VOLUME 2 - APPENDICES

FINAL

ENVIRONMENTAL IMPACT STATEMENT

MOAPA SOLAR ENERGY CENTER

BUREAU OF INDIAN AFFAIRS
BUREAU OF LAND MANAGEMENT
ENVIRONMENTAL PROTECTION AGENCY
NATIONAL PARK SERVICE

On Behalf of:

THE MOAPA BAND OF PAIUTE INDIANS

FEBRUARY 2014

Volume 2 - Appendices

FINAL

ENVIRONMENTAL IMPACT STATEMENT

(FEIS)

MOAPA SOLAR ENERGY CENTER

On Behalf of:

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ENVIRONMENTAL PROTECTION AGENCY
NATIONAL PARK SERVICE

February 2014

APPENDICES

TABLE OF CONTENTS

Appendix A

Scoping Report

Moapa Solar Energy Center

Environmental Impact Statement

SCOPING REPORT

Prepared for:

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Western Regional Office
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Phoenix, AZ 85004

and

Bureau of Indian Affairs
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TABLE OF CONTENTS

APPENDICES

1.0 INTRODUCTION

The Bureau of Indian Affairs (BIA) is the lead Federal agency responsible for the National Environmental Policy Act (NEPA) process for the proposed Moapa Solar Energy Center (Project). The BIA, in cooperation with the Moapa Band of Paiute Indians (Tribe), the Bureau of Land Management (BLM), the U.S. Environmental Protection Agency (EPA), the National Park Service (NPS) and the U.S. Fish and Wildlife Service (USFWS), as cooperating agencies, intends to prepare an environmental impact statement (EIS) for the proposed Moapa Solar Energy Center on the Moapa River Indian Reservation (Reservation) in Clark County, Nevada. The purpose of this report is to summarize issue areas raised by individuals, organizations and agencies during the scoping comment period for this project.

This report summarizes all comments received during the scoping period. The BIA will fully analyze the issues raised by these scoping comments and help shape the environmental analysis and alternatives to be considered in the draft EIS. The NEPA scoping process is designed to encourage involvement by all interested parties and to help agencies make better-informed decisions.

This report also describes methods used for soliciting input, as well as how comments received were categorized by resource topic. A copy of each individual comment received is contained in Appendix E of this report.

PROJECT DESCRIPTION

The Project would be located in Mount Diablo Meridian, Township 16 South, Range 64 East, Sections 30 and 31, Clark County, Nevada. For the purposes of this EIS, the "Analysis Area" will include an approximately 1,000-acre solar site and water pipeline entirely located on the Reservation. Corridors for the transmission interconnection and access road would be located on Federal lands managed by the BLM.

The Project may include two solar technologies. One would be a photovoltaic (PV) solar project capable of producing up to 100 megawatts (MW) of power. The PV project would include up to 175,000 PV panels on single-axis tracking systems, inverters, and an operation and maintenance building. Construction of the PV solar component is expected to take up to 12 months and is projected to have a life of 25 years.

The second solar technology would be a concentrating solar power (CSP) project utilizing either eSolar's CSP plant technology or AREVA Solar's CSP technology. The eSolar technology consists of multiple 250-foot tall tower/receiver combinations situated between fields of heliostat mirrors. The focused solar heat boils water within the thermal receiver and produces steam that is aggregated and sent to a steam turbine to generate electricity. AREVA Solar's Compact Linear Fresnel Reflector uses modular flat reflectors to focus the sun's heat onto elevated receivers which consist of a system of tubes through which water flows. The concentrated sunlight boils the water in the tubes (at an approximate height of 80 feet) generating high-pressure superheated steam for direct use in power generation without the need for heat exchangers.

The water supply required for the CSP project would be supplied by water leased from the Tribe and delivered to the site via a water pipeline from one of the Tribe's production wells. The pipeline will be located entirely on the reservation and will follow existing rights-of-way. Other major parts of the CSP project would include an operation and maintenance facility building along with cooling towers and evaporation ponds. The CSP project is expected to take 24 months to construct and expected to operate for approximately 25 to 30 years.

An overhead 230 kilovolt (kV) transmission line would connect the solar energy center to the nearby Harry Allen 230 kV Substation approximately six miles from the site. An additional 500 kV interconnection line could be constructed and connected to the Crystal Substation located approximately one mile east of project boundary.

An access road would be constructed to the Project site to provide access from the frontage road along the west side of Interstate-15 (I-15). This road would be approximately 2.5 miles long and follows existing roads for much of its length.

2.0 SCOPING PROCESS AND SOLICITATION OF COMMENTS

During the scoping period, the BIA informed the public, landowners, Government agencies, tribes and interested stakeholders about the proposed Moapa Solar Energy Center and solicited their comments.

The BIA announced the project and scoping process through various means, held public scoping meetings, and invited the public to comment and ask questions. The project and public scoping meetings were publicized in the *Federal Register*, on the project website: http://www.moapasolarenergycentereis.com/, in letters mailed to interested stakeholders, and through public notices/news releases published in local newspapers. These outreach and notification activities are described in more detail in the following subsections.

FEDERAL REGISTER

The public scoping period officially began with the publication of the Notice of Intent (NOI) to prepare an EIS which described the project, announced the public scoping meetings, and outlined the ways to provide comments for the Moapa Solar Energy Center. The NOI was published in the *Federal Register* on August 6, 2012. The NOI can be found in Appendix A.

PROJECT WEBSITE

A project website was established for access by anyone at any time during the EIS process. It provides project information and an opportunity to submit comments. The website will remain active for the duration of the EIS process and can be accessed at http://www.moapasolarenergycentereis.com/.

SCOPING NOTIFICATION LETTER

Scoping notification letters were sent by the BIA to Government agencies, elected officials, property owners near the proposed project, various non-Governmental organizations and other interested stakeholders. The scoping letter briefly explained the project, identified the Federal review process, announced the public scoping meetings, and described the various ways to provide comments. Included with the scoping notification letter were project area and project location maps. Over 75 scoping letters were mailed on August 7, 2012. The scoping letter with attached maps and the project mailing list can be found in Appendix B.

NEWSPAPER ADVERTISEMENTS

A public notice/news release was published in three local newspapers on August 8, 2012. The publications included:

- Las Vegas Review Journal
- Las Vegas Sun
- Moapa Valley Progress

Copies of the published public notice/news release can be viewed in Appendix B.

METHODS FOR SUBMITTING COMMENTS

- The BIA encouraged interested parties to submit comments through a variety of methods:
    - Individual letters could be hand delivered or mailed via the U.S. Postal Service to Mr. Paul Schlafly, Natural Resource Specialist, BIA, Southern Paiute Agency, 180 North 200 East Suite 111, P.O. Box 720, St George, Utah, 84770; or to Ms. Amy Heuslein, Regional Environmental Protection Officer, BIA Western Regional Office, 2600 North Central Avenue, 4th Floor Mailroom, Phoenix, AZ 85004.
    - Comments could be submitted via "submit comment" tab on the project website at http://www.moapasolarenergycentereis.com/
    - Comments could be provided via email or phone to either Mr. Paul Schlafly, at paul.schlafly@bia.gov; telephone: (435) 674-9720 or Ms. Amy Heuslein, at amy.heuslein@bia.gov; telephone: (602) 379-6750
    - Comments could be provided at the public meetings either orally or by filling out a comment form provided at the meetings (that could be handed in at the meeting or mailed in at a later date). A copy of the comment form is provided in Appendix C. See below for the details of the scoping meetings.

3.0 PUBLIC SCOPING MEETINGS

The BIA hosted public information and scoping meetings in Moapa Town on the reservation and in Las Vegas at the BLM office to provide NEPA process and proposed project information and gather public comments. The two public scoping meetings were held at the times and locations listed below.

Meeting Date and Time	City/State/Zip Code	Address	Attendance
August 21, 2012 5:30PM to 7:30PM	Moapa Town, NV 89025-	Moapa River Indian Reservation Tribal Hall, One Lincoln Street	40
August 22, 2012 5:30PM to 7:30PM	Las Vegas, NV 89130	BLM Conference Room, Southern Nevada District Office, 4701 North Torrey Pines Drive	29
TOTAL ATTENDANCE			69

The public scoping meetings were a combination of open house and formal presentation. Attendees were greeted at the entrance and asked to sign in. Handouts were available for the public and posters were on display that described the project and NEPA process. Attendees were able to ask questions to the agency and project representatives while viewing posters.

HAND-OUTS

The following handouts were available at the public meetings:

- 8 1/2” by 11” color project area map
- Public scoping letter
- Comment form

The handouts available at meetings can be found in Appendix C.

PRESENTATION

Following an open house of approximately 30 minutes, a formal presentation was provided. Both scoping meetings followed the same agenda, with the exception of an opening prayer that was conducted at the Moapa River Indian Reservation by Mr. Leroy Spotted Eagle and introductory remarks at the BLM office in Las Vegas by Ms. Brenda Wilhight, BLM Realty Specialist. The program opened with Chairman Mr. William Anderson of the Moapa Band of Paiute Indians providing a brief history of the Reservation, what he envisions will be the future of his people and the importance of the Proposed Action to the community of Paiute Indians. Ms. Kellie Youngbear, BIA Superintendant for the Southern Paiute Agency, introduced herself and her agency staff. Following Ms. Youngbear, Ms. Amy Heuslein, BIA Regional Environmental Protection Officer, introduced BIA and BLM staff and explained the various ways to provide comments.

Ms. Heuslein gave a presentation explaining the purpose and need of the EIS, EIS schedule and the NEPA process.

Mr. Randy Schroeder of the EIS consultant team then presented the Proposed Action with an overview of the technical aspects and the environmental issues already identified to be addressed in the Draft EIS. Following the presentation, the attendees were invited to provide verbal comments or ask questions about the Proposed Action. A court reporter was present at the Moapa meeting and detailed notes were taken at the Las Vegas meeting to record the public comments expressed. The scoping meeting presentation, transcripts and public meeting summaries are provided in Appendix C

INFORMATION STATIONS

Both public meetings included the following posters/ stations:

- How to Participate
- Proposed Action
- NEPA Process/Schedule
- Involved Agencies
- Overall Project Description
- Areva Solar CSP Technology
- eSolar CSP Technology
- Photovoltaic Technology
- Associated Project Facilities
- PV Solar Project Conceptual Site Layout
- CSP and PV Solar Project Conceptual Site Layout

Display boards presented at these stations are included in Appendix E.

4.0 COMMENT EVALUATION

COMMENTS RECEIVED

The scoping period began on August 6, 2012, the date the NOI was published in the *Federal Register*. In addition to comments received at the two scoping meetings there were 12 comment letters/forms received through a variety of means (see "Methods for Submitting Comments" for more details). All comments were reviewed and categorized. Copies of all comments and their categorization are contained in Appendix E.

PROCESSING COMMENTS

Each comment letter was read to identify key issues and code them. Commenter contact information and coded comments were recorded. In some cases, a single comment document contained multiple comments that were identified using a coding system that corresponded to resource/issue categories. Appendix D contains the coding categories used.

SUMMARIZATION

This report summarizes issue areas identified from the scoping comments received. For the purposes of this summary, all comments were given equal weight, regardless of whether they were mentioned once or mentioned several times. This report does not prioritize issue areas or track the number of comments each issue category received. The identified issues and areas of concern will be used to guide the environmental analysis for the EIS.

5.0 COMMENT RESULTS PER RESOURCE TOPIC

The following sections organize the comments received by resource and issue categories. Each coded individual comment letter/form showing the individual comments is shown in Appendix E.

PURPOSE AND NEED

- Project should not move forward unless a better substantiation of purpose of need is provided.
- Given that the power from the nearby K Road Moapa facility has yet to be purchased, the public statements from Nevada Energy that they are not interested in purchasing any more renewable energy at this time, and statements from California that they only want to purchase from in state resources, the entire purpose and need for this project is in doubt.
- When is the PPA going to be in place? The project sounds speculative.

ALTERNATIVES

- Consider assessing a hybrid-wet/dry cooling and dry-cooling alternatives when deciding on technology.
- Include the exact number of CSP towers proposed to be built.
- Include a cost/benefit analysis in the alternatives evaluation.
- Explain why two alternatives are being considered and analyzed, but only one transmission line will be built.
- Alternatives to dredge or fill materials discharged into the waters of the U.S. should be discussed.
- Since impacts on biological resources vary between the different solar energy technologies, recommend determining the technology prior to the ROD to avoid impacts to biological resources.
- A range of meaningful alternatives should be explored.
- Consider alternatives to avoid desert tortoise habitat.

CLIMATE

- Address additive impacts from climate change on resources affected by the project, including impacts that the project will have on desert tortoise habitat and habitat linkages, carbon sequestration from the loss of desert vegetation and soil disruption.

- Identify in the planning documents measures to avoid significant adverse impacts that will change the landscape and negatively add to climate change.

- Document the significant benefits from reduced greenhouse gas emissions from the proposed project as it compares to energy production associated with fossil fuels.

WATER RESOURCES

- How much groundwater is required for PV and CSP?

- Where would the water be drawn from – the river or a well?

- Minimize water use over project life.

- Avoid placement of heliostats in desert washes.

- Commit to use natural washes for flood control.

- Concern regarding impacts of groundwater usage.

- Consider benefits of PV technology with regard to water conservation.

- Effects of evaporation ponds associated with CSP need to be evaluated.

- Identify quantity of water required during construction and operation process, describe source of water, effects on other users, impacts to groundwater recharge, and other water bodies and biological resources.

- Discuss potential for subsidence.

- The potential for water recycling and use of xeric plants for landscaping should be addressed.

- Discuss climate change effects on water quantity.

- Address effect of project discharges on water quality.

- Water sustainability must be one of the guiding principles for siting solar energy development.

- Solar energy development should not contribute to exceeding the sustainable yield of the surface or groundwater source to avoid injury to special status species and their habitat.

- The Moapa Solar Energy Center project may be subject to Nevada Division of Environmental Protection, Bureau of Water Pollution Control (BWPC) permitting associated with any of its discharges – including, but not limited to well development, wastewater, DeMinimis, Underground Injection Control (UIC), and domestic sewage discharges.

- Other entities who may have interest in the water in the area [USFWS, Southern Nevada Water Authority (SNWA), Muddy Valley Irrigation Company (MVIC)] that could have an issue down the road regarding the amount of water that is needed for the project.

- A stringent water usage plan and water monitoring plan should be incorporated in the planning documents to take into account future projects that maybe be proposed for the area and have additional water usage requirements.

AIR QUALITY

- Provide a detailed discussion of ambient air conditions (baseline or existing conditions), National Ambient Air Quality Standards (NAAQS) and nonattainment areas, and potential air quality impacts of the project, including cumulative and indirect impacts for each fully evaluated alternative.

- Mitigation measures should include multiple techniques to combat potential fugitive dust situations that may occur during both project construction and operation.

- Emissions should be estimated for the construction phase, as well as for the operational phase from maintenance activities and ancillary operations. Construction-related mitigation measures should be discussed.

BIOLOGICAL RESOURCES

- Desert Tortoise
    - Avoid and minimize unavoidable impacts to desert tortoise habitat.
    - Any proposed translocation of desert tortoise must be accompanied by specific monitoring or research to study the success of these efforts.
    - Will the desert tortoise need to be relocated or allowed to stay in the area?
    - Authorization by the State of Nevada is required in addition to any Federal authorizations for relocation/removal of desert tortoises.
    - It is increasingly difficult to find intact, high quality desert tortoise habitat in private ownership that could be purchased and conserved to provide some mitigation for the loss of other occupied desert tortoise habitat in the Northeastern Mojave Recovery Unit such as the lands proposed for this solar plant.
    - Address whether as part of the preparation of the site for solar energy development, mass grading and leveling would be required, that would destroy tortoise habitat and render it unsuitable in perpetuity. Concerned that even if mass grading were not done, the habitat would be significantly degraded.

- Concern that the proposed project may increase new sites for perches and nests for the common raven (Corvus cora), a known predator of juvenile desert tortoises.

- Recommend non-lattice structures be considered for power lines because they afford less perching, roosting and nesting locations for ravens.

- Address potential impacts to Mojave desert tortoise (Gopherus agassizii) and Moapa dace (Moapa coriacea), and their habitats.

- Concern that the Moapa dace may be impacted by groundwater withdrawal required for the project.
- The USFWS's Biological Opinion should be included as an appendix to the EIS.
- Analysis of impacts and mitigation on listed species should include:
    - Baseline conditions of habitats and populations of the covered species.
    - Clear description of how avoidance, mitigation, and conservation measures will protect and encourage the recovery of the covered species and their habitats in the project area.
    - Monitoring, reporting and adaptive management efforts to ensure species and habitat conservation effectiveness.
- Include maps and description of all waters of U.S. potentially affected by the alternatives.
- Demonstrate the alternatives' compliance with the Clean Water Act 404(b)(1) guidelines.
- Recommend analysis of possible project impacts to federally listed species, state-protected species and migratory birds.
- Discuss potential impacts of construction, installation, and maintenance activities on habitat and species.
- Discuss the impacts associated with an increase of shade in the desert environment on vegetation and species, and impacts associated with constructing fences around the project site.
- Recommend multi-year avian surveys.
- Practices that preserve vegetation and habitat, minimize weed invasion, and prevent erosion should be incorporated into the project.
- Describe how the project will meet the requirements of Executive Order 13112 and include an invasive plant management plan for the monitoring and control of noxious weeds.
- Include mitigation measures for desert tortoise and other wildlife considered avian prey.
- Consider innovative construction techniques that leave vegetation and wildlife habitat in place under photovoltaic panels and heliostats to reduce construction and maintenance costs by minimizing water erosion, reducing airborne dust, preventing weed invasion, and hastening reclamation.
- Gila monster is known to occur within the geographic area, thus recommend evaluation of project impacts to any existing populations and suitable habitat for this species.

- Concern that project-related activities could facilitate the incursion and/or spread of non-native, invasive plants. The spread of invasive species is known to alter fire ecology of the Mojave Desert and increase wildfire frequency.
- Develop a vegetation plan describing how sensitive or state listed plants will be avoided, salvaged, and made available for restoration or compensated for.
- Avoidance of sensitive and state-listed plants should be taken into account when developing the project footprint and the layout of solar infrastructure should be sited and arranged to avoid impacting such plants.
- Plant surveys should be conducted for state protected cacti and yuccas, stick ringstem, Beaverdam breadroot, three-corner milkvetch, Las Vegas buckwheat, sticky buckwheat, rosy two-toned penstemon and white bearpoppy during spring flowering periods and any found plant locations geospatially mapped. At least two years of plant surveys should be conducted to confirm the absence of the species and if found to be present, protective measures should be established to avoid, minimize and mitigate impacts.
- Land clearing or other surface disturbance associated with the proposed project should be conducted outside the avian breeding and nesting season which occurs approximately between March 1 and July 31. If this is not feasible, it is recommended that a qualified biologist survey the area prior to land clearing.
- If burrowing owls are determined through surveys to occur within the project, the project should be designed to avoid disturbing burrows that are used by owls.
- Concerns about the potential impacts to raptors, including eagles and other migratory birds, from loss of foraging habitat, transmission line strikes and power towers. It is recommended that pre-project surveys be conducted for raptors, including eagles, and other migratory birds, and to develop a Bird and Bat Conservation Strategy and an Eagle Conservation Plan.
- Holes, gaps or hollow spaces in the proposed facilities or structures should be closed during construction to prevent bird entry.
- When the Biological Assessment (BA) is prepared and BIA requests consultation, the project design or proposed action should be near final with a preferred alternative that includes a single footprint, proposed methods, and technologies.

SOCIOECONOMICS

- When will any project-related jobs be available?
- Tribal Employment Rights requires availability of jobs for Native Americans.

- How are independent contractors on Indian land selected to ensure construction/inspection is done correctly and Indian investments are protected?
- Ensure the project leads to training and employment opportunities including the creation of long-term jobs in the electricity and natural resources sectors for the Moapa Band of Paiute Indians.
- Care should be taken to protect other users of common corridors.

LAND/RESOURCE USE

- Will the new transmission lines be located in existing transmission corridors?
- As utility corridor crossings are determined as part of the proposed project, enough space should be identified to allow utility corridor crossings be as near to right angles as possible to separate transmission lines so interference is minimized and the possibility of construction damage is minimized.
- Military Use
    - The proposed project is under the primary route used by military aircraft to enter and exit the Nevada Test and Training Range (NTTR) from Nellis Air Force Base (NAFB). The NTTR is a pristine military testing and training laboratory built on over 70 years of scientific research supporting military intelligence, arms, and radar advancement through the investment of an incalculable sum of Federal funding. The training and testing environment provided by the NTTR cannot be replicated. NAFB currently conducts approximately 50,000 over-flights per year in this area, which will increase to an estimated 63,000 flights following the bed-down of F-35 Joint Strike Fighter aircraft on NAFB.
    - The area is located within the navigational aid flight path for approaching aircraft and is north of the controlled bailout area.
    - Potential damage to the array may occur depending on the altitude and direction of the aircraft during an emergency ejection.
    - Obstacles in this area are highly incompatible with flight operations, and may present severe safety concerns.
    - Thermal boundaries: Certain solar technologies release or emit extreme heat near and/or above their development. The extreme heat may create a thermal boundary that requires aircraft to avoid the area in order to prevent aircraft buffeting, damage, or accidents. Further, heat-sensitive armament may create a severe safety hazard for aircrew and ground-based personnel in the area.

- o Glint/Glare: Depending on technology design features utilized, reflective glint and glare may create a severe safety hazard to pilots and aircraft, (including major force exercises such as RED FLAG and Weapons School Mission Employment Phase).
- o Cameras/security: Many solar technologies require the use of cameras for the targeting of mirrors on solar collectors. The use of high definition camera equipment in the region may present a security concern for joint and allied aircraft test and training operations.
- o Wireless systems: Electronic jamming on the NTTR is conducted on a regular basis. It is unknown how military operations could impact wirelessly controlled mirrors, or how disturbing the mirror alignment could create a glare hazard to flight crews or navigation.
- o Current Air Force regulations require pilots to avoid structures by 500 feet, so any technology rising above ground level (including PV arrays and solar towers) will place new and/or further restrictions on military operations in the area. Transmission lines (individually or through a cumulative effect) may create restrictions that adversely impact military testing and training capabilities depending on the location and/or quantity.

CULTURAL RESOURCES

- The project location is about five miles west of the Congressionally-designated alignment of the Old Spanish National Historic Trail (NHT), co-administered by the NPS and BLM.
- Traditional Cultural Properties

VISUAL RESOURCES

- How tall are the towers for both the PV and CSP?
- How tall are the transmission line poles?
- Will the transmission lines be located in existing transmission corridors?
- The construction of power towers in the vicinity of the Old Spanish Trail NHT is a concern for the NPS, and a photovoltaic only project is preferred. Where CSP technology is used, smaller towers with a height limit of 80 feet tall would be preferable. The use of photovoltaic technology or smaller power towers would minimize adverse impacts to the visual resources of the Old Spanish Trail NHT.
- NPS suggests the use of color palliatives to camouflage the scarring that may occur when cutting in new roads as a project design feature.

HEALTH AND SAFETY

- Address potential direct, indirect, and cumulative impacts of waste generation, including hazardous waste, from project construction and operation.
- How tall are the towers for both the PV and CSP? How tall are the transmission line poles? The military will need latitude/longitude and Mean Sea Level/Above Ground Level (MSL/AGL) heights.
- Transmission lines (individually or cumulatively) may create restrictions that adversely impact military testing and training capabilities depending on the location and/or quantity.
- Alternative methods that minimize hazardous materials use should be evaluated.
- Multiple issues regarding potential hazards to air navigation were raised by the Air Force (summarized under land use heading above).
- Concern over the mitigation of potential electrical current negatively affecting pipelines causing corrosion issues.

CUMULATIVE

- What will be the cumulative effects of the groundwater usage?
- The Moapa Solar Energy Center and BLM Solar Energy Zone (SEZ) proposals would both affect the desert tortoise and other desert plant and wildlife species, and are in the same overextended carbonate ground water flow system, thereby potentially impacting the rare and imperiled species, including the Moapa dace and other rare desert fish and spring snails found in the Muddy River drainage.
- Describe the methodology used to assess cumulative impacts; the methodology developed jointly by EPA, the Federal Highway Administration, and the California Department of Transportation is recommended.
- Address cumulative impacts to water resources and the desert tortoise.
- Cumulative impacts should consider other projects proposed by BLM in the desert southwest.
- There is concern over the magnitude and severity of impacts from large-scale, disparate projects in this area which may have significant and unintended consequences on biological resources. In particular, potential widespread loss, degradation, or fragmentation of habitats due to direct, indirect, or cumulative effects of numerous large-scale renewable energy projects likely places listed species at a lower probability of recovery and increased risk of extirpations or extinction.
- Need to consider the cumulative impacts the Moapa Solar project will have, as well as K Road and other existing projects in the area.

- Where is the location of the K Road Solar project in relation to the Moapa Solar Energy Center project?

OTHER

- In 2011, The Nevada State Legislature passed AB307 resulting in NRS 701.600 through 701.640 and creating the Energy Planning and Conservation Fund, and the Fund for Recovery of Costs.
- Disclose the chosen solar technology in the Draft EIS.
- What is the advantage of one technology versus the other – PV or CSP?
- How much power is required to pump the water needed for the solar panels?
- How much power will be generated and is it a certainty?
- Consider procuring PV components from a company that minimizes environmental impacts during production.
- Are there plans for supplemental power during the night?
- Where will the power go to….Nevada or California?

6.0 ISSUE SUMMARY

This section provides a summary of the key issues identified by the comments provided during scoping for the Moapa Solar Energy Center Project. These issues will be the focus of the EIS analysis.

PURPOSE AND NEED

The Purpose and Need for the project needs to be well substantiated including the need to provide economic opportunity for the Tribe as well as meeting the renewable energy goals of the country and region.

ALTERNATIVES

A range of meaningful alternatives need to be developed including a dry-cooling and hybrid wet/dry cooling technology alternatives for the CSP technology with a corresponding cost/benefit analysis.

SENSITIVE WILDLIFE AND HABITATS

Habitat loss or degradation and other impacts to sensitive species must be evaluated. The desert tortoise is the primary species of interest and the potential effect of groundwater withdrawal on the Moapa dace was also identified. Other species of interest are the gila monster, Burrowing Owls, Raptors including Eagles and other migratory birds.

VEGETATION

The evaluation of vegetation impacts must include the potential effects on sensitive or protected plant species as well as the potential for the project to facilitate the introduction or spread of weeds.

WATER RESOURCE

Potential hydrology impacts of groundwater usage particularly associated with the proposed CSP solar technology must be evaluated. Project variations or mitigations that would minimize water use over the project life need to be considered. Potential effects on water quantity must also be included.

CLIMATE CHANGE

The potential impacts of the project on climate change must be evaluated.

AIR QUALITY

An analysis of air quality impacts including estimates of emissions for both the construction and operational phases needs to be conducted for each alternative.

SOCIOECONOMICS

The potential socioeconomic effects of the project particularly on tribal members need to be evaluated. This must include a description of the training and employment available to the Moapa Band of Paiute Indians that would be provided by the project.

LAND/RESOURCE USE

The potential impact of the project on the execution of military training activities conducted by Nellis Air Force Base in the area must be addressed. In addition, the location and land ownership of new transmission lines, water lines and access roads must be clarified.

VISUAL RESOURCES

The visibility of the project from the Old Spanish National Historic Trail must be assessed to determine the potential impact to the trail.

CUMULATIVE IMPACTS

The cumulative effect of the proposed project when combined with other projects in the area, need to be evaluated including specific attention to potential impacts to groundwater and sensitive biological resources. Waste and hazardous waste generation and management for the project must be clarified.

7.0 NEXT STEPS

The BIA will develop the draft EIS focusing on the identified issues, evaluating a range of reasonable alternatives, assessing potential impacts, and identifying possible mitigation measures.

Once complete, the BIA will publicly circulate the draft EIS and host a public comment period. During this period, the BIA will notify the public and hold public meetings. Public comments on the draft EIS will be responded to in the final EIS.

The BIA is committed to involving the public in the NEPA process. The BIA anticipates providing periodic status updates and publishing all project documents on the project website:

http://www.moapasolarenergycentereis.com/

APPENDIX D –CODING CATEGORIES DESCRIPTION

CODE	CATEGORIES
PN	Purpose and Need
ALT	Alternatives
CLI	Climate
WAT	Water Resources
AQ	Air Quality
CUL	Cultural Resources
BIO	Biology Resources
SOC	Socioeconomics
AQ	Air Quality
LAN	Land/Resource Use
HEA	Health and Safety
CUM	Cumulative
OTH	Other

APPENDIX E – SCOPING COMMENTS RECEIVED

This Appendix contains all scoping comments received. Each comment is identified by a document number and comments have been coded according to the coding list contained in Appendix D.

Comment Reference Document 1

CENTER for BIOLOGICAL DIVERSITY

Because life is good.

Bureau of Indian Affairs
Western Regional Office, Branch of Environmental Quality
Attn: Ms. Amy Heuslein
2600 North Central Avenue, 4th Floor
Phoenix, AZ 85004-3008

September 5, 2012

Sent via e-mail: amy.heuslein@bia.gov

RE: Scoping comments- Moapa Solar Energy Center Project

Dear Ms. Heuslein:

On behalf of the Center for Biological Diversity ("Center"), please accept this set of scoping comments regarding the Notice of Intent to prepare an Environmental Impact Statement ("EIS") for the Moapa Solar Energy Center Project ("MSEC").

The Center is a non-profit, public interest environmental organization dedicated to the protection of native species and their habitats through science, policy, and environmental law. The Center has over 375,000 members and on-line activists throughout Nevada and the United States.

We submit these comments on behalf of our members, activists, staff, and members of the general public who are interested in protecting native species and their habitats in Nevada and particularly those lands that would be impacted by the proposed action.

The development of renewable energy is a critical component of efforts to reduce carbon pollution and climate-warming gases, avoid the worst consequences of global warming, and to assist in meeting needed emission reductions. The Center strongly supports the development of renewable energy production, and the generation of electricity from solar power, in particular. However, like any project, proposed solar power projects should be thoughtfully planned to minimize impacts to the environment. In particular, renewable energy projects should avoid impacts to sensitive species and habitat, and should be sited in proximity to the areas of electricity end-use in order to reduce the need for extensive new transmission corridors and the efficiency loss associated with extended energy transmission. Only by maintaining the highest environmental standards with regard to local impacts, and effects on species and habitat, can renewable energy production be truly sustainable.

We are grateful for this opportunity to submit scoping comments to you for your consideration in preparing the draft environmental impact statement for this project. We present the following initial comments addressing those issues and concerns for your consideration:

1-PN 1

1-PN 2

1. Uncertain and Speculative Nature of the Project.
The Center is highly concerned about the approach to the environmental analysis being undertaken. At the scoping meeting held in Las Vegas on August 22, the proponent and then the BIA stated that the technology to be used may not be determined until the time of the Record of Decision. This poses great difficulties in ascertaining the scope and nature of the environmental impacts and even in our identifying our concerns with any specificity. It seems to us that this is a "fishing expedition" on the part of the proponent and highly speculative by its very nature. Given that the power from the nearby K Road Moapa facility has yet to been purchased, the public statements from Nevada Energy that they are not interested in purchasing any more renewable energy at this time, and statements from California that they only want to purchase from in-state resources, the entire purpose and need for this project is in doubt.

It is our view that the NEPA for this project should not advance until the proponent can better substantiate the stated purpose and need, and should it move forward, the draft EIS must disclose the chosen technology should this project move forward.

1-BIO 1

1-ALT 1

1-BIO 2

2. Impacts on desert tortoise. The desert tortoise is protected as Threatened under the Endangered Species Act. The desert tortoise is continuing to decline throughout its range despite being under federal and state Endangered Species Acts protection as threatened.[1] The project area lies in the Northeastern Mojave Recovery Unit for the desert tortoise, within potential occupied habitat, and outside of areas designated as critical habitat.[2] Typically, as part of the preparation of the site for solar energy development, mass grading and leveling would be required, that would destroy tortoise habitat and render it unsuitable in perpetuity. Even if mass grading were not done, the habitat would be significantly degraded.

NEPA requires that a range of meaningful alternatives be explored in the environmental review process. 42 U.S.C. §§ 4332(C)(iii),(E). The agency must "study, develop, and describe appropriate alternatives to recommend courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources." 42 U.S.C. § 4332(2)(E); *see also* 40 C.F.R. § 1502.14 (requires the EIS to examine all reasonable alternatives to the proposal).

The EIS must address the impacts of this project and other linked projects to the survival and recovery of desert tortoise in this recovery unit and take seriously the development of meaningful alternatives to this project that will avoid impacts to the species and its habitat. As the BIA is aware, it is increasingly difficult to find intact, high quality desert

[1] U.S. Fish & Wildlife Service. 2008. Draft range-wide monitoring of the Mojave population of the desert tortoise: 2007 annual report. Report by the Desert Tortoise Recovery Office, U.S. Fish and Wildlife Service, Reno, Nevada. Pgs. 50. Available at: http://www.fws.gov/Nevada/desert_tortoise/documents/reports/2007_Rangewide_Desert_Tortoise_Population_Monitoring_DRAFT.pdf

[2] U.S. Fish and Wildlife Service. 1994. Recovery plan for the Mojave population of the desert tortoise (*Gopherus agassizii*) at 21. U.S. Fish and Wildlife Service. http://www.fws.goc/endangered/recovery/index.html#plans .

1-BIO 2

tortoise habitat in private ownership that could be purchased and conserved to provide some mitigation for the loss of other occupied desert tortoise habitat in the Northeastern Mojave Recovery Unit such as the lands proposed for this solar plant. Therefore, avoiding impacts to this essential habitat and maintaining the largest possible areas of intact, high quality habitat is absolutely critical for recovery of the species.

The DEIS must clearly address actions for avoiding, minimizing and mitigating impacts to the desert tortoise and its habitat. The BIA must first look to ways to avoid impacts to desert tortoise, for example, by identifying and analyzing alternative sites outside of tortoise occupied habitat, areas that have already been severely disturbed by prior land use, or by employing the alternative solar energy strategy of distributed power. The BIA must also look at ways to minimize any impacts that it finds to be unavoidable, for example by requiring designs that minimize ground disturbances, limiting access roads, and provide for functional tortoise access across the site. Mitigation measures might include the acquisition of lands that would be perpetually managed for conservation, or the funding of conservation management measures on federal lands or for tortoise research.

1-BIO 3

The Scientific Advisory Committee (SAC) of the U.S. Fish and Wildlife Service's Desert Tortoise Recovery Office has recently concluded that "translocation is fraught with long-term uncertainties, notwithstanding recent research showing short-term successes, and should not be considered lightly as a management option. When considered, translocation should be part of a strategic population augmentation program, targeted toward depleted populations in areas containing "good" habitat. The SAC recognizes that quantitative measures of habitat quality relative to desert tortoise demographics or population status currently do not exist, and a specific measure of "depleted" (e.g., ratio of dead to live tortoises in surveys of the potential translocation area) was not identified. Augmentations may also be useful to increase less depleted populations if the goal is to obtain a better demographic structure for long-term population persistence. Therefore, any translocations must be accompanied by specific monitoring or research to study the effectiveness or success of the translocation relative to changes in land use, management, or environmental condition." Translocation should be used as a tool to augment populations within depleted recovery units, not as a mitigation strategy to allow for development in desert tortoise habitat.[3]

Obviously, since this project has a federal nexus, consultation under the Endangered Species Act would be required. Such consultations must consider climate change impacts, including the need for maintaining habitat linkages between current and future desert tortoise habitat – see discussion below. The EIS must thoroughly disclose and analyze the impacts on the desert tortoise and its recovery and consider meaningful alternatives that would avoid significant impacts to the tortoise and other resources.

[3] U.S. Fish & Wildlife Service. 2009. Scientific Advisory Committee, Desert Tortoise Recovery Office. Meeting Summary, March 13, 2009, San Diego Wild Animal Park, Escondido, CA. pgs 4. Available at: http://www.fws.gov/Nevada/desert_tortoise/documents/sac/20090313_SAC_meeting_summary.pdf .

3. Climate change and landscape linkages. In light of unprecedented climate change, animal and plant species will attempt to adapt by expanding their ranges north and upslope to cooler conditions mimicking their current habitats, and abandoning their present no longer hospitable ranges. At a 2008 Desert Manager Group symposium entitled, "Climate and Deserts Workshop", Wayne Spencer of the Conservation Biology Institute gave a compelling lecture on this likely scenario in which he called for the maintenance of broad ecological connectivity and the minimization of movement barriers to conserve species and ecological processes in the face climate change.[4] Such connectivity is not only important for the physical movement of species but perhaps more so for the conservation of genetic diversity and the prevention of genetic bottlenecks.

   At the same workshop, Kirsten Ironside presented on predicting climate change impacts. She presented historic data and modeling that suggests that species found abundantly in California and southern Nevada, such as Joshua tree, will be rare or eliminated from their current ranges and given the means will be extending northward into Nevada and Utah.[5]

   The US Fish and Wildlife Service ("FWS") has indicated that the revised Dry Lake SEZ was situated in an area that provides habitat and genetic connectivity between areas with greater habitat suitability, particularly between the Mormon Mesa Critical Habitat Unit west of the SEZ and portions of greater habitat suitability north and east of the SEZ. The FWS identified the entire revised SEZ as priority connectivity habitat for the desert tortoise through a least-cost pathway model (Ashe 2012) based upon the USGS model for desert tortoise predicted suitable habitat (Nussear et al. 2009).[6]

   Given the MSEC adjacency to the Dry lake SEZ discussed above, it is highly likely that the project site could impose a significant barrier to future movement and gene flow between populations within the Northeastern Mojave Recovery Area, as well as with populations in other recovery areas. The EIS must disclose and analyze the projects' impacts to movement corridors and habitat connectivity taking into account the heightened importance of such corridors in light of climate change.

4. Cumulative and connected actions
   NEPA's implementing regulations state that agencies should consider similar, reasonably foreseeable actions together in the same environmental review document when the actions "have similarities that provide a basis for evaluating their environmental consequences together, such as common timing or geography," and the "best way to assess adequately [their] combined impacts […] or reasonable alternatives" is to consider them together. 40 C.F.R. 1508.25(a)(C). It is important for federal agencies to consider connected actions together in a single NEPA process as opposed to segmenting review. *Daly v. Volpe*, 514 F.2d 1106, 1110 (9th Cir. 1975) (where actions are interconnected in

[4] Managing Landscape Linkages to Conserve Desert Wildlife During Climate Change, by Wayne Spencer at: http://www.dmg.gov/climate/agenda.html .
[5] Modeling Approaches for Predicting Climate Change Impacts on Natural Systems; From Inputs to Algorithms to Outputs and What They Can Tell Us, by Kirsten E. Ironside at: http://www.dmg.gov/climate/agenda.html .
[6] Ibid, page 11.3-41.

terms of fulfilling a joint purpose it may be necessary to conduct a single NEPA review). Here, the BIA should coordinate this NEPA process with the approval process for all of the connected actions including the transmission and water lines and substations that are proposed to serve this site. This would allow all of the projects' significant impacts to be fully considered together.

In particular, the BIA should consider together the additive impacts to biological resources, including the desert tortoise and its habitat, from the proposed solar project and from the other proposed projects in the area to ensure that the true extent of impacts are fully disclosed and analyzed. BIA should not treat this critical analysis as a cumulative impacts question alone. Because the currently proposed projects are linked and interdependent they should be evaluated together under NEPA. Most importantly, this project will have direct impacts on desert tortoise populations in the Northeastern Mojave Recovery Unit; around 2000 acres of tortoise habitat will be taken if it is approved and permitted for development. BIA must look at those impacts in a comprehensive way that would allow it to formulate meaningful alternatives that could avoid many of the impacts of these linked projects and where impacts remain that cannot be avoided through alternatives, provide for comprehensive minimization and mitigation measures that will ensure that impacts to this recovery unit are appropriately mitigated. Ultimately, BIA must ensure that the approval of these linked projects does not impair the recovery of the desert tortoise populations in the Northeastern Mojave Recovery Unit.

Groundwater

The project is within the Colorado River Hydrologic Basin and more specifically, it is in groundwater basin #216 – Dry Lake/Garnet Valley. The Garnet Valley groundwater basin, a basin-fill aquifer covering approximately 342,400 acres. The basin-fill aquifer consists of unconfined alluvium and lacustrine deposits of sand, silt, and clay, with an average thickness of around 600 ft. Regional-scale carbonate rock aquifers underlay the basin-fill aquifers in Garnet Valley. These carbonate rock aquifers are a part of the White River Groundwater Flow System (a subunit of the Colorado River groundwater system), a regional-scale groundwater system that generally flows southward and terminates at Muddy River Springs, Rogers and Blue Point Springs, and the Virgin River.[7]

The perennial yield for this basin has been set at 400 ac-ft/yr by the State Engineer based on available data. In 2002, the State Engineer issued Order 1169 stating that new applications for water in the carbonate-rock aquifer systems within Garnet Valley would be suspended to allow further study of the system. Recent withdrawals of groundwater have ranged from 797-1558 ac-ft/yr; additionally, the Las Vegas Valley Water District has leased 2200 ac-ft/yr of its current water rights to dry-cooled power plants in the valley. An additional 44,500 ac-ft/yr (55 million m3/yr) of water rights have been applied for within the basin and are under consideration by the NDWR.

[7] Bureau for Land Management and Department of Energy. 2012. Final Programmatic Environmental Impact Statement for Solar Engergy Development in Six Southwestern States. Vol 4, Chapter 11, page 11.3-17.

Of particular concern regarding cumulative impacts is the proposal for a Bureau of Land Management ("BLM") Solar Energy Zone ("SEZ") adjacent to this project. The environmental compliance for the SEZ is currently underway, and the BLM has released a draft environmental impact statement that proposes 5,717 acres be developed for solar energy production.[8]

1-CUM 1

The MSEC and BLM SEZ proposals both are reasonably foreseeable and affect the desert tortoise and other desert plant and wildlife species, and are in the same over extended carbonate ground water flow system, thereby potentially impacting the rare and imperiled species, including the Moapa dace and other rare desert fish and springsnails found in the Muddy River drainage. The cumulative effects analysis must taken into account habitat destruction and water needs from all these proposed projects and disclose their impacts on the desert environment and the plants and animals that inhabit it.

5. Rare plant concerns

1-BIO 4

Plant surveys should be conducted for stick ringstem, Beaverdam breadroot, three-corner milkvetch, sticky buckwheat, rosy twotoned penstemon and white bearpoppy during spring flowering periods and any found plant locations geospatially mapped.

At least two years of plant surveys should be conducted to confirm the absence of the species and if found to be present, protective measures should be established to avoid, minimize and mitigate impacts.

The Center wishes to be an active stakeholder in this planning process and requests that we be added to any stakeholder notification list the BIA may develop.

Thank you for this opportunity to comments and we look forward to other opportunities to provide review and input.

Sincerely yours in conservation,

Rob Mrowka

Rob Mrowka
Ecologist and Nevada Conservation Advocate

[8] Ibid, page 11.3-1.

Comment Reference Document 2

BIA Western Regional Office
Branch of Environmental Quality Services
Attn: Ms. Amy Heuslein
2600 North Center Ave, 4th Floor Mail Room
Phoenix, AZ 85004-3008

September 7, 2012

Via E-mail: amy.heuslein@bia.gov
With a copy to: paul.schafly@bia.gov

Subject: Notice of Intent To Prepare an Environmental Impact Statement for the Moapa Solar Energy Center on the Moapa River Indian Reservation, Clark County NV.

Dear Ms. Heuslein:

Please accept these comments submitted on behalf of the Sierra Club (the "Sierra Club") on the Moapa Solar Energy Center (the "Project"), a proposed 200 MW solar project on the Moapa River Indian Reservation (the "Tribal Lands").

The Sierra Club is a national nonprofit organization of approximately 1.3 million members and supporters dedicated to exploring, enjoying, and protecting the wild places of the earth; to practicing and promoting the responsible use of the earth's ecosystems and resources; to educating and enlisting humanity to protect and restore the quality of the natural and human environment; and to using all lawful means to carry out these objectives. The Sierra Club's concerns encompass protecting our public lands, wildlife, air and water while at the same time rapidly increasing our use of renewable energy to reduce global warming.

We submit these comments on behalf of our members, activists, staff, and members of the general public who are interested in protecting native species and their habitats as well as supporting the development of clean, renewable sources of electrical energy. The development of renewable energy is a critical component of efforts to reduce carbon pollution and climate-warming gases, avoid the worst consequences of global warming, and to assist in meeting needed emission reductions. We strongly support the development of renewable energy production, and the generation of electricity from solar power, in particular.

The Moapa Band of Pauite Indians (the "Moapa") and the Southern Nevada Group of the Sierra Club have worked together for years to retire the Reid Gardner coal-fired power plant ("Reid Gardner"), which emits more than 4,000 tons of nitrogen oxides, more than 1,200 tons of sulfur dioxide, and more than five million tons of carbon pollution each year.[1] Reid Gardner is located just a few hundred yards from the Tribal Lands and is a major source of air pollutants and particulate matter--causing well- documented serious respiratory and other health problems amongst those living on Tribal Lands. The Tribal Lands are located within airshed region H-218 (California Wash) which is a non-attainment area for ozone emissions. [2] Electricity production from the Project will not cause emissions, and the Project is anticipated to have a positive effect on climate change.[3] We see the Project as a means to illustrate that it is possible to develop clean, renewable and cost-effective sources of electrical energy in Nevada.

For the above reasons, we encourage the development of a solar power project on the Tribal Lands. However, like any project, solar power projects should be thoughtfully planned to minimize impacts to natural resources.

Based on information provided as the public scoping meeting for the Project held at the Las Vegas Bureau of Land Management (BLM) office held on August 22, 2012 (the "Scoping Meeting"), and our experience working on natural resource issues in Southern Nevada, we offer the following recommendations for your consideration.

Training and Employment Programs

We view the Project as an opportunity for the Moapa to gain valuable long-term economic opportunities. The developer of the recently approved K Road Moapa Solar Project worked with the Moapa and local labor partners to develop a training program for tribal workers**.** We encourage the project proponent to engage in similar efforts to create long-term jobs in the electricity and natural resources sectors. We encourage the Bureau of Indian Affairs (BIA) and the project proponent to ensure that the Project leads to training and employment opportunities for the Moapa.

2-SOC 1

Water Issues

2-WAT 1

Water sustainability must be one of the guiding principles for siting solar energy development. It is critical that solar energy development should not contribute to exceeding the sustainable yield of the surface or groundwater source, to avoid injury to special status species and their habitat.

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[1] http://nevada.sierraclub.org/sngroup/text/Reid%20Gardner%20Costly%20Contamination.pdf

For these reasons, we do not support the use of wet cooled concentrated solar technology in areas (such as Clark County, Nevada) with serious water resource constraints, particularly when the impacts to sensitive and threatened species on an individual or ecosystem level may be very high. In particular, we are concerned regarding the impacts of groundwater usage.[4] This focus on wet-cooled technology is particularly surprising in light of both the wide-spread availability of technologies which do not pose such risks, and an industry-wide shift towards such technologies. Cooling systems such as dry cooling and hybrid cooling can conserve water in the cooling cycle, and concentrating PV can conserve even more water because no cooling cycle is needed. We recommend the project proponent and the BIA fully consider the benefits of both dry-cooled concentrated solar and photovoltaic technologies.

2-WAT 2

2-ALT 1

Technology

We are also concerned that the technology for this Project is not yet determined, and based on statements made at the Scoping Meeting, may not be determined until the Record of Decision (ROD) for the Project is issued. The impacts on biological resources are highly variable between different solar energy technologies. Determining technology early in the development process allows the developer to site the solar project to avoid impacts to biological resources, and to develop a robust and effective mitigation strategy.

2-ALT 2

Desert Tortoise

The desert tortoise Mojave Desert population has been provided protection under the Endangered Species Act ("ESA") as a threatened species since 1990.[5] A plan to recover and conserve the species was formalized in 1994, and in May of 2011 was revised to incorporate new information and science.[6] The Project is within the revised Northeastern Recovery Unit.[7] We strongly

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[4] The project is within the Colorado River Hydrologic Basin and more specifically, it is in groundwater basin #216 – Dry Lake/Garnet Valley. The Garnet Valley groundwater basin, a basin-fill aquifer covering approximately 342,400 acres. The perennial yield for this basin has been set at 400 ac-ft/yr by the State Engineer based on available data. In 2002, the State Engineer issued Order 1169 stating that new applications for water in the carbonate-rock aquifer systems within Garnet Valley would be suspended to allow further study of the system. Recent withdrawals of groundwater have ranged from 797-1558 ac-ft/yr; additionally, the Las Vegas Valley Water District has leased 2200 ac-ft/yr of its current water rights to dry-cooled power plants in the valley. An additional 44,500 ac-ft/yr (55 million m3/yr) of water rights have been applied for within the basin and are under consideration by the NDWR.

[5] U.S. Fish and Wildlife Service. 2011. Revised recovery plan for the Mojave population of the desert tortoise (*Gopherus agassizii*). U.S. Fish and Wildlife Service, Pacific Southwest Region, Sacramento, California. Page 1.

[7] U.S. Fish and Wildlife Service. 2011. Page 46.

recommend robust and comprehensive desert tortoise surveys are conducted, and effective avoidance, minimization and mitigation measures are implemented.

Rare Plant Surveys.

2-BIO 1 Plant surveys should be conducted for Las Vegas buckwheat and various state-protected cacti and yuccas, Beaverdam breadroot, three-corner milkvetch, sticky buckwheat, rosy twotoned penstemon and white bearpoppy during spring flowering periods and any found plant locations geospatially mapped. 2-BIO 2 The Proponent should develop a comprehensive vegetation plan describing how sensitive or state-listed plants will be avoided, salvaged and made available for restoration, or compensated for. 2-BIO 3 Avoidance of sensitive and state-listed plants should be taken into account when developing the Project footprint and layout, and solar infrastructure should be sited and arranged to avoid impacting such plants.

Avian Species

The impacts of solar power tower technology on sensitive avian and bat species are still unknown, but potentially significant. Golden eagles are likely present on the site on an irregular basis as they utilize the area for foraging, and there may be potential for take. Other species of birds, most if not all protected under the Migratory Bird Treaty Act, may be present on the site and could be adversely impacted by the development of a power tower technology on the site. 2-BIO 5 For this reason, we encourage the developer and the BIA to conduct multi-year avian surveys, and to create a comprehensive and robust strategy for avoiding impacts to sensitive avian species.

We thank you for the opportunity to provide scoping comments on the Project and to participate in the successful development of the Project as interested stakeholders. We look forward to working with the project proponent, the Moapa and the BIA to successfully develop a viable, sustainable project with minimal impacts to natural resources.

Sincerely,

Sarah K. Friedman

Sarah K. Friedman
Senior Campaign Representative
Beyond Coal Campaign
Sierra Club

cc: paul.schafly@bia.g

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

Comment Reference Document 3

August 24, 2012
File No. 84320-2010-CPA-0078

Memorandum

To: Regional Environmental Protection Officer, Environmental Quality Services, Western Regional Office, Bureau of Indian Affairs, Phoenix, Arizona

From: State Supervisor, Nevada Fish and Wildlife Office, Reno, Nevada

Subject: EIS Scoping Comments on the NOI for the Moapa Solar Energy Center (RES Americas), Clark County, Nevada

This memorandum is in response to your August 3, 2012, Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS) for the subject project. This memorandum has been prepared 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 Migratory Bird Treaty Act of 1918 (MBTA), as amended (16 U.S.C. 703 et seq.), the Bald and Golden Eagle Protection Act of 1940 (16 U.S.C. 668-668c), 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 the Bureau of Indian Affairs (BIA) and Bureau of Land Management (BLM) are evaluating the permitting of rights-of-way to RES Americas Developments to construct and operate the proposed Moapa Solar Energy Project on the Moapa River Indian Reservation. The project would consist of a photovoltaic project up to 100 Megawatts (MW) in size, and a concentrated solar power tower (CSP) project up to 100 MW in size on 1,000 acres of the tribal lands. The project would include electric transmission lines to two nearby substations, a 2.5 mile access road, and other supporting facilities on BLM-administered lands.

Federally listed threatened and endangered species

We are concerned that the proposed project may adversely affect the federally listed Mojave desert tortoise *(Gopherus agassizii)*, Moapa dace (*Moapa coriacea*), and their habitats. Habitat loss and degradation are major threats to the recovery of the desert tortoise. The proposed

3-BIO 1 project potentially would disturb desert tortoise habitat and indirectly may affect adjacent undisturbed desert tortoise habitat surrounding the project area. The Moapa dace may be impacted by groundwater withdrawal required for the project.

The NEPA document should disclose direct, indirect, and cumulative effects to these species and their habitats from the proposed project combined with other reasonable and foreseeable projects in the region. The proposed project and NEPA document must identify measures to minimize mortality and injury to these species from project activities; commit resources and funding for such measures; and include a thorough analysis of the potential effects of desert tortoise translocation as it specifically relates to this project.

3-BIO 2 The proposed project may increase new sites for perches and nests for the common raven (*Corvus corax*), a known predator of juvenile desert tortoises. We recommend that project structures be designed to deter the perching and nesting of ravens (e.g., fence posts, power poles and towers, signs). We further recommend that ravens be monitored and managed during the construction and operation of the project through the implementation of best management practices, such as controlling litter and limiting water use.

3-BIO 3 We recommend consideration of innovative construction techniques that leave vegetation and wildlife habitat in place. Leaving vegetation under photovoltaic panels and heliostats could reduce construction and maintenance costs by minimizing water erosion, reducing airborne dust, preventing weed invasion, and hastening reclamation. Additionally, this vegetation could provide wildlife habitat.

Based on your regulatory oversight, a Biological Assessment (BA) for compliance with section 7 of the Act should be prepared and include a thorough analysis of the potential effects from this project to the listed species. Information contained in the final NEPA document should be referenced in the request for consultation.

State-protected species

3-BIO 4 We are concerned about project impacts to the banded Gila monster (*Heloderma suspectum cinctum*), a species protected under the Nevada Administrative Code 503.080, regarded as a species at risk by the Nevada Natural Heritage Program and designated as a sensitive species by BLM in Nevada. Given that the Gila monster is known to occur within the geographic area, we
3-BIO 4 recommend that you evaluate project impacts to any existing populations and suitable habitat for this species in the NEPA document. We suggest that you contact the Nevada Department of Wildlife to identify measures to minimize and mitigate impacts to this species.

Invasive Plants

3-BIO 5

We are concerned that project-related activities could facilitate the incursion and/or spread of non-native, invasive plants. The spread of invasive species is known to alter fire ecology of the Mojave Desert and increase wildfire frequency. The NEPA document needs to discuss measures to prevent the spread of invasive plants in or near the project area. We further recommend the development and implementation of a project-specific weed management plan.

The NEPA document should incorporate stipulations specific to mitigation, revegetation, and restoration efforts for impacts to wildlife and plant habitats. For example, revegetation seed mixes should be comprised of native plant species; monitoring programs and contingency plans should be developed that identify appropriate success criteria; and adaptive management programs should be implemented. Most importantly, great care should be taken to prevent initial establishment of invasive species.

Migratory birds

3-BIO 6

The Service holds the conservation responsibilities and management authority for migratory birds. Under the MBTA, nests of migratory birds may not be harmed, nor may migratory birds be killed. Therefore, land clearing, or other surface disturbance associated with the proposed project, should be conducted outside the avian breeding season. 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.

3-BIO 7

Burrowing owls (*Athene cunicularia hypugaea*) may be present within the project area. We are concerned about project impacts to this species from the proposed action. The western burrowing owl is a Bird of Conservation Concern (Service 2008) and listed as a BLM sensitive species. 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" (attached).

3-BIO 8

We are concerned about the potential impacts to raptors, including eagles, and other migratory birds from loss of foraging habitat, transmission line strikes, and power towers. We recommend the applicant conduct pre-project surveys for raptors, including eagles, and other migratory birds and develop a Bird and Bat Conservation Strategy and Eagle Conservation Plan. These plans should also be included in the NEPA document. More information on these plans is available at the Service's website: *http://www.fws.gov/windenergy/eagle_guidance.html*. Although this information mostly relates to wind energy, the applicant has a responsibility to disclose the impacts from solar development.

3-BIO 10

Lastly, 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 supplemental environmental assessment.

Cumulative effects

3-CUM 2

We are concerned that the magnitude and severity of impacts from large-scale, disjunct projects in this area may have significant and unintended adverse consequences on biological resources. In particular, potential widespread loss, degradation, or fragmentation of habitats due to direct, indirect, and cumulative effects of numerous large-scale renewable energy projects likely places listed species at a lower probability of recovery and increased risk of extirpations or extinction. It also potentially increases threats to other species to the point where Federal listing may become warranted in the future. Therefore, the NEPA document should analyze the direct, indirect, and cumulative effects of renewable energy projects together with other impacts associated with human encroachment to federally listed, State-protected, sensitive, and at-risk species, as well as migratory birds. The analysis should disclose cumulative impacts and propose measures to avoid, minimize, or mitigate these impacts. The analysis should address the efficacy of these proposed measures in reducing adverse impacts to these resources and how and when they would be implemented.

Conclusion

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

We appreciate the opportunity to provide comments on the proposed project. Please reference the file number above in future correspondence concerning this project. If you have any questions, please contact Michael Burroughs in the Nevada Fish and Wildlife Office in Las Vegas at (702) 515-5230.

Edward D. Koch (FOR)

Attachment

cc:
Assistant Field Office Manager, Renewable Resources, Las Vegas Field Office, Bureau of Land Management, Las Vegas, Nevada
Chairman, Moapa Band of Paiutes, Moapa, Nevada
Environmental Review Office, Communities and Ecosystems Division, Environmental Protection Agency, San Francisco, California
Natural Resource Specialist, Southern Paiute Agency, Bureau of Indian Affairs, Saint George, Utah

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KENNETH E. MAYER
Director

RICHARD L. HASKINS, II
Deputy Director

PATRICK O. CATES
Deputy Director

Comment Reference Document 4

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

September 5, 2012

NDOW-SR #: 13-029
SAI #: E2013-031

Ms. Amy Heuslein
Regional Environmental Protection Officer
BIA Western Regional Office, Branch of Environmental Quality Services
2600 North Central Avenue, 4th Floor Mail Room
Phoenix, Arizona 85004-3008

Re: EIS Scoping Comments, Moapa Solar Energy Center (EIS)

Dear Ms. Heuslein:

The Nevada Department of Wildlife (Department) appreciates this opportunity to provide input during the scoping phase of the EIS process. The Department recognizes the importance of solar energy generation for developing renewable energy resources and understands the concept of the proposed action provided in text summary and illustrated project alternatives. The text description indicates the transmission line interconnection and access road corridor associated with the project will be located on Federal lands administered and managed by the Bureau of Land Management (BLM). That portion of the proposed project is the emphasis of the following preliminary comments and recommendations regarding potential effects to the State's wildlife resources.

4-BIO 1

In the event the final EIS include impact minimization measures for the desert tortoise including an ability to remove individuals encountered in the course of construction out of harm's way, authorization by the State of Nevada additional to any federal authorizations is required per NRS 503.597 and NAC 503.093. The Department's Cris Tomlinson can be contacted for additional assistance on this item at 702.486.5127 x3700 or ctomlinson@ndow.org. Additional to measures implemented to avoid conservation conflicts with species like the desert tortoise, inclusion of the Department's Gila monster protocol as part of project worker education and monitoring would be appreciated. The Gila monster protocol is available online at http://ndow.org/wild/conservation/reptile/07Gila_Protocol.pdf.

4-BIO 2

Birds protected under the Migratory Bird Treaty Act (MBTA), including eagles and hawks, are also State Protected (NAC 503.050). Ground disturbing activities should avoid the breeding and nesting season which occurs approximately between March 1 and July 31. If seasonal avoidance is not practicable, then the Department recommends a qualified biologist survey the project site prior to any ground disturbing activities to determine if nesting 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 species involved must be identified and avoided until young birds have fledged. This measure is consistent with preventive actions advocated by the U.S. Fish and Wildlife Service (Service) concerning MBTA-protected birds. An example of species-specific guidance is that for the burrowing owl found online at http://www.azgfd.gov/pdfs/w_c/owl/burrowingowlclearanceprotocol.pdf.

Another consideration concerning management of migratory birds is their relationship to conservation efforts for other special status species. There is documentation and broad acceptance that the common raven will exploit young desert tortoises as a significant prey item[1,2]. Ravens are opportunistic feeders utilizing prey items and carrion located near their nests[3,4]. To a lesser degree, certain raptors may also include vulnerable-sized desert tortoises additional to more regularly taken wildlife. Powerline structures have been touted as a benefit to these larger birds by providing them with safe nest and roost sites which have enabled them to expand their territories into areas otherwise offering little safe nesting and roosting opportunities[5]. Transmission structures also provide a potential physiological benefit during hunting by these birds by offsetting their need to fly (a high energy demand activity) to spotting, observing and capturing prey. Lattice design structures have been demonstrated to provide nesting, perching and roosting opportunities [6,7] for raptors and common ravens. The Department recommends utilizing non-lattice structures for power and communication lines because they afford less perching, roosting and nesting locations [8,9] or their design accommodates effective installation of perching and nesting discouragers.

4-BIO 3

Alternatively, utilization of lattice structures would require two mitigation measures to be implemented for desert tortoise and other wildlife considered avian prey. The first would be removal of raven nests at the proper time during the nesting season preventing successful nest construction and subsequent brood rearing. The optimum time is at the beginning of the nesting season before eggs appear in the nest. This action requires coordination with the Service and may necessitate obtaining depredation authorization from the Service and Department. Second, and in order to discourage transmission structure use for roosting and perching, the project proponent would annually contribute to an existing account used by Wildlife Services for providing for raven control. Raven removals would compensate for as long as the lines are present or until such time that it can be determined they no longer present a concern. Control efforts would need to occur minimally during the desert tortoise activity period and migratory bird nesting season when young are present.

4-BIO 4

The 2011 Nevada State Legislature passed AB307 resulting in NRS 701.600 through 701.640 and creating the Energy Planning and Conservation Fund and the Fund for the Recovery of Costs. The Department recently contacted the project's representative and provided the necessary information concerning awareness of "AB307" compliance needs.

4-OTH 1

Thank you again for this review opportunity. The Department looks forward to input opportunities as part of the NEPA process. For additional assistance please contact Habitat Biologist Anthony Miller of the Department's Southern Region office in Las Vegas. He can be reached at 702.486.5127 x3613 or by email at ajmiller@ndow.org.

Sincerely,

D. Bradford Hardenbrook
Supervisory Biologist

AJM/DBH:ajm/dbh

cc: Paul Schiafly, Natural Resource Officer, BIA Southern Paiute Agency
Nevada State Clearinghouse
NDOW, Files

References

[1] Boarman,W. 2003 "Managing a Subsidized Predator Population: Reducing Common Raven Predation on Desert Tortoise. Environmental Management 32:205-217.

[2] Kristan, William B. III, and William Boarman 2007. Effects of anthropogenic developments on Common Raven nesting biology in the western Mojave Desert. In *Ecological Applications* 17(6): 1703-1713.

[3] Kristan, William B, William Boarman and John Crayon. 2004. Diet composition of common ravens across the urban-wildliand interface of the West Mojave Desert. *Wildlife Society Bulletin* 32(1): 244-253.

[4] Stiehl, Richard B. and Steven N. Trautwein. 1991. Variations in Diets of Nesting Common Ravens. *Wilson's Bulletin* 103(1): 83-92.

[5] Siegel, S. 2001. Safe Nesting, Protected Power Lines - Use of Alternate Nesting Platforms for Raptors *in* Avian Interactions with Utility and Communication Structures Workshop Proceedings. EPRI Technical Report # 1005180.

[6] Eedholm. 2010. Wind Energy Protects Wildlife Populations *in* National Wind

[7] Electric Power Research Institute. 1988. A Joint Utility Investigation of Unexplained Transmission Line Outages. *EPRI EL*-5735.

[8] American Bird Conservancy. 2007. Wind Energy Policy.

[9] American Wind Energy Association "Wind Energy Fact Sheet"

Comment Reference Document 5

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 99TH AIR BASE WING (ACC)
NELLIS AIR FORCE BASE NEVADA

AUG 30 2012

Colonel Barry R. Cornish
Commander
4430 Grissom Ave, Ste 101
Nellis AFB NV 89191-6520

RECEIVED
SEP 11 2012
SO. PAIUTE AGENCY

Ms. Kellie Youngbear
Superintendent
Bureau of Indian Affairs
Southern Paiute Agency
PO Box 720
St. George UT 84711

Dear Ms. Youngbear

The 99th Air Base Wing would like to thank you for your invitation to participate as a cooperating agency in the Moapa Solar Power, LLC Environmental Impact Statement (EIS). At this time, we decline to accept cooperating agency status; however, we would like to participate in the external review process by providing comments on the EIS as required.

We also request that you notify us of all Moapa Solar Power, LLC EIS scoping meetings and solicitations for comments. The Nellis AFB points of contact for the EIS are Mr. Tod Oppenborn at 702-652-9366 or tod.oppenborn@nellis.af.mil and Ms. Deborah MacNeill at 702-652-7777 or deborah.macneill@nellis.af.mil. We appreciate your efforts in allowing us to participate in the EIS process.

Sincerely

BARRY R. CORNISH
Colonel, USAF

Enable Success Through Innovative Base Support

5-LAN 1

5-LAN 1

5-LAN 1

5-HEA 1

5-LAN 2, HEA 2

General Comments

Nellis Air Force Base (NAFB), located to the southwest of the site, maintains a major military airfield from which nearly 50,000 DoD and allied aircraft departures and arrivals occur annually. The proposed project is under the primary route used by military aircraft to enter and exit the Nevada Test and Training Range (NTTR) from NAFB.

This complex represents almost 40% of the Air Force's (AF) land assets, 10% of Department of Defense's (DoD) land assets, and is an irreplaceable national security asset and supports every aircraft type in the DoD inventory. Joint and allied partners conduct several highly specialized flying and ground combat testing and training missions on the Complex in preparation for real-world joint combat operations worldwide. The NTTR is a pristine military testing and training laboratory built on over 70 years of scientific research supporting military intelligence, arms, and radar advancement through the investment of an incalculable sum of federal funding. The training and testing environment provided by the NTTR cannot be replicated.

Solar development in this area may present mission impacts to military operations in the region, as outlined below. However, specific technology information and site plans are necessary in order to effectively determine the level of military mission impacts.

1) NAFB currently conducts approximately 50,000 over-flights per year in this area, which will increase to an estimated 63,000 flights following the beddown of F-35 Joint Strike Fighter aircraft on NAFB. Current Air Force regulations require pilots to avoid structures by 500 feet, so any technology rising above ground level (including PV arrays and solar towers) will place new and/or further restrictions on military operations in the area. The area is located within the navigational aid flight path for approaching aircraft and is north of the controlled bailout area. Potential damage to the array may occur depending on the altitude and direction of the aircraft during an emergency ejection. Obstacles in this area are highly incompatible with flight operations, and may present severe safety concerns.
2) Transmission lines: The need for multiple, interconnected transmission lines to transport power from the proposed site to demand centers/marketplace may negatively impact airspace through increased altitude restrictions in low-level flight corridors and Military Operating Areas (MOAs). Transmission lines (individually or through a cumulative effect) may create restrictions that adversely impact military testing and training capabilities depending on the location and/or quantity.
3) Thermal boundaries: Certain solar technologies release or emit extreme heat near and/or above their development. The extreme heat may create a thermal boundary that requires aircraft to avoid the area in order to prevent aircraft buffeting, damage, or accidents. Further, heat-sensitive armament may create a

severe safety hazard for aircrew and ground-based personnel in the area.

5-LAN 3, HEA 3

4) Glint/Glare: Depending on technology design features utilized, reflective glint and glare may create a severe safety hazard to pilots and aircraft, (including major force exercises such as RED FLAG and Weapons School Mission Employment Phase).

5-LAN 4

5) Cameras/security: Many solar technologies require the use of cameras for the targeting of mirrors on solar collectors. The use of high definition camera equipment in the region may present a security concern for joint and allied aircraft test and training operations.

5-LAN 5, HEA 4

6) Wireless systems: Electronic jamming on the NTTR is conducted on a regular basis. It is unknown how military operations could impact wirelessly controlled mirrors, or how disturbing the mirror alignment could create a glare hazard to flight crews or navigation.

REVIEW COMMENTS: Moapa Reservation K Road Energy Project

Reviewer: **Nellis AFB** **Office Symbol:** **Contact Number:** **702 652-9366**

#	Page	Line/Para./Sec	Reviewer	Comment	Response
1.		General	57 WG/SEF	♦ The proposed location is on the north end of our controlled bailout (ejection) area. This development poses a risk to their solar equipment from falling aircraft debris (or the aircraft itself), as well as a potential risk to aircrew descending in parachutes (depending on the winds).	
2.		General	57 WG/SEF	♦ A field of shiny solar arrays reflecting sunlight poses a legitimate concern for aircraft in the vicinity since Dry Lake is along the approach/recovery corridor to the east side of the NTTR. Dry Lake is also a common holding point for emergency aircraft prior to landing.	
3.		General	Rob Brabant - 57 WG/OSAF	♦ Will need lat/long and MSL/AGL heights to look at it	
4.		General	James Callahan – 57 OSS/OSM	♦ We want to know how high the power lines will be and which alternative energy methods will be used. After the meeting, those answers were not available but we will continue to pursue them in the future.	5-VIS 1
5.		General	James Callahan – 57 OSS/OSM	♦ We will need the height of any structures and need to know if they will be lighted. They stated they MAY use one, or a combination of two, types of solar facilities.	
6.				♦	
7.				♦	
8.				♦	
9.				♦	
10.				♦	
11.				♦	
12.				♦	
13.				♦	
14.				♦	
15.				♦	
16.				♦	
17.				♦	
18.				♦	
19.				♦	
20.				♦	

#	Page	Line/Para./Sec	Reviewer	Comment	Response
21.				♦	
22.				♦	
23.				♦	
24.				♦	
25.				♦	
26.				♦	
27.				♦	
28.				♦	
29.				♦	
30.				♦	
31.				♦	
32.				♦	
33.				♦	
34.				♦	

PUBLIC COMMENT FORM
Bureau of Indian Affairs

MOAPA SOLAR ENERGY CENTER PROJECT
www.MoapaSolarEnergyCenterEIS.com
Scoping Comments

NAME: Tod Oppenborn

ADDRESS: 6020 Beale Ave
Nellis AFB NV 89191

( ) I have no comments, please keep me informed.

( ) Please remove me from your mailing list for this Project.

(X) I have the following comments about the Moapa Solar Energy Center Project:

Please send them e-mail me a copy of the slides used at the meeting.

tod.oppenborn@nellis.af.mil

Thank you.

Return to: Ms. Amy Heuslein, Regional Environmental Protection Officer, BIA Western Regional Office, 2600 North Central Avenue, 4th Floor Mailroom, Phoenix, AZ 85004
Email: amy.heuslein@bia.gov (Or fold, seal, and add a stamp to the back of the sheet)

Comment Reference Document 6

September 16, 2012

Bureau of Indian Affairs
Western Regional Office, Branch of Environmental Quality
Attn. Ms. Amy Heuslein
2600 North Central Avenue, 4th Floor
Phoenix AZ 85004-3008

Sent via e-mail: amy.heuslein@bia.gov

RE: EIS Scoping comments for Moapa Solar Energy Center Project

Dear Ms. Heuslein,

You are receiving these scoping comments past the due date because I did not receive notification of the scoping meetings until September 6, 2012. I would appreciate receiving further notices in a more timely matter.

It is not easy to comment on a project where the proposed technology and hence the impact on such resources as groundwater is yet unknown. Impacts on other environmental resources such as the desert tortoise, rare plants, and the banded Gila Monster cannot be determined without more information.

As a plant ecologist I am very familiar with this area. I have conducted rare plant surveys in the areas of both transmission line options, all on Bureau of Land Management (BLM) lands, and also assisted the tortoise biologists with plant identification within the project site. A number of rare plants and plants of concern to the BLM were found, and also several species of cacti. Threecorner milkvetch, a State of Nevada Critically Endangered Species and a Federal Species of Concern may occur in the project site. Since this species does not germinate every year, further plant surveys may be needed before this project gets approved.

Incidentally, the fact that tortoise surveys and plant surveys were performed in 2010 was not acknowledged during the scoping meetings. That information should have been available to the attendees of these meetings.

Sincerely,

Hermi D. Hiatt
Biological Consultant
8180 Placid Street
Las Vegas, NV 89123

cc: Paul Schlafly

Comment Reference Document 7

Skip Canfield

From:	Rebecca Palmer
Sent:	Tuesday, September 04, 2012 9:56 AM
To:	Skip Canfield
Subject:	RE: Nevada State Clearinghouse Notice E2013-031

The SHPO supports this document as written.

Rebecca Lynn Palmer
Deputy Historic Preservation Officer
901 South Stewart Street, Suite 5004
Carson City NV 89701
Phone (775) 684-3443
Fax (775) 684-3442

Please note, my email is rlpalmer@shpo.nv.gov

From: scanfield@lands.nv.gov [mailto:scanfield@lands.nv.gov]
Sent: Monday, August 13, 2012 1:40 PM
To: Alan Coyner; Alan Jenne; Alisanne Maffei; clytle@lincolnnv.com; Brad Hardenbrook; ddavis@unr.edu; dmouat@dri.edu; Edward Foster; ed.rybold@navy.mil; gderks@dps.state.nv.us; James Morefield; Jason Woodruff; Jennifer Newmark; Jennifer Scanland; munteanj@unr.edu; jprice@unr.edu; kirk.bausman@us.army.mil; cohnl@nv.doe.gov; Lowell Price; Mark Freese; Mark Harris; Mike Dondero; deborah.macneill@nellis.af.mil; escomm2@citlink.net; Octavious.Hill@nellis.af.mil; Pete Anderson; Pete Konesky; Rebecca Palmer; Rich Harvey; Robert K. Martinez; Sandy Quilici; Sherry Rupert; Steven Siegel; tcompton@dot.state.nv.us; Terry Rubald; Richard Ewell; tmueller@dot.state.nv.us; Tod.oppenborn@nellis.af.mil; William.Cadwallader@nellis.af.mil; zip.upham@navy.mil; Joe Strolin; Alex Lanza; Dave Marlow; Michael Visher; Kevin J. Hill; dziegler@lcb.state.nv.us; Richard A. Wiggins; Robert Gregg; Shimi.Mathew@nellis.af.mil; Skip Canfield; whenderson@nvnaco.org; Tim Rubald; djohnston@dps.state.nv.us; John Walker; Karen Beckley; Russ Land; Cliff Lawson; mstewart@lcb.state.nv.us; sscholley@lcb.state.nv.us; Jennifer Crandell; Madams@ag.nv.gov; McClain Peterson; WHowle@ag.nv.gov
Subject: Nevada State Clearinghouse Notice E2013-031

NEVADA STATE CLEARINGHOUSE
Department of Conservation and Natural Resources, Division of State Lands
901 S. Stewart St., Ste. 5003, Carson City, Nevada 89701-5246
(775) 684-2723 Fax (775) 684-2721

TRANSMISSION DATE: 08/13/2012

U.S. Bureau of Indian Affairs

Nevada State Clearinghouse Notice E2013-031
Project: DEIS Moapa Solar Energy Center

Follow the link below to find information concerning the above-mentioned project for your review and comment.

E2013-031 - http://clearinghouse.nv.gov/public/Notice/2013/E2013-031.pdf

- **Please evaluate this project's effects on your agency's plans and programs and any other issues that you are aware of that might be pertinent to applicable laws and regulations.**

- **Please reply directly from this e-mail and attach your comments.**

- **Please submit your comments no later than Tuesday September 4th, 2012.**

Clearinghouse project archive

Questions? Skip Canfield, Program Manager, (775) 684-2723 or nevadaclearinghouse@lands.nv.gov

____No comment on this project ____Proposal supported as written

AGENCY COMMENTS:

Signature:

Date:

Requested By:

Distribution:
- Division of Emergency Management
Alan Coyner - Commission on Minerals
Alan Jenne - Department of Wildlife, Elko
Alex Lanza -
Alisanne Maffei - Department of Administration
Cliff Lawson - Nevada Division of Environmental Protection
Cory Lytle - Lincoln County
D. Bradford Hardenbrook - Department of Wildlife, Las Vegas
Dave Marlow -
Dave Ziegler - LCB
David David - UNR Bureau of Mines
David Mouat - Desert Research Institute

Comment Reference Document 8

Ms. Amy Heuslein
Regional Environmental Protection Officer BIA Western Regional Office
2600 North Central Avenue
4th Floor Mailroom
Phoenix, AZ 85004

RE: Notice of Intent To Prepare an Environmental Impact Statement for the Moapa Solar Energy Center on the Moapa River Indian Reservation, Clark County NV

Dear Ms. Heuslein:

The National Park Service (NPS) appreciates the opportunity to provide comments regarding the above stated Notice of Intent. The NPS supports renewable energy projects so long as such projects can be constructed and operated in an environmentally responsible manner that serves the public interest, protects natural resources and protects our treasured landscapes.
It is the role of the NPS to contribute to the process and the analysis of renewable energy projects to help ensure that such projects are "Smart from the Start." As a cooperating agency, our goal is to provide both positive and practical feedback in order to mitigate potential impacts to the resources of National Park units in the vicinity.

After review of the proposed project and project location, the NPS would like to submit the following comments:

8-CUL 1

8-VIS 1

The National Park Service National Trails Intermountain Region office has reviewed the proposed location of the Moapa Solar Energy Center (MSEC) on the Moapa River Indian Reservation, in Clark County, Nevada. The location is about five miles west of the Congressionally designated alignment of the Old Spanish National Historic Trail (NHT), which we co-administer with the Bureau of Land Management. Because of the distance, no direct impacts on the trail are foreseeable. The Proposed Action consists of constructing and operating a solar generation energy center, consisting of a photovoltaic installation up to 100 megawatts, and a concentrating solar power installation up to 100 MW in size. Transmission lines and associated facilities will also be required. We do not believe that a photovoltaic installation would have the potential to impact the setting of the Old Spanish NHT in this location. We reviewed the K Road Moapa photovoltaic project earlier this year, located nearby, and did not find any impacts to the Old Spanish NHT or its setting. However, depending on the nature of the concentrating solar power installation, visual impacts could occur on the trail. Specifically, power tower technology, described on the project webpage as one option, could involve the installation of 250-foot tall towers that may be visually intrusive on the trail. The other concentrating solar power technology involves concentrating mirrors that focus sunlight on horizontal pipes. This technology would only be 80 feet tall, much closer to the ground, and would likely pose very little visual impact to the setting of the Old Spanish NHT. The transmission lines and associated facilities will not impact the trail or its setting, based on our experience with the K Road Moapa photovoltaic project.

If you have any questions or need additional information, please contact Amee Howard, Renewable Energy Specialist – NPS Pacific West Region at
(702)293-8645 or amee_howard@nps.gov.

Amee R. Howard
Renewable Energy Specialist
Pacific West Region
Lake Mead National Recreation Area
Office: (702)293-8645
Cell: (702)308-3178

Comment Reference
Document 9

Skip Canfield

From: Alex Lanza
Sent: Wednesday, August 29, 2012 2:15 PM
To: Skip Canfield
Subject: RE: Nevada State Clearinghouse Notice E2013-031 - DEIS Moapa Solar Energy Center

Good afternoon Skip;

The Nevada Division of Environmental Protection (NDEP) - Bureau of Water Pollution Control (BWPC) - does not have any comments regarding **Notice E2013-031 - DEIS Moapa Solar Energy Center, Nevada.**

9-WAT 1

Please note that the entity who manages this **Moapa Solar Energy Center project** may be subject to BWPC permitting associated with any of its discharges – including, but not limited to but not limited to well development, wastewater, Diminimis, UIC, and domestic sewage discharges.

Thank you for the information and the opportunity to comment.

If you have any questions, please contact me at (775) 687-9468.

Respectfully,

Alexi Lanza

Alexi Lanza, P.E.
Permits Branch - Bureau of Water Pollution Control
Nevada Division of Environmental Protection
901 S. Stewart St., Ste 4001
Carson City NV 89701
Phone: 775.687.9468 - Fax: 775.687.4684
www.ndep.nv.gov

Please visit BWPC's main website: http://ndep.nv.gov/bwpc/index.htm

Please join our electronic mailing lists: http://ndep.nv.gov/bwpc/email.htm

From: scanfield@lands.nv.gov [mailto:scanfield@lands.nv.gov]
Sent: Monday, August 13, 2012 1:40 PM
To: Alan Coyner; Alan Jenne; Alisanne Maffei; clytle@lincolnnv.com; Brad Hardenbrook; ddavis@unr.edu; dmouat@dri.edu; Edward Foster; ed.rybold@navy.mil; gderks@dps.state.nv.us; James Morefield; Jason Woodruff; Jennifer Newmark; Jennifer Scanland; munteanj@unr.edu; jprice@unr.edu; kirk.bausman@us.army.mil; cohnl@nv.doe.gov; Lowell Price; Mark Freese; Mark Harris; Mike Dondero; deborah.macneill@nellis.af.mil; escomm2@citlink.net; Octavious.Hill@nellis.af.mil; Pete Anderson; Pete Konesky; Rebecca Palmer; Rich Harvey; Robert K. Martinez; Sandy Quilici; Sherry Rupert; Steven Siegel; tcompton@dot.state.nv.us; Terry Rubald; Richard Ewell; tmueller@dot.state.nv.us; Tod.oppenborn@nellis.af.mil; William.Cadwallader@nellis.af.mil; zip.upham@navy.mil; Joe Strolin; Alex Lanza; Dave Marlow; Michael Visher; Kevin J. Hill; dziegler@lcb.state.nv.us; Richard A. Wiggins; Robert Gregg; Shimi.Mathew@nellis.af.mil; Skip Canfield; whenderson@nvnaco.org; Tim Rubald; djohnston@dps.state.nv.us; John Walker; Karen Beckley; Russ Land; Cliff Lawson; mstewart@lcb.state.nv.us; sscholley@lcb.state.nv.us; Jennifer Crandell; Madams@ag.nv.gov; McClain Peterson; WHowle@ag.nv.gov
Subject: Nevada State Clearinghouse Notice E2013-031

NEVADA STATE CLEARINGHOUSE
Department of Conservation and Natural Resources, Division of State Lands
901 S. Stewart St., Ste. 5003, Carson City, Nevada 89701-5246
(775) 684-2723 Fax (775) 684-2721

TRANSMISSION DATE: 08/13/2012

U.S. Bureau of Indian Affairs

Nevada State Clearinghouse Notice E2013-031
Project: DEIS Moapa Solar Energy Center

Follow the link below to find information concerning the above-mentioned project for your review and comment.
E2013-031 - http://clearinghouse.nv.gov/public/Notice/2013/E2013-031.pdf

- **Please evaluate this project's effects on your agency's plans and programs and any other issues that you are aware of that might be pertinent to applicable laws and regulations.**

- **Please reply directly from this e-mail and attach your comments.**

- **Please submit your comments no later than Tuesday September 4th, 2012.**

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

Comment Reference Document 10

August 21, 2012

Amy Heuslein
Regional Environmental Protection Officer
Bureau of Indian Affairs
Western Regional Office
2600 North Central Avenue, 4th floor
Phoenix, Arizona 85004-3008

Paul Schlafly
Natural Resource Specialist
BIA Southern Paiute Agency
P.O. Box 720
St. George, Utah 84770

Subject: EPA scoping comments for the proposed Moapa Solar Energy Center, Moapa River Indian Reservation, Clark County, Nevada

Dear Ms. Heuslein and Mr. Schlafly:

The U.S. Environmental Protection Agency (EPA) has reviewed the Federal Register Notice published on August 3, 2012 requesting comments on the Bureau of Indian Affairs (BIA) decision to prepare a draft Environmental Impact Statement for the subject project. Our comments are provided pursuant to the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508) and our NEPA review authority under Section 309 of the Clean Air Act. EPA is a cooperating agency for the proposed project.

The project proposes to construct and operate a solar energy center consisting of a photovoltaic project up to 100 Megawatts (MW) in size, and a concentrated solar power (CSP) project up to 100 MW in size on 1,000 acres of the Moapa River Indian Reservation. The project would include electric transmission lines to 2 nearby substations, a 2.5 mile access road, and other supporting facilities.

EPA supports the increase in renewable energy resource development, as recommended in the National Energy Policy Act of 2005. Using renewable energy resources, such as solar power, can help the nation meet its energy requirements without generating greenhouse gas emissions. We are also very supportive of tribal government interests in renewable energy as a means to help meet tribal economic development goals and help the nation's transition to cleaner energy.

To assist in the scoping process, we have identified several issues for your attention in the preparation of the EIS (see attached detailed comments). We appreciate the opportunity to provide comments on the preparation of the DEIS, and look forward to continued participation in the NEPA process. If you have any questions, please contact me at (415) 947-4178 or vitulano.karen@epa.gov.

Sincerely,

Karen Vitulano
Environmental Review Office

Enclosures: EPA's Detailed Comments

cc: William Anderson, Chairman, Moapa Band of Paiutes
Darren Daboda, Environmental Coordinator, Moapa Band of Paiutes

EPA DETAILED SCOPING COMMENTS ON THE MOAPA SOLAR ENERGY CENTER, MOAPA RIVER INDIAN RESERVATION, CLARK COUNTY, NEVADA, AUGUST 21, 2012

Purpose and Need

The Draft Environmental Impact Statement (DEIS) should clearly identify the underlying purpose and need for the project and for which alternatives are being proposed (40 CFR 1502.13). When formulating the need, identify and describe the underlying problem, deficiency, or opportunity that the action is meant to address. The purpose then defines the measurable objectives to be used for evaluating the effectiveness of potential alternatives toward meeting the need. For example, this section should clearly indicate the factors that are used to evaluate the size of the project, in terms of megawatts and land acreage, in relation to achieving the underlying need.

The DEIS should discuss the proposed project in the context of the larger energy market that the project would serve; identify potential purchasers of the power produced; and discuss how the project will assist utilities, the Tribe, or the state, as applicable, in meeting any renewable energy portfolio standards and goals.

Alternatives Analysis

Reasonable alternatives should include, but are not necessarily limited to, alternative configurations and mountings, alternative capacities, alternative solar technologies, and alternative cooling technologies for the concentrating solar power (CSP) plant. We strongly recommend a dry cooling alternative be developed and evaluated, along with a hybrid wet-dry cooling alternative. The DEIS should provide a discussion of the reasons for the elimination of alternatives which are not evaluated in detail.

10-ALT 1

A reasonable range of alternatives will include options for avoiding environmental impacts. The Council on Environmental Quality (CEQ) Regulations for implementing the National Environmental Policy Act (NEPA) state that alternatives should include appropriate mitigation measures not already included in the proposed action or alternatives (40 CFR 1502.14(f)).

Water Resources

Dry cooling alternative

Because the project is located in the desert, EPA strongly recommends evaluation of an alternative that utilizes dry cooling technology. The majority of water consumption at a CSP facility occurs during the cooling process. The water intensity[1] of wet cooled CSPs is generally higher than that of fossil fuel facilities that utilize wet cooling. We understand the Tribe has sufficient water rights to enable wet cooling; however, water resources in the desert are invaluable to both humans and wildlife and are irreplaceable. The value of water will only increase with the cumulative effects of climate change. For this reason, a project that utilizes wet cooling in the desert cannot be considered a sustainable project in the long term.

Dry cooling has its drawbacks. Air has a lower capacity to carry heat than water; therefore dry cooling is less efficient than wet cooling in removing heat and may require the use of cooling fans that consume a portion of the electricity generated by the plant. It may be possible to offset the effect of dry cooling on net electricity generation by using bigger solar collecting fields or PV systems to run cooling fans.

[1] water consumed per megawatt hour of electricity produced

The Department of Energy[2] found that electricity generation at a dry-cooled facility dropped off at ambient temperatures above 100 degrees Fahrenheit. The DEIS should include the data that shows the number of days this temperature is exceeded to help in the evaluation.

The trend for large scale solar energy projects is to utilize dry cooling. Of the 32 solar energy projects undergoing the NEPA review in Region 9, only three projects continue to consider wet cooling as an option, Abengoa Mojave Solar Project, Hyder Valley Solar Project, and Beacon Solar Project. Recognizing the constraints associated with increased water usage in desert environments, most companies have switched either to dry cooling or hybrid cooling systems that use less water. Several companies have even opted to switch technologies, going from parabolic trough to PV instead, due to lower costs associated with PV usage.

Government agencies also recognize the value of water in the desert. Bureau of Land Management (BLM) and the U.S. Fish and Wildlife Service (FWS), along with California state agencies, have drafted best management practices for desert renewable energy projects[3] that help proponents design projects that minimize environmental and public health/safety impacts. A main suggestion is that projects not use fresh groundwater or surface water for power plant cooling. BLM and FWS also participated in the independent science advisors recommendations prepared for the California Desert Renewable Energy Conservation Plan[4] which stated that renewable energy projects should have a goal of strictly minimizing total water use over the life of a project.

Cost-benefit analysis

According to the Department of Energy, air cooling and wet/dry hybrid cooling systems offer highly viable alternatives that could reduce the total water usage of steam-generating CSP plants by 80 to 90% at a penalty in electricity cost in the neighborhood of 2 to 10%, depending on plant location and other assumptions. The penalty for linear Fresnel designs, which the NOI indicates is being considered for the project, is expected to be somewhat higher than for troughs because of its lower operating temperature. Conversely, power towers would have a lower cost penalty because of their higher operating temperature[5].

It is clear that an evaluation of CSP technologies with regard to how well they can accommodate water-efficient cooling technologies is important for the impact assessment. We believe it is appropriate that a thorough evaluation of the costs and benefits of these technologies be included in the DEIS, as an aid in evaluating the environmental consequences of the alternatives. It is also necessary if alternatives will be eliminated on the basis of costs; i.e. statements that dry cooling will decrease the project output which will render the Project economically unsound or noncompetitive. Such statements should consider that the impact assessment for the Beacon Solar Energy Project in California found that dry cooling was economically feasible because it surpassed the benchmark internal rate of return established for economic feasibility. Three solar thermal projects (Blythe, Palen and Desert Sunlight Solar Projects) propose the use of dry cooling in similar climate as the proposed Project, clearly finding this cooling technology economically feasible.

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[2] *Concentrating Solar Power Commercial Application Study: Reducing Water Consumption of Concentrating Solar Power Electricity Generation.* Available: http://www1.eere.energy.gov/solar/pdfs/csp_water_study.pdf

[3] "Best Management Practices and Guidance Manual: Desert Renewable Energy Projects" Available: http://www.energy.ca.gov/2009publications/CEC-700-2009-016/CEC-700-2009-016-SD.PDF

[4] http://www.energy.ca.gov/2010publications/DRECP-1000-2010-008/DRECP-1000-2010-008-F.PDF

[5] See footnote 2

Other environmental benefits of dry cooling
According to the Genesis Solar Energy Project EIS, dry cooling provides environmental benefits beyond water conservation. Dry cooling significantly reduces emissions of particulate matter, both 10 micron (PM_{10}) and 2.5 micron ($PM_{2.5}$), due to the elimination of cooling tower mists. The Dry Cooling Alternative in that EIS showed reductions of annual PM_{10} emissions by 19% and reductions of $PM_{2.5}$ emissions by 53%.

The NOI indicates that, along with cooling towers, evaporation ponds would be components of the CSP project. Evaporation ponds pose several threats to wildlife. The ponds can be a danger to the birds if potentially toxic concentrations of salt or other constituents are present within the groundwater. The ponds could also attract ravens which could increase predation rates on desert tortoise and other sensitive species in on-site and adjacent habitats. This should be discussed.

10-BIO 1

Water Supply and Water Quality
The DEIS should estimate the quantity of water the project will require during the construction phase and during operations (process and cooling water for CSP, cleaning the PV panels during routine maintenance, administration and sanitation uses in the small on-site office, etc.). Describe the source of this water and potential effects on other water users. If groundwater will be used, the potentially-affected groundwater basin should be identified and impacts to groundwater recharge, springs or other surface water bodies and biologic resources should be analyzed. The study area should be based on the resource and not the tribal reservation boundaries. Potential for subsidence should be identified. The DEIS should include a discussion of cumulative impacts to groundwater resources within the hydrographic basin, including reasonably foreseeable impacts from other large-scale solar installations that have been proposed. Available technologies to minimize or recycle water should be identified. Any landscaping around buildings should utilize xeric native plants.

10-WAT 1

10-WAT 2

Because of potential climate change affects on water quantity, the DEIS should describe water reliability for the proposed project and clarify how existing and/or proposed sources may be affected by climate change. Discuss adaptability of the project to these changes.

The DEIS should also address the potential effects of project discharges on surface and groundwater quality, including wastewater discharges from the office and any maintenance buildings.

Clean Water Act Section 404
We understand a jurisdictional delineation for waters of the U.S. has been prepared and is being submitted to the Corps of Engineers. If a 404 permit is required, the project must comply with *Federal Guidelines for Specification of Disposal Sites for Dredged or Fill Materials* (40 CFR 230), promulgated pursuant to Section 404(b)(1) of the CWA ("404(b)(1) Guidelines"). Pursuant to 40 CFR 230, any permitted discharge into WOUS must be the least environmentally damaging practicable alternative (LEDPA) available to achieve the project purpose. The DEIS should include, and craft NEPA alternatives consistent with, evaluating project alternatives in this context, in order to demonstrate the project's compliance with the 404(b)(1) Guidelines. If, under the proposed project, dredged or fill material would be discharged into WOUS, the DEIS should discuss alternatives to avoid those discharges.

10-ALT 2

The DEIS should describe all waters of the U.S. that could be affected by the project alternatives, and include maps that clearly identify all waters within the project area. The discussion should include the acreages and channel lengths, habitat types, values, and functions of these waters.

Avoiding desert washes regardless of jurisdiction
Most of the river miles in Nevada (88%) are seasonal or ephemeral (flowing only immediately after heavy rain), where infrequent, short-lived but high-volume flash flows are the norm. These flows, although rare, are essential to the integrity of the nation's arid ecosystems, underscoring the importance of their protection. These flows also recharge groundwater by storing and circulating water in the stream network across a landscape. A recent study in Arizona's San Pedro River basin showed that the network of ephemeral streams account for up to 40% of annual regional aquifer recharge during wet years.

10-WAT 3

The DEIS should commit to the use of natural washes, in their present location and natural form and with adequate natural buffers, for flood control to the maximum extent practicable. Because placement of heliostats would result in erosion, migration of channels and local scour, heliostats should not be placed in washes to minimize direct and indirect impacts to the washes. The potential damage that could result from disturbance of flat-bottomed washes includes alterations to the hydrological functions that natural channels provide in arid ecosystems: adequate capacity for flood control, energy dissipation, and sediment movement, as well as impacts to valuable habitat for desert species.

Air Quality

10-AQ 1

The DEIS should provide a detailed discussion of ambient air conditions (baseline or existing conditions), National Ambient Air Quality Standards (NAAQS) and nonattainment areas, and potential air quality impacts of the project, including cumulative and indirect impacts, for each fully evaluated alternative.

10-AQ 2

Emissions should be estimated for the construction phase, as well as for the operational phase from maintenance activities and ancillary operations. Construction-related mitigation measures should be discussed (see below).

The Las Vegas 8-hour ozone nonattainment area excludes the Moapa River Indian Reservation; however, the reservation is surrounded by this nonattainment area and emissions from the project have the potential to impact this area. Therefore, emissions of ozone precursors, (volatile organic carbons (VOCs) and oxides of nitrogen (NOx)) should be reduced through mitigation measures, especially during the construction phase.

EPA finalized an attainment designation for particulate matter less than 10 microns (PM10) for the Las Vegas Planning Area to the southwest of the reservation in August of 2010. However, reasonable mitigation measures to reduce fugitive dust should still be implemented, for the benefit of localized receptors such as construction workers, and to reduce impacts to existing flora and fauna habitats.

Construction Emissions Mitigation
As mentioned above, standard mitigation measures should be implemented to reduce impacts associated with emissions of particulate matter, ozone precursors, and mobile source air toxics from construction-related activities. The following are recommended:

Fugitive Dust Source Controls:

- Stabilize open storage piles and disturbed areas by covering and/or applying water or chemical/organic dust palliative where appropriate. This applies to both inactive and active sites, during workdays, weekends, holidays, and windy conditions.
- Install wind fencing and phase grading operations where appropriate, and operate water trucks for stabilization of surfaces under windy conditions.
- When hauling material and operating non-earthmoving equipment, prevent spillage and limit speeds to 15 miles per hour (mph) and speed of earth-moving equipment to 10 mph.

Mobile and Stationary Source Controls:

- Maintain and tune engines per manufacturer's specifications to perform at EPA certification levels, where applicable, and to perform at verified standards applicable to retrofit technologies.
- Employ periodic, unscheduled inspections to limit unnecessary idling and to ensure that construction equipment is properly maintained.
- Prohibit any tampering with engines and require continuing adherence to manufacturer's recommendations.
- If practicable, lease new, clean (diesel or retrofitted diesel) equipment[6]. In general, commit to the best available emissions control technology. Tier 4 engines should be used for project construction equipment to the maximum extent feasible[7].
- Utilize EPA-registered particulate traps and other appropriate controls where suitable to reduce emissions of diesel particulate matter and other pollutants at the construction site.

Administrative controls:

- Develop a construction traffic and parking management plan that minimizes traffic interference and maintains traffic flow.
- Identify any sensitive receptors in the project area and minimize impacts to these populations. If applicable, locate construction equipment and staging zones away from sensitive receptors and fresh air intakes to buildings and air conditioners.

Biological Resources and Habitat

Desert Biodiversity

Impacts to biological resources can be substantial in desert habitats. Unless projects establish strict conservation goals for desert aquatic resources, renewable energy production may come at the expense of desert biodiversity. Less than 1% of the vegetation in deserts is riparian (streamside), yet most desert animal species, whether birds, mammals, reptiles or amphibians, rely on riparian habitat for at least part of their life cycle.

PV array fields typically are graded flat with all vegetation removed before installation begins. Soils under PV arrays are frequently sterilized to prevent weed growth, which prevents the natural revegetation of native plants that could minimize erosion and provide wildlife habitat.

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[6] EPA's website for nonroad mobile sources is http://www.epa.gov/nonroad

[7] Diesel engines < 25 hp rated power started phasing in Tier 4 Model Years in 2008. Larger Tier 4 diesel engines will be phased in depending on the rated power (e.g., 25 hp - <75 hp: 2013; 75 hp - < 175 hp: 2012-2013; 175 hp - < 750 hp: 2011 - 2013; and ≥ 750 hp 2011- 2015).

10-BIO 2 The potential impacts of construction, installation, and maintenance activities on habitat and species should be discussed in the DEIS. Discuss the impacts associated with an increase of shade in the desert environment on vegetation and species, and impacts associated with constructing fences around the project site.

Efforts to preserve vegetation and habitat should be pursued. In arid areas, disturbed vegetation is slow to recover. It may be possible to mount PV panels at sufficient height above ground to maintain natural vegetation and drainage. Practices that preserve habitat, minimize weed invasion, and prevent erosion should be incorporated into the project.

Protected Species
We understand that formal consultation with the U.S. Fish and Wildlife Service under Section 7 of the Endangered Species Act will occur for the federally listed Desert Tortoise and other potentially impacted listed species. We recommend that the Service's Biological Opinion be included as an
10-BIO 3 appendix to the EIS.

10-BIO 4 Analysis of impacts and mitigation on listed species should include: (1) baseline conditions of habitats and populations of the covered species; (2) a clear description of how avoidance, mitigation and conservation measures will protect and encourage the recovery of the covered species and their habitats in the project area; and (3) monitoring, reporting and adaptive management efforts to ensure species and habitat conservation effectiveness.

Invasive Species
Executive Order (E.O.) 13112, *Invasive Species* (February 3, 1999), mandates that federal agencies whose actions may affect the status of invasive species shall use their relevant authorities to prevent their introduction, provide for their control, and minimize the economic, ecological, and human health impacts that invasive species cause. The DEIS should describe how the project will meet the
10-BIO 5 requirements of E.O. 13112. We recommend including an invasive plant management plan for the monitoring and control noxious weeds.

Cumulative Impacts
Cumulative impact analyses describe the threat to resources as a whole, presented from the perspective of the resource instead of from the individual project. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR §1508.7). Discussions of cumulative impacts are usually more effective when included in the larger discussions of environmental impacts from the action (the environmental consequences chapter), as opposed to locating cumulative impact analyses in a separate chapter.

The DEIS should describe the methodology used to assess cumulative impacts. We recommend the methodology developed jointly by EPA, the Federal Highway Administration, and the California
10-CUM 1 Department of Transportation, available at: http://www.dot.ca.gov/ser/cumulative_guidance/approach.htm. While this methodology was developed for transportation projects, the principles and steps in this guidance offer a systematic way to analyze cumulative impacts for any project.

There are currently many solar energy projects being proposed on Bureau of Land Management (BLM) land in the desert southwest. The analysis of cumulative impacts should consider these other projects, in addition to other developments in the area and general resource trends, on the resources that would be affected by the proposed project. We recommend thorough discussions of cumulative impacts to water resources and the Desert Tortoise.

Climate Change Effects

10-CLI 1 Climate change is likely to contribute cumulative impacts to some resources, including water, air and biological resources. The additive impacts from climate change on resources affected by the project should be discussed. In discussing direct climate change effects from the project, include impacts that the project will have on carbon sequestration from the loss of desert vegetation and soil disruption. Recent studies have estimated that the desert biome absorbs an amount of carbon comparable to temperate forests and grassland ecosystems[8]. The DEIS should also document the significant benefits from reduced greenhouse gas emissions from the proposed project as it compares to energy production 10-CLI 2 associated with fossil fuels.

Hazardous Materials/Waste Management

10-HAZ 1 The DEIS should address potential direct, indirect and cumulative impacts of waste generation, including hazardous waste, from construction and operation. The document should identify projected waste types and volumes, including from maintenance vehicles, and identify expected storage, disposal, and management. Identify the applicability of federal hazardous waste requirements. The generation of hazardous waste should be minimized. If PV panel trackers will utilize hazardous materials such as refrigerants, discuss and evaluate potential impacts from accidental or unexpected releases on environmental resources. Alternative tracking methods that minimize hazardous materials use should be evaluated.

Photovoltaic Production and Recycling

From a life-cycle perspective, production of PV components results in environmental impacts, from relatively high energy use to the use of large quantities of bulk materials and small quantities of scarce or toxic materials[9]. PV production companies can minimize their environmental impacts during raw material extraction, minimize the amount of rare materials used in the product, and facilitate future 10-OTH 1 material recovery for reuse or recycling. To the extent possible, EPA recommends that the project source PV components from a company that minimizes environmental impacts during production.

[8] Wohlfahrt, G., Fenstermaker, L.F., and Arnone III, J.A. 2008. "Large Annual Net Ecosystem CO_2 uptake of a Mojave Desert Ecosystem". Global Change Biology, Vol.14, 1475-1487

[9] Tsoutsos,T. et al. 2005. Environmental impacts from the solar energy technologies. Energy Policy 33, 289–296.

Comment Reference Document 11

PUBLIC COMMENT FORM
Bureau of Indian Affairs

MOAPA SOLAR ENERGY CENTER PROJECT
www.MoapaSolarEnergyCenterEIS.com
Scoping Comments

NAME: Fran Cherry

ADDRESS: Kern River Gas Transmission Co
PO Box 71400
Salt Lake City Ut 84171-0400

( ) I have no comments, please keep me informed.

( ) Please remove me from your mailing list for this Project.

(X) I have the following comments about the Moapa Solar Energy Center Project:

Please see attached comments

Return to: Ms. Amy Heuslein, Regional Environmental Protection Officer, BIA Western Regional Office, 2600 North Central Avenue, 4th Floor Mailroom, Phoenix, AZ 85004
Email: amy.heuslein@bia.gov (Or fold, seal, and add a stamp to the back of the sheet)

Kern River®
GAS TRANSMISSION COMPANY
A MIDAMERICAN ENERGY HOLDINGS COMPANY

August 20, 2012

Francis (Fran) Cherry
Senior Environmental Specialist
P.O. Box 71400
Salt Lake City, UT 84171-0400
Phone 801-937-6133
fran.cherry@kernrivergas.com

Ms. Kellie Y. Youngbear
Superintendent, Southern Paiute Agency
Bureau of Indian Affairs
P.O. Box 720
St. George, UT 84771

Attention: Mr.Paul Schlafly

Dear Ms. Youngbear:

Kern River Gas Transmission Company ("Kern River"), a subsidiary of MidAmerican Energy Holdings Company, appreciates the opportunity to submit comments concerning the Proposed Moapa Solar Energy Center, Clark County NV, public scoping, in preparation of an Environmental Impact Statement. Kern River respectfully submits these comments on issues that should be considered in the preparation of the draft Environmental Impact Statement (EIS) for the above project.

Kern River owns and operates 1,680 miles of interstate natural gas pipeline through the states of Wyoming, Utah, Nevada and California. By state, 154 miles are located in Wyoming, 712 miles in Utah, 276 miles in Nevada and 538 miles in California. Approximately 850 miles are located on federally managed lands. The pipeline consists of 1,310 miles of 36-inch diameter steel pipe and 219 miles of 42-inch diameter pipe. The remaining portions are 30-inch diameter or less. The Kern River pipeline system currently has a design capacity of more than 2.14 billion cubic feet per day and is considered critical energy infrastructure for the western United States. For example, Kern River delivers approximately 25% of the average daily demand of natural gas into California and 84% of the average daily demand of natural gas into Southern Nevada.

Because Kern River transports natural gas in interstate commerce, it is regulated by the Federal Energy Regulatory Commission ("FERC") under the Natural Gas Act.

As can be ascertained from the project description accompanying the scoping meeting invitation, the detailed maps of the proposal, and in looking at energy expansion needs, additional, especially green sources of energy, are needed to keep abreast with the rapid population expansion of the southwest. Natural gas demand is undergoing a similar growth requirement, not only in the southwest, but across the nation. Business and industry as well as the general public are looking for additional sources of energy that are cost efficient and that exhibit low pollution impacts.

Kern River notes in the scoping description, the proposed location of the project site on the Moapa Indian Reservation would be in the vicinity of the Kern River gas transmission pipelines and several other utility corridors in the area. Just as the Moapa Solar Energy Center is trying to meet the ever increasing demand for additional power, so too is Kern River as well as many other companies that are attempting to meet the demands for energy expansion. Power companies, gas transmission companies, and other linear based utilities need corridors and routes to safely and efficiently traverse the western United States, especially in the Las Vegas area. As
11-SOC 1 this EIS and site plan are developed special care should be taken to protect other users of common corridors, allowing all the ability to continue to operate and maintain their respective operations, complimenting everyone's needs. This is necessary so as to not negatively affect other transmission needs that would environmentally or economically put any user at a disadvantage relative to each other. Kern River is also concerned that as corridor crossings are
11-LAN 1 determined for as a part of this process, that enough space be identified to allow crossings be as near to right angles as possible to separate transmission lines so interference is minimized and the possibility of construction damage is minimized. There is also concern over the mitigation of
11-HEA 1 potential electrical current negatively affecting pipelines causing corrosion issues.

Summary

Many areas of the West are experiencing unprecedented growth with ever increasing energy demands and an overtaxed energy delivery system. Energy supply demands, existing capacity constraints and utility service reliability obligations make it imperative that as new major systems are added, despite the difficult environmental and permitting challenges facing western infrastructure developers, care be taken not to harm existing energy providers' systems. A well-considered EIS and cooperation between the permitting agencies, proponent and other users, holds great promise as a solution to the infrastructure needs of the developing southwest described in the scoping process. Toward that end, Kern River is hopeful the recommendations provided above will help assure that the Moapa Solar Energy Center facility is processed in a timely manner and constructed environmentally responsible manner.

Kern River appreciates the opportunity to comment on this scoping process and looks forward in cooperating in the EIS process. If you have any questions on these comments or would like more information, please feel free to contact me at 801-937-6133.

Sincerely,

Francis (Fran) Cherry
Senior Environmental Specialist
Kern River Gas Transmission Company
801-937-6133
fran.cherry@kernrivergas.com

Comment Reference Document 12

MOAPA SOLAR ENERGY CENTER

SCOPING COMMENT PROVIDED VIA PROJECT WEBSITE

Name.first	james
Name.last	flier
Email	jamesflier@cox.net
Comment	full speed ahead.
Address	744 e milano drive
Would you like to be included on our mailing list?	Yes
City	n las vegas
Zip Code	89081
Select One	Nevada

Comment Reference
Document 13

Case: U.S. Bureau of Indian Affairs & The Moapa Band of Paiute Indians

Transcript Testimony of **Moapa Public Meeting**

Date: August 21, 2012
Volume:

Job #: 585214

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TRANSCRIPT OF PROCEEDINGS

MOAPA PUBLIC SCOPING MEETING

Taken on Tuesday, August 21, 2012

At 5:29 P.M.

At One Lincoln Street

Moapa, Nevada

Reported by: DONNA J. ABRAHAMSEN, RPR, NV. CCR NO. 420
CA. CSR NO. 9652, WA. CCR NO. 3262

TRANSCRIPT OF PROCEEDINGS,

taken at One Lincoln Street, Moapa, Nevada, on Tuesday, August 21, 2012, at 5:29 p.m., before Donna J. Abrahamsen, RPR, Certified Court Reporter, in and for the State of Nevada.

APPEARANCES:

William Anderson, Tribal Chairman
Moapa Band of Paiutes

Paul Szewczykowski, Logan Simpson Design Inc.
Kellie Youngbear, Bureau of Indian Affairs
Amy Hueslein, Bureau of Indian Affairs
Paul Schlafly

Kathleen Sprowl, Bureau of Land Management
Brenda Wilhight, Bureau of Land Management
Vanessa Hice, Bureau of Land Management
John Evans, Bureau of Land Management
Daniel Menahem, resAMERICAS
Gary Cantley, resAMERICAS

* * * * *

MOAPA, NEVADA; TUESDAY, AUGUST 21, 2012

5:29 P.M.

CHAIRMAN WILLIAM ANDERSON: Good afternoon, everybody.

I'm going to go ahead and welcome all of you here to tonight's scoping meeting. And what I want to do is I want to go ahead and bring our council member, Richard Fisher, up here to go ahead and give a blessing for today.

MR. RICHARD FISHER: Good evening. Father, Lord in Heaven, we thank you for this time being here, Father, to come together. We ask a special blessing upon the food that was partaken, Father, to nourish our body and give us strength, and we thank you for that. And, Lord, we thank you for this evening, and Father, we have your hands laid upon this place, Father, that the right way will be safe, Father. And your presence are welcome, Father. Thank you.

And give the honor and praise, Father. Watch everyone that's on their way. We thank you for that and carefully give you the honor and presence. In Jesus' name. Thank you.

CHAIRMAN WILLIAM ANDERSON: All right. Thank you for that, Richard. Well, first of all, I want to introduce myself. My name's William Anderson, Chairman for the Moapa Band of Piutes. This is the second scoping meeting that I'm very pleased to go ahead and be a part of. The first one that we threw was K Road, it was -- it went very well. I'm pleased how things worked out. And the way things are working out right now with resAMERICAS on their second site, it looks like the same thing is going to happen again. And we're going to go ahead and continue on and start development for the second site.

And what happened was is that the main thing that we were trying to focus on was just a lot of issues that were being -- work done during the time -- most the time go ahead and make sure we get the right type of project that's been brought out here. With resAMERICAS, what they're going to do is they're going to offer not only just the PV panels that you see displayed here around the building here, but also we're going to go with a concentrated solar which they're going to go ahead and talk to you more all, but they're going to explain a lot more to it.

The -- the main reason that we -- that I wanted to be a part of this project is to make sure that we go ahead and bring this development towards the reservation. And where in the, you know, I don't want to go ahead and turn to another subject, but it's basically what we're trying to do, is we're trying to go ahead and provide clean energy.

Clean energy is something that we want to go ahead and have, something that would not affect our people.

Something that would not affect our land, animals, plants, and the earth -- and Mother Earth itself. We want to go ahead and ensure that we protect it and do everything we can to go ahead and make sure that everything goes through as smoothly as the way it should be.

It's something that has been going on for a while that this process has been handling here. And during this time, we also face another fact that was coming into play which was with environmental issues dealing with coal. And to see so many people pass away as well as I want to give my respects out to Calvin who's still there now. He's still hanging in there. And he's one of the closest people that's closest to the plant.

And to ensure that we don't have the type of problem again, I want to make sure that we do somethings that right for the environment, right for Mother Earth, right for, you know, everything that we have been trying to work towards. And basically, that's what we're a part of.

Our people are -- we are connected to this earth. We are connected to this land. And through this connection, this is how we want to go ahead and show it. We want to go ahead and bring together, not only a new technology, but a new technology that will work with our people as well. And with everything that we had here and everything we have is from the sun, we have plenty of sun. We have plenty of land, and. We also got a power corridor going through our land and issues that we're facing right now, this is how things seem to work for us.

And, you know, just how things happen is the way things happen. And it's not the, you know, that's the way things are tended to be. And that's what we're trying to work towards. Again, we're trying to go ahead and be responsible. We're trying to show that we're not just going to go ahead and just sit here and just take this type of pollution. We're also going to go ahead and doing something towards it and go ahead help towards it, ultimately ways to find new energy. Many, many ways that we can go ahead and do this. The best way right now is working with solar.

And when I first met Daniel, it was we wanted to go ahead and make sure we did everything that was right. I'm glad through a lot of hard work and a lot of talking and a lot of phone tag and everything we have been doing all this time, it's now where we are today. It just seems again how things work with everything we have been going and doing right now. It was during the energy summit where we were at getting a lot of publicity.

And it just so happened to be that very same day that when -- when we were approved for our fast track. And I didn't know, you know, at the time that Daniel called me and, "Oh, did you get the message? Did you get the e-mail?

I'm like, "No, I didn't. It's like I'm on my way there." He goes, "Yeah, we got approved for it." I said, like, "Really?"

I just couldn't -- it just blew me away how things just kind of just worked, how everything happened all together. It was just good news on top of good news on top of good news we received all day from both developments. Actually, it was three, it was two for solar and one for Harry Reid to go ahead and give us the support we were looking for.

And, again, it's been through a lot of hard work to go ahead and work with all these agencies to go ahead and work with the BLM, work with the BIA, Fish & Wildlife, and everybody that we have been involved with during this time. And we want to make sure that we do the right thing again. We want to make sure -- we also take care of our land, and We want to make sure we take care of our animals. Most of all, ensure that we have -- we are healthy enough to go ahead and see this project through.

And so that's why when -- when these things just happened, it was just, like I said, one after another. And the last part was when Ken Salazar himself wanted to ensure that we got this project to go through and, you know, it was just a lot of hard work to go ahead and just give him notice to us, and to see if he could get that recommendation that we were looking for.

So again, I'm glad -- again, it was like only, what, seven renewable projects across the country that were set for fast track. Two were here in the State of Nevada, and out of all the solar projects that were -- that was waiting for this approval, resAMERICAS was the other one.

And, again, it was something that the -- I was glad to see it happen. So it was one thing after another, and here we are today. And like I said, I'm glad to be here for the second one to be a part of this, and I want to go ahead and to also let you know that the BIA worked so hard with us, too, to make sure that we got this project to work where we are today.

Without their help, without everything that they have done, we probably still will be another year behind. But they were working very, very well with all the groups. Amy Heuslein, she'll be coming up here in a bit. She's the one that's been coordinating that we have been trying to go ahead and focus on and making sure that we do what we to do to get EIS through.

So everything that we have here, from the -- everything that's displayed here, everything we have around here, we have -- Daniel, you don't mind raising your happened over there (indicating). Go ahead and have questions with him. If you want to ask any questions dealing request with K Road, they're right in the back over there, too. That's Lori and Alice so they can go ahead and answer any questions, too. But, again, this is -- this might is just resAMERICAS or what their project is, and I'm very glad, very glad to go ahead and get to see where they're at right now. So what I want to do now is I want to go ahead and bring the next presentation here is going to be done by Kellie, Kellie Youngbear, from the BIA. Thanks.

MS. MS.KELLIE YOUNGBEAR: Thank you.

My name is Kellie Youngbear. I'm a superintendent for Southern Paiute agencies Bureau of Indian Affairs. And our office is located in St. George, Utah. I would like to introduce the agency staff so that you know who we are when we're out here. Christina Varrella, she's our realty assistant. Paul Schlafly, he's our natural resource specialist. And, also, Tamara Dawes which is the western regional realty specialist who is helping us with all of the lease and any documents that pertain to realty.

I would also like to thank the Chairman for inviting us, and it is a exciting process. It's good to see and I'm excited to be involved with it. And if you have any questions, please give us a call, but we are involved because we have trust responsibility over the trust lands in Moapa. So thank you.

MS. AMY HEUSLEIN: Good evening and welcome to the first public scoping meeting for the resAMERICAS Moapa solar project here on the Moapa Band of Paiutes reservation. My name is Amy Heuslein. I'm with the Bureau of Indian Affairs, western regional office out of Phoenix, Arizona. I'm also the regional Environmental Protection officer. I've been with the Bureau of Indian Affairs over 26 years.

I've seen a lot of projects go on Indian lands, some that have gone to construction, and some that haven't. We have gone through very -- a lot of environmental processes, but I'm glad to be here tonite to help go through some of what we have to go through to get a project on the ground. Some of the environmental compliance requirements, and I'm going to be explaining those here in a moment for you.

In the mean time, I'd like to go ahead and do some introductions, also. I've got some staff here from the BI Western Regional office. We've got the regional archeologist with us this evening, Gary Cantley.

Gary, can you stand please (indicating). Thank you.

We also have representation from the Bureau of Land Management. The Bureau of Land Management is going to be a cooperating agency with us on the Environmental Impact Statement or what we refer to as an EIS, and I'm going to have them introduce themselves, if you wouldn't mind. We can start with Brenda, please.

MS. BRENDA WILHIGHT: Hi. I'm Brenda Wilhight, a realty specialist, and I will be the project lead on this particular project in Las Vegas.

MS. KATHLEEN SPROWL: I'm Kathleen Sprowl, and I handle the cultural resources and paleontology for projects, and I work with Brenda.

MS. VANESSA HICE: Vanessa Hice. I'm from the Las Vegas field office. I'm the assistant manager for the lands division.

MR. JOHN EVANS: I'm John Evans, planning and environmental coordinator for the Las Vegas field office.

MS. AMY HEUSLEIN: Thank you.

We also have several other agencies, federal agencies, who are cooperating agencies. Unfortunately, they couldn't make it -- be with us tonight. But they include here the list that's on -- on the overhead here, the PowerPoint. And that's the U.S. Fish & Wildlife Service, the National Park Service, the Environmental Protection Agency out of San Francisco, and also, Nellis Air Force Base. They all have an interest in this project. They may have should subsequent approval actions that they may adopt this Environmental Impact Statement, EIS, for their federal action they may have. Or they need information from these documents for their own -- for their own compliance purposes with us.

Before I go into actually the details of the project -- and this is something that I want to make sure that folks also know -- that we do have a consultant working with us, and the consultant is In-Value. In-Value is out of Denver, Colorado, and they're helping to prepare the EIS. And I'd like to introduce Randy Schroeder. Randy's going to be talking with us soon. And Jeannette Losstracco, if I pronounce that Jeannette. She's back at the sign-in sheet table.

And also to help Jeannette, if you guys have not signed in yet, please do. We're trying to keep a record of who's here tonight. We also have some comment cards in the back. So if you're interested in providing any comments to us on this process, that would be good. If you don't want to submit one of the comment cards to us, then you can always e-mail myself or Paul. Where is Paul again? Paul Schlafly with the BIA.

And we also have a website that is available, and then, of course, there's always hard mail if you want to write us a letter. You know, so there's various means for us to hear communications from you-all on this. And then, also, we are -- where is Paul?

Paul, you want to introduce -- Paul is our third-party reviewing consultant. You want to introduce yourself, Paul?

MR. PAUL SCHLAFLY: My name's Paul Schlafly, I'll be working with everyone.

MS. AMY HEUSLEIN: So you can see we have got quite a full team of folks who are working on this project. Last but not least is with the resAMERICAS, and they were introduced a little earlier, but Daniel Menahem and Ryan Henning. Thank you, guys.

And then of course, not -- as I said, if it wasn't for the tribe, Moapa Band of Paiute Indians, we wouldn't be here tonight working -- trying to work toward this project for something for the tribe itself. So I'm glad that we're here and I appreciate Chairman Anderson having us -- allowing us to have the meeting here and bring the information to you-all.

So let's talk a little bit about where we're at and what the proposed action is for this project. This is going to be a proposal by the Moapa Solar, LLC, group which is basically resAMERICAS. And the Moapa Band of Paiutes. The proposal is for an up to 30-year land lease on reservation for the operation of up to a 200-megawatts solar generation facility, and that includes rights of ways on BLM lands for the transmission line, which could be several transmission lines we're looking at, one of 500 kV line and also a 230 kV line. Both to either -- one to go to Harry

Allen substation, potentially one to go to the Crystal Substation. And hopefully, most of you folks know where that is located at. And then, of course, access to the site, an access road.

It's going to be here in Clark County on the reservation and also nearby BLM-administered lands. The actual location is in the southwest corner of the reservation, the very southwest corner of the reservation. I think we have a poster in the back that has a map of the reservation where it's located here on my right or your left and then also another poster that's more site specific in the back for the project.

Why are we doing this? Well the tribe says they would like to provide some economic development for the reservation and other benefits such as jobs and a revenue source for the Moapa Band itself. So -- and also trying to meet some renewable energy goals that have been set out for the company itself and for the region itself. Okay.

I'm going to go into why we're doing this process the NEPA process, but I have some background here. This is just my information and where I'm located at. And, Randy, I think you have to put up that other presentation, if you could, so just for a moment. While he's doing that, the Bureau of Indian Affairs is responsible and has jurisdiction for Indian lands. So what we're looking at here is to ensure that the environmental compliance is done correctly, and we have to go through this Environmental Impact Statement process.

But I wanted to share with you -- Gary, I need some lights so -- because this is a little darker so people can see this. BIA is in the Department of Interior, and I wanted to show you kind of where we sit in the process of, you know, where we're located, my office is.

We have got our central office which is our Washington, D.C., office. And that's located in Washington, D.C. And then we have the Assistant Secretary for Indian Affairs and the BIA director. We have an office of trust services that handles a lot of the trust activities like our realty activities our natural resources, forestry for tribal lands.

And then there's an office of management support services, and underneath that is the division of environmental and cultural resources management. Again, these are offices back in D.C. We report to all of those folks one way or another. In our western regional office in Phoenix, we have a regional director, and under the regional director is a deputy director of trust services.

Underneath that is where my office falls within the division of environmental, cultural, and safety management. So my office is called Environmental Quality

Services that's listed in red up here. And then we work with the field agencies and the tribes, get down on the ground and work with them. Also provide technical assistance and try to involve these efforts that we're working on the ground right now with this EIS process.

So that's how we're working with Kellie and Paul and Christine in camera to make sure we're coordinating correctly for you guys out here. The BI western region, I just wanted to give you a little background. We cover 42 tribes and actually a six-state region. The majority of the tribes are in Utah, Arizona, and Nevada.

Then there's some overlap along the Colorado River down in Arizona into California and then here in Nevada up in Idaho and Oregon, we have a couple tribes that go into those states, too. So we've got 12 million acres of not only tribal lands but also Indian allotments that we deal with and that we have responsibilities for. So just give you an idea, we have got a pretty big area to cover. A lot -- a lot of issues out there.

Oh, I know this gets a little busy, and I don't want to give too much detail with this, but I wanted to explain a little bit what the Environmental Policy Act is. We call it NEPA. We like to use acronyms. So NEPA is the term tonight. It was a public law that was originally that came into play back in 1969 and was approved by President

Nixon in 1970. So it's been on the books for over -- well over 40 years.

We have some regulations we call the Council Environment Quality Regulations, and those were issued back in 1978 time frame. And then the department came up with some implementing procedures in -- in early 1980 time. And then we also had a final rule on implementation of the -- of the Act itself which turned those particular implementing procedures into regulations for the department in 19 -- or 2008.

So you can see the kind of transition that is taking place. As far as BIA's concerned, our -- we had our original handbook that actually came out in 1983. We updated it in 1993 or revised it. And then it was revised again in 2005. It just was released here within about a week ago for another update and revision. And now we're calling it the NEPA Guide Book. Used to be called the NEPA handbook. So that's out on the street right now.

And it's publicly available on the BIA website, also. We also had categorical exclusions which is another form of NEPA work. And we had several -- we have had those on the books since 1996. We had a new one issued here recently just within the last month here for home site leases. So that's a good plus for us in Indian country.

And then, of course, BIA has their tribal government to government consultation policy which was done in December of 2000. But also, the BIA has a policy that was issued about a year ago in 2011. So -- so we have got some, you know, guidance for how we deal with tribes on a government to government basis, also.

This handbook, as I said, the last handbook we did was '93, and then we did 2005 and now we have the newest one here in 2012. All right. There's some key other environmental laws that we have to deal with when we go down the road with developing this EIS document. And as you can see up here, they include the Endangered Species Act, and that's where we're working with the U.S. Fish & Wildlife Service.

And with this particular project, we will have an endangered species we're dealing with on Moapa. We have the Desert Tortoise, the Mojave Desert Tortoise. It's not as -- of the tortoise on the last project, the K Road Project, we had quite a few tortoises on that particular site because it was a good habitat site for them and we found a lot. On the cite for the resAMERICAS site, we're not finding as much because I think the habitat is not as great as the other site was.

But we still have to work with the U.S. Fish & Wildlife service through what we call "formal consultation," and there's a process we must go through for that. So that's one of the laws we are responsible for and how we're going to accomplish that and working, you know, the requirements that we must get through.

The Clean Water Act is another law. Also, the National Preservation Act. That deals with cultural resources, archeological resources, and we would be doing surveys here in the near future for that. And hopefully also have some tribal monitoring going on associated with that.

Clean Air Act, and then there's a numerous executive orders that's been issued by the President or secretarial orders issued by the Secretary of the Interior we must follow, too. So there's quite a few things that come together in this one document that we're working on.

There's some other federal Indian policies out there just to be aware of that have been issued through, you know, the last, oh, I'd say last several 20 years or so. They include consultation and coordination with Indian -- Indian tribal governments. Also, memorandums that have been issued to the heads of executive offices how to deal with tribes.

We have some secretarial orders and then also other executive orders such as the executive order on environmental justice. So, again, these executive orders we have to take a look at within our NEPA document, the EIS document we're working on. We have types of -- different types of federal activities and actions that are subject to NEPA, also. And the Bureau's responsible. Anytime we deal with some of these activities up here, this will trigger our requirement for compliance with NEPA. It could be a policy. It could be a plan. It could be a program or a project.

If we're looking at approvals that the BIA has to approve on, normally they will fall under like realty-type actions such as leases, rights-of-ways, permits, what we call fee and trust acquisitions. That means maybe the tribe has some land that they brought privately and they wanted to bring it into trust status, meaning part of the reservation. Some forest activities to housing, roads, irrigation, agricultural projects, so there's a number of different areas we might need to approve something.

As far as funding actions, if the Bureau of Indian Affairs gets funding down through our annual budgets for our project on tribal lands, that may trigger NEPA compliance, and we have to do some kind of documentation, clearances, surveys, et cetera, to comply with these Acts -- or these federal laws and Acts I was showing you earlier.

And then there could be legislative proposals come down from Congress that require our compliance with NEPA. Sometimes they exempt NEPA, but sometimes they don't so we have to make sure we're following suit with that. Okay.

We're -- why are NEPA documents required? Well, it's because there's a federal nexus that the BIA has to comply with such as funding or approvals. So if we have a -- we're funding a project as an example or we're approving a lease of land like in this case for this project, with resAMERICAS, we're going to go approve in coordination with the tribe that's negotiated a lease for the lease of that particular land for that project.

Because of that, BI has to approve that. That triggers our requirement to do this NEPA document, this EIS. Why is it important? Well, really to make better decisions and to identify any concerns or issues that might come up from that project, and if necessary, any mitigating those impacts.

So, for example, we have the Desert Tortoise, we've got to make sure that we're not harming the Desert Tortoise, that we make sure that we deal with that issue. We're not going to get involved with having a problem with an archeological site, as an example. That we mitigate that issue with that particular resource. Okay.

What are some of the environmental issues that may be out there that we're dealing with as far as a project? Well, as I said, biological resources, cultural resources, water resources, surface and groundwater. This project, it will be explained here in a little, but it may have some water usage on it. And so we -- it might be -- I think the project's going to include a pipeline for some water because the solar concentrated part of the project uses water and has some towers associated with it.

I'm not going to go into the details on that. You get to do that, Randy. He'll explain what that's about. Air resources, climate change, environmental justice, Indian trust assets, social economic conditions, we have to document in detail that, and then human health and public safety.

Those are all things that we're going to write about and talk about in the environmental document. Potential or possible mitigation measures -- and we kind of go through this process that analyze the impacts in the document -- could include, for example, the biological resources, installing fencing around the project area, putting in buffer zones, relocation of species, monitoring of the construction activities, establishment of tribal escrow accounts which is a mitigation fee, and that might occur for the Desert Tortoise here because we have had to do for the prior project, the K Road Project.

Cultural resources, again, monitoring of construction activities, data recovery, including potential for testing and excavation. I don't think we're going to be able to have to go that far with this particular project because we don't have any large sites we're dealing with. The one area that we have to deal with is the Old Spanish Trail in that area, and that will be from a visual perspective, visual impacts that we have to look at.

And, for example, monitor our -- for water resources, it could be putting in monitoring wells for water quantity or quality, if that is a requirement and that would be necessary. I just want to give you some examples of potential mitigation measures. Okay.

Who's involved with this process? Well, there's a lot of people involved in it. You know, we have the lead agency which in this case is the BIA, Bureau of Indian Affairs. We have the cooperating agencies which I mentioned before. Again, I'll repeat that, BLM, the National Park Service, U.S. Fish & Wildlife service, Nellis Air Force Base, and the Environmental Protection Agency.

So I have five federal agencies that are involved as cooperating agencies and one more, the -- the Band itself, the Moapa Band of Paiutes. We have -- we could have allottees, if we have allottees, they might be involved. Third-party consultants, like Randy is here as a third-party consultant or Paul who's helping us here. The project of the -- private project applicants. Well, that would be resAMERICA.

Other -- may be other federal agencies that aren't cooperating agencies might have an interest. State and local agencies, the general public, and we also could have environmental groups that may have an interest in this project. So it's -- the gamut of different entities that are involved.

There three types of environmental documents, and the one we're concentrating on tonight is the Environmental Impact Statement, the third one up there. The other two are others that we have to deal with. If they're not as large a project or have consequences or we call significant impacts, but for tonight's purposes, we're dealing with the third once environmental impact statements. Okay. That was quick. At least in my eyes it was quick. So -- all right.

I think we'll go on now here is I'm going to have Randy go ahead and come up and get a little more detail about the project itself so you can have an idea of what's going to be on the ground. I just wanted to at least share with you kind of why we're doing this process and what it is about, and then that way, you guys can have a feel for, you know, why we're going down this path we're going.

So with that in mind, I'll go ahead and let you start -- well, actually, yeah. Let me finish one more slide here, I think that we have up here. And this is the EIS process and the schedule. And if we're lucky, we'll get through this. The Department of Interior, by the way, has put this as a priority project for us for this next year.

So basically, we're in the public scoping process right now here in August of 2012. We hope by next spring, by April time frame is what we're looking for, is to have a draft EIS available. And then that document will go out for a 45-day public review. We'll be back here again having another meeting just like this.

But we'll have it -- instead of calling it a "scoping meeting," it will just be a public meeting where you guys will have the opportunity to have the document in hand for a few weeks. Take a look at it and then if you see any issues or you want to submit comments on it at that time, you can, or maybe after, towards the end of the comment period time.

And then we're going to have the -- hope to have a final EIS done probably in the fall of 2013. October time frame. We normally take the document out for a 30-day review. We won't have another meeting at that time. We're not really required to under the regulations. But then by December, we hope to have a record of decision done. And that's the process we go through is to develop this draft EIS, get to a final document, and then issue a record of decision.

That Record of Decision is either given to our regional director in Phoenix of BIA to make the decision, or they can move it up the ladder to our Washington office, our Bureau director, or the assistant secretary of Indian Affairs or like the last one for K Road Project, it went to the Secretary of the Interior group, and this might go up to that level. We'll just have to see how-- what they want to do at that time frame. But we had the Secretary actually approved that document.

Other than I told you how could you submit comments, if you'd like to, verbally at this meeting here after we're done with the presentation, the comment form, or comment card in the back and leave it behind for us or mail it in. Directly, if you want to, if you don't want to speak to us formally here, you can go sit with the young lady over here, our court reporter. If you want to talk to her and just say, "I've got a come of comments I'd like to give for the record put down." Or you can send it to either Paul or me via e-mail address and also via the website. We have a website that's up and running now, if you'd like to do that, we can do that, too.

And that information when this slide goes off, this information is over here on one of those back posters, also. Okay. Randy, well, I'll let you take over.

So let me introduce Randy Schroeder, please.

MR. KENTON LEE: Who are you?

MS. AMY HEUSLEIN: I'm Amy Heuslein. I'm with the

Bureau of Indian Affairs in Phoenix, western regional office.

RANDY SCHROEDER: Okay. I'm just going to give a quick summary of the document, kind of give you an idea of what's being proposed here. And, again, Amy touched on this already, the purpose of the project is to provide a diverse and long-term economically viable revenue stream for the tribe as well as providing jobs, as well as assisting in the goal of developing more renewable energy.

All of the states and the federal government also have goals for renewable energy development, and this will help meet those goals. And, also, this lease in the use of this land for solar energy will optimize the tribal lands while providing the economic benefits that we just talked about. Okay.

The location we talked about, that a little bit. We have a map here that we'll bring up, and we have other maps as well. What you'll see when we show the maps is that the solar field itself, the solar site is located wholly on the reservation in the southwest corner, as Amy mentioned.

But off the reservation, there are linear features, two transmission lines, and an access road that would cross BLM lands and require rights-of-way. The two transmission lines: One is roughly six to seven miles long and would go south from the southwest corner of the reservation to the existing Harry Allen Power Plant. There's a substation there that it would interconnect with. That would be a 230 kV line, and then another line would go approximately a mile to the east to the Crystal substation, and that would be a 500 kV line.

And in addition, the access road would be about two-and-a-half miles long. Again, transmission lines and the access road all on BLM land, and with some of it on the reservation before it exit the projects. So here's a map just showing the general location of the project relative to the reservation itself. You can see the southwest corner of the reservation.

There's a thousand acres there. That's the proposed project site boundary. You can see it relative to the City of Las Vegas. You guys all know where we are because we're here right now. But the site itself, we're here on this part of the -- the reservation. The site is way down in the southwest corner.

This is more of a close-up view, and this shows all of the associated features as well. Again, the thousand-acre project site in the southwest corner. One proposed transmission line corridor that would go due south from the project site.

This yellow land is all BLM land. It goes south until it would intercept all of the existing transmission lines that are out there which would follow down to the Harry Allen site. The substation it would interconnect to is on the south side of the plant. And so depending upon where the utilities dictate these lines would interconnect, it'd either come in this way or this way if you had to connect on the northwest side or the southeast side.

And then a second -- the second line that we talked about over to the Crystal Substation would follow the reservation boundary, the southbound reservation, to a point due north of the Crystal Substation, and then it would cross BLM land there. And the primary access, this is the frontage road along I15, and there's an existing road that goes in this direction, follows either one of the transmission rights-of-way or the gas pipeline rights-of-way that are there and then would access the site in that manner.

And if this line is built, then another option would be for the road to follow the new access road for that transmission line to a point there where it would interconnect with another existing road that is on BLM land. So again, about a thousand acres there, two transmission lines, and then access to the project, those are the primary components. Okay.

Just -- again, just verifies what we just went over, but it also talks about the different technologies that are being considered for the solar project. There are a couple different technologies. One is a Photovoltaic technology similar to the K Road Project. But also being considered are two different types of concentrating solar technologies, and we'll talk about those a little bit more here.

One of the CSP technologies, concentrated solar technologies is the Areva technology, and this slide kind of shows a schematic of the process, and basically there are a number of mirrors that are focused on an elevated tube filled with fluid, water, and then the sun hits those mirrors that's reflected up to that tube heats the water sufficiently to create steam which turns a steam turbine which then creates electricity.

And so after the steam turns the turbine, then it reverts back to water, and then it's recycled through the process. And then this next slide actually shows a picture of what that looks like, and we have posters that show this as well over here. So this is the -- the tube on the top, it's roughly 50 feet off the ground or so.

And then each of these mirrors is focused -- reflect the light on that which heats it up and then all of that hot water is elected and then goes back to the plant where it's used -- the steam is used to create energy. The other technology that's being considered for the CSP component is the eSolar technology, and this is a power tower you might have heard it referred to.

Where here you have fields of mirrors similar to the ones we just looked at, and they are all focused on a tower. And so all of these mirrors reflect our light to this tower where it also heats water into steam and then goes through the same cycle where it goes through the steam turbine, turns the turbine, makes electricity, condenses, and then is reused in the system.

And that's what that looks like. Towers are roughly 250 feet tall, and you can see how each one of these individual mirrors they're relatively small mirrors. And they're all focused on the tower to generate the heat and create the steam. Then the Photovoltaic plant, what's being proposed here, is a -- a PV system with a single-access tracking system which means the rows of panels are aligned north to south, and then they track the sun during the course of the day starting on the east and then they turn to the west tracking the sun as it goes.

And then in the case of PV which you may know from other projects, it converts sunlight directly to energy so there is no steam component or steam cycle, and so it converts it to DC energy. And then it's converted to AC current which we all use in our homes and then are carried on the transmission lines.

And then all of the electricity from those panels are collected. And then they go to the site substation where the power's delivered via the transmission lines. This is what the PV panels generally look like, and here you can see the single-access tracking mounted in a north/south direction. And this is pretty close to midday where it's facing straight up, but again, they -- they track and follow the sun over the course of the day.

Okay. The associated facilities, we have talked about most of these already. The two transmission lines: One to Harry Allen, one to Crystal on BLM lands. The access road also on BLM land from the I15 frontage road to the site following existing roads, upgrading those existing roads, for the most part. Also, is mentioned a waterline because the two CSP technologies require water to convert to steam, water will be provided from an existing we will here on the reservation to the power -- the project site via new water pipeline that would be built.

And then on the CSP technologies, you actually have what's referred to as a power block where we talked about the steam turbine, and this is where the -- the team is collected, turns the turbine, it's condensed back to water, and then recycled through. So there's a central facility on the site where all of that goes to to create the steam -- to collect the steam to create the energy from the steam turbine.

And then that water then has -- there's evaporation ponds and cooling towers to condense that water back so it can be reused. And then each the PV and the CSP projects would have operation and maintenance buildings, control buildings, for the processes. And as Amy mentioned earlier, the entire site would be fenced as well. So that's another part of the project.

The biological resources, Amy also went over these so I won't go back over them. But all of these issues here on this slide have been identified as things that we need to evaluate in the EIS, and if there are others that are identified through scoping like this, then those would be evaluated as well.

But preliminarily, these are the ones that have been identified. Okay? And this is just a different view of the schedule, again, us being here, with a draft out next spring, and public meeting shortly thereafter, the final EIS next fall, and then the record of decision at the end of next year. Okay. That's pretty much the end of the -- the presentation.

So now we would throw it open to anyone who had a comment or a question and -- do you want people to come up here and use the microphone, or does it matter?

So if you want to come up here and use this, you can. You don't need to. If you can just provide your name, so we have that for the record. Like I said, any questions or comments you might have.

MR. CONNER CASTILLO: I do. Between now and then,

13-SOC 1

between now and December 13th of next year or whatever, are there going to be any jobs available between now and then, or how is that going to work out?

MR. RANDY SCHROEDER: There won't -- construction on the project can't occur until after that decision at the end of next year.

MR. CONNER CASTILLO: Okay.

MR. RANDY SCHROEDER: There will be some surveys done in the coming year, and I think we talked about in the field today that there would be some monitor positions for those cultural research surveys. But that's all I'm aware of currently.

MR. CONNER CASTILLO: Okay.

AMY HIGHTOWER: Could we get your name, please.

MR. CONNER CASTILLO: Connor Castillo.

MR. RANDY SCHROEDER: Anyone else?

MR. VERNON LEE: Yeah, I'd like this job here. Is he a Mexican or a white man or what? He Indian? I can say whatever I can say. The answer?

MR. RANDY SCHROEDER: I don't know this that's relevant.

MR. VERNON LEE: Thank you.

MR. RANDY SCHROEDER: Yes?

MR. JACK CASWELL: Jack Caswell with Bureau Veritas. I'm kind of jumping forward here because I kind of came in on the tail end. I have talked with your Director William Anderson in the past. I met him at a Native American event in -- I believe it was either Las Vegas or Scottsdale -- and we're actually a conformance company that does construction, inspection, plan review, environmental monitoring.

We currently represent the Bureau of Land Management as well as the California Energy Commission on concentrated solar or, solartron projects. We are active right now in the Mojave Desert doing that work, and I was curious as how those independent contractors are assigned on Native American lands to ensure construction/inspection is done correctly, shop inspections should materials be manufactured outside the state and outside the U.S., which they often are, meet the standards as well as enforce the environmental compliance mitigation measures as an independent third party per the EIS documents that are produced.

13-SOC 2

Who's the authority that chooses that contract or to do that work? I guess this question would be to you, Director.

MR. RICHARD FISHER: That would be the developer. They would be the ones that would go ahead and contact them.

MR. JACK CASWELL: Is there a name that I can get so I can contact specific to the developer that I can talk to, speak with about that, because this actually protects Indian lands and Indian investments.

MR. DANIEL MENAHEM: I'm Daniel. You go come see me afterwards.

MR. JACK CASWELL: All right. Thank you very much.

MR. AARON DAEODA: I'm Aaron Daeoda. A question on the water use.

THE REPORTER: I'm sorry. Louder, please.

MR. AARON DAEODA: I'm Aaron Daeoda, D-a-e-o-d-a.

13-WAT 1

I just had a question on the water use for PV. Are you looking at 15-acre feet of water, or what kind water you using for PV water?

MR. RANDY SCHROEDER: I don't know.

Daniel, you had numbers on the water use for PV versus CSP?

MR. DANIEL MENAHEM: CSP will be up to -- on PV, it will be good enough how many washings a year people do on the site of the project, so up to 50. No more than 50 feet, and that water may be trucked in and used for that.

Also, on that question, water. PV available, or what is that?

MS. AMY HEUSLEIN: Can we repeat that? And I need to have you speak louder for the court reporter. So one more time, Aaron. And Dan, you'll have to stand up and speak, also.

MR. DANIEL MENAHEM: On the water, I'm just referring to the piping PCP well or PC1.

MS. AMY HEUSLEIN: Your answer to that was?

MR. DANIEL MENAHEM: I believe that was CSP of 250-acre feet for the PV.

MR. AARON DAEODA: May I? Yes. This -- you can hear me very well. Sir, you say there's other people in the ending. There's one well or using just water -- the ending or the well. You know, what that means?

MR. RANDY SCHROEDER: No, I'm not sure I follow you.

MR. AARON DAEODA: The well?

MR. RANDY SCHROEDER: Yeah, there's an existing well over the water.

MR. AARON DAEODA: The water over here, the river that comes out, and they put a pipe to it. There you go.

MR. RANDY SCHROEDER: No. This would come from a well, not the river.

MR. AARON DAEODA: Where's that?

MR. RANDY SCHROEDER: It's an existing well here on the reservation.

MR. AARON DAEODA: Is that right?

MR. RANDY SCHROEDER: Yes?

13-OTH 1

MR. VERNON LEE: I'm wondering: Is there any additional plans for supplemental power during the night?

MR. RANDY SCHROEDER: Right now, that is not part of what this project is proposing to do. So this project would generate power during the day. The PV panels, like I said, they generate power when hit directly by the sun.

MR. VERNON LEE: Okay.

MR. RANDY SCHROEDER: And then the CSP can actually produce power a little bit after the sun goes down because the heated fluid stays warm enough for a while, but not very long. Yes?

13-SOC 3

MS. IRIS DAEODA: Iris Daeoda. I was just wondering about employment. Is the -- is the company aware of our Title Employment Rights office which is an arm of EEOC that says that you have to hire our native people?

MR. RANDY SCHROEDER: Yes. Daniel?

MR. DANIEL MENAHEM: Yeah. We are aware that there are requirements, and we will be hiring tribe workers development in the comment.

MR. RANDY SCHROEDER: Yes?

MR. PAUL SCHLAFLY: My name's Paul Schlafly. I don't know if you or Daniel could tell me, but there's the

13-OTH 2

80 feet Areva and then the 250 feet of eSolar, but then they both spin the turbine. But at this point, I guess that's why you're studying it, but what is the advantage of one versus the other, if you could say?

MR. DANIEL MENAHEM: The advantage of one over another is price and efficiency. And then the other is the preference of the customer. In this case, the Indians totally may be a preference of one over another. That's why we have all three options.

MR. PAUL SCHLAFLY: Thanks.

MR. RANDY SCHROEDER: Yes?

MR. VERNON LEE: Just all here in the people, like, they can say to you also: Are we going to get -- you got to grab the water or is it not good, the air, that's what I'm saying also, there's ones under the ground that they made or they got to grow it and, you know, take the water and sun it up to here and -- where they all at? Where's the water? Right there. One right there. What is that for? Indians don't have enough wind where you got that wind. Is that the water was no good?

MR. RANDY SCHROEDER: I'm not sure I follow that one.

MR. VERNON LEE: Yeah. I know you don't.

MR. RANDY SCHROEDER: No. Anyone else?

MR. VERNON LEE: How much water do we have in orders, if I may? Again, how much poor -- and power? We don't have no power or we got to have more just to make it?

MR. RANDY SCHROEDER: Oh, you're talking about whether or not getting the water will take more energy than the power plant produces?

MR. VERNON LEE: Well, if it may be.

MR. RANDY SCHROEDER: Yeah -- no. It would take a very nominal amount of power to pump the water from the well where this project would generate up to 200 megawatts. So hundreds and hundreds, thousands of times over the amount of power it would take to get the water on the ground. Yes?

13-WAT 2

THE SPEAKER: My name's Anna -- how much water is it going to be using to run this solar thing?

MR. RANDY SCHROEDER: Oh okay. Well, as Daniel just said a short time ago, if the CSP option is developed, the concentrating solar which uses more water, it would use up to eight hundred feet -- eight hundred acre feet per year of water and if the PV option was selected, it would use about 50-acre feet per year.

MS. AMY HEUSLEIN: Randy, you have a comparison of what eight hundred acre feet would look like versus 50 acre feet? How many swimming pools as an example or --

THE SPEAKER: Football field.

MS. AMY HEUSLEIN: -- foot ball field, something like that that you can throw that out there off the top of your head so people understand how much that -- how much water that is?

MR. RANDY SCHROEDER: Yeah, I mean, the easiest reference is in acre feet. Eight hundred acre feet would be enough water to cover an acre eight hundred feet high. That's eight hundred acre feet. And then 50-acre feet, same thing up to 50 feet high. So one's roughly 20 times greater than the other.

MR. VERNON LEE: Please, once more. If I understand, what I'm saying: Does the reservation, do we buy the white man. We got to buy it, water?

MR. RANDY SCHROEDER: No.

MR. VERNON LEE: It's not good?

MR. RANDY SCHROEDER: No. The reservation is providing the water.

MR. VERNON LEE: Uh-huh.

MR. RANDY SCHROEDER: It's the reservation's water they're providing to the project.

MR. VERNON LEE: Is that right? Wow.

MR. DANIEL MENAHEM: To clarify, reservation owns 25-acre feet of surface water and the rights of 25-acre feet to groundwater. We're looking to tap the groundwater.

MR. RANDY SCHROEDER: Anyone else?

Well, we do have these posters set up here, and there will be people around the room to answer anymore detailed and specific questions you might have. Yes?

13-BIO 1

THE SPEAKER: What are we going to do with the Desert Tortoise that are found in the area? Are they going to be relocated or just stay kept in this area?

MR. RANDY SCHROEDER: Well, that's one of the things we'll be working through with the Fish & Wildlife service to determine whether or not they need to be translocated or if they can be dealt with in place. That's part of that process, yeah. Okay.

If no one else has any other questions, then like I said, feel free to stick around and ask some questions. More details on the project itself. And then the process over here that Amy was talking about. Yes, sir?

MR. VERNON LEE: Me? Yes. I heard, also, the woman that drilled the wells here, I heard that they had to cut them off and cut them off, made them less? I heard. I don't know for true. I heard that.

MR. RANDY SCHROEDER: Yeah, I don't know anything about that.

MR. VERNON LEE: I just know the wells, I had to check it. I don't know how many it is. I won't know.

MR. RANDY SCHROEDER: Okay. Okay. Thank you all very much. And like I said, stick around ask some questions.

(The proceedings concluded at 6:28 P.M.)

STATE OF NEVADA)
) ss
COUNTY OF CLARK)

I, DONNA J. ABRAHAMSEN, a Certified Court Reporter, do hereby certify:

That prior to being examined, the witness in the foregoing proceedings was by me duly sworn to testify to the truth, the whole truth, and nothing but the truth;

That said proceedings were taken before me at the time and place therein set forth and were taken down by me in shorthand and thereafter transcribed into typewriting under my direction and supervision;

I further certify that I am neither counsel for, nor related to any party to said proceedings, not in anywise interested in the outcome thereof.

In witness whereof, I have hereunto subscribed my name.

Dated: September 4, 2012

Donna J. Abrahamsen
DONNA J. ABRAHAMSEN, RPR
NV CCR NO. 420, CA CSR NO. 9652
WA. CCR NO. 3262

Moapa Solar Energy Center EIS

Public Scoping Meeting Summary

Meeting Date and Location: August 22, 2012
BLM Conference Room, 4701 N. Torrey Pines, Drive Las Vegas, Nevada 89130

The public scoping meeting began at 5:30 PM. The meeting commenced with an open house of approximately 30 minutes. The formal presentation began at approximately 6:00 PM andattendees were seated. Brief introductory remarks were made by Brenda Wilhight, BLM Realty Specialist Renewable Energy Office at the Las Vegas meeting. The program opened with Chairman William Anderson of the Moapa Band of Paiute Indians. Chairman Anderson gave a brief history of the Reservation, what he envisions will be the future of his people and the importance of the Proposed Action to the community of Paiute Indians. Chairman Anderson then turned the presentation over to Ms. Kellie Youngbear who introduced herself and her agency staff. Following Ms. Youngbear, BIA Regional Environmental Protection Officer, Amy Heuslein introduced BIA and BLM staff and explained the various ways to provide comments. Ms. Heuslein gave a presentation explaining the purpose and need of the EIS, EIS schedule and the NEPA process. ENValue Project Manager, Randy Schroeder of the EIS consultant team, presented the Proposed Action with an overview of the technical aspects and the environmental issues already identified to be addressed in the Draft EIS. Following the presentation, Mr. Schroeder concluded the meeting with a public comment session inviting the public to provide verbal comments on the Proposed Action. Detailed notes were taken to record the public comments expressed. The following are verbal public comments received at the formal portion of the scoping meeting:

14-ALT1

1. Rob Morwka with the Center for Biological Diversity. Explain why there is a need for transmission lines to go to two different substations. Would both transmission lines be built?

   Randy Schroeder with ENValue responded that only one transmission line to one substation would be built, but both alternatives are being considered in the EIS. One proposed transmission line corridor would go due south from the project site, crossing BLM lands, where it would intercept all of the existing lines out there which follow down to the Harry Allen Power Plant. The second proposed transmission line would follow the southern boundary of the reservation to a point due north of the Crystal Substation, then it would cross BLM lands to connect from there.

14-VIS 1

2. Jim Callahan with Nellis Air Force Base. How tall will the transmission lines be?

Mr. Schroeder responded for the 230kV line they would average 120 feet tall and for the 500 kV line they would average 140 to 150 feet tall. All of these heights would vary depending on topography.

14-CUM 1

3. Bill Codwallander with Nellis Air Force Base. Where is the K Road solar project in relationship to the Moapa Solar Energy Project?
Mr.Schroeder responded the K Road solar project is located to the north east of this proposed project and is adjacent to Interstate 15.

14-WAT 1

4. Rob Morwka. Do you have an estimate of the amount of groundwater that would be used for the project?
Mr. Schroeder responded for the PV portion it would be about 50 acre-feet per year and for the CSP technology it would be about about 800 acre-feet per year.

14-CUL 1

5. Darren Dabado with the Environmental Department for the Moapa Band of Paiutes. Where is the Old Spanish Trail in relation to this project?
Kathleen Sprowl with the BLM responded that there are several segments of trails in the area, and their locations will be identified during the cultural surveys for the project. The congressionally designated trail is located across Interstate 15 on the east side of the mountains and so the solar project would not be visible from that trail.

14-VIS 2

6. Tom Miller with Nellis Air Force Base. What is the height of the towers that would crossing existing transmission line corridors – how high would they be? How tall are the receivers on the eSolar towers?
Mr. Schroeder responded that the receivers on the eSolar towers are 250 feet tall. The transmission line poles would be 120 to 150 feet high depending on topography and kV of the line.

14-CUM 2

7. Rob Morwka. We have K Road and other projects in the area and are concerned with cumulative impacts of these combined with the Moapa Solar Energy project.
Mr. Schroeder responded that the cumulative effects analysis would consider all proposed, existing and past projects in the area. This information would be contained in the EIS.

14-OTH 1

8. Christopher Caswell. Is the total megawatt generated from the PV a certainty? Which technology would be part of the Project?
Mr. Schroeder responded the PV would generate up to 100 MG. Another 100 MG could be generated from CSP.

14-PN 1

9. Rob Morwka. The project sounds speculative. When is the PPA going to be in place? We won't know the location of the transmission line routes. How would you do cumulative for tortoise and groundwater without knowing the location of the transmission line route?
   Daniel Menahem with RES Americas responded the PPA should be in place within the next 12 months.
   Mr. Schroeder responded that both transmission line routes would be included and analyzed in the cumulative effects analysis for tortoise and groundwater.

After the conclusion of the verbal comments from the public, the meeting transitioned into an open house format. Agency representatives were on hand to answer questions. Members of the public were invited to view the project information posters, take a comment sheet, fill it out and leave it with meeting representatives or take it home and mail it in later. The meeting concluded at 7:30 P.M.

Comment Reference
Document 15

From: Level 3 Network Relocations [mailto:Level3.NetworkRelocations@Level3.com]
Sent: Wednesday, October 10, 2012 8:55 AM
To: Hice, Vanessa L
Subject: N-62093/01, N-88870, 2800 (NVS0056)

Ms. Hice,

Level 3 has received your letter dated 9/17/12 regarding the project at the Moapa River Indian Reservation ("Project"). After reviewing the information you provided it is uncertain whether the Project will impact the Facilities. Any sub structure or structure constructed on or near the ROW needs to have a level3 representative met with and present for this construction. Any underground or excavation activity performed near the ROW needs to have a Level 3 representative onsite. Lastly, there may be no loss of access of our easement ROW by the construction of this facility.

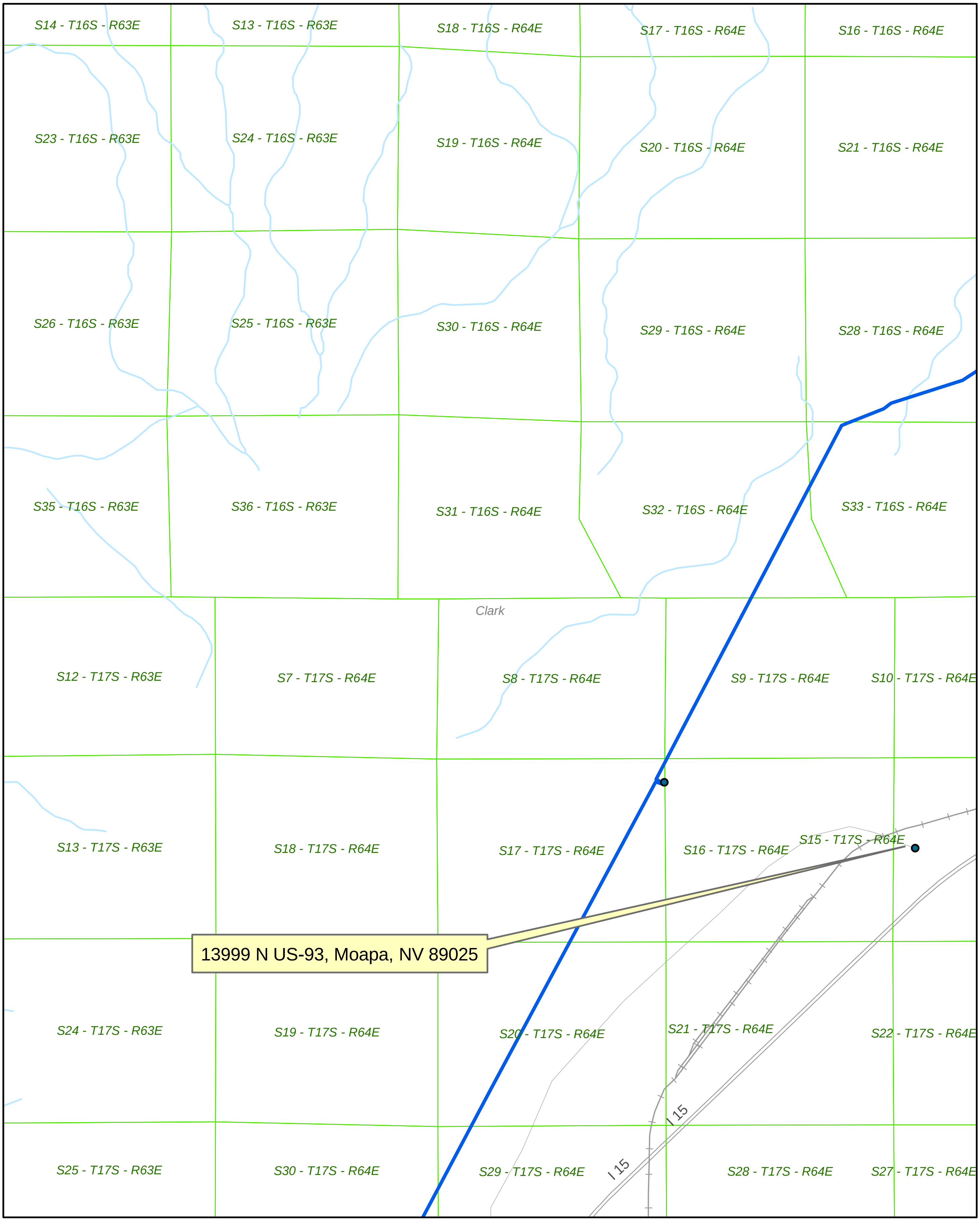
The Facilities have been constructed on private property and/or public right of way with the authorization of the applicable property owner.

If it is determined that an adjustment and/or relocation of the Facilities is necessary to accommodate the Project, please contact the undersigned to discuss and reference the file number ***37155 NV*** with any future communications. Any changes or additions to the Project plans or parameters should be submitted to Level 3 for review of potential new impacts to the Level 3 facilities. Unless Level 3 receives information that such adjustment or relocation is necessary it will assume that any potential conflict between the Project and Facilities has been eliminated.

Sincerely,

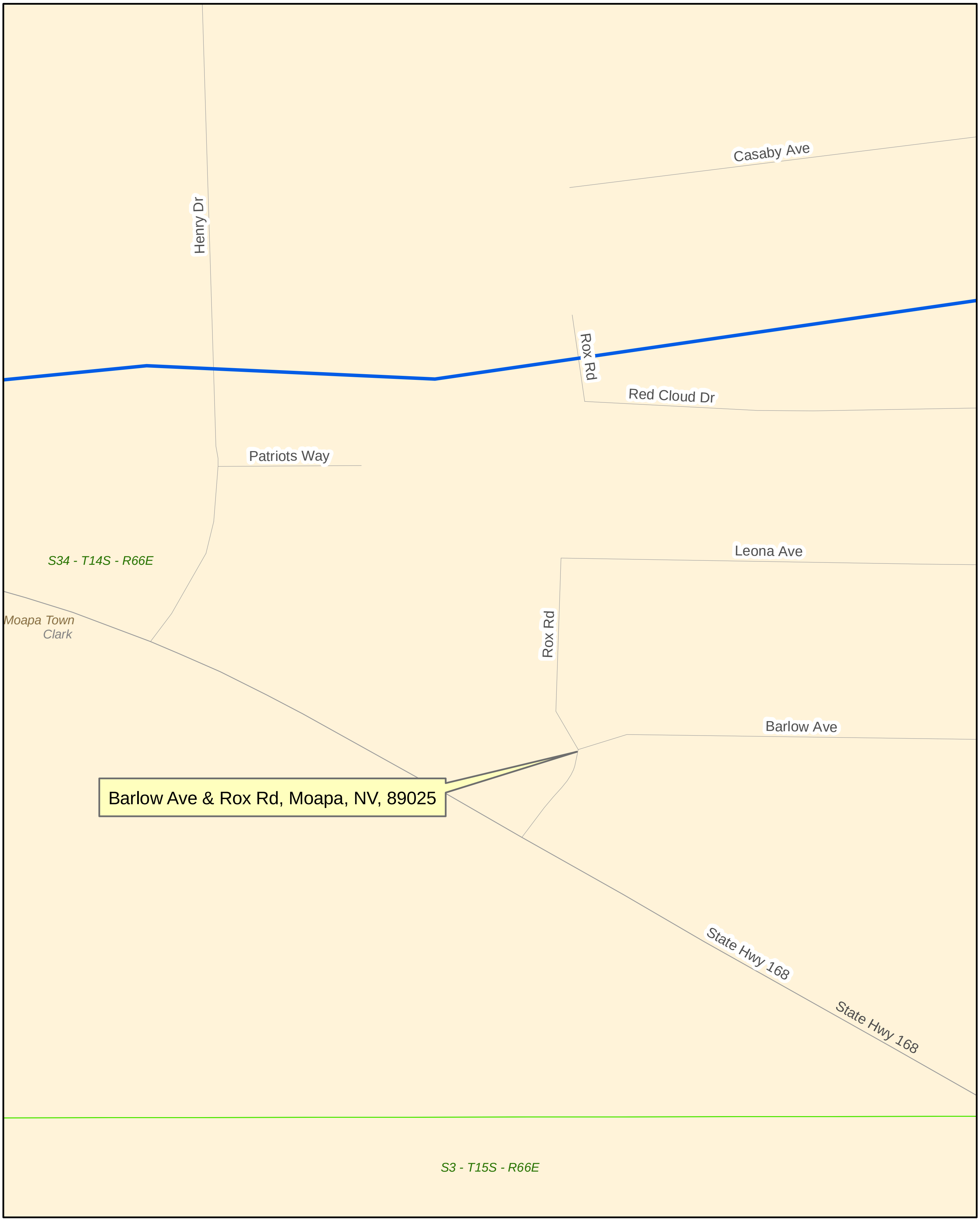
Matt Prink
Network Relocations – Business Analyst
Level 3 Communications
1025 Eldorado Blvd
Broomfield, CO 80021 (Office 33A-525)
p: 720-888-2639
e: Matthew.Prink@Level3.com

Level(3) www.level3.com



Level 3 Facilities

Note that the locations of Facilities shown on these drawings are only approximate and Level 3 hereby disclaims any responsibility to third parties for the accuracy of this information. Persons working in the area covered by these drawings must contact the statewide Call-Before-You-Dig System to ascertain the location of underground facilities prior to performing any excavation.



Level 3 Facilities

Note that the locations of Facilities shown on these drawings are only approximate and Level 3 hereby disclaims any responsibility to third parties for the accuracy of this information. Persons working in the area covered by these drawings must contact the statewide Call-Before-You-Dig System to ascertain the location of underground facilities prior to performing any excavation.

k Road Moapa

Comment Reference Document 16

September 25, 2012

Ms. Vanessa Hice
Assistant Field Manager
Division of Lands
Bureau of Land Management
Las Vegas Field Office
4701 North Torrey Pines Drive
Las Vegas, Nevada 89130-2301

Subject: Response to Letter from BLM Dated September 17, 2012
Moapa Solar LLC Proposed Transmission Line
N-90176
N-88870
2800 (NVS0056)

Dear Ms. Hice:

K Road appreciates the notice provided by the Bureau of Land Management. K Road would like to express its concern with the proposed transmission lines connecting the proposed Moapa Solar, LLC facility to the Crystal Substation. As BLM is aware, the proposed K Road Moapa Solar Facility will interconnect to the Crystal Substation for delivery of up to 350 MW of solar energy, with construction anticipated to start late this year. K Road holds a Right of Way issued by BLM under application number N-89176 for the transmission line that will connect the K Road Moapa Solar Facility to the Crystal Substation.

The construction of the proposed transmission lines indicated in the letter under case file N-88870 would potentially interfere with K Road's utilization of the Right of Way (ROW) and the successful completion of the K Road Moapa Solar Facility.

We strongly request that BLM ensures during the permitting process for case file N-88870 that the existing ROW granted to the K Road Moapa Solar Facility be protected against adverse impacts from the newly proposed line.

In addition, we would like to be sure that BLM/BIA's analysis includes any other potential impact on our project. We would like to be involved in efforts to create effective mitigation for the new project. Please keep us on your mailing list and provide us with all notices, filings, etc. made in case file N-88870.

Finally, please update the address in your files for K Road Moapa Solar LLC. Please send all correspondence to the address to:

Alice L. Harron
Managing Director, Development
K Road Moapa Solar LLC
295 Madison Avenue, 37th Floor
New York, NY 10017.

Thank you for your time.

Sincerely,

Alice L. Harron
Managing Director, Development
K Road Moapa Solar LLC

CC: Brenda Wilhight

United States Department of the Interior

BUREAU OF RECLAMATION
Lower Colorado Regional Office
P.O. Box 61470
Boulder City, NV 89006-1470

IN REPLY REFER TO:
LC-2514
LND-3.00

SEP 28 2012

RECEIVED
Bureau of Land Management
07:30
OCT 01 2012
LAS VEGAS FIELD OFFICE
Las Vegas, Nevada

BCW 10/4/12
WHee 10/31/12

Comment Reference Document 17

MEMORANDUM

To: Bureau of Land Management, 4701 North Torrey Pines Drive, Las Vegas, NV 89130-2301; Attn: Ms. Brenda Wilhight

From: Faye Streier
Manager, Lands Group

Faye Streier

Subject: Right of Way Application From Moapa Solar, LLC, Request for Comments (Your Letter, N-88870, Dated September 17, 2012)

This office received your letter regarding a right of way application from Moapa Solar, LLC, for a 230 kV and a 500 kV transmission line and access road. The proposed project area is near the Navajo McCullough transmission line right of way (Bureau of Land Management grant NVN-04790). The Bureau of Reclamation is one of the holders of the grant, but NV Energy has managerial authority on behalf of the holders in accordance with the Navajo McCullough Transmission Line Agreement. Therefore, it is not necessary for this office to review or comment on the application.

If you need additional information or have questions, please contact Ms. Kay Sundberg, Regional Realty Officer, at 702-293-8176 or ksundberg@usbr.gov.

Appendix B

Policies, Plans, and Laws that could apply to the Proposed Project

APPENDIX B

POLICIES AND PROGRAMS

The following sections summarize the Federal, State, and local policies, plans, and laws that apply to the Proposed Project. The Proposed Project would be located on Tribal lands and Federal lands managed by the Bureau of Land Management (BLM). The Federal actions to be taken by the Bureau of Indian Affairs (BIA) and BLM require compliance with the National Environmental Policy Act (NEPA). The portions of the Proposed Project located on BLM and lands on the Reservation and within the BLM managed utility corridor must comply with applicable Federal, State, and local rules and policies that apply to BLM. The portion of the Proposed Project on the Reservation would be under the jurisdiction of the Tribe's Environmental Policy Ordinance.

Below is a summary of local, State and Federal laws and regulations that could apply to the Proposed Project.

GENERAL

National Environmental Policy Act (NEPA)

NEPA requires Federal agencies to review the effects of their actions on the natural and human made environment prior to taking action. The law requires all Federal agencies to consider the direct, indirect, and cumulative effects of proposals and reasonable alternatives prior to making a decision and to provide review by Federal, State, local, and tribal environmental authorities, as well as by other affected parties and interested citizens.

Federal Land Policy and Management Act (FLPMA)

The Federal Land Policy and Management Act (FLPMA) (43 U.S.C. 1761(a)) governs the way that public lands administered by the BLM are managed. FLPMA is designed to allow a variety of uses on BLM-administered Federal lands while simultaneously trying to preserve and manage the natural resources on them.

BLM must respond to the Applicant's application under Title V of FLPMA for ROW grants to construct, operate, maintain, and decommission electric transmission line(s), water pipeline, and access road ROWs on BLM-administered land pursuant to 43 CFR 2800.

Executive Order 11514 (National Environmental Policy Act)

This order requires Federal agencies to continually monitor and control their activities to protect and enhance the quality of the environment. The order also requires Federal agencies to develop procedures to (1) ensure that the public is informed and understands the Federal plans and programs with potential environmental impact and (2) obtain the views of interested parties.

Moapa Band of Paiutes Tribal Environmental Policy Ordinance

The Moapa Band of Paiutes Business Council developed the Tribal Environmental Policy Ordinance to support the Tribal Government, in cooperation with Federal, State and local governments, and other concerned public and private organizations, to use all practicable means and measures to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Tribal members. Under this ordinance, the Tribe will study the environmental impacts of major projects using a systematic, interdisciplinary approach to insure the integrated use of the natural and social sciences and the environmental design arts in planning and in decision making which may have an impact on man's environment.

Moapa Utility Corridor and the Moapa Act

The Moapa Utility Corridor and the Moapa Act (Public Law 96-491-Dec. 2, 1980) reserved portions of a designated utility corridor on the Reservation to BLM jurisdiction. Utilities located within this corridor would require a ROW authorization by BLM in accordance with Title V of FLPMA.

AIR QUALITY

Clean Air Act

The U.S. Environmental Protection Agency (EPA) implements and enforces the requirements of most Federal environmental laws. EPA Region 9 administers Federal air programs in Nevada, including oversight of the State of Nevada Department of Environmental Protection (NDEP) and Clark County Department of Air Quality and Environmental Management (DAQEM) which are responsible for implementing those programs within their jurisdiction. The Clean Air Act (CAA), most recently amended in 1990, provides EPA with the legal authority to regulate air pollution from stationary, area, and mobile sources.

Council on Environmental Quality − Draft NEPA Guidance on Consideration of the Effects of Climate Change and Greenhouse Gas Emissions

In February 2010, the Council on Environmental Quality (CEQ) issued a draft guidance memorandum for public consideration and comment on the ways in which Federal agencies consider the effects of GHG emissions and climate change under NEPA. The guidance advises Federal agencies to consider, in scoping their NEPA analyses, whether analysis of the direct and indirect GHG emissions from their proposed actions may provide meaningful information to decision makers and the public.

Clark County Department of Air Quality and Environmental Management

The Clark County DAQEM has been delegated the authority, under the provisions of Nevada Revised Statute (NRS) 445B.500 and by direction of the Governor of the State of Nevada and the Clark County Board of County Commissioners, to implement and enforce an air pollution control program in Clark County, Nevada. Air quality regulations applicable to the Proposed Action on BLM lands or within the designated utility corridor on the Reservation include:

- Section 41, Fugitive Dust: This section establishes that any person engaged in activities involving grading, clearing of land, public or private construction, the operation of machines and equipment, the grading of roads, trenching operations, the operation and use of unpaved parking facilities to take all reasonable precautions to abate fugitive dust from becoming airborne from such activities.
- Section 45, Idling of Diesel- Powered Motor Vehicles: This section limits the idling of the engine of a diesel truck or a diesel bus to less than 15 consecutive minutes.
- Section 94, Permitting and Dust Control for Construction Activities: The purposes of this section are to limit the emission of particulate matter into the ambient air by preventing, controlling, and mitigating fugitive dust from construction activities

.

WATER RESOURCES

There are no perennial surface waters in the Project area so there is no local governing water authority for the area. The management and allocation of water resources for the basin is under the authority of the Nevada Division of Water Resources (NDWR) State Engineer.

Clean Water Act

The Clean Water Act of 1977 was enacted to restore and maintain the integrity of the Nation's water and prohibit the discharge of toxic pollutants to waters of the United States. The Clean Water Act (CWA) provides guidelines and limitations for effluent discharges from point-source discharges, and provides authority for the EPA to implement the National Pollutant Discharge Elimination System (NPDES) permitting program. Section 402(p) requires permits for storm water discharges associated with industrial activity.

Construction General Stormwater Permit

The CWA §402 regulates construction-related stormwater discharges to surface waters through the NPDES program. Region 9 of the EPA manages construction stormwater permits on Tribal lands. In Nevada, the NDEP has been delegated the authority by the EPA to administer the NPDES program through the Bureau of Water Pollution Control for other Federal lands. The construction stormwater permit is required for all sites greater than 1 acre. The permit requires the preparation of a Stormwater Pollution Prevention Plan (SWPPP) during construction. Nevada does not have specific regulations pertaining to the treatment of fuel spills during construction. All petroleum-contaminated materials must be disposed of in accordance with applicable State and local regulations.

Section 404 Permitting

Section 404(a) of the Clean Water Act authorizes the U.S. Army Corps of Engineers (USCOE) to issue permits regulating the discharge of dredged or fill material into the waters of the United States, including wetlands. The main premise of the Section 404 regulatory program is that no discharge of dredged or fill material can be permitted if a practicable alternative exists which is less damaging to the environment.

Section 401 Permitting

Some Section 404 permits issued by the USCOE require that a water quality certification be obtained. In Nevada, 401 permitting is the responsibility of the NDEP, Bureau of Water Quality Planning and to the EPA on Reservation land.

Safe Drinking Water Act

The Safe Drinking Water Act's primary objective is to protect the quality of public water supplies and all sources of drinking water. The State of Nevada regulates public drinking water supplies in Nevada and enforces drinking water standards and implements aquifer and water source protection regulations.

National Flood Insurance Program (NFIP)

The NFIP is administered by the Federal Emergency Management Agency (FEMA) and is designed to reduce future flood risks to new construction in Special Flood Hazard Areas, In support of the NFIP, FEMA identifies flood hazard areas throughout the United States and its territories by producing Flood Hazard Boundary maps, Flood Insurance Rate maps, and Flood Boundary and Floodway maps.

Floodplain Management

The Clark County Regional Flood Control District has a comprehensive floodplain management program in place that includes a regulatory program that establishes standards and requirements for flood hazard management. These regulations outline when and where Floodplain Use Permits are required.

Executive Order 11988 (Floodplain Management)

This order requires Federal agencies to establish procedures to ensure that the potential effects of flood hazards and floodplain management are considered for actions undertaken in a floodplain. It also requires that floodplain impacts be avoided to the extent practicable.

CULTURAL AND HISTORIC RESOURCES

National Historic Preservation Act

The National Historic Preservation Act (NHPA) of 1966 provides that sites with significant national historic value be placed on the National Register of Historic Places. It requires evaluation of whether a Federal activity could impact a historic property resource. If so, consultation with the Advisory Council on Historic Preservation will be required that identifies mitigation to minimize adverse impacts. Coordination with the State Historic Preservation Officer is also undertaken to ensure that potentially significant sites are properly identified and appropriate mitigative actions implemented.

Archaeological Resources Protection Act

The Archaeological Resources Protection Act of 1979 protects archaeological resources located on U.S. public lands and American Indian lands. The requirements concerning protection of archaeological resources would be addressed prior to site disturbances by consultation with the Department of Interior Advisory Council on Historic Preservation and the State Historic Preservation Officer.

American Indian Religious Freedom Act.

The American Indian Religious Freedom Act of 1978 is a policy Statement intended to reaffirm American Indian rights regarding religious freedom. The purpose of the Act is to ensure that American Indians have access to and protection of physical locations and resources that are sacred and sometimes required for the practice of American Indian religious rites and ceremonies.

Native American Graves Protection and Repatriation Act

The Native American Graves Protection and Repatriation Act of 1990 governs ownership or control of American Indian remains and cultural items which are excavated or discovered on Federal or tribal lands.

Antiquities Act

The Antiquities Act of 1906 protects historic and prehistoric ruins, monuments, and antiquities, including paleontological resources, on Federally controlled lands.

Paleontological Resources Preservation Act

The Paleontological Resources Preservation Act (PRPA) provides protection for vertebrate (i.e., animals with backbones) paleontological resources on Federal lands by limiting the collection of vertebrate fossils and scientifically important fossils to permitted and qualified researchers.

National Trails System Act

This act supports the designation and management of National trails near urban areas and within scenic areas and along historic travel routes often more remotely located.

BIOLOGICAL RESOURCES

Endangered Species Act

The Endangered Species Act (ESA) of 1973, as amended, is intended to prevent the further decline of endangered and threatened species and to restore these species and their habitats. Section 7 of the ESA requires consultation by Federal agencies to determine whether endangered and threatened species are known to have critical habitats onsite or in the vicinity of proposed action.

Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act promotes more effectual planning and cooperation between Federal, State, public, and private agencies for the conservation and rehabilitation of the nation's fish and wildlife and authorizes the U.S. Department of Interior to provide assistance.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act of 1918 governs the taking, killing, or possession of migratory birds.

Bald Eagle Protection Act

The Bald Eagle Protection Act of 1940 protects bald and golden eagles by prohibiting the taking, possession, and commerce of such birds and establishes civil penalties for violations.

Public Lands - Wild Horses and Burros Act

The Public Lands - Wild Horses and Burros Act requires the protection, management, and control of wild free-roaming horses and burros on public lands. Free-roaming horses and burros are prohibited from capture, branding, harassment, or death and they are to be considered an integral part of the natural system of the public lands.

Executive Order 13112 - Invasive Plants and Noxious Weeds

Invasive plants and noxious weeds are managed on public lands by the BLM under the direction of the National Invasive Species Council (NISC) established in 1999 (Executive Order 13112). Much of the management of invasive plants and the listing of noxious weeds is also regulated by the U.S. Department of Agriculture (USDA) under the Federal Noxious Weed Act.

Nevada Revised Statute 527.060–527.120

Nevada Revised Statute (NRS) 527 protects and regulates the removal of Christmas trees, yuccas, and cacti for commercial purposes. Such removal or possession requires a permit and tags from the Nevada Spur Forester Fire Warden, Nevada Division of Forestry. Chapter 527 also gives the Nevada Natural Heritage Commission the ability to protect native flora by listing them on their protected species list.

Nevada Revised Statute 501

NRS 501, supplemented by the NAC, covers administration and enforcement of wildlife resources within the State. The administering agency is the Nevada Department of Wildlife (NDOW). Any authorizations for impacts to protected species would be processed through the NDOW.

LAND USE

BLM Las Vegas Resource Management Plan

The Las Vegas Resource Management Plan (LVRMP) contains the land management direction for resources within this area compliant with FLPMA. It includes ROW development guidelines for the authorization of ROWs on public lands for a variety of uses including electrical transmission lines, electrical power plants and substations, and related power distribution lines. The LVRMP emphasizes protecting unique habitats for threatened, endangered, and special status species, while providing various uses including recreation, community growth, and mineral exploration and development (BLM 1998a).

Clark County Comprehensive Plan

This plan provides long-term planning goals and policies for Clark County's future growth. The Clark County Comprehensive Plan has goals and policies related to land use, energy, and utilities. Clark

County’s Utilities Policy UT 1-6 encourages the development of transmission capability and interconnectivity for distributed energy, cogeneration, and alternative energy sources, including regional interconnectivity and transmission capability. Energy Policy CV7-1.6 States that “Clark County supports partnerships and cooperation with local, regional, and Federal agencies to further promote energy conservation and efficiency, renewable energy projects, and sustainable development” (Clark County 2006).

Federal Aviation Administration

Federal Aviation Administration (FAA) regulations address potential aircraft obstruction for structures taller than 200 feet or within 20,000 feet of an airport. Specifically, Federal Regulation Title 14, Part 77, establishes standards and notification requirements for objects that have the potential to affect navigable airspace.

SOCIAL/ECONOMIC

Executive Order 12898 (Environmental Justice)

This order directs Federal agencies to identify and address disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States.

Executive Order 13166

Executive Order 13166 requires all recipients of Federal funds to provide meaningful access to persons who are limited in their English proficiency (LEP).

HUMAN HEALTH AND HAZARDOUS MATERIALS

Occupational Safety and Health Act

The Occupational Safety and Health Act of 1970 establishes the authority for assuringsafe and healthful working conditions for employees.

Hazardous Waste and Solid Waste Amendments Act

The Hazardous Waste and Solid Waste Amendments Act of 1984 are amendments to the Resource Conservation and Recovery Act (RCRA) that address waste minimization, land disposal of hazardous wastes, and underground storage tanks.

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)

The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980 provides a statutory framework for the cleanup of waste sites containing hazardous substances. The Superfund Amendments and Reauthorization Act provides an emergency response program in the event of a release (or threat of a release) of a hazardous substance to the environment.

Toxic Substances Control Act

The Toxic Substances Control Act of 1976 provides the EPA with the authority to require testing of both new and old chemical substances entering the environment and to regulate them where necessary. The Act also regulates the treatment, storage, and disposal of certain toxic substances not regulated by the Resource Conservation and Recovery Act or other statutes, particularly polychlorinated biphenyls (PCB), chlorofluorocarbons, and asbestos.

Executive Order 12856 (Right-to-Know Laws and Pollution Prevention Requirements)

This order requires all Federal agencies to reduce and report toxic chemicals entering any waste stream; improve emergency planning, response, and accident notification; and encourage clean technologies and testing of innovative prevention technologies.

Appendix C

Weed Management Plan

Final

Weed Management Plan

Moapa Solar Energy Center

February 2014

1.0 INTRODUCTION

Moapa Solar Power, LLC (Moapa Solar) proposed to construct and operate the Moapa Solar Energy Center (MSEC). The MSEC will include a variety of major components, including the Solar Power Generating Facility (SPGF), an onsite substation, a gen-tie transmission line, a water pipeline, and access road. The proposed project site is in Clark County Nevada approximately 20 miles northeast of Las Vegas, Nevada. The MSEC would be located on 850 acres of leased land on the Moapa River Indian Reservation. The associated gen-tie lines would occur on lands administered by the Tribe and by the Bureau of Land Management (BLM). The proposed access road would be located on BLM lands and the associated water pipeline would be located on lands administered by the Tribe.

Invasive, non-native plants, often referred to as “weeds”, are considered undesirable and warrant effective management and control for a variety of reasons including, competition with native and agricultural plant species, impacts to habitat function and capability, degradation of the aesthetic qualities and values of viewsheds and landscapes, and more. In the Nevada Revised Statutes (555.005) a noxious plant is defined as “any species of plant which, is, or is likely to be, detrimental or destructive and difficult to control or eradicate.” As human presence and activity increases, the potential for spreading and establishing noxious and invasive plants increases.

The Nevada Department of Agriculture Plant Industry Division maintains a list of noxious weeds for the State of Nevada. Noxious weeds on this list are assigned to one of three categories, including:

- Category A Weeds: Weeds that are generally not found or that are limited in distribution throughout the State. Category A weeds are subject to active exclusion from the Sate and active eradication where found, including the premises of a dealer of nursery stock.
- Category B Weeds: Weeds that are generally established in scattered populations in some counties of the State. Such weeds are subject to active exclusion, where possible; and active eradication from the premises of a dealer of nursery stock.
- Category C Weeds: Weeds that are generally established and generally widespread in many counties of the State. Such weeds are subject to active eradication from premises of a dealer of nursery stock.

Appendix A of this report includes a list of the state-listed noxious and invasive plant species that are relevant to the proposed MSEC project in Clark County, Nevada and the focus of this weed management plan. The BLM Southern Nevada Field Office manages all weeds on this state list on lands managed by the field office.

1.1 Purpose of this Plan

The purpose of this plan is to describe methods to prevent, mitigate, and control the spread and establishment of weeds during the implementation of the project. The project proponent and its approved contractors would be responsible for implementing the aspects of this plan. This weed management plan is applicable to the construction, operation and, decommissioning of the proposed project.

1.2 Goals and Objectives

The goal of this weed management plan is to reduce the establishment and spread of weeds during the construction and operation phases of the proposed project. The objectives of this plan include working with relevant agencies to control weeds in the project area, understand the type and distribution of weeds in the project area, and to implement effective control and monitoring efforts toward reducing the spread and establishment of weeds in the project area.

1.3 Project Description

1.3.1 Project Area

The proposed project would be located approximately 20 miles northeast of Las Vegas in Clark County, Nevada (**Figure 1**). The main project site, including the Solar Power Generating Facility (SPGF), would be located on 850 leased acres within the Reservation in Mount Diablo Meridian, Township 16 South, Range 64 East, Sections 29, 30, 31,and 32.

Portions of the gen-tie lines and access road would be located on lands administered by the Tribe and BLM. A water pipeline associated with the Project would be located on Reservation lands north and east of the SPGF. **Figure 2** shows the location of the Proposed Project and associated facilities.

The proposed project would occur in the Basin and Range physiographic province in a part of the Mojave Desert. This physiographic province is characterized by the hundreds of long, narrow, and nearly parallel mountain ranges that are separated by deep valleys (Mac et al 1998). These features of the province are visible at the proposed project site, with nearly parallel mountain ranges on the western and eastern sides of the site and a broad and gently sloping valley between. The proposed project site occurs in the Mojave Desert Scrub biome, and is dominated by plants common to this biome including creosote bush (*Larrea tridentata*), and white bursage (*Ambrosia dumosa*).

1.3.2 Proposed Project

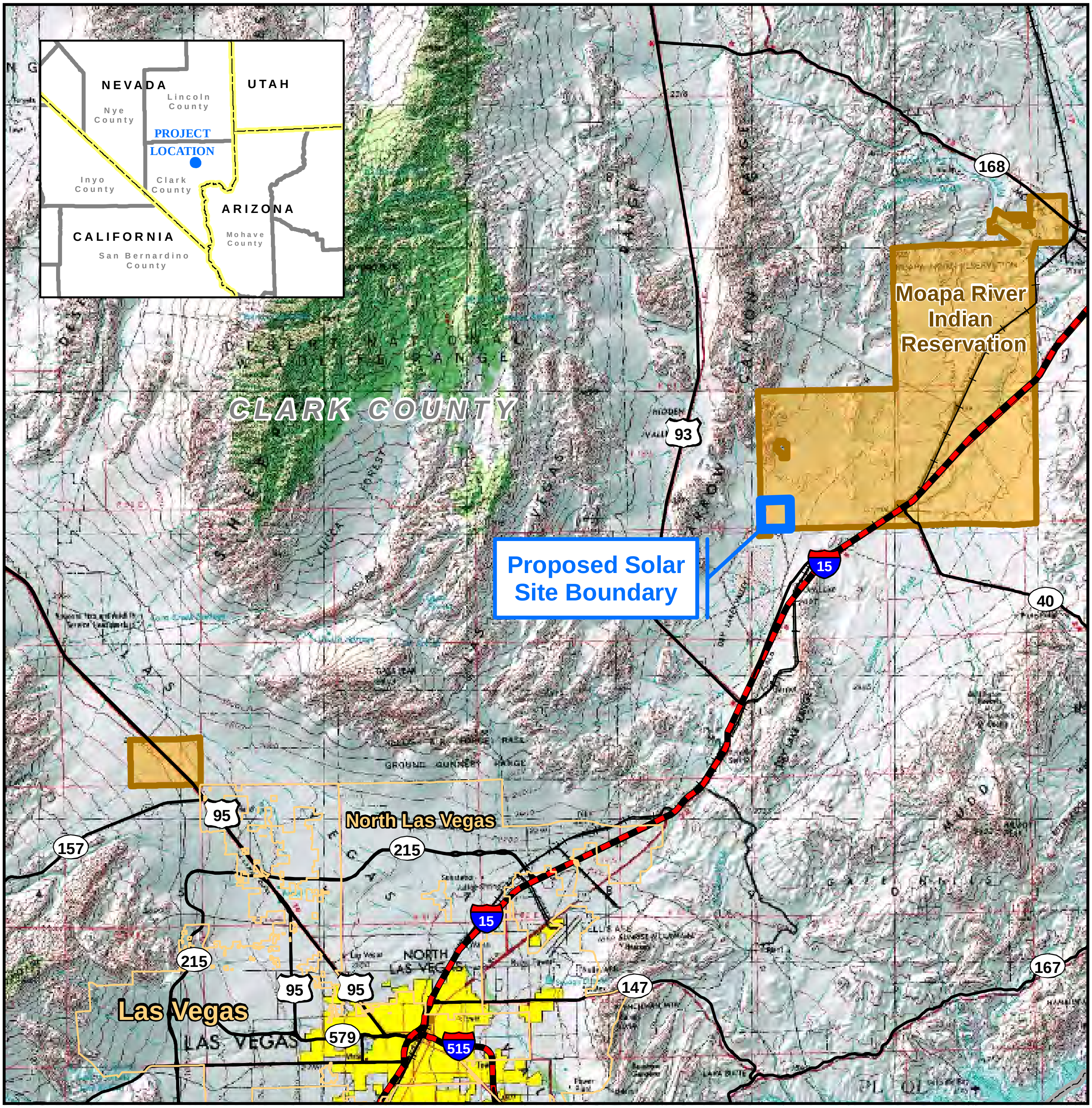
The following sections describe the major features of the proposed project. For a comprehensive description of the proposed project, refer to the associated environmental impact statement (EIS).

Solar Power Generation Facility

The SPGF would be located wholly on lands within the Reservation. It would be developed using photovoltaic (PV) technology and would generate up to 200 Megawatts (MWs) of energy.

Onsite Substation

A substation with medium voltage (12.5-kV or 34.5-kV) to high voltage (230-kV/500-kV) step-up transformer(s) with mineral oil, breakers, buswork, protective relaying, supervisory control and data acquisition (SCADA), and associated substation equipment would be located on the site. The substation will be fenced for safety per codes and one or more structures may be outside the fence for meters and control equipment.



Legend

- Interstate
- US/ State Highway
- Railroad
- Municipal Boundary
- Proposed Solar Site Boundary

Jurisdictional Land Ownership

- Indian Reservation

0 2 4 6 8 10

Miles

Universal Transverse Mercator
North American Datum 1983
Zone 11 North, Meters

Moapa Solar Energy Center

FIGURE 1
PROJECT LOCATION

Map Extent: Clark County, Nevada

Date: 03-28-13		Author: djb

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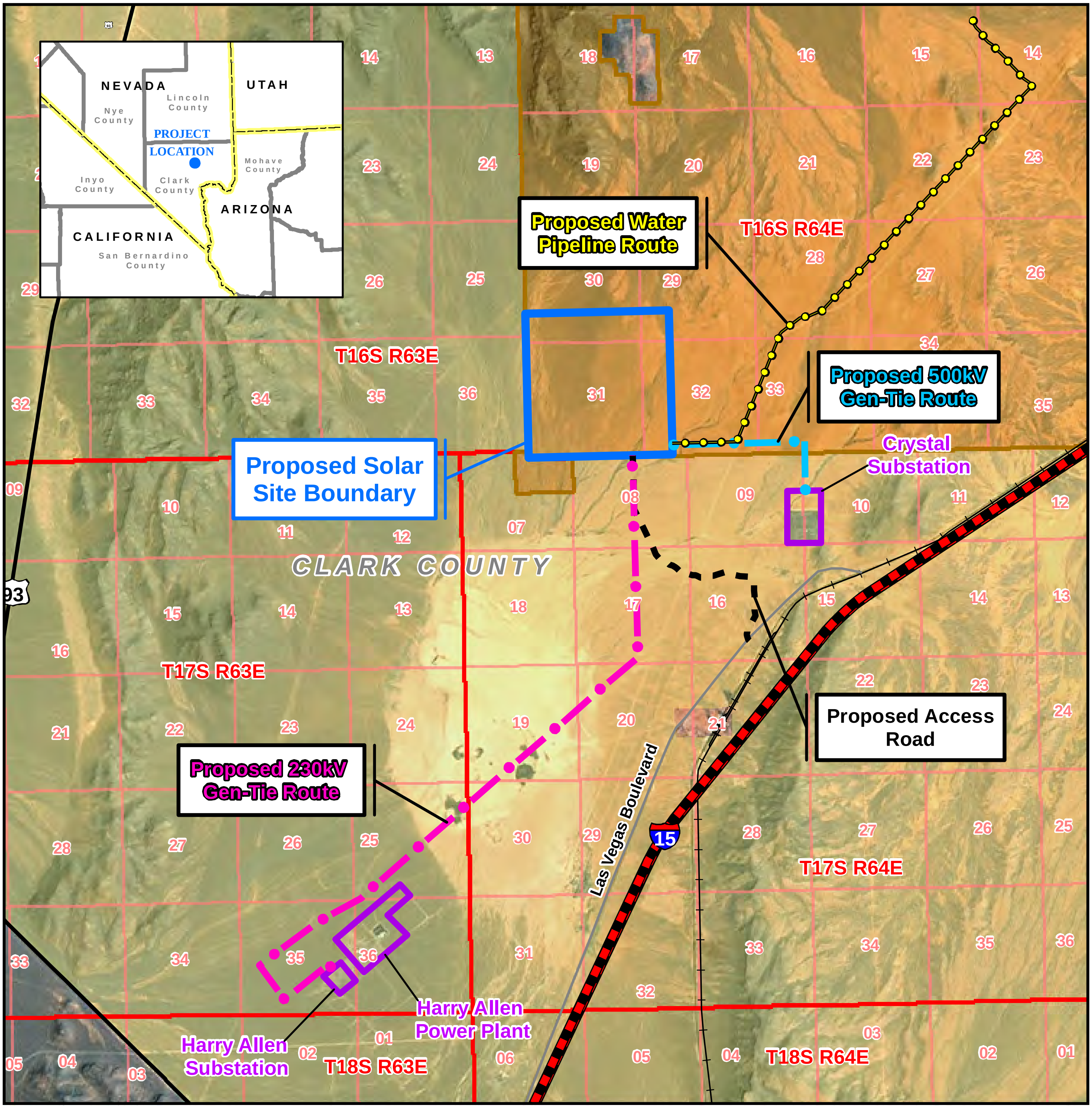

Legend

- Interstate
- US/State Highway
- Local Road
- Railroad
- Proposed Water Pipeline
- Proposed 230kV Gen-Tie
- Proposed 500kV Gen-Tie
- Proposed Access Road
- Township/Range Boundary
- Section Line
- Existing Substation Boundary
- Proposed Solar Site Boundary
- Jurisdictional Land Ownership
- Bureau of Land Management Land
- Indian Reservation

0 0.5 1 1.5
Miles

Universal Transverse Mercator
North American Datum 1983
Zone 11 North, Meters

Moapa Solar Energy Center

FIGURE 2
PROPOSED PROJECT FACILITIES

Map Extent: Clark County, Nevada

Date: 03-28-13 | Author: djb

I:\Moapa Solar/MXD's/Proposed Project Facilities 8.5x11 031413_EIS Figure 2-1.mxd

The communication system for the substation may include above or below ground fiber optic cable or microwave tower. The project will be interconnected to the regional transmission system from this on-site substation/switchyard via the gen-tie interconnections described in subsection below.

Gen-Tie Transmission Line and Interconnections

The construction of a new transmission line is necessary to deliver the power generated by the proposed project to the electrical grid. Two gen-tie transmission lines will be constructed to the Harry Allen Substation (via a 230 kV transmission line) and the Crystal Substation (via a 500 kV transmission line) as different entities can be accessed from each location. The 230 kV or 500 kV transmission line will originate at the Project substation located on the SPGF site.

The gen-tie lines would consist of the following:

- Approximately 7.3 miles of single-circuit 230-kV overhead transmission line from the SPGF to the Harry Allen 230-kV Substation
- Approximately 1.6 miles of single-circuit 500-kV overhead transmission line from the SPGF to the 500 kV Crystal Valley Substation.

The 230 kV line to Harry Allen would head south from the SPGF site for approximately 2.5 miles until meeting an existing 500-kV transmission line. The proposed transmission line would then follow, on the north side, the existing transmission line for approximately 3.2 miles and then turn west and southwest for about 1.1 miles to be routed around the Harry Allen 500-kV Substation. Approximately 0.3 miles past the substation, the proposed line would cross an existing 500-kV transmission line at a 90-degree angle and proceed for another 0.5 miles before turning northeast and connecting into the Harry Allen 230-kV Substation on the north side of the substation. This route is approximately 7.3 miles long.

The maintenance road associated with the existing 500 kV line will be used to the extent possible for construction and maintenance of the proposed 230 kV transmission line. The design, construction, operation, and maintenance of the transmission lines will meet requirements of the National Electrical Safety Code (NESC); U.S. Department of Labor, Occupational Safety and Health Standards; and the Resource Management Plan’s requirements for safety and protection of landowners and their property. Transmission line design will also be consistent with recommendations for reducing negative impacts of power lines on birds found in *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* by Edison Electric Institute and the Avian Power Line Interaction Committee (APLIC 2006), and their more recent publication “*Reducing Avian Collisions with Power Lines* (APLIC 2012).

Access Road

The Project would require vehicular access for construction, operation, and maintenance. A 2.5-mile gravel access road connecting the SPGF to the existing paved frontage road adjacent to I-15 would be constructed on BLM-administered lands. From the existing paved frontage road west of I-15, the proposed site access road would follow an existing dirt road for approximately 2.0 miles until it reaches the proposed 230 kV gen-tie transmission line ROW which it would follow approximately 0.5 mile north to the SPGF site.

The access road would be designed to accommodate equipment deliveries, the construction workforce, and, ultimately, the operational needs of the Project. The surface of the road is proposed to be 24 feet wide, would be two lanes, and would have adjacent shoulders and drainage swales on either side. The Applicant has requested a 100-foot-wide ROW so the existing road can be straightened if needed in some places. Final design for the access road would be consistent with BLM and Clark County road standards. The road would be maintained as part of the Project.

Water Pipeline

Water for the Project would be provided by the Tribe from an existing well located northeast of the SPGF site. It would travel from the southeast corner of the Proposed Project site for approximately 5.4 miles and connect with the existing Reservation well. Water uses for a PV project includes panel washing, service water, potable water, and fire protection. The water pipeline is located entirely on Tribal lands.

Fire Prevention

The Project's fire protection water system will be supplied from a dedicated raw water storage tank, holding a minimum of 2-hours of full flow runtime, located on the plant site. One electric and one diesel-fueled backup firewater pump will be installed to deliver water to the fire protection water-piping network. Fire protection pump flowrates will be in accordance with applicable standards. A smaller electric motor-driven jockey pump will maintain pressure in the piping network. If the jockey pump is unable to maintain a set operating pressure in the piping network, a main fire protection pump starts automatically. All fire protection system pumps must be shut off manually.

The piping network will be configured in a loop so that a piping failure can be isolated with shutoff valves without interrupting the supply of water to a majority of the loop. Portable fire extinguishers of appropriate sizes and types will be located throughout the plant site.

2.0 WEED SURVEYS

A designated field contact representative (FCR) will be assigned to the construction phase of the solar project components; additional FCRs will be assigned for the linear project components including the transmission line and water pipeline. The FCR will oversee the weed monitors.

A weed survey of the project site, including the routes for the transmission lines, pipeline, and access road, will be conducted prior to conducting surface disturbing activities. This survey will be focused on identifying and mapping occurrences of weed species described in the Nevada Revised Statues 555.005, **Appendix A**. Occurrences of cheatgrass (*Bromus tectorum*), red brome (*Bromus rubens*), halogeton (*Halogeton glomeratus*), Russian thistle (*Salsola kali*), revennagrass (*Saccharum ravennae*), ripgut brome (*Bromus diandrus*), and Mediterranean grass (*Schismus spp.)* will also be identified and described, although not listed as a noxious weed by the State of Nevada. The State of Nevada has not categorized or designated these species as noxious weeds because their distribution and occurrence are far too widespread for management efforts to successfully eradicate these species. The management efforts, described in this plan, will rely on the results of this initial weed survey.

The results of the weed survey will contribute to the identification of problem areas within the proposed project site. The weed survey will include botanists walking parallel transects, searching for weeds on both sides of each transect. Identified weed occurrences will be described to species, assigned a ground cover rating, and individuals will be counted or estimated, as appropriate. The location of identified weed occurrences will be recorded using a hand-held global positioning system (GPS) unit and all recorded occurrences will be mapped using geographic information system (GIS) software. All identified weed occurrences will be marked in the field, either by flagging, pin flags or other means so as to indicate to construction personnel that such areas are to be avoided until appropriately treated.

3.0 WEED MANAGEMENT

Weed management at the proposed MSEC project will include identification of problem areas, implementation of measures intended to prevent the spread and establishment of new weed occurrences, and application of appropriate measures to treat known occurrences of weeds. These steps toward effective weed management are described in the following sections.

3.1 Preventative Measures

The prevention of weed establishment is the most effective weed management practice. Preventing or reducing the potential for weed establishment reduces additional efforts, costs, and time invested in subsequent weed control or eradication measures. Several measures have proven to be effective toward preventing the spread and establishment of weeds on projects where surface disturbing activities are proposed. The following preventative measures will be implemented:

- Vehicles and equipment to be used on site will be washed prior to gaining entry and before leaving the site (if not trucked off site). Vehicle washing efforts will concentrate on areas that are most likely to be in contact with the ground and or likely to transport weed seeds including vehicle tracks, feet, tires; vehicle under carriage, steps, running boards, bumpers, and brush guards. Washing will occur off site at existing car washes with appropriate containment facilities. Each piece of equipment will have a vehicle wash log stating the location, date and time, type of equipment used, and methods used to wash the vehicle. These logs will be verified by the environmental site monitor before vehicles enter the site.
- Vehicle cabs will be subject to cleaning in an effort to remove refuse, soil, or other materials susceptible to transporting weed seeds or other plant structures. The use of compressed air is recommended for cleaning vehicle cabs before and immediately prior to departing the site.
- All materials used during site reclamation, revegetation, and installation of stormwater/erosion control measures will be certified as weed free.
- Vehicle travel in the proposed project area will be restricted to designated roads and established overland travel routes.
- Disturbance areas will be limited to the smallest area needed for construction.
- The WEAP training will include a section on weed spread and colonization.
- Additonally, on BLM lands, all weed stipulations for construction projects developed by BLM will be implemented (Appendix E).

3.2 Treatment Methods

Treatment methods are necessary to control and eradicate known invasive and noxious weed occurrences. Treatment methods include a variety of approaches such as mechanical, chemical, and biological controls. The most appropriate and effective weed treatment measures will be determined following the assessment of existing weed populations on the proposed project site. The project site occurs within suitable and occupied desert tortoise habitats. As such, the application of herbicides may be permitted, though a Pesticide Use Proposal (PUP) would need to be submitted to the BLM prior to herbicide use.

Mechanical treatments include the use of physical means to remove plants, reproductive parts, or propagules. Mechanical treatments include manual methods (pulling weed plants from the soil), use of hand tools and hand-held power tools, mowing, and more aggressive efforts that involve removing above and below ground plant structures. The designation of the appropriate mechanical treatment will depend on variables including season, plant life stage, weed species, size and population of each occurrence, and more. The weed management contractor will coordinate with the appropriate agencies before implementing any weed treatment methods.

Chemical treatments involve the use and application of herbicides. The use of herbicides is highly regulated and involves a variety of specific protocols, safety measures, and precautions for eliminating, reducing, and mitigating for uncontrolled releases. The possible use of herbicides as a treatment method is described in additional detail in Section 5 of this report.

Biological treatments include the use of plants and animals (particularly insects) that parasitize, ingest, or out compete weed species. Based on the weed species expected to occur in the project area and other factors, biological controls are not expected to be a viable or appropriate alternative for treating weed occurrences at the proposed site.

3.3 Agency Specific Requirements

3.3.1 Bureau of Land Management Lands

The BLM regulates the use and type of herbicides on all of its administered lands. Included in its *Final Programmatic Environmental Impact Statement Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States* (BLM 2007) is a list of the 14 active herbicidal ingredients approved for use on BLM lands. **Appendix B** includes the 2012 list of adjuvants, chemical additives intended to improve the efficacy of herbicides, approved for use on lands administered by the BLM. Guidelines for the use of chemical means to control vegetation on lands administered by the BLM are presented in the BLM's *Chemical Pest Control Manual* (BLM n.d.). These guidelines require submittal of a pesticide use proposal (PUP) and pesticide application records (PAR) for use of herbicides on lands administered by the BLM. **Appendix C** includes a BLM PUP submittal form, and **Appendix D** includes an example of a BLM PAR form.

PUPs are to be submitted to BLM several weeks before herbicide application on lands administered by the BLM. The appropriate weed control procedures, including target species, timing of control, and method of control, will be determined through consultation with the Southern Nevada District Office (SNDO) weed specialist. All personnel associated with application of weed control measures will be appropriately trained and hold all of the required certifications. PARs are to be submitted no more than 24 hours after application of the herbicide.

3.3.2 Nevada Revised Statute (NRS): The Nevada Control of Insects, Pests, and Noxious Weed Act

NRS 555.150

NRS 555.150 (Eradication of Noxious Weeds by Owner or Occupant of Land) of the Nevada Revised Statute reads:

> ”*Every railroad, canal, ditch, or water company, and every person owning, controlling, or occupying lands in this State, and every county, incorporate city or district having the supervision and control over streets, alleys, lanes, rights-of-way, or other lands shall cut, destroy, or eradicate all weeds declared and designated as noxious in NRS 555.130, before such weeds propagate and spread, and whenever required by the State Quarantine Officer.”*

NRS 555.210

NRS 555.210 (Performance of Necessary Work by Weed Control Officer on Failure by Landowner Charges as Lien) of the Nevada Revised Statute reads:

> “*If any landowner fails to carry out a plan of weed control for his or her land in compliance with the regulations of the district, the weed control officer may enter upon the land affected, perform any work necessary to carry out the plan, and charge such work against the landowner. Any such charge, until paid, is a lien against the land affected coequal with a lien for unpaid general taxes, and may be enforced in the same manner.”*

3.3.3 BLM Las Vegas Field Office Weed Management Plan

The project proponent coordinated with the SNDO of the BLM to prepare this document as guidance for weed management. The methods included in the BLM Weed Management Plan (BLM 2006) originated from a cooperative effort between BLM and other federal agencies that produced the document, Partners Against Weeds.

These regulations and guidelines will be generally followed and implemented on all areas of proposed disturbance throughout the project site.

4.0 WEED MONITORING

Monitoring is the repeated collection and assessment of information toward evaluating attainment of the resource management object. If management objectives are not being met, weed control measures should be scrutinized and modified to improve their effectiveness. Effective monitoring will increase the likelihood of timely detection and control of weed occurrences on the project site.

Weed monitoring will be conducted by qualified biologists and appropriately trained personnel. All areas in the project area that are proposed for surface disturbance will be monitored for weeds. Monitoring will occur when weed species are most likely to be detected and can be easily identified. New or previously unidentified weed infestations identified during monitoring will be described, their locations recorded using a hand-held GPS unit, and reported to the SNDO weed specialist.

4.1 Ongoing Monitoring

Weed monitoring will occur on an ongoing basis during implementation of the proposed project. Qualified and appropriately trained personnel will use the results of the initial weed inventory to monitor known weed occurrences and will observe activity areas for opportunistic weed occurrences.

4.2 Post Construction

Weed monitoring will begin immediately following each completed activity that includes surface disturbance. Weed monitoring will occur at all disturbed sites at least twice a year (March and September) for an estimated five years or until restoration efforts are deemed complete. The goal of weed monitoring is to ensure a no net increase in weed species or overall weed cover to the baseline conditions on BLM lands. Identified weed occurrences will be noted and recorded in the same manner as was described for the weed inventory effort. A monitoring report will be submitted to the SNDO weed specialist within two weeks of monitoring. The report will help determine whether success criteria are being met. Adaptive management strategies would be implemented if necessary.

4.3 Monitoring of Known Infestation Area

As previously mentioned, known occurrences of weed infestations will be evaluated on a regular basis. Evaluations will determine if noteworthy changes have occurred at each infestation, particularly if the number or area covered by an infestation has changed dramatically. At a minimum, annual monitoring is recommended for each known infestation. A brief summary will be prepared for each annual monitoring effort and will include sufficient detail to allow for an evaluation of the effectiveness of the weed management program, including weed infestation identification, weed monitoring, and weed control.

5.0 HERBICIDE APPLICATION, HANDLING, SPILLS, AND CLEANUP

5.1 Herbicide Application

Weed management contractors/personnel that are responsible for applying herbicides will obtain all of the required Federal, State, or local agency permits and will hold all necessary certifications and have received all relevant training. Permits may include terms and conditions that are not included in this weed management plan. A licensed contractor will apply herbicides in accordance with all applicable laws, regulations, and permit stipulation, including U.S. Environmental Protection Agency (EPA) label instructions. A PUP must be obtained from BLM prior to herbicide application. If faced with any of the following scenarios, herbicide application shall be suspended until such conditions no longer exist:

- Wind velocities in excess of 10 miles per hour (mph) during application of liquid herbicides and 15 mph during application of dry herbicides;
- Snow or ice present on weed foliage; or
- Precipitation is occurring or imminent.

For weed infestations readily accessible and passable by vehicle, vehicle-mounted applicators will be used. Manual application methods will be used in weed occurrences that are relatively small, inaccessible by established road or ROW, or in rough, varied terrain. All herbicide applicators, spreaders and sprayers, will be calibrated before each use to ensure all applications rates and procedures are appropriately implemented.

Herbicide transport and handling will follow these methods:

- No herbicides will be stored onsite.
- Only the quantity of herbicide expected for each day's use will be transported.
- Herbicide concentrate will be transported in approved containers in a controlled manner so as to prevent spills. Concentrate will be positioned in delivery or work vehicles so as to be secured and separated from the driving compartment, food, clothing, and safety equipment.
- The mixing of herbicide materials will be conducted at an offsite location or within a controlled space in the Operations and Management Area that is designated onsite. All mixing will take place over a drip/spill containment device and at a distance more than 200 feet from open or flowing water, wetlands, or other sensitive resources.
- Herbicides will not be applied to areas of open or flowing water, wetlands, or other sensitive resources unless authorized by the appropriate regulatory agency.
- All equipment and containers used for herbicide storage, application, and transport will subject to inspection for leaks or damage.
- Emptied herbicide containers will be disposed in accordance with instructions provided on the label.

5.2 Herbicide Spills and Cleanup

All spills and inadvertent releases of herbicides will be addressed immediately upon detection. Spill response kits approved for the correct spill size will be readily available in herbicide contractor vehicles and in daily onsite herbicide storage areas.

Spill response will vary depending on a variety of conditions, including location, amount of spill, area impacted by spill, type of herbicide spilled, and more. For each spill the following procedures should be implemented. Disseminate the appropriate onsite and agency notifications of a spill. Secure the affected area barring pedestrian and vehicle traffic. All spill response personnel shall don the appropriate PPE prior to entering the spill containment area. Personnel, while wearing the appropriate PPE and equipped with the necessary tools and equipment, shall stop the herbicide leak or release. All materials associated with spill response, including the released herbicide, affected soils and plants, absorptive material, clothing, and PPE shall be removed and containerized according to appropriate regulations and procedures. All generated spill response containers shall be transported, following appropriate regulations, and disposed legally at an approved disposal facility.

5.3 Worker Safety and Spill Reporting

All contractors responsible for herbicide use, transport, application, and control at the site will hold the appropriate certifications. Such certifications shall be made available. Contractors transporting herbicides to the site shall also have legible material safety data sheets (MSDSs) and labels onsite. All herbicide spills and inadvertent releases shall be reported in accordance with all applicable laws and regulations.

6.0 REFERENCES

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APPENDICES

Appendix A –Nevada Designated Noxious Weed Species

Table A-1: Designated Noxious and Invasive Weed Species of the State of Nevada

Common Name	Scientific *Name*	State of Nevada Category
African rue	*Peganum harmala*	A
Austrian fieldcress	*Rorippa austriaca*	A
Black henbane	*Hyoscyamus niger*	A
Camelthorn	*Alhagi psedualhagi*	A
Common crupina	*Crupina vulgaris*	A
Common St. Johnswort	*Hypercum perforatum*	A
Crimson fountaingrass	*Pennisetum setaceum*	A
Dalmation toadflax	*Linaria dalmatica*	A
Dyer's woad	*Isatis tinctoria*	A
Eurasian water-milfoil	*Myriophyllum spicatum*	A
Giant reed	*Arundo donax*	A
Giant salvinia	*Salvinia molesta*	A
Goatsrue	*Galega officinalis*	A
Houndstongue	*Cynoglossum officinale*	A
Hydrilla	*Hydrilla verticillata*	A
Iberian start thistle	*Centaurea iberica*	A
Klamath weed	*Hypericum perforatum*	A
Malta start thistle	*Centaurea melitensis*	A
Mayweed chamomile	*Anthemis cotula*	A
Mediterranean sage	*Salvia aethiopis*	A
Purple loosestrife	*Lythrum salicaria, L. virgatum*	A
Purple start thistle	*Centaurea calcitrapa*	A
Rush skeletonweed	*Chondrilla juncea*	A
Sow thistle	*Sonchus arvensis*	A
Spotted knapweed	*Centaurea masculosa*	A
Squarrose star knapweed	*Centaurea virgate Lam Var. squarrose*	A
Sulfur cinquefoil	*Potentilla recta*	A
Swainsonpea	*Sphaerophysa salsula*	A
Syrian bean caper	*Zygophyllum fabago*	A
Yellow starthistle	*Centaurea solstiltialis*	A
Yellow toadflax	*Linaria vulgaris*	A
Carolina horse-nettle	*Solanum carolinense*	B
Diffuse knapweed	*Centaurea diffusa*	B
Leafy spurge	*Euphorbia esula*	B
Medusahead	*Taeniatherum caput-medusae*	B
Musk thistle	*Carduus nutans*	B
Russian knapweed	*Acroptilon repens*	B
Sahara mustard	*Brassica tournefortii*	B
Scotch thistle	*Onopordum acanthium*	B

Common Name	**Scientific *Name***	**State of Nevada Category**
Silverleaf nightshade	*Solanum elaegnifolium*	B
White horse-nettle	*Solanum carolinense*	B
Canada thistle	*Cirsium arvense*	C
Hoary cress	*Cardaria draba*	C
Johnson grass	*Sorghum halepense*	C
Perennial pepperweed	*Lepidium latifolium*	C
Poison hemlock	*Conium maculatum*	C
Puncture vine	*Tribulus terrestris*	C
Salt cedar (tamarisk)	*Tamarix spp.*	C
Water hemlock	*Cicuta maculate*	C

A: Weeds not found or limited in distribution throughout the state; actively excluded from the state and actively eradicated where found; control required by the state in all infestations.
B: Weeds established in scattered populations in some counties of the state; actively excluded where possible; control required by the state in areas where populations are not well established or previously unknown to occur.
C: Weeds currently established and generally widespread in many counties of the state; abatement at the discretion of the State Quarantine Officer.

Appendix B – Adjuvant and Herbicide Formulas Approved by the BLM

Adjuvants Approved for Use on BLM Administered Lands

Update: September 25, 2012

Adjuvant Class	Adjuvant Type	Trade Name	Manufacturer	Comments
Surfactant	Non-ionic	Agrisolutions Preference	Agriliance, LLC.	WA Reg. No. 1381-50011
		A-90	Alligare, LLC	
		Aqufact	Aqumix, Inc.	
		Brewer 90-10	Brewer International	
		No Foam A	Creative Marketing & Research, Inc.	CA Reg. No. 1050775-50015
		Aquafact	Crop Production Services	
		Baron	Crown (Estes Incorporated)	
		Audible 80	Exacto, Inc.	
		Audible 90	Exacto, Inc.	
		N.I.S. 80	Estes Incorporated	
		Inlet	Helena Chemical Company	CA Reg. No. 5905-50099-AA
		Spec 90/10	Helena Chemical Company	
		Optima	Helena Chemical Company	CA Reg. No. 5905-50075-AA
		Induce	Setre (Helena)	CA Reg. No. 5905-50066-AA
			Helena Chemical Company	CA Reg. No. 5905-50091-AA
		Activator 90	Loveland Products Inc.	CA Reg. No. 34704-50034-AA
		LI-700	Loveland Products Inc.	CA Reg. No. 34704-50035
				WA Reg. No. AW36208-70004
		Scanner	Loveland Products Inc.	CA Reg. No. 34704-50064
				WA Reg. No. 34704-09003
		Spreader 90	Loveland Products Inc.	WA Reg. No. 34704-05002-AA
		UAP Surfactant 80/20	Loveland Products Inc.	
		X-77	Loveland Products Inc.	CA Reg. No. 34704-50044
		Magnify	Monterey AgResources	CA Reg. No. 17545-50018
		Elite Platinum	Red River Specialties, Inc.	
		Red River 90	Red River Specialties, Inc.	
		Red River NIS	Red River Specialties, Inc.	
		Cornbelt Premier 90	Van Diest Supply Co.	
		Cornbelt Trophy Gold	Van Diest Supply Co.	
		Spray Activator 85	Van Diest Supply Co.	
		R-900	Wilbur-Ellis	

Adjuvant Class	Adjuvant Type	Trade Name	Munufacturer	Comments
Surfactant	Non-ionic (cont.)	Super Spread 90	Wilbur-Ellis	WA Reg. No. AW-2935-70016
		Super Spread 7000	Wilbur-Ellis	CA Reg. No. 2935-50170
				WA Reg. No. AW-2935-0002
		Agrisolutions Activate Plus	Winfield Solutions, LLC	CA Reg. No. 9779-50004-AA
				WA Reg. No. 1381-09001
		Agrisolutions Preference	Winfield Solutions, LLC	WA Reg. No. 1381-50011
	Spreader/Sticker	Agri-Trend Spreader	Agri-Trend	
		TopFilm	Biosorb, Inc.	
		Onside Kick	Exacto, Inc.	
		Bind-It	Estes Incorporated	
		Surf-King PLUS	Crown (Estes Incorporated)	
		CWC 90	CWC Chemical, Inc.	
		Cohere	Helena Chemical Company	CA Reg. No. 5905-50083-A
		Attach	Loveland Products Inc.	CA Reg. No. 34704-50026
		Bond	Loveland Products Inc.	CA Reg. No. 36208-50005
		Bond Max	Loveland Products Inc.	CA Reg. No. 34704-50060
				WA Reg. No. 34704-08003
		Tactic	Loveland Products Inc.	CA Reg. No. 34704-50041-AA
		Widespread Max	Loveland Products Inc.	CA Reg. No. 34704-50061
				WA Reg. No. 34704-09001
		Rocket DL	Monterey AgResources	CA Reg. No. 17545-50019
		Nu-Film-IR	Miller Chem. & Fert. Corp.	
		Nu Film 17	Miller Chem. & Fert. Corp.	CA Reg. No. 72-50021-AA
		Nu Film P	Miller Chem. & Fert. Corp.	CA Reg. No. 72-50022-AA
		Lastick	Setre (Helena)	
		Insist 90	Wilbur-Ellis	
		R-56	Wilbur-Ellis	CA Reg. No. 2935-50144
		Aqua-King Plus	Winfield Solutions, LLC.	
		Surf-King Plus	Winfield Solutions, LLC.	

Adjuvant Class	Adjuvant Type	Trade Name	Munufacturer	Comments
Surfactant (cont.)	Silicone-based	SilEnergy	Brewer International	
		Silnet 200	Brewer International	
		Scrimmage	Exacto, Inc.	
		Bind-It MAX	Estes Incorporated	
		Thoroughbred	Estes Incorporated	
		Aero Dyne-Amic	Helena Chemical Company	CA Reg. No. 5905-50080-AA
		Dyne-Amic	Helena Chemical Company	CA Reg. No. 5095-50071-AA
		Kinetic	Setre (Helena)	CA Reg. No. 5905-50087-AA
		Freeway	Loveland Products Inc.	CA Reg. No. 34704-50031
				WA Reg. No. 34704-04005
		Phase	Loveland Products Inc.	CA Reg. No. 34704-50037-AA
		Phase II	Loveland Products Inc.	
		Silwet L-77	Loveland Products Inc.	CA Reg. No. 34704-50043
		Elite Marvel	Red River Specialties, Inc.	
		Sun Spreader	Red River Specialties, Inc.	
		Syl-coat	Wilbur-Ellis	CA Reg. No. 2935-50189
				WA Reg. No. 2935-12002
		Sylgard 309	Wilbur-Ellis	CA Reg. No. 2935-50161
		Syl-Tac	Wilbur-Ellis	CA Reg. No. 2935-50167
		Thoroughbred	Winfield Solutions, LLC.	
Oil-based	Crop Oil Concentrate	Alligare Forestry Oil	Alligare, LLC	
		Brewer 83-17	Brewer International	
		CWR Herbicide Activator	Creative Marketing & Research, Inc.	CA Reg. No. 1050775-50020-AA
		Majestic	Crown (Estes Incorporated)	
		Agri-Dex	Helena Chemical Company	CA Reg. No. 5905-50094-AA
		Crop Oil Concentrate	Helena Chemical Company	CA Reg. No. 5905-50085-AA
		Power-Line Crop Oil	Land View Inc.	
		Crop Oil Concentrate	Loveland Products Inc.	
		Maximizer Crop Oil Conc.	Loveland Products Inc.	CA Reg. No. 34704-50059
				WA Reg. No. 34704-08002
		Herbimax	Loveland Products Inc.	CA Reg. No. 34704-50032-AA
				WA Reg. No. 34704-04006
		Monterey M.S.O.	Monterey AgResources	CA Reg. No. 17545-50025
		Red River Forestry Oil	Red River Specialties, Inc.	
		Red River Pacer Crop Oil	Red River Specialties, Inc.	
		Cornbelt Crop Oil Concentrate	Van Diest Supply Co.	

Adjuvant Class	Adjuvant Type	Trade Name	Munufacturer	Comments
Oil-based (cont.)	Crop Oil Concentrate	Cornbelt Premium Crop Oil Concentrate	Van Diest Supply Co.	
	(Cont.)	R.O.C. Rigo Oil Conc.	Wilbur-Ellis	
		Mor-Act	Wilbur-Ellis	CA Reg. No. 2935-50098
		Agrisolutions Prime Oil	Winfield Solutions, LLC	CA Reg. No. 979-50002-AA
		Agrisolutions Superb HC	Winfield Solutions, LLC	WA Reg. No. 1381-06003
	Methylated Seed Oil	MSO Concentrate	Alligare, LLC	
		SunEnergy	Brewer International	
		Sun Wet	Brewer International	
		Premium MSO	Helena Chemical Company	
		Methylated Spray Oil Conc.	Helena Chemical Company	
		MSO Concentrate	Loveland Products Inc.	CA Reg. No. 34704-50029-AA
		Elite Supreme	Red River Specialties, Inc.	
		Red River Supreme	Red River Specialties, Inc.	
		Sunburn	Red River Specialties, Inc.	
		Sunset	Red River Specialties, Inc.	
		Cornbelt Base	Van Diest Supply Co.	
		Cornbelt Methylates Soy-Stik	Van Diest Supply Co.	
		Hasten	Wilbur-Ellis	CA Reg. No. 2935-50160
				WA Reg. No. 2935-02004
		Super Kix	Wilbur-Ellis	
		Super Spread MSO	Wilbur-Ellis	
		Agrisolutions Destiny HC	Winfield Solutions, LLC	WA Reg. No. 1381-09002
		Atmos	Winfield Solutions, LLC	
	Methylated Seed Oil +	Inergy	Crown (Estes Incorporated)	
	Organosilicone	Inergy	Winfield Solutions, LLC	
	Vegetable Oil	Motion	Exacto, Inc.	
		Noble	Estes Incorporated	
		Amigo	Loveland Products Inc.	CA Reg. No. 34704-50028-AA
				WA Reg. No. 34704-04002
		Elite Natural	Red River Specialities	
		Competitor	Wilbur-Ellis	CA Reg. No. 2935-50173
				WA Reg. No. AW-2935-04001

Adjuvant Class	Adjuvant Type	Trade Name	Munufacturer	Comments
Fertilizer-based	Nitrogen-based	Quest	Setre (Helena)	CA Reg. No. 5905-50076-AA
		Quest	Helena Chemical Company	CA Reg. No. 5905-50076-AA
		Actamaster Spray Adjuvant	Loveland Products Inc.	WA Reg. No. 34704-50006
		Actamaster Soluble Spray Adjuvant	Loveland Products Inc.	WA Reg. No. 34704-50001
		Dispatch	Loveland Products Inc.	
		Dispatch 111	Loveland Products Inc.	
		Dispatch 2N	Loveland Products Inc.	
		Dispatch AMS	Loveland Products Inc.	
		Flame	Loveland Products Inc.	
		Cornbelt Gardian	Van Diest Supply Co.	
		Cornbelt Gardian Plus	Van Diest Supply Co.	
		Bronc	Wilbur-Ellis	
		Bronc Max	Wilbur-Ellis	
		Bronc Max EDT	Wilbur-Ellis	
		Bronc Plus Dry	Wilbur-Ellis	
		Bronc Plus Dry EDT	Wilbur-Ellis	WA Reg. No.2935-03002
		Bronc Total	Wilbur-Ellis	
		Cayuse Plus	Wilbur-Ellis	CA Reg. No. 2935-50171
		Agrisolutions Alliance	Winfield Solutions, LLC	CA Reg. No. 1381-50002-AA
				WA Reg. No.1381-05005
		Agrisolutions Class Act NG	Winfield Solutions, LLC	WA Reg. No. 1381-01004
		Agrisolutions Corral AMS Liquid	Winfield Solutions, LLC	WA Reg. No. 1381-01006
Special Purpose	Buffering Agent	Yardage	Exacto, Inc.	
or Utility		Buffers P.S.	Helena Chemical Company	CA Reg. No. 5905-50062-ZA
		Spray-Aide	Miller Chem. & Fert. Corp.	CA Reg. No. 72-50006-AA
		Oblique	Red River Specialties, Inc.	
		Brimstone	Wilbur-Ellis	
		Tri-Fol	Wilbur-Ellis	CA Reg. No. 2935-50152
	Colorants	Hi-Light	Becker-Underwood	
		Hi-Light WSP	Becker-Underwood	
		Hash Mark Green Powder	Exacto, Inc.	
		Hash Mark Green Liquid	Exacto, Inc.	
		Hash Mark Blue Powder	Exacto, Inc.	
		Hash Mark Blue Liquid HC	Exacto, Inc.	

Adjuvant Class	Adjuvant Type	Trade Name	Munufacturer	Comments
Special Purpose	Colorants (cont.)	Hash Mark Blue Liquid	Exacto, Inc.	
or Utility - cont.		Spray Indicator XL	Helena Chemical Company	
		Marker Dye	Loveland Products Inc.	
		TurfTrax	Loveland Products Inc.	
		TurfTrax Blue Spray Indicator	Loveland Products Inc.	
		BullsEye	Milliken Chemical	
		Mark-It Blue	Monterey AgResources	
		Mark-It Red	Monterey AgResources	
		Signal	Precision	
		SPI-Max Blue Spray Marker	PROKoZ	
		Elite Splendor	Red River Specialities, Inc.	
	Compatibility/	E Z MIX	Loveland Products Inc.	CA Reg. No. 36208-50006
	Suspension	Support	Loveland Products Inc.	WA Reg. No. 34704-04011
	Agent	Blendex VHC	Setre (Helena)	
	Deposition Aid	Cygnet Plus	Brewer International	CA Reg. No. 1051114-50001
		Poly Control 2	Brewer International	
		CWC Sharpshooter	CWC Chemical, Inc.	
		Offside	Exacto, Inc.	
		Grounded	Helena Chemical Company	
		Grounded - CA	Helena Chemical Company	CA Reg. No. 5905-50096-AA
		ProMate Impel	Helena Chemical Company	
		Pointblank	Helena Chemical Company	CA Reg. No. 52467-50008-AA-5905
		Strike Zone DF	Helena Chemical Company	CA Reg. No. 5905-50084-AA
		Compadre	Loveland Products Inc.	CA Reg. No. 34704-50050
				WA Reg. No. 34704-06004
		Intac Plus	Loveland Products Inc.	
		Liberate	Loveland Products Inc.	CA Reg. No. 34704-50030-AA
				WA Reg. No. 34704-04008
		Reign	Loveland Products Inc.	CA Reg. No. 34704-50045
				WA Reg. No. 34704-05010
		Reign LC	Loveland Products Inc.	CA Reg. No. 34704-50048
		Weather Gard	Loveland Products Inc.	CA Reg. No. 34704-50042-AA
		Mist-Control	Miller Chem. & Fert. Corp.	CA Reg. No. 72-50011-AA
		Sustain	Miller Chem. & Fert. Corp.	CA Reg. No. 72-50015-AA

Adjuvant Class	Adjuvant Type	Trade Name	Munufacturer	Comments
Special Purpose	Deposition Aid - cont.	Exit	Miller Chem. & Fert. Corp.	CA Reg. No. 72-50014-AA
or Utility - cont.		Elite Secure Ultra	Red River Specialties, Inc.	
		Secure Ultra	Red River Specialties, Inc.	
		Sta Put	Setre (Helena)	CA Reg. No. 5905-50068-AA
		Agripharm Drift Control	Walco International	
		Bivert	Wilbur-Ellis	CA Reg. No. 2935-50163
		Coverage G-20	Wilbur-Ellis	
		Droplex	Winfield Solution, LLC.	
		Crosshair	Wilbur-Ellis	
		EDT Concentrate	Wilbur-Ellis	
		Agrisolutions Interlock	Winfield Solutions, LLC	
	Defoaming Agent	Fast Break	Agrisolutions	CA Reg. No. 1381-50006-AA
				WA Reg. No. 1381-50006
		Defoamer	Brewer International	
		Tripleline	Creative Marketing & Research, Inc.	CA Reg. No. 1050775-50023-AA
		Reverse	Exacto, Inc.	
		Foambuster Max	Helena Chemical Company	
		Fighter-F 10	Loveland Products Inc.	
		Fighter-F Dry	Loveland Products Inc.	
		Unfoamer	Loveland Products Inc.	CA Reg. No. 34704-50062
				WA Reg. No. 34704-09002
		Foam Fighter	Miller Chem. & Fert. Corp.	CA Reg. No. 72-50005-AA
		Red River Defoamer	Red River Specialities, Inc.	
		Foam Buster	Setre (Helena)	CA Reg. No. 5905-50072-AA
		Cornbelt Defoamer	Van Diest Supply Co	
		No Foam	Wilbur-Ellis	CA Reg. No. 2935-50136
	Diluent/Deposition	Improved JLB Oil Plus	Brewer International	
	Agent	JLB Oil Plus	Brewer International	
		Bark Oil EC	Crop Production Services	
		Bark Oil	Crop Production Services	
		Hy-Grade I	CWC Chemical, Inc	
		Hy-Grade EC	CWC Chemical, Inc	
		Elite Premier	Red River Specialties, Inc.	
		Elite Premier Blue	Red River Specialties, Inc.	

Adjuvant Class	Adjuvant Type	Trade Name	Munufacturer	Comments
Special Purpose	Diluent/Deposition	Red River Basal Oil	Red River Specialties, Inc.	
or Utility - cont.	Agent (Cont.)	Thinvert TRU	Waldrum Specialities, Inc.	
		Thinvert Concentrate	Waldrum Specialities, Inc.	
		In-Place	Wilbur-Ellis	CA Reg. No. 2935-50169
		W.E.B. Oil	Wilbur-Ellis	CA Reg. No. 2935-50166
				WA Reg. No. AW 2935-70023
	Foam Marker	Align	Helena Chemical Company	
		Tuff Trax Foam Concentrate	Loveland Products, Inc.	
		Trekker Trax	Loveland Products, Inc.	
		Red River Foam Marker	Red River Specialties, Inc.	
		R-160	Wilbur-Ellis	
	Invert Emulsion Agent	Redi-vert II	Wilbur-Ellis	CA Reg. No. 2935-50168
	Tank Cleaner	Wipe Out	Helena Chemical Company	
		All Clear	Loveland Products Inc.	
		Back Field	Exacto, Inc.	
		Tank and Equipment Cleaner	Loveland Products Inc.	
		Red River Tank Cleaner	Red River Specialties, Inc.	
		Elite Vigor	Red River Specialties, Inc.	
		Kutter	Wilbur-Ellis	
		Neutral-Clean	Wilbur-Ellis	
		Cornbelt Tank-Aid	Van Diest Supply Co.	
	Water Conditioning	Rush	Crown (Estes Incorporated)	
		Completion	Exacto, Inc.	
		AccuQuest WM	Helena Chemical Company	
		Hel-Fire	Helena Chemical Company	
		Blendmaster	Loveland Products Inc.	
		Choice	Loveland Products Inc.	CA Reg. No. 34704-50027-AA
				WA Reg. No. 34704-04004
		Choice Xtra	Loveland Products Inc.	
		Choice Weather Master	Loveland Products Inc.	CA Reg. No. 34704-50038-AA
				WA Reg. No. 34704-05005
		Elite Imperial	Red River Specialities, Inc.	
		Cornbelt N-Tense	Van Diest Supply Co.	

Adjuvant Class	Adjuvant Type	Trade Name	Munufacturer	Comments
Special Purpose	Water Conditioning	Climb	Wilbur-Ellis	CA Reg. No. 2935-50181
or Utility - cont.	(Cont.)			WA Reg. No. 2935-09001
		Cut-Rate	Wilbur-Ellis	

Appendix C – Example of BLM Pesticide Use Proposal Submittal Form

UNITED STATE DEPARTMENT OF THE INTERIOR

BUREAU OF LAND MANAGEMENT

PESTICIDE USE PROPOSAL

STATE: ______________________

COUNTY: ______________________

DISTRICT: ______________________

DURATION OF PROPOSAL: __________

LOCATION: ______________________

DATE: ______________________

PROPOSAL NUMBER: ______________

EA REFERENCE NUMBER: __________

DECISION RECORD (DR) NUMBER: ________

ORIGINATOR – NAME: ______________________

ORIGINATOR – COMPANY: ______________________

ORIGINATOR – CONTACT INFORMATION: ______________________

PROPOSAL PREPARER - NAME: ______________________

PROPOSAL PREPARER – COMPANY: ______________________

PROPOSAL PREPARER – CONTACT INFORMATION: ______________________

I. APPLICATION INFORMATION – Including mixtures and adjuvants):

1. TRADE NAME(S): ______________________
2. COMMON NAME(S) ______________________
3. EPA REGISTRATION NUMBER(S): ______________________
4. MANUFACTURER(S): ______________________
5. METHOD OF APPLICATION: ______________________
6. MAXIMUM RATE OF APPLICATION – AS STATED IN THE EIS:
   a. Pounds Active Ingredient or Acid Equivalent: ______________
7. MAXIMUM RATE OF APPLICATION – AS STATED ON THE LABEL:
   a. Formulated Product: ______________________
   b. Pounds Active Ingredient or Acid Equivalent: ______________
8. INTENDED RATE OF APPLICATION:
   a. Formulated Product: ______________________
   b. Pounds Active Ingredient or Acid Equivalent: ______________
9. APPLICATION DATE(S): ______________________
10. NUMBER OF APPLICATIONS: ______________

II. PEST [List specific pest(s) and reason(s) for the proposed application of the pesticide]:

III. DESIRED RESULTS OF THE APPLICATION – LINKED TO THE OBJECTIVES OF THE APPLICATION:

IV. APPLICATION SITE DESCRIPTION:

1. ESTIMATED NUMBER OF ACRES: ______________________
2. GENERAL DESCRIPTION (Describe land type or use, size, stage of growth of target species, soil characteristics, and any additional information that may be important in describing the area to be treated.)

V. SENSITIVE ASPECTS AND PRECAUTIONS (Describe sensitive areas – marsh, endangered, threatened, candidate, and sensitive species habitat – and distance to application site. List measures to be taken to avoid impact to these areas):

VI. NON-TARGET VEGETATION (Describe potential immediate and cumulative impacts to non-target pests in project area as a result of the pesticide application. Identify any planned mitigation measures that will be employed – BE GENERAL, SPECIFICS DISCUSSED IN THE EA):

VII. INTEGRATED PEST MANAGEMENT PRACTICES CONSIDERED IN THE OVERALL PROJECT :

VIII. SIGNATURES:

1. Pesticide Use Proposal's Originator: ______________________ Date: ______
   a. Company: ______________________
2. Certified Pesticide Applicator: ______________________ Date: ______
   a. License Number: ______________________
   b. Certifying Organization: ______________________
3. Field Office Pesticide/Noxious Weed Coordinator: ______________________ Date: ______
4. Field Office Manager: ______________________ Date: ______
5. BLM State Pesticide Coordinator: ______________________ Date: ______
6. Deputy State Director: ______________________ Date: ______
   - Concur or Approved
   - Not Concur or Disapproved
   - Concur or Approved With Modifications

     - Any changes (modifications) to this proposal by the State Pesticide Coordinator will be listed in an attached memo to the manager requesting approval from the Deputy State Director.

Appendix D – Example of a BLM Pesticide Application Record Form

UNITED STATE DEPARTMENT OF THE INTERIOR

BUREAU OF LAND MANAGEMENT

PESTICIDE APPLICATION RECORD

Project Name: ______________________________

Operator: ______________________________

Pesticide Use Proposal Number: ______________________________

NEPA Reference Number: ______________________________

1. APPLICATOR:

a. Name of Applicator or Employee(s) Making the Application:

______________________________ ______________________________

______________________________ ______________________________

2. APPLICATION:

a. Application Dates: ____________ ____________

b. Time Frame of Application: ____________ ____________

c. Location: ______________________________

d. Application Equipment: ______________________________

3. PESTICIDE INFORMATION:

a. Trade Name: ______________________________

b. Company/Manufacturer/Formulator's Name: ______________________________

c. Pesticide Formulation Type: ______________________________

d. Rate of Application – Per Acre:

i. Formulated Product: ______________________________

ii. Active Ingredient/Acid Equivalent: ______________________________

iii. Total Spray Solution Amount: ______________________________

4. APPLICATION CONDITIONS:

a. Wind Speed: ____________ Wind Direction: ____________

b. Air Temperature: ____________ Surface Conditions: ____________

5. **APPLICATION AREA:**

a. Area Treated – Based upon JD Definition: ______________________________ Acres.

b. Area Treated – Based upon Chemical Used or Amount of Chemical Applied:

____

c. Status of Application Site (Circle One): Dry Moist

d. Status of Application Site (Circle One): Native Vegetation Seeded Vegetation Other Type

6. **TARGETED PEST(S):**

Name	Stage of Growth/Development

7. **MONITORING RECORD:**

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NOTE:

1. **This record is required and must be completed, except for monitoring, within 24 hours following application of the pesticide.**
2. **This record must be kept on file/maintained for a minimum of 10 years.**

Appendix E – Weed Stipulations for Construction Projects on BLM Land

<u>Weed Stipulations for Construction Projects</u>

1. The project proponent will limit the size of any vegetation and/or ground disturbance to the absolute minimum necessary to perform the activity safely and as designed. The project proponent will avoid creating soil conditions that promote weed germination and establishment.

2. At the onset of project planning in the NEPA analysis phase, the project proponent, project lead or the SNDO noxious weed coordinator will complete the Risk Assessment Form for Noxious/Invasive Weeds. This will provide information about the methods of weed treatments and weed prevention schedules for the management of noxious weeds on the project footprint. This will identify the level of noxious weed management necessary for stipulation 3 below.

3. The project proponent will coordinate project activities with the BLM Weed Coordinator (702-515-5295) regarding any proposed herbicide treatment. If herbicide treatment is needed, the project proponent will prepare, submit, obtain and maintain a pesticide use proposal (PUP) for the proposed action. Weed treatments may include the use of herbicides, and only those herbicides approved for use on Public lands by the BLM.

4. Before ground-disturbing activities begin, the project proponent will review the weed risk assessment and prepare a weed management plan that will inventory and prioritize weed infestations for treatment within the project foot print. Should the weeds spread beyond the project foot print as a result of project activity then these weeds will be treated as a part of the project. This will include access routes.

5. The project proponent will begin project operations in weed free areas whenever feasible before operating in weed-infested areas.

6. The project proponent will locate pits and staging areas for the use of equipment storage, machine and vehicle parking or any other area needed for the temporary placement of people, machinery and supplies. These staging areas will be selected from locations that are relatively weed-free. The project proponent will avoid or minimize all types of travel through weed-infested areas or restrict major activities to periods of time when the spread of seed or plant parts are least likely.

7. BLM or the project proponent will determine equipment cleaning sites. These sites will be coordinated with the BLM. Project related equipment and machinery (**this especially includes the nooks and crannies of undercarriages**) will be cleaned of all mud, dirt and plant parts before moving into relatively weed-free areas and when leaving weed infested sites. Seeds and plant parts need to be collected, bagged and deposited in landfills through the waste disposal system when practical. (This is not meant to apply to service vehicles that will stay on roadways avoiding weed infested sites.)

8. Project workers need to inspect, remove, and dispose of weed seed and plant parts found on their clothing and equipment. Disposal methods vary depending on the project.

9. The project proponent will evaluate options, including area closures, to regulate the flow of traffic on sites where native vegetation needs to be established.

10. A Noxious weed inventory will be performed for the project footprint prior to any ground disturbing activities. The results of this initial inventory will be incorporated into the Weed Management Plan. The type of survey needed will depend on the size of the project footprint.

11. The proponent shall be responsible for controlling all undesirable invading plant species (including listed noxious weeds and other invasive plants identified as undesirable by federal, state or local authorities) within the boundaries of their authorization area and Bureau-authorized ancillary facilities (e.g. access and utility corridors), including all operating and reclaimed areas, until revegetation activities have been deemed successful and responsibility released by the authorized officer. Control standards and measures proposed must conform to applicable state and federal regulations.

12. The proponent shall use weed free seed for reclamation and for other organic products for erosion control, stabilization, or revegetation (e.g. straw bales, organic mulch) must be certified weed free.

13. The proponent is responsible for ensuring that all project related vehicles and equipment arriving at the site (including, but not limited to, drill rigs, dozers, support vehicles, pickups and passenger vehicles, including those of the operator, any contractor or subcontractor and invited visitors) do not transport noxious weeds onto the project site. The proponent shall ensure that all such vehicles and equipment that will be traveling off constructed and maintained roads or parking areas within the project area have been power washed, including the undercarriage, since their last off road use and prior to off road use on the project. When beginning off road use on the project, such vehicles and equipment shall not harbor soil, mud or plant parts from another locale. Depending on the site setting such as remoteness, or other site condition, the operator may be required to have an on-site wash area identified and readily available. If a noxious weed infestation is known or later discovered on the project site, project related vehicles or equipment that have traveled through such an infestation shall be power washed including the undercarriage prior to leaving the site, at an established, identified wash area. Wash water and sediment shall be contained in an adjacent settling basin. Should any vegetation emerge in the wash area or settling basin, it will be promptly identified and appropriately controlled if found to be an undesirable invasive plant.

14. Should undesirable invasive plants become established on developed areas prior to reclamation reshaping; appropriate measures will be taken to ensure that the invasive plants are eradicated prior to reclamation earthwork. Should undesirable invasive plants become established on reshaped areas prior to reclamation seeding; appropriate measures will be taken to ensure that invasive plants are eradicated prior to seeding the site.

Appendix D

Draft Decommissioning Plan

DRAFT CONCEPTUAL DECOMMISSIONING PLAN

MOAPA SOLAR ENERGY CENTER

August 2013

TABLE OF CONTENTS

Acronyms Used in the Report

BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
EPA	Environmental Protection Agency
ESA	Environmental Site Assessment
NEPA	National Environmental Policy Act
O&M	Operations and Maintenance
MSEC or Project	Moapa Solar Energy Center Project
PV	Photovoltaic
PPA	Power Purchase Agreement
RCRA	Resource Conservation and Recovery Act
Reservation	Moapa River Indian Reservation
SPGF	Solar Power Generation Facility
TSCA	Toxic Substances Control Act

1.0 INTRODUCTION

The Moapa Solar Energy Center (MSEC or Project) has been proposed by Moapa Solar LLC (Applicant) on land within the Moapa River Indian Reservation (Reservation) and on Bureau of Land Management (BLM) lands in the Mojave Desert in Clark County, Nevada. **Figure 1** shows the general location of the Project.

The Proposed Project would consist of a solar power generation facility (SPGF), electrical lines that would interconnect the Project to the regional electrical transmission grid (gen-tie lines), a water pipeline, and an access road between the SPGF and a frontage road (North Las Vegas Boulevard) along the west side of Interstate 15 (I-15). The SPGF would be located entirely on lands within the Moapa River Indian Reservation, the gen-tie lines, water pipeline, and proposed access road would be located on both Reservation and BLM-administered lands. **Figure 2** shows the location of the various Project components.

1.1 Purpose of the Decommissioning Plan

The purpose of this Decommissioning Plan is to establish the conceptual methodologies that would be employed for decommissioning activities associated with the permanent closure of the Project. The actual actions implemented in the facility closure would be determined by the expected future use of the site. Therefore, a more detailed decommissioning plan would be developed in advance of the start of decommissioning activities.

The Project is expected to operate at a minimum for the life of its lease with the Tribe (30 years) and the term of its Power Purchase Agreement (PPA) or other energy contracts. It is possible, because much of the needed electrical infrastructure will have been developed, the SPGF would continue to be upgraded and used to generate solar energy even beyond the term of the initial lease and energy purchase agreements. Therefore, it is possible that the SPGF site would remain in solar energy production for the foreseeable future.

It is also possible that the Tribe could re-purpose the Project site at the termination of solar project. Certain facility components such as the access road, electrical transmission lines, water pipeline, Operations and Maintenance (O&M) building, and others could be used to support other future uses on this site.

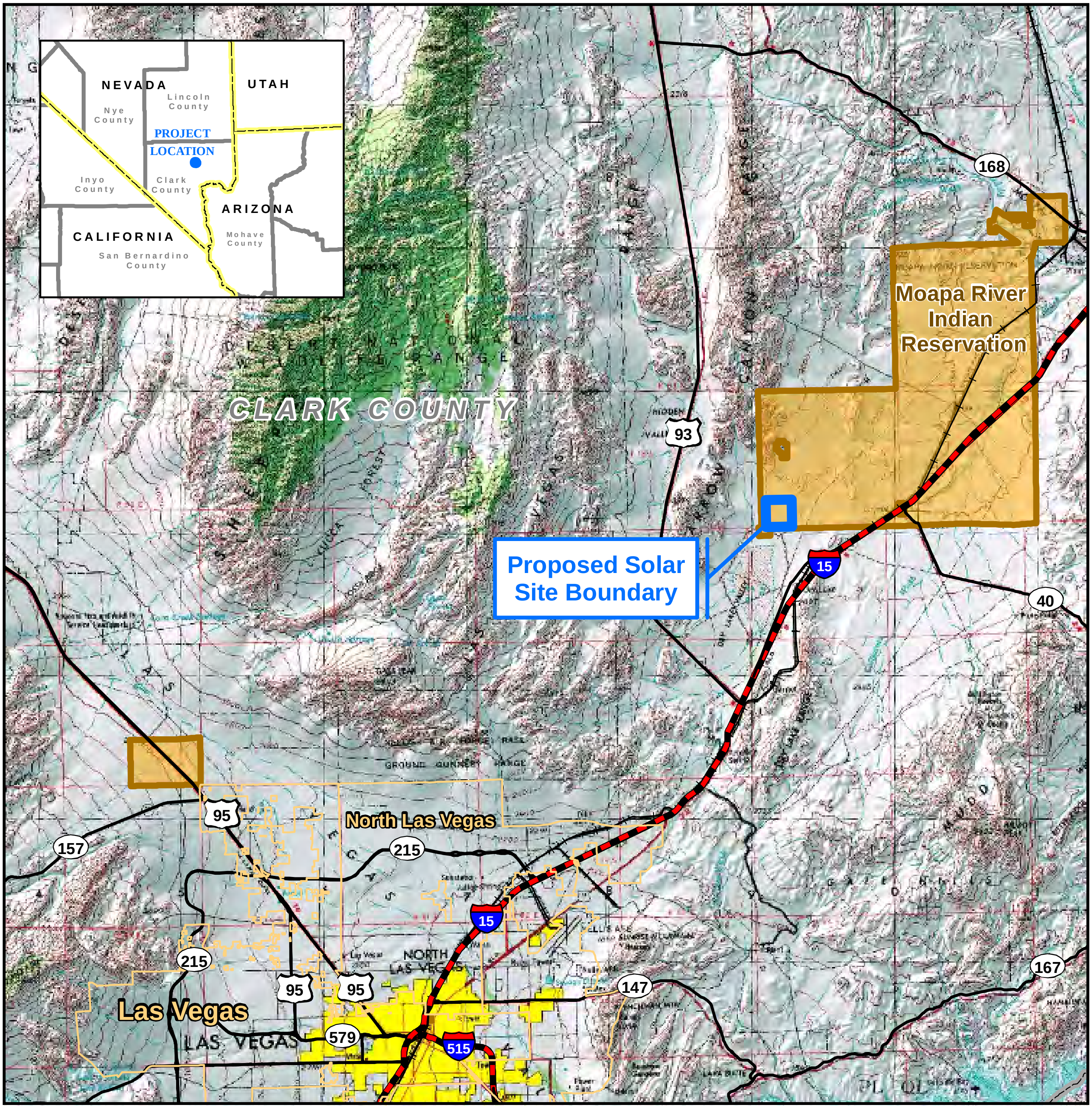
For purposes of developing this plan, it is assumed that if and when the solar Project were decommissioned, all Project structures and electrical equipment would be removed from the SPGF site and associated rights-of way (ROWs) and the disturbed areas would be reclaimed in accordance with the Restoration and Revegetation Plan.

1.2 Organization of the Plan

This conceptual decommissioning plan addresses the following:

- Project Description
- Regulatory Criteria
- Decommissioning Activities
    - Pre-Decommissioning
    - Removal of Facilities
    - Hazardous Waste Management
    - Debris Management, Disposal, and Recycling
    - Post-Demolition Site Stabilization
- Project Decommissioning Costs and Bonding

As mentioned earlier, because this document addresses Project actions that would occur well in the future, it will be updated and finalized in the months prior to the scheduled decommissioning. This will ensure the final plan addresses the proposed future land use of the site and the applicable rules and regulations in place at that time.



Legend

- Interstate
- US/ State Highway
- Railroad
- Municipal Boundary
- Proposed Solar Site Boundary

Jurisdictional Land Ownership

- Indian Reservation

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Miles

Universal Transverse Mercator
North American Datum 1983
Zone 11 North, Meters

Moapa Solar Energy Center

FIGURE 1
PROJECT LOCATION

Map Extent: Clark County, Nevada

Date: 04-30-13		Author: djb

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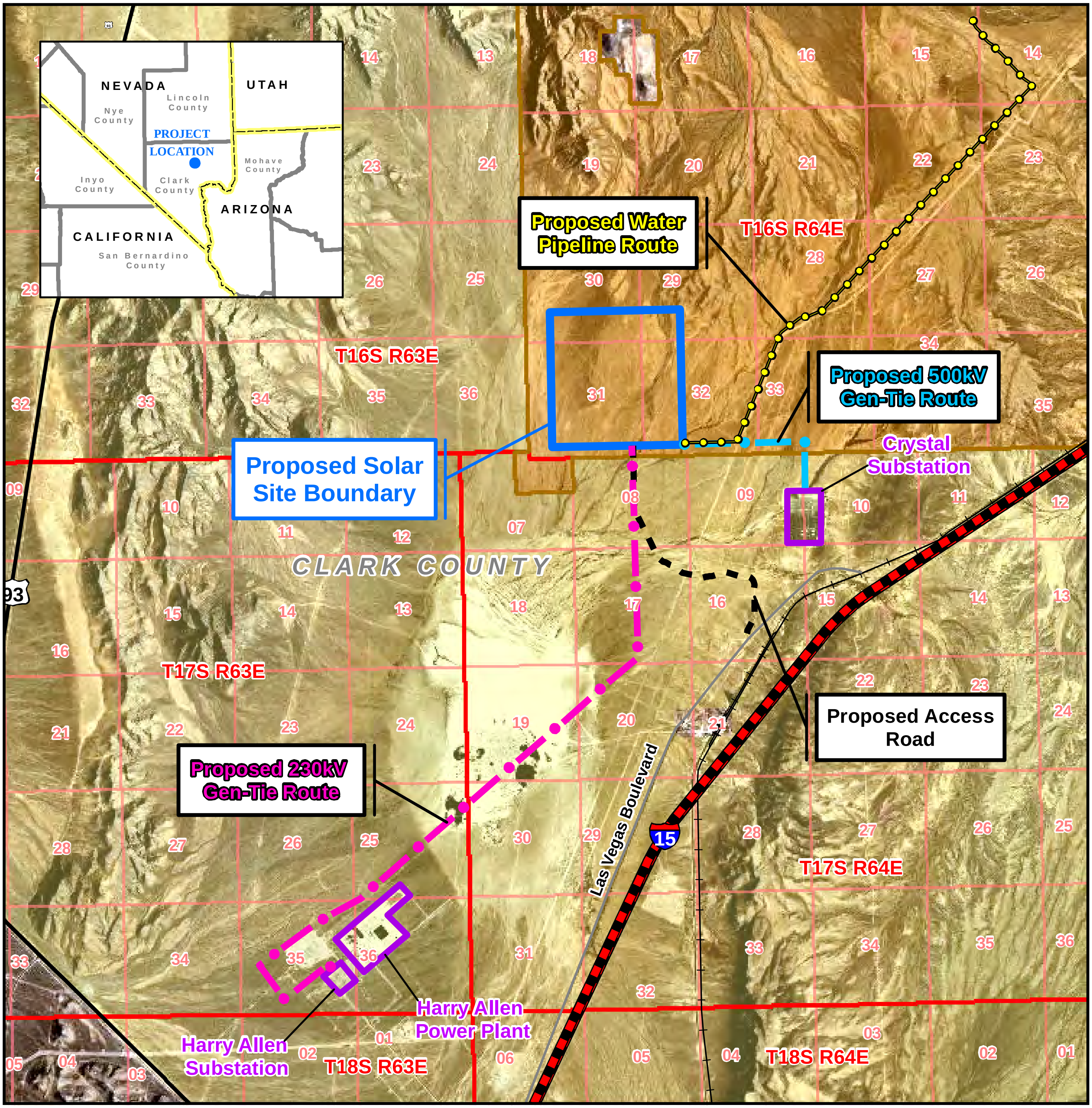

Legend

Interstate	Township/Range Boundary
US/State Highway	Section Line
Local Road	Existing Substation Boundary
Railroad	Proposed Solar Site Boundary
Proposed Water Pipeline	Jurisdictional Land Ownership
Proposed 230kV Gen-Tie	Bureau of Land Management Land
Proposed 500kV Gen-Tie	Indian Reservation
Proposed Access Road	

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Universal Transverse Mercator
North American Datum 1983
Zone 11 North, Meters

Moapa Solar Energy Center

FIGURE 2
PROPOSED PROJECT FACILITIES

Map Extent: Clark County, Nevada

Date: 04-30-13		Author: djb

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2.0 PROJECT DESCRIPTION

This section provides an overview of the proposed MSEC Project and its various components. Construction is anticipated to begin in 2014 or 2015 and will occur over an approximate 2 to 3year period.

2.1 SPGF

The SPGF would be located wholly on lands within the Reservation. It would utilize photovoltaic (PV) technology and would generate up to 200 Megawatts (MWs) of energy. It is expected to disturb up to the entire 850-acre SPGF site.

The proposed PV project would utilize crystalline silicon or thin-film PV panels that would be mounted on single-axis trackers. The output of the PV modules are collected through one or more combiner boxes and directed to an inverter. The inverter converts the DC power to AC power, which flows to a transformer where it is stepped up to distribution level voltage. Multiple transformers are connected in parallel via low voltage collector lines to the Project substation.

The Project site would be fenced and would also include an O&M building and parking.

2.2 Gen-Tie Lines

One or two gen-tie transmission lines will be constructed based on the customer for the power generated at the SPGF. The gen-tie lines would include approximately 7.1 miles of single-circuit 230-kV overhead transmission line from the SPGF to the Harry Allen 230-kV Substation and/or approximately 1.6 miles of single-circuit 500-kV overhead transmission line from the SPGF to the 500 kV Crystal Valley Substation. These lines would be built with single steel pole structures. The 230 kV line would be located primarily on BLM lands with a small portion on the Reservation and the 500 kV line would be located on Reservation and BLM lands.

2.3 Access Road

A 2.5-mile gravel access road connecting the SPGF to the existing paved frontage road adjacent to I-15 would be constructed predominantly on BLM-administered lands with a short segment on the Reservation.

2.4 Water Pipeline

Water for the Project would be provided by the Tribe from an existing well located about 5.4 miles northeast of the SPGF site. It would be delivered to the SPGF site via a water pipeline located on the Reservation but also in a designated utility corridor administered by BLM.

3.0 REGULATORY CRITERIA

During the decommissioning process, all activities will be conducted in compliance with all applicable Federal and Tribal regulations in place at the time. Consultation with the Tribe, BIA, BLM, and any other involved entities would be conducted to ensure that all Federal and Tribal requirements are addressed.

The primary guidance documents for decommissioning will be the Final Decommissioning Plan (prepared just in advance of project closure) and the Restoration and Revegetation Plan.

Federal requirements involving hazardous wastes and toxic substances will also be followed during to decommissioning activities. Among these are the Toxic Substances Control Act (TSCA) (15 U.S.C. §2601) that requires reporting, record-keeping and testing requirements and restrictions relating to the use and disposal of chemical substances and/or mixtures. TSCA also addresses the production, importation, use and disposal of specific chemicals (EPA 2011a). The Resource Conservation and Recovery Act (RCRA) (42 U.S.C. §6901) gives the EPA the authority to control hazardous waste from its generation till disposal, also including transportation, treatment, and storage (EPA 2011b).

Coordination with the Tribe and agencies throughout the life of the Project, including decommissioning, is critical so that applicable regulations are not violated and the public and the environment are not impacted by the Project.

4.0 PROJECT DECOMMISSIONING

The procedures described for decommissioning are designed to promote public health and safety, environmental protection and compliance with applicable regulations. It is assumed that decommissioning will begin approximately 30 or more years after Project operation is initiated. The Project decommissioning plan may incorporate the sale of some of the facility components via the used equipment market and recycling of components. Decommissioning will be conducted in accordance with a Final Decommissioning Plan that will be developed in months prior to decommissioning being initiated.

This decommissioning plan assumes that all equipment and facilities within and associated with the SPGF will be removed. The transmission lines, access road and water pipeline would also be restored to as close to its original state. A compliance inspection would be performed by BLM on BLM lands

4.1 Pre-Decommissioning Activities

Pre-decommissioning activities will be conducted to prepare the Project for demolition. This would include assessing the existing site conditions and development of the final Decommissioning Plan and schedule as described above.

An Environmental Site Assessment (ESA) will be conducted before any decommissioning activities occur. The ESA will document the existing conditions of the SPGF including the location and presence of hazardous materials on the site. The results of the ESA will be used to define any remediation or cleanup methodologies that could be required and incorporated into the Final Decommissioning Plan. This documentation would ensure that areas containing hazardous materials can be decommissioned appropriately.

Other pre-decommissioning activities would include removing hazardous materials from the site including residues that occur in equipment. All operational liquids and chemicals are expected to be removed and disposed of as discussed in Section 4.4. Hazardous material and petroleum containers, pipelines, and other similar structures shall be rinsed clean, when feasible, and the waste liquid collected for off-site disposal.

Locations for decommissioned structures, non-hazardous waste, and debris will be designated on the final decommissioning plan to facilitate the decommissioning process and off-site removal.

4.2 Removal of Facilities

Site decommissioning and equipment removal can take a year or more. Therefore, access roads, fencing, electrical power, and raw/sanitary water facilities will temporarily remain in place for use by the decommissioning and restoration workers until no longer needed. Therefore, these components would be the last to be removed prior to site rehabilitation.

SPGF Above- and Below-Ground Facilities

Structures that need to be dismantled during decommissioning include the on-site substation, on-site O&M area, perimeter fence, solar field, and transformers and inverters. These structures will be dismantled and moved to designated areas for either recycling or disposal at an approved landfill.

Above-ground structures will be removed through mechanical or other approved methods. Below-ground structures will be removed or, upon agency approval, may remain in place to minimize soil disturbance. Below-ground facilities/utilities that potentially may be removed include pipelines, electrical lines and conduits, gas lines, concrete slabs.

The evaporation ponds will be closed by first removing the wastewater and the solids / sludge from the ponds. Following removal of the materials, the high density polyethylene (HDPE) liners, drainage layers and leak detection system will then be removed along with any hard surface / protective layer and granular fill that may have been used as base material.

Gen-Tie Transmission Lines

If the gen-tie transmission lines will not continue to be utilized by the Tribe for another purpose at the time of Project decommissioning, the lines will be removed. Decommissioning of the gen-tie will consist of removal of all structures associated with the construction of the transmission line(s) to include, but not limited to overhead conductors and the removal of poles. All steel will be recycled and the foundations will be removed to a depth of at least 2 feet below the ground surface, unless BLM does not require removal of the foundations. Aluminum from overhead conductors will be recycled.

Roads

Access and on-site roads will remain in place to accomplish decommissioning at the end of the facility's life and would be one of the last Project components to be removed. If the graveled access road is not needed for other future uses by the Tribe or BLM, the gravel and base material would be removed and recycled or transported to an appropriate disposal site. The same is true of any on-site roads developed in the solar field.

After the road materials are removed, the roads will be restored to approximate preconstruction conditions in accordance with the Restoration and Revegetation Plan.

Water Pipeline

If the water pipeline would not be utilized by the Tribe for another purpose, it could be removed or possibly left in place.

4.3 Debris Management, Disposal, and Recycling

All removed material and demolition debris will be placed in designated locations within the SPGF-site. Each stockpile will be transported off-site to either a used equipment market, off-site recycling center, or approved landfill depending on the material type. Debris will be broken down into manageable sizes so that transportation is simplified.

4.4 Hazardous Waste Management

All disposal and transportation of hazardous waste will be conducted under compliance with RCRA (42 U.S.C. §6901), and TSCA (15 U.S.C. §2601), and other regulations as needed. In areas where no record of hazardous waste exposure occurred, a visual inspection would be conducted as part of the post-operational ESA described earlier. If a concern is identified, further evaluation of the area shall occur and the area or structure will be treated accordingly. A licensed state waste contractor would be used to ensure that all required laws and regulations have been met and to address any remaining requirements needed to successfully close the Project.

4.5 Post-Demolition Site Stabilization

After all removal of existing structures of the SPGF and ancillary facilities, the Project area will be restored to topographic conditions similar to pre-construction. Then revegetation and reclamation activities required to return the disturbed areas to a pre-construction state will be conducted in accordance with the plans prepared as part of the Project. These plans include:

- Restoration and Revegetation Plan
- Noxious Weed Management Plan

The objectives of these plans include the following:

- Restore topography and reduce potential for erosion
- Restore habitat suitable to support desert fauna
- Implement the weed management program that minimizes the need for non-native species eradication.

5.0 PROJECT DECOMMISSIONING COSTS AND BONDING

Prior to the issuance of any Project ROW Grants, the Applicant will provide performance and reclamation bonding in an amount sufficient to ensure the implementation of the approved Decommissioning Plan for restoration and performance.

The bond instrument will be based on a decommissioning cost estimate provided by the Applicant and based on the final design of the Project. This estimate will consider any Project components that are expected to be left in place at the request of and for the benefit to the Tribe (gen-tie lines, access road, water pipeline). The decommissioning , performance, and reclamation estimate will also include the residual value of any salvageable or recyclable property, as well as the then-current cost of decommissioning.

6.0 REFERENCES

United States Environmental Protection Agency (EPA). 2011a. Summary of the Toxic Substances Control Act. http://www.epa.gov/lawsregs/laws/tsca.html.

United States Environmental Protection Agency (EPA). 2011b. Summary of the Resource Conservation and Recovery Act. http://www.epa.gov/lawsregs/laws/rcrs.html.

Appendix E

Draft Restoration and Revegetation Plan

Draft

Restoration and Revegetation Plan

Moapa Solar Energy Center

August 2013

1.0 INTRODUCTION

Moapa Solar Power, LLC (Moapa Solar) proposes to construct and operate the Moapa Solar Energy Center (MSEC). The MSEC will include a variety of major components, including the Solar Power Generating Facility (SPGF), an onsite substation, gen-tie transmission lines, a water pipeline, and access road. The proposed project site is in Clark County Nevada approximately 20 miles northeast of Las Vegas, Nevada. The MSEC would be located on 850 acres of leased land on the Moapa River Indian Reservation. The associated gen-tie lines and access road would occur on Tribal lands and Federal lands managed by the Bureau of Land Management (BLM). The proposed water pipeline would be located on Tribal lands with some within a designated utility corridor administered by the BLM.

1.1 Purpose

The purpose of this Habitat Restoration and Revegetation Plan (HRRP) is to describe the proposed project, considerations related to restoration and revegetation, and the various factors and methods to be applied toward restoring the site to pre-project conditions.

1.2 Goals and Objectives

The goal of this HRRP and its successful implementation is to mitigate the potential impacts associated with the proposed project and to facilitate managed and natural restoration of the site and impacted areas toward achieving pre-project or similar conditions.

The objectives of this HRRP include:

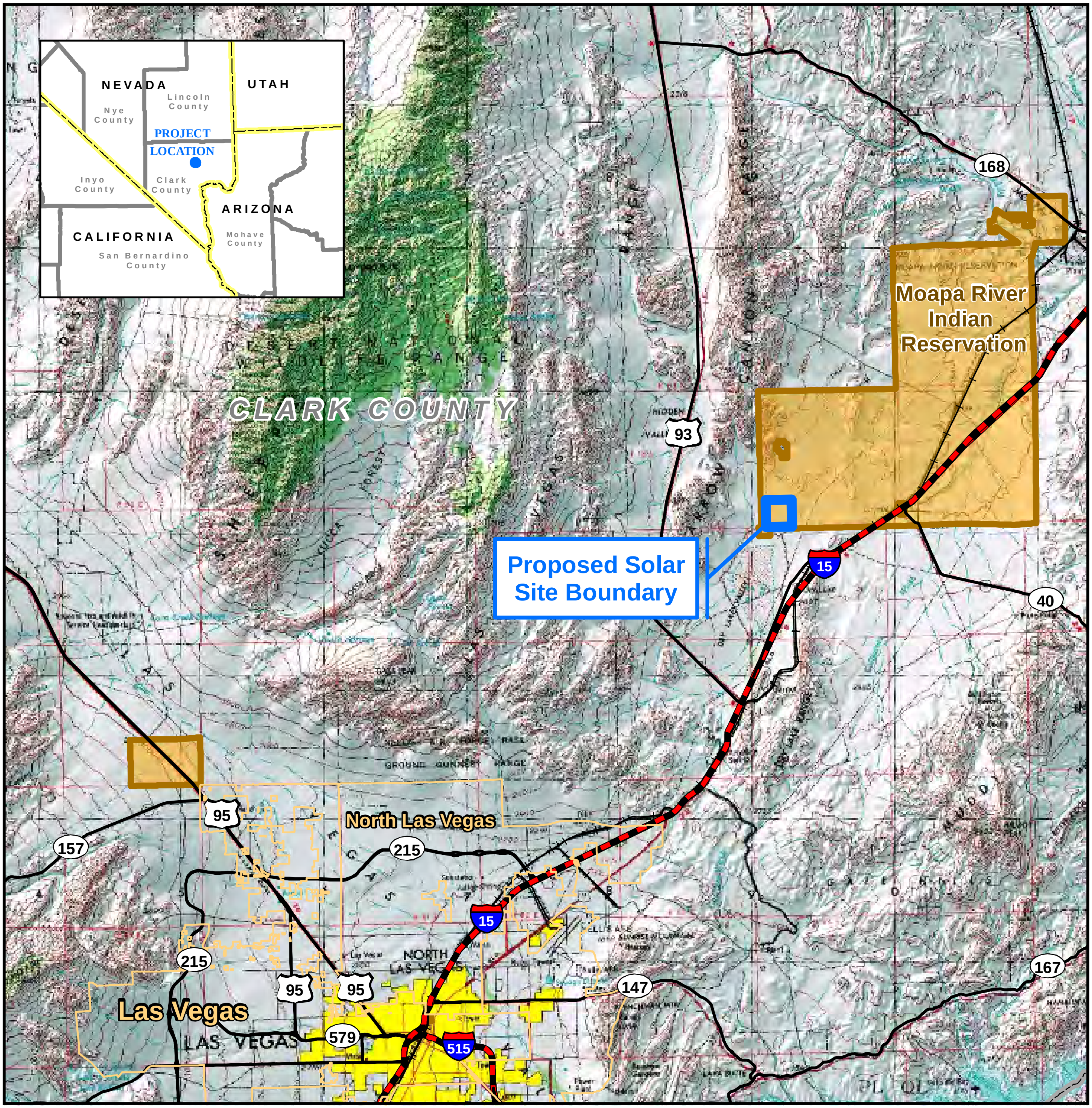
- Minimize initial disturbance to habitats within the proposed project area;
- Preserve site-specific materials for use in the restoration/revegetation phase, including topsoil, plants, and seeds, where practicable;
- Use native, agency-approved plant species to revegetate disturbed areas;
- Implement revegetation practices in a timely manner, thereby reducing secondary effects including soil erosion and establishment of noxious plant species; and
- Return the project site to conditions similar to those that existed prior to project-initiation by restoring soils, topography, plant species and their densities and distribution.

1.3 Project Description

1.3.1 Project Area

The proposed project would be located approximately 20 miles northeast of Las Vegas in Clark County, Nevada (**Figure 1**). The main project site, including the Solar Power Generating Facility (SPGF), would be located on 850 leased acres within the Reservation in Mount Diablo Meridian, Township 16 South, Range 64 East, Sections 29, 30, 31,and 32.

Portions of the gen-tie lines and access road would be located on lands administered by the Tribe and BLM. A water pipeline associated with the Project would be located on Reservation lands north and east of the SPGF. **Figure 2** shows the location of the Proposed Project and associated facilities.



Legend

- Interstate
- US/ State Highway
- Railroad
- Municipal Boundary
- Proposed Solar Site Boundary

Jurisdictional Land Ownership

- Indian Reservation

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Miles

Universal Transverse Mercator
North American Datum 1983
Zone 11 North, Meters

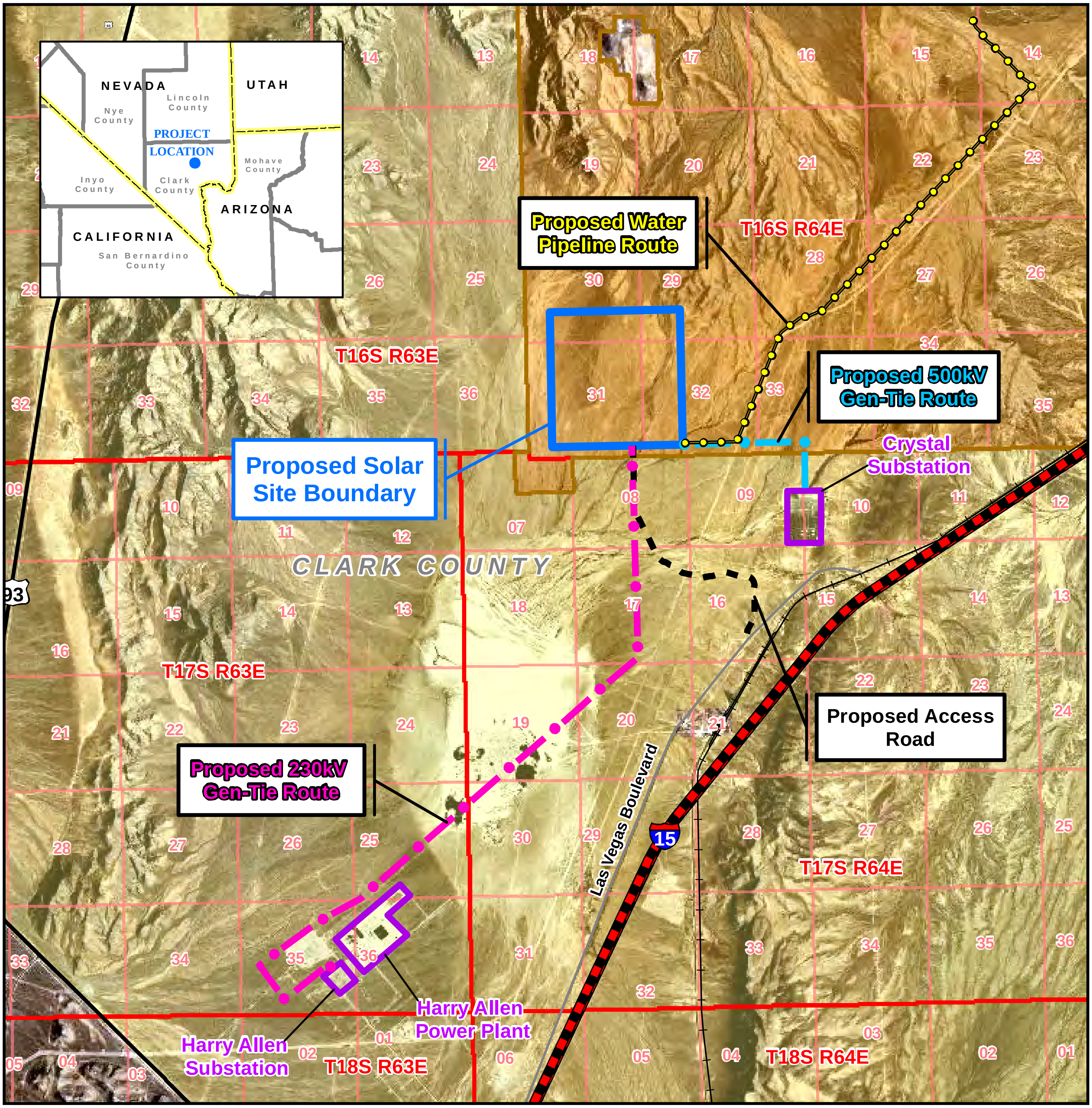
Moapa Solar Energy Center

FIGURE 1
PROJECT LOCATION

Map Extent: Clark County, Nevada

Date: 04-30-13		Author: djb

I:\Moapa Solar/MXD's/Project Location 8.5x11 043013_Moapa Weed Management Figure 1.mxd



Legend

- Interstate
- US/State Highway
- Local Road
- Railroad
- Proposed Water Pipeline
- Proposed 230kV Gen-Tie
- Proposed 500kV Gen-Tie
- Proposed Access Road
- Township/Range Boundary
- Section Line
- Existing Substation Boundary
- Proposed Solar Site Boundary
- Jurisdictional Land Ownership
- Bureau of Land Management Land
- Indian Reservation

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Universal Transverse Mercator
North American Datum 1983
Zone 11 North, Meters

Moapa Solar Energy Center

FIGURE 2
PROPOSED PROJECT FACILITIES

Map Extent: Clark County, Nevada

Date: 04-30-13		Author: djb

I:\Moapa Solar/MXD's/Proposed Project Facilities 8.5x11 043013_EIS Figure 2-1.mxd

The proposed project would occur in the Basin and Range physiographic province in a part of the Mojave Desert. This physiographic province is characterized by the hundreds of long, narrow, and nearly parallel mountain ranges that are separated by deep valleys (Mac et al 1998). These features of the province are visible at the proposed project site, with nearly parallel mountain ranges to the east and to the west of the site and a broad and gently sloping valley between. The proposed project site occurs in the Mojave Desert Scrub biome, and is dominated by plants common to this biome including creosote bush (*Larrea tridentata*), and white bursage (*Ambrosia dumosa*).

1.3.2 Project Components

The major components of the proposed Moapa Solar Energy Center (MSEC) project include a solar power generation facility (SPGF) would use photovoltaic (PV) to generate up to 200 Megawatts (MWs) of energy. The project would require an onsite substation with medium to high voltage step-up transformers. New transmission lines would be constructed to connect to the existing transmission utility in order to deliver the generated power. The project would connect to the electrical grid via one or two gen-tie lines, depending on the needs of the customer(s) purchasing the electricity. A single circuit, 230 kilovolt (kV) overhead transmission line would be constructed from the SPGF to the Harry Allen Substation, an estimated distance of 7.1 miles. A 500-kV overhead transmission line would be constructed from the SPGF to the Crystal Valley Substation, an estimated distance of 1.6 miles. Vehicle and construction equipment would gain access to the site by using a proposed 2.5-mile gravel road that would connect the project to an existing paved frontage road near Interstate 15. This proposed gravel road would follow an existing unimproved route for an estimated 2.0 miles where it meets the proposed 230-kV right-of-way (ROW). From this point, the proposed access road would lead 0.5 miles to the north to connect with the SPGF site.

2.0 SOILS

Typical of soils in arid environments, local soils are poorly developed and shallow; they are almost completely absent in some areas. In general, the local soils are typically only four inches deep and rarely more than 18 inches in depth over an underlying caliche layer. The 850-acre MSEC site contains two soil series - the Grapevine series which covers approximately 95 percent and the Ireteba series that makes up the remaining 5 percent. Soils where the proposed transmission line corridors, and access road to support the project are located include the Anthony, Bard, Mormon Mesa, St. Thomas, and Tonopah series.

3.0 VEGETATION

The Mojave Desert hosts a wide variety of vegetation, including approximately 250 species of annual herbaceous plants, at least 80 of which are endemic (Randall et al. 2010). These plants are typically tolerant of low humidity, prolonged droughts, desiccating winds, high alkalinity or salinity, rocky or very sandy soils, and the periodic influx of high quantities of water in the form of surface flooding.

The most commonly found species is the creosote bush (*Larrea tridentata*). Approximately 70 percent of the Mojave Desert is covered by creosotebush-white bursage (*Ambrosia dumosa*) associations. Species associated with creosotebush-white bursage communities in the Mojave Desert include Shockley's goldenhead (*Acamptopappus shockleyi*), Anderson's wolfberry

(*Lycium andersonii*), range rhatany (*Krameria parvifolia*), Mojave yucca (*Yucca schidigera*), California joint fir (*Ephedra funerea*), spiny hopsage (*Grayia spinosa*), and winterfat (*Krascheninnikovia lanata*). Other associated species are desert senna (*Cassia armata*), Nevada ephedra (*Ephedra nevadensis*), white burrobrush (*Hymenoclea salsola*) and wolfberry (USDAFS 2010). Grasses regularly found are big galleta (*Hilaria rigida*), Indian rice grass (*Oryzopsis hymenoides*), bush muhly (*Muhlenbergia porteri*), fluff grass (*Erioneuron pulchellum*), red brome (*Bromus rubens*), desert needle (*Stipa speciosa*), Arabian grass (*Schismus arabicus*), snakeweed (*Gutierrezia* sp.), desert trumpet (*Eriogonum inflatum*), winged saltbush (*Atriplex canescens*), and desert grass (*Blepharidachne kingii*).

The proposed project is situated within the Mojave desertscrub biome, and is dominated by the creosotebush series. The area is dominated by open stands of creosotebush and white bursage, and cactus-yucca scrub is also present and concentrated within the ephemeral washes. Desert saltbush scrub habitat (saltbush series) is present though not widespread. Cactus species observed during the biological surveys include the barrel cactus (*Ferocactus acanthodes*), beavertail cactus (*Opuntia basilaris*), cottontop cactus (*Echinocactus polycephalus*), hedgehog cactus (*Echinocereus engelmanii* var. *chrysocentrus*), pencil cholla (*Opuntia ramosissima*), silver cholla (*Opuntia echinocarpa*), grizzlybear prickly pear (*Opuntia polyacanthia* var *erinacea*), and teddybear cholla (*Opuntia bigelovii*).

Vegetation within the Project Area is composed primarily of Mojave Desert creosote bush scrub as defined by Holland (1986) classification of plant communities. Disturbed areas, both within and adjacent to the Project Area, are associated with multiple dirt roads and less impacted off road vehicle trails, adjacent railroad and interstate highway (to the east) and adjacent transmission line and natural gas line corridors (to the north and west).

Creosotebush Series

Creosotebush-White Bursage

This community is dominated by creosotebush shrubs (*Larrea tridentata)* and white bursage (*Ambrosia dumosa)*, 0.5-3m tall, widely spaced, usually with bare ground between. Many species of ephemeral herbs may flower in late March and April if the winter rains are sufficient. This plant community is usually found on well drained secondary soils with very low water-holding capacity on slopes, fans, and valleys. Other, less numerous species of annuals appear following summer thundershowers. This creosotebush scrub is typical of the Mojave Desert. Nearly the entire SPGF and most of the gen-tie transmission routes, access road, and water pipeline are covered by this vegetation community.

White bursage is a pioneer species and provides a stable environment for creosote bush to establish a foothold. The typical growth height for creosote bush is four feet, although some may reach up to 12 feet with an adequate water supply.

Many desert animals use creosote bush for shelter. Burrows are dug around and under creosote bushes by both reptiles and amphibians. Roots of creosote bush stabilize the soil and support burrows of the desert tortoise. Large kit fox den complexes are often found in association with creosote habitat for the same reason (NDOW 2012). Most animals bed in or under the bushes as well as use them for perching or nesting. Creosote bush enables animals to escape the harsh sun and extreme temperatures as well as provides cover and escape from predators. Creosote bush is browsed, or consumed, by many small mammals. The foliage, twigs and seeds are readily consumed as a food source.

White bursage commonly grows on arroyos, bajadas, gentle slopes, valley floors, and sand dunes at elevations up to 3,000 feet throughout the Sonoran and Mojave Deserts (USDAFS 2010). White bursage is a desert shrub growing up to two feet tall and spanning three feet in width. White bursage is of intermediate forage value (USDAFS 2010). White bursage plants, seedlings, and seeds are a food source for black-tailed jackrabbits (*Lepus californicus)*. Desert rodents, such as the kangaroo rat (*Dipodomys sp.)*, also consume the seeds.

Cactus/Yucca

Cactus/yucca is also present and concentrated near the south end of the 230-kV gen-tie option. Cactus species observed during the biological surveys were the barrel cactus (*Ferocactus acanthodes*), beavertail cactus (*Opuntia basilaris*), cottontop cactus (*Echinocactus polycephalus*), hedgehog cactus (*Echinocereus engelmannii* var. *chrysocentrus*), pencil cholla (*Opuntia ramosissima*), silver cholla (*Opuntia echinocarpa*), grizzlybear prickly pear (*Opuntia polyacantha* var. *erinacea*), and teddybear cholla (*Opuntia bigelovii*). Most cacti were concentrated in ephemeral washes as well as on a sloping bajada near the Harry Allen Substation.

Xeroriparian

Xeroriparian habitats were associated with the several small washes that cross the various portions of the project area. These habitats generally resembled the Creosotebush-white bursage habitats but had a higher overall density of vegetation as well as a greater abundance of big galleta grass. Other species included cholla, cheesebush (*Hymenoclea salsola*) and ephedra (*Ephedra* sp.).

Saltbush

Approximately 10.4 acres of saltbush occurs within the ROW of the 230-kV gen-tie option and is found at the margins of the playa lake. These areas include small but monotypic stands of saltbush (*Atriplex* sp.) and form the transition between the surrounding upland habitats and the playa lake.

Fourwing saltbush (*Atriplex canescens)* is a common occupant in early successional habitats. However, it is also found late in successions dominated by sagebrush. Saltbush growth can reach up to 15 feet high, depending on the amount of water available, though saltbushes commonly grow two to three feet high. Saltbush provides food and shelter for desert wildlife. Fourwing saltbush is a valuable forage shrub because it is abundant, palatable, provides large quantities of forage, is nutritious, and grows rapidly. Leaves, stems and fruits provide browse throughout the year.

Playa Lake

The 230-kV gen-tie transmission option crosses a large playa lake. This habitat type consists of unvegetated habitats with highly compacted soils. This lake is likely subject to ephemeral flooding following large precipitation events. Playas are formed by intermittent flooding and evaporation that precipitates fine soils and mineral salts onto the lowest flat depressions until an impermeable layer of sodic clay is lain down. Dry playas are often barren of vegetation from their center out to their outer margins, where saltgrass, pickleweed, or stunted greasewood maintain a foothold on the fresher soils. When soils are kept moist but short of saturation over several weeks or months, Baltic rush, smartweed, sedges, and spikerushes emerge, in progressive order of wetness. Most playas in Nevada do not have permanent sources of water; therefore the value of playas to wildlife is largely ephemeral in nature. When playas are watered for the proper period of time, they can produce not only lush growth of emergent and submergent vegetation, but also prodigious volumes of aquatic invertebrates attracting a myriad of waterfowl, shorebirds, and small water birds (NDOW 2012).

Mesquite

Several small mesquite bosques are located within the perimeter of the playa lake. These areas represent monotypic stands of mesquite (*Prosopis* sp.) with no understory species.

Disturbed

Disturbed habitats include all areas with little or no native vegetation as a result of anthropogenic disturbance. These areas include existing roads, transmission line pole sites, pipeline right-of-ways and other areas that have been significantly altered.

3.1 Special Status Species – Cacti and Yucca

In the State of Nevada cacti and yucca are afforded protection. According to the Nevada Revised Statute (NRS 527.100):

"It is unlawful….to remove or possess any Christmas tree, cactus, yucca or branches thereof, or knowingly transport or sell any Christmas tree, cactus, yucca or its branches from any of the lands owned by or under the jurisdiction of the State of Nevada or its counties, or any reserved or unreserved lands owned by the United States, or from any privately owned lands, without permission from the legal owner, or the legal owner's duly authorized agent, specifying locality by legal land description and number of plants to be removed or possessed."

As previously described, aspects of the proposed project occur on Tribal lands [Moapa Band of Paiute Indians (Tribe)] and the BLM. In instances of cacti and yucca relocation and salvaging, both the Tribe and BLM will be consulted for guidance. Cacti or yucca that occur in areas that are proposed for permanent disturbance will be subject to salvage operations and either transplanted at an approved offsite location, or in areas onsite that are not proposed for disturbance and suitable to supporting these plants. The Tribe will be consulted prior to transplanting cacti or yucca to offsite Tribal lands.

The BLM manages cacti and yucca as special forest products with a commercial value. Cacti and yucca that occur in areas proposed for temporary disturbance will be appropriately removed and maintained onsite until temporary disturbance has concluded and appropriate restoration efforts have occurred to support replanting these plants in their original habitats. All cacti and yucca planting activities shall be conducted by a qualified salvage contractor. BLM requires contractors to have at least three years experience in Mojave desert salvaging, including maintaining cacti and yucca. On BLM lands, the contractor will also be required to use the BLM salvage protocol (included as **Appendix A**).

4.0 RESTORATION ACTIONS

Pre-construction Tasks

Pre-construction tasks include 1) perennial plant salvage and seed collection (if required by the BLM), 2) succulent plant salvage (if required by BLM), 3) vegetation propagation (if required by BLM), 4) vertical mulch salvage, and 5) topsoil salvage.

The collection of locally-occurring seeds is an effective means of increasing the success of revegetation efforts because this resource represents local genetic variations, adaptations, and vigor of the plant species. However, seed collection can be labor- and time-intensive, costly, and often seed collection efforts fail to yield the type and quantity of seed required for full revegetative success. The application and effectiveness of performing onsite seed collection prior to the start of surface disturbing activities will be evaluated with the Tribe and BLM.

In some cases, active local seed collection is not necessary, as the removed and stockpile topsoil contains a seed bank that can provide natural opportunities for reseeding. In situations where the local seed bank is insufficient or enough topsoil is not available to resurface and reclaim disturbed sites, commercially available certified weed-free seed would be obtained and used for reseeding. The seed mix would be approved by the BLM.

Vertical mulch would be salvaged adjacent to the disturbed areas with the topsoil (e.g., vegetation and topsoil will be windrowed on the outer edges of disturbed areas).

Post-Construction Tasks

Restoration and revegetation efforts at disturbed sites will begin within weeks of completing the soil disturbing activities. For sites that may be disturbed again during the construction phase, temporary soil covering, erosion control, and weed monitoring would occur until more permanent revegetation efforts can be applied.

Disturbed sites will be reclaimed prior to initiating specific revegetation efforts. In accordance with Nevada Guidelines for Revegetation and BLM requirements, salvaged topsoil would be replaced. Disturbed sites would be recontoured to pre-disturbance elevations, soils would be decompacted, and stockpiled topsoil and vertical mulch will be replaced. The soil surface would then be textured, succulents would be replanted, and the area would be reseeded with a BLM-approved seed mix. In instances when salvaged topsoil and its associated seed bank are not in sufficient supply or type, seed mixes approved by the BLM and Tribe will be used. Seed mixes shall be certified weed free, obtained from local suppliers, and should preferentially be of native varieties that originate from within 1,000 feet elevation of the project site. In cases where native seed are not available, the BLM and Tribe shall approve the use of non-native, non-invasive, naturalized species. Finally, signs identifying restoration areas will be installed at all vehicle entry points.

The use of stockpiled topsoil may not be appropriate or possible in all areas proposed for disturbance. In areas that stockpiled topsoil is not used during restoration and revegetation, the following practices will be implemented:

- Disturbed soil will be scarified, harrowed or disked, in order to prepare a seed bed;
- Native and/or naturalized seeds will be broadcast;
- Sowed seeds will be protected with a layer of weed-free mulch or straw;
- Seed contact with soil will be improved by disking or rolling; and
- Reseeded areas will be appropriately watered.

All restoration and revegetation efforts should be implemented soon after disturbance of a site has concluded and prior to the typical rainy season of late summer and early fall. This will minimize the potential for soil loss and establishment of noxious weeds, as well as maximize revegetation efforts. Reseeded reclaimed areas shall be watered during periods of below average precipitation, in order to promote seed propagation.

Per BLM requirements, the salvage contractor must maintain cacti and yucca for at least one year and attain an 80 percent success rate. BLM also requires project proponents to seed any disturbance where earth moving occurs. Reseeding is also required if the project does not meet its performance criteria (Section 8).

6.0 PHASES OF RESTORATION AND REVEGETATION

Restoration and revegetation activities will occur primarily in two phases; 1) post-construction and 2) post-decommission.

6.1 Post-Construction

Post-construction restoration and revegetation activities focus on areas that will not experience additional surface disturbing activities (e.g. service roads required during construction, equipment and material laydown areas, etc.). Seeds of native herbaceous plants will be used to revegetate temporary work areas and other areas that will not be disturbed following construction. Successful revegetation will decrease the potential for soil erosion, preserving suitable conditions for plant growth, as well as maintaining structural support and foundation for the installed solar modules (Section 8).

6.2 Post-Decommission

Post-decommission restoration and revegetation efforts will focus on all areas within the SPGF facility. Other features that occur beyond the SPGF on BLM administered lands, including roads and transmission lines, will not be restored or revegetated. Post-decommission restoration and revegetation will be based on similar regulations, guidelines, practices, and techniques as previously described in this report. The goal of post-decommission restoration and revegetation is to restore the project site to conditions similar to pre-construction conditions (Section 8).

7.0 WEED MANAGEMENT

Weed management for this project will be conducted throughout the life of the project and in accordance with the project-specific Weed Management Plan (to be approved by the BLM and Tribe). BLM guidelines and regulations for weed management will be applied for the entire project, regardless of land ownership, because the Tribe has not issued weed management guidance.

8.0 MONITORING

The goal of restoration and revegetation both after construction and after decommissioning is to achieve plant densities and species compositions that reflect the native, non-invasive vegetative communities occurring in adjacent or nearby habitats. A qualified biologist that is familiar with Nevada flora and restoration practices will conduct the monitoring.

Both qualitative and quantitative monitoring will be conducted per the schedule described in **Table 1**. Both quantitative and qualitative monitoring data will be used to evaluate recovery, identify the need for additional remediation, inform a final decision to release the proponent from further responsibility, and return of any bonds held by BLM. Monitoring of pre-construction restoration actions, such as plant salvage and seed collection, will be performed under the supervision of a qualified biologist or restoration ecologist.

Table 1 – Restoration Monitoring Schedule

Task	**Year 1**	**Year 2**	**Years 3-5**	**Year 6**
Qualitative Monitoring				
Site inspections/visual assessments	Monthly	Quarterly	Biannually	Annually
Photo monitoring	Biannually	Annually	Annually	Annually
Quantitative monitoring				
Transect/plot monitoring	Annually	Annually	Annually	Annually

Qualitative Monitoring

Qualitative monitoring will be used inform the proponent, contractors, and BLM regarding the trajectory of recovery and identify potential problems at an early stage so that corrective actions can be taken before the overall project time line is adversely affected. Qualitative monitoring will include documentation via photo points, site inspections and visual assessments made by the Project Biologist or Restoration Ecologist. A site-specific qualitative monitoring form should be developed and used to provide consistency throughout the monitoring period. The goal of qualitative monitoring is to document site conditions and evaluate the need for remediation to ensure that sites are progressing toward the success standard.

Qualitative monitoring should include: observations regarding the germination and establishment of species included in the seed mix; estimates of the success parameters (cover, density and richness of perennial vegetation); and estimates of the density and richness of native annuals. Other site characteristics that should be observed and noted include: soil erosion, natural recruitment of native plant species, reproduction, nonnative plant species abundance, animal use, and patterns of establishing vegetation (i.e., presence of large interspaces).

Quantitative Monitoring

Quantitative monitoring will be used to objectively evaluate whether the project has achieved sufficient progress so that it can be considered restored to a point where natural processes will complete recovery, and the proponent can be released from further responsibility. As part of quantitative monitoring, success parameters are measured on restored sites in the sixth growing season (or sooner if deemed appropriate) and compared to undisturbed reference areas to determine if the restoration standards have been met.

Sample locations within both the reference area and reclaimed area need to be randomly selected. Sample size adequacy should be calculated to ensure a sufficient number of samples are taken to estimate the means for success parameters with a given level of confidence. If the mean for a given success parameter is less than the standard (i.e., 70% of the reference area mean) a statistical comparison is made with a one sample, one-sided t-test (with a=0.10 and a=0.20). Failure to reject the null hypothesis that the reclaimed area value is greater than or equal to 70% of the reference area value for each parameter (cover and density) indicates that the site has been successfully reclaimed.

Species richness is evaluated by comparing the total number of native perennial plant species encountered in the measured area of the reclaimed site to that of the reference area. Species richness of the reference area is based on the same amount of area that was sampled within the restored site. Because species richness is based on the entire measured area of a site, there is no measure of variation, and therefore no statistical test can be performed. Therefore, a comparison of the absolute numbers of species to the reference area must be made.

Quantitative Performance Standards

Restoration will be considered successful if plant cover, density, and species richness of the dominant native perennial vegetation is equal to or exceeds a designated percentage of the values for these parameters in undisturbed reference areas. The standards required for the four BLM land management designations are: 100 percent for R1, 70% for R2, and 60% for R3 and R4 (see Appendix A).

The annual performance targets in Table 2 are recommended to evaluate annual progress towards achieving the final standard. If progress substantially differs from these performance targets, remedial measures could be necessary to bring the project back on schedule.

Table 2 – Six Year Performance Targets

	Year	**Transplant/Container Survival**	**Native Perennial Species Cover**	**Density of Native Perennial Species**	**Richness of Native Perennial Species**	**Noxious Weed Cover**
Recommended Performance Targets	1	N/A	10%	>100%	60%	<2%
	2	N/A	20%	80%	60%	<2%
	3	N/A	30%	60%	60%	<2%
	4	N/A	40%	60%	60%	<2%
	5	N/A	50%	60%	60%	<2%
Final Performance Standard[1]	**6**	**N/A**	**60%**	**60%**	**60%**	**<2%**

[1]Depending on conditions that affect seedling germination establishment and growth, achieving the final performance standard for cover may be less important, if density, species richness and other factors indicate an overall positive upward trend for the project.

9.0 MAINTENANCE AND REPORTING

Regular maintenance and reporting are essential for project success. Regular maintenance includes weeding and maintaining fencing, if constructed. Maintenance and reporting will be performed as described in Table 3.

Table 3 – Six Year Restoration Maintenance and Reporting Schedule

Task	Year 1	Year 2	Year 3-5	Year 5
Maintenance				
Weeding	As needed	As needed	Annually	Annually
Fencing Inspections/Repair	Monthly	Quarterly	Annually	Annually
Trash Removal	As needed	Quarterly	Annually	Annually
Reporting				
Upon Completion of Construction	As-built			
Email Progress Reports	Quarterly	Quarterly	Biannually	N/A
Annual Report	Yes	Yes	Yes	Yes

As-Built Report

Within 30 days of the completion of project construction, the As-Built report will be submitted to BLM for approval. Once approved, the six-year monitoring, maintenance and reporting period will begin. The purpose of the As-Built report is to document implementation of the pre- and post-construction restoration tasks described in Table 3 and describe any changes made during implementation. At a minimum the As-Built report will include:

- Discussion of how the project was implemented, key personnel responsible for the project, any problems encountered and how they were resolved.
- A chronology of the implementation with dates and names of contractors and key personnel responsible for implementing restoration tasks.
- Photo documentation of all milestone restoration tasks (Le. earthwork, seeding, signage)
- Copies of field notes or log entries from biological monitors present.
- A map of the restoration site indicating treatment locations, the location of photo points, quantitative reference sites and monitoring sites.
- Scans of the seed tags or any germination viability testing performed on wild collected seed used for seeding.
- Copies of dated invoices from contractors and subcontractors that provided services for the project.
- Baseline data collected for quantitative monitoring.

Progress Reports

Progress reports will be provided to BLM using the schedule described in Table 3. The purpose of the progress reports is to document regular site monitoring by the proponent or designated contractor. Progress reports are not expected to be extensive and are anticipated to be delivered in an email or similar format. At a minimum, the progress reports will include:

- The dates and name(s) of the biological monitor(s) completing the site assessments.
- A brief discussion of site conditions.
- A discussion of problems encountered with recommendations for corrective actions, if necessary.
- The dates and a brief description of all maintenance activities completed during the monitoring period.

Annual Reports

Annual reports will be provided to BLM using the schedule described in Table 3. The annual report will be provided to BLM by December 31 of each calendar year. The purpose of the annual report is to summarize maintenance and monitoring activities for the year, document wildlife activity of the site, report the results of the annual qualitative and quantitative monitoring activities, compare current seasons findings with the base line and previous years to evaluate project progress towards meeting annual performance targets the final performance standards, identify potential problems, and, if necessary, recommend corrective actions.

10.0 CORRECTIVE ACTIONS AND BOND RELEASE

Corrective Actions

If the recommended annual performance goals are not achieved, corrective actions will be necessary. Making corrective actions early in the project during the first or second growing season is particularly important to keeping the project on schedule for completion in the six-year timeframe. Corrective actions could include, but are not limited to, reseeding, weed treatments, installing and maintaining container plantings, and installing protective fencing or wire cages to protect individual plants.

Final Project Release

The restoration will be considered successful when the final performance standards have been met. Bonds held by BLM for the restoration/revegetation/reclamation phase will not be eligible for release until the final performance standards are achieved. If the minimum levels are not achieved, then corrective actions or additional growing seasons will be necessary. If the project has not achieved the performance standards within the six-year timeline, the proponent remains responsible for continuing project maintenance, monitoring and reporting until the standards are achieved or until BLM determines sufficient progress has been made and releases the project.

11.0 REFERENCES

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Appendix A – BLM Salvage Protocol

Salvage, Stockpiling, and Final Transplanting of Cacti and Yucca

Salvage: The salvaging contractor shall identify on site with flagging tape all cacti and yucca that are subject for removal and will mark the north orientation for any barrel or Joshua tree. The following plants will be salvaged: 1) all yucca, 2) barrel cactus, 3) hedgehog, 4) cottontops, 5) all beavertail cactus and other cactus species; and 6) all cholla LESS THAN THREE FEET IN HEIGHT.

Cholla over three feet in height and Joshua trees over 10 feet in height do **not** need to be salvaged. This material will be used as vertical mulch and spread over the surface of the restored areas to prevent possible trespass.

During the survey, all yucca clusters shall be counted as separate plants. Since the material will not be used immediately, it needs to be stockpiled in a location that can be protected (fenced). Cacti and yucca are very shallow-rooted.

- Cacti should be dug by hand and carefully removed in order to not damage roots.
- Yucca must be salvaged with heavy equipment (eg, front end loader). The material must be carefully extracted to not damage any of the roots, stems, or lower part of the plant. The material must be transplanted to a stockpiling area immediately.

Stockpiling: The salvage can be transferred to prepared 3-foot wide, 18-inches deep stockpiling trenches of any desired length. If using multiple, parallel trenches, they should be far enough apart to allow heavy equipment access to each trench. Trenches shall be watered thoroughly prior to transplanting material. In planting cacti and yucca, they should be placed in the trench and planted with native soil. Care should be taken to properly tamp down and compact all soil around roots of plants to remove all air pockets. A depression around each plant should be formed to hold water. After cacti are transplanted, they shall be watered thoroughly one time. A one time watering approximately fifteen (15) days after planting shall occur to remove or minimize any air pockets and assure proper soil compaction. Yucca will be placed in the trenches and the soil tamped by hand around the base of the plant so that there are no air pockets. To reduce watering, DriWater can be applied to each yucca. DriWater is a gelatinous polymer that slowly breaks down to water over time. DriWater comes in biodegradable cartons and is applied by cutting the top of the carton and placing it upsidedown around the plant to be watered. The area around the plant must be thoroughly wet to activate the DriWater. The DriWater is applied around the base of the plant at a rate of one quart for every foot in plant height. DriWater cartons are to be buried completely. At the surface, a watering well will be formed around the plant. Afterward, the plant will be watered thoroughly again. A 9-inch soil moisture probe (which can be obtained from any commercial plant nursery) will be used after 2 weeks to assess the moisture of the soil to see if further watering is needed. If the probe reads “dry” on the moisture scale, then a second watering will be done.

Final Planting at Landscape Sites: All salvaged plant material shall be replanted in a natural pattern. Large yucca will be carefully removed from the stockpiling area, taking care to not damage stems, roots, or the base of the plant. A hole at least two feet deep and three feet wide shall be prepared for each single stem yucca. Multiple stem plantings will be accordingly larger to accommodate the stem size. The hole will be filled with water and allowed to drain once. Then the hole will be filled with water again and then back-filled with soil to form a muddy matrix to about 18 inches from the surface. The yucca will then be planted and the soil tamped around the plant so that there are no air pockets. DriWater will be applied around the plant at a rate of one quart for every foot in height. DriWater cartons are to be buried completely. At the surface, a watering well will be formed around the plant. Afterward, the plant will be watered thoroughly again. A 9-inch soil moisture probe (which can be obtained from any commercial plant nursery) will be used after 2 weeks to assess the moisture of the soil to see if further watering is needed. If the probe reads “dry” on the moisture scale, then a second watering will be done. Mojave yuccas will be re-planted in groups of three or more for a natural effect. All small cacti shall be watered thoroughly one time upon being transplanted into the field. Transplanting and maintenance of plant material will be done such that 80 percent survivorship after two years is achieved.

Appendix F

Hydrogeological Assessment

Mifflin & Associates, Inc.

HYDROGEOLOGIC ASSESSMENT
and
GROUNDWATER MODELING ANALYSES
for the
MOAPA SOLAR ENERGY CENTER

A RES Americas Project

In Cooperation with the Moapa Band of Paiutes

Moapa Indian Reservation
Clark County, Nevada

Prepared by
Mifflin and Associates, Inc.

Martin Mifflin
Cady Johnson

June 11, 2013

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Table of Contents

List of Figures

List of Tables

Appendices

Introduction

Moapa Solar, LLC (RES Americas) and the Moapa Band of Paiutes (MBOP) are developing a 200 MW solar energy project on the Moapa Indian Reservation and lands administered by the Bureau of Land Management (BLM) in Clark County, Nevada. The projected water consumption of the Project is estimated to be between 350 and 800 acre-feet per year (afy). The proposed source of water supply is the Carbonate-Rock Aquifer, which underlies the western extents of the Moapa Indian Reservation. The proposed site for photovoltaic and concentrated solar arrays is in the southwestern portion of the Reservation, in Sections 29, 30, 31, and 32 of T16S, R64E (Fig. 1). The supply well (ECP-1) is located approximately 4 miles northeast of the Project boundary in the Belly Tank Flat area.

The purpose of this study is to evaluate the direct and indirect impacts of the Project's pumping stresses in the carbonate aquifer on the hydrologic systems of the region. As the depths to regional saturation in the carbonate aquifer are generally quite deep (100 to 200 meters) and transmissivities are high (over 2,500 m^2/day) in the area where the production well has been completed and tested, the lowering of water levels due to pumping cones has not been recognized as a concern. A few feet, or even several tens of feet of water-level decline are not primary concerns because the pumping lifts are relatively large, the aquifers are thick (over 1,000 m), and existing production wells are deeply penetrating (generally over 100 m). However, many of the carbonate aquifers throughout the general region are believed to be associated with groundwater flow systems that discharge at large springs. Therefore, a continuing concern as the carbonate aquifers are developed for water supplies is the potential for long-term impacts on spring flows. A formal decision framework for evaluating these concerns is made possible by numerical groundwater models, which embody known and assumed physical properties of the hydrologic system and mathematical rigor to forecast impacts in time and space that would result from hypothetical pumping stresses. To be most useful, groundwater modeling analyses should address conceptual uncertainty through bounding analyses.

The bedrock of the Project area is largely composed of Paleozoic carbonate rocks, ancient marine sediments that contain the minerals calcite and dolomite as their primary constituents. Fracture zones and associated solution cavities within these carbonate rocks provide highly transmissive aquifers where saturated, and such transmissive zones can be continuous over areas larger than the topographic basins and ranges evident at land surface. "Regional" groundwater flow is the result of these large-scale interconnections, and is readily demonstrated by uniformity of temperature and discharge at associated springs, and by chemical characteristics (Mifflin, 1968). Discharge from regional groundwater flow systems can be several basins removed from contributing areas of recharge, as is the case for the Muddy River springs and Rogers/Blue Point springs areas (Fig. 1). Recharge is known to be most effective in high, mountainous terrain where precipitation is greatest and winter snow packs are common. The fact that large springs with uniform flow characteristics are present in the low (<1000 m) and arid (11-12 cm/yr) Project area while winter snow packs are rare in adjacent ranges argues strongly for regional (interbasin) groundwater flow.

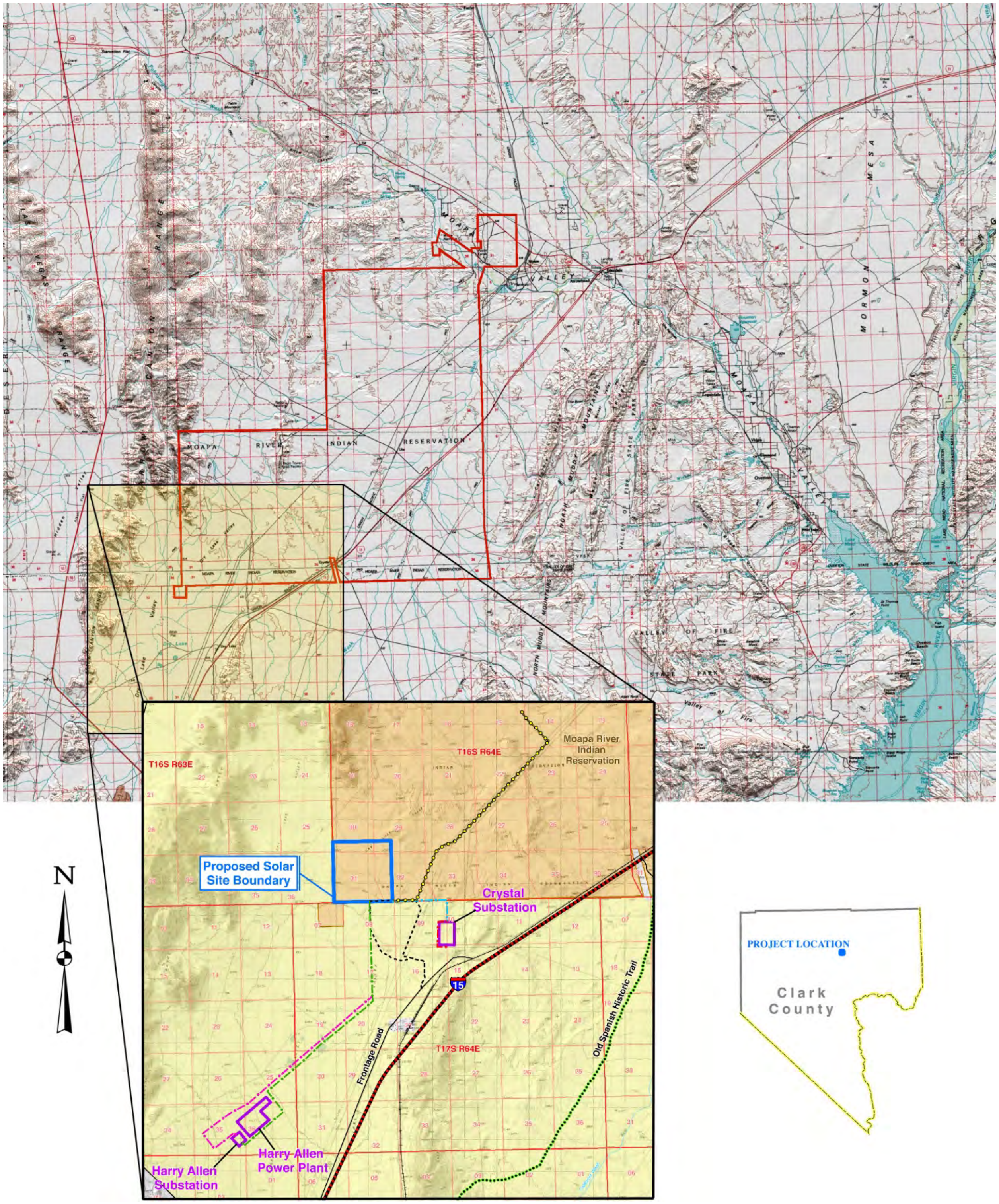

Figure 1. Location of Moapa Solar Energy Center in Clark County, Nevada, with Moapa Indian Reservation indicated by red outline. Coyote Spring Valley, where much future development is proposed by other private and municipal entities, occupies the northwest (top left) portion of the base map. Scale varies; land grid in miles. [file MoapaSolarFig1.jpg]

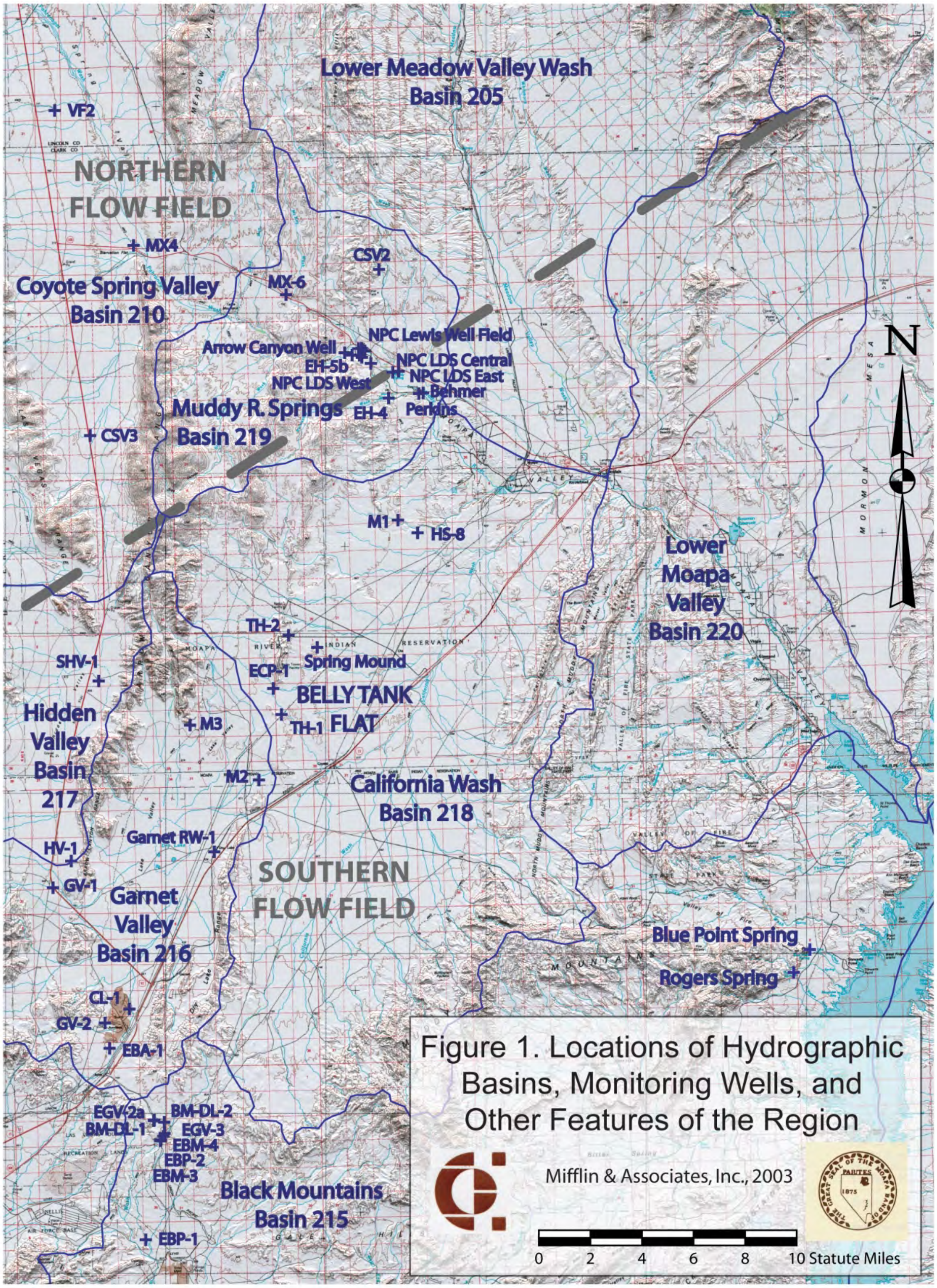

Figure 2. Northern and Southern Flow Fields of the Arrow Canyon Range Cell of the Carbonate-Rock Aquifer, and hydraulic barrier of Johnson and Mifflin (2003) [file CalpineFigure1A.jpg]

A primary question is the impact of the Project on future flows from the Muddy River springs, an area of regional groundwater discharge about 12 miles north of well ECP-1. Outflow channels from the springs constitute the headwaters of the Muddy River and establish the habitats of the endangered Moapa Dace, an endemic fish. The analytical strategy that satisfies this objective consists of stepwise application of a) a steady-state, regional model based on the Analytic Element Method (AEM) from which boundary conditions for b) a transient, sub-regional model based on the Finite Difference Method (FDM) are extracted. Secondary questions related to water-level changes and dynamics of flow within the aquifers of the region are conveniently addressed with these modeling tools.

Hydrogeology

There are three distinctive lithologies that determine the regional patterns of groundwater flow: Paleozoic carbonate rock, indurated Mesozoic sediments, and Cenozoic basin fill. Paleozoic terrain can be highly transmissive, particularly where affected by extensional faulting and subsequent dissolution. Mesozoic terrain is locally important as a hydraulic barrier, particularly where large folds involving fine-grained sediments are present beneath Mesozoic thrust faults. Cenozoic basin fill is very heterogeneous, but volumetrically the fine-grained sediments (aquitards) are far more significant than local accumulations of sand and gravel at basin margins.

The Paleozoic carbonate rock sequences are about 2 km thick in the Project area (Longwell et al., 1965), and Mesozoic red beds of siltstone and sandstone are locally thicker but erosion has removed them from much of the region. Mesozoic rocks are preserved primarily in the footwalls of Mesozoic thrust faults, and in that setting are strongly folded and thickened. Thickness of Cenozoic basin fill is highly variable and known only from geophysics and sparse drill holes, but can reach thousands of feet.

Since early Miocene time, extensional faulting has been blocking out the present basins and adjacent mountainous terrain as the basins filled with sediments rich in volcanic ash and therefore low in permeability. The subsurface geometry of the extensional faults and the magnitude of Cenozoic extension are intertwined issues and subjects of great controversy in the scientific literature.

The area of study incorporates the general framework above, with lacustrine sediments of the Muddy Creek Formation the most widely exposed basin-fill unit. The Muddy Creek also contains paludal (spring and marsh) deposits, but lithologically it is fine-grained except at basin margins, and hydrologically can be considered an aquitard. Evaporites (salts) occur within the Muddy Creek, making this unit a poor target for groundwater development from both quality and quantity standpoints. Mesozoic rocks are rich in evaporates and of low permeability, so are similarly unattractive as exploration targets.

Locally, alluvial aquifers inset into the Muddy Creek Formation occur in the basin along the Muddy River and lower Meadow Valley Wash. Alluvial gravels in upper Moapa Valley extend from about 3 km northwest of the Muddy River springs area to the Glendale area, where they are joined by similar alluvial gravels associated with lower Meadow Valley Wash. The alluvial gravels attain thicknesses of about 35 m beneath the narrow floodplains of these two drainages. Local heavy pumping from these transmissive gravels has degraded water quality as poorer-quality water has been drawn in from the subjacent Muddy Creek Formation.

Complicating the hydrology in the Muddy River springs area is the relationship between the carbonate aquifer and the alluvial gravels. The Muddy Creek Formation generally separates these aquifers, but locally it is missing or conduits provide a direct connection from the carbonate aquifer to the gravels. The gravel aquifer is recharged by the carbonate aquifer 3 km up-gradient from the Muddy River springs, where the alluvial aquifer discharges as base flow in the headwater channels of the Muddy River. In this same general area several large springs issue directly from the carbonate aquifer with outflow channels to the Muddy River. Roughly one half of the flow in the Muddy River was spring discharge in the early 1960s, and the other half base flow derived from the alluvial aquifer (Eakin and Moore, 1964). Highly cemented, active and extinct spring conduits pass *through* the alluvial aquifer without contributing much leakage to the alluvial aquifer gravels. Within about 1.5 km below the spring zone, the Muddy River channel becomes hydraulically isolated from the underlying alluvial aquifer gravel by a Holocene clay, and remains separated at least to the Reservation boundary where well control ends. The Warm Springs Road gaging station is downstream of the area where the alluvial aquifer becomes confined, thus gaging records are very useful to measure net upstream groundwater and surface-water diversions from the two aquifers, springs, and river.

The entire flow of the Muddy River is derived from the discharge from the regional carbonate aquifer, except during infrequent precipitation events that increase River flows for up to a few days. Historic flow records indicate that about 51 cubic feet per second (cfs) of groundwater discharge sustain the spring and river flows. Currently, consumptive uses related to 1) natural evapotranspiration, 2) surface-water diversions, and 3) groundwater diversions reduce the Muddy River flows to about 25,000 afy (35 cfs) at the Warm Springs Road gaging station, located about 3 km downstream of the spring area. Thus, about 32% (12,000 afy) of the regional flux to the area is consumptively removed from the system above the gage. Of this, about 3600 afy (~25%) is estimated to be lost by evapotranspiration from the well-vegetated areas of the headwater channels and springs, and the rest is removed through pipelines by Moapa Valley Water District (MVWD) and Nevada Power Company (now Nevada Energy) for use elsewhere. During the drought that began in 1997 and continued until the fall of 2004, flows appear to have decreased by about 4 cfs (3000 afy) in association with a gradual decline in water levels in the carbonate aquifer throughout the region. The wet spring of 2005 has caused at least a partial recovery of these drought-induced decreases.

The Paleozoic limestones and dolomites of the Project area extend over a very large area to the north, south, and west of the Project area to establish a sub-region that has been named the Arrow Canyon Range Cell (ACRC) of the carbonate aquifer (Mifflin, 1992; Johnson and Mifflin, 2003). The Carbonate Rock Province (Mifflin 1968, 1988) extends from southeastern California through much of eastern Nevada and western Utah, where bedrock geology is dominated by Paleozoic carbonates and evidence for interbasin groundwater flow is commonly recognized. Within the ACRC, which underlies the western half of the Moapa Indian Reservation, hydraulic gradients are so small that directions of groundwater movement are uncertain. Questions of groundwater fluxes and flow directions have been addressed using groundwater models. Since 2000, comprehensive water-level monitoring on the Reservation and a 7-day aquifer test have provided the parameter estimates and boundary information required by modeling studies.

Several new monitoring wells were drilled in Coyote Spring Valley in 2003 by the Southern Nevada Water Authority (SNWA), providing constraints on the broader hydrologic regime via water levels and hydrochemical information. Isotopic data from these wells has proven to be particularly useful. The EIS analyses for the Calpine Project (Johnson et al., 2001) began a series of in-depth modeling investigations that evolved as the monitoring records accumulated, culminating in recognition of an important hydraulic barrier (Johnson and Mifflin, 2003) and publication of the modeling approach (Johnson and Mifflin, 2006).

The carbonate aquifer of the ACRC is very unusual, with good hydraulic continuity over a vertical thickness of 5000 feet based on water temperatures and measurements while drilling. Regional transmissivities are therefore high, and fluxes can be large in spite of the low hydraulic gradients. Given that upwelling zones are almost certainly present near the Project area, based on pumping response and the presence of fossil spring deposits (described below), it will be very difficult to document the effects of Project-related production by direct observation beyond the local well field area, because the pumping signal will be very small and likely masked by natural “noise” evident in the water-level and discharge records.

Figure 3 (the “conceptual model”) embodies a set of material-property domains, line sinks, prescribed-head boundaries, no-flow boundaries, a recharge area, and an important hydraulic barrier separating domain K1 (the Southern Flow Field) from domain K2+K3 (the Northern Flow Field). Where domain K0 underlies the eastern part of the Reservation, a result of faulting on the Hogan Springs Fault Zone (Schmidt et al., 1996), exploratory drilling of up to 4,000 feet (Johnson et al., 1986) has not encountered Paleozoic carbonate rock. Details of these model elements are given in Appendix B.

Figure 4 depicts the potentiometric surface (water table) in the region of interest, with residuals (differences between computed and observed water levels) indicated. Inflow to the ACRC occurs from the north and west, and diffuse discharge occurs to the south and east. Noteworthy are the relatively flat hydraulic gradients in the Northern and Southern Flow Fields, and the small “step” (two meters or so) between these flow domains resulting from a hydraulic barrier. All regional and local databases and testing analyses to date indicate that the Southern Flow Field in general and the Project area in particular are favorable for large-scale groundwater production without adverse effects on regional springs. The modeling analyses that follow address conceptual uncertainty using a set of scenarios that differ in terms of boundary conditions and the effectiveness of the “leaky” hydraulic barrier of Johnson and Mifflin (2003), but otherwise share the same distribution of material-property domains.

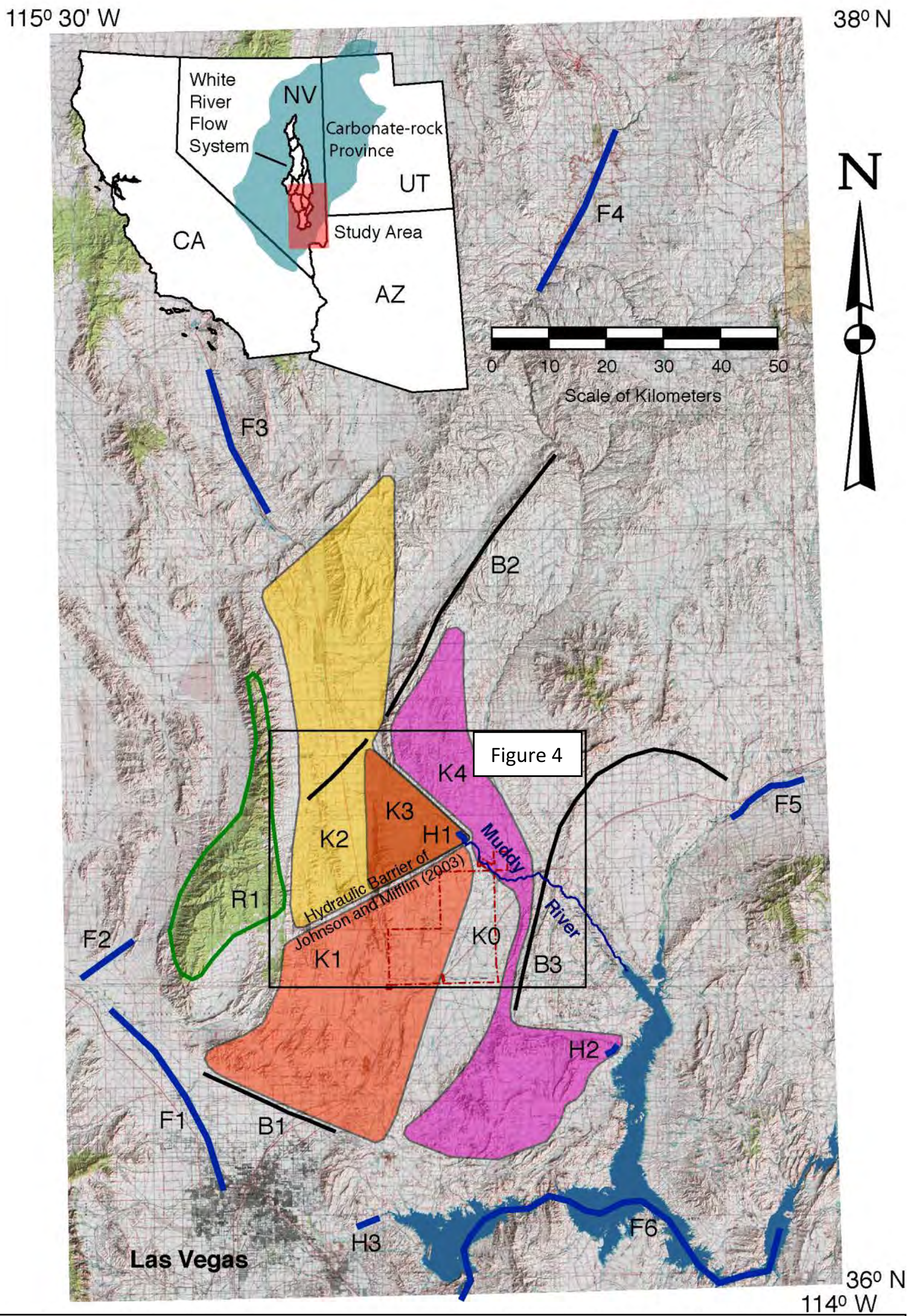

Figure 3. Analytic element representation of the study area, showing hydraulic-conductivity domains (K), no-flow barriers (B), far-field features (F), near-field discharge (H), and recharge (R); reference Appendix for details [file AshGroveFig2.tif]

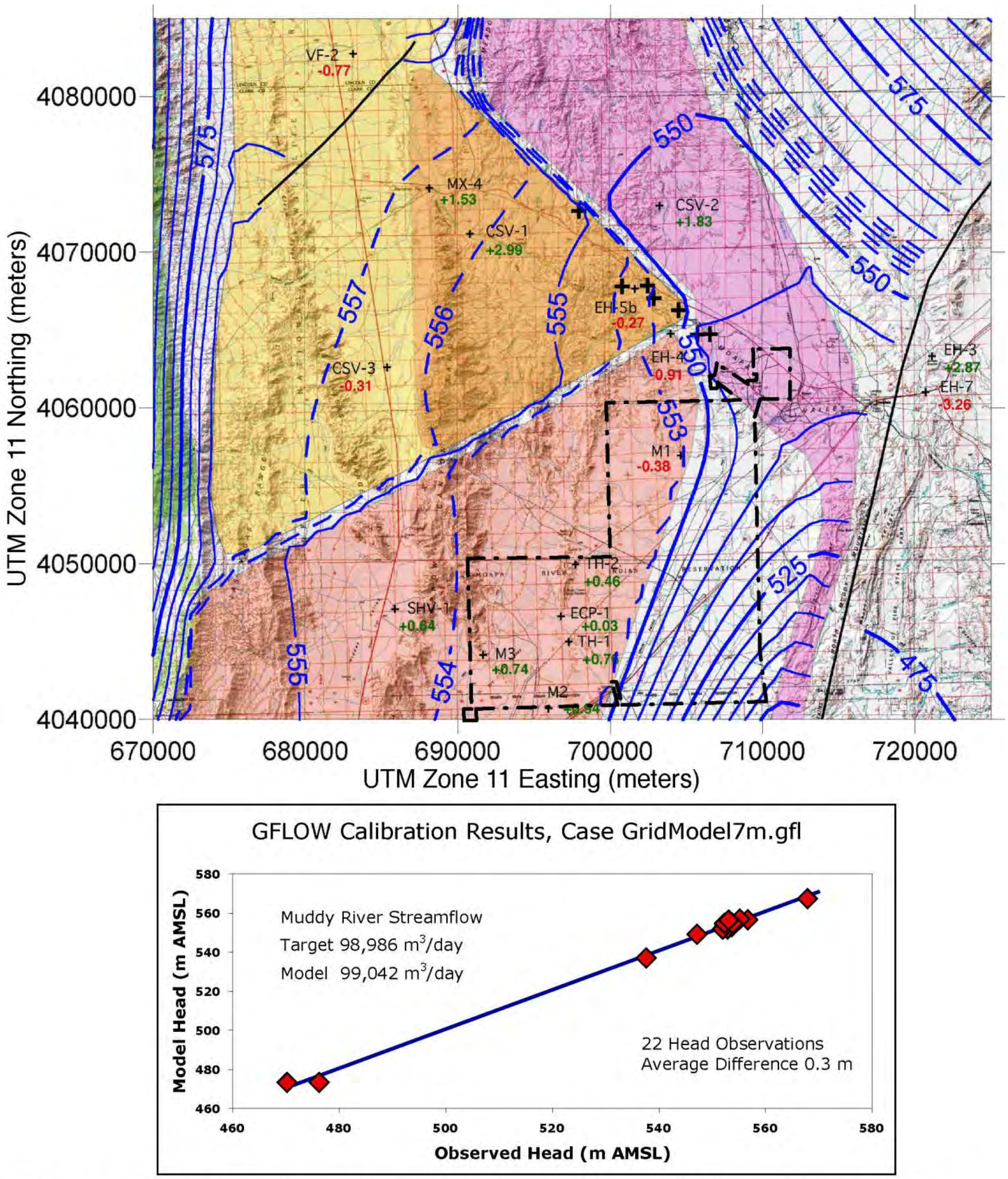

Figure 4. AEM model results for year 2001 conditions with calibration summary, showing head contours (meters AMSL) and residuals (meters + or -) at monitoring well locations. Contour interval 1 meter where dashed, 5 meters elsewhere. Bold symbols (**+**) show model locations of groundwater extraction by Nevada Power Company (Nevada Energy) and Moapa Valley Water District [file AshGroveFig3.tif]

Present groundwater development in the Southern Flow Field consists of about 3000 afy (4 cfs) for industrial uses near Apex (in the extreme southern-most extent of K1, Fig. 3). Water is used there for gypsum processing in drywall manufacture and power generation, and is somewhat seasonal. Large-scale development in the Northern Flow Field is concentrated near the Muddy River springs and southeastern Coyote Spring Valley in the K3 domain, where up to 14,600 afy (20 cfs) is being withdrawn for irrigation, industrial and municipal uses, with pumping strongly weighted to the summer months. Water-level fluctuations are uniform throughout the Southern Flow Field and sinusoidal in terms of the shape of the waveform (Figure 5); in the Northern Flow Field a seasonal pumping signal is superimposed on the natural background, resulting in asymmetrical annual highs and lows. Most if not all of the annual periodicity in both flow fields may be attributable to loading phenomena related to Lake Mead, and this signal component tends to mask the pumping-induced component in Northern Flow Field records. The analysis by Johnson and Mifflin (2006) utilized long-term records from monitoring wells EH-5B and MX-4 in the Northern Flow Field, monthly production totals from all large wells in upper Moapa Valley, and subtracted the annually periodic signal component derived from Southern Flow Field records to perform a well-hydraulics analysis and obtain the parameter estimates that were used for model domain K3. Johnson and Mifflin (2012b) obtained parameter estimates for southeastern Coyote Spring Valley by applying barometric and tidal adjustments to well hydrographs to filter these sources of noise from the water-level signal.

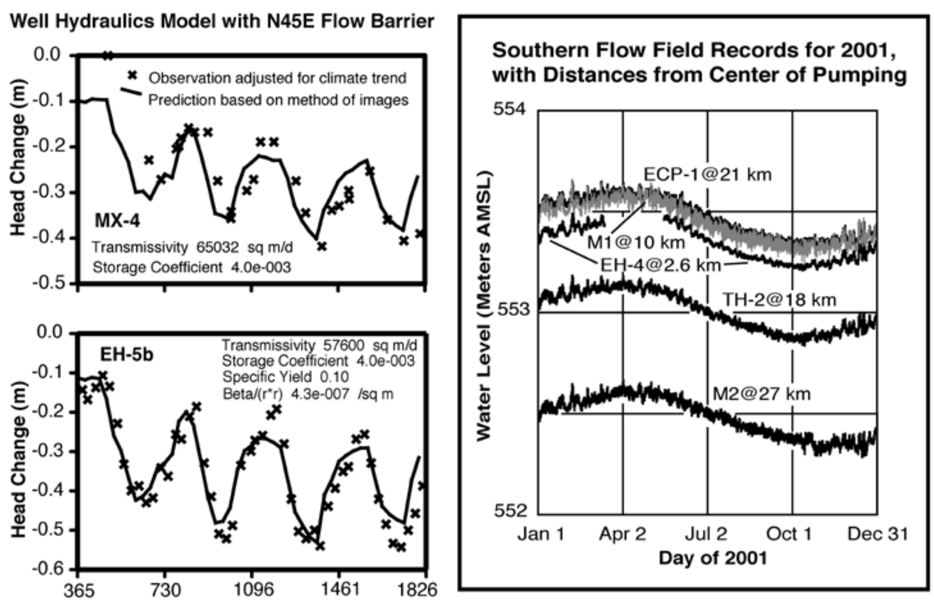

Figure 5. Four-year record (1998-2001) of hand measurements and simulated pumping signals in Northern flow field (left), and hourly year-2001 Southern flow field record (right) in which pumping effects appear to be absent. X-axis on multi-year charts is days beginning January 1, 1997 (the simulation period was five years, 1997-2001).

The Hogan Spring Fault Zone is a zone of north-trending fractures and faults extending from the Muddy River spring area southward to the Project area. Western lineaments of the Zone in its northern portion seem to be fractures without large vertical displacements, and eastern lineaments indicate major faults, juxtaposing fine-grained basin fill on the east against carbonate-rock aquifers on the west. These major faults, in combination with the hydraulic barrier of Johnson and Mifflin (2003), may control the general location of the Muddy River spring area by damming eastward flow of groundwater beyond that area. Two sub-parallel, north-trending lineaments localize spring areas within the general discharge area, and the distribution of paleodischarge deposits has been controlled by the fractures and faults in this area and to the south. North-south ridges are perhaps also related, overprinted on earlier, large-amplitude folds of the Arrow Canyon Range structural block (Page, 1992; Schmidt, et al., 1996). South of the general area of the Muddy River springs, the lineaments are less apparent, perhaps due to the widespread and well-developed pediment surfaces developed on Muddy Creek sediments. However, east of monitoring wells M-1 and TH-2 (Figs. 2, 4) a north-trending fault scarp displaces an old pediment surface, and two local areas of paleodischarge deposits formed on pediment gravels may be localized by the Zone lineaments.

The Hogan Spring Fault Zone is clearly related to Cenozoic extensional tectonics, and is part of a larger network of normal faults that created the complex graben containing California Wash and Upper Moapa Valley between the similarly complex Arrow Canyon Range and North Muddy Mountains horsts. In Figures 3 and 4, the K0 finger beneath the eastern part of the Moapa Indian Reservation represents the downfaulted basin sediments of low transmissivity, whereas the K1 domain represents carbonate rock with documented transmissive properties.

The hydraulic and hydrochemical databases of the Northern and Southern flow fields (Johnson et al., 2001; Johnson and Mifflin 2003, 2006) suggest limited hydraulic continuity between the two flow-field regions. However, the Hogan Spring Fault Zone extends north and south of the postulated barrier zone, suggesting well-developed hydraulic continuity between the two areas. The two general lines of evidence offer two important conceptual model differences: well-developed hydraulic continuity between northern and southern areas, or poorly-developed hydraulic continuity between the two areas. A conceptual model that satisfies both general lines of evidence incorporates upwelling of deeply-circulated waters along fractures of the Hogan Spring Fault Zone. The effect of several "constant-head" zones between the two areas would be to isolate the two flow fields as effectively (or more effectively) than a permeability barrier. In the modeling analyses two general conceptual models are employed to bound the conceptual uncertainty. In the first, the hydraulic barrier of Johnson and Mifflin (2003) is included, in the second it is removed. The effects of prescribing head versus prescribing flux at the model boundary are examined for cases with and without the hydraulic barrier, as is a case where a small upwelling (constant-head) is present within a domain that has flux prescribed on its perimeter.

Basis for Pumpage Scenarios

RES Americas has negotiated a long-term lease for up to 800 afy of water supply. Actual consumptive use of water is likely to be less than 500 afy based on experience with similar generating facilities. The 500 afy used for modeling analyses is a nominal estimate based on the proposed lease amount and experience. Modeling results based on the assumed 500 afy consumptive-use rate scalable to other rates in almost exact proportions; for example, multiplying a drawdown or discharge reduction resulting from the 500 afy extraction rate by 1.6 gives the impact attributable to an 800 afy rate.

Cumulative pumpage to evaluate cumulative impacts is quantified based on the following relationships. The Tribe's permitted water right originated as one of two Las Vegas Valley Water District (LVVWD) 1989 applications for 10 cfs each (7245 afy) that were acted upon by the State Engineer in Ruling 5115. One application was held in abeyance and the other restricted to a permitted total of 2500 afy. Until the full 2500 afy of permitted water right is put to beneficial use and impacts assessed, no production will be allowed from the second LVVWD application. It is unlikely that any other permits in the California Wash hydrographic basin will be issued, as the 1989 LVVWD applications have priority over other large applications in the basin, and the resource base remains uncertain. Therefore, for the foreseeable future, the 2500 afy permitted amount determines the additional pumpage in the basin, and this pumpage will be Moapa Indian Reservation projects. As the Belly Tank Flat area is central to the Carbonate Aquifer extent in California Wash basin, the full 2500 afy of pumpage has been concentrated in the area of the ECP wells, which as a group are capable of producing nearly twice that amount based on drilling and testing results.

It is important to note that future developments using the balance of the 2500 afy of permitted water rights held by the Tribe will likely require EIS reviews, and be incremental additions of pumpage. Records of hydraulic responses to initial pumpage will be available to refine modeling predictions of impacts for added increments of pumpage.

Cumulative impacts from Muddy River spring area pumpage and the upgradient Coyote Spring Valley pumpage are addressed by the Memorandum of Agreement (MOA) between the U.S. Fish and Wildlife Service (USFWS), MVWD, SNWA, Tribe, and Coyote Spring Investments (CSI), all parties to the Agreement as negotiated in 2005 and signed in late 2006. The MOA provides for limitations on pumpage in Coyote Spring Valley and the Muddy River headwaters area if the impacts on spring flows reach certain decreased flow values, and also potentially limit Tribal pumpage in California Wash basin to 1250 afy of the 2500 afy permit. The MOA provides for annual monitoring analyses by a Hydrologic Review Team (HRT) to adjust pumpage based on documented impacts on spring flow.

Based on the following analyses, we anticipate California Wash basin pumpage will have no significant impacts on Muddy River springs-area flows, although significantly increased pumpage in the Northern Flow Field (upper Moapa Valley and Coyote Spring Valley hydrographic basins) has resulted in reductions of spring discharge and groundwater flux to the headwaters of the Muddy River (Johnson and Mifflin, 2013). All analyses and databases continue to indicate very close hydraulic continuity between Coyote Spring Valley and the Muddy River springs area.

Modeling Analyses

Based on geologic reconnaissance, analysis of monitoring records, a 7-day aquifer test for parameter estimation, and a thorough review of the literature, a “base case” conceptual model of the hydrologic regime was developed (Fig. 3). Fossil spring deposits in the Project area (Fig. 6) are clear evidence that upwelling of groundwater has occurred in the geologically recent past. Pumping response that almost perfectly fits an upwelling zone co-located with this spring mound two miles from the pumping well (Fig. 7) suggests a “constant head” boundary internal to the model domain related to this ancient spring deposit. That is, the presence of a conduit system that supplies inflow in response to pumping and thereby mitigates drawdowns in the Project area is suggested by the geologic record and by aquifer tests.

Figure 6. Fossil spring mound east of monitoring well TH-2, two miles northeast of the Belly Tank Flat well field. This feature indicates past upwelling of groundwater.

The MODFLOW grid consists of 36,000 square cells, 1320 feet (402.3 m) on a side. In the west-east direction, it represents an area extending 45 miles (73 km) from the east flank of the Sheep Range east to the Overton Arm of Lake Mead. South to north, it extends 50 miles (81 km) from Las Vegas north to the central Meadow Valley Mountains (Fig. 8). The model domain is uniformly 5000 feet (1524 m) thick, based on the aggregate thickness of Paleozoic carbonate rock in the stratigraphic section and depth of circulation suggested by groundwater temperatures. The distribution of hydraulic conductivity within the grid is given in Figure 9, inherited from the AEM model (Fig. 3 and Appendix B). No-flow zones are associated with the Las Vegas Shear Zone, southwestward extension of the Kane Springs Wash Fault beneath Coyote Spring Valley, and Weiser Syncline (features B1, B2, and B3, respectively). Boundary conditions were prescribed at the perimeter of the grid and internally for those cases incorporating an "upwelling zone".

Utilization of a single model layer, or "two-dimensional" model based on the Dupuit-Forchheimer assumption provides a built-in conservatism by permitting hydraulic continuity between "Northern" and "Southern" flow fields that contain the Muddy River springs and Project area, respectively. Such hydraulic continuity is contra-indicated by the monitoring record, but to achieve greater isolation between the two flow fields in the model some speculative material specifications in the lower Meadow Valley Wash area would be necessary. One modeling challenge is how to supply flow to Rogers and Blue Point springs, the terminus of flow in domain K4, if the hydraulic barrier of Johnson and Mifflin (2003) were to be extended northeastward beyond the Muddy River (Fig. 3) to provide the degree of isolation between K1 and K3 suggested by the monitoring record. A three-dimensional model appears to be desirable in the lower Meadow Valley Wash area, but the absence of the required subsurface information precludes a useful analysis. Ongoing evaluations of industry seismic data by the U.S. Geological Survey (Ric Page, personal communication) may clarify relations in this important area.

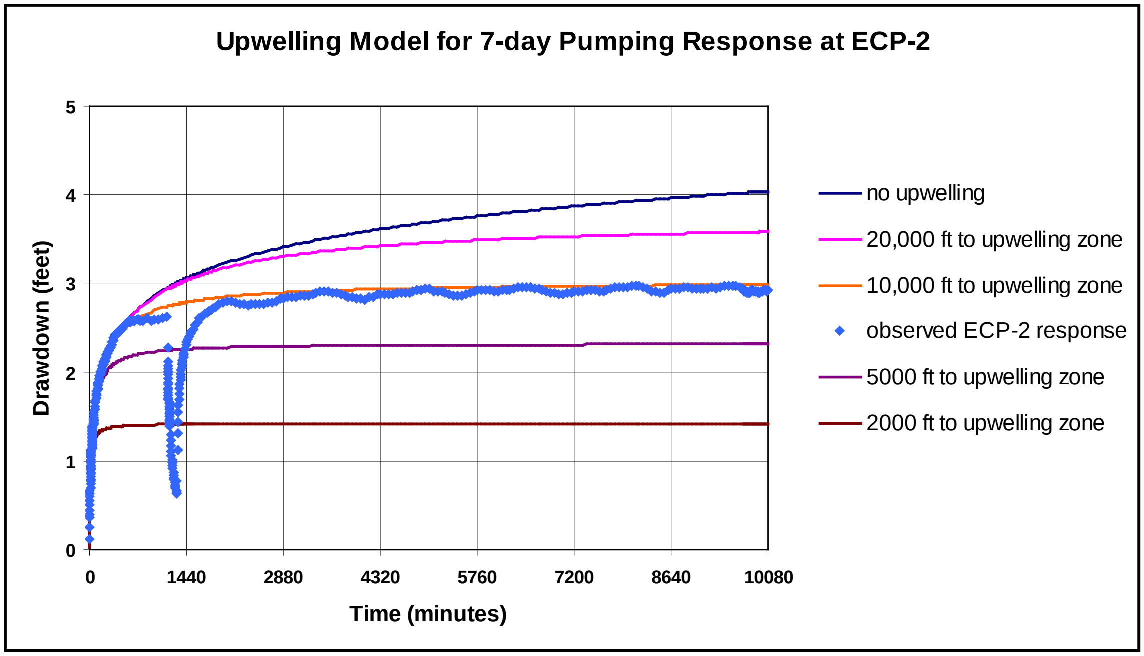

Figure 7. Theoretical response at ECP-2 in Theis aquifer with T=30484.4 ft^2/d, S=0.000640805, Q_{ECP-1}=1005 gpm, and r_{ECP-2}= 500 feet.

For the preliminary assessment, a set of six conceptual models was explored using MODFLOW, as implemented in the Groundwater Vistas modeling environment. Finite-difference grids for the MODFLOW simulations were extracted from GFLOW analytic element models of the region, which are important precursors to the application of MODFLOW in the Mifflin & Associates (MAI) modeling strategy. By extracting MODFLOW grids from GFLOW, boundary conditions on the grids are derived from calibrated, steady-state models of regional flow rather than being arbitrarily specified. Two analytic element models, one with and one without the hydraulic barrier of Johnson and Mifflin (2003) were developed. MODFLOW grids extracted from the AEM models “inherit” boundary conditions associated with steady-state conditions. For the two contrasting physical-property configurations (barrier and no-barrier), the effects of prescribed-head and prescribed-flux boundary conditions were examined, including a variant of the prescribed-flux case where a small area of prescribed head was included to represent an “upwelling zone”. Six conceptual models therefore frame the results given here.

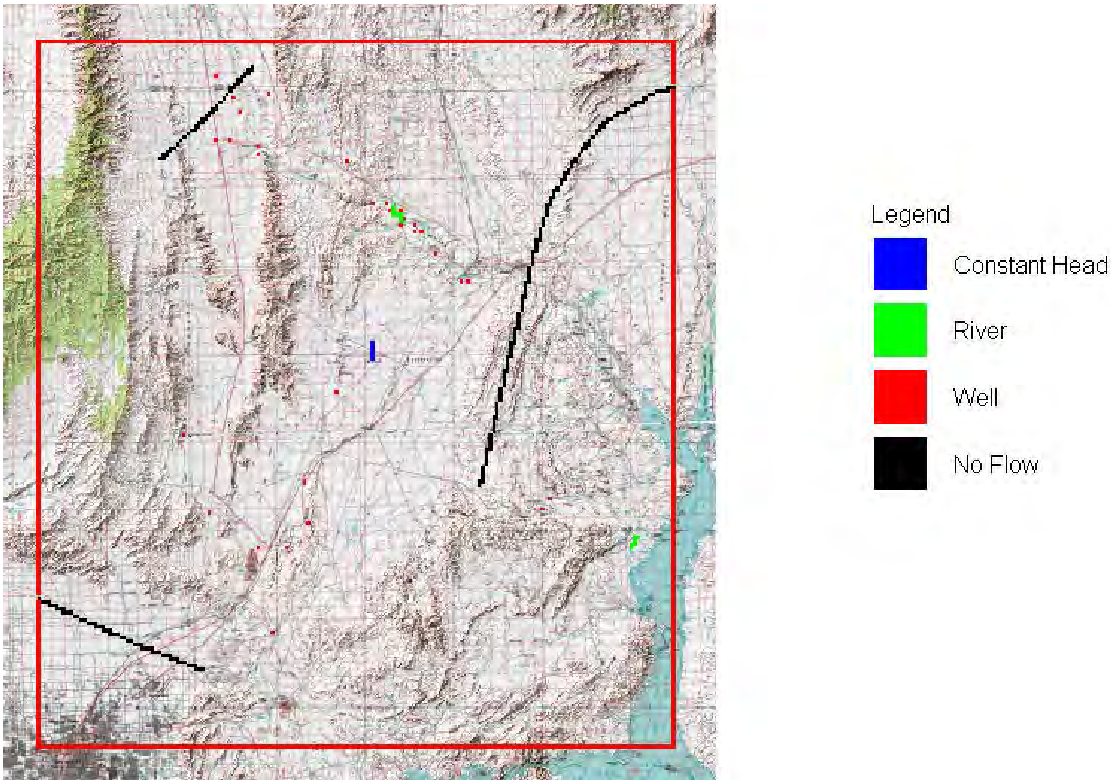

Figure 8. Lateral extent of MODFLOW grid. Flux or head conditions at grid perimeter were inherited from GFLOW steady-state AEM model. Constant-head blocks near center of model domain represent upwelling zone. Calibration assures river flow is near 51 cfs.

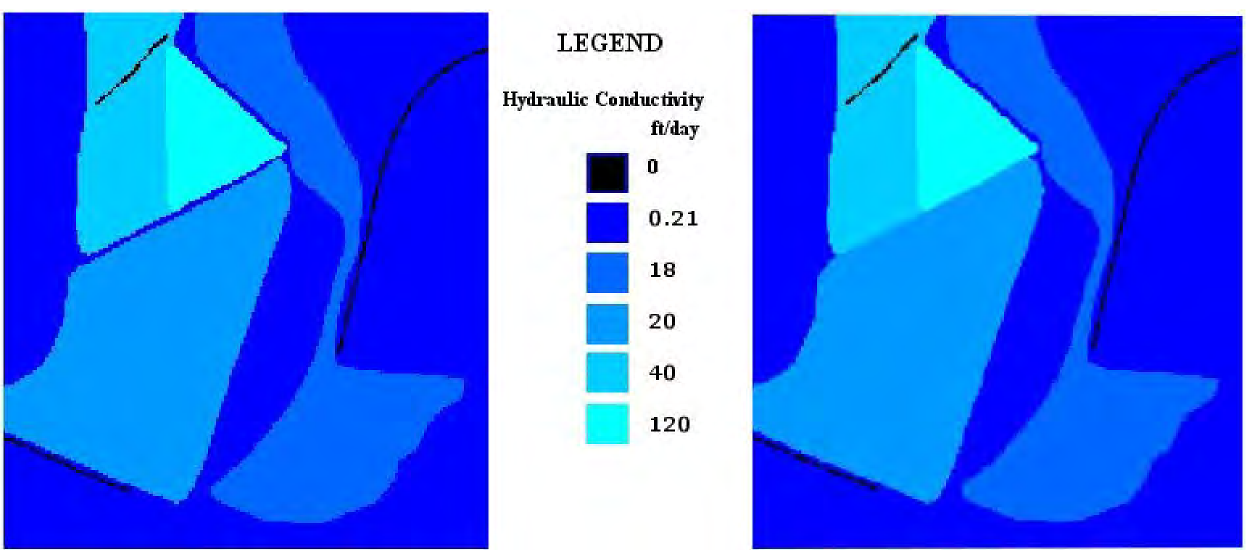

Figure 9. Hydraulic conductivity distribution for MODFLOW domain of Figure 7 with (left) and without (right) the hydraulic barrier of Johnson and Mifflin (2003).

A prescribed-head boundary is a region where water levels (heads) are held constant in the simulation, so if drawdowns occur in adjacent areas the flux of water across the prescribed-head boundary increases in response to the increased hydraulic gradient. These “induced inflows” mitigate drawdowns and lessen impacts on groundwater sinks (springs) in the model domain. Prescribed-flux boundaries, on the other hand, are regions where the water level (head) is allowed to vary, but the amount of water entering or leaving the model domain in those regions is held constant. The model solves for head rather than flux along prescribed-flux boundaries, so any water extracted from the model domain must be supplied entirely by flow reductions at existing sinks with no contribution from induced inflow. Reliance on prescribed-head boundaries in the absence of good evidence that they exist is non-conservative, and using only prescribed-flux boundaries is usually overly conservative, since seldom will a model domain have no interaction with a larger region. These are useful constructs, however, to bound what occurs in nature.

To evaluate the effects of upwelling within the model domain, suggested by aquifer tests and the presence of groundwater-discharge deposits, a small area of prescribed head was introduced within the model domain, near where the deposits occur in nature. Flow reductions in the Muddy River and drawdowns in the Project area were forecast at 10 and 75 years for each conceptual model, giving a total of 12 transient test cases. This approach brackets conceptual uncertainty by exploring a range of intrinsic property and hydrologic boundary effects that influence model predictions.

Model Results

Two indicators of impact were used to compare the forecast impacts from the various scenarios or “conceptual models” investigated for the Project. These are drawdown near the proposed Project well field, expressed in feet of decline at a hypothetical monitoring well, and flow reductions at the headwaters of the Muddy River, expressed as percentage decreases from average 2001 River flows (2001 was the first full calendar year of Southern flow field monitoring records, which indicated a hydraulic barrier and the climatic component of regional water-level decline, which in turn allowed a 5-year well hydraulics analysis of the Muddy River springs area and a comprehensive water balance on the Muddy River). Simulated conditions with and without the barrier at 10 and 75 years from Project startup were examined.

<u>Drawdown in the Project area</u>

Synthetic (model-derived) hydrographs of a hypothetical monitoring well located approximately 1.3 miles (2 km) west-northwest of the Belly Tank Flat pumping center was used to illustrate a range of possible near-field pumping effects (Fig. 10). The upper four curves represent the predicted drawdowns for the Project life cycle, for cases with and without the hydraulic barrier of Johnson and Mifflin (2003) under two alternative representations of boundary conditions on the model grid (either head or flux retaining prescribed values with time). “Upwelling” cases (lower 2 curves) are the most consistent with pumping response and paleohydrologic evidence (spring mound) and suggest upwelling through localized conduits within the model domain to provide internal recharge boundaries.

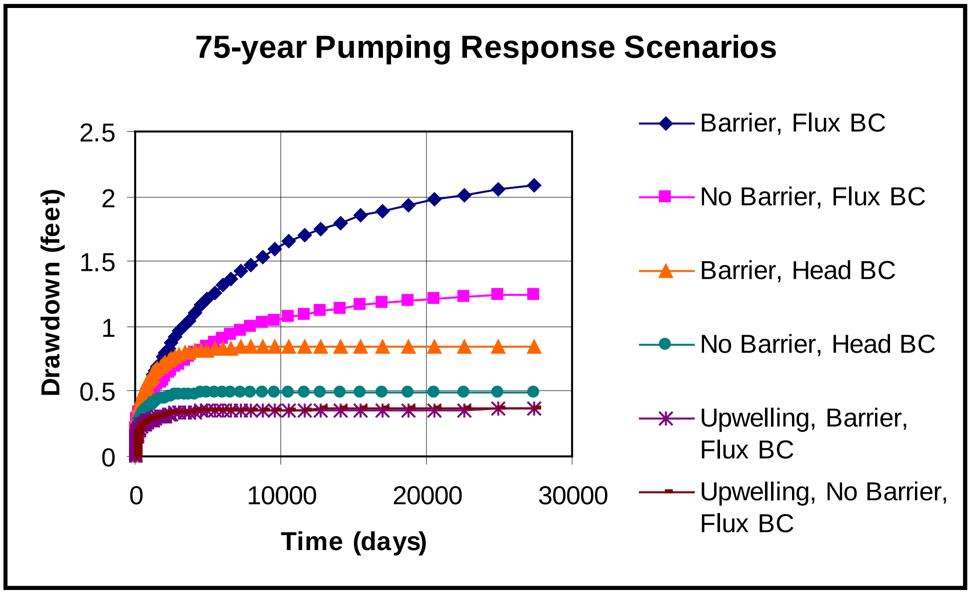

Figure 10. Predicted drawdowns at a hypothetical monitoring well 1.3 miles from the Project pumping center, for several possible configurations of model boundaries. Responses are nearly identical in upwelling cases.

These six cases illustrate how water-level monitoring may provide the basis for discriminating among alternative conceptual models for the hydrogeology of the site. However, great care will be needed to confidently recognize even the larger predicted drawdowns due to system noise, which is known to include periodic and aperiodic signals of frequencies from greater than one per day to less than one per year. Tidal and barometric forcing, loading by rail traffic and possibly surface water, and long-term climate effects all introduce noise to produce
the observed water-level signal from which pumping effects must be extracted by digitally filtering the noise from the raw signal.

The seven-day aquifer test of 2000, conducted for Calpine Corporation, provides guidance as to how a cone of depression will develop in the Project area. The most notable feature of that experiment was a flattening of the drawdown curves after only two days, which was interpreted in the 2001 analysis (Johnson et al., 2001) as representing delayed yield from unconfined storage (Fig. 11). Predictions of pumping response based on the Neuman model suggest that a resumption of drawdown would have occurred had the test continued 2-3 months longer (Figure 11). The alternative, and currently favored explanation for the flattening is that a recharge boundary was encountered, halting the development of the cone of depression by inducing inflow from an upwelling zone associated with the Hogan Springs Fault Zone (Figs 6 and 7).

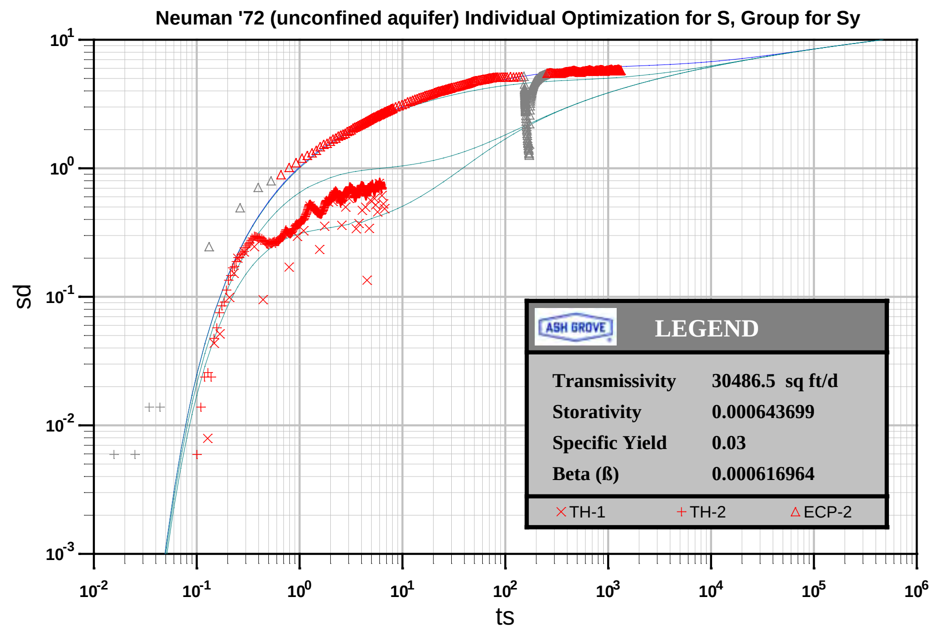

Figure 11. Parameter estimation based on the model of Neuman (1972), from 7-day test in July of 2000 in which ECP-1 was pumped at 1005 gpm.

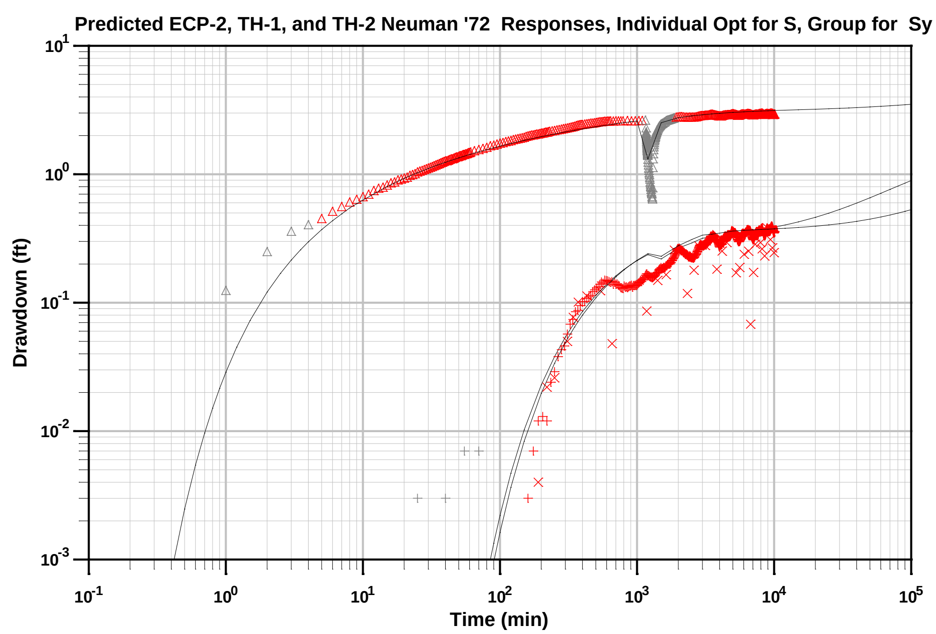

Figure 12. Pumping response predicted by the Neuman (1972) model, which attributes flattening of the response curves at intermediate times to delayed yield from unconfined storage.

The presence of a "constant head" boundary in such close proximity to a proposed pumping center will markedly limit pumping cone development over time. Early (2000-2001) models required such an upwelling zone for calibration, but with the recognition of the Johnson/Mifflin hydraulic barrier an equally credible source for water in the Southern flow field is inflow from the west. Both sources may, in fact, contribute. The varied boundary condition scenarios, with and without the near-field recharge boundary of the Hogan Spring Fault Zone, have been evaluated to bound uncertainty created by differing credible interpretations of the databases.

Flow Reductions

Modeling results have been summarized in Table 1 in terms of percentage decreases in Muddy River flows (using 2001 flows as the baseline) at 10 and 75 years, resulting from Project withdrawals of 500 acre-feet per year from the ECP-1 locality. At the maximum estimated withdrawal rate of 800 afy, the values in Table 1 should be adjusted upward by a factor of 1.6. At the minimum estimated rate of 350 afy, the Table 1 entries should be adjusted downward by a factor of 0.7.

	With hydraulic barrier			Without hydraulic barrier		
	Flux boundary		Head boundary	Flux boundary		Head boundary
Induced inflow?	no	Upwelling zone	Grid perimeter	no	Upwelling zone	Grid perimeter
10 years	0.36	0.10	0.19	0.60	0.18	0.35
75 years	1.03	0.14	0.22	1.21	0.22	0.36

Table 1. Model impacts on Muddy River flows, in percent of 2001 flows (nominally 40.5 cfs). Results are linearly scalable to other extraction rates.

Minimum impact at both 10 and 75 years (0.10 and 0.14%, respectively, the best-case scenario) is associated with upwelling within the model domain and the presence of a hydraulic barrier, both supported by experimental and observational evidence. Two cases that give minor impact and almost identical results (0.18-0.19 and 0.22%) are those with a) a prescribed head boundary at the grid perimeter, a barrier, and no upwelling; and b) a prescribed flux boundary, no barrier, and upwelling. Intermediate impacts at 10 years (0.35-0.36%) are associated with the absence of upwelling, and either a hydraulic barrier or a prescribed-head boundary at the grid perimeter, but not both. By 75 years the hydraulic barrier has lost effectiveness, so the only "intermediate" case (0.36%) is characterized by a flux boundary at the grid perimeter, no upwelling, and no hydraulic barrier. Maximum impact at both 10 and 75 years (0.60 and 1.21%, respectively, the worst-case scenario) is associated with the absence of both the hydraulic barrier and upwelling, and a prescribed-flux boundary. Even with a barrier present, near-worst-case conditions (1.03% flow reduction) apply with a flux boundary and no upwelling.

It is evident that a rapid approach to equilibrium would occur with induced inflow from a constant-head boundary, with conditions 10 years after startup expected to offer a good approximation of the ultimate steady state. In contrast, only one-third to one-half of the ultimate impact would be observable at 10 years from startup if flux from the boundary does not respond to new withdrawals, that is, if there is no induced inflow. Nonetheless, forecast reductions to Muddy River flows are still only on the order of one percent at 75 years.

Discussion

The 7-day aquifer test of 2000 suggests that the "most likely" scenario resembles the "best case", incorporating both the hydraulic barrier of Johnson and Mifflin (2003) and an upwelling zone about 2 miles from the proposed Project well field. Multiple lines of evidence support the hydraulic barrier (Johnson and Mifflin, 2006), and the existence of a fossil spring mound the exact distance from ECP-1 as the "best fit" distance in the upwelling zone analysis of Figure 7 strongly suggests that this conceptual model is also valid.

Model predictions for the region surrounding upper Moapa Valley are strongly influenced by the type of boundary condition applied to the perimeter of the model grid, especially when forecasting several decades into the future. At 10 years the impacts on Muddy River flows for cases with a prescribed-head boundary average 56% of impacts for cases with a prescribed-flux boundary, but only 26% at 75 years. The effects of a hydraulic barrier separating "Northern" and "Southern" flow fields diminish with time; a barrier as represented in the model limits impacts at 10 years to an average of 57% of what would occur in its absence, but at 75 years impacts with a barrier average 73% of those without.

The presence of an upwelling zone internal to the model domain is suggested by paleo-spring deposits associated with north-trending lineaments, by experimental data that suggest a recharge boundary is encountered by the cone of depression when ECP-1 is pumped, and by monitoring records that suggest a greater degree of isolation between the Northern and Southern Flow fields than that provided by the "leaky" hydraulic barrier extending from the Arrow Canyon Range to the Muddy River springs.

Cumulative Impacts

Figure 13 illustrates drawdowns and water levels after 75 years of pumping the full 2500 afy permitted water quantity from the Belly Tank Flat well field, disallowing induced inflow at the model boundaries and incorporating an upwelling zone indicated by experimental data and field evidence. Widespread drawdowns in the 0.5 to 1.5 foot range are projected, which are slightly over five times the contribution of the Project alone. Even these modest impacts reflect over-conservatism at the model boundaries, since induced inflows would occur at the domain boundaries, though locations and quantities cannot be predicted.

Model-projected Impacts and Measurable Impacts

The modeling analyses adopting varied but credible boundary conditions all result in rather small impacts compared to natural variations noted in monitoring well records. Since monitoring began in 2000 in the Southern flow field, drought conditions resulted in net annual declines of about 0.3 feet until the spring of 2005 (Fig. 27). Two key relationships are indicated by these records – all monitoring wells demonstrated the same net declines throughout the large Reservation area, and these declines are comparable to model-forecast declines after decades of pumping. Thus, natural system responses to drought conditions produce larger effects than projected effects of the Project, except in the immediate vicinity of the production wells. The other key observation is that one wet winter wiped out 3-4 years of drought-induced water-level lowering.

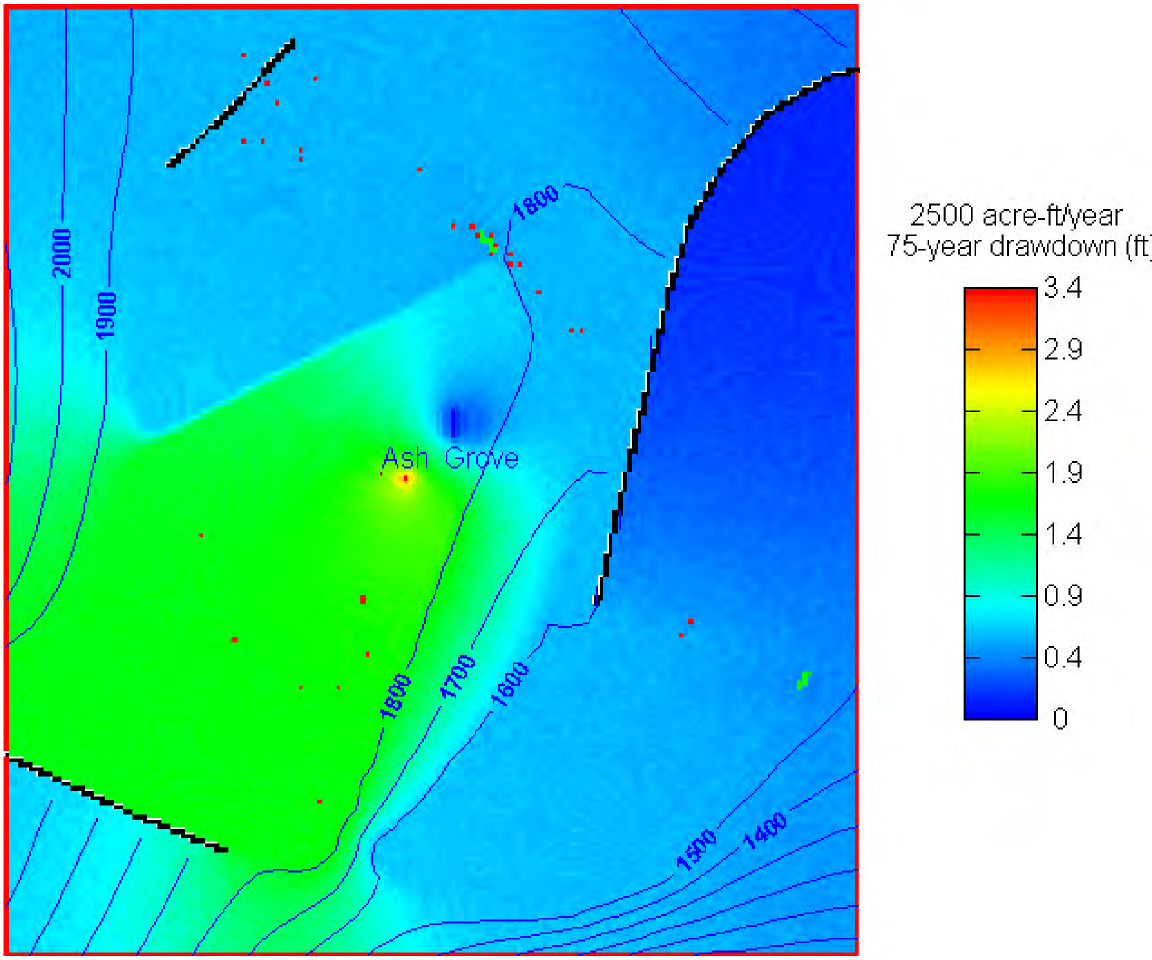

Figure 13. Drawdowns and associated water levels (in feet AMSL) within MODFLOW domain of Figure 8 resulting from pumping 2500 afy from the Belly Tank Flat well field with steady boundary fluxes. "Ash Grove" labels the hypothetical monitoring well of Figure 10. The Belly Tank Flat well field is associated with the single red grid block beneath the "s" of the Ash Grove label. [case CumulativeUpwell_75yr.gwv]

Natural stresses on the carbonate aquifer result in larger water-level responses than projected pumping impacts per unit of time in most of the model domain. Similarly, the 4 cfs springflow reduction during the recent drought far exceeds future reductions attributable to the Project, though the observed reduction may be due, in part, to pumping in the Northern flow field. Thus it will be difficult to separate the pumping-induced water-level declines and flow reductions from natural causes, given that projected impacts of the 500 afy Project pumping stress (or even the 2500 afy cumulative impact which would be slightly over five times as great) are well within the envelope of historic variation. Further, the marked recovery of the hydrologic system during a single wet season suggests that, even with pumping stresses larger than modeled, long-term declines may well be offset by short-term recoveries due to exceptional wet years.

Department of Interior (Tetra Tech) Model

Two printed reports describing development of a three-dimensional groundwater flow model and predictions derived from that model were released in late October, 2012, along with a CD containing MODFLOW input files and executable code to allow the simulations to be run (Tetra Tech 2012a, 2012b). The MODFLOW input files contain information on the conceptual model and system geometry, and are sufficient to allow limited comparison with other modeling efforts and results thereof. Unfortunately, Tetra Tech modified the MODFLOW source code to accommodate an assumed hydraulic conductivity versus depth relationship, effectively preventing users who rely on an execution environment such as Groundwater Vistas from importing the non-standard MODFLOW data files and applying the model to pumping scenarios other than those considered by Tetra Tech. A comparative evaluation of the Tetra Tech model with results presented herein was accomplished by developing a two-dimensional representation of a sub-region of the Tetra Tech model domain (orange outline in Figure 14), based on an equivalent 4000-foot-thick aquifer. The thickness difference (4000 feet versus 5000 feet in our earlier modeling work) is immaterial, since transmissisvity (the hydraulic conductivity X thickness product) is directly comparable in the two conceptual models.

Figure 14, a composite of three Tetra Tech figures with annotation, shows flux boundaries as interpreted by Harrill (2007), production well clusters, an outline of the area with the most detailed and regular (250 X 250 m) gridding in the Tetra Tech model (grid blocks are larger and telescoped to rectangular shapes outside this region), and the smaller, rotated grid utilized by Johnson and Mifflin (2012b) for Order 1169 parameter estimation from short-term pumping response. Boundary inflow is greatest along segment CSV-3 as delineated by Harrill (2007), and production well clusters are as shown in the Tetra Tech (2012a) model documentation report. The figures that follow represent the area of the detailed grid.

As illustrated in Figure 15, in the Tetra Tech model the PC4 (Paleozoic Carbonate Zone 4) aquifer is thickest west of the Meadow Valley Wash Fault, represented in the Model as a high-angle fault as shown in cross-section C-C’ which crosses the southern Mormon Mountains and northern Coyote Spring Valley. There is conceptual uncertainty and professional disagreement as to the validity of this representation of the geology. Low-angle fault surfaces with brittle deformation in the Mormon Mountains have been attributed to gravity slides from high-angle fault blocks (consistent with the Tetra Tech model) but alternatively to detachment faulting, perhaps extending beneath the Meadow Valley Mountains).

The top of the Tetra Tech model grid corresponds to the static water-level elevation (Figure 16), and the base of the grid is uniformly 15,630 feet below the static water level. The model consists of 18 layers that increase in thickness with depth. The physical properties of hydrogeologic units (HGUs) were distributed through the 1,181,268 model grid cells according to the top and bottom elevations of the HGUs as described by Anderman and Hill (2000).

Hydrogeologic Unit PC4 is the primary aquifer in the Coyote Spring Valley – Muddy River Springs area, and is the focus of the present evaluation. The top of PC4 occurs at shallow depths (<500 feet) throughout most of the detailed-grid area (Figure 17). Multiple-well aquifer tests (which allow storage properties to be estimated) are known to have been conducted at only three localities in this large region: in the Northern Flow Field at MX-5 by Ertec (1981) and RW-2 (Converse Consultants, 2002), and in the Southern Flow Field at ECP-1 (Johnson and others, 2001; Mifflin and Johnson, 2005).

The thickness of PC4 varies from zero to the full grid thickness. Saturated PC4, as represented in the Tetra Tech model, is relatively thin beneath the Arrow Canyon Range and thickest in the Vicinity of Meadow Valley Wash (Figure 18).

Carbonate-aquifer Unit PC4 is unconfined over much of the detailed study area (Figure 19); the three multi-well aquifer tests that have yielded storage estimates were conducted under unconfined conditions. Tetra Tech used our (MAI's) first analysis of aquifer tests on the Moapa Indian Reservation (Johnson and others, 2001) as the basis for estimates of specific storage (SS) and specific yield (SYTP) of PC4. Tetra Tech assigned storage properties dynamically according to the state of saturation of PC4 in individual grid blocks of layer 1: SS = 1.1×10^{-6} ft^{-1} where saturated, STYP = 0.02 where dewatering. Johnson and Mifflin (2012b) estimated specific yield in the vicinity of MX-5 from responses to the April, 2012 re-start; $STYP_{MAI}$ = 0.003.

Tetra Tech assumed that hydraulic conductivity decreases exponentially with depth from the surface value, due to the weight of the overlying rocks. MAI derived transmissivity (ft^2/day) of the PC4 carbonate-aquifer unit by summing the (thickness) X (hydraulic conductivity) products of 10 slices across the saturated portion of the unit to approximate the depth-dependence of hydraulic conductivity, K (Figure 20). Direct comparison of the Tetra Tech model with MAI's parameter estimation model of 2012 was accomplished by assuming a uniform 4000-foot thickness of an equivalent PC4, consistent with temperature data which constrains the maximum depth of circulation.

By calculating the hydraulic conductivities at the mid-point of ten horizontal slices of the PC4 aquifer at each xy grid point, then summing the thickness-weighted hydraulic conductivities of the individual slices, the *effective* hydraulic conductivity for the full PC4 was derived by MAI to simplify model evaluation (Figure 21). Since effective K X thickness gives transmissivity, dividing transmissivity by 4000 feet yields *equivalent* hydraulic conductivity values for a single layer of uniform 4000-foot thickness.

Drawdowns associated with the April, 2012 re-start of MX-5 were analyzed to obtain the aquifer parameters T and S_y by Johnson and Mifflin (2012b). Simulating the pumping response using the equivalent parameter distributions for the PC4 unit from Tetra Tech (2012) produces the computed responses shown in Figure 22. The Tetra Tech model under-predicts drawdowns at all three target wells where drawdown has been resolved; responses were too small to be measured at UMVM-1 after 14 days of pumping, so only predicted responses are shown for that location. The discrepancies may be due in part to the fact that Tetra Tech's computational grid was not refined in the area near MX-5 for this analysis. Specific yield in the Tetra Tech model is, however, higher by a factor of 7 than estimated by Johnson and Mifflin (2012b), and surely delays model drawdowns. When the specific yield is decreased to 0.003, the results of Figure 23 are obtained. We conclude that as boundary conditions come into play, at later times, and as the proportion of pumped water derived from storage decreases, those boundary conditions (flux at input boundaries, head at output boundaries, and distribution of no-flow boundaries) exert the dominant control over pumping responses.

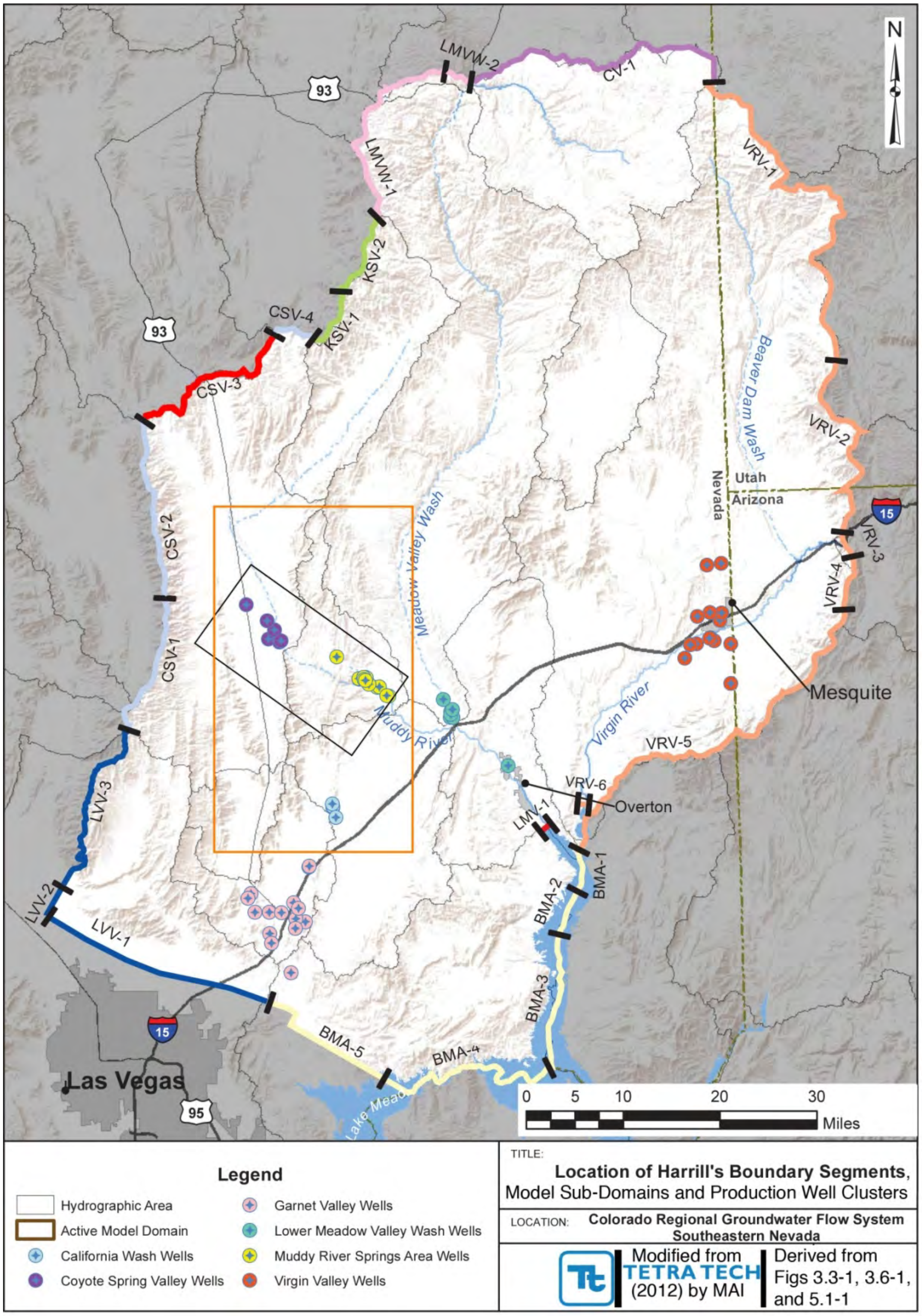

Figure 14. Tetra Tech model domain showing boundary-flux segments, production-well clusters, and the area of the most detailed gridding that encloses most of the Johnson and Mifflin (2012) parameter-estimation model domain [file Detail_Grid_Outline.jpg]

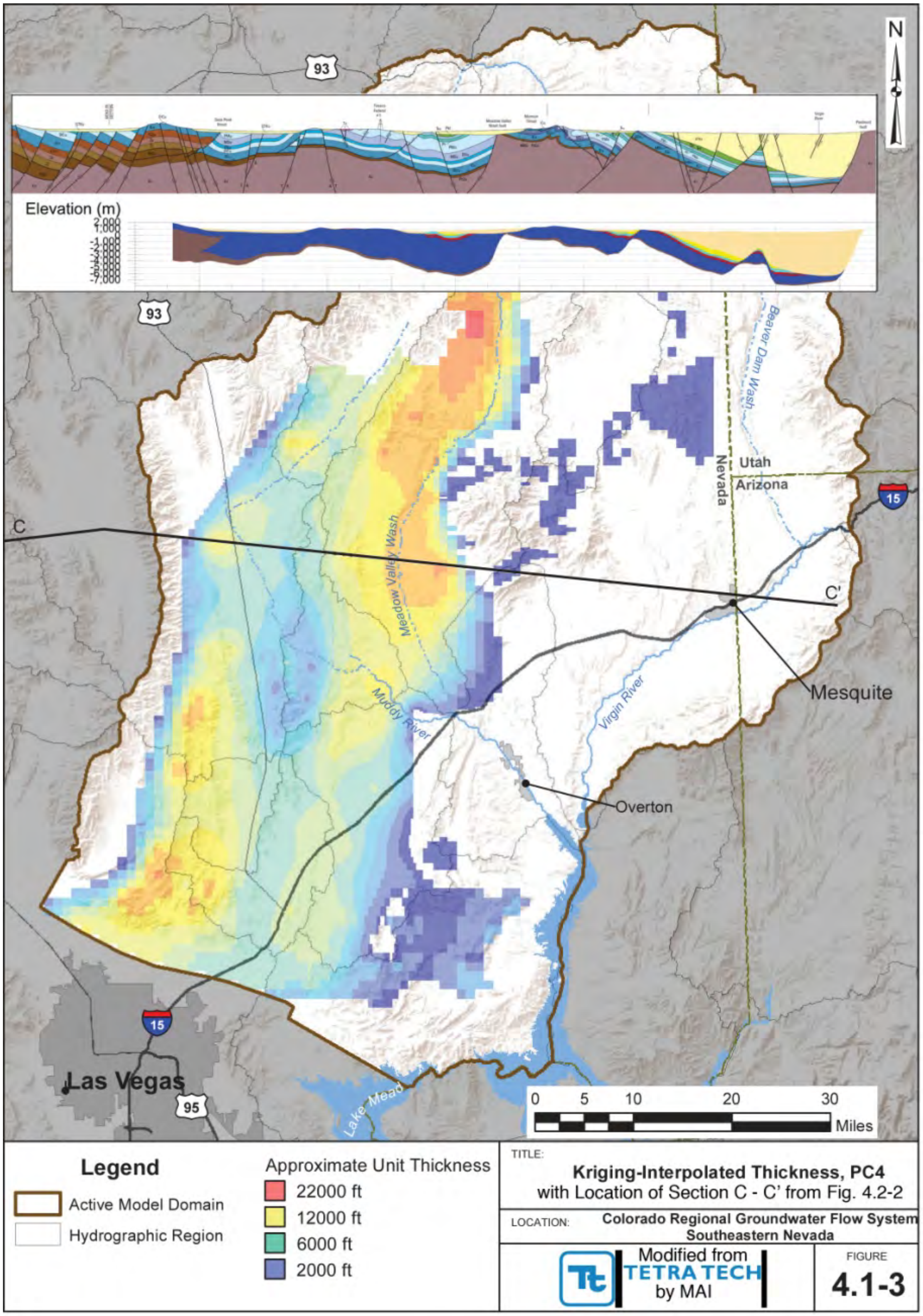

Figure 15. Representation of thickness of the PC4 unit in the Tetra Tech model [file MAI_HRT20121115.pptx, Slide 2]

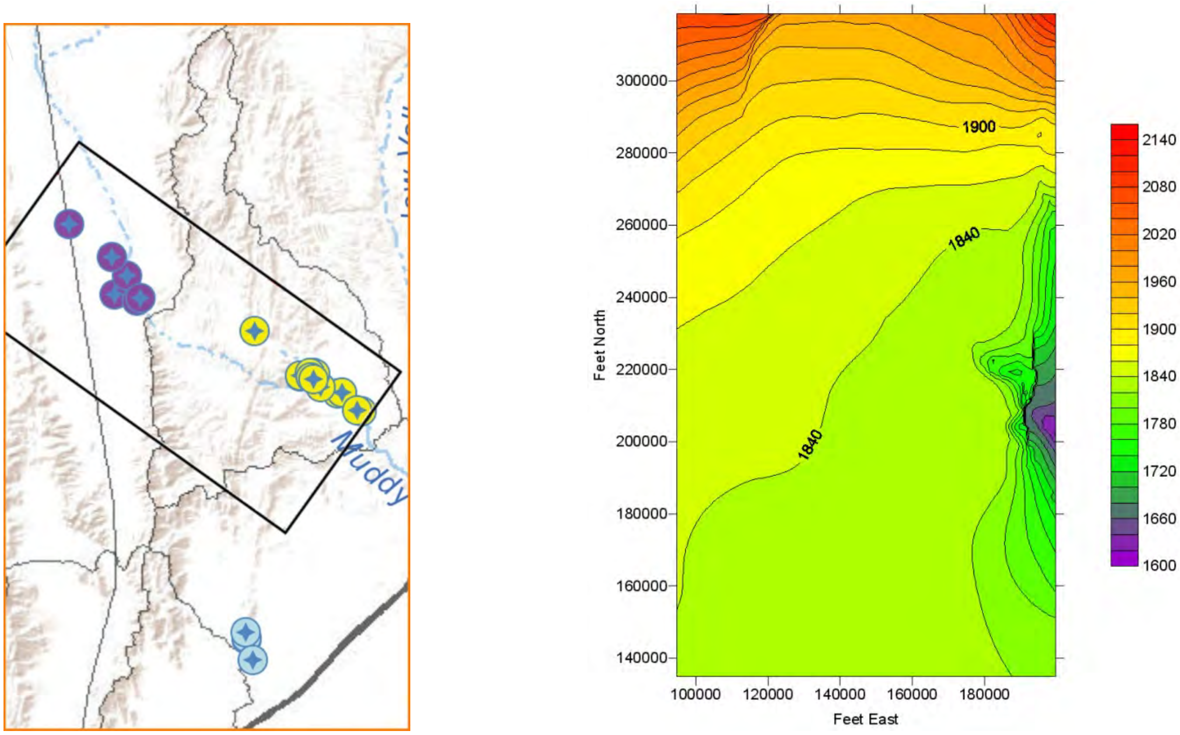

Figure 16. Water levels (feet AMSL) from Tetra Tech 1987 head-save file, used as initial condition for Order 1169 simulation [file WT1987.jpg]

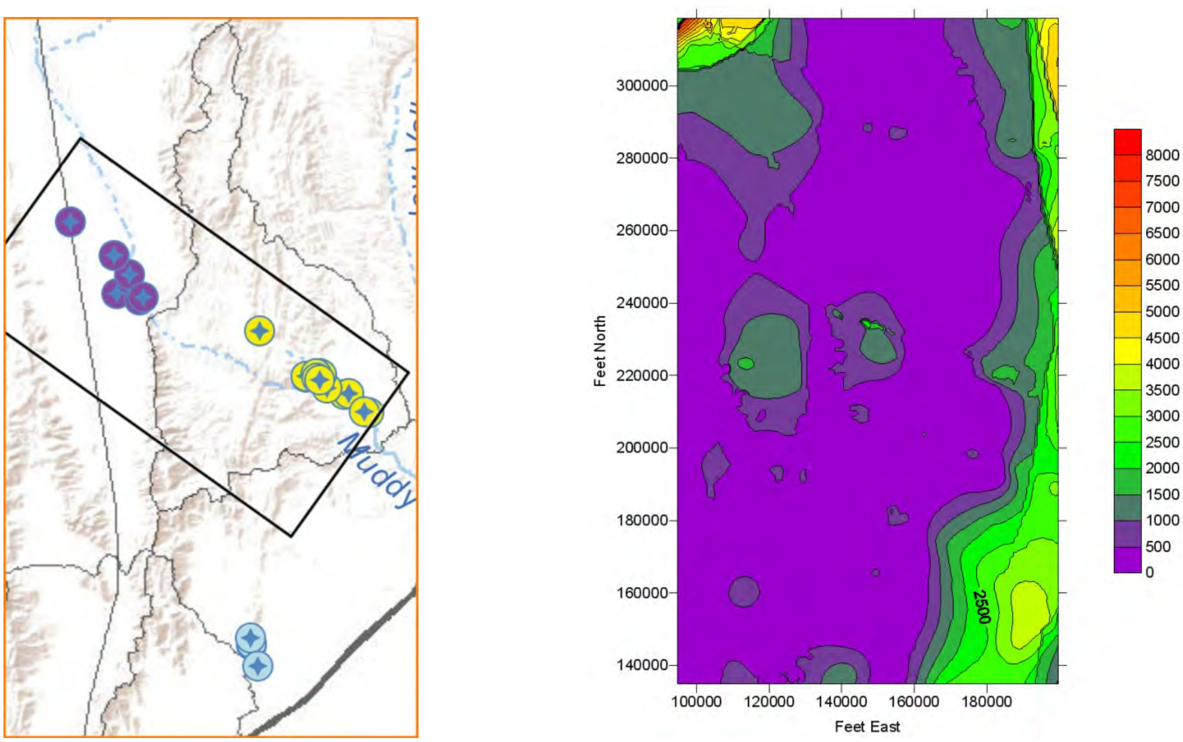

Figure 17. Depth of carbonate-aquifer unit PC4 top in feet below land surface [file DepthToPC4.jpg]

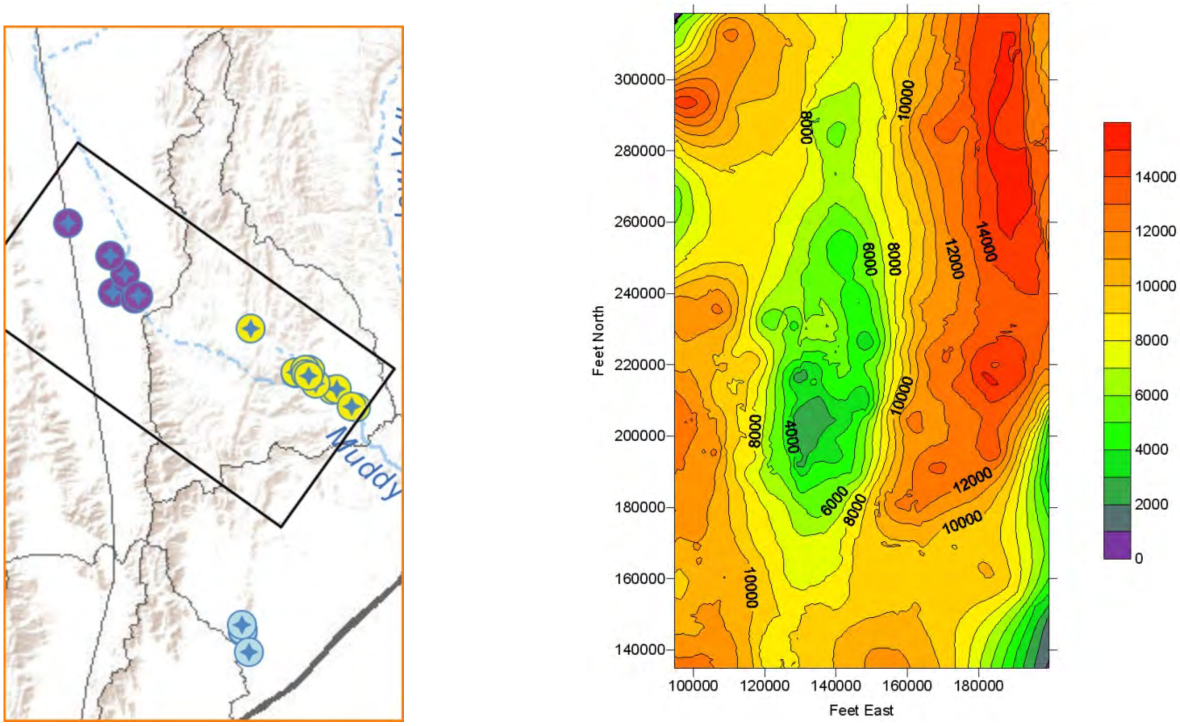

Figure 18. Saturated thickness (feet) of carbonate aquifer PC4 in the Tetra Tech model [file PC4satThickness.jpg]

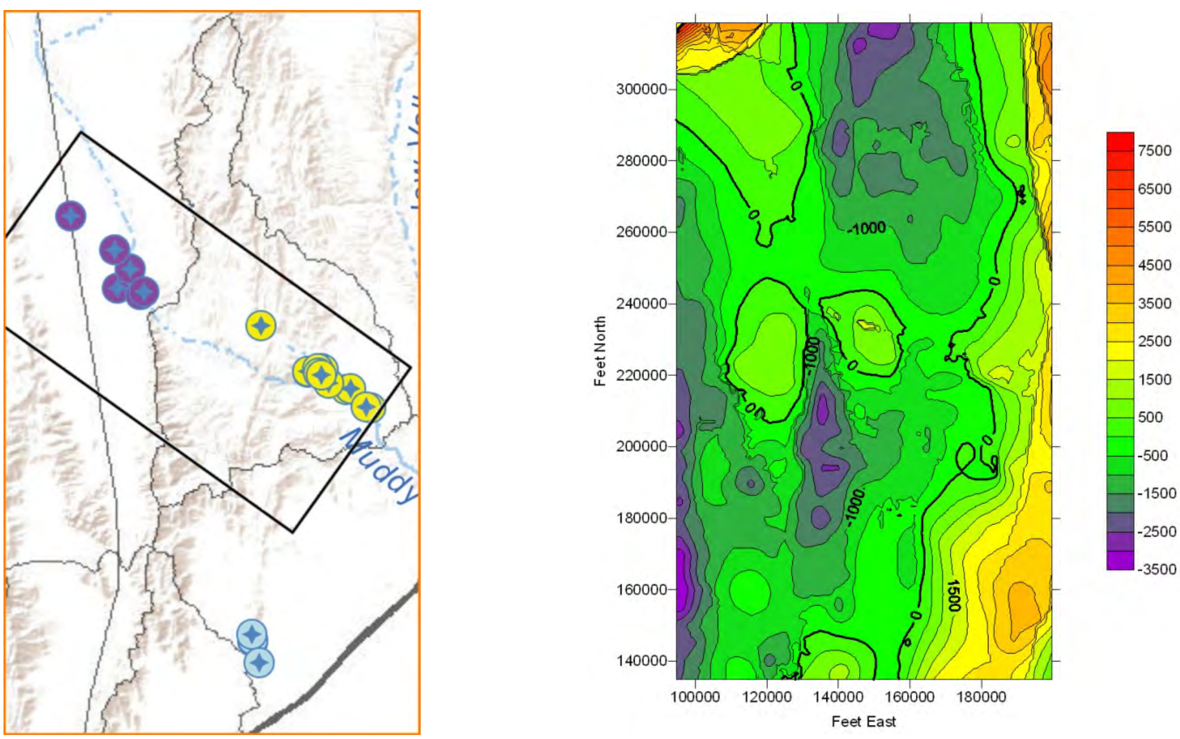

Figure 19. Confined and unconfined conditions (positive and negative values, respectively) obtained as the difference between 1987 water level and the top of the PC4 carbonate aquifer (feet AMSL) [file PC4confinement.jpg]

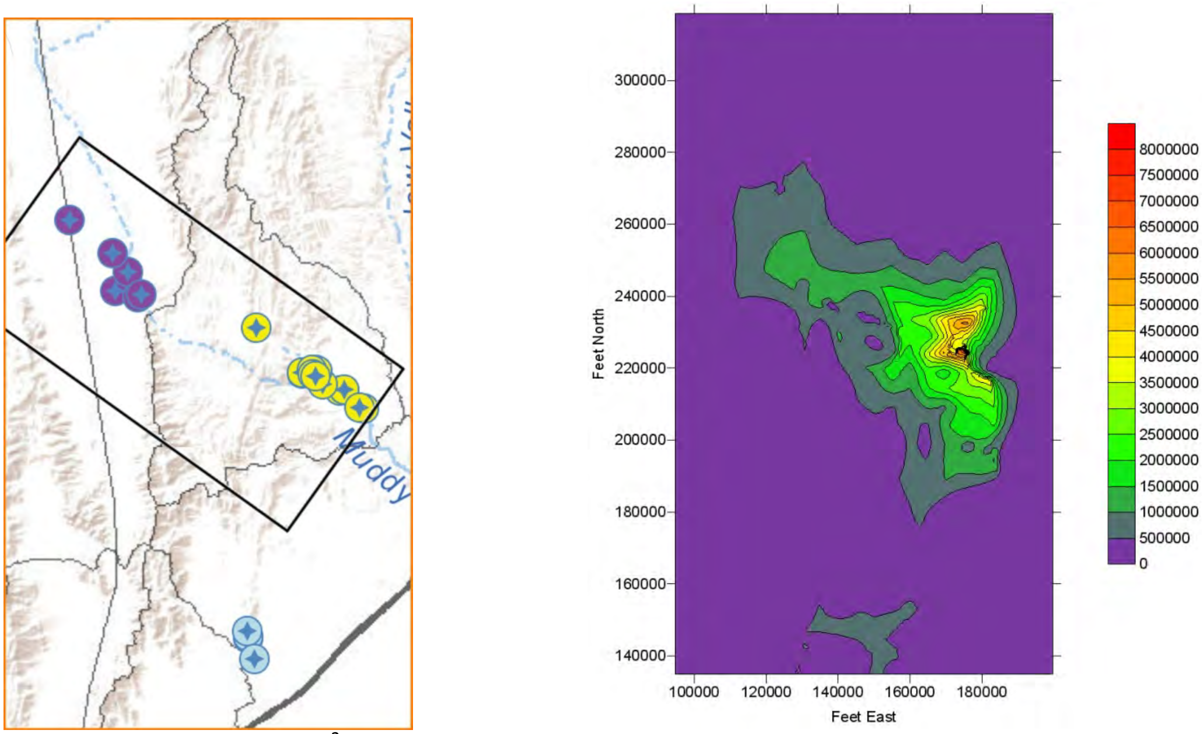

Figure 20. Transmissivity (ft^2/day) of the saturated portion of carbonate aquifer PC4 based on the Tetra Tech model for decreasing hydraulic conductivity with depth described on pages 27 and 40 and illustrated in Figure 5.1-2 of the Model Development report [file MAI_HRT20121115.pptx, Slide 12]

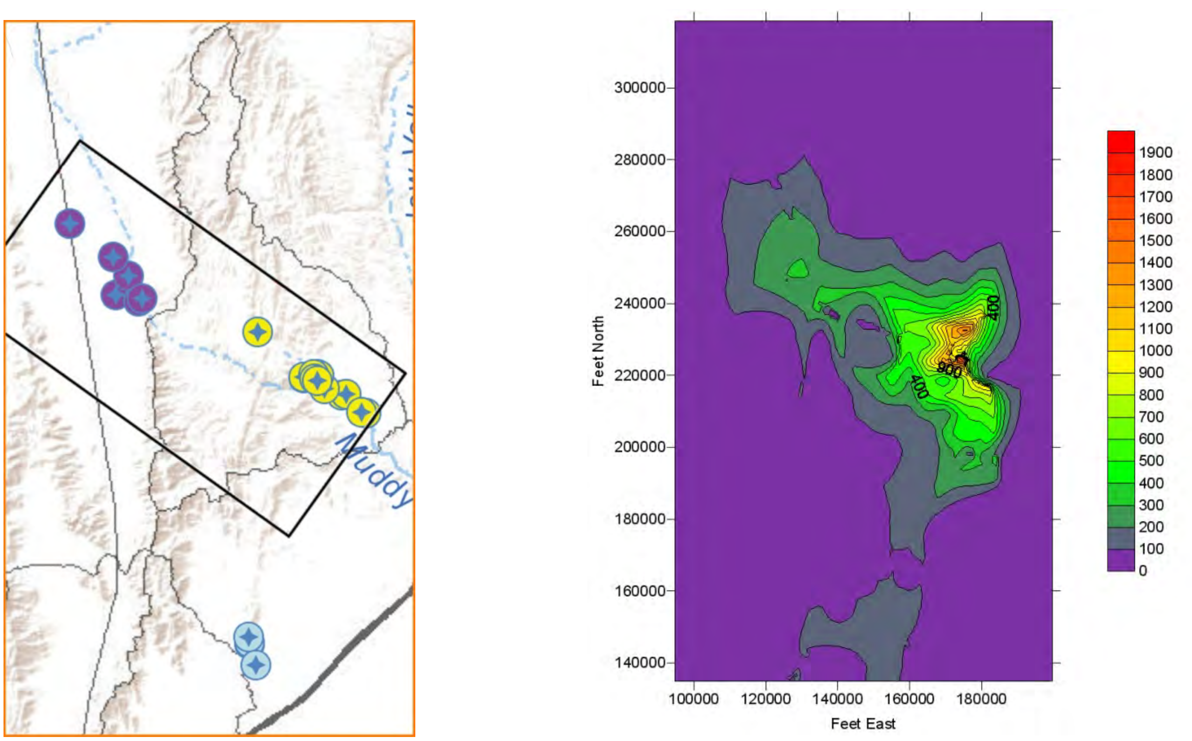

Figure 21. Equivalent hydraulic conductivity (ft/day) of the saturated portion of carbonate aquifer PC4 based on the Tetra Tech model for decreasing hydraulic conductivity with depth described on pages 27 and 40 and illustrated in Figure 5.1-2 of the Model Development report [file NewKxKy.jpg]

The Tetra Tech model under-predicts drawdowns at all locations where drawdowns have been resolved (confidently identified) after about one day. Tetra Tech's specific yield (0.02), derived by Johnson and others (2001) from aquifer testing in the Southern Flow Field, is 7X greater than estimated by Johnson and Mifflin (2012b) for the MX-5 area. The overall match to observations is improved by lowering the specific yield of the PC4 aquifer to 0.003, but pumping responses suggest that unrecognized horizontal flow barriers (HFBs) are present in the model domain, because at greater times more drawdown is observed than is predicted regardless of choice of specific yield.

The Tetra Tech model helps explain the lag of several months between pumping in Coyote Spring Valley and the expression of pumping effects as discharge reductions in the headwaters area (Mifflin & Associates, 2010; Johnson and Mifflin, 2011). The time constant of the impulse response function (time to reach 63.2% of the full impact of pumping) is about 4.5 months (Figure 24), likely due to the contribution from storage in the relatively large system domain that was modeled by Tetra Tech as compared to Johnson and Mifflin (2012b). When the model is run using the specific yield derived from near-field responses to MX-5 pumping, 0.003, the time constant is reduced to only about 21 days, consistent with the findings of Johnson and Mifflin (2012b) (Figure 25).

An important shortcoming of the Tetra Tech model is that it under-predicts Muddy River discharge near Moapa and over-predicts discharge near Glendale (Figure 26). In the words of the authors, "Note that the simulated flow at the gage near Moapa at the beginning of the predictive simulation (approximately 25 cfs) is approximately two-thirds of the observed flow (37 cfs in early 2010)…" (Tetra Tech, 2012b, p. 14). Also, "The average flow measured near Glendale in 2011 was also approximately 37 cfs, but the model simulates additional groundwater and surface water discharge (from Meadow Valley Wash) into the Muddy River upstream of the Glendale gage, producing a simulated flow of approximately 63 cfs at the gage." (Tetra Tech, 2012b, p. 15).

The Tetra Tech model is most sensitive to the specification of recharge: "The parameter with the greatest impact on water levels and discharge in the model is the recharge" (Tetra Tech, 2012a, p. 55). USGS records indicate that infiltration losses between the SR168 culvert and Moapa Gage are substantial during runoff events, though infiltration along ephemeral drainages is not represented in the Tetra Tech model. Routing a portion of recharge overland to Pahranagat Wash and allowing it to infiltrate there would partially solve the inconsistency between Moapa- and Glendale-gage records and observations. Subsurface diversion of recharge from Meadow Valley Wash to the west would require revision of the geologic model, perhaps by incorporating a detachment surface beneath the Meadow Valley Mountains

Tetra Tech's approach to model grid design is state-of-the art, though sparse physical-property data and conceptual uncertainty result in a model system that is extremely over-prescribed. The Model proved too complex for comprehensive review and validation, or for application to other scenarios of interest such as pumping in the Southern Flow Field. The Model distributes fluxes preferentially to upper portions of the system, in contrast to the Exhibit 54 model (LVVWD, 2001), which contained active flow zones at depths of up to 60,000 feet. Re-distribution of recharge would potentially solve the most salient shortcoming of the Tetra Tech model, its "miss" with respect to reproducing observed conditions along the Muddy River.

File RESAmericasEISv5.docx

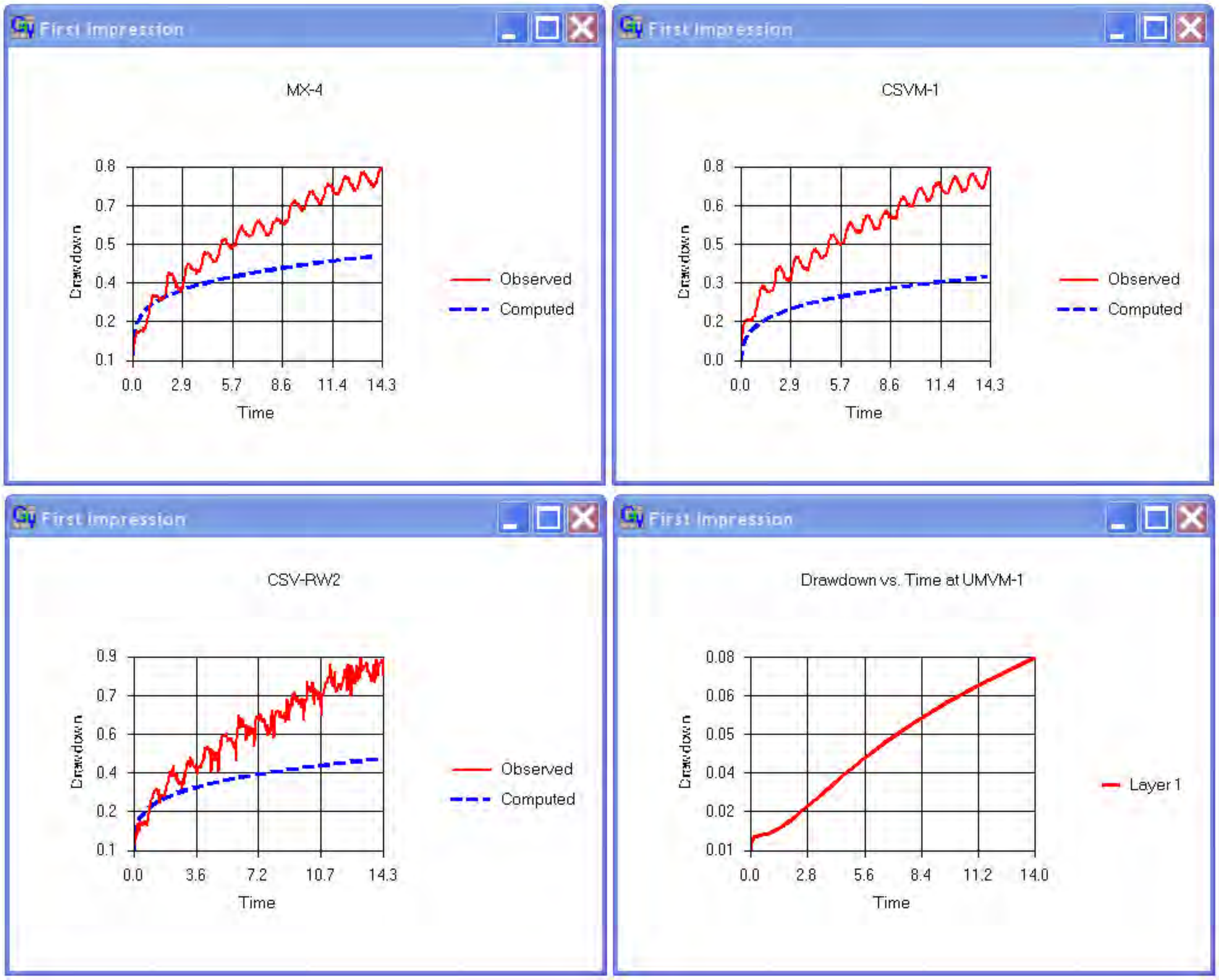

Figure 22. Predicted and observed drawdowns (feet) vs time (days) in response to April, 2012 re-start of MX-5, based on an unconfined PC4 aquifer with transmissivity equivalent to that in the Tetra Tech model, specific yield of 0.02, Storage Coefficient 0.0044, K_X,K_Y:K_Z anisotropy ratio of 40, and uniform 4000-foot thickness. [files New14dayHydrographs.jpg, screenshot from TetraTechReviewTR4.gwv; time-drawdown data from files MX4_Apr12response.xlsx; RW2responseAprMay12.xlsx, and CSVM1_RawP_2012.xlsx]

The Tetra Tech model is an important contribution to ongoing efforts to characterize the regional hydrology of southeastern Nevada, but relies on a proprietary version of MODFLOW that is not compatible with execution environments available to third-party reviewers. It is evident that aquifer-parameter distributions govern the timing of impacts to the Muddy River system, while boundary conditions govern their magnitude. The Model demonstrates that groundwater withdrawn from the Northern Flow Field is essentially capture of natural flux sustaining the Muddy River, setting the stage for a “perfect storm” with respect to currently-issued groundwater permits (in the up-gradient areas) and Nevada Water Law.

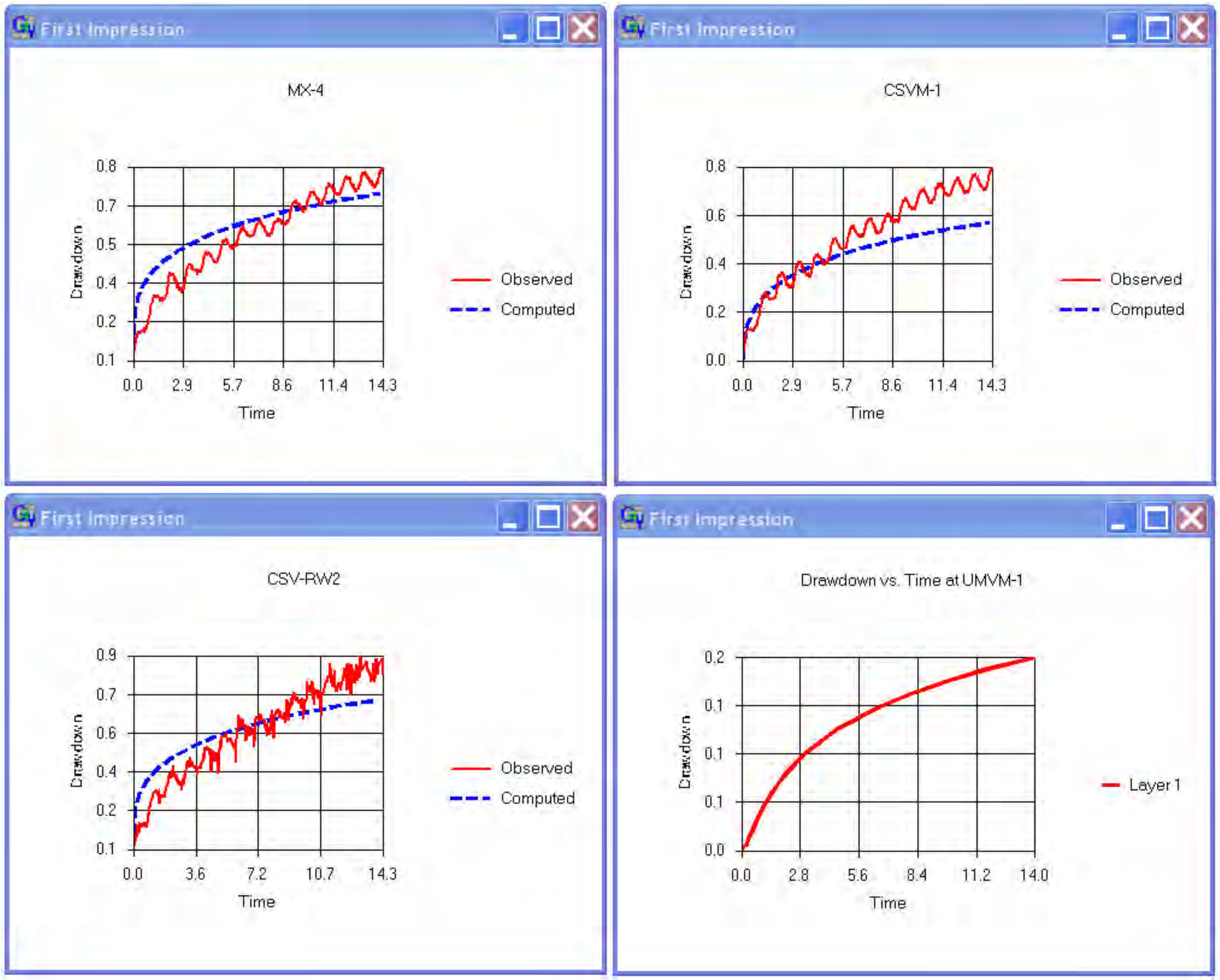

Figure 23. Effect of decreasing specific yield of the PC4 aquifer to 0.003, the value estimated by Johnson and Mifflin (2012b). Drawdowns in feet and times in days.

The Tetra Tech model offers the prospect of quantitatively evaluating the upwelling phenomena of the Southern Flow Field that best explain observed pumping response recorded during testing at ECP-1 in the year 2000 (Johnson and others, 2001; Mifflin and Johnson, 2005). However, until Tetra Tech releases their proprietary MODFLOW source code to developers of MODFLOW execution environments (such as Environmental Simulations, Inc.), and those developers upgrade their products (notably Groundwater Vistas) to incorporate depth-dependence of hydraulic conductivity into the modeling environment, widespread application of the Tetra Tech model will remain impractical.

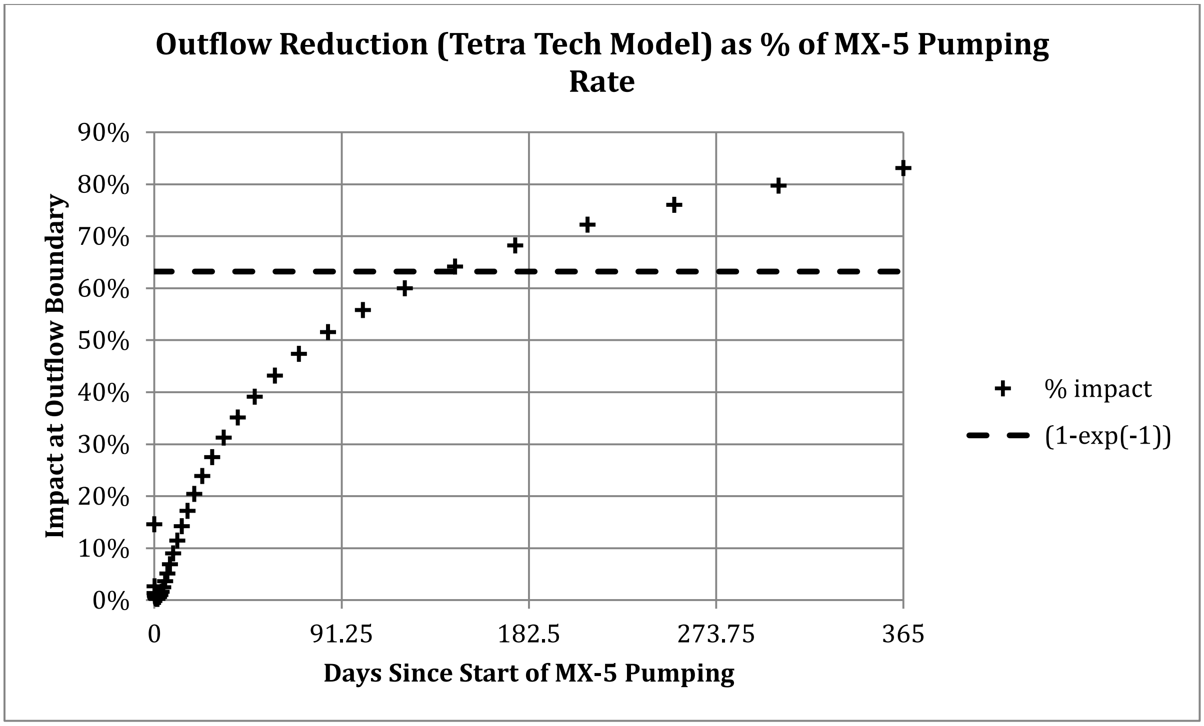

Figure 24. Time required for MX-5 diversions to be expressed as outflow reductions in the headwaters area. The quantity (1-exp(-1)) defines the time constant for the impulse response function, which in this model is about 4.5 months. [file 365dayCHBflux.xlsx, sheet 'NewKeq'; data from TetraTechReviewTR4.gwv]

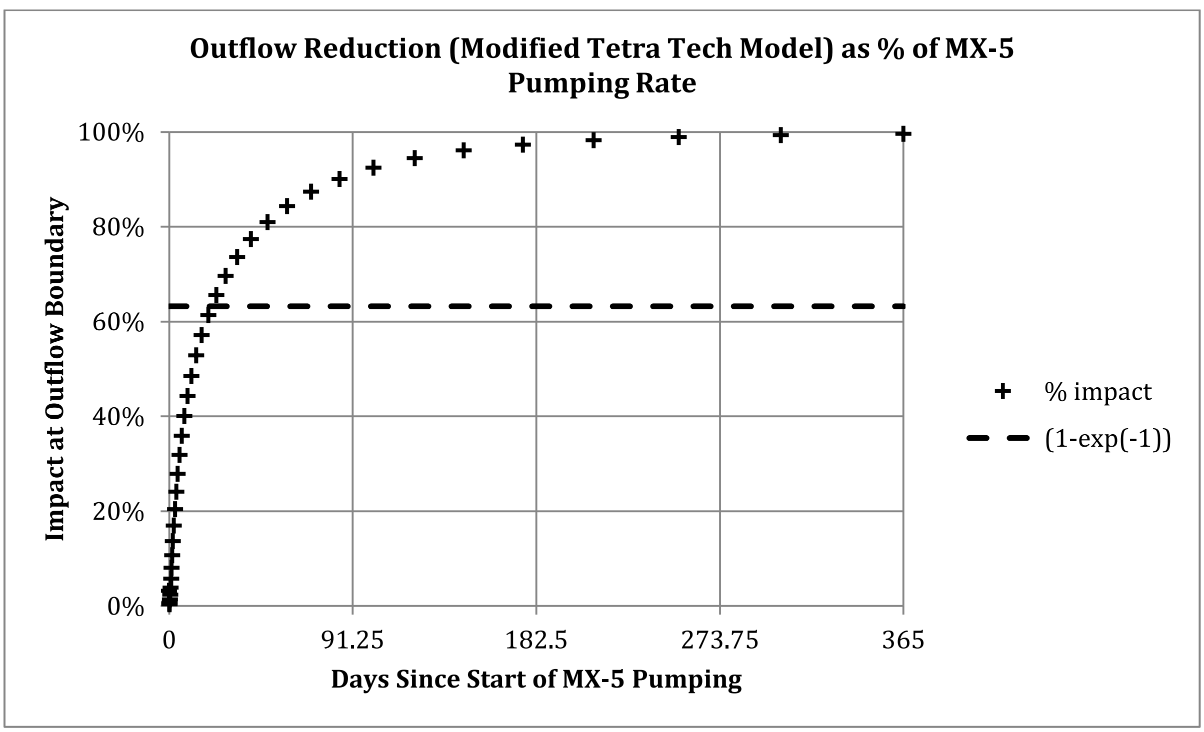

Figure 25. Effect of reducing the specific yield of the PC4 aquifer to 0.003, the value estimated by Johnson and Mifflin (2012b) [file 365dayCHBflux.xlsx, sheet 'ReduceSy'; data from TetraTechReviewTR4a.gwv]

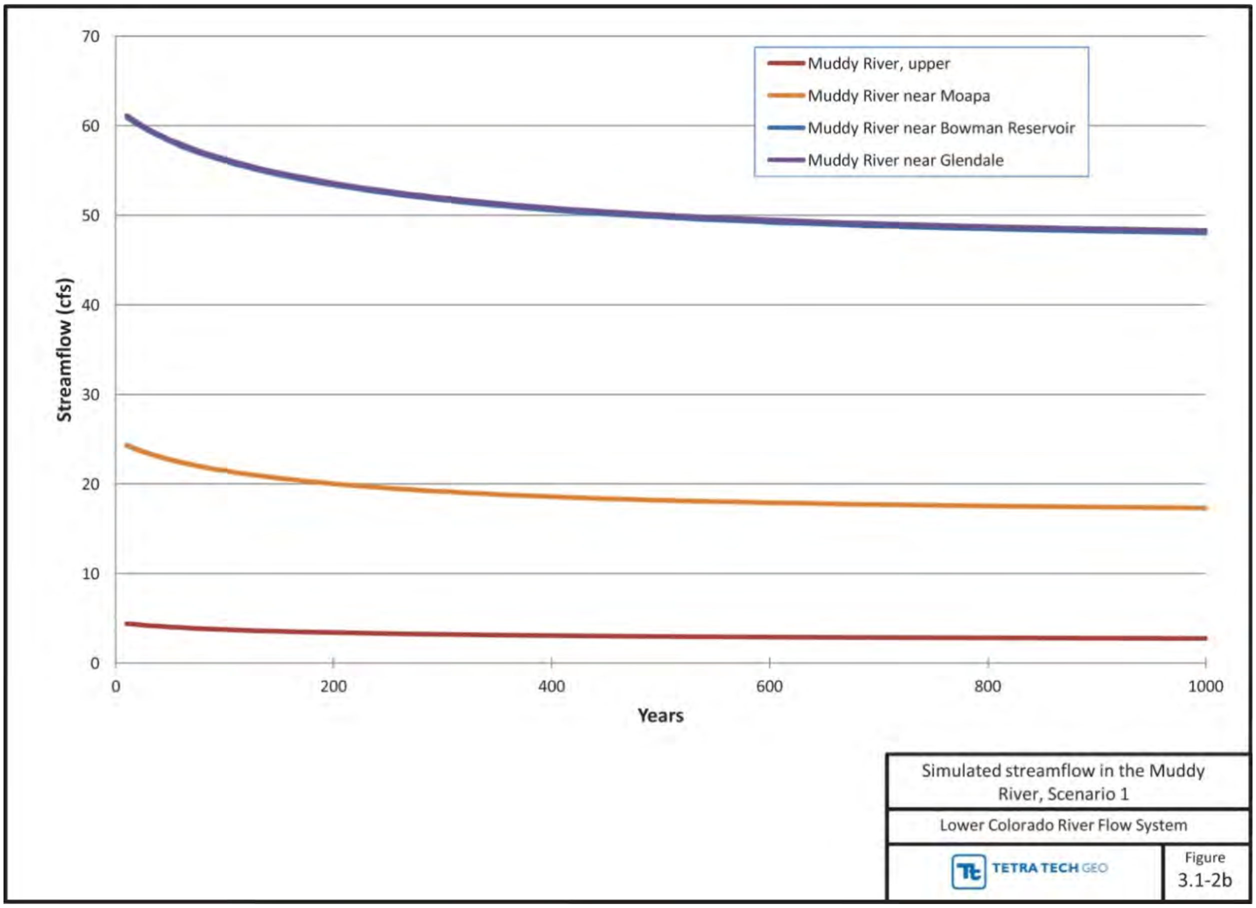

Figure 26. The Tetra Tech model under-predicts Muddy River discharge near Moapa and over-predicts discharge near Glendale

Implications for Monitoring

Regional monitoring-well records will eventually clarify the relative long-term impacts related to drought, pumpage, and exceptional wet years. From what has been observed since 1986 when comprehensive monitoring began in the Muddy River spring area and since 2000 when comprehensive monitoring began on the Reservation, two periods of drought (1987-1992 and 1998-2004) have ended with marked water-level recoveries in exceptionally wet years. Full recovery occurred in the Muddy River springs area in 1992-1993 after five years of net annual declines, and in the spring of 2005, after almost 7 years of strong drought and major annual net declines, about 50% of the drought-induced cumulative decline seems to have been eliminated.

These historic records of drought-induced declines and wet-year recoveries illustrate the complex nature of the water-level signals (fluctuation patterns) and highlight the analytical challenges, since pumping responses from any likely pattern of development in the Southern flow field are forecast to be smaller than the natural variability. Signal components attributable to pumping can be extracted from the background of natural "noise" attributable to barometric, tidal, and climatic effects by digital signal processing, but this requires a level of sophistication beyond standard practice for routine processing of monitoring records.

Modeling results (Figs. 4, 5, 7, 10, 12 and 13; Table 1) demonstrate that boundaries capable of delivering inflow in response to pumping-induced drawdown in the Project area markedly limit impacts. In general, induced-inflow zones are difficult to locate, but a well-defined cone of depression (as established by water-level monitoring) may demonstrate locations where induced inflow is supplementing groundwater storage and capture of basin outflow as the ultimate sources of Project water. Similarly, the linear extent and transmissive properties of the hydraulic barrier of Johnson and Mifflin (2003) is of continued interest, as these properties govern the time frame over which the barrier isolates exploitation impacts of the Northern and Southern flow fields.

During the Calpine study of 2000-2003, a five-well monitoring network for the carbonate aquifer was established on the Moapa Indian Reservation and equipped with continuous recorders. One of these systems, at well TH-2, provided uninterrupted hourly measurements of water level and barometric pressure from mid-2000 until mid-2005 (Fig. 27). This network has proved invaluable in providing the basic data needed to resolve fundamental relationships within the Southern flow field and between the Northern and Southern flow fields. Similarly, records of monthly diversions from upper Moapa Valley, Coyote Spring Valley, and gaging of the Muddy River have been instrumental in attributing losses from the Muddy River system to their origins.

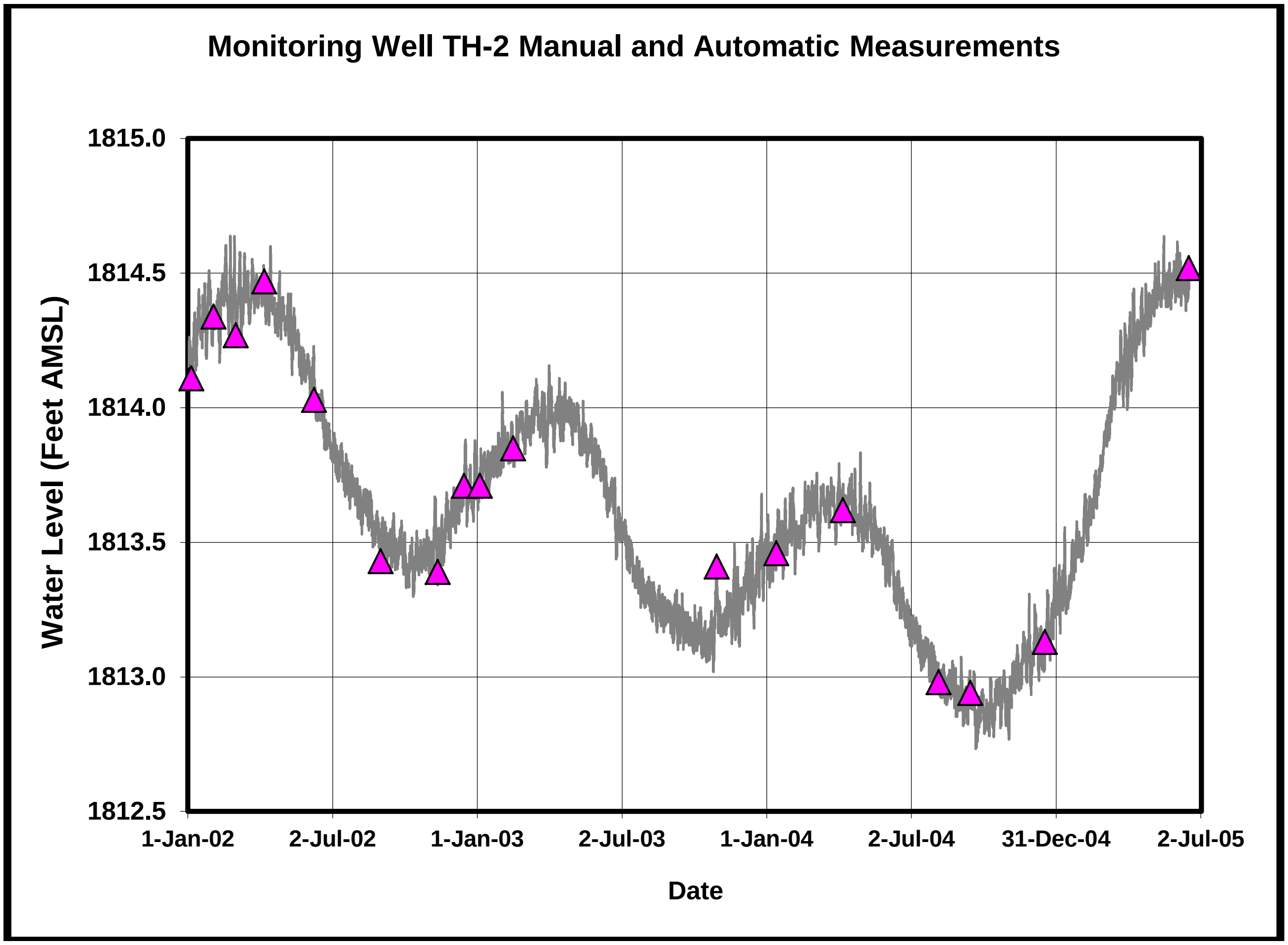

Figure 27. Long-term, drought-related decline in monitoring well TH-2, followed by recovery in the very wet spring of 2005.

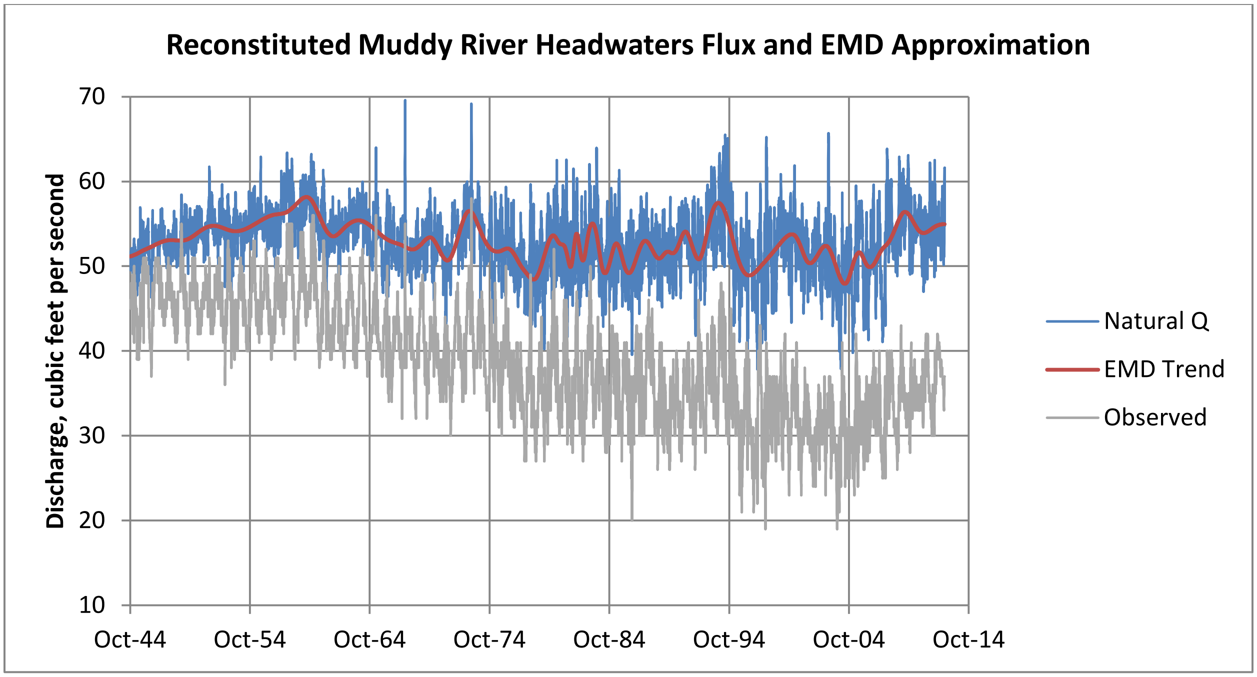

Figure 28. When the natural flux reaching the Muddy River headwaters area is reconstituted by accounting for evapotranspiration and all major diversions, a natural variation of ±9.7% (5.1 cfs) about the long-term average of 52.9 cfs is demonstrated. “EMD Trend” refers to the sum of low-frequency intrinsic modes of the daily hydrograph, extracted by empirical mode decomposition (EMD). [file ReconstSimple4.xlsx, sheet ‘ReconstMR4412EMD’]

An important Project monitoring objective is to establish early in the Project life cycle the extent to which induced inflow and the hydraulic barrier affect drawdowns in the Project area. In a seven-day aquifer test in 2000, drawdowns stabilized after only two days, consistent with either unconfined conditions or induced inflow from a nearby upwelling zone. It has not been possible to pinpoint or confirm the presence of such an upwelling zone, but north-trending faults of the Hogan Springs Fault Zone (Schmidt et al., 1996) that limit the eastern extent of Domain K1 (Fig. 2) could be regional flow conduits, and fossil spring deposits east of monitoring well TH-2 prove that groundwater discharge has occurred there in the past. If an upwelling zone is also supported by responses to prolonged pumping, such would greatly improve the accuracy of groundwater model forecasts in the Project area. Comprehensive groundwater monitoring, designed to establish spatial *and* temporal trends of water levels in and near the Project area, will lead to an in-depth understanding of the effects of pumping on regional water levels. The time at which a “crossover” in relative importance between the known hydraulic barrier and any induced inflows occurs will depend on the length and permeability of the barrier, the distance to “constant head” zones where inflow may occur, and other factors. The integrated program of monitoring and groundwater modeling will lead to a refined conceptual model from the current set of alternative models, based on monitoring records that most closely approximate model predictions.

Conclusions

A Project pumping stress of up to 800 afy will produce very small impacts in terms of water-level decline or springflow reductions, even after 75 years of pumping. Databases and analyses allow several credible conceptual models, which in turn influence the magnitudes of those small projected impacts in the Muddy River springs area. All scenarios, however, yield very small impacts, within the range of natural variations of water level and spring discharge. It is important to note that the model-forecasted impacts for the various scenarios are theoretical, and that natural stresses of larger magnitude and operating at shorter time scales will conceal any Project effects.

The cumulative impacts from up to 2500 afy in California Wash basin are, at least theoretically, approaching a level of pumpage that might produce minor impacts over the 75-year Project life cycle in the most conservative (unfavorable) scenarios, with flow reductions approaching 6% of year-2001 Muddy River discharge or less than 5% of the natural flux to the headwaters area (Figure 28). Again, this is well within the >9% range of natural variations and uncertainty in individual surface-water flow measurements. In other words, the forecasted cumulative impacts for the worst-case scenario would still not be large enough after 75 years to be confidently measured or recognized as decreased spring or river flows. Conversely, flow reductions of the order of 6%, which might be detectable by long-term monitoring, would not be attributable to a specific cause without an appropriate theoretical framework (based on monitoring and modeling) in place to evaluate the hydrologic system. Experience indicates that a pumping stress of the order of the full 2500 afy will be required to generate responses that are useful in regional analyses, and anything less will be rendered "invisible" by natural system noise.

A recent analysis by Johnson and Mifflin (2013) suggests the annual periodicity shared by well hydrographs (e.g. Figures 5 and 27) throughout the Arrow Canyon Range Cell of the Carbonate-Rock Aquifer (Mifflin, 1992) is sub-regional in nature and may be related to annual water loading and unloading in the Lake Mead basin. There appears to be propagation of a loading signal from southeast to northwest, accompanied by lag and attenuation that would be forcing from the southeast. The characteristic seasonality is absent in Carbonate-Rock Aquifer monitoring localities 100 miles (160 km) to the north and 100 miles to the west, and is far too large to be accounted for by barometric or tidal forcing. This evidence should dispel the notion that pumping effects from the Apex and Muddy River headwaters areas are being propagated northward and southward, respectively, through an aquifer with nearly infinite hydraulic diffusivity. At present it appears that it may be necessary to account for the poroelastic effects described by Cavalié and others (2007) in any comprehensive analysis.

Key Database Sources

In a comprehensive (regional) study such as this, databases and analyses that have been considered are voluminous, and can not be readily incorporated into the reporting. The Bibliography that follows incorporates references either cited or otherwise useful. Hydrogeochemistry (water chemistry and isotopic data bases), apart from water-level databases, constitute the most useful data for regional studies of the carbonate aquifer. Thomas et al. (2001) provided the most comprehensive compilation to date, with only the more limited and recent (2002-2013) information from SNWA monitoring wells in Coyote Spring Valley not included. The interested reader may obtain access to the SNWA Central Data Repository online at www.snwawatershed.org/portal. A user name and password are required for access, and may be obtained by contacting the SNWA database administrator, Lisa Atwood, at (702) 862-3790.

Prior to these compilations, the Mifflin & Associates, Inc. study (Johnson et al., 2001) , published as Appendix D of the Moapa Paiute Energy Center Draft EIS and Supplemental Draft EIS (U.S. Bureau of Indian Affairs and U.S. Bureau of Land Management, 2001), contained the following databases and analyses as appendices:

A. ECP-1 aquifer tests summary report;
B. Geochemical and isotopic data for the Arrow Canyon Range Cell and surrounding areas;
C. Horizontal and vertical elevation control and water levels for carbonate-rock and associated wells located in the Apex, California Wash, Hidden Valley, Coyote Spring Valley, and Moapa areas;
D. Nevada State Engineer hydrographic basin abstracts of active water rights status, current through 8/17/00;
E. Monitoring plan, Moapa Band of Paiute Indians;
F. Summary of groundwater development impacts in the upper Moapa Valley, Nevada.

Since these data have been published and are in the public domain, they are not reproduced herein.

In addition to these sources, the annually-published U.S. Geological Survey "Water Resources Data – Nevada" contains streamflow records for the Muddy River and outflow channels of selected springs in the Muddy River springs area. Historical records for daily flows of the Muddy River at the Warm Springs Road gage are available online at http://nwis.waterdata.usgs.gov/nv/nwis/discharge/?site_no=09416000.

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Appendix A: Stable Isotope Discussion

Trace quantities of the stable (non-radioactive) isotopes hydrogen-2 (deuterium, or "D") and oxygen-18 ("O-18") in the water molecule are natural tracers of groundwater recharge areas, flow paths, and mixing relations. The isotopic composition of a water sample is expressed as "per mil" difference from a standard such as Standard Mean Ocean Water (SMOW); per mil is analogous to percent, but represents parts per thousand. Nearly all terrestrial and meteoric waters are isotopically "depleted" with respect to SMOW, because evaporation from the ocean and precipitation as rain or snow tend to leave deuterium and O-18 behind, first in the ocean and then in the cloud. The higher the latitude or the altitude where the rain or snow falls, the "lighter" it tends to be isotopically. The values presented in tables and charts of stable isotope relations are therefore almost always negative numbers.

Thomas et al. (2001) provided a compilation of stable isotope data from the southeastern Nevada region, that has been supplemented in recent years by new analyses from Coyote Spring Valley monitoring wells drilled by the Las Vegas Valley Water District and Southern Nevada Water Authority (Fig. A1). Excluding roughly 7% of the samples that constitute outliers (highly evaporated or reflecting experimental error), a very good correlation between D and O-18 is evident. At the lower left end of the linear cluster of points are the waters from the cooler climates of northern basins, likely containing a component of water recharged during a pluvial climate over ten thousand years ago. At the other end of the cluster are waters of the southern basins and local mountain springs that are subject to more evaporation in the locations where they are found.

Samples from the vicinity of the Moapa Indian Reservation plot near the center of the linear cluster of points, which suggests they may be mixtures of end-member waters. Several investigators (Kirk and Campana, 1990; Thomas et al. 1996, 2001) have explored complex mixing relations but their studies suffer from the absence of well-defined mixing end-members and therefore are inconclusive for that principal reason.

Samples from Belly Tank Flat (the Project area) have lighter O-18 compositions than others from the local area plotted on the Figure A1 inset. Temperatures during drilling and testing of ECP-1 were uniformly near 31 deg C, and TDS is near 1000 mg/l. Though chemically quite different, the possibility exists that Project area waters have affinities with Coyote Spring Valley samples CSVM-2 and CSVM-5 because their isotopic compositions plot parallel to and above the regression line of Figure A1.

Well CSVM-5 is located at the southwestern edge of Coyote Spring Valley, in Elbow Canyon at the north end of the Las Vegas Range. CSVM-5 water is relatively dilute and its isotopic composition relatively heavy, suggesting a modern local recharge component. The TDS of 11 samples collected while drilling this hole averages 320 mg/l, with no vertical trends evident in the profile. CSVM-5 water is cool, 23.4 deg C (average of 4 samples). The static water level of 2045 feet AMSL further suggests local recharge, and there has been recovery of about a foot over the past two years.

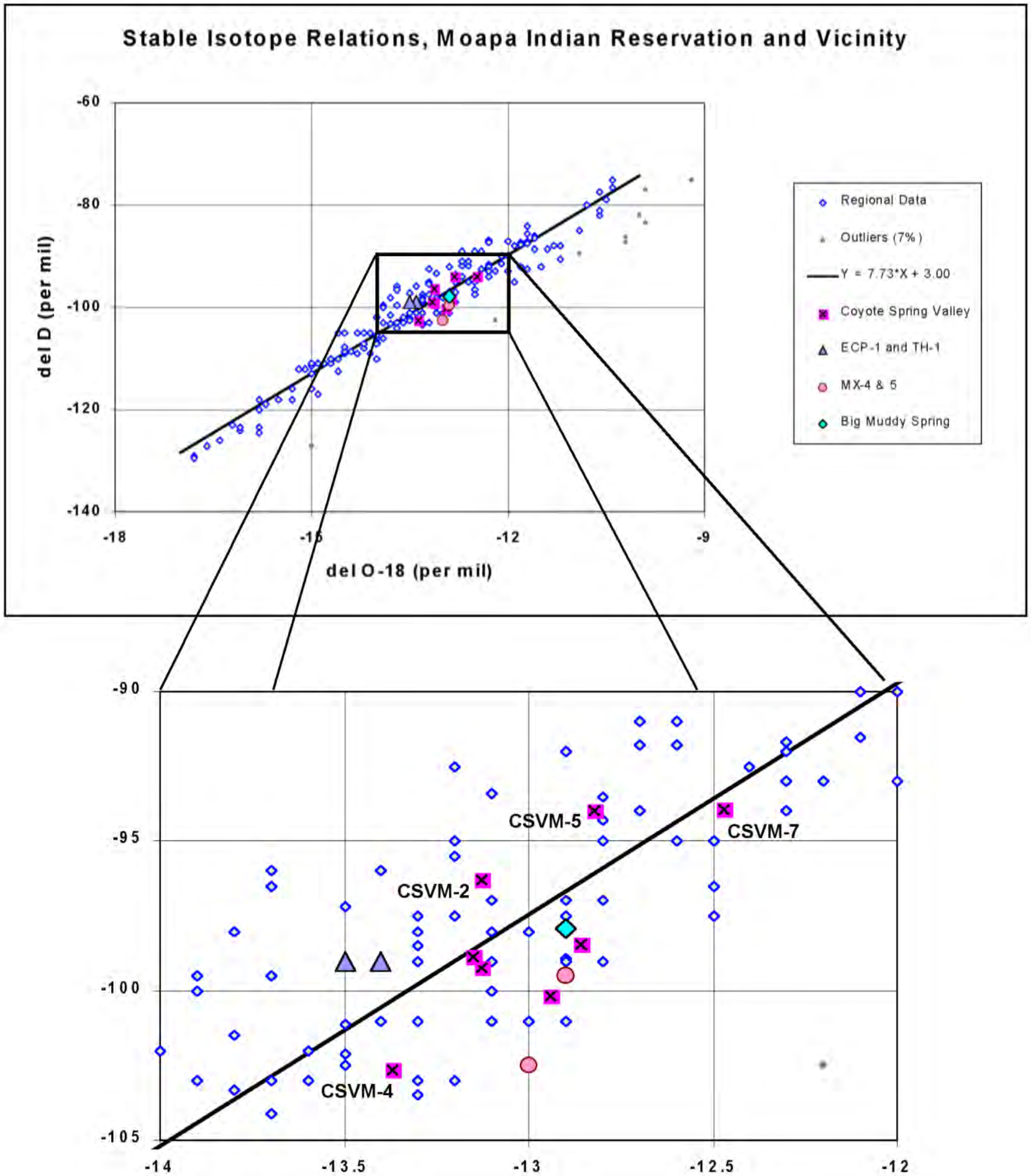


Figure A1. Stable isotope data from the southeastern Nevada region, highlighting the relationships among samples from the Ash Grove Project area.

Well CSVM-2 is in South Pass, near US93 at the far south end of Coyote Spring Valley. The water level in CSVM-2 is 1825 feet, having recovered about two feet over the past two years of monitoring. Field temperature data are not available. The uppermost waters in this hole have TDS under 500 mg/l, those deep in the hole over 600 mg/l. The isotopic composition of a composite sample is intermediate between CSVM-5 and the Belly Tank Flat waters.

The relations at CSVM-2 suggest stratification and incomplete mixing of locally-derived waters (represented by CSVM-5) with regionally-derived waters (represented by the ECP-wells in Belly Tank Flat). Whether or not these locally-derived waters are affected by the hydraulic barrier of Johnson and Mifflin (2003) remains unknown, but we now recognize the possibility of an overprint of the chemical and isotopic signature of locally-derived waters in the upper levels of the carbonate aquifers, particularly in Coyote Spring Valley.

The regionally-derived end-member of Northern flow field waters may have been sampled in CSVM-4, a new monitoring well in northeastern Coyote Spring Valley south of Kane Springs Wash. This hole displays 36.8-degree C water containing 4.74 mg/l fluoride. It has not responded to short-term climatic effects, with water levels fluctuating less than a foot from 1874 ft AMSL over the two years of record. The TDS is 476 mg/l. The isotopic composition of this water is the most depleted of the Coyote Spring Valley samples.

At the other end of the Coyote Spring Valley spectrum is CSVM-7, completed in Pahranagat Wash alluvium at the far north end of Coyote Spring Valley. The relatively high water level of 2246 feet AMSL has risen about a foot over the past two years. The water is cool (23.6 deg C) with a TDS of 530 mg/l and a fluoride concentration of 1.04 mg/l. It is unlikely that this water contains a significant component of regional discharge from Pahranagat Valley, being so dissimilar chemically and isotopically to the Pahranagat Valley springs. These relationships reinforce our contention that the Muddy River springs' discharge can not be dominated by underflow from Pahranagat Valley, as postulated by Eakin (1966), but is more likely dominated by underflow from upper Meadow Valley Wash (Panaca Valley) along the general trend of the Delamar Thrust Fault.

APPENDIX B. Features and properties of the analytic element model (from Figure 3)

Far-field controls		
F1	Corn Creek to Las Vegas	Specified heads 892 to 652 m
F2	Divide Well to Cow Camp	Specified heads 895 to 867 m
F3	Pahranagat Valley	Specified heads 1100 to 900 m
F4	Upper Meadow Valley Wash	Specified heads 1500 to 1300 m
F5	Virgin River	Specified heads 500 to 450 m
F6	Colorado River	Specified heads 250 to 200 m
Inhomogeneities		
K0	Far-field zone	K=0.064 m/day, obtained by calibration
K1	Southern flow field	K=6.1 m/day from 7-day aquifer test reported by Johnson et al. (2001). Bounded on south and west by Las Vegas Shear Zone and Gass Peak Thrust, respectively (Longwell et al., 1965); on north by sub-regional hydraulic barrier described by Johnson and Mifflin (2003 and this report), and on east by down-faulted Tertiary (K0) sediments of California Wash (Johnson et al., 1986; Langenheim et al., 2001,2002)
K2	Northern flow field	K=12.2 m/day, obtained by calibration. Bounded on west by Gass Peak Thrust, on north by Menard Lake Fault, and on east by Delamar Mountains Thrust and fold belt (Tschanz and Pampeyan, 1970).
K3	Arrow Canyon zone	K=36.6 m/day from analysis of seasonal pumping response, 1997-2001 (Johnson and Mifflin, 2003 and this report). Bounded on west by normal fault on west side of Arrow Canyon Range.
K4	Glendale cell	K=5.5 m/day, obtained by calibration. Isotopic data reviewed by Pohlmann et al. (1998).
Near-Field Discharge		
H1	Muddy River springs	Specified heads 536 to 530 m, hydraulic resistance 1.35 days
H2	Rogers / Blue Point Springs	Specified heads 488 to 463 m, hydraulic resistance 2.7 days
H3	Southern receptor zone	Specified heads 450 to 396 m at south end along Las Vegas Wash, hydraulic resistance 2 days
No-flow barriers		
B1	Las Vegas Shear Zone	Accounts for large hydraulic gradient between Southern flow field (K1) and Las Vegas Valley, and absence of candidate outflow component in Las Vegas Valley groundwater (Johnson et al., 2001)
B2	Kane Springs Wash Fault	Diverts flow from north around area of exposed basement rock in Mormon Mountains (Tschanz and Pampeyan, 1970); southwestward extension in Coyote Spring Valley required to fit VF-2 and CSV-3 water levels (Figure 3).
B3	Weiser Syncline	Continuous feature per Axen et al. (1990), bent and rotated clockwise at northern end by Moapa Peak Shear Zone; required to match EH-3 and EH-7 water levels (Figure 3)
Recharge		
R1	Sheep Range	0.7 cm/yr in forested highlands, by calibration. Recharge area encompasses 420 km^2, total 2.94 x 10^6 m^3/yr (2380 acre-ft/yr). Previous estimates include 2,000 acre-ft/yr (Eakin, 1966), 5,000 to 6,000 acre-ft/yr (Kirk and Campana, 1990) and 14,000 acre-ft/yr (Thomas et al., 1996).

Appendix G

Jurisdictional Waters Determination

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO CA 95814-2922

REPLY TO
ATTENTION OF

February 16, 2011

Regulatory Division (SPK-2010-01033-SG)

Mr. James Diven
RES America Developments
11101 West 120th Avenue
Broomfield, Colorado 80021

Dear Mr. Diven:

We are responding to your August 16, 2010 request for an approved jurisdictional determination for the Moapa Solar Project. The approximately 1600-acre site is located near Apex, in Section 10, Township 64 South, Range 64 East, Mount Diablo Meridian, Latitude 36.4819°, Longitude -114.8617°, Moapa, Clark County, Nevada.

The 4.44-acres of waters identified on the enclosed Figure1drawings, titled Wetlands and Waters Map, and the drawing labeled Figure 2, from the document titled: **"Moapa Solar Energy Project Site, Clark County, Nevada Request for Jurisdictional Determination,"** are intrastate isolated waters with no apparent interstate or foreign commerce connection. As such, these waters are not currently regulated by the Corps of Engineers. This disclaimer of jurisdiction is only for Section 404 of the Federal Clean Water Act. Other Federal, State, and local laws may apply to your activities. *In particular, you may need authorization from the U.S. Fish and Wildlife Service.*

This verification is valid for five years from the date of this letter, unless new information warrants revision of the determination before the expiration date. This letter contains an approved jurisdictional determination for your subject site. If you object to this determination, you may request an administrative appeal under Corps regulations at 33 CFR Part 331.

A combination Notification of Appeal Process and Request for Appeal (appeal request) form is enclosed. If you request to appeal this determination, you must submit a completed appeal request form to the South Pacific Division Office at the following address: Administrative Appeal Review Officer, Army Corps of Engineers, South Pacific Division, CESPD-PDS-O, 1455 Market Street, San Francisco, California 94103-1399, Telephone: 415-503-6574, FAX: 415-503-6646.

In order for an appeal request to be accepted by the Corps, the Corps must determine that it is complete, that it meets the criteria for appeal under 33 CFR Part 331.5, and that it has been received by the Division Office within 60 days of the Notification of Appeal Process. Should you decide to submit an appeal request form, it must be received at the above address by 60 days from the date of this letter. It is not necessary to submit an appeal form to the Division Office if you do not object to the determination in this letter.

You should provide a copy of this letter and notice to all other affected parties, including any individual who has an identifiable and substantial legal interest in the property.

This determination has been conducted to identify the limits of Corps of Engineers' Clean Water Act jurisdiction for the particular site identified in this request. This determination may not be valid for the wetland conservation provisions of the Food Security Act of 1985. If you or your tenant are US Department of Agriculture (USDA) program participants, or anticipate participation in USDA programs, you should request a certified wetland determination from the local office of the Natural Resources Conservation Service prior to starting work.

We appreciate feedback. At your earliest convenience, please tell us how we are doing by completing our *Customer Service Survey:* *http://per2.nwp.usace.army.mil/survey.html.* Please select the Sacramento District and St. George Utah field location in the lower portion of the survey.

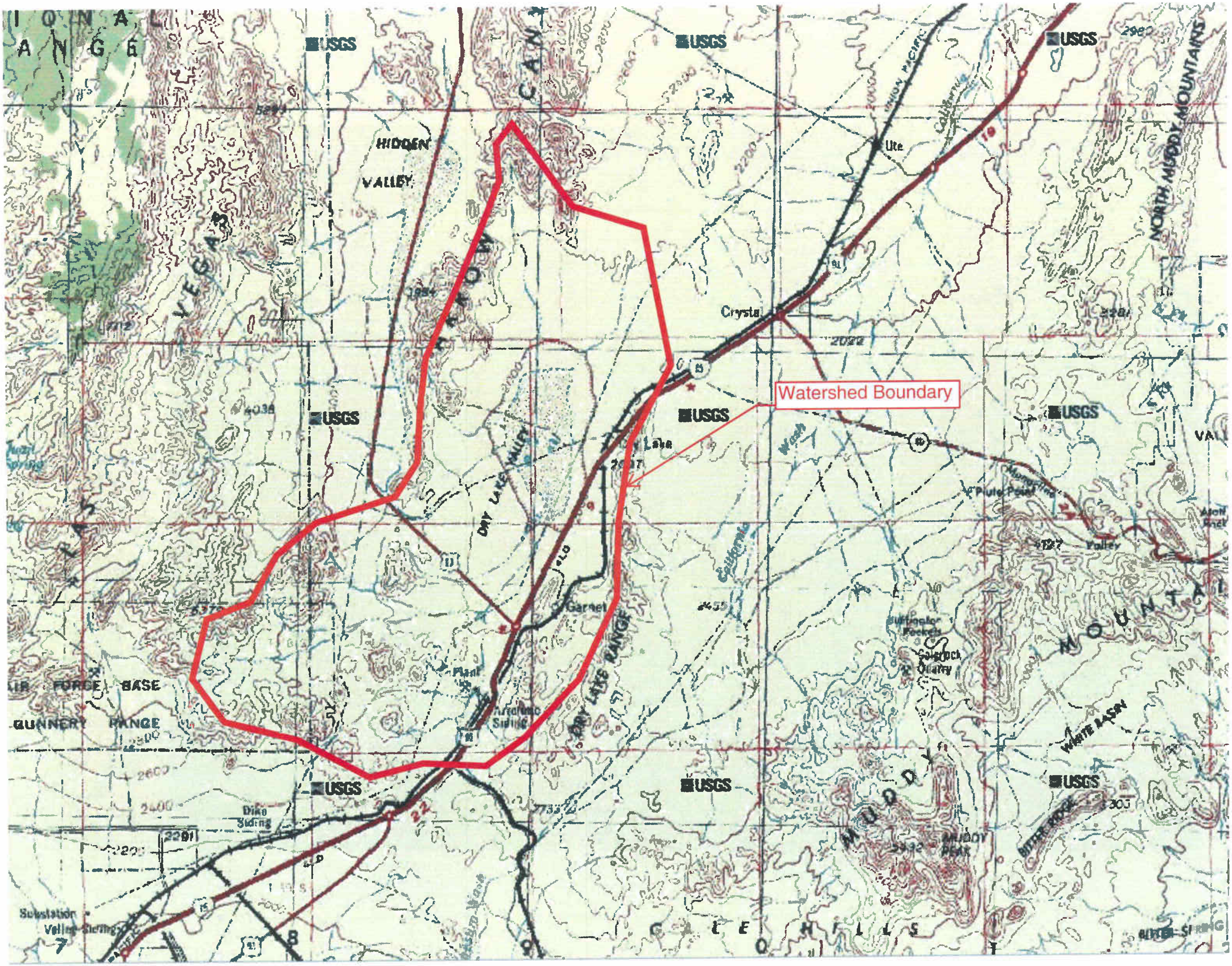
Please refer to identification number SPK-2010-01033-SG in any correspondence concerning this project. If you have any questions, please contact Patricia McQueary, at 321 North Mall Drive, Suite L-101, St. George, Utah 84790, telephone 435-986-3979, or email *Patricia.L.McQueary@usace.army.mil.* For more information regarding our program, please visit our website at *www.spk.usace.army.mil/regulatory.html.*

Sincerely,

FOR

Jason A. Gipson
Chief, Nevada-Utah Regulatory Branch
Sacramento District

Enclosures



Watershed Boundary
HIDDEN
VALLEY
DRY LAKE VALLEY
DRY LAKE RANGE
Crystal
Ute
Garnet
Apex
NORTH MUDDY MOUNTAINS
MUDDY
MUDDY PEAK
MOUNTAIN
WHITE BASIN
BITTER RIDGE
AIR FORCE BASE
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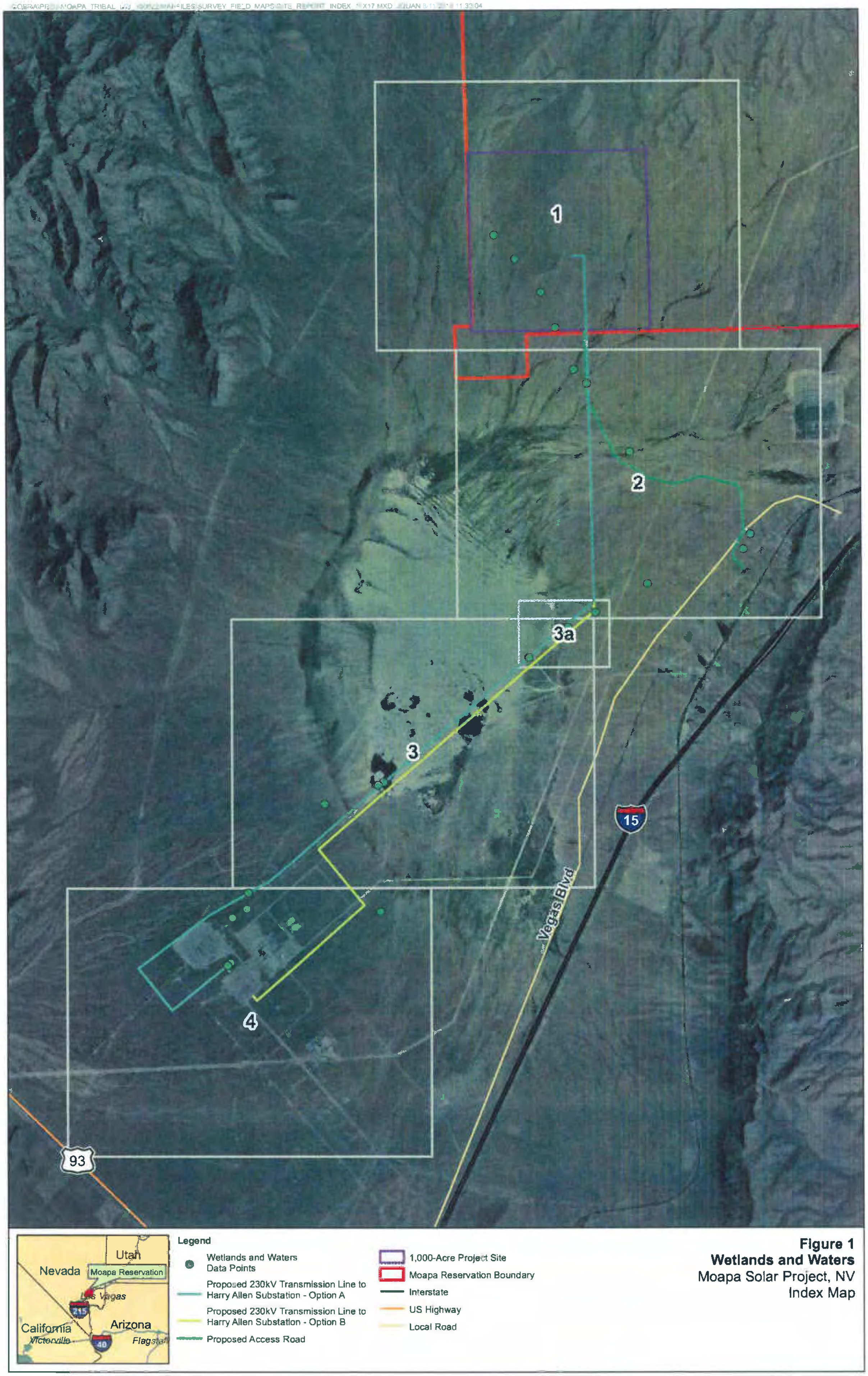

Figure 1
Wetlands and Waters
Moapa Solar Project, NV
Index Map

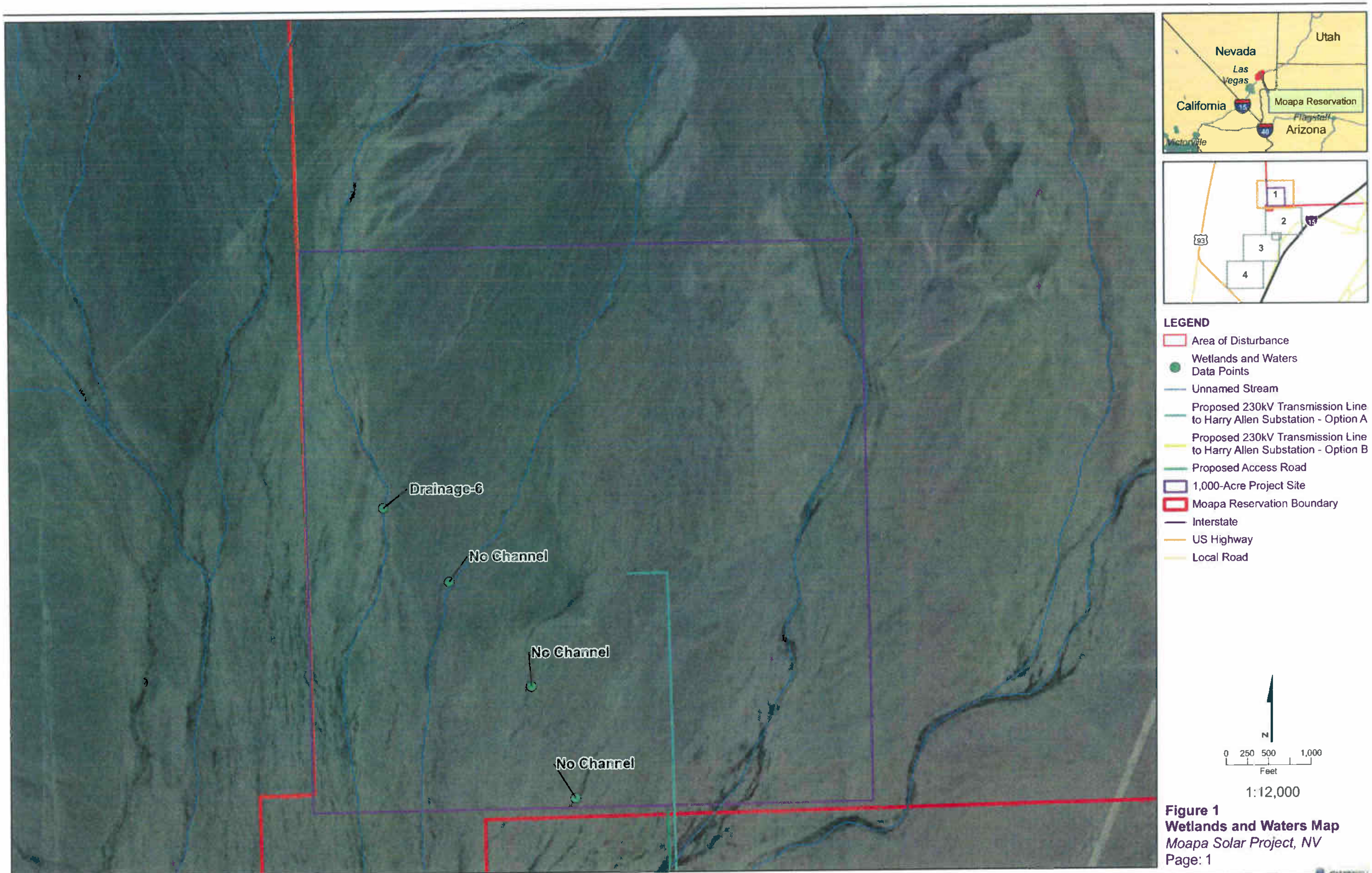

Figure 1
Wetlands and Waters Map
Moapa Solar Project, NV
Page: 1

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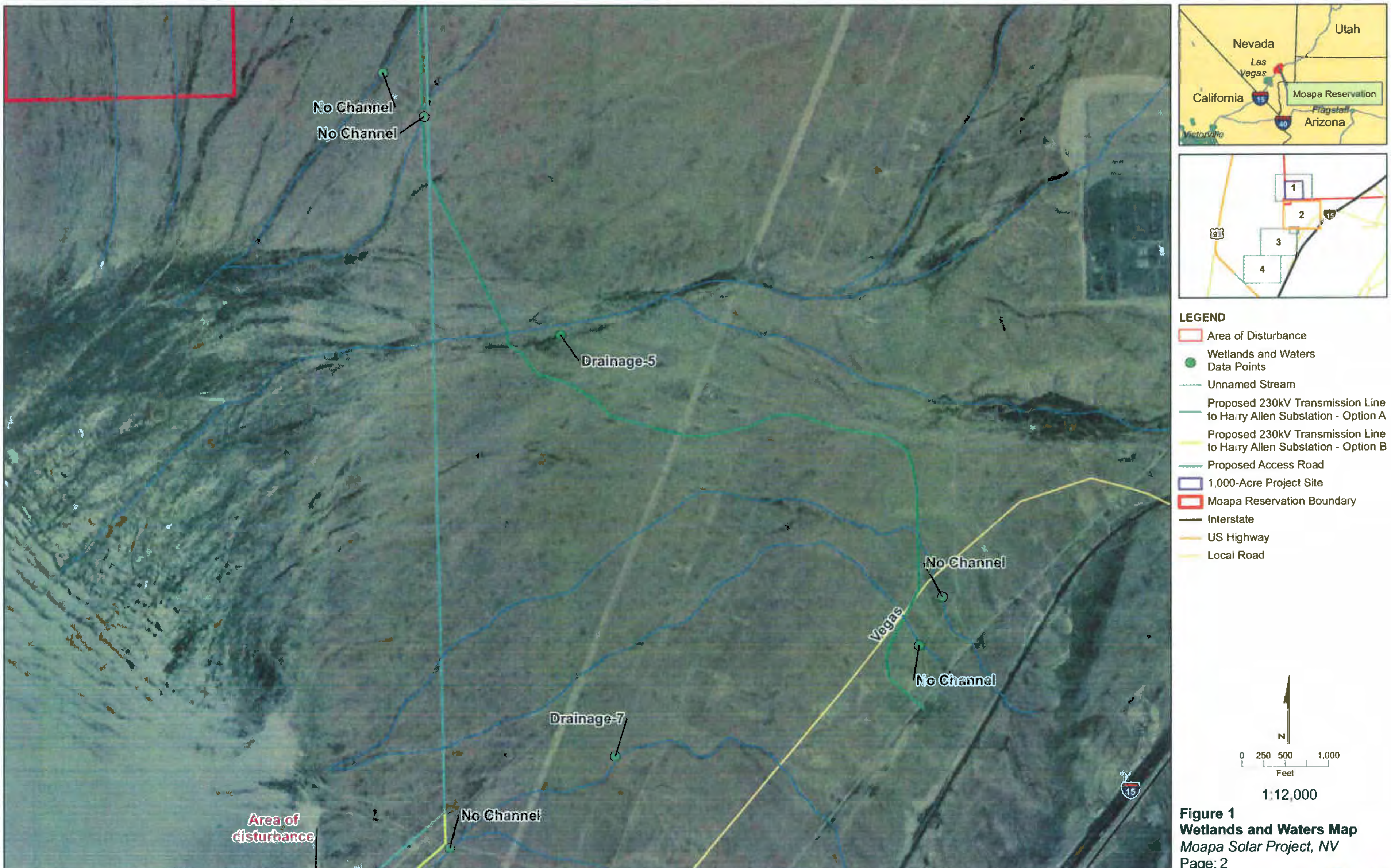

Figure 1
Wetlands and Waters Map
Moapa Solar Project, NV
Page: 2

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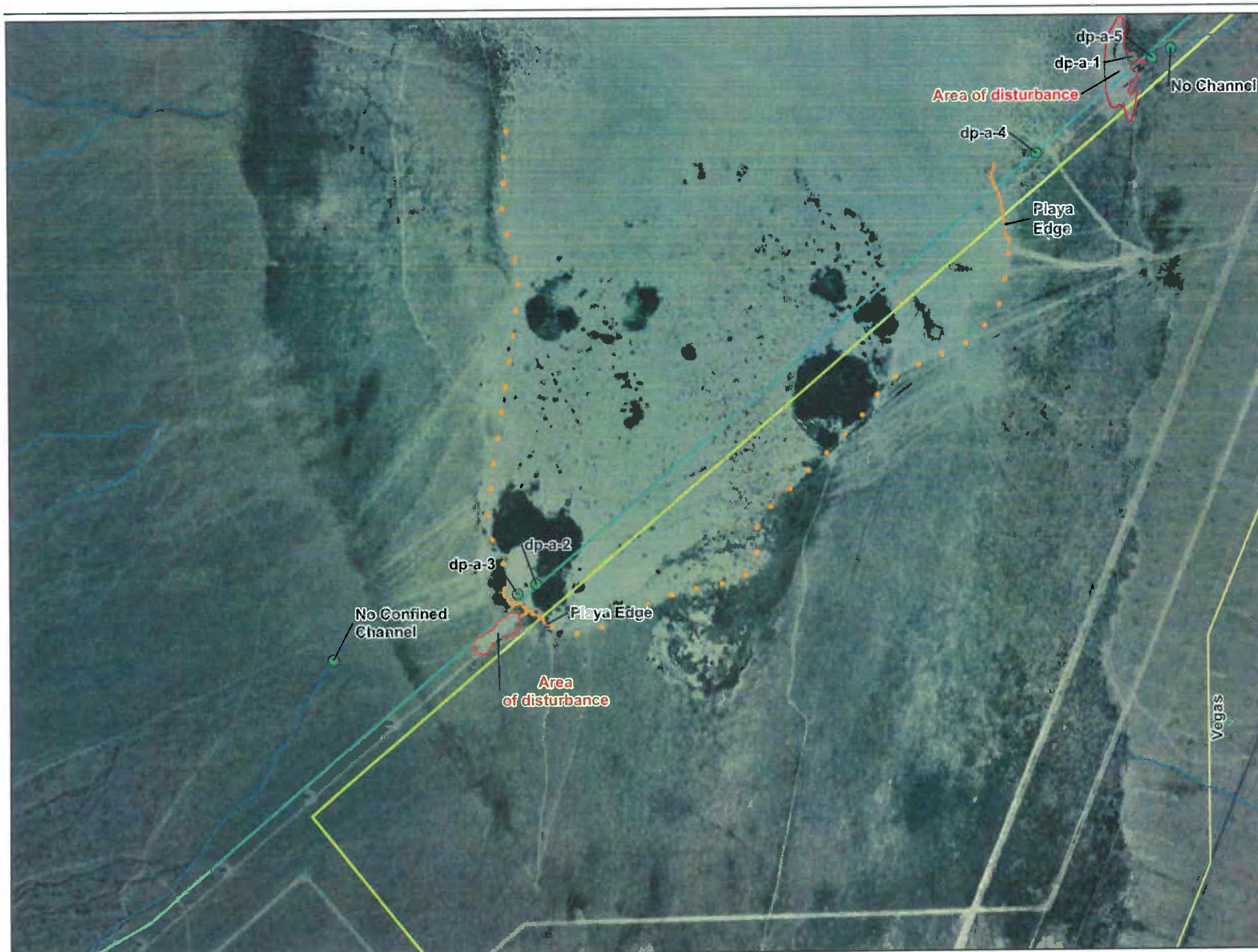

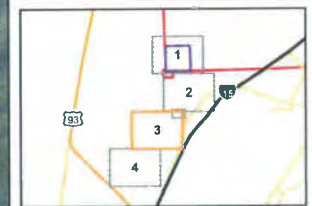

LEGEND

- Area of Disturbance
- Wetlands and Waters Data Points
- Playa Edge
- Unnamed Stream
- Proposed 230kV Transmission Line to Harry Allen Substation - Option A
- Proposed 230kV Transmission Line to Harry Allen Substation - Option B
- Proposed Access Road
- 1,000-Acre Project Site
- Moapa Reservation Boundary
- Interstate
- US Highway
- Local Road
- Expanded Playa Edge (Aerial Photo)

N

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Figure 1
Wetlands and Waters Map
Moapa Solar Project, NV
Page: 3

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Figure 1
Wetlands and Waters Map
Moapa Solar Project, NV
Page: 3a

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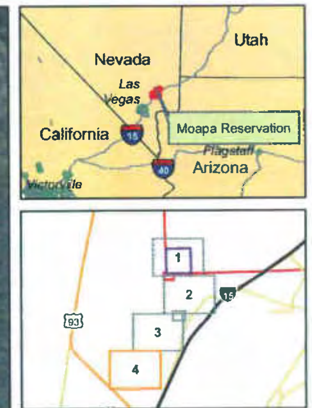

LEGEND

- Area of Disturbance
- Wetlands and Waters Data Points
- Unnamed Stream
- Proposed 230kV Transmission Line to Harry Allen Substation - Option A
- Proposed 230kV Transmission Line to Harry Allen Substation - Option B
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- Moapa Reservation Boundary
- Interstate
- US Highway
- Local Road

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Figure 1
Wetlands and Waters Map
Moapa Solar Project, NV
Page: 4

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Figure 2
National Wetlands Inventory
Moapa Solar Project, NV

NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL

Applicant: James Diven, RES America Developments 1600-acre Moapa Solar Project site, Clark County NV	File No.: SPK-2010-01033-SG	Date: February 16, 2011

Attached is:		See Section below
	INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission)	A
	PROFFERED PERMIT (Standard Permit or Letter of permission)	B
	PERMIT DENIAL	C
➢➢	APPROVED JURISDICTIONAL DETERMINATION	D
	PRELIMINARY JURISDICTIONAL DETERMINATION	E

SECTION I - The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at h*ttp://www.usace.army.mil/inet/functions/cw/cecwo/reg* or Corps regulations at 33 CFR Part 331.

A: INITIAL PROFFERED PERMIT: You may accept or object to the permit.

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.

- OBJECT: If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B: PROFFERED PERMIT: You may accept or appeal the permit

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.

- APPEAL: If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer (address on reverse). This form must be received by the division engineer within 60 days of the date of this notice.

C: PERMIT DENIAL: You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer (address on reverse). This form must be received by the division engineer within 60 days of the date of this notice.

D: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved JD or provide new information.

- ACCEPT: You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice, means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.

- APPEAL: If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer (address on reverse). This form must be received by the division engineer within 60 days of the date of this notice.

E: PRELIMINARY JURISDICTIONAL DETERMINATION: You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

SECTION II - REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMIT

REASONS FOR APPEAL OR OBJECTIONS: (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

POINT OF CONTACT FOR QUESTIONS OR INFORMATION:

If you have questions regarding this decision and/or the appeal process you may contact: Patricia McQueary, Regulatory Project Manager U.S. Army Corps of Engineers 321 N Mall Drive Suite L-101, St. George, Utah 84790 Phone: 435-986-3979, FAX 435-986-3981 Email: Patricia.L.McQueary@usace.army.mil (Use this address for submittals to the **district** engineer)	If you only have questions regarding the appeal process you may also contact: Thomas J. Cavanaugh, Administrative Appeal Review Officer U.S. Army Corps of Engineers 1455 Market Street San Francisco, California 94103-1399 Phone: 415-503-6574, FAX 415-503-6646) Email: Thomas.J.Cavanaugh@usace.army.mil (Use this address for submittals to the **division** engineer)

RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15 day notice of any site investigation, and will have the opportunity to participate in all site investigations.

_______________________ Signature of appellant or agent.	Date:	Telephone number:

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO CA 95814-2922

REPLY TO
ATTENTION OF

February 17, 2011

Regulatory Division SPK-2010-01033-SG

James Diven
RES America Developments
11101 W 120th Avenue
Broomfield, Colorado 80021

Dear Mr. Diven:

This concerns your proposed Moapa Solar Project in or near Apex Dry Lake. The project is located on or near the Apex Dry Lake and associated ephemeral drainages, Section 10, Township 64 S, Range 64 E, Mount Diablo Meridian, Latitude 36.48197°, Longitude -114.8617°, Apex, Clark County, Nevada.

Based on the information you have provided, we have determined that the proposed work will not result in the discharge of dredged or fill material within waters of the United States. Therefore, a Department of the Army Permit is not required for this work. Measures should be taken to prevent construction materials and/or activities from entering any waters of the United States. Appropriate soil erosion and sediment controls should be implemented onsite to achieve this end.

Our disclaimer of jurisdiction is only for this activity as it pertains to Section 404 of the Federal Clean Water Act and does not refer to, nor affect jurisdiction over any waters present on site. Other Federal, State, and local laws may apply to your activities. Therefore, in addition to contacting other Federal and local agencies, you should also contact state regulatory authorities to determine whether your activities may require other authorizations or permits.

We appreciate your feedback. At your earliest convenience, please tell us how we are doing by completing the customer survey on our website at http://per2.nwp.usace.army.mil/survey.html and select Sacramento District – St. George on page 2 of the survey form.

Please refer to identification number SPK-2010-01033-SG in any correspondence concerning this project. If you have any questions, please contact Patricia Mcqueary at 321 North Mall Drive, Suite L-101, St. George, Utah 84790, email *Patricia.L.McQueary@usace.army.mil*, or telephone 435-986-3979. For more information regarding our program, please visit our website at *www.spk.usace.army.mil/regulatory.html.*

Sincerely,

Patricia L. McQueary

Patricia L. McQueary
Chief, St. George Regulatory Office
Sacramento District

Cc:
Amy Lahav, CH2MHill, 2485 Village View Drive, Suite 350, Henderson, NV 89074

Appendix H

Desert Tortoise Survey Report

Desert Tortoise Survey Report

Moapa Solar Energy Project

UPDATED REPORT (Revision 2)

October 2013

Prepared by:

Heritage Environmental Consultants, LLC

Table of Contents

INTRODUCTION

Moapa Solar LLC (Moapa) proposes to construct and operate the Moapa Solar Energy Center (Project) in northeastern Clark County in southern Nevada. The Project would consist of a solar power generation facility (SPGF), water pipeline, gen-tie lines that would interconnect the Project to the regional electrical transmission grid, and an access road between the SPGF and a frontage road along the west side of Interstate 15 (I-15). The SPGF and water pipeline would be located entirely on lands within the Moapa River Indian Reservation, the gen-tie lines would be located on both Reservation and BLM-administered lands, and the access road would be located primarily on BLM-administered lands (**Figures 1 and 2**).

Solar Power Generation Facility

The solar power generation facility (SPGF) would be located on the Moapa River Indian Reservation, approximately 20 miles northeast of Las Vegas, Nevada, near Apex, Nevada. Specifically, the SPGF will be located on approximately 850 acres of leased tribal lands owned by the Moapa Band of Paiutes. It would be developed using photovoltaic (PV) technology producing up to 200 Megawatts (MWs) in size. The proposed PV project would utilize crystalline silicon or thin-film PV panels that would be mounted on single-axis trackers. Using single-axis trackers, the panels will be oriented in north-south rows with the panels moving to track the sun as it moves across the sky during the day.

Water Supply/Pipeline

Water for the Project would be provided by the Tribe from an existing groundwater well located in Section 15, about 5.4 miles northeast of the SPGF site. It would be delivered to the SPGF site via a water pipeline located wholly on the Reservation. The pipeline would originate at the well and would follow existing roads and ROWs from the well to the SPGF site. The water pipeline would be 8 to 12 inches in diameter and would be buried 3 to 6 feet below the ground surface. A portion of this pipeline (about 4.7 miles) would be within a designated utility corridor administered by the BLM.

Transmission Lines

The construction of new transmission lines is necessary to deliver the power generated by the MSEC Project to the electrical grid. Two gen-tie transmission lines will be constructed for the power generated at the SPGF to be delivered to the Harry Allen Substation (via a 230 kV transmission line) and the Crystal Substation (via a 500 kV transmission line). The 230 kV and 500 kV transmission lines would originate at the Project substation located on the SPGF site.

The gen-tie lines would consist of the following:

- Approximately 7.5 miles of single-circuit 230-kV overhead transmission line from the SPGF to the Harry Allen 230-kV Substation
- Approximately 1.5 miles of single-circuit 500-kV overhead transmission line from the SPGF to the 500 kV Crystal Valley Substation.

The 230 kV line to Harry Allen would head south from the SPGF site for approximately 2.5 miles until intersecting an existing 500-kV transmission line. The proposed transmission line would then follow, on the north side, the existing transmission line for approximately 3.8 miles and then stay north of the Harry Allen 500-kV Substation. Approximately 0.3 mile past the substation, the proposed line would cross an existing 500-kV transmission line at a 90-degree angle and proceed for another 0.4 mile before turning northeast and connecting into the Harry Allen 230-kV Substation on the north side of the substation. This route is approximately 7.5 miles long (**Figure 1**).

A modified route for the 230 kV line as it approaches the Harry Allen 230 kV substation has been developed to accommodate the proposed expansion of the existing substation west of the Harry Allen Power Plant. This route modification would follow the above described alignment until adjacent to the Harry Allen Power Plant where it would turn due west for approximately 0.5 miles before heading southwest for approximately 0.65 miles, then southeast for approximately 0.6 miles, then turning northeast for approximately 0.45 miles where it would enter the Harry Allen 230 kV substation on the southwest side (**Figure 3**).

The maintenance road associated with the existing 500 kV line will be used to the extent possible for construction and maintenance of the proposed 230 kV transmission line.

The design, construction, operation, and maintenance of the transmission lines will meet requirements of the National Electrical Safety Code (NESC); U.S. Department of Labor, Occupational Safety and Health Standards; and the Resource Management Plan's requirements for safety and protection of landowners and their property. Transmission line design will also be consistent with recommendations for reducing negative impacts of power lines on birds found in Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006 by Edison Electric Institute and the Avian Power Line Interaction Committee (APLIC, 2006).

The Project is planning to use steel monopole transmission structures for the 230 kV line to the Harry Allen Substation. The monopole structures for the 230 kV line would range in height from 60 feet to 100 feet. The structures for the 500 kV line to the Crystal Substation would also be steel monopole structures.

Access Road

The Project would require vehicular access for construction, operation, and maintenance. A 2.5-mile gravel access road connecting the SPGF to the existing paved frontage road adjacent to I-15 would be constructed on BLM-administered lands. From the existing paved frontage road west of I-15, the proposed site access road would follow an existing dirt road for approximately 2.0 miles until it reaches the proposed 230 kV gen-tie transmission line ROW which it would follow approximately 0.5 mile north to the SPGF site (**Figure 1**).

The access road would be designed to accommodate equipment deliveries, the construction workforce, and, ultimately, the operational needs of the Project. The surface of the road is proposed to be 24 feet wide, would be two lanes, and would have adjacent shoulders and drainage swales on either side. The Applicant has requested a 100-foot-wide ROW so the existing road can be straightened if needed in some places. Final design for the access road would be consistent with BLM and Clark County road standards. The road would be maintained by the Project.

Legal Description

The SPGF is located in T17S, R64E; and T17S, R63E Mount Diablo Base and Meridian. The legal description, township/range, section, and subdivision for the BLM-administered lands crossed by the transmission lines and access road are shown in **Table 1**.

Table 1 - Township/Range, Section, and Subdivision Information

Township/Range	Section	Subdivision	Project Element
T17S, R64E	8	E 1/2 of W 1/2	Transmission Line Route Access Road
		NE 1/4	Access Road
	16	W 1/2	Access Road
	17	E 1/2 of W 1/2	Transmission Line Route
	20	NW 1/4	Transmission Line Route
	19	SE 1/4 of NE 1/4, SE 1/4, SE 1/4 of SW 1/4	Transmission Line Route
	30	NW 1/4	Transmission Line Route
T17S, R63E	25	S 1/2 of NE 1/4, NW 1/4 of SE 1/4, SW 1/4	Transmission Line Route
	36	NW 1/4 NW 1/4	Transmission Line Route
	35	NE 1/4, SE 1/4 of NW 1/4, SW 1/4, SE 1/4	Transmission Line Route
		SE 1/4 of SE 1/4	Transmission Line Route
	36	W 1/2 of NE 1/4, SE 1/4 of NW 1/4, SW 1/4	Transmission Line Route

T17S R64E	9	E ½ of SE	Transmission Line Route
	10	W ½ of SW	
T16S, R64E	15	SE 1/4, NE 1/4	Pipeline
	14	SW 1/4, NW 1/4	Pipeline
		NW 1/4, SW 1/4	Pipeline
		SE 1/4, SW 1/4	Pipeline
	23	NW 1/4, NW 1/4	Pipeline
		SW 1/4. NW1/4	Pipeline
	22	SE 1/4, NE 1/4	Pipeline
		NE 1/4, SE 1/4	Pipeline
		SW 1/4, SE 1/4	Pipeline
		SE 1/4, SW 1/4	Pipeline
	27	NE 1/4, NW 1/4	Pipeline
		NW 1/4, NW1/4	Pipeline
	28	SE 1/4, NE 1/4	Pipeline
		NE 1/4, SE 1/4	Pipeline
		NW 1/4, SE 1/4	Pipeline
		SE 1/4, SW 1/4	Pipeline
		SW 1/4, SW1/4	Pipeline
	33	NW 1/4, NW 1/4	Pipeline
		SE 1/4, SE1/4	Pipeline
		SW1/4, SE1/4	Pipeline
		SE 1/4, SW1/4	Pipeline
		SW 1/4, SW 1/4	Pipeline

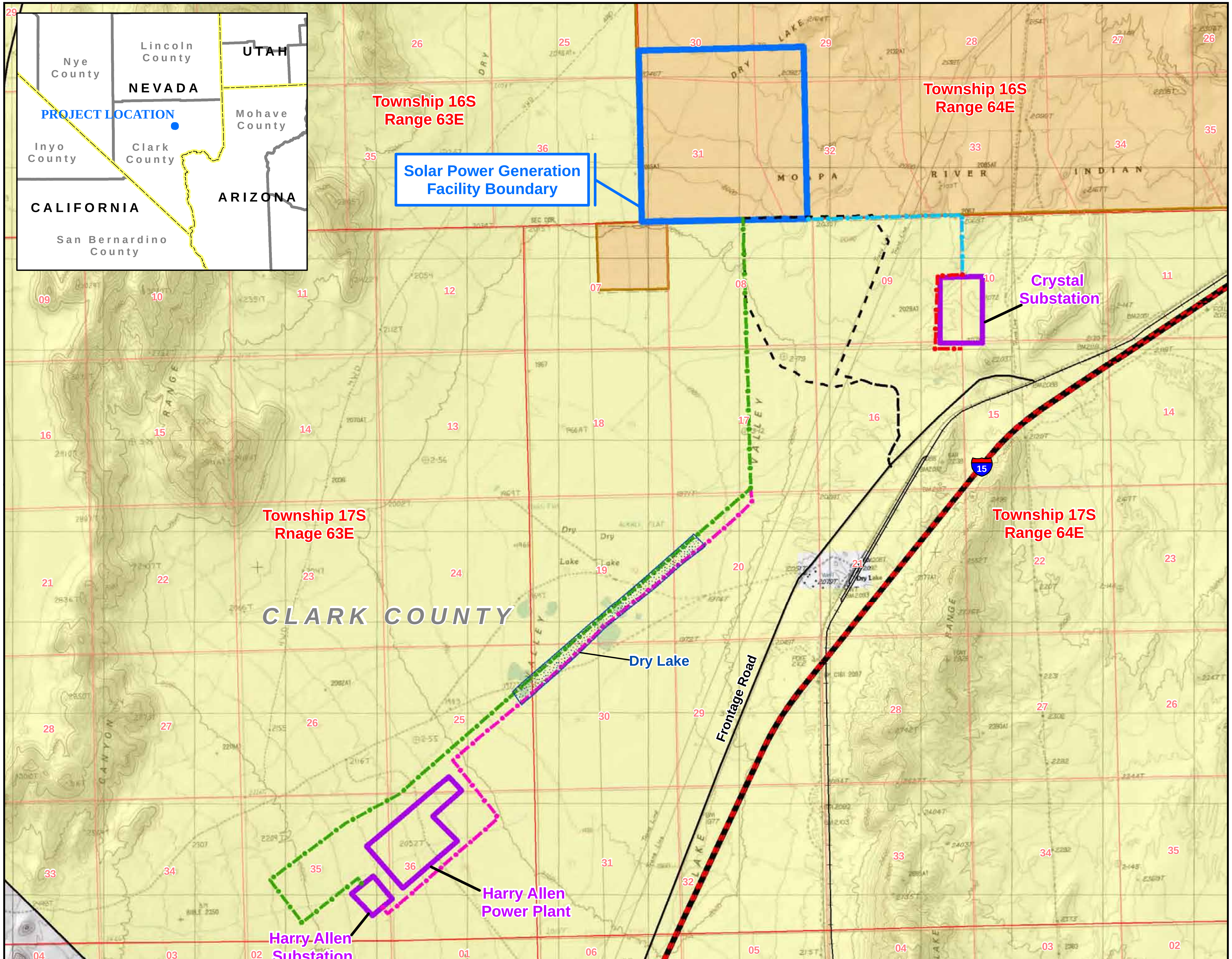
Surveyed Species

Desert tortoise (*Gopherus agassizii*), Burrowing Owl (*Athene cunicularia*) and gila monster (*Heloderma suspectum*) were identified by the BLM as species of concern for the Project and they requested that desert tortoise surveys be conducted to determine presence/absence and relative densities within the proposed Project area and alternatives. The BLM also requested that incidental observations of Burrowing Owls and gila monsters be recorded during the desert tortoise survey (Slaughter 2012). Biological surveys for these species were conducted previously in 2010 (Nevada Biological Consulting 2010) but because desert tortoise surveys expire after one year, the results of these 2010 surveys became invalid during the spring of 2011.

This report documents the results of spring and fall 2012 surveys, and fall 2013 surveys targeting the aforementioned species on tribal and federal lands to be used by the Project and associated transmission interconnection and access road options.

Agency Consultation History

The Project and Project biologists participated in several phone calls with the USFWS and BLM prior to surveys in 2012. Patrick Golden contacted Michael Burrows, Fish and Wildlife Biologist, USFWS in February 2012 and again in April 2012 to verify the use of the 2010 survey protocol and to verify the appropriate survey timing. Mr. Golden also contacted Mark Slaughter, Wildlife Biologist, BLM in April 2012 to verify which special status species, in addition to the desert tortoise, should be surveyed concurrently with desert tortoise surveys. The applicant contacted the USFWS in October 2012 to discuss the Fall 2012 survey plan. Mr. Golden also spoke with Susan Cooper, Fish and Wildlife Biologist, USFWS and Melanie Cota, Wildlife Biologist, BLM in September 2013 prior to initiating the survey.



Legend

Interstate

Railroad

Proposed Access Road - 100' ROW

Proposed Transmission Lines

230-kV Transmission Line Option A

230-kV Transmission Line Option B

500-kV Transmission Line Option A

Additional 500-kV Transmission Survey Corridor

Township/Range Boundary

PLSS Section Line

Existing Substation Boundary

Solar Power Generation Facility Boundary

Unsuitable Desert Tortoise Habitat

Jurisdictional Land Ownership

Bureau of Land Management Land

Indian Land

0 0.5 1 1.5

Miles

Universal Transverse Mercator
North American Datum 1983
Zone 11 North, Meters

Moapa Solar Energy Center

FIGURE 1 - PROJECT AREA

Map Extent: Clark County, Nevada

Date: 09-26-12 Author: djb

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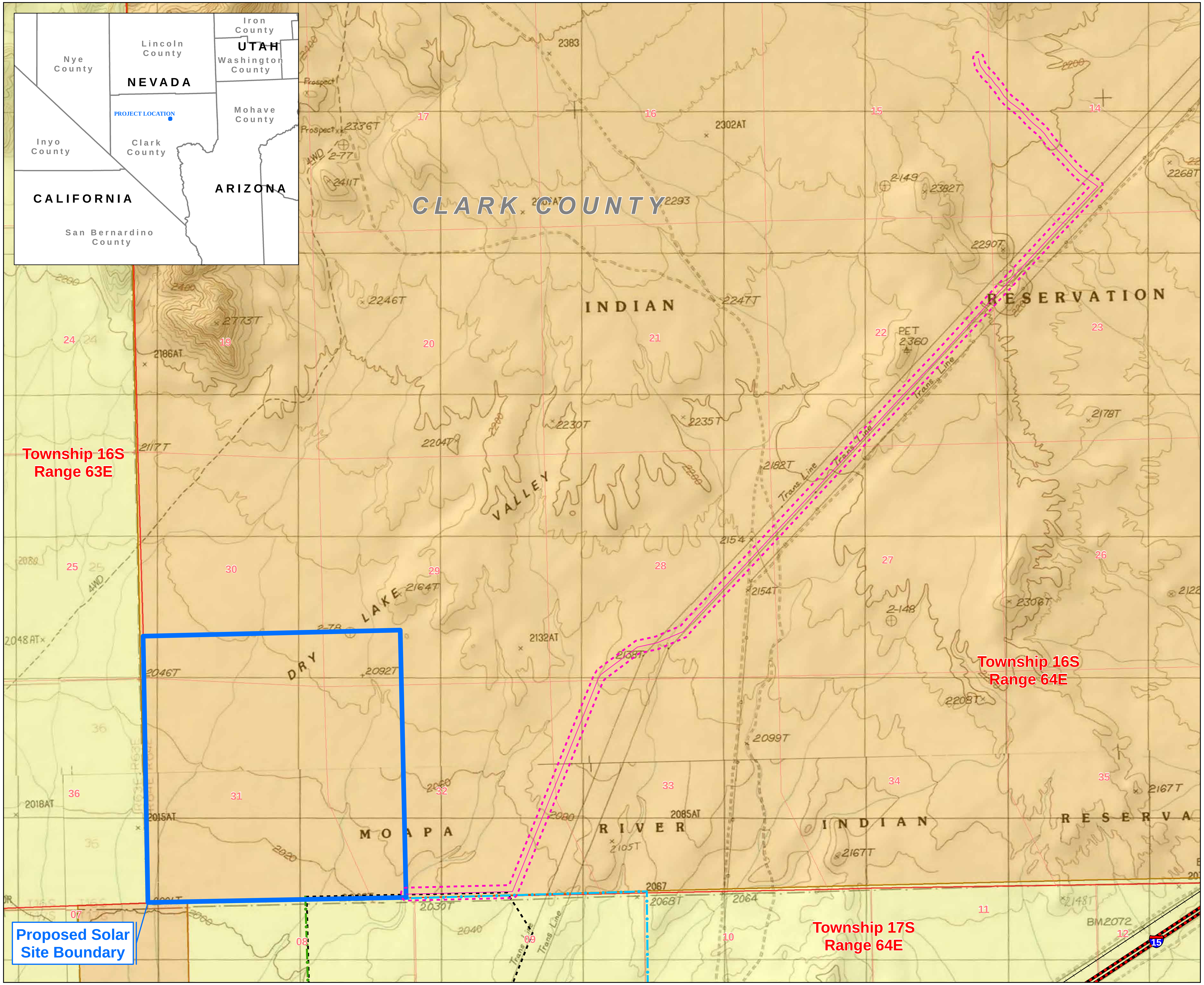

Moapa Solar Energy Center

Figure 2 - Water Pipeline Project Area

Map Extent: Clark County, Nevada

Date: 11-20-12

Author: rnc

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Legend
Interstate
Frontage Road
Proposed 230-kV T-Line
Proposed 230-kV T-Line Reroute
Township/Range Boundary
PLSS Section Line
Existing Substation Boundary
Proposed 230-kV T-Line ROW
Proposed 230-kV T-Line Reroute ROW
Jurisdictional Land Ownership
Bureau of Land Management Land
Nye County
Lincoln County
Iron County
UTAH
Washington County
NEVADA
PROJECT LOCATION
Mohave County
Inyo County
Clark County
CALIFORNIA
ARIZONA
San Bernardino County
T17S R63E
T17S R64E
T18S R64E
T18S R63E
CLARK COUNTY
Harry Allen Power Plant
Harry Allen Substation
Frontage Road
15
0
1,000
2,000
3,000
Feet
Universal Transverse Mercator
North American Datum 1983
Zone 11 North, Meters
Moapa Solar Energy Center
Figure 3 – 230kv Transmission Re-Route
Map Extent: Clark County, Nevada
Date: 10-07-13
Author: rnc
I:\Moapa Solar/MXD's/230kvTransmission Re-Route_100713.mxd

METHODS

Desert Tortoise

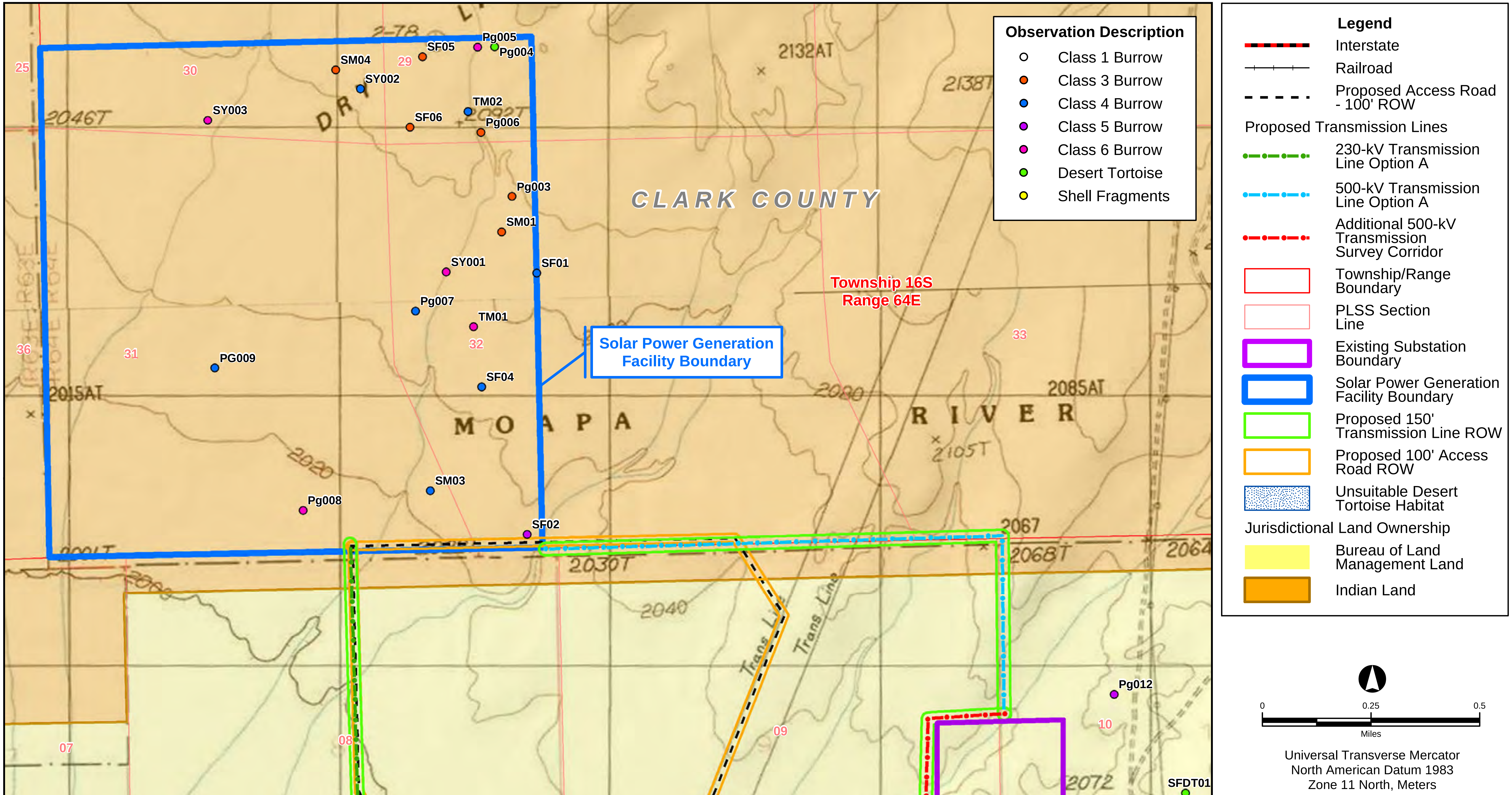
The desert tortoise survey methodology employed was designed to determine presence/absence and abundance of desert tortoises within the Project area. It is the *Pre-project Field Survey Protocol for Potential Desert Tortoise Habitats* (USFWS protocol) described in the *Preparing For Any Action That May Occur Within The Range Of The Mojave Desert Tortoise (Gopherus agassizii*; USFWS 2010). The information gathered is intended to:

1. Determine the appropriate level of consultation with the U.S. Fish and Wildlife Service (USFWS) and Nevada Department of Wildlife (NDOW);
2. Determine the amount of incidental take of Desert Tortoises resulting from the Project as defined by the Endangered Species Act (ESA) and state laws; and
3. Assess the distribution of Desert Tortoises to help minimize and avoid take.

Based on the most recent USFWS protocol (USFWS 2010), a site assessment is conducted within the survey area to determine the suitability of the habitat for Desert Tortoise. Pursuant to the protocol, if the survey area is large (>40 acres), surveys should be conducted during the Desert Tortoise's most active periods (April through May or September through October) when air temperatures are lower than 104°F. The USFWS guidance also indicates that projects smaller than 2,789 acres that are located within the North-East Mojave: North Recovery Unit must complete 100% coverage surveys. Therefore, probabilistic sampling was not an option for the Project. Ten-meter wide belt transects were used during the survey and were designed to cover the entire Project area (100 percent coverage). The sampling protocol implemented for this survey was reviewed and approved by the USFWS prior to implementation.

Occurrences of either live desert tortoises or desert tortoise sign in the survey area were used to indicate desert tortoise presence. The Project site, transmission line ROWs, and access road ROWs were surveyed with ten-meter transects ensuring 100 percent coverage of those areas. If neither actual desert tortoises nor sign thereof were encountered during the surveys in any given portion of Project (e.g. a particular transmission interconnection corridor), three additional 10-m belt transects at 200-m intervals parallel to and/or encircling the Project area perimeter (200- m, 400-m, and 600-m from the perimeter of the Project site) were also surveyed. These transects were used to determine the presence/absence of desert tortoise but they were not included in the estimation of desert tortoise abundance.

Three separate desert tortoise surveys were conducted. The first survey took place in May of 2012 and surveyed the SPGF, access roads and transmission lines (**Figures 4a, 4b, and 4c)**. The second survey was conducted in October of 2012 and covered the water pipeline (**Figure 5).** The third survey took place in October of 2013 and covered the route modification of the 230 kV transmission line near the Harry Allen 230 kV substation (**Figure 6**). Twelve 10-meter wide belt transects were surveyed during the route modification survey (an area 120 meters, or 395 feet, wide). All observed desert tortoise sign were mapped and recorded. Sign included scat, burrows, live tortoises, carcasses, shell fragments, eggshells, tracks, courtship rings, and drinking depressions.



Universal Transverse Mercator
North American Datum 1983
Zone 11 North, Meters

Moapa Solar Energy Center

FIGURE 4A
DESERT TORTOISE DETECTION

Map Extent: Clark County, Nevada

Date: 10-07-13 | Author: rnc

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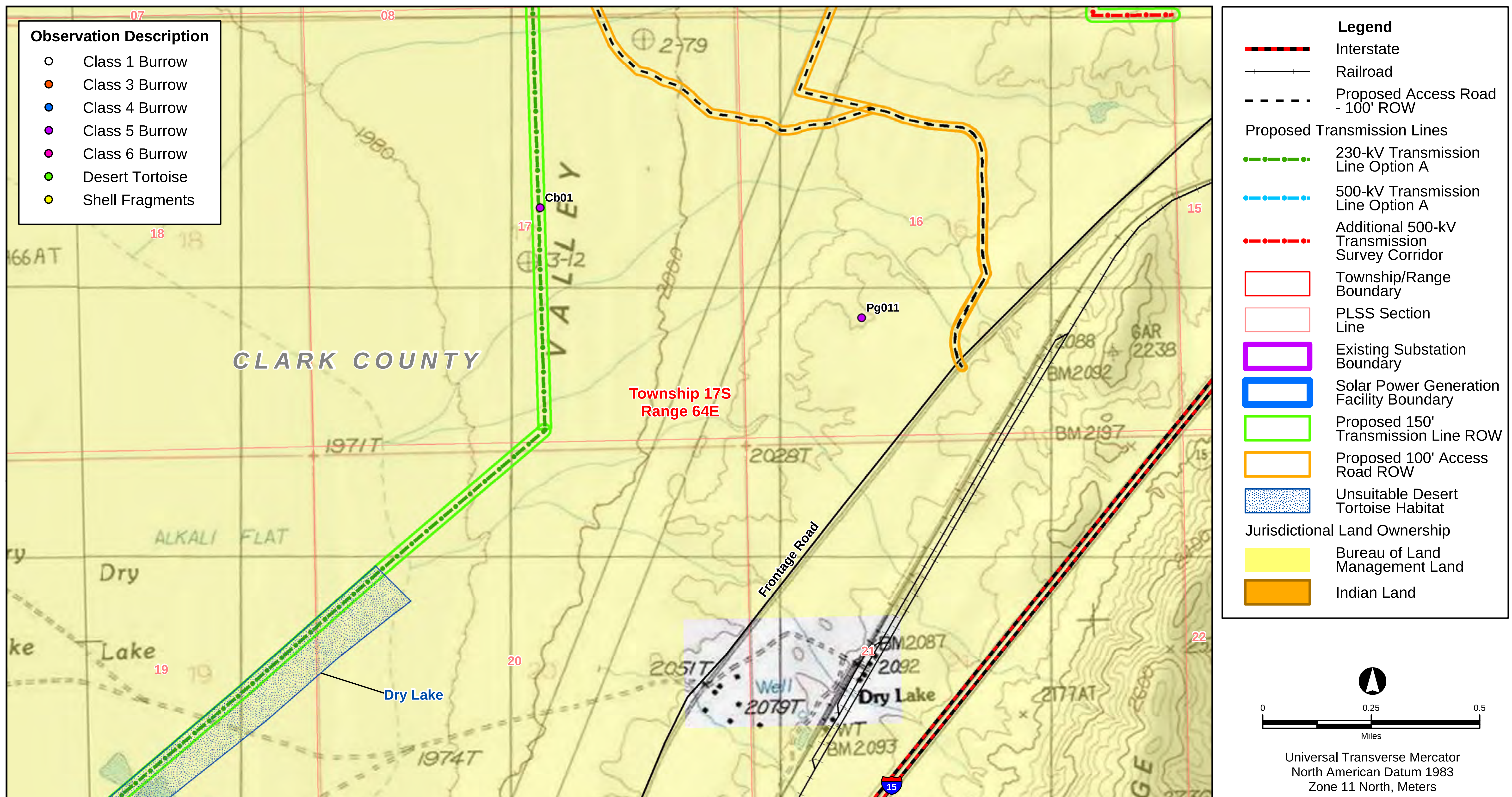

Moapa Solar Energy Center

FIGURE 4B
DESERT TORTOISE DETECTION

Map Extent: Clark County, Nevada

Date: 10-07-13 | Author: rnc

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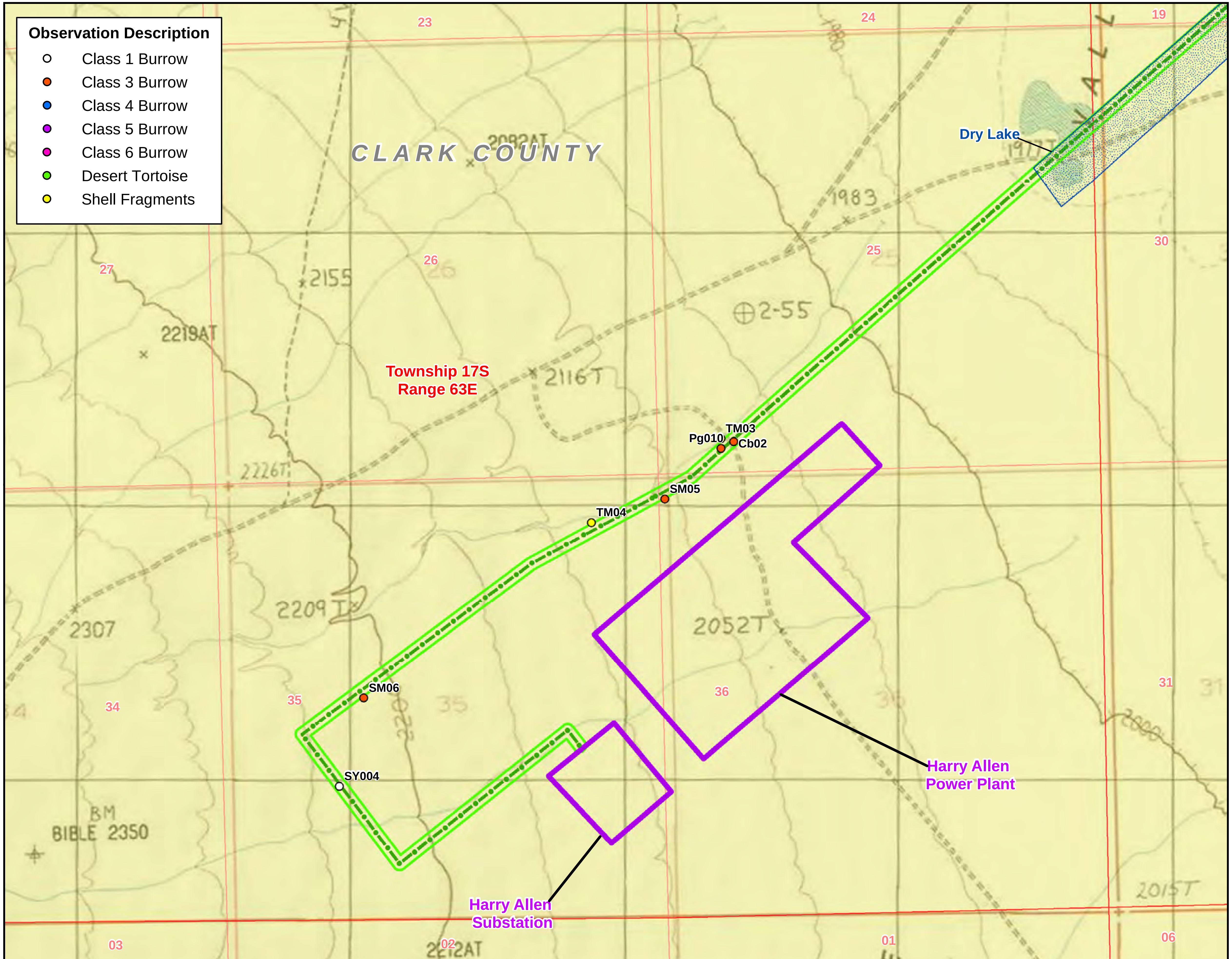

Legend

- Interstate
- Railroad
- Proposed Access Road - 100' ROW

Proposed Transmission Lines

- 230-kV Transmission Line Option A
- 500-kV Transmission Line Option A
- Additional 500-kV Transmission Survey Corridor
- Township/Range Boundary
- PLSS Section Line
- Existing Substation Boundary
- Solar Power Generation Facility Boundary
- Proposed 150' Transmission Line ROW
- Proposed 100' Access Road ROW
- Unsuitable Desert Tortoise Habitat

Jurisdictional Land Ownership

- Bureau of Land Management Land
- Indian Land

0 0.25 0.5
Miles

Universal Transverse Mercator
North American Datum 1983
Zone 11 North, Meters

Moapa Solar Energy Center

FIGURE 4C
DESERT TORTOISE DETECTION

Map Extent: Clark County, Nevada

Date: 10-07-13 | Author: rnc

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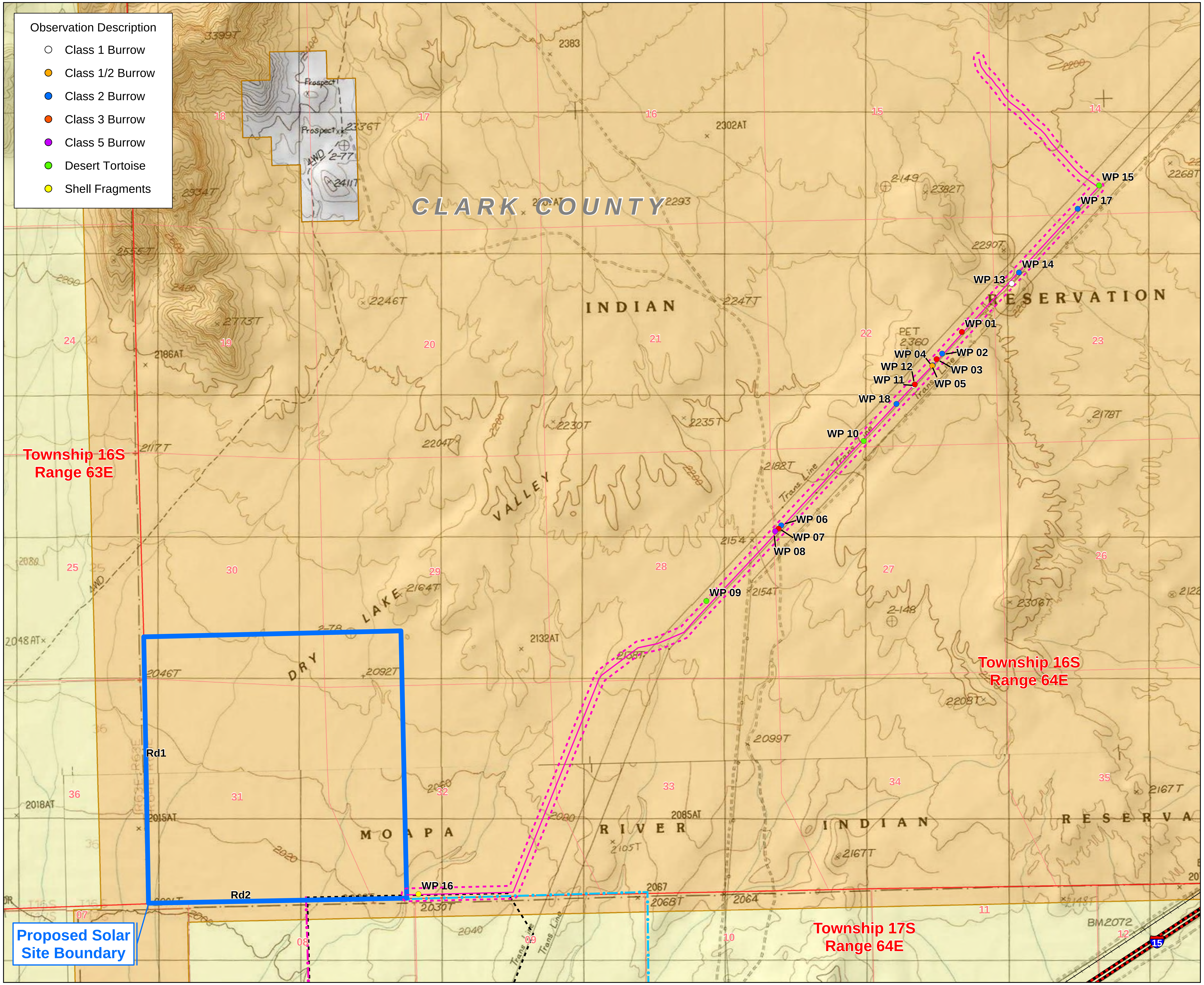

Moapa Solar Energy Center

Figure 5 - Water Pipeline Desert Tortoise Observations

Map Extent: Clark County, Nevada

Date: 10-07-13 | Author: rnc

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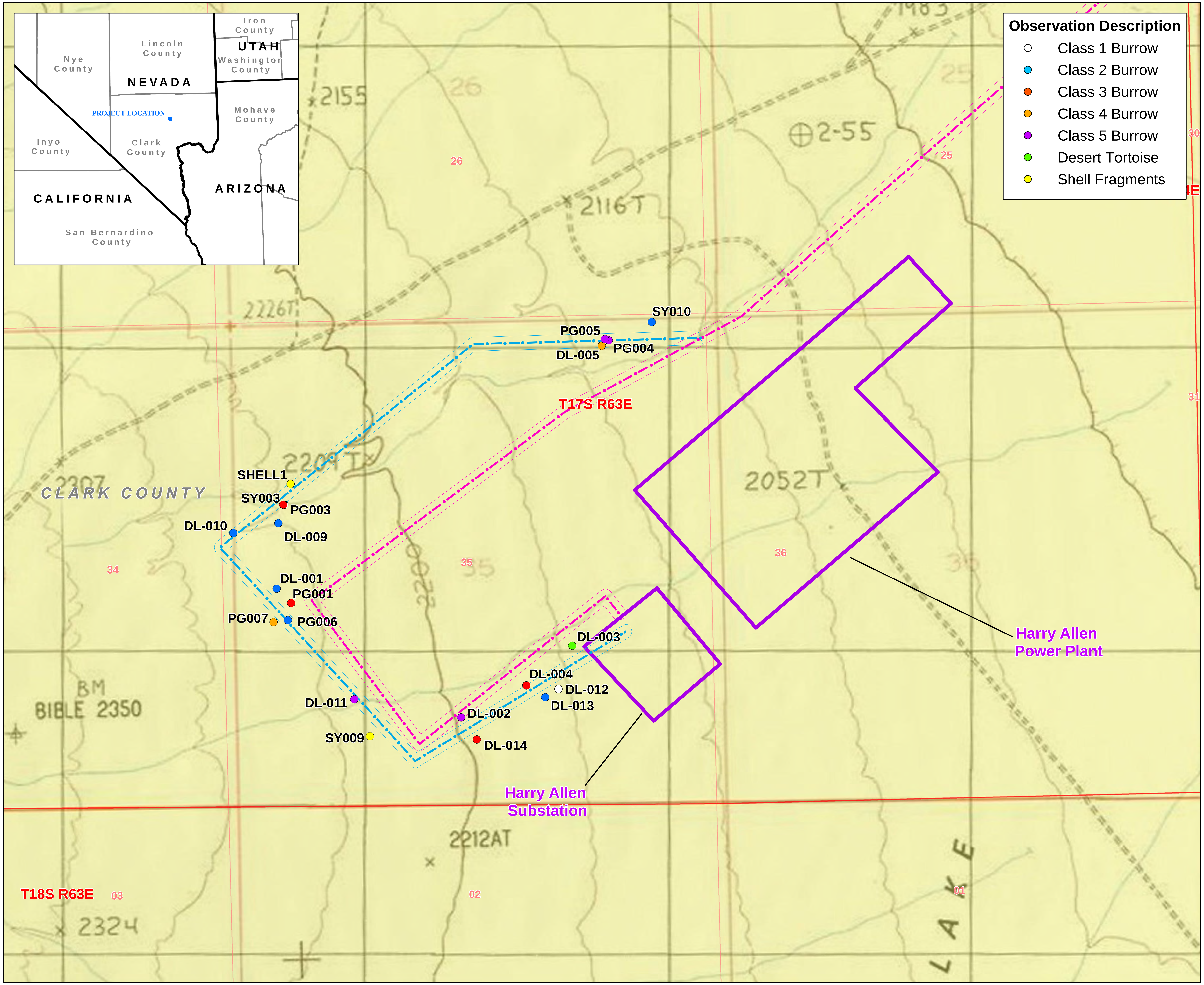

Legend

- Proposed 230-kV T-Line
- Proposed 230-kV T-Line Reroute
- Township/Range Boundary
- PLSS Section Line
- Existing Substation Boundary
- Proposed 230-kV T-Line ROW
- Proposed 230-kV T-Line Reroute ROW

Jurisdictional Land Ownership

- Bureau of Land Management Land

0 1,000 2,000 3,000
Feet

Universal Transverse Mercator
North American Datum 1983
Zone 11 North, Meters

Moapa Solar Energy Center

Figure 6 – 23kV Transmission Option Desert Tortoise Observations

Map Extent: Clark County, Nevada

Date: 10-07-13 | Author: rnc

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Relative Abundance Calculation

Desert tortoise population estimates were generated based on recommended methodologies contained in USFWS (2010). These estimates were generated for all Project components for which there were detections of adult desert tortoise. Population estimates were generated using the following equation:

$$\hat{N} = \frac{n}{(P_a)(P_d)} \times \frac{(A)}{(a)}$$

Where $\hat{N}$ is the corrected population estimate, n is the number of Desert Tortoises observed, P_a is the probability a Desert Tortoise in the Project area would be above ground based on previous winter precipitation per USFWS (2010). For the Table 3 calculation of the May 2012 survey, the October 2012 pipeline survey, and the October 2013 230 kV reroute survey, a value of 0.8 was used (Western Regional Climate Center 2012). P_d is the probability that an above-ground Desert Tortoise would be detected (0.63); A is the size of the Project area, and a is the size of the area surveyed. Corrected estimates are reported here with 95% confidence intervals (CI) per USFWS (2010).

Other Sensitive Species

Surveys for Burrowing Owls and gila monsters were conducted concurrently with desert tortoise surveys. Individuals and/or sign were recorded and mapped. In the case of Burrowing Owls, potentially suitable burrows were checked for owl sign (prey items, scratches, scat, pellets, feathers, etc.).

RESULTS

Desert Tortoise

Most of the Project area represents potentially suitable habitat for the desert tortoise. The Project area is largely dominated by Mojave creosote-bush scrub vegetation. This vegetation class includes Mojave mixed scrub and creosote-bursage vegetation. Dominant species associated with this vegetation community include shadscale (*Atriplex confertifolia*), brittlebrush (*Encelia farinosa*), creosote (*Larrea tridentata*), bursage (*Ambrosia dumosa*), and desert saltbush (*Atriplex polycarpa*) that occur on lower slopes and in washes. Associate species also included Mojave yucca (*Yucca schidigera*), Mormon tea (*Ephedra nevadensis*), range ratany (*Krameria parvifolia*), desert trumpet (*Eriogonum inflatum*), big galleta (*Hilaria rigida*), and Indian ricegrass (*Oryzopsis hymenoides*).

The portion of the transmission interconnection (approximately 1.7 miles in length) that traverses Dry Lake is not suitable desert tortoise habitat and was not surveyed (**Figures 1, 4B, and 4C**). This area was almost completely unvegetated with hard-packed soils, often with an alkali crust. Based on the lack of vegetation, there is no forage or cover present for desert tortoises. This portion of Dry Lake is also occasionally completely inundated; precluding tortoises from occupying burrows. Small portions of this area were spot sampled – suitable burrows were not found, nor were soil conditions conducive for burrow excavation. The vegetated margins of the lake bed were surveyed since these areas represented potentially suitable foraging areas; though soils in these areas were still extremely hard packed.

Near the south end of the 230 kV transmission interconnection, the habitat becomes steeper with rockier soils and greater components of cholla (*Cylindropuntia* sp.), Mojave yucca and prickly pear (*Opuntia* sp.). This area is crossed by several small ephemeral drainages that extend from a large sloping bajada extending from the southwest.

Desert tortoise and desert tortoise sign were observed in the Project area. An adult desert tortoise and suitable desert tortoise burrows were observed within the Solar Power Generating Facility site; desert tortoise sign and potentially suitable burrows were observed along the 230-kV Transmission Line Alternative; an adult desert tortoise and potentially suitable burrows were observed along the buffer transects associated with the 500-kV Transmission Line Alternative; one potentially suitable burrow occurred along the access road, two adult and one subadult desert tortoise and fourteen suitable burrows were observed along the pipeline ROW; and, one adult tortoise, 19 suitable desert tortoise burrows, and two desert tortoise shells/shell fragments were observed along the 230 kV transmission reroute (**Tables 2a, 2b, and 2c, Figures 4a, 4b, 4c, 5, and 6**).

Table 2a – Desert Tortoise Sign and Observations. May 2012 Survey

Transect	Project Component	Observation Description[1]	GPS ID	Notes
1	Solar Power Generating Facility	Class 4 burrow	SF001	
6	Solar Power Generating Facility	Class 5 burrow	SF002	
10	Solar Power Generating Facility	Class 3 burrow	PG003	Scat present
12	Solar Power Generating Facility	Class 3 burrow	SM001	Scat present
14	Solar Power Generating Facility	Desert Tortoise	PG004	Tortoise not in burrow; 280mm MCL
19	Solar Power Generating Facility	Class 3 burrow	PG006	Egg fragments present; in wash
20	Solar Power Generating Facility	Class 6 burrow	PG005	Located in small rivulet
21	Solar Power Generating Facility	Class 4 burrow	SF004	
23	Solar Power Generating Facility	Class 6 burrow	TM001	No sign
	Solar Power Generating Facility	Class 4 burrow	TM002	Scat present
32	Solar Power Generating Facility	Class 6 burrow	SY001	
38	Solar Power Generating Facility	Class 3 burrow	SF005	
40	Solar Power Generating Facility	Class 4 burrow	SM003	
43	Solar Power Generating Facility	Class 4 burrow	PG007	No sign
45	Solar Power Generating Facility	Class 3 burrow	SF006	

62	Solar Power Generating Facility	Class 4 burrow	SY002	
70	Solar Power Generating Facility	Class 3 burrow	SM004	Creosote flat
85	Solar Power Generating Facility	Class 6 burrow	PG008	Partially filled in
115	Solar Power Generating Facility	Class 4 burrow	PG009	Near coyote den
116	Solar Power Generating Facility	Class 6 burrow	SY003	
Access 400W	Access Road	Class 5 burrow	PG011	No sign; near rivulet
Crystal 400N	500-kV Transmission Line (buffer)	Class 5 burrows (x2)	PG012	Two burrows; no sign
Crystal 600N	500-kV Transmission Line (buffer)	Desert Tortoise	SFDT01	Desert tortoise in burrow; 250mm MCL
HA1	230-kV Transmission Line	Shell fragments and scutes	TM003	Estimated time since death: >4 years
HA1	230-kV Transmission Line	Shell fragments	TM004	Estimated time since death: >4 years
HA2	230-kV Transmission Line	Class 1 burrow	SY004	Very fresh sign at entrance
HA3	230-kV Transmission Line	Class 3 burrow	PG010	Shell fragments
HA4	230-kV Transmission Line	Class 5 burrow	CB001	
HA4	230-kV Transmission Line	Class 3 burrow	CB002	
HA5	230-kV Transmission Line	Class 3 burrow	SM005	No sign; upper bajada
HA5	230-kV Transmission Line	Class 3 burrow	SM006	No sign: upper bajada near wash

Table 2b – Desert Tortoise Sign and Observations. Oct. 2012 Survey

Transect	Project Component	Observation Description[1]	GPS ID	Notes
1	Pipeline	Desert Tortoise	WP 09	Subadult. Not in burrow
2	Pipeline	Class 3 burrow	WP 01	No sign
2	Pipeline	Class 2 burrow	WP 02	No sign
2	Pipeline	Class 3 burrow	WP 03	No sign
2	Pipeline	Class 2 burrow	WP 04	No sign
2	Pipeline	Class 1-2 burrow	WP 05	Tracks
2	Pipeline	Class 2 burrow	WP 06	No sign
2	Pipeline	Class 3 burrow	WP 07	No sign
2	Pipeline	Class 5 burrow	WP 08	No sign
3	Pipeline	Class 2 burrow	WP 18	No sign
3	Pipeline	Class 2 burrow	WP 17	No Sign
3	Pipeline	Shell Frags	WP 16	Carcass
4	Pipeline	Desert Tortoise	WP 10	Adult. Not in Burrow
4	Pipeline	Desert Tortoise	WP 15	Adult .Not completely in burrow
5	Pipeline	Class 1 burrow	WP 11	Scat
5	Pipeline	Class 3 burrow	WP 12	No sign
5	Pipeline	Class 1 burrow	WP 13	No sign
5	Pipeline	Class 2 burrow	WP 14	No sign

Table 2c – Desert Tortoise Sign and Observations. Oct. 2013 Survey

Transect	Project Component	Observation Description[1]	GPS ID	Notes
1	Harry Allen Reroute	Class 3 Burrow	PG001	No sign
1	Harry Allen Reroute	Class 2 Burrow	DL009	No sign
2	Harry Allen Reroute	Class 2 Burrow	DL001	No sign
2	Harry Allen Reroute	Class 5 Burrow	DL002	
2	Harry Allen Reroute	Class 1 Burrow/Desert Tortoise	DL003	Adult observed inside burrow entrance
4	Harry Allen Reroute	Class 1 Burrow	PG003	Burrow found near midden containing DT scat; 10"x 3" satellite burrow (Class 3, collapsed)
4	Harry Allen Reroute	Class 3 Burrow	SY003	No sign
5	Harry Allen Reroute	Class 3 Burrow	DL004	No sign
5	Harry Allen Reroute	Class 4 Burrow	DL005	No sign
7	Harry Allen Reroute	Class 5 Burrow	PG004	No sign
7	Harry Allen Reroute	Class 5 Burrow	PG005	No sign
7	Harry Allen Reroute	Class 2 Burrow	PG006	No sign
8	Harry Allen Reroute	Shell fragments	Shell-01	Fully intact, recent (<1 year old)
8	Harry Allen Reroute	Class 2 Burrow	DL010	No sign
8	Harry Allen Reroute	Class 5 Burrow	DL011	No sign
10	Harry Allen Reroute	Class 4 Burrow	PG007	No sign

11	Harry Allen Reroute	Class 1 Burrow	DL012	Fresh spoils suggest recent DT use
11	Harry Allen Reroute	Class 2 Burrow	DL013	No sign
11	Harry Allen Reroute	Class 3 Burrow	DL014	No sign
12	Harry Allen Reroute	Shell (Carapace & plastron)	SY009	Some scutes starting to delaminate; entirely intact (~2yrs old)
12	Harry Allen Reroute	Class 2 Burrow	SY010	No sign

[1]Burrow Class 1 – Definitely Desert Tortoise – currently active with desert tortoise or recent desert tortoise sign; Class 2 – Definitely Desert Tortoise – good condition, no evidence of recent use; Class 3 – Definitely Desert Tortoise – Deteriorated (includes collapsed); Class 4 – Possibly Desert Tortoise – good condition but unsure of species; Class 5 – Possibly Desert Tortoise – deteriorated (includes collapsed)

Relative Abundance Calculation

Desert tortoises are expected to be present within the SPGF area, proposed access road, pipeline ROW, and the transmission routes (both 500-kV route as well as 230-kV route – including the reroute near Harry Allen). This is based on the presence of sign and/or suitable burrows, though population estimates were not always possible because adult desert tortoises were not detected in all project components. An adult desert tortoise was observed in the buffer area associated with the 500-kV Transmission Line alternative but tortoises located in buffer areas are not used to generate relative abundance estimates.

As detailed in the 2010 USFWS protocol, corrected desert tortoise estimates are calculated upon completion of the field surveys. These calculations were performed using the USFWS interactive Table 3, included in the *2010 Pre-project Survey Protocol* (USFWS 2010). This table calculates desert tortoise populations based on the number of adult tortoises observed during surveys, as described in the **Relative Abundance Calculation** section, above. Results from the May 2012 "Table 3" calculations indicate approximately 2.0 Desert Tortoises are expected to occupy the SPGF Project area (95%CI: 0.36-10.64). Results from the October 2012 "Table 3" calculations indicate approximately 6.8 Desert Tortoises are expected to occupy the pipeline ROW (95%CI: 1.98-23.11). Finally, results from the October 2013 "Table 3" calculations indicate that approximately 2.0 desert tortoises are expected to occupy the rerouted portions of the 230 kV transmission line ROW (95% CI: 0.37-10.77). Copies of the completed "Table 3's" are included in **Appendix 3**.

Other Sensitive Species

No gila monster or Burrowing Owl sign or individuals were observed in or immediately adjacent to any project components during the 2012 or 2013 surveys. The Project area represents potentially suitable habitat for Burrowing Owls. Potentially suitable Burrowing Owl burrows were relatively scarce, though present at the Project site. None of these burrows showed evidence of recent occupancy by Burrowing Owls (scat, scratches, feathers, prey items, pellets, etc.). No Burrowing Owl individuals were observed during pedestrian desert tortoise surveys or incidentally while driving in the Project area. A single Burrowing Owl and apparently occupied burrow was incidentally observed approximately 1.25 miles north of the 230 kV reroute.

Gila monsters are known to occupy a variety of vegetation types across their range including desert scrub, thorn scrub, pinyon-juniper or oak woodlands and rarely agricultural habitats. Most frequently, this species is found on low slopes or canyon bottoms with relatively steep rocky slopes. Burrows are important for this species as is temporary shelter. Gila monsters spend 95-98% of their lives underground (NatureServ 2012). Several potentially suitable burrows were observed during the surveys but no sign of gila monster activity was observed at any of these burrows. No gila monster individuals were observed, though sightings of individuals are relatively uncommon given the amount of time spent underground. May is considered their most active month for gila monsters in Nevada (Nevada Department of Wildlife 2012).

REFERENCES

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Appendix 1 – Survey Data Sheets

USFWS 2010 DESERT TORTOISE PRE-PROJECT SURVEY DATA SHEET

Please submit a completed copy to the action agency and local USFWS office within 30-days of survey completion

Date of survey: 30, Sept. 2013 (day, month, year) Survey biologist(s): Pat Golden (303) 618-7910 pgolden@heritage-ec.com, Scott Yancey, Daniel Livigni (name, email, and phone number)

Site description: 230-KV ReRoute for Moapa Solar Energy Center (project name and size; general location)

County: Clark Quad: ______ Location: ______ (UTM coordinates, lat-long, and/or TRS; map datum)

Circle one: 100% coverage or Sampling Area size to be surveyed: 2.25 miles x 120 meters Transect #: 1-6 Transect length: 2.25 miles

GPS Start-point: 11S 688062 4034188 637 m (easting, northing, elevation in meters) Start time: 1200 am/pm

GPS End-point: 11S 687651 4033205 655 m (easting, northing, elevation in meters) End time: 1438 am/pm

Start Temp: 30 ºC End Temp: 33 ºC

Live Tortoises

	Detection number	GPS location Easting	Northing	Time	Tortoise location (*in burrow*: all of tortoise beneath plane of burrow opening, or *not in burrow*)	Approx MCL >160-mm? (*Yes, No or Unknown*)	Existing tag # and color, if present
DL003	1	687615	4033208	1317	not in burrow	Yes	N/A, transect 2
	2						
	3						
	4						
	5						
	6						
	7						
	8						

Tortoise Sign (burrows, scats, carcasses, etc)

	Detection number	GPS location Easting	Northing	Type of sign (*burrows, scats, carcass, etc*)	Description and comments
DL001	1	686638	4033397	Burrow	Class 2, Transect 2
PG001	2	686686	4033349	Burrow	Class 3, Transect 1
DL002	3	687247	4032971	Burrow	Class 5, Transect 2
DL003	4	687615	4033208	Burrow	Class 1: adult DT observed just outside entrance, fresh urine left from burrow Transect 2
DL004	5	687463	4033077	Burrow	Class 3, Transect 5
DL005	6	687711	4034199	Burrow	Class 4, Transect 5
	7				
	8				

Page: 1 of 3

Transect number: 1-6

USFWS 2010 DESERT TORTOISE PRE-PROJECT SURVEY DATA SHEET

Please submit a completed copy to the action agency and local USFWS office within 30-days of survey completion

Date of survey: 2, Oct, 2013 (day, month, year) Survey biologist(s): See page 1 of 3 (name, email, and phone number)

Site description: See page 1 of 3 (project name and size; general location)

County: Clark Quad: ______ Location: ______ (UTM coordinates, lat-long, and/or TRS; map datum)

Circle one: 100% coverage or Sampling Area size to be surveyed: See page 1 of 3 Transect #: 6-12 Transect length: 2.25 miles

GPS Start-point: 11S 688055 4034247 637 m (easting, northing, elevation in meters) Start time: 0706 am/pm

GPS End-point: 11S 687683 4033158 655 m (easting, northing, elevation in meters) End time: 0955 am/pm

Start Temp: 19 °C End Temp: 29 °C

Live Tortoises

Detection number	GPS location Easting	Northing	Time	Tortoise location (*in burrow*: all of tortoise beneath plane of burrow opening, or *not in burrow*)	Approx MCL >160-mm? (*Yes, No or Unknown*)	Existing tag # and color, if present
1						
2						
3						
4						
5						
6						
7						
8						

Tortoise Sign (burrows, scats, carcasses, etc)

	Detection number	GPS location Easting	Northing	Type of sign (*burrows, scats, carcass, etc*)	Description and comments
PG004	1	687735	4034217	Burrow	Class 5, Transect 7
PG005	2	687722	4034221	Burrow	Class 5, Transect 7
DL010	3	686495	4033581	Burrow	Class 2, Transect 8
PG006	4	686675	4033293	Burrow	Shallow (~2 ft. deep) Transect 7 Class 2, appears to be under construction
DL011	5	686895	4033031	Burrow	Class 5, Transect 8
DL012	6	687569	4033065	Burrow	Fresh spoils indicate Class 1, recent DT use Transect 11
DL013	7	687525	4033038	Burrow	Class 2, Transect 11
DL014	8	687299	4032898	Burrow	Class 3, Transect 11

Transect number: 6-12

USFWS 2010 Desert Tortoise Pre-Project Survey Data Sheet

Please submit a completed copy to the action agency and local USFWS office within 30-days of survey completion

Date of survey: 2, Oct, 2013 (day, month, year) Survey biologist(s): See page 1 of 3 (name, email, and phone number)

Site description: See page 1 of 3 (project name and size; general location)

County: Clark Quad: ______ Location: ______ (UTM coordinates, lat-long, and/or TRS; map datum)

Circle one: 100% coverage or Sampling Area size to be surveyed: See page 1 of 3 Transect #: 6-12 Transect length: 2.25 miles

GPS Start-point: 11S 688055 4034247 637 m (easting, northing, elevation in meters) Start time: 0706 am/pm

GPS End-point: 11S 687683 4033158 655 m (easting, northing, elevation in meters) End time: 0855 am/pm

Start Temp: 19 °C End Temp: 27 °C

Live Tortoises

Detection number	GPS location Easting	Northing	Time	Tortoise location (*in burrow*: all of tortoise beneath plane of burrow opening, or *not in burrow*)	Approx MCL >160-mm? (*Yes, No or Unknown*)	Existing tag # and color, if present
1						
2						
3						
4						
5						
6						
7						
8						

Tortoise Sign (burrows, scats, carcasses, etc)

	Detection number	GPS location Easting	Northing	Type of sign (*burrows, scats, carcass, etc*)	Description and comments
SY009	1	686947	4032909	Shell	- Carapace & plastron intact (225 mm MCL) · Scute delamination (~2 yrs since death)
PG007	2	686628	4033286	Burrow	Class 4, Transect 10
SY010	3	687877	4034277	Burrow	Class 2, Transect 12
	4				
	5				
	6				
	7				
	8				

Transect number: 6-12

Appendix 2 – Photographs

Representative creosote bush-white bursage scrub on solar site (May 2012)

Tortoise in burrow on 230 kV transmission route (May 2012)

Representative habitat near Harry Allen substation (May 2012)

Dry lakebed on 230 kV transmission route (unsuitable habitat) (May 2012)

Example of suitable burrow on water pipeline ROW (Oct 2012)

Representative habitat on the water pipeline ROW (Oct 2012)

Live desert tortoise observed on water pipeline ROW (Oct 2012)

Representative habitat on the 230 kV re-route ROW (Oct 2013)

Desert tortoise shell located on 230 kV re-route (Oct 2013)

Appendix 3 – USFWS "Table 3" Relative Abundance Calculation

Table 3. USFWS Desert Tortoise Pre-Project Survey Guidance

What is the estimated number of tortoises and associated 95% confidence interval for the action area?

INSTRUCTIONS ***Use this tab when all your transects were of equal length.***

Enter the appropriate values from the survey into the yellow cells below. The number of tortoises and assocated 95% confidence interval for the action area will be calculated.

N =	**2.0**
Lower 95%CI =	**0.36**
Upper 95%CI =	**10.64**
Total action area (acres)	**850**
Prob that a tort is above ground given winter rainfall (Pa from Table 2) =	**0.800**
Total length of transects walked (L, km) =	**348**
Transect length (km)	**2**
Number of transects walked (k) =	**174**
Number of tortoises found during surveys (n) =	**1**

Transects all the same length

Number of tortoises (n_i)	**Number of transects on which (n_i) tortoises were**
0	173
1	1
2	0
3	0
4	0
5	0
6	0
7	0
8	0
9	0

October 2012 Survey

Table 3. USFWS Desert Tortoise Pre-Project Survey Guidance	
What is the estimated number of tortoises and associated 95% confidence interval for the action area?	
INSTRUCTIONS ***Use this tab when all your transects were of equal length.*** *Enter the appropriate values from the survey into the yellow cells below. The number of tortoises and assocated 95% confidence interval for the action area will be calculated.*	
N =	6.8
Lower 95%CI =	1.98
Upper 95%CI =	23.11
Total action area (acres)	177
Prob that a tort is above ground given winter rainfall (Pa from Table 2) =	0.800
Total length of transects walked (L, km) =	42
Transect length (km)	8
Number of transects walked (k) =	5
Number of tortoises found during surveys (n) =	2

Transects all the same length

Number of tortoises (n_i)	Number of transects on which (n_i) tortoises were seen
0	3
1	2
2	0
3	0
4	0
5	0
6	0
7	0
8	0
9	0

Table 3. USFWS Desert Tortoise Pre-Project Survey Guidance

What is the estimated number of tortoises and associated 95% confidence interval for the action area?

INSTRUCTIONS ***Use this tab when all your transects were of equal length.***

Enter the appropriate values from the survey into the yellow cells below. The number of tortoises and assocated 95% confidence interval for the action area will be calculated.

N =	**2.0**
Lower 95%CI =	**0.37**
Upper 95%CI =	**10.77**
Total action area (acres)	**103**
Prob that a tort is above ground given winter rainfall (Pa from Table 2) =	**0.800**
Total length of transects walked (L, km) =	**42**
Transect length (km)	**3**
Number of transects walked (k) =	**12**
Number of tortoises found during surveys (n) =	**1**

Transects all the same length

Number of tortoises (n_i)	Number of transects on which (n_i) tortoises were
0	11
1	1
2	0
3	0
4	0
5	0
6	0
7	0
8	0
9	0

Appendix I

Cultural Resource Consultation

United States Department of the Interior
BUREAU OF INDIAN AFFAIRS
WESTERN REGIONAL OFFICE
2600 North Central Avenue
Phoenix, Arizona 85004-3008

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:
Environmental Quality Services

NOV 19 2012

Mr. Ronald M. James
State Historic Preservation Officer
Nevada State Historic Preservation Office
901 South Stewart Street, Suite 5004
Carson City, Nevada 89701-5246

Dear Mr. James:

This letter and the enclosures constitute initiation of the process prescribed by Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA), and codified at 36 CFR 800. As Lead Agency Official at 36 CFR 800.2(a)(2), we have determined that the proposed project constitutes a federal undertaking: **approval of a lease for the Moapa Solar Energy Center and associated facilities, Clark County, Nevada (Project No. 2009-223)**. As noted in the enclosed Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS), the undertaking can be characterized as consisting of up to two components comprising approximately 1,000 acres on land of the Moapa Band of Paiute Indians. The proposed undertaking will further require right-of-way approval by the Bureau of Land Management (BLM) for an associated transmission line and access road.

The undertaking would entail construction of a solar photovoltaic plant of up to 200 megawatts (MWs) and/or a concentrated solar power (CSP) facility up to 100 MWs. The CSP facility would consist of either: a) twenty-four 250-foot tall towers between heliostat mirrors; or b) modular flat reflectors to focus energy onto elevated receivers with a height of approximately 80 feet. Also included are transmission lines and an access road located on both tribal and BLM lands and a water pipeline on tribal land.

Pursuant to 36 CFR 800.3, we wish to initiate the consultation process for the undertaking with the Nevada State Historic Preservation Office (SHPO). We are writing to request your views and consult regarding the following prescribed steps:

Involving the public pursuant to 36 CFR 800.3(e): We plan to involve the public while developing the EIS under the National Environmental Policy Act (NEPA). As part of the NEPA review process, we will employ BIA, BLM, and Tribal notification procedures for addressing our responsibilities as defined at 36 CFR 800.2(d).

Identifying other consulting parties pursuant to 36 CFR 800.3(f): Besides your office, the consulting parties identified to date for this undertaking include the Moapa Band of Paiute Indians as identified at 36 CFR 800.3(d), Moapa Solar LLC, BLM Las Vegas Field Office, and National Park Service (NPS). Pursuant to 36 CFR 800.2(c)(2)(ii), we presently are approaching Tribes in the region that may attach religious and cultural significance to historic properties that may be affected by the undertaking. Pursuant to 36 CFR 800.2(c)(5), we also are approaching the Old Spanish Trail Association.

Determining the Area of Potential Effects (APE) pursuant to 36 CFR 800.4(a)(1): We presently consider the APE to include the parcel of approximately 1,000 contiguous acres for the solar energy center lease and all associated facilities, including a water line, alternative transmission routes, and associated access roads. We propose the indirect APE for the undertaking to extend from the lease area a radius of five miles or the visual horizon, whichever is closer.

Any additional efforts that may be necessary to identify historic properties in the APE pursuant to 36 CFR 800.4(b): As we follow subsequent steps in the consultation process, we will submit an archeological survey report for your review that covers the proposed lease area, transmission line alignments, and any other associated facilities. We note that an ethnographic study conducted for a previously proposed project adjoining the present project area revealed no traditional cultural properties. We anticipate a viewshed analysis will be used to identify areas in the indirect APE from which the undertaking may be visible.

We look forward to your views on these steps and additional efforts we may employ to satisfy our responsibilities as prescribed by the NHPA.

If there are any questions, please contact Mr. Garry J. Cantley, Regional Archeologist, at (602) 379-6750 extension 1256.

Sincerely,

/s/ Rodney McVey

Deputy Regional Director - Trust Services

Enclosures

cc: Superintendent, Southern Paiute Agency (w/enc)
Attn: Environmental Coordinator
Chairman, Moapa Business Council (w/enc)
Chairperson, Moapa Cultural Committee (w/enc)
Field Manager, BLM Las Vegas Field Office (w/enc)
Renewable Energy Specialist, Pacific West Region, NPS (w/enc)
Cultural Resource Specialist, Nat'l Trails System-Intermountain Region, NPS (w/enc)
Environmental Review Office, Region 9, EPA (w/enc)
Biologist, Southern Nevada Field Office, USFWS (w/enc)
Senior Manager Development, Solar, RES Americas (w/enc)
Regional Realty Officer, WRO (w/enc)
Federal Preservation Officer, CO (w/enc)

United States Department of the Interior

BUREAU OF INDIAN AFFAIRS
WESTERN REGIONAL OFFICE
2600 North Central Avenue
Phoenix, Arizona 85004-3008

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:
Environmental Quality Services

NOV 19 2012

Mr. Dennis Ditmanson
Association Manager
Old Spanish Trail Association
P.O. Box 909
Las Vegas, New Mexico 87701

Dear Mr. Ditmanson:

As Agency Official for purposes of Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA), the Western Regional Office of the Bureau of Indian Affairs (BIA) wishes to consult with the Old Spanish Trail Association (OSTA) about the proposed project: **approval of a lease for the Moapa Solar Energy Center and associated facilities, Clark County, Nevada (Project No. 2009-223).** As noted in the enclosed Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS), the undertaking can be characterized as consisting of up to two components comprising approximately 1,000 acres on land of the Moapa Band of Paiute Indians. The proposed undertaking will further require right-of-way approval by the Bureau of Land Management (BLM) for an associated transmission line and access road.

The undertaking would entail construction of a solar photovoltaic plant of up to 200 megawatts (MWs) and/or a concentrated solar power (CSP) facility up to 100 MWs. The CSP facility would consist of either: a) twenty-four 250-foot tall towers between heliostat mirrors; or b) modular flat reflectors to focus energy onto elevated receivers with a height of approximately 80 feet. Also included are transmission lines and an access road located on both tribal and BLM lands and a water pipeline on tribal land.

The BIA is serving as Lead Federal Agency as described at 36 CFR 800.2(a)(2) for the project. Consulting parties identified to date for this undertaking include the Moapa Band of Paiute Indians, Nevada State Historic Preservation Office, Moapa Solar LLC, BLM Las Vegas Field Office, and National Park Service (NPS). A cultural resource inventory report will be prepared for the proposed area of potential effects (APE). We note that an ethnographic study conducted for a previously proposed project adjoining the present project area revealed no traditional cultural properties.

Following provisions of the NHPA, we are seeking counsel with the OSTA regarding the proposed undertaking to identify any concerns about historic properties; advise on our identification efforts and evaluation of historic properties; articulate views on the undertaking's effects; and participate in the resolution of any adverse effects. We specifically are asking to be advised if the OSTA has any concerns about the effects of the project on the Old Spanish Trail Corridor and any related trail segments.

We look forward to your views on this project and other efforts we may employ to satisfy our responsibilities as prescribed by the NHPA.

If there are any questions, please contact Mr. Garry J. Cantley, Regional Archeologist, at (602) 379-6750 extension 1256.

Sincerely,

/s/ Rodney McVey

Deputy Regional Director - Trust Services

Enclosures

cc: Superintendent, Southern Paiute Agency
Attn: Environmental Coordinator
Chairman, Moapa Business Council
Chairperson, Moapa Cultural Committee
Field Manager, BLM Las Vegas Field Office
Renewable Energy Specialist, Pacific West Region, NPS
Cultural Resource Specialist, Nat'l Trails System-Intermountain Region, NPS
Federal Preservation Officer, CO
Senior Manager Development, Solar, RES Americas
Nevada Director, Board of Directors OSTA (w/enc)
President, Nevada Chapter, OSTA (w/enc)
President, Board of Directors OSTA (w/enc)

United States Department of the Interior
BUREAU OF INDIAN AFFAIRS
WESTERN REGIONAL OFFICE
2600 North Central Avenue
Phoenix, Arizona 85004-3008

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:
Environmental Quality Services

NOV 19 2012

Honorable Edward D. Smith
Chairman, Chemehuevi Tribal Council
P.O. Box 1976
Havasu Lake, California 92362

Dear Chairman Smith:

As Agency Official for purposes of Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA), the Western Regional Office of the Bureau of Indian Affairs (BIA) wishes to consult with the Chemehuevi Indian Tribe (CIT) about the proposed project: **approval of a lease for the Moapa Solar Energy Center and associated facilities, Clark County, Nevada (Project No. 2009-223).** As noted in the enclosed Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS), the undertaking can be characterized as consisting of up to two components comprising approximately 1,000 acres on land of the Moapa Band of Paiute Indians. The proposed undertaking will further require right-of-way approval by the Bureau of Land Management (BLM) for an associated transmission line and access road.

The undertaking would entail construction of a solar photovoltaic plant of up to 200 megawatts (MWs) and/or a concentrated solar power (CSP) facility up to 100 MWs. The CSP facility would consist of either: a) twenty-four 250-foot tall towers between heliostat mirrors; or b) modular flat reflectors to focus energy onto elevated receivers with a height of approximately 80 feet. Also included are transmission lines and an access road located on both tribal and BLM lands and a water pipeline on tribal land.

The BIA is serving as Lead Federal Agency as described at 36 CFR 800.2(a)(2) for the project. Consulting parties identified to date for this undertaking include the Moapa Band of Paiute Indians, Nevada State Historic Preservation Office, Moapa Solar LLC, BLM Las Vegas Field Office, and National Park Service (NPS). A cultural resource inventory report will be prepared for the proposed area of potential effects (APE). We note that an ethnographic study conducted for a previously proposed project adjoining the present project area revealed no traditional cultural properties.

Following provisions of the NHPA, we are seeking counsel with your office regarding the proposed undertaking to identify any concerns about historic properties; advise on our identification efforts and evaluation of historic properties; articulate views on the undertaking's effects; and participate in the resolution of any adverse effects. We specifically are asking to be advised if the CIT attaches religious and cultural significance to any historic properties in the APE.

We look forward to your views on this project and other efforts we may employ to satisfy our responsibilities as prescribed by the NHPA.

If there are any questions, please contact Mr. Garry J. Cantley, Regional Archeologist, at (602) 379-6750 extension 1256.

Sincerely,

/s/ Rodney McVey

Deputy Regional Director - Trust Services

Enclosures

cc: Superintendent, Southern Paiute Agency
Attn: Environmental Coordinator
Superintendent, Colorado River Agency
Chairman, Moapa Business Council
Chairperson, Moapa Cultural Committee
Field Manager, BLM Las Vegas Field Office
Renewable Energy Specialist, Pacific West Region, NPS
Cultural Resource Specialist, Nat'l Trails System-Intermountain Region, NPS
Senior Manager Development, Solar, RES Americas
Director of Cultural Resources, CIT (w/enc)

United States Department of the Interior
BUREAU OF INDIAN AFFAIRS
WESTERN REGIONAL OFFICE
2600 North Central Avenue
Phoenix, Arizona 85004-3008

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:
Environmental Quality Services

NOV 19 2012

Honorable Eldred Enas
Chairman, Colorado River Indian Tribes
26600 Mohave Road
Parker, Arizona 85344-7737

Dear Chairman Enas:

As Agency Official for purposes of Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA), the Western Regional Office of the Bureau of Indian Affairs (BIA) wishes to consult with the Colorado River Indian Tribes (CRIT) about the proposed project: **approval of a lease for the Moapa Solar Energy Center and associated facilities, Clark County, Nevada (Project No. 2009-223).** As noted in the enclosed Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS), the undertaking can be characterized as consisting of up to two components comprising approximately 1,000 acres on land of the Moapa Band of Paiute Indians. The proposed undertaking will further require right-of-way approval by the Bureau of Land Management (BLM) for an associated transmission line and access road.

The undertaking would entail construction of a solar photovoltaic plant of up to 200 megawatts (MWs) and/or a concentrated solar power (CSP) facility up to 100 MWs. The CSP facility would consist of either: a) twenty-four 250-foot tall towers between heliostat mirrors; or b) modular flat reflectors to focus energy onto elevated receivers with a height of approximately 80 feet. Also included are transmission lines and an access road located on both tribal and BLM lands and a water pipeline on tribal land.

The BIA is serving as Lead Federal Agency as described at 36 CFR 800.2(a)(2) for the project. Consulting parties identified to date for this undertaking include the Moapa Band of Paiute Indians, Nevada State Historic Preservation Office, Moapa Solar LLC, BLM Las Vegas Field Office, and National Park Service (NPS). A cultural resource inventory report will be prepared for the proposed area of potential effects (APE). We note that an ethnographic study conducted for a previously proposed project adjoining the present project area revealed no traditional cultural properties.

Following provisions of the NHPA, we are seeking counsel with your office regarding the proposed undertaking to identify any concerns about historic properties; advice on our identification efforts and evaluation of historic properties; articulate views on the undertaking's effects; and participate in the resolution of any adverse effects. We specifically are asking to be advised if the CRIT attaches religious and cultural significance to any historic properties in the APE.

We look forward to your views on this project and other efforts we may employ to satisfy our responsibilities as prescribed by the NHPA.

If there are any questions, please contact Mr. Garry J. Cantley, Regional Archeologist, at (602) 379-6750 extension 1256.

Sincerely,

/s/ Rodney McVey

Deputy Regional Director - Trust Services

Enclosures

cc: Superintendent, Southern Paiute Agency
Attn: Environmental Coordinator
Superintendent, Colorado River Agency
Chairman, Moapa Business Council
Chairperson, Moapa Cultural Committee
Field Manager, BLM Las Vegas Field Office
Renewable Energy Specialist, Pacific West Region, NPS
Cultural Resource Specialist, Nat'l Trails System-Intermountain Region, NPS
Senior Manager Development, Solar, RES Americas
Director, CRIT Museum (w/enc)

United States Department of the Interior
BUREAU OF INDIAN AFFAIRS
WESTERN REGIONAL OFFICE
2600 North Central Avenue
Phoenix, Arizona 85004-3008

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:
Environmental Quality Services

NOV 19 2012

Honorable Timothy Williams
Chairman, Fort Mojave Tribal Council
500 Merriman Avenue
Needles, California 92363

Dear Chairman Williams:

As Agency Official for purposes of Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA), the Western Regional Office of the Bureau of Indian Affairs (BIA) wishes to consult with the Fort Mojave Indian Tribe (FMIT) about the proposed project: **approval of a lease for the Moapa Solar Energy Center and associated facilities, Clark County, Nevada (Project No. 2009-223).** As noted in the enclosed Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS), the undertaking can be characterized as consisting of up to two components comprising approximately 1,000 acres on land of the Moapa Band of Paiute Indians. The proposed undertaking will further require right-of-way approval by the Bureau of Land Management (BLM) for an associated transmission line and access road.

The undertaking would entail construction of a solar photovoltaic plant of up to 200 megawatts (MWs) and/or a concentrated solar power (CSP) facility up to 100 MWs. The CSP facility would consist of either: a) twenty-four 250-foot tall towers between heliostat mirrors; or b) modular flat reflectors to focus energy onto elevated receivers with a height of approximately 80 feet. Also included are transmission lines and an access road located on both tribal and BLM lands and a water pipeline on tribal land.

The BIA is serving as Lead Federal Agency as described at 36 CFR 800.2(a)(2) for the project. Consulting parties identified to date for this undertaking include the Moapa Band of Paiute Indians, Nevada State Historic Preservation Office, Moapa Solar LLC, BLM Las Vegas Field Office, and National Park Service (NPS). A cultural resource inventory report will be prepared for the proposed area of potential effects (APE). We note that an ethnographic study conducted for a previously proposed project adjoining the present project area revealed no traditional cultural properties.

Following provisions of the NHPA, we are seeking counsel with your office regarding the proposed undertaking to identify any concerns about historic properties; advise on our identification efforts and evaluation of historic properties; articulate views on the undertaking's effects; and participate in the resolution of any adverse effects. We specifically are asking to be advised if the FMIT attaches religious and cultural significance to any historic properties in the APE.

We look forward to your views on this project and other efforts we may employ to satisfy our responsibilities as prescribed by the NHPA.

If there are any questions, please contact Mr. Garry J. Cantley, Regional Archeologist, at (602) 379-6750 extension 1256.

Sincerely,

/s/ Rodney McVey

Deputy Regional Director - Trust Services

Enclosures

cc: Superintendent, Southern Paiute Agency
Attn: Environmental Coordinator
Superintendent, Colorado River Agency
Chairman, Moapa Business Council
Chairperson, Moapa Cultural Committee
Field Manager, BLM Las Vegas Field Office
Renewable Energy Specialist, Pacific West Region, NPS
Cultural Resource Specialist, Nat'l Trails System-Intermountain Region, NPS
Senior Manager Development, Solar, RES Americas
Director, Aha Makav Cultural Society, FMIT (w/enc)

United States Department of the Interior

BUREAU OF INDIAN AFFAIRS
WESTERN REGIONAL OFFICE
2600 North Central Avenue
Phoenix, Arizona 85004-3008

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:
Environmental Quality Services

NOV 19 2012

Honorable Sherry J. Counts
Chairwoman, Hualapai Tribal Council
P.O. Box 179
Peach Springs, Arizona 86434

Dear Chairwoman Counts:

As Agency Official for purposes of Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA), the Western Regional Office of the Bureau of Indian Affairs (BIA) wishes to consult with the Hualapai Indian Tribe about the proposed project: **approval of a lease for the Moapa Solar Energy Center and associated facilities, Clark County, Nevada (Project No. 2009-223).** As noted in the enclosed Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS), the undertaking can be characterized as consisting of up to two components comprising approximately 1,000 acres on land of the Moapa Band of Paiute Indians. The proposed undertaking will further require right-of-way approval by the Bureau of Land Management (BLM) for an associated transmission line and access road.

The undertaking would entail construction of a solar photovoltaic plant of up to 200 megawatts (MWs) and/or a concentrated solar power (CSP) facility up to 100 MWs. The CSP facility would consist of either: a) twenty-four 250-foot tall towers between heliostat mirrors; or b) modular flat reflectors to focus energy onto elevated receivers with a height of approximately 80 feet. Also included are transmission lines and an access road located on both tribal and BLM lands and a water pipeline on tribal land.

The BIA is serving as Lead Federal Agency as described at 36 CFR 800.2(a)(2) for the project. Consulting parties identified to date for this undertaking include the Moapa Band of Paiute Indians, Nevada State Historic Preservation Office, Moapa Solar LLC, BLM Las Vegas Field Office, and National Park Service (NPS). A cultural resource inventory report will be prepared for the proposed area of potential effects (APE). We note that an ethnographic study conducted for a previously proposed project adjoining the present project area revealed no traditional cultural properties.

Following provisions of the NHPA, we are seeking counsel with your office regarding the proposed undertaking to identify any concerns about historic properties; advise on our identification efforts and evaluation of historic properties; articulate views on the undertaking's effects; and participate in the resolution of any adverse effects. We specifically are asking to be advised if the Hualapai Indian Tribe attaches religious and cultural significance to any historic properties in the APE.

We look forward to your views on this project and other efforts we may employ to satisfy our responsibilities as prescribed by the NHPA.

If there are any questions, please contact Mr. Garry J. Cantley, Regional Archeologist, at (602) 379-6750 extension 1256.

Sincerely,

/s/ Rodney McVey

Deputy Regional Director - Trust Services

Enclosures

cc: Superintendent, Southern Paiute Agency
Attn: Environmental Coordinator
Superintendent, Truxton Canon Agency
Chairman, Moapa Business Council
Chairperson, Moapa Cultural Committee
Field Manager, BLM Las Vegas Field Office
Renewable Energy Specialist, Pacific West Region, NPS
Cultural Resource Specialist, Nat'l Trails System-Intermountain Region, NPS
Senior Manager Development, Solar, RES Americas
Tribal Historic Preservation Officer, Hualapai Indian Tribe (w/enc)

United States Department of the Interior
BUREAU OF INDIAN AFFAIRS
WESTERN REGIONAL OFFICE
2600 North Central Avenue
Phoenix, Arizona 85004-3008

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:
Environmental Quality Services

NOV 19 2012

Honorable Leroy N. Shingoitewa
Chairman, Hopi Tribal Council
P.O. Box 123
Kykotsmovi, Arizona 86039

Dear Chairman Shingoitewa:

As Agency Official for purposes of Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA), the Western Regional Office of the Bureau of Indian Affairs (BIA) wishes to consult with the Hopi Tribe about the proposed project: **approval of a lease for the Moapa Solar Energy Center and associated facilities, Clark County, Nevada (Project No. 2009-223).** As noted in the enclosed Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS), the undertaking can be characterized as consisting of up to two components comprising approximately 1,000 acres on land of the Moapa Band of Paiute Indians. The proposed undertaking will further require right-of-way approval by the Bureau of Land Management (BLM) for an associated transmission line and access road.

The undertaking would entail construction of a solar photovoltaic plant of up to 200 megawatts (MWs) and/or a concentrated solar power (CSP) facility up to 100 MWs. The CSP facility would consist of either: a) twenty-four 250-foot tall towers between heliostat mirrors; or b) modular flat reflectors to focus energy onto elevated receivers with a height of approximately 80 feet. Also included are transmission lines and an access road located on both tribal and BLM lands and a water pipeline on tribal land.

The BIA is serving as Lead Federal Agency as described at 36 CFR 800.2(a)(2) for the project. Consulting parties identified to date for this undertaking include the Moapa Band of Paiute Indians, Nevada State Historic Preservation Office, Moapa Solar LLC, BLM Las Vegas Field Office, and National Park Service (NPS). A cultural resource inventory report will be prepared for the proposed area of potential effects (APE). We note that an ethnographic study conducted for a previously proposed project adjoining the present project area revealed no traditional cultural properties.

Following provisions of the NHPA, we are seeking counsel with your office regarding the proposed undertaking to identify any concerns about historic properties; advise on our identification efforts and evaluation of historic properties; articulate views on the undertaking's effects; and participate in the resolution of any adverse effects. We specifically are asking to be advised if the Hopi Tribe attaches religious and cultural significance to any historic properties in the APE.

We look forward to your views on this project and other efforts we may employ to satisfy our responsibilities as prescribed by the NHPA.

If there are any questions, please contact Mr. Garry J. Cantley, Regional Archeologist, at (602) 379-6750 extension 1256.

Sincerely,

/s/ Rodney McVey

Deputy Regional Director - Trust Services

Enclosures

cc: Superintendent, Southern Paiute Agency
Attn: Environmental Coordinator
Superintendent, Hopi Agency
Chairman, Moapa Business Council
Chairperson, Moapa Cultural Committee
Field Manager, BLM Las Vegas Field Office
Renewable Energy Specialist, Pacific West Region, NPS
Cultural Resource Specialist, Nat'l Trails System-Intermountain Region, NPS
Senior Manager Development, Solar, RES Americas
Director, Cultural Preservation Office, Hopi Tribe (w/enc)

United States Department of the Interior
BUREAU OF INDIAN AFFAIRS
WESTERN REGIONAL OFFICE
2600 North Central Avenue
Phoenix, Arizona 85004-3008

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:
Environmental Quality Services

NOV 19 2012

Honorable Manuel Savala
Chairman, Kaibab Paiute Tribal Council
HC65, Box 2
Fredonia, Arizona 86022

Dear Chairman Savala:

As Agency Official for purposes of Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA), the Western Regional Office of the Bureau of Indian Affairs (BIA) wishes to consult with the Kaibab Band of Paiute Indians about the proposed project: **approval of a lease for the Moapa Solar Energy Center and associated facilities, Clark County, Nevada (Project No. 2009-223).** As noted in the enclosed Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS), the undertaking can be characterized as consisting of up to two components comprising approximately 1,000 acres on land of the Moapa Band of Paiute Indians. The proposed undertaking will further require right-of-way approval by the Bureau of Land Management (BLM) for an associated transmission line and access road.

The undertaking would entail construction of a solar photovoltaic plant of up to 200 megawatts (MWs) and/or a concentrated solar power (CSP) facility up to 100 MWs. The CSP facility would consist of either: a) twenty-four 250-foot tall towers between heliostat mirrors; or b) modular flat reflectors to focus energy onto elevated receivers with a height of approximately 80 feet. Also included are transmission lines and an access road located on both tribal and BLM lands and a water pipeline on tribal land.

The BIA is serving as Lead Federal Agency as described at 36 CFR 800.2(a)(2) for the project. Consulting parties identified to date for this undertaking include the Moapa Band of Paiute Indians, Nevada State Historic Preservation Office, Moapa Solar LLC, BLM Las Vegas Field Office, and National Park Service (NPS). A cultural resource inventory report will be prepared for the proposed area of potential effects (APE). We note that an ethnographic study conducted for a previously proposed project adjoining the present project area revealed no traditional cultural properties.

Following provisions of the NHPA, we are seeking counsel with your office regarding the proposed undertaking to identify any concerns about historic properties; advise on our identification efforts and evaluation of historic properties; articulate views on the undertaking's effects; and participate in the resolution of any adverse effects. We specifically are asking to be advised if the Kaibab Band of Paiute Indians attaches religious and cultural significance to any historic properties in the APE.

We look forward to your views on this project and other efforts we may employ to satisfy our responsibilities as prescribed by the NHPA.

If there are any questions, please contact Mr. Garry J. Cantley, Regional Archeologist, at (602) 379-6750 extension 1256.

Sincerely,

/s/ Rodney McVey

Deputy Regional Director - Trust Services

Enclosures

cc: Superintendent, Southern Paiute Agency
Attn: Environmental Coordinator
Chairman, Moapa Business Council
Chairperson, Moapa Cultural Committee
Field Manager, BLM Las Vegas Field Office
Renewable Energy Specialist, Pacific West Region, NPS
Cultural Resource Specialist, Nat'l Trails System-Intermountain Region, NPS
Senior Manager Development, Solar, RES Americas
Cultural Preservation Director, Kaibab (w/enc)

United States Department of the Interior
BUREAU OF INDIAN AFFAIRS
WESTERN REGIONAL OFFICE
2600 North Central Avenue
Phoenix, Arizona 85004-3008

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:
Environmental Quality Services

NOV 19 2012

Honorable Bennie Tso
Chairman, Las Vegas Paiute Tribe
One Paiute Drive
Las Vegas, Nevada 89106

Dear Chairman Tso:

As Agency Official for purposes of Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA), the Western Regional Office of the Bureau of Indian Affairs (BIA) wishes to consult with the Las Vegas Paiute Tribe about the proposed project: **approval of a lease for the Moapa Solar Energy Center and associated facilities, Clark County, Nevada (Project No. 2009-223).** As noted in the enclosed Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS), the undertaking can be characterized as consisting of up to two components comprising approximately 1,000 acres on land of the Moapa Band of Paiute Indians. The proposed undertaking will further require right-of-way approval by the Bureau of Land Management (BLM) for an associated transmission line and access road.

The undertaking would entail construction of a solar photovoltaic plant of up to 200 megawatts (MWs) and/or a concentrated solar power (CSP) facility up to 100 MWs. The CSP facility would consist of either: a) twenty-four 250-foot tall towers between heliostat mirrors; or b) modular flat reflectors to focus energy onto elevated receivers with a height of approximately 80 feet. Also included are transmission lines and an access road located on both tribal and BLM lands and a water pipeline on tribal land.

The BIA is serving as Lead Federal Agency as described at 36 CFR 800.2(a)(2) for the project. Consulting parties identified to date for this undertaking include the Moapa Band of Paiute Indians, Nevada State Historic Preservation Office, Moapa Solar LLC, BLM Las Vegas Field Office, and National Park Service (NPS). A cultural resource inventory report will be prepared for the proposed area of potential effects (APE). We note that an ethnographic study conducted for a previously proposed project adjoining the present project area revealed no traditional cultural properties.

Following provisions of the NHPA, we are seeking counsel with your office regarding the proposed undertaking to identify any concerns about historic properties; advise on our identification efforts and evaluation of historic properties; articulate views on the undertaking's effects; and participate in the resolution of any adverse effects. We specifically are asking to be advised if the Las Vegas Paiute Tribe attaches religious and cultural significance to any historic properties in the APE.

We look forward to your views on this project and other efforts we may employ to satisfy our responsibilities as prescribed by the NHPA.

If there are any questions, please contact Mr. Garry J. Cantley, Regional Archeologist, at (602) 379-6750 extension 1256.

Sincerely,

/s/ Rodney McVey

Deputy Regional Director - Trust Services

Enclosures

cc: Superintendent, Southern Paiute Agency
Attn: Environmental Coordinator
Chairman, Moapa Business Council
Chairperson, Moapa Cultural Committee
Field Manager, BLM Las Vegas Field Office
Renewable Energy Specialist, Pacific West Region, NPS
Cultural Resource Specialist, Nat'l Trails System-Intermountain Region, NPS
Federal Preservation Officer, CO
Senior Manager Development, Solar, RES Americas
Manager, Environmental Programs, LVPT (w/enc)

United States Department of the Interior

BUREAU OF INDIAN AFFAIRS
WESTERN REGIONAL OFFICE
2600 North Central Avenue
Phoenix, Arizona 85004-3008

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:
Environmental Quality Services

NOV 19 2012

Honorable Jeanine Borchardt
Chairwoman, Paiute Indian Tribe of Utah Tribal Council
440 North Paiute Drive
Cedar City, Utah 84720-2613

Dear Chairwoman Borchardt:

As Agency Official for purposes of Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA), the Western Regional Office of the Bureau of Indian Affairs (BIA) wishes to consult with the Paiute Indian Tribe of Utah (PITU) about the proposed project: **approval of a lease for the Moapa Solar Energy Center and associated facilities, Clark County, Nevada (Project No. 2009-223).** As noted in the enclosed Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS), the undertaking can be characterized as consisting of up to two components comprising approximately 1,000 acres on land of the Moapa Band of Paiute Indians. The proposed undertaking will further require right-of-way approval by the Bureau of Land Management (BLM) for an associated transmission line and access road.

The undertaking would entail construction of a solar photovoltaic plant of up to 200 megawatts (MWs) and/or a concentrated solar power (CSP) facility up to 100 MWs. The CSP facility would consist of either: a) twenty-four 250-foot tall towers between heliostat mirrors; or b) modular flat reflectors to focus energy onto elevated receivers with a height of approximately 80 feet. Also included are transmission lines and an access road located on both tribal and BLM lands and a water pipeline on tribal land.

The BIA is serving as Lead Federal Agency as described at 36 CFR 800.2(a)(2) for the project. Consulting parties identified to date for this undertaking include the Moapa Band of Paiute Indians, Nevada State Historic Preservation Office, Moapa Solar LLC, BLM Las Vegas Field Office, and National Park Service (NPO). A cultural resource inventory report will be prepared for the proposed area of potential effects (APE). We note that an ethnographic study conducted for a previously proposed project adjoining the present project area revealed no traditional cultural properties.

Following provisions of the NHPA, we are seeking counsel with your office regarding the proposed undertaking to identify any concerns about historic properties; advise on our identification efforts and evaluation of historic properties; articulate views on the undertaking's effects; and participate in the resolution of any adverse effects. We specifically are asking to be advised if the PITU attaches religious and cultural significance to any historic properties in the APE.

We look forward to your views on this project and other efforts we may employ to satisfy our responsibilities as prescribed by the NHPA.

If there are any questions, please contact Mr. Garry J. Cantley, Regional Archeologist, at (602) 379-6750 extension 1256.

Sincerely,

/s/ Rodney McVey

Deputy Regional Director - Trust Services

Enclosures

cc: Superintendent, Southern Paiute Agency
Attn: Environmental Coordinator
Chairman, Moapa Business Council
Chairperson, Moapa Cultural Committee
Field Manager, BLM Las Vegas Field Office
Renewable Energy Specialist, Pacific West Region, NPS
Cultural Resource Specialist, Nat'l Trails System-Intermountain Region, NPS
Senior Manager Development, Solar, RES Americas
Cultural Resource Director, PITU (w/enc)

LEO M. DROZDOFF, P.E.
Director
Department of Conservation and Natural Resources

RONALD M. JAMES
State Historic Preservation Officer

BRIAN SANDOVAL
Governor

STATE OF NEVADA

Address Reply to:
901 S. Stewart Street, Suite 5004
Carson City, NV 89701-5248
Phone: (775) 684-3448
Fax: (775) 684-3442

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REGIONAL DIRECTOR

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DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES
STATE HISTORIC PRESERVATION OFFICE

December 20, 2012

Rodney McVey
Bureau of Indian Affairs
Western Regional Office
2600 North Central Avenue
Phoenix, Arizona 85004-3008

RE: *Approval of a Lease for the Moapa Solar Energy Center and Associated Facilities, Clark County, Nevada.*
Project No. 2009-223/ Undertaking #2013-2452.

Dear Mr. McVey:

The Nevada State Historic Preservation Office (SHPO) has initiated its review of the subject undertaking.

Based on the submitted information, the SHPO notes that identified members of the public and representatives of organizations that have a demonstrated interest in properties of cultural significance that could be affected by the undertaking is adequate. The SHPO will forward any additional interested parties and representatives of organizations that have a demonstrated interest in properties of cultural significance that could be affected by the undertaking should they make themselves known to this office.

Based on the submitted information, the SHPO concurs with the Bureau of Indian Affairs' (BIA) determination that the area of potential effect (APE) is adequate for identification of historic properties that could potential be affect by the above-mentioned undertaking.

The SHPO thanks the BIA for its initiative in beginning consultation with this office at such an early stage in the planning process for this undertaking. If you have any questions concerning this correspondence, please contact Jessica Axsom by phone at (775) 684-3445 or by e-mail at jaxsom@shpo.nv.gov.

Sincerely,

Rebecca Palmer

Rebecca Lynn Palmer, Deputy
State Historic Preservation Officer

THE HOPI TRIBE

LeRoy N. Shingoitewa
CHAIRMAN

Herman G. Honanie
VICE-CHAIRMAN

RECEIVED
DEC 03
BIA Western Region
Office of the Regional Director

November 29, 2012

Rodney McVey, Deputy Regional Director – Trust Services
Attention: Gary Cantley, Regional Archaeologist
Bureau of Indian Affairs, Western Regional Office
2600 North Central Ave.
Phoenix, Arizona 85004-3008

Dear Mr. McVey,

This letter is in response to your correspondence dated November 19, 2012, regarding a 1000 acre lease for the Moapa Solar Energy Center and associated facilities on land of the Moapa Band of Paiute Indians in Clark County, Nevada, Project No. 2009-223.

The Hopi Tribe claims cultural affiliation to Ancestral Puebloan prehistoric cultural groups in Nevada. The Hopi Cultural Preservation Office supports the identification and avoidance of prehistoric archaeological sites, and we consider the prehistoric archaeological sites of our ancestors to be "footprints" and Traditional Cultural Properties. Therefore, we appreciate the Bureau of Indian Affairs' solicitation of our input and your efforts to address our concerns.

The Hopi Cultural Preservation Office is not aware of any Traditional Cultural Properties in this project area. However, we are interested in consulting on any proposal that has the potential to adversely affect National Register eligible prehistoric sites. Therefore, if prehistoric sites are identified by the cultural resources survey of the area of potential effect that will be adversely affected by project activities, please provide us with copies of the survey report and any proposed draft treatment plan for review and comment.

If you have any questions or need additional information, please contact Terry Morgart at the Hopi Cultural Preservation Office at 928-734-3619 or tmorgart@hopi.nsn.us. Thank you for your consideration.

Respectfully,

Leigh J. Kuwanwisiwma, Director
Hopi Cultural Preservation Office

xc: Nevada State Historic Preservation Office

November 28, 2012

DEC 2012
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SERVICES

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Hualapai Department of Cultural Resources
P.O. Box 310, Peach Springs, Arizona 86434
Office: 928.769.2223 Fax 928.769.2235

December 10, 2012

Bureau of Indian Affairs
Attention: Mr. Rodney McVey, Deputy Regional Director
Western Regional Office
2600 North Central Avenue
Phoenix AZ 85004-3008

In Reference, Reply To:
HDCR2013-088

Reference: Moapa Solar Energy Center

Dear Sir,

It has come to our attention that the Bureau of Indian Affairs, Western Regional Office, (BIA) appears to be giving consideration to a proposed federal or federally-assisted undertaking in the within the Moapa Reservation, Nevada, with the potential to affect historic properties. Section 106 of the National Historic Preservation Act (NHPA), 16 U.S.C. §470f, requires that, prior to approving the expenditure of any federal funds on undertaking with the potential to affect historic properties, or prior to issuing any license or other authorization for such an undertaking, the federal agency must engage in the consultation process mandated by NHPA section 106.

The Hualapai Tribal would like to defer to the Moapa Band of Paiute Indians in all matters pertaining to the construction of the solar photovoltaic plant currently under consideration.

Thank you for consulting with the Hualapai Tribe on this matter. If you have any concerns, please feel free to contact our offices.

Sincerely,

Loretta Jackson-Kelly

Loretta Jackson-Kelly, THPO
Director, Hualapai Department of Cultural Resources

United States Department of the Interior
BUREAU OF INDIAN AFFAIRS
WESTERN REGIONAL OFFICE
2600 North Central Avenue
Phoenix, Arizona 85004-3008

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:
Environmental Quality Services

JUL 31 2013

Ms. Rebecca L. Palmer
Acting State Historic Preservation Officer
Nevada State Historic Preservation Office
901 South Stewart Street, Suite 5004
Carson City, Nevada 89701-5246

Dear Ms. Palmer:

As Agency Official for purposes of Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA), the Bureau of Indian Affairs (BIA) wishes to consult with you regarding the proposed undertaking: **approval of a lease for the RES Americas Moapa Solar Energy Center and grants of easement for associated transmission lines, access roads, and a water line (Project No. 2009-223).** This project would occur on lands of the Moapa River Indian Reservation and Bureau of Land Management (BLM) in Clark County, Nevada.

Since our letter of November 19, 2012, initiating the consultation process for this undertaking with your office, the preferred alternative of the proposed project has been redefined to solely entail photovoltaic technology. The undertaking now under consideration can be characterized as consisting of a solar photovoltaic plant generating up to 200 megawatts (MWs) and comprising approximately 1,000 acres on land of the Moapa Band of Paiute Indians. The proposed undertaking will require right-of-way approval by both the BIA and BLM for an associated transmission line (230 kV or 500 kV) and access road. BIA also may be asked to approve right-of-way for an associated water pipeline located entirely on tribal land.

Besides our respective offices, the Consulting Parties for the undertaking have been identified as the BLM Southern Nevada District Office, National Park Service (NPS), and Moapa Band of Paiute Indians as identified at 36 CFR 800.3(d). In consultation with these parties, we have made a reasonable and good faith effort to carry out appropriate identification efforts as prescribed at 36 CFR 800.4. We have gathered sufficient information to evaluate the eligibility of the identified properties for the National Register of Historic Places (National Register) and make a determination of effect. Documentation of this finding is provided in the enclosed report titled *An Archaeological Survey of Approximately 1,850 Acres for the Moapa Solar Energy Center, Clark County, Nevada* (Baker and Harper, July 2013).

It is our opinion that application of the National Register criteria has the following result:

Site Designation	Land Status	Eligible	Criteria	Historic Property Effects
Old Spanish National Historic Trail	BLM	Yes	A,B,D	No Adverse Effect
26CK3848 Mormon Wagon Road	Moapa BLM	Yes	A	No Adverse Effect
26CK6115 Alternative Route Segment Mormon Wagon Road	BLM	Yes	A	No Adverse Effect
26CK6528 Two rock rings w/possible trail	Moapa	No	A – D	N/A
26CK9851 Historic tin can scatter	BLM	No	A – D	N/A

In our application of the NHPA regulations regarding effects of the undertaking on historic properties, we have arrived at a determination of "**No Adverse Effect**" pursuant to 36 CFR 800.5(b).

A prominent historic feature in the area of potential effects (APE) is the Congressionally-designated Old Spanish National Historic Trail (Trail), the main route of which lies opposite Interstate 15 from the proposed solar generation facility. Although no direct effects would occur as a result of the proposed project, we have considered the indirect visual effects of the undertaking on the Trail. Our simulations from key observations points (KOP) of what the facility would look like before and after construction of the solar facility are provided in the enclosed report. As the simulations illustrate, the visual effects from the perspective of the Trail would be minimal. By letter dated November 19, 2012, we contacted the Old Spanish Trail Association (OSTA) in Las Vegas, Nevada, to inquire about any concerns that organization might have about project effects. Our correspondence and follow-up communication have not prompted any expressed concerns from the OSTA about the project. The Consulting Parties together have considered the potential effects of the proposed undertaking and judge that it would not alter any characteristics nor diminish any attributes of the Trail that make it worthy of its designation as a National Historic Trail.

Another trail referred to as the Old Spanish Trail/Mormon Wagon Road (26CK3848) would be crossed by one of the alternative access roads to the proposed solar facility. Although this historic road as a whole is eligible for the National Register, the segment within the APE has in previous consultations with your office been determined not to be a contributing element to the historic property's eligibility due to the issue of integrity. We are unaware of any new information or observations that would prompt us to reevaluate this determination.

Regarding still another trail in the APE, the Baker and Harper report concludes that 26CK6115 is not a short-term route used to supply construction of what is now the Union Pacific and Southern Pacific Railroad (26CK5685). Instead, these authors provide information suggesting this trail is an alternative route segment of the Old Spanish Trail/Mormon Wagon Road (26CK3848). This particular segment has previously been determined not eligible for the National Register due to lack of integrity; however, in light of the report's new identification, we revisited the eligibility of the segment and find it to be eligible under Criterion A.

As for effect of the undertaking on 26CK6115, the report notes that a proposed alternative access road would cross this trail in an area that has been highly disturbed and lacks integrity. Moreover, since the landscape of the general area is populated with existing transmission lines and associated infrastructure, we conclude that the proposed undertaking would not notably change the character of the property's setting or affect those values that make 26CK6115 eligible for the National Register.

The two rock rings and a possible trail comprising 26CK6528 are not associated with any diagnostic artifacts and no new information about this site was revealed during our identification efforts. As was the case for previous projects in the area that evaluated 26CK6528, we have determined that this site is not National Register eligible.

As noted in the Baker and Harper report (2013:3), 26CK4538 was not relocated in the surveyed APE. We accept the reason as being due to some error or imprecision in mapping the location of the site, whether this occurred at the time of the original recording or with subsequent mapping iterations.

By letters dated November 19, 2012, the BIA approached eight Tribes in the region inquiring if there were any concerns about the effects of the proposed project on historic properties or areas of traditional or cultural importance. These Tribes include the Chemehuevi Indian Tribe, Colorado River Indian Tribes, Fort Mojave Indian Tribe, Hualapai Indian Tribe, Hopi Tribe, Kaibab Band of Paiute Indians, Las Vegas Paiute Tribe, and Paiute Indian Tribe of Utah. The Hualapai Tribe responded by saying they would defer to the Moapa Band of Paiute Indians. The Hopi Tribe responded that it would be interested in further consultation if the proposed undertaking potentially would have an adverse effect on prehistoric Ancestral Puebloan sites, which we do not consider to be the case.

Our determination of "No Adverse Effect" to historic properties will be included as part of the Environmental Impact Statement (EIS) documentation being prepared for the proposed undertaking. As part of the National Environmental Policy Act (NEPA) review process, we are employing corresponding federal and tribal notification procedures for addressing our responsibilities as defined at 36 CFR 800.2(d). In August, 2012 we held two public scoping meetings for the project, one on the Moapa River Indian Reservation and the other at the BLM Southern Nevada District Office in Las Vegas. Additional public meetings will be held at the same locations upon publication of the Draft EIS, which is anticipated to occur sometime later this year. To date we have not received any comments from the public regarding the undertaking's effects on historic properties.

As required at 36 CFR 800.5(c), we are submitting documentation of this finding and await your response within thirty days of receipt. We trust you will agree with this finding and seek your concurrence that the Section 106 consultation process has been successfully completed for the subject undertaking.

If there are any questions, please contact Mr. Garry J. Cantley, Regional Archeologist, at (602) 379-6750 extension 1256.

Sincerely,

Deputy Regional Director - Trust Services

Enclosures

cc: Superintendent, Southern Paiute Agency
Attn: Environmental Coordinator
Chairman, Moapa Business Council (w/enc)
Chairperson, Moapa Cultural Committee
Field Manager, Southern Nevada District Office, BLM (w/enc)
Renewable Energy Specialist, Pacific West Region, NPS
Cultural Resource Specialist, National Trails System-Intermountain Region, NPS (w/enc)
Senior Manager Development, Solar, RES Americas
Environmental Consultant, ENValue
Regional Realty Officer, WRO
Federal Preservation Officer, CO/DECRM

United States Department of the Interior
BUREAU OF INDIAN AFFAIRS
WESTERN REGIONAL OFFICE
2600 North Central Avenue
Phoenix, Arizona 85004-3008

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:
Environmental Quality Services
MS620-EQS

NOV 12 2013

Ms. Rebecca L. Palmer
Acting State Historic Preservation Officer
Nevada State Historic Preservation Office
901 South Stewart Street, Suite 5004
Carson City, Nevada 89701-5246

Dear Ms. Palmer:

As Agency Official for purposes of Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA), the Bureau of Indian Affairs (BIA) wishes to further consult with you regarding the proposed undertaking: **approval of a lease for the RES Americas Moapa Solar Energy Center and grants of easement for associated transmission lines, access roads, and a water line (Project No. 2009-223)**. You may recall that a majority of the project is on the Moapa River Indian Reservation. Since receiving your letter dated August 21, 2013, concurring with our determination of eligibility and effect, the project proponent has proposed a reroute of one of the two alternative transmission lines associated with the undertaking. The reroute encompasses approximately 108 acres entirely on lands managed by the Bureau of Land Management (BLM). We are consulting in our current capacity as Agency Official for the undertaking as a whole.

In consultation with the BLM, Moapa Band of Paiute Indians, and the National Park Service, we have made a reasonable and good faith effort to carry out appropriate identification efforts as prescribed at 36 CFR 800.4 for the proposed reroute and find that no historic properties are present within the revised area of potential effects (APE). Documentation of this finding is provided in the enclosed addendum report titled *Addendum Class III Archaeological Survey of Approximately 108 Acres for the Moapa Solar Energy Center, Clark County, Nevada* (Harper, October 2013).

Our original determinations of eligibility and effect for the proposed undertaking remain the same. As required at 36 CFR 800.5(c), we are submitting documentation of this finding and await your response within thirty days of receipt. We trust you will agree with this finding and seek your concurrence that the Section 106 consultation process has been successfully completed for the subject undertaking.

If there are any questions, please contact Mr. Garry J. Cantley, Regional Archeologist, at (602) 379-6750 extension 1256.

Sincerely,

Deputy Regional Director - Trust Services

Enclosure

cc: Superintendent, Southern Paiute Agency
Attn: Environmental Coordinator
Chairman, Moapa Business Council (w/enc)
Chairperson, Moapa Cultural Committee
Field Manager, Southern Nevada District Office, BLM (w/enc)
Renewable Energy Specialist, Pacific West Region, NPS
Cultural Resource Spec., Nat'l Trails System-Intermountain Region, NPS (w/enc)
Senior Manager Development, Solar, RES Americas
Environmental Consultant, ENValue
Regional Realty Officer, WRO
Federal Preservation Officer, CO/DECRM

LEO M. DROZDOFF, P.E.
Director
Department of Conservation and National Resources

REBECCA L PALMER
State Historic Preservation Officer

BRIAN SANDOVAL
Governor

STATE OF NEVADA

Address Reply to:
901 S. Stewart St, Suite 5004
Carson City, NV 89701-5248
Phone: (775) 684-3448
Fax: (775) 684-3442

www.nvshpo.org

DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION OFFICE

December 9, 2013

Rodney McVey
Deputy Regional Director – Trust Services
Bureau of Indian Affairs
Western Regional Office
2600 North Central Avenue
Phoenix, Arizona 85004-3008

RE: Addendum to *RES Americas Moapa Solar Energy Center and Grants of Easement for Associated Transmission Lines, Access Roads, and a Waterline, Clark County, Nevada.* Environmental Quality Services/ BIA Project # 2009-223/ Undertaking #2013-2452.

Dear Mr. McVey:

The Nevada State Historic Preservation Office (SHPO) has reviewed the subject undertaking in compliance with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended.

This cultural resource inventory report was completed following an intensive archaeological and historic inventory of the project area.

The SHPO concurs with the Bureau of Indian Affairs' (BIA) determination that no historic properties were found within the extended area of potential effects (APE) for the subject undertaking.

The SHPO concurs with the BIA's previous determination that proposed undertaking will not pose an adverse effect to the identified historic properties.

If any buried and previously unidentified resources are located during the project activities, the SHPO recommends that all work in the vicinity of the find cease and this office be contacted for additional consultation per 36 CFR 800.13.b.3.

Should you have any questions concerning this correspondence, please contact Jessica Axsom at (775)684-3445 or by e-mail at jaxsom@shpo.nv.gov .

Sincerely,

Rebecca Lynn Palmer
State Historic Preservation Officer

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BIA Western Region
Office of the Regional Director

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SERVICES

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United States Department of the Interior

BUREAU OF INDIAN AFFAIRS
WESTERN REGIONAL OFFICE
2600 North Central Avenue
Phoenix, Arizona 85004-3008

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:
Environmental Quality Services
MS-620EQS

DEC 31 2013

Memorandum

To: Superintendent, Southern Paiute Agency
Attention: Environmental Coordinator

From: Deputy Regional Director – Trust Services /s/Catherine Wilson

Subject: Section 106 of NHPA, RES Americas Moapa Solar Energy Center, Moapa River Indian Reservation

You are hereby advised that the consultation process with the Nevada State Historic Preservation Office (SHPO) has been completed for the proposed undertaking, **approval of a lease for the RES Americas Moapa Solar Energy Center and grants of easement for associated transmission lines, access roads, and a water line (Project No. 2009-223)**. This project would occur on lands of the Moapa River Indian Reservation and Bureau of Land Management (BLM) in Clark County, Nevada. The SHPO has concurred with our determination of effect by receipt of the attached letters dated August 21 and December 9, 2013.

We have determined that the following reports are accurate for purposes of compliance with Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA):

An Archaeological Survey of Approximately 1,850 Acres for the Moapa Solar Energy Center, Clark County, Nevada (Baker and Harper, July 2013);

Addendum Class III Archaeological Survey of Approximately 108 Acres for the Moapa Solar Energy Center, Clark County, Nevada (Harper, October 2013).

Our responsibilities under the NHPA are complete, with the stipulation that should any unrecorded cultural material be encountered during the course of construction, all activity in the vicinity of the discovery shall halt and the Tribe and BIA Regional Archeological be contacted immediately.

This determination should be included as part of the National Environmental Policy Act (NEPA) documentation associated with the proposed actions to demonstrate compliance with Federal responsibilities under Section 106 of NHPA.

If you have any questions, please contact Mr. Garry J. Cantley, Regional Archeologist, at (602) 379-6750 extension 1256.

Attachments

cc: Chairman, Moapa Business Council (w/attach)
Chairperson, Moapa Cultural Committee (w/attach)
Field Manager, Southern Nevada District Office, BLM (w/attach)
Renewable Energy Specialist, Pacific West Region, NPS (w/attach)
Cultural Resource Specialist, Nat'l Trails System-Intermountain Region, NPS (w/attach)
Senior Manager Development, Solar, RES Americas (w/attach)
Environmental Consultant, ENValue (w/attach)
Regional Realty Officer, WRO (w/attach)
Federal Preservation Officer, CO/DECRM (w/attach)

LEO M. DROZDOFF, P.E.
Director
Department of Conservation and National Resources

REBECCA L PALMER
State Historic Preservation Officer

BRIAN SANDOVAL
Governor

STATE OF NEVADA

Address Reply to:
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Carson City, NV 89701-5248
Phone: (775) 684-3448
Fax: (775) 684-3442

www.nvshpo.org

DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION OFFICE

December 9, 2013

Rodney McVey
Deputy Regional Director – Trust Services
Bureau of Indian Affairs
Western Regional Office
2600 North Central Avenue
Phoenix, Arizona 85004-3008

RE: Addendum to *RES Americas Moapa Solar Energy Center and Grants of Easement for Associated Transmission Lines, Access Roads, and a Waterline, Clark County, Nevada.* Environmental Quality Services/ BIA Project # 2009-223/ Undertaking #2013-2452.

Dear Mr. McVey:

The Nevada State Historic Preservation Office (SHPO) has reviewed the subject undertaking in compliance with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended.

This cultural resource inventory report was completed following an intensive archaeological and historic inventory of the project area.

The SHPO concurs with the Bureau of Indian Affairs' (BIA) determination that no historic properties were found within the extended area of potential effects (APE) for the subject undertaking.

The SHPO concurs with the BIA's previous determination that proposed undertaking will not pose an adverse effect to the identified historic properties.

If any buried and previously unidentified resources are located during the project activities, the SHPO recommends that all work in the vicinity of the find cease and this office be contacted for additional consultation per 36 CFR 800.13.b.3.

Should you have any questions concerning this correspondence, please contact Jessica Axsom at (775)684-3445 or by e-mail at jaxsom@shpo.nv.gov .

Sincerely,

Rebecca Palmer

Rebecca Lynn Palmer
State Historic Preservation Officer

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BIA Western Region
Office of the Regional Director

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Appendix J

Visual Rating Sheets

Form 8400-4
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date

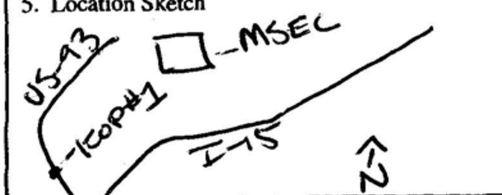
District Southern Nevada Field Office

Resource Area Los Vegas

Activity (program)

SECTION A. PROJECT INFORMATION

1. Project Name Moapa Solar Energy Center
2. Key Observation Point #1
3. VRM Class Project & KOP in VRM Class III
4. Location Township 18S Range 63E Section 3
5. Location Sketch



SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	FG - Flat terrain, US-93 MG - Flat terrain BG - Jagged, angular mtns.	FG - dotted, Scattered MG - dotted Scattered BG - indistinct	FG - US-93 - Road MG - N/A BG - N/A
LINE	FG - Flat & horizontal MG - Flat & horizontal BG - jagged & uneven	FG - horizontal, continuous MG - horizontal, continuous BG - indistinct	FG - Horizontal MG - N/A BG - N/A
COLOR	FG - gray to light brown MG - med to dark brown BG - brown, light blue - sky	FG - light brown MG - light to med brown BG - indistinct	FG - Gray - Black Pavement MG - N/A BG - N/A
TEXTURE	FG - smooth MG - coarse BG - ragged, jagged Mtn. ranges	FG - dotted, patchy MG - dotted, patchy BG - indistinct	FG - Smooth MG - N/A BG - N/A

SECTION C. PROPOSED ACTIVITY DESCRIPTION - N/A Solar site will not be visible from KOP 1

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM			
LINE			
COLOR			
TEXTURE			

SECTION D. CONTRAST RATING ☐ SHORT TERM ☐ LONG TERM - N/A Solar site will not be visible from KOP 1

1\.

DEGREE OF CONTRAST		LAND/WATER BODY (1) Strong	Moderate	Weak	None	VEGETATION (2) Strong	Moderate	Weak	None	STRUCTURES (3) Strong	Moderate	Weak	None
ELEMENTS	Form				X				X				X
	Line				X				X				X
	Color				X				X				X
	Texture				X				X				X

2. Does project design meet visual resource management objectives? ☐ Yes ☐ No (Explain on reverse side)

3. Additional mitigating measures recommended? ☐ Yes ☒ No (Explain on reverse side)

Evaluators' Names: Derrik Berg

Dates

Form 8400-4
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date

District Southern Nevada Field Office

Resource Area Las Vegas

Activity (program)

SECTION A. PROJECT INFORMATION

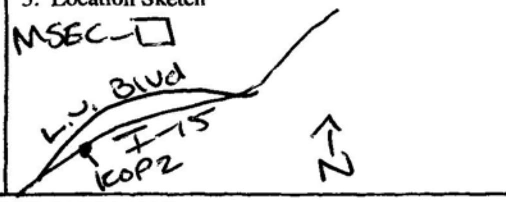
1. Project Name Moapa Solar Energy Center

2. Key Observation Point #2

3. VRM Class Project in VRM Class IV, KOP in Class III

4. Location
Township 17S
Range 64E
Section 29

5. Location Sketch



SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	FG - Flat terrain MG - Flat terrain BG - jagged Mtn terrain	FG - N/A - indistinct MG - dotted scattered BG - N/A - indistinct	FG - road, markers, guard rail MG - T-line poles BG - N/A
LINE	FG - Horizontal MG - Horizontal BG - angular, uneven	FG - N/A indistinct MG - horizontal BG - indistinct - N/A	FG - Horizontal & vertical MG - Horizontal + vertical BG - N/A
COLOR	FG - gray, light brown MG - light brown BG - gray, blue-sky	FG - N/A - indistinct MG - Brown, gray BG - indistinct - N/A	FG - Gray, black pavement, rail MG - Gray-brown poles + lines BG - N/A
TEXTURE	FG - gravel, coarse MG - smooth BG - rugged, jagged Mtn, ranges	FG - indistinct - N/A MG - smooth BG - indistinct - N/A	FG - smooth MG - rugged BG - N/A

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	MG - smooth surface w/ white pole structures	MG - removal of some vegetation	MG - smooth surface w/ white pole structures
LINE	MG - horizontal + vertical	MG - horizontal - no change to remaining veg	MG - horizontal panels + vertical pole structures
COLOR	MG - dark blue panels white poles	MG - no change to remaining veg	MG - dark blue panels, white poles
TEXTURE	MG - smooth	MG - no change to remaining veg	MG - smooth

SECTION D. CONTRAST RATING ☐ SHORT TERM ☒ LONG TERM

1. DEGREE OF CONTRAST

	FEATURES: LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
ELEMENTS	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
Form		X					X			X		
Line			X					X			X	
Color		X					X			X		
Texture			X				X				X	

2. Does project design meet visual resource management objectives? ☒ Yes ☐ No
(Explain on reverse side)

3. Additional mitigating measures recommended?
☒ Yes ☐ No (Explain on reverse side)

Evaluators' Names: Derrik Berg

Dates

SECTION D. (Continued)

Comments from item 2.

The project lies within VRM Class IV. KOP #2 is approx. 3.5 miles SE of the project site. The objective of Class IV is to provide for management activities that require major modifications to the existing character of the landscape. Project activities will moderately modify the existing landscape, but mitigation measures will be taken to minimize impacts & repeat existing elements. Mitigation measures are described in the section below.

Additional Mitigating Measures (See item 3)

Buildings / Structures will be painted in a neutral color to blend into the desert landscape. Transmission structures will be similar to the existing structures in the area.

★US GOVERNMENT PRINTING OFFICE: 2002-773-001-46077

Form 8400-4
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date

District Southern Nevada Field Office

Resource Area Las Vegas

Activity (program)

SECTION A. PROJECT INFORMATION

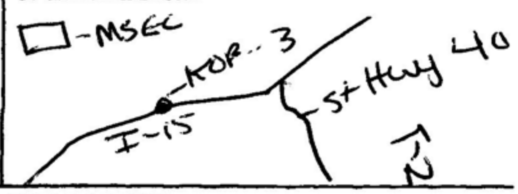
1. Project Name
Moapa Solar Energy Center

2. Key Observation Point #3

3. VRM Class
Project is in VRM Class IV, KOP is in Class III

4. Location
Township 17S
Range 64E
Section 15

5. Location Sketch



SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	FG - Flat terrain MG - Flat terrain BG - jagged, angular mtns.	FG - random, dotted, spotty MG - random, dotted, scattered BG - indistinct	FG - fence MG - T-line poles + lines, sub BG - N/A
LINE	FG - Horizontal MG - Horizontal BG - jagged, angular uneven	FG - horizontal MG - horizontal BG - Indistinct	FG - vert. + horizontal MG - Vert. + horizontal BG - N/A
COLOR	FG - light brown MG - light brown BG - Med brown, gray blue sky	FG - light - dark green MG - light - dark green BG - indistinct	FG - Brown / Gray MG - Brown poles / dark grey lines Steel Sub BG - N/A
TEXTURE	FG - coarse gravel MG - gravel, smooth sand BG - rugged, jagged mtn.	FG - dotted, patchy MG - dotted, patchy BG - indistinct	FG - wood MG - wood poles, steel sub smooth BG - N/A

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	MG - smooth surface w/ white poles	MG - removal of some veg	MG - smooth panels w/ white poles
LINE	MG - horizontal + vertical	MG - horizontal - no change to remaining veg	MG - horizontal panels, vertical pole structures
COLOR	MG - blue panels, white poles	MG - no change to remaining veg - green	MG - dark blue panels, white poles
TEXTURE	MG - smooth	MG - no change to remaining veg - dotted patchy	MG - smooth

SECTION D. CONTRAST RATING ☐ SHORT TERM ☒ LONG TERM

1. DEGREE OF CONTRAST

ELEMENTS	LAND/WATER BODY (1) Strong	Moderate	Weak	None	VEGETATION (2) Strong	Moderate	Weak	None	STRUCTURES (3) Strong	Moderate	Weak	None
Form		X					X			X		
Line			X					X			X	
Color		X					X			X		
Texture			X				X				X	

2. Does project design meet visual resource management objectives? ☒ Yes ☐ No (Explain on reverse side)

3. Additional mitigating measures recommended? ☒ Yes ☐ No (Explain on reverse side)

Evaluators' Names: Derek Berg

Dates

SECTION D. (Continued)

Comments from item 2.

The project lies with VRM class IV. KOP #3 is approx 2.0 miles SE of the project site. The objective of Class IV is to provide for management activities that require major modifications to the existing character of the landscape. Project activities will moderately modify the existing landscape, but mitigation measures will be taken to minimize impacts & repeat existing elements. Mitigation measures are described in the Section below.

Additional Mitigating Measures (See item 3)

Buildings / structures will be painted in a neutral color to blend into the desert landscape. Transmission structures will be similar to the existing structures in the area.

★US GOVERNMENT PRINTING OFFICE: 2002-773-001-46077

Form 8400-4
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date

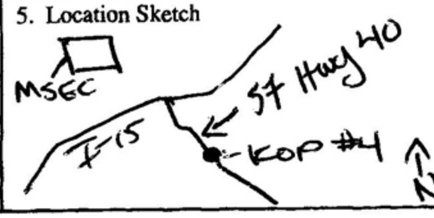
District Southern Nevada Field Office

Resource Area Las Vegas

Activity (program)

SECTION A. PROJECT INFORMATION

1. Project Name Moapa Solar Energy Center
2. Key Observation Point #4
3. VRM Class Project in VRM Class IV, KOP in Class III
4. Location
   Township 17S
   Range 65E
   Section 16
5. Location Sketch



SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	FG - Flat - slightly undulating MG - flat BG - jagged + uneven	FG - dotted, scattered, horizontal MG - dotted, scattered, horizontal BG - indistinct	FG - Road - St Hwy 40 MG - N/A BG - N/A
LINE	FG - Horizontal - diagonal MG - Horizontal BG - angular + jagged	FG - horizontal MG - horizontal BG - indistinct	FG - diagonal, horizontal MG - N/A BG - N/A
COLOR	FG - light brown, slightly red MG - light brown, slightly red BG - gray-brown, blue sky	FG - light red - brown MG - reddish brown BG - indistinct	FG - Gray-black pavement MG - N/A BG - N/A
TEXTURE	FG - smooth MG - smooth BG - jagged, rugged	FG - dotted, patchy MG - dotted, patchy + continuous BG - indistinct	FG - smooth MG - N/A BG - N/A

SECTION C. PROPOSED ACTIVITY DESCRIPTION - N/A - Site not visible from KOP #4

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM			
LINE			
COLOR			
TEXTURE			

SECTION D. CONTRAST RATING ☐ SHORT TERM ☐ LONG TERM - N/A Site not visible from KOP #4

1.

DEGREE OF CONTRAST		LAND/WATER BODY (1) Strong	Moderate	Weak	None	VEGETATION (2) Strong	Moderate	Weak	None	STRUCTURES (3) Strong	Moderate	Weak	None
ELEMENTS	Form				X				X				X
	Line				X				X				X
	Color				X				X				X
	Texture				X				X				X

2. Does project design meet visual resource management objectives? ☐ Yes ☐ No (Explain on reverse side)

3. Additional mitigating measures recommended? ☐ Yes ☒ No (Explain on reverse side)

Evaluators' Names: Derrik Berg

Dates

Form 8400-4
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date

District Southern Nevada Field Office

Resource Area Las Vegas

Activity (program)

SECTION A. PROJECT INFORMATION

1. Project Name Moapa Solar Energy Center
2. Key Observation Point #5
3. VRM Class Project in VRM Class IV, KOP in Class III

4. Location
Township 18S
Range 65E
Section 6

5. Location Sketch

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION • KOP 5

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	FG - Horizontal, flat MG - flat BG - jagged, uneven	FG - dotted, scattered MG - dotted, continuous BG - indistinct	FG - N/A MG - N/A BG - N/A
LINE	FG - Horizontal MG - Horizontal BG angular, undulating	FG - horizontal MG - horizontal BG - indistinct	FG - N/A MG - N/A BG - N/A
COLOR	FG - light brown MG - light - dark brown BG - gray brown / blue - sky	FG - light green, med. green MG - med - dark green BG - indistinct	FG - N/A MG - N/A BG - N/A
TEXTURE	FG - smooth MG - smooth BG - jagged, uneven	FG dotted patchy MG - uniform BG - indistinct	FG - N/A MG - N/A BG - N/A

SECTION C. PROPOSED ACTIVITY DESCRIPTION - N/A Site not visible from KOP 5

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM			
LINE			
COLOR			
TEXTURE			

SECTION D. CONTRAST RATING ☐ SHORT TERM ☐ LONG TERM - N/A Site not visible from KOP 5

1.

DEGREE OF CONTRAST	LAND/WATER BODY (1) Strong	Moderate	Weak	None	VEGETATION (2) Strong	Moderate	Weak	None	STRUCTURES (3) Strong	Moderate	Weak	None
ELEMENTS Form				X				X				X
Line				X				X				X
Color				X				X				X
Texture				X				X				X

2. Does project design meet visual resource management objectives? ☐ Yes ☐ No
(Explain on reverse side)

3. Additional mitigating measures recommended?
☐ Yes ☒ No (Explain on reverse side)

Evaluators' Names	Dates
Derrik Berg	

Appendix K

Hazardous Radius Report

GeoSearch

On time. On target. In touch.™

Radius Report

http://www.geo-search.net/QuickMap/index.htm?DataID=Standard0000057765

Click on link above to access the map and satellite view of current property

Target Property:

Moapa
Clark County, Nevada 89406

Prepared For:

Satisfi

Order #: 25468
Job #: 57765
Project #: 16001-001
Date: 05/21/2013

phone: 888-396-0042 · fax: 512-472-9967 · www.geo-search.com

TARGET PROPERTY SUMMARY

Moapa
Clark County, Nevada 89406

USGS Quadrangle: ***Arrow Canyon Se, NV***
*Target Property Geometry:****Area***

Target Property Longitude(s)/Latitude(s):
(-114.869818, 36.491375), (-114.870020, 36.508944), (-114.845648, 36.508781), (-114.846086, 36.491429), (-114.869818, 36.491375)

County/Parish Covered:
Clark (NV)

Zipcode(s) Covered:
Overton NV: 89040

State(s) Covered:
NV

****Target property is located in Radon Zone 3.***
Zone 3 areas have a predicted average indoor radon screening level less than 2 pCi/L (picocuries per liter).

DATABASE FINDINGS SUMMARY

DATABASE	ACRONYM	LOCA-TABLE	UNLOCA-TABLE	SEARCH RADIUS (miles)
FEDERAL				
AEROMETRIC INFORMATION RETRIEVAL SYSTEM / AIR FACILITY SUBSYSTEM	AIRSAFS	0	0	Target Property
BIENNIAL REPORTING SYSTEM	BRS	0	0	Target Property
CLANDESTINE DRUG LABORATORY LOCATIONS	CDL	0	0	Target Property
EPA DOCKET DATA	DOCKETS	0	0	Target Property
FEDERAL ENGINEERING INSTITUTIONAL CONTROL SITES	EC	0	0	Target Property
EMERGENCY RESPONSE NOTIFICATION SYSTEM	ERNSNV	0	0	Target Property
FACILITY REGISTRY SYSTEM	FRSNV	0	0	Target Property
HAZARDOUS MATERIALS INCIDENT REPORTING SYSTEM	HMIRSR09	0	0	Target Property
INTEGRATED COMPLIANCE INFORMATION SYSTEM (FORMERLY DOCKETS)	ICIS	0	0	Target Property
INTEGRATED COMPLIANCE INFORMATION SYSTEM NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM	ICISNPDES	0	0	Target Property
MATERIAL LICENSING TRACKING SYSTEM	MLTS	0	0	Target Property
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM	NPDESR09	0	0	Target Property
PCB ACTIVITY DATABASE SYSTEM	PADS	0	0	Target Property
PERMIT COMPLIANCE SYSTEM	PCSR09	0	0	Target Property
RCRA SITES WITH CONTROLS	RCRASC	0	0	Target Property
CERCLIS LIENS	SFLIENS	0	0	Target Property
SECTION SEVEN TRACKING SYSTEM	SSTS	0	0	Target Property
TOXICS RELEASE INVENTORY	TRI	0	0	Target Property
TOXIC SUBSTANCE CONTROL ACT INVENTORY	TSCA	0	0	Target Property
NO LONGER REGULATED RCRA GENERATOR FACILITIES	NLRRCRAG	0	0	Target Property and Adjoining
RESOURCE CONSERVATION & RECOVERY ACT - GENERATOR FACILITIES	RCRAGR09	0	0	Target Property and Adjoining
HISTORICAL GAS STATIONS	HISTPST	0	0	0.2500
BROWNFIELDS MANAGEMENT SYSTEM	BF	0	0	0.5000
COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION & LIABILITY INFORMATION SYSTEM	CERCLIS	0	0	0.5000

DATABASE FINDINGS SUMMARY

DATABASE	ACRONYM	LOCA-TABLE	UNLOCA-TABLE	SEARCH RADIUS (miles)
LAND USE CONTROL INFORMATION SYSTEM	LUCIS	0	0	0.5000
NO FURTHER REMEDIAL ACTION PLANNED SITES	NFRAP	0	0	0.5000
NO LONGER REGULATED RCRA NON-CORRACTS TSD FACILITIES	NLRRCRAT	0	0	0.5000
OPEN DUMP INVENTORY	ODI	0	0	0.5000
RESOURCE CONSERVATION & RECOVERY ACT - TREATMENT, STORAGE & DISPOSAL FACILITIES	RCRAT	0	0	0.5000
DELISTED NATIONAL PRIORITIES LIST	DNPL	0	0	1.0000
DEPARTMENT OF DEFENSE SITES	DOD	0	0	1.0000
FORMERLY USED DEFENSE SITES	FUDS	0	0	1.0000
NO LONGER REGULATED RCRA CORRECTIVE ACTION FACILITIES	NLRRCRAC	0	0	1.0000
NATIONAL PRIORITIES LIST	NPL	0	0	1.0000
PROPOSED NATIONAL PRIORITIES LIST	PNPL	0	0	1.0000
RESOURCE CONSERVATION & RECOVERY ACT - CORRECTIVE ACTION FACILITIES	RCRAC	0	0	1.0000
RECORD OF DECISION SYSTEM	RODS	0	0	1.0000
SUB-TOTAL		**0**	**0**	

STATE (NV)

DATABASE	ACRONYM	LOCA-TABLE	UNLOCA-TABLE	SEARCH RADIUS (miles)
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMITS	NPDES	0	0	Target Property
SPILLS LISTING	SPILLS	0	0	Target Property
ABOVEGROUND STORAGE TANKS	AST	0	0	0.2500
REGISTERED UNDERGROUND STORAGE TANKS	UST	0	0	0.2500
BROWNFIELD PROPERTIES	BF	0	0	0.5000
HAZARDOUS WASTE RECYCLING FACILITIES	HWRECYCLERS	0	0	0.5000
LEAKING UNDERGROUND STORAGE TANKS	LUST	0	0	0.5000
RECYCLING FACILITIES	RECYCLERS	0	0	0.5000
SOLID WASTE FACILITIES	SWF	0	1	0.5000

DATABASE FINDINGS SUMMARY

DATABASE	ACRONYM	LOCA-TABLE	UNLOCA-TABLE	SEARCH RADIUS (miles)
TIER I I FACILITY LISTING	TIERII	0	0	0.5000
VOLUNTARY CLEANUP PROGRAM SITES	VCP	0	0	0.5000
SUB-TOTAL		**0**	**1**	
TRIBAL				
UNDERGROUND STORAGE TANKS ON TRIBAL LANDS	USTR09	0	0	0.2500
LEAKING UNDERGROUND STORAGE TANKS ON TRIBAL LANDS	LUSTR09	0	0	0.5000
OPEN DUMP INVENTORY ON TRIBAL LANDS	ODINDIAN	0	0	0.5000
INDIAN RESERVATIONS	INDIANRES	1	0	1.0000
SUB-TOTAL		**1**	**0**	
TOTAL		**1**	**1**	

LOCATABLE DATABASE FINDINGS

ACRONYM	SEARCH RADIUS (miles)	Target Property	1/8 Mile (> TP)	1/4 Mile (> 1/8)	1/2 Mile (> 1/4)	1 Mile (> 1/2)	> 1 Mile	Total
FEDERAL								
AIRSAFS	.0200	0	NS	NS	NS	NS	NS	0
BRS	.0200	0	NS	NS	NS	NS	NS	0
CDL	.0200	0	NS	NS	NS	NS	NS	0
DOCKETS	.0200	0	NS	NS	NS	NS	NS	0
EC	.0200	0	NS	NS	NS	NS	NS	0
ERNSNV	.0200	0	NS	NS	NS	NS	NS	0
FRSNV	.0200	0	NS	NS	NS	NS	NS	0
HMIRSR09	.0200	0	NS	NS	NS	NS	NS	0
ICIS	.0200	0	NS	NS	NS	NS	NS	0
ICISNPDES	.0200	0	NS	NS	NS	NS	NS	0
MLTS	.0200	0	NS	NS	NS	NS	NS	0
NPDESR09	.0200	0	NS	NS	NS	NS	NS	0
PADS	.0200	0	NS	NS	NS	NS	NS	0
PCSR09	.0200	0	NS	NS	NS	NS	NS	0
RCRASC	.0200	0	NS	NS	NS	NS	NS	0
SFLIENS	.0200	0	NS	NS	NS	NS	NS	0
SSTS	.0200	0	NS	NS	NS	NS	NS	0
TRI	.0200	0	NS	NS	NS	NS	NS	0
TSCA	.0200	0	NS	NS	NS	NS	NS	0
NLRRCRAG	.1250	0	0	NS	NS	NS	NS	0
RCRAGR09	.1250	0	0	NS	NS	NS	NS	0
HISTPST	.2500	0	0	0	NS	NS	NS	0
BF	.5000	0	0	0	0	NS	NS	0
CERCLIS	.5000	0	0	0	0	NS	NS	0
LUCIS	.5000	0	0	0	0	NS	NS	0
NFRAP	.5000	0	0	0	0	NS	NS	0
NLRRCRAT	.5000	0	0	0	0	NS	NS	0

LOCATABLE DATABASE FINDINGS

ACRONYM	SEARCH RADIUS (miles)	Target Property	1/8 Mile (> TP)	1/4 Mile (> 1/8)	1/2 Mile (> 1/4)	1 Mile (> 1/2)	> 1 Mile	Total
ODI	.5000	0	0	0	0	NS	NS	0
RCRAT	.5000	0	0	0	0	NS	NS	0
DNPL	1.000	0	0	0	0	0	NS	0
DOD	1.000	0	0	0	0	0	NS	0
FUDS	1.000	0	0	0	0	0	NS	0
NLRRCRAC	1.000	0	0	0	0	0	NS	0
NPL	1.000	0	0	0	0	0	NS	0
PNPL	1.000	0	0	0	0	0	NS	0
RCRAC	1.000	0	0	0	0	0	NS	0
RODS	1.000	0	0	0	0	0	NS	0
SUB-TOTAL		**0**	**0**	**0**	**0**	**0**	**0**	**0**

STATE (NV)

ACRONYM	SEARCH RADIUS (miles)	Target Property	1/8 Mile (> TP)	1/4 Mile (> 1/8)	1/2 Mile (> 1/4)	1 Mile (> 1/2)	> 1 Mile	Total
NPDES	.0200	0	NS	NS	NS	NS	NS	0
SPILLS	.0200	0	NS	NS	NS	NS	NS	0
AST	.2500	0	0	0	NS	NS	NS	0
UST	.2500	0	0	0	NS	NS	NS	0
BF	.5000	0	0	0	0	NS	NS	0
HWRECYCLERS	.5000	0	0	0	0	NS	NS	0
LUST	.5000	0	0	0	0	NS	NS	0
RECYCLERS	.5000	0	0	0	0	NS	NS	0
SWF	.5000	0	0	0	0	NS	NS	0
TIERII	.5000	0	0	0	0	NS	NS	0
VCP	.5000	0	0	0	0	NS	NS	0
SUB-TOTAL		**0**	**0**	**0**	**0**	**0**	**0**	**0**

TRIBAL

ACRONYM	SEARCH RADIUS (miles)	Target Property	1/8 Mile (> TP)	1/4 Mile (> 1/8)	1/2 Mile (> 1/4)	1 Mile (> 1/2)	> 1 Mile	Total
USTR09	.2500	0	0	0	NS	NS	NS	0

LOCATABLE DATABASE FINDINGS

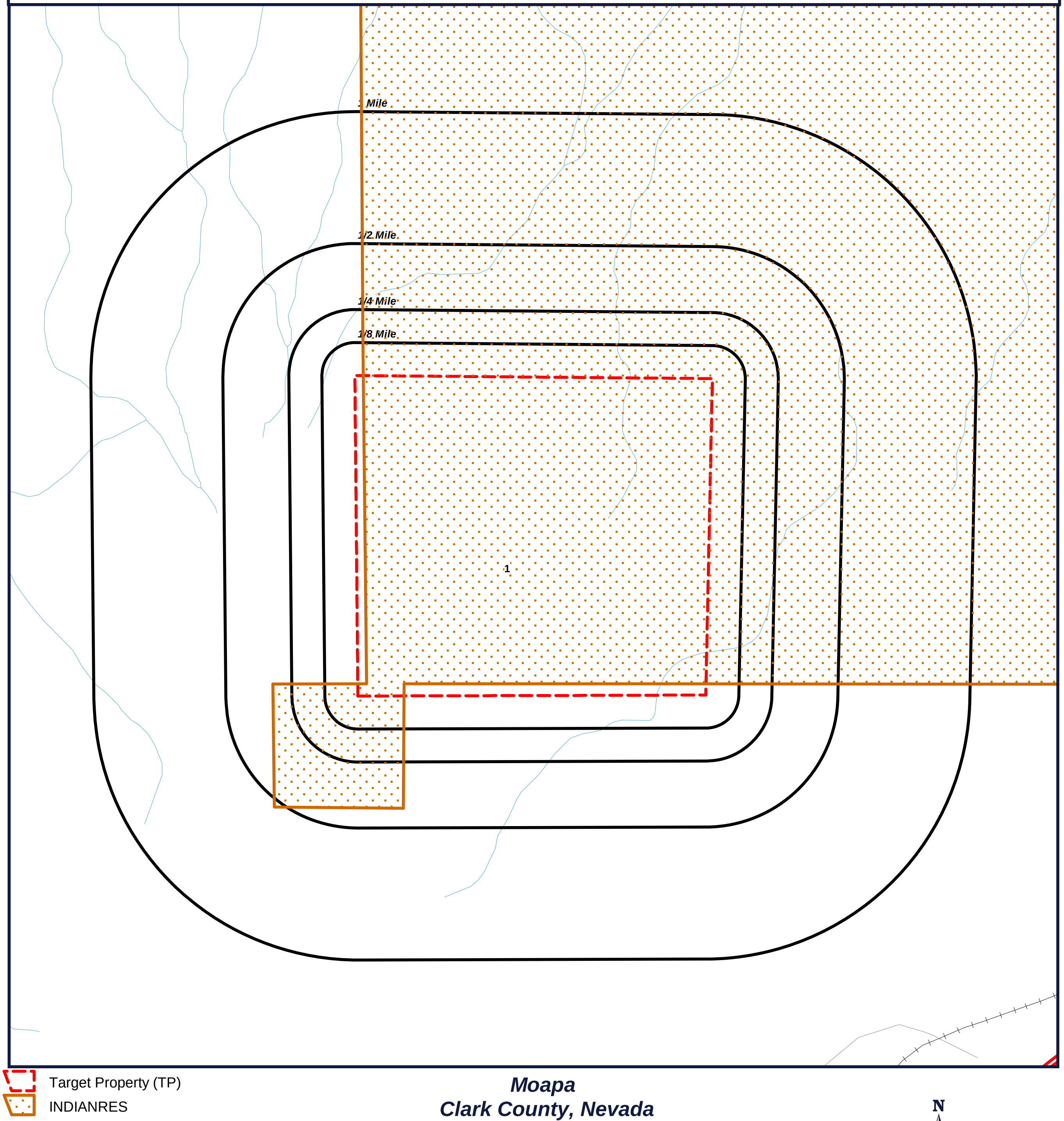
ACRONYM	SEARCH RADIUS (miles)	Target Property	1/8 Mile (> TP)	1/4 Mile (> 1/8)	1/2 Mile (> 1/4)	1 Mile (> 1/2)	> 1 Mile	Total
LUSTR09	.5000	0	0	0	0	NS	NS	0
ODINDIAN	.5000	0	0	0	0	NS	NS	0
INDIANRES	1.000	1	0	0	0	0	NS	1
SUB-TOTAL		**1**	**0**	**0**	**0**	**0**	**0**	**1**

TOTAL		**1**	**0**	**0**	**0**	**0**	**0**	**1**

NOTES:

NS = NOT SEARCHED

RADIUS MAP



Moapa
Clark County, Nevada
89406

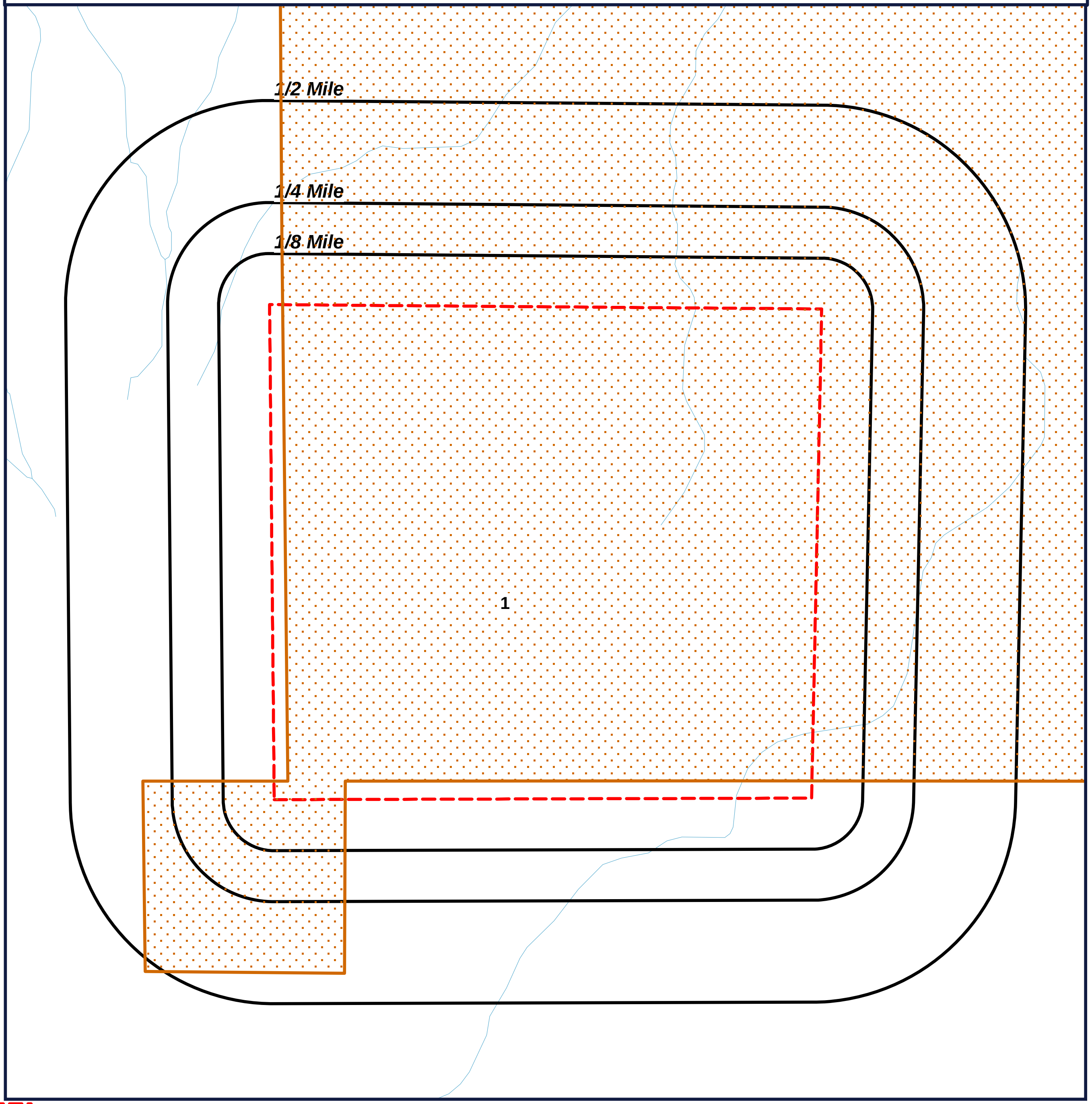
N
W E
S

0' 1500' 3000' 4500'
SCALE: 1" = 3000'

GeoSearch *www.geo-search.com - phone: 888-396-0042 - fax: 512-472-9967*

JOB #: 57765 - 5/21/2013

RADIUS MAP



Target Property (TP)
INDIANRES

Moapa
Clark County, Nevada
89406

JOB #: 57765 - 5/21/2013

ORTHOPHOTO MAP

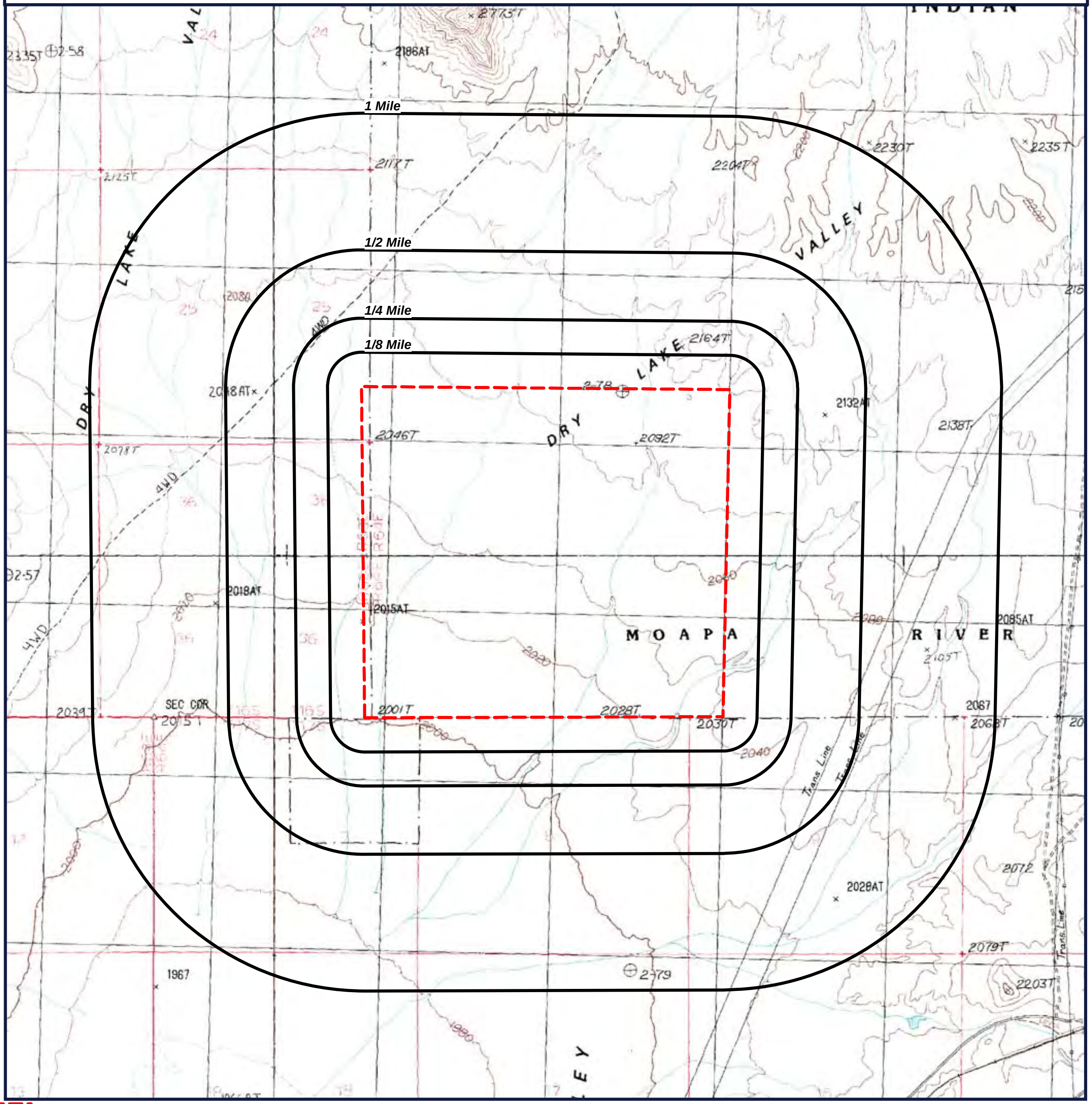
Target Property (TP)
INDIANRES

Quadrangle(s): Arrow Canyon
Se, Dry Lake
Source: USGS (1994 05 2)
Moapa
Clark County, Nevada
89406

N W E S

0' 1000' 2000' 3000'
SCALE: 1" = 2000'

TOPOGRAPHIC MAP



Target Property (TP)

Quadrangle(s): Arrow Canyon Se, Dry Lake
Source: USGS, 1986
Moapa
Clark County, Nevada
89406

N
W E
S

0' 1500' 3000' 4500'
SCALE: 1" = 3000'

REPORT SUMMARY OF LOCATABLE SITES

MAP ID#	DATABASE NAME	SITE ID#	DISTANCE FROM SITE	SITE NAME	ADDRESS	CITY, ZIP CODE	PAGE #
1	INDIANRES	487	0.001 NE	MOAPA RIVER RESERVATION	MOAPA BAND OF PAIUTE INDIANS OF THE	OVERTON, 89040	1

INDIAN RESERVATIONS (INDIANRES)

MAP ID# 1 **Distance from Property: 0.00 mi. NE**

SITE INFORMATION

ENTITY: **MOAPA RIVER RESERVATION**

OCCUPANT: **MOAPA BAND OF PAIUTE INDIANS OF THE MOAPA RIVER INDIAN RESERVATION, CALIFORNIA**

AIANA DESCRIPTION: **AMERICAN INDIAN RESERVATION**

ENTITY IN FEDERAL REGISTER: **YES**

ACRES: **71675.04** SQUARE MILES: **111.99**

REPORT SUMMARY OF UNLOCATABLE SITES

DATABASE TYPE	SITE ID#	SITE NAME	ADDRESS	CITY	ZIP CODE
SWF	1262234730	MOAPA INDIAN RESERVATION		OVERTON	89040

SOLID WASTE FACILITIES (SWF)

FACILITY INFORMATION

GS ID: **1262234730**

FACILITY ID: **NOT REPORTED**

NAME: **MOAPA INDIAN RESERVATION**

ADDRESS: **STREET NOT REPORTED**
OVERTON, NV 89040

COUNTY: **CLARK**

AFFILIATE ADDRESS: **NOT REPORTED**

FACILITY DETAILS

FACILITY TYPE: **CLASS II**

FACILITY STATUS: **CLOSED**

AIRSAFS Aerometric Information Retrieval System / Air Facility Subsystem

VERSION DATE: 8/2012

The United States Environmental Protection Agency (EPA) modified the Aerometric Information Retrieval System (AIRS) to a database that exclusively tracks the compliance of stationary sources of air pollution with EPA regulations: the Air Facility Subsystem (AFS). Since this change in 2001, the management of the AIRS/AFS database was assigned to EPA's Office of Enforcement and Compliance Assurance.

BF Brownfields Management System

VERSION DATE: 4/2013

Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties takes development pressures off of undeveloped, open land, and both improves and protects the environment. The United States Environmental Protection Agency maintains this database to track activities in the various brown field grant programs including grantee assessment, site cleanup and site redevelopment.

BRS Biennial Reporting System

VERSION DATE: 12/2009

The United States Environmental Protection Agency (EPA), in cooperation with the States, biennially collects information regarding the generation, management, and final disposition of hazardous wastes regulated under the Resource Conservation and Recovery Act of 1976 (RCRA), as amended. The Biennial Report captures detailed data on the generation of hazardous waste from large quantity generators and data on waste management practices from treatment, storage and disposal facilities. Currently, the EPA states that data collected between 1991 and 1997 was originally a part of the defunct Biennial Reporting System and is now incorporated into the RCRAInfo data system.

CDL Clandestine Drug Laboratory Locations

VERSION DATE: 3/2013

The U.S. Department of Justice ("the Department") provides this information as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments. The Department does not establish, implement, enforce, or certify compliance with clean-up or remediation standards for contaminated sites; the public should contact a state or local health department or environmental protection agency for that information.

CERCLIS Comprehensive Environmental Response, Compensation & Liability Information System

VERSION DATE: 12/2012

CERCLIS is the repository for site and non-site specific Superfund information in support of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). This United States Environmental Protection Agency database contains an extract of sites that have been investigated or are in the process of being investigated for potential environmental risk.

DNPL Delisted National Priorities List

VERSION DATE: 12/2012

This database includes sites from the United States Environmental Protection Agency's Final National Priorties List (NPL) where remedies have proven to be satisfactory or sites where the original analyses were inaccurate, and the site is no longer appropriate for inclusion on the NPL, and final publication in the Federal Register has occurred.

DOCKETS EPA Docket Data

VERSION DATE: 12/2005

The United States Environmental Protection Agency Docket data lists Civil Case Defendants, filing dates as far back as 1971, laws broken including section, violations that occurred, pollutants involved, penalties assessed and superfund awards by facility and location. Please refer to ICIS database as source of current data.

DOD Department of Defense Sites

VERSION DATE: 12/2005

This information originates from the National Atlas of the United States Federal Lands data, which includes lands owned or administered by the Federal government. Army DOD, Army Corps of Engineers DOD, Air Force DOD, Navy DOD and Marine DOD areas of 640 acres or more are included.

EC Federal Engineering Institutional Control Sites

VERSION DATE: 4/2013

This database includes site locations where Engineering and/or Institutional Controls have been identified as part of a selected remedy for the site as defined by United States Environmental Protection Agency official remedy decision documents. A site listing does not indicate that the institutional and engineering controls are currently in place nor will be in place once the remedy is complete; it only indicates that the decision to include either of them in the remedy is documented as of the completed date of the document. Institutional controls are actions, such as legal controls, that help minimize the potential for human exposure to contamination by ensuring appropriate land or resource use. Engineering controls include caps, barriers, or other device engineering to prevent access, exposure, or continued migration of contamination.

ERNSNV Emergency Response Notification System

VERSION DATE: 12/2012

This National Response Center database contains data on reported releases of oil, chemical, radiological, biological, and/or etiological discharges into the environment anywhere in the United States and its territories. The data comes from spill reports made to the U.S. Environmental Protection Agency, U.S. Coast Guard, the National Response Center and/or the U.S. Department of Transportation.

FRSNV Facility Registry System

VERSION DATE: 11/2012

The United States Environmental Protection Agency's Office of Environmental Information (OEI) developed the Facility Registry System (FRS) as the centrally managed database that identifies facilities, sites or places subject to environmental regulations or of environmental interest. The Facility Registry System replaced the Facility Index System or FINDS database.

FUDS Formerly Used Defense Sites

VERSION DATE: 2/2013

The 2011 FUDS inventory includes properties previously owned by or leased to the United States and under Secretary of Defense jurisdiction. The remediation of these properties is the responsibility of the Department of Defense.

HISTPST Historical Gas Stations

VERSION DATE: 7/1930

This historic directory of service stations is provided by the Cities Service Company. The directory includes Cities Service filling stations that were located throughout the United States in 1930.

HMIRSR09 Hazardous Materials Incident Reporting System

VERSION DATE: 1/2013

The HMIRS database contains unintentional hazardous materials release information reported to the U.S. Department of Transportation located in EPA Region 9. This region includes the following states: Arizona, California, Hawaii, Nevada, and the territories of Guam and American Samoa.

ICIS Integrated Compliance Information System (formerly DOCKETS)

VERSION DATE: 8/2012

ICIS is a case activity tracking and management system for civil, judicial, and administrative federal Environmental Protection Agency enforcement cases. ICIS contains information on federal administrative and federal judicial cases under the following environmental statutes: the Clean Air Act, the Clean Water Act, the Resource Conservation and Recovery Act, the Emergency Planning and Community Right-to-Know Act - Section 313, the Toxic Substances Control Act, the Federal Insecticide, Fungicide, and Rodenticide Act, the Comprehensive Environmental Response, Compensation, and Liability Act, the Safe Drinking Water Act, and the Marine Protection, Research, and Sanctuaries Act.

ICISNPDES Integrated Compliance Information System National Pollutant Discharge Elimination System

VERSION DATE: 8/2012

In 2006, the Integrated Compliance Information System (ICIS) - National Pollutant Discharge Elimination System (NPDES) became the NPDES national system of record for select states, tribes and territories. ICIS-NPDES is an information management system maintained by the United States Environmental Protection Agency's Office of Compliance to track permit compliance and enforcement status of facilities regulated by the NPDES under the Clean Water Act. ICIS-NPDES is designed to support the NPDES program at the state, regional, and national levels.

LUCIS Land Use Control Information System

VERSION DATE: 9/2006

The LUCIS database is maintained by the U.S. Navy and contains information for former Base Realignment and Closure (BRAC) properties across the United States.

MLTS Material Licensing Tracking System

VERSION DATE: 1/2013

MLTS is a list of approximately 8,100 sites which have or use radioactive materials subject to the United States Nuclear Regulatory Commission (NRC) licensing requirements.

NFRAP No Further Remedial Action Planned Sites

VERSION DATE: 12/2012

This database includes sites which have been determined by the United States Environmental Protection Agency, following preliminary assessment, to no longer pose a significant risk or require further activity under CERCLA. After initial investigation, no contamination was found, contamination was quickly removed or contamination was not serious enough to require Federal Superfund action or NPL consideration.

NLRRCRAC No Longer Regulated RCRA Corrective Action Facilities

VERSION DATE: 3/2013

This database includes RCRA Corrective Action facilities that are no longer regulated by the United States Environmental Protection Agency or do not meet other RCRA reporting requirements.

NLRRCRAG No Longer Regulated RCRA Generator Facilities

VERSION DATE: 3/2013

This database includes RCRA Generator facilities that are no longer regulated by the United States Environmental Protection Agency or do not meet other RCRA reporting requirements. This listing includes facilities that formerly generated hazardous waste.
Large Quantity Generators: Generate 1,000 kg or more of hazardous waste during any calendar month; or Generate more than 1 kg of acutely hazardous waste during any calendar month; or Generate more than 100 kg of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, or acutely hazardous waste during any calendar month; or Generate 1 kg or less of acutely hazardous waste during any calendar month, and accumulate more than 1kg of acutely hazardous waste at any time; or Generate 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month, and accumulated more than 100 kg of that material at any time.
Small Quantity Generators: Generate more than 100 and less than 1000 kilograms of hazardous waste during any calendar month and accumulate less than 6000 kg of hazardous waste at any time; or Generate 100 kg or less of hazardous waste during any calendar month, and accumulate more than 1000 kg of hazardous waste at any time.
Conditionally Exempt Small Quantity Generators: Generate 100 kilograms or less of hazardous waste per calendar month, and accumulate 1000 kg or less of hazardous waste at any time; or Generate one kilogram or less of acutely hazardous waste per calendar month, and accumulate at any time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, or acutely hazardous waste; or Generate 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, or acutely hazardous waste during any calendar month, and accumulate at any time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste.

NLRRCRAT No Longer Regulated RCRA Non-CORRACTS TSD Facilities

VERSION DATE: 3/2013

This database includes RCRA Non-Corrective Action TSD facilities that are no longer regulated by the United States Environmental Protection Agency or do not meet other RCRA reporting requirements. This listing includes facilities that formerly treated, stored or disposed of hazardous waste.

NPDESR09 National Pollutant Discharge Elimination System

VERSION DATE: 4/2007

Information in this database is extracted from the Water Permit Compliance System (PCS) database which is used by United States Environmental Protection Agency to track surface water permits issued under the Clean Water Act. This database includes permitted facilities located in

EPA Region 9. This region includes the following states: Arizona, California, Hawaii, Nevada, and the territories of Guam and American Samoa. The NPDES database was collected from December 2002 until April 2007. Refer to the PCS and/or ICIS-NPDES database as source of current data.

NPL National Priorities List

VERSION DATE: 12/2012

This database includes United States Environmental Protection Agency (EPA) National Priorities List sites that fall under the EPA's Superfund program, established to fund the cleanup of the most serious uncontrolled or abandoned hazardous waste sites identified for possible long-term remedial action.

ODI Open Dump Inventory

VERSION DATE: 6/1985

The open dump inventory was published by the United States Environmental Protection Agency. An “open dump” is defined as a facility or site where solid waste is disposed of which is not a sanitary landfill which meets the criteria promulgated under section 4004 of the Solid Waste Disposal Act (42 U.S.C. 6944) and which is not a facility for disposal of hazardous waste. This inventory has not been updated since June 1985.

PADS PCB Activity Database System

VERSION DATE: 11/2012

The PCB Activity Database System (PADS) is used by the United States Environmental Protection Agency to monitor the activities of polychlorinated biphenyls (PCB) handlers.

PCSR09 Permit Compliance System

VERSION DATE: 8/2012

The Permit Compliance System is used in tracking enforcement status and permit compliance of facilities controlled by the National Pollutant Discharge Elimination System (NPDES) under the Clean Water Act and is maintained by the United States Environmental Protection Agency's Office of Compliance. PCS is designed to support the NPDES program at the state, regional, and national levels. This database includes permitted facilities located in EPA Region 9. This region includes the following states: Arizona, California, Hawaii, Nevada, and the territories of Guam and American Samoa.

PNPL Proposed National Priorities List

VERSION DATE: 12/2012

This database contains sites proposed to be included on the National Priorities List (NPL) in the Federal Register. The United States Environmental Protection Agency investigates these sites to determine if they may present long-term threats to public health or the environment.

RCRAC Resource Conservation & Recovery Act - Corrective Action Facilities

VERSION DATE: 3/2013

This database includes hazardous waste sites listed with corrective action activity in the RCRAInfo system. The Corrective Action Program requires owners or operators of RCRA facilities (or treatment, storage, and disposal facilities) to investigate and cleanup contamination in order to protect human health and the environment. The United States Environmental Protection Agency defines RCRAInfo as the comprehensive information system which provides access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. RCRAInfo replaces the data recording and reporting abilities of the Resource Conservation and Recovery Information System (RCRIS) and the Biennial Reporting System (BRS).

RCRAGR09 Resource Conservation & Recovery Act - Generator Facilities

VERSION DATE: 3/2013

This database includes sites listed as generators of hazardous waste (large, small, and exempt) in the RCRAInfo system. The United States Environmental Protection Agency defines RCRAInfo as the comprehensive information system which provides access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. RCRAInfo replaces the data recording and reporting abilities of the Resource Conservation and Recovery Information System (RCRIS) and the Biennial Reporting System (BRS). This database includes sites located in EPA Region 9. This region includes the following states: Arizona, California, Hawaii, Nevada, and the territories of Guam and American Samoa.
Large Quantity Generators: Generate 1,000 kg or more of hazardous waste during any calendar month; or Generate more than 1 kg of acutely hazardous waste during any calendar month; or Generate more than 100 kg of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, or acutely hazardous waste during any calendar month; or Generate 1 kg or less of acutely hazardous waste during any calendar month, and accumulate more than 1kg of acutely hazardous waste at any time; or Generate 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month, and accumulated more than 100 kg of that material at any time.
Small Quantity Generators: Generate more than 100 and less than 1000 kilograms of hazardous waste during any calendar month and accumulate less than 6000 kg of hazardous waste at any time; or Generate 100 kg or less of hazardous waste during any calendar month, and accumulate more than 1000 kg of hazardous waste at any time.
Conditionally Exempt Small Quantity Generators: Generate 100 kilograms or less of hazardous waste per calendar month, and accumulate 1000 kg or less of hazardous waste at any time; or Generate one kilogram or less of acutely hazardous waste per calendar month, and accumulate at any time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, or

acutely hazardous waste; or Generate 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, or acutely hazardous waste during any calendar month, and accumulate at any time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste.

RCRASC RCRA Sites with Controls

VERSION DATE: 6/2012

This list of Resource Conservation and Recovery Act sites with institutional controls in place is provided by the U.S. Environmental Protection Agency.

RCRAT Resource Conservation & Recovery Act - Treatment, Storage & Disposal Facilities

VERSION DATE: 3/2013

This database includes Non-Corrective Action sites listed as treatment, storage and/or disposal facilities of hazardous waste in the RCRAInfo system. The United States Environmental Protection Agency defines RCRAInfo as the comprehensive information system which provides access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. RCRAInfo replaces the data recording and reporting abilities of the Resource Conservation and Recovery Information System (RCRIS) and the Biennial Reporting System (BRS).

RODS Record of Decision System

VERSION DATE: 1/2013

These decision documents maintained by the United States Environmental Protection Agency describe the chosen remedy for NPL (Superfund) site remediation. They also include site history, site description, site characteristics, community participation, enforcement activities, past and present activities, contaminated media, the contaminants present, and scope and role of response action.

SFLIENS CERCLIS Liens

VERSION DATE: 6/2012

A Federal CERCLA ("Superfund") lien can exist by operation of law at any site or property at which United States Environmental Protection Agency has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties. This database contains those CERCLIS sites where the Lien on Property action is complete.

SSTS Section Seven Tracking System

VERSION DATE: 12/2009

The United States Environmental Protection Agency tracks information on pesticide establishments through the Section Seven Tracking System (SSTS). SSTS records the registration of new establishments and records pesticide production at each establishment. The Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) requires that production of pesticides or devices be conducted in a registered pesticide-producing or device-producing establishment. ("Production" includes formulation, packaging, repackaging, and relabeling.)

TRI Toxics Release Inventory

VERSION DATE: 12/2011

The Toxics Release Inventory, provided by the United States Environmental Protection Agency, includes data on toxic chemical releases and waste management activities from certain industries as well as federal facilities. This inventory contains information about the types and amounts of toxic chemicals that are released each year to the air, water, and land as well as information on the quantities of toxic chemicals sent to other facilities for further waste management.

TSCA Toxic Substance Control Act Inventory

VERSION DATE: 12/2006

The Toxic Substances Control Act (TSCA) was enacted in 1976 to ensure that chemicals manufactured, imported, processed, or distributed in commerce, or used or disposed of in the United States do not pose any unreasonable risks to human health or the environment. TSCA section 8(b) provides the United States Environmental Protection Agency authority to "compile, keep current, and publish a list of each chemical substance that is manufactured or processed in the United States." This TSCA Chemical Substance Inventory contains non-confidential information on the production amount of toxic chemicals from each manufacturer and importer site.

AST Aboveground Storage Tanks

VERSION DATE: 6/2008

This listing of aboveground storage tanks was provided by the Nevada State Emergency Response Commission (SERC). In January of 2009, the SERC discontinued the sharing of facility specific information due to the U.S. Environmental Protection Agency's Office of General Counsel and a Nevada Attorney General's guidance relating to the Emergency Planning and Community Right-to-Know Act (EPCRA). According to the SERC, AAI requirements do not fall under the EPCRA program and the SERC does not and never has "regulated" ASTs. For these reasons, companies such as GeoSearch are unable to obtain current aboveground storage tank information. Please contact the SERC at (775) 687-6973 if you require information regarding the EPCRA reporting requirements of a specific facility within the State of Nevada.

BF Brownfield Properties

VERSION DATE: 1/2012

This listing of brownfield properties is maintained by the Nevada Division of Environmental Protection (NDEP). The NDEP describes brownfields as abandoned, idled, or underused industrial or commercial properties taken out of productive use because of real or perceived risks from environmental contamination. The State of Nevada has initiated Brownfields, a land-recycling program, to provide an opportunity to redevelop these undesirable properties and revitalize communities.

HWRECYCLERS Hazardous Waste Recycling Facilities

VERSION DATE: 1/2011

This listing of hazardous waste recycling facilities is maintained by the Nevada Division of Environmental Protection's (NDEP) Bureau of Waste Management. Nevada Administrative Code (NAC) 444.84555 requires a facility or mobile unit for the recycling of hazardous waste to obtain a Written Determination by the NDEP Administrator.

LUST Leaking Underground Storage Tanks

VERSION DATE: 1/2013

This database includes both Leaking Underground Storage Tank (LUST) cases as well as Corrective Action (non-regulated) sites and is maintained by the Nevada Division of Environmental Protection's Bureau of Corrective Actions.

NPDES National Pollutant Discharge Elimination System Permits

VERSION DATE: 1/2013

This listing of active NPDES Permits is maintained by the Nevada Division of Environmental Protection's Bureau of Water Pollution Control (BWPC). The BWPC issues National Pollutant Discharge Elimination System (NPDES) Permits for discharge to surface waters, ground water permits for discharges that may impact subsurface waters, Underground Injection Control (UIC) permits for injection through wells, and Stormwater Permits.

RECYCLERS Recycling Facilities

VERSION DATE: NR

The recycling facilities included in this database are compiled from various city and county listings created between 2011 and 2012, and are provided by the Nevada Division of Environmental Protection.

SPILLS Spills Listing

VERSION DATE: 1/2013

The Nevada Division of Environmental Protection (NDEP) defines a release as any pollutant, hazardous waste or contaminant that has been spilled, leaked, pumped, poured, emitted, emptied, discharged, injected, escaped, leached, dumped or disposed into the environment. A spill of any quantity that affects a water way within the State of Nevada must be reported, regardless of the quantity.

SWF Solid Waste Facilities

VERSION DATE: 1/2012

This inventory of open and closed solid waste disposal facilities is maintained by the Nevada Division of Environmental Protection's Bureau of Waste Management.

TIERII Tier I I Facility Listing

VERSION DATE: 6/2008

The Nevada State Emergency Response Commission (SERC) provided this listing of Tier II facilities which store hazardous chemicals or materials on-site. The OSHA Hazard Communication Standard defines hazardous chemicals as any substance for which a facility must maintain a Material Safety Data Sheet (MSDS). In January of 2009, the SERC discontinued the sharing of facility specific information due to the U.S. Environmental Protection Agency's Office of General Counsel and a Nevada Attorney General's guidance relating to the Emergency Planning and Community Right-to-Know Act (EPCRA). For this reason, companies such as GeoSearch are unable to obtain current TIER II facility information. Please contact the SERC at (775) 687-6973 if you require information regarding the EPCRA reporting requirements of a specific facility within the State of Nevada.

UST Registered Underground Storage Tanks

VERSION DATE: 1/2013

This listing of registered underground and aboveground storage tanks is maintained by the Nevada Division of Environmental Protection's Bureau of Corrective Actions.

VCP Voluntary Cleanup Program Sites

VERSION DATE: 8/2011

The Voluntary Cleanup Program (VCP) provides relief from liability to owners who undertake cleanups of contaminated properties under the oversight of the by the Nevada Division of Environmental Protection's Bureau of Corrective Actions.

INDIANRES Indian Reservations

VERSION DATE: 1/2000

The Department of Interior and Bureau of Indian Affairs maintains this database that includes American Indian Reservations, off-reservation trust lands, public domain allotments, Alaska Native Regional Corporations and Recognized State Reservations.

LUSTR09 Leaking Underground Storage Tanks On Tribal Lands

VERSION DATE: 2/2012

This database, provided by the United States Environmental Protection Agency (EPA), contains leaking underground storage tanks on Tribal lands located in EPA Region 9. This region includes the following states: Arizona, California, Hawaii, Nevada, and the territories of Guam and American Samoa.

ODINDIAN Open Dump Inventory on Tribal Lands

VERSION DATE: 11/2006

This Indian Health Service database contains information about facilities and sites on tribal lands where solid waste is disposed of, which are not sanitary landfills or hazardous waste disposal facilities, and which meet the criteria promulgated under section 4004 of the Solid Waste Disposal Act (42 U.S.C. 6944).

USTR09 Underground Storage Tanks On Tribal Lands

VERSION DATE: 2/2012

This database, provided by the United States Environmental Protection Agency (EPA), contains underground storage tanks on Tribal lands located in EPA Region 9. This region includes the following states: Arizona, California, Hawaii, Nevada, and the territories of Guam and American Samoa.

Appendix L

Air Emission Calculations

Summary of PV Construction Emissions

2014 Construction Emissions

Construction Emission Category	NOx (tons)	CO (tons)	SO2 (tons)	VOC (tons)	PM10 (tons)	PM2.5 (tons)	CO2 (tons)	N2O (tons)	CH4 (tons)	CO2e (metric tons)	TOTAL HAP (tons)
Construction Equipment Exhaust	5.53	3.35	0.01	0.74	0.57	0.57	-	-	-	-	-
On-Road Vehicle Exhaust - Heavy Duty Vehicles	3.22	1.27	0.00	0.16	0.19	0.17	455.29	0.00	0.01	413.37	0.03
On-Road Vehicle Exhaust - Commute Vehicles	3.01	13.21	0.03	0.58	0.21	0.12	1709.90	0.02	0.03	1556.94	0.17
Fugitive Dust from Travel on Paved Roads	-	-	-	-	5.39	1.32	-	-	-	-	-
Fugitive Dust from Travel on Unpaved Roads	-	-	-	-	2.79	0.28	-	-	-	-	-
Fugitive Dust from Construction Activities	-	-	-	-	11.15	2.32	-	-	-	-	-
Total	**11.77**	**17.83**	**0.04**	**1.48**	**20.31**	**4.78**	**2165.19**	**0.02**	**0.04**	**1970.31**	**0.20**

2015 Construction Emissions

Construction Emission Category	NOx (tons)	CO (tons)	SO2 (tons)	VOC (tons)	PM10 (tons)	PM2.5 (tons)	CO2 (tons)	N2O (tons)	CH4 (tons)	CO2e (metric tons)	TOTAL HAP (tons)
Construction Equipment Exhaust	9.74	5.86	0.01	1.34	0.97	0.97	-	-	-	-	-
On-Road Vehicle Exhaust - Heavy Duty Vehicles	5.91	2.36	0.01	0.30	0.36	0.31	907.17	0.00	0.02	823.64	0.06
On-Road Vehicle Exhaust - Commute Vehicles	5.43	24.54	0.06	1.03	0.41	0.23	3357.99	0.03	0.06	3056.64	0.31
Fugitive Dust from Travel on Paved Roads	-	-	-	-	10.74	2.64	-	-	-	-	-
Fugitive Dust from Travel on Unpaved Roads	-	-	-	-	5.57	0.56	-	-	-	-	-
Fugitive Dust from Construction Activities	-	-	-	-	0.10	0.02	-	-	-	-	-
Total	**21.08**	**32.76**	**0.08**	**2.67**	**18.15**	**4.73**	**4265.16**	**0.04**	**0.08**	**3880.28**	**0.36**

Moapa Solar PV Construction - Construction Equipment Exhaust

Expected Construction Start	7/1/2014				
Expected Construction End	12/31/2015				
2014 Construction Duration	131	days	Mon-Fri	12	hours/day
2015 Construction Duration	261	days	Mon-Fri	12	hours/day

Model Equipment Types	Fuel Type	Horsepower (hp)	Number	Duration (days)	Duration (hours)	2014 Construction Equipment Emission Factors (g/hp-hr)						2014 Construction Equipment Emissions (tons)					
						NOx	CO	SOx	VOC	PM10	PM2.5	NOx	CO	SOx	VOC	PM10	PM2.5
Aerial Lifts	Diesel	50	1	131	1,572	5.77	6.78	0.005	1.776	0.968	0.968	0.500	0.588	0.000	0.154	0.084	0.084
Concrete/Industrial Saws	Diesel	50	1	131	1,572	4.25	1.48	0.004	0.253	0.246	0.246	0.369	0.128	0.000	0.022	0.021	0.021
Cranes	Diesel	175	1	131	1,572	2.86	0.727	0.003	0.227	0.174	0.174	0.868	0.220	0.001	0.069	0.053	0.053
Dumpers/Tenders	Diesel	50	1	131	1,572	5.58	6.13	0.005	1.528	0.922	0.922	0.484	0.531	0.000	0.132	0.080	0.080
Excavators	Diesel	175	2	131	1,572	2.19	0.949	0.003	0.187	0.229	0.229	1.329	0.575	0.002	0.114	0.139	0.139
Off-Highway Trucks	Diesel	300	1	131	1,572	1.53	0.444	0.003	0.151	0.082	0.082	0.798	0.231	0.001	0.078	0.042	0.042
Rough Terrain Forklifts	Diesel	75	1	131	1,572	3.90	2.82	0.004	0.316	0.340	0.340	0.506	0.366	0.000	0.041	0.044	0.044
Tractors/Loaders/Backhoes	Diesel	75	1	131	1,572	5.21	5.44	0.005	0.967	0.797	0.797	0.678	0.707	0.001	0.126	0.104	0.104
Total												5.53	3.35	0.007	0.736	0.567	0.567

Model Equipment Types	Fuel Type	Horsepower (hp)	Number	Duration (days)	Duration (hours)	2015 Construction Equipment Emission Factors (g/hp-hr)						2015 Construction Equipment Emissions (tons)					
						NOx	CO	SOx	VOC	PM10	PM2.5	NOx	CO	SOx	VOC	PM10	PM2.5
Aerial Lifts	Diesel	50	1	261	3,132	5.59	6.32	0.004	1.643	0.907	0.907	0.966	1.090	0.001	0.284	0.157	0.157
Concrete/Industrial Saws	Diesel	50	1	261	3,132	4.05	1.23	0.004	0.230	0.197	0.197	0.700	0.212	0.001	0.040	0.034	0.034
Cranes	Diesel	175	1	261	3,132	2.48	0.647	0.003	0.209	0.156	0.156	1.501	0.391	0.002	0.126	0.094	0.094
Dumpers/Tenders	Diesel	50	1	261	3,132	5.38	5.59	0.004	1.379	0.849	0.849	0.929	0.965	0.001	0.238	0.146	0.146
Excavators	Diesel	175	2	261	3,132	1.82	0.797	0.003	0.174	0.192	0.192	2.204	0.963	0.004	0.210	0.232	0.232
Off-Highway Trucks	Diesel	300	1	261	3,132	1.13	0.274	0.003	0.141	0.045	0.045	1.175	0.284	0.003	0.146	0.046	0.046
Rough Terrain Forklifts	Diesel	75	1	261	3,132	3.73	2.54	0.004	0.284	0.294	0.294	0.967	0.656	0.001	0.074	0.076	0.076
Tractors/Loaders/Backhoes	Diesel	75	1	261	3,132	5.00	5.03	0.004	0.879	0.728	0.728	1.294	1.302	0.001	0.228	0.189	0.189
Total												9.74	5.86	0.013	1.345	0.974	0.974

Notes:

1 - Per the Project, construction of the SPGF, from site preparation and grading to commercial operation, will be expected to take 18 months (mid-2014-end 2015). Construction will generally occur between 7 a.m. and 7 p.m., Monday through Friday.

2 - Construction equipment emission factors developed using EPA NONROAD model.

3 - Construction equipment number, type, and HP rating was assumed: A mid-range HP value was chosen for each equipment category.

Moapa Solar PV Construction - On-Road Vehicle Exhaust - Heavy Duty Vehicles

Expected Construction Start	7/1/2014	
Expected Construction End	12/31/2015	
2014 Construction Duration	131	days
2015 Construction Duration	261	days

Heavy Duty Vehicle Details	**Maximum Quantity per day**	**Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day)**	**Max Daily Onsite Roundtrip Distance per Vehicle (miles/day)**	**Duration (days)**	**2014 Heavy Duty Vehicle Emission Factors (g/mi)** NOx	CO	SOx	VOC	PM10	PM2.5	**2014 Heavy Duty Vehicle Emissions (tons)** NOx	CO	SOx	VOC	PM10	PM2.5
Concrete Delivery Truck for General Construction	2	80	0	131	12.6	4.96	0.01	0.62	0.75	0.66	0.290	0.114	0.000	0.014	0.017	0.015
Dump Truck	1	0	7.5	131	12.6	4.96	0.01	0.62	0.75	0.66	0.014	0.005	0.000	0.001	0.001	0.001
Flatbed Truck	5	0	7.5	131	12.6	4.96	0.01	0.62	0.75	0.66	0.068	0.027	0.000	0.003	0.004	0.004
Staff & Security Truck	4	0	7.5	131	12.6	4.96	0.01	0.62	0.75	0.66	0.054	0.021	0.000	0.003	0.003	0.003
Pickup Truck	10	0	7.5	131	12.6	4.96	0.01	0.62	0.75	0.66	0.136	0.054	0.000	0.007	0.008	0.007
Road Preparation Materials Truck	10	15	0	131	12.6	4.96	0.01	0.62	0.75	0.66	0.272	0.107	0.000	0.014	0.016	0.014
General Materials Delivery Truck for General Construction	1	100	0	131	12.6	4.96	0.01	0.62	0.75	0.66	0.182	0.072	0.000	0.009	0.011	0.009
PV Module, Tracker, & Electrical component Delivery	12	100	0	131	12.6	4.96	0.01	0.62	0.75	0.66	2.178	0.859	0.002	0.108	0.131	0.114
Water Delivery Truck	2	0	7.5	131	12.6	4.96	0.01	0.62	0.75	0.66	0.027	0.011	0.000	0.001	0.002	0.001
Total											3.222	1.270	0.004	0.160	0.193	0.168

Heavy Duty Vehicle Details	**Maximum Quantity per day**	**Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day)**	**Max Daily Onsite Roundtrip Distance per Vehicle (miles/day)**	**Duration (days)**	**2014 Heavy Duty Vehicle Emission Factors (g/mi)** CO2	N2O	CH4	**2014 Heavy Duty Vehicle Emissions (tons)** CO2	N2O	CH4	CO2e (metric tons)
Concrete Delivery Truck for General Construction	2	80	0	131	1776.3	0.004	0.03	41.040	0.000	0.001	37.26
Dump Truck	1	0	7.5	131	1776.3	0.004	0.03	1.924	0.000	0.000	1.75
Flatbed Truck	5	0	7.5	131	1776.3	0.004	0.03	9.619	0.000	0.000	8.73
Staff & Security Truck	4	0	7.5	131	1776.3	0.004	0.03	7.695	0.000	0.000	6.99
Pickup Truck	10	0	7.5	131	1776.3	0.004	0.03	19.238	0.000	0.000	17.47
Road Preparation Materials Truck	10	15	0	131	1776.3	0.004	0.03	38.475	0.000	0.001	34.93
General Materials Delivery Truck for General Construction	1	100	0	131	1776.3	0.004	0.03	25.650	0.000	0.000	23.29
PV Module, Tracker, & Electrical component Delivery	12	100	0	131	1776.3	0.004	0.03	307.801	0.001	0.005	279.46
Water Delivery Truck	2	0	7.5	131	1776.3	0.004	0.03	3.848	0.000	0.000	3.49
Total								455.290	0.001	0.008	413.368

Moapa Solar PV Construction - On-Road Vehicle Exhaust - Heavy Duty Vehicles – Continued

					2014 Heavy Duty Vehicle Emission Factors (g/mi)															
Heavy Duty Vehicle Details	**Maximum Quantity per day**	**Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day)**	**Max Daily Onsite Roundtrip Distance per Vehicle (miles/day)**	**Duration (days)**	**Benzene**	**Ethanol**	**MTBE**	**1,3-Butadiene**	**Form-aldehyde**	**Acet-aldehyde**	**Acrolein**	**2,2,4-Trimethyl-pentane**	**Ethyl Benzene**	**Hexane**	**Propion-aldehyde**	**Styrene**	**Toluene**	**Xylene**	**Naphthalene**	**PAH (less Naphthalene)**
Concrete Delivery Truck for General Construction	2	80	0	131	0.007	0.002	0.000	0.002	0.046	0.021	0.004	0.003	0.003	0.003	0.002	0.001	0.010	0.009	0.005	0.003
Dump Truck	1	0	7.5	131	0.007	0.002	0.000	0.002	0.046	0.021	0.004	0.003	0.003	0.003	0.002	0.001	0.010	0.009	0.005	0.003
Flatbed Truck	5	0	7.5	131	0.007	0.002	0.000	0.002	0.046	0.021	0.004	0.003	0.003	0.003	0.002	0.001	0.010	0.009	0.005	0.003
Staff & Security Truck	4	0	7.5	131	0.007	0.002	0.000	0.002	0.046	0.021	0.004	0.003	0.003	0.003	0.002	0.001	0.010	0.009	0.005	0.003
Pickup Truck	10	0	7.5	131	0.007	0.002	0.000	0.002	0.046	0.021	0.004	0.003	0.003	0.003	0.002	0.001	0.010	0.009	0.005	0.003
Road Preparation Materials Truck	10	15	0	131	0.007	0.002	0.000	0.002	0.046	0.021	0.004	0.003	0.003	0.003	0.002	0.001	0.010	0.009	0.005	0.003
General Materials Delivery Truck for General Construction	1	100	0	131	0.007	0.002	0.000	0.002	0.046	0.021	0.004	0.003	0.003	0.003	0.002	0.001	0.010	0.009	0.005	0.003
PV Module, Tracker, & Electrical component Delivery	12	100	0	131	0.007	0.002	0.000	0.002	0.046	0.021	0.004	0.003	0.003	0.003	0.002	0.001	0.010	0.009	0.005	0.003
Water Delivery Truck	2	0	7.5	131	0.007	0.002	0.000	0.002	0.046	0.021	0.004	0.003	0.003	0.003	0.002	0.001	0.010	0.009	0.005	0.003

	2014 Heavy Duty Vehicle Emissions (tons)																
Heavy Duty Vehicle Details	**Benzene**	**Ethanol**	**MTBE**	**1,3-Butadiene**	**Form-aldehyde**	**Acet-aldehyde**	**Acrolein**	**2,2,4-Trimethyl-pentane**	**Ethyl Benzene**	**Hexane**	**Propion-aldehyde**	**Styrene**	**Toluene**	**Xylene**	**Naphthalene**	**PAH (less Naphthalene)**	**Total HAPs**
Concrete Delivery Truck for General Construction	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003
Dump Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Flatbed Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
Staff & Security Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
Pickup Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
Road Preparation Materials Truck	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003
General Materials Delivery Truck for General Construction	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002
PV Module, Tracker, & Electrical component Delivery	0.001	0.000	0.000	0.000	0.008	0.004	0.001	0.000	0.001	0.000	0.000	0.000	0.002	0.001	0.001	0.001	0.021
Water Delivery Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	0.002	0.001	0.000	0.001	0.012	0.005	0.001	0.001	0.001	0.001	0.001	0.000	0.003	0.002	0.001	0.001	0.031

Moapa Solar PV Construction - On-Road Vehicle Exhaust - Heavy Duty Vehicles – Continued

					2015 Heavy Duty Vehicle Emission Factors (g/mi)						2015 Heavy Duty Vehicle Emissions (tons)					
Heavy Duty Vehicle Details	**Maximum Quantity per day**	**Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day)**	**Max Daily Onsite Roundtrip Distance per Vehicle (miles/day)**	**Duration (days)**	NOx	CO	SOx	VOC	PM10	PM2.5	NOx	CO	SOx	VOC	PM10	PM2.5
Concrete Delivery Truck for General Construction	2	80	0	261	11.57	4.61	0.01	0.58	0.70	0.602	0.533	0.212	0.001	0.027	0.032	0.028
Dump Truck	1	0	7.5	261	11.57	4.61	0.01	0.58	0.70	0.602	0.025	0.010	0.000	0.001	0.002	0.001
Flatbed Truck	5	0	7.5	261	11.57	4.61	0.01	0.58	0.70	0.602	0.125	0.050	0.000	0.006	0.008	0.006
Staff & Security Truck	4	0	7.5	261	11.57	4.61	0.01	0.58	0.70	0.602	0.100	0.040	0.000	0.005	0.006	0.005
Pickup Truck	10	0	7.5	261	11.57	4.61	0.01	0.58	0.70	0.602	0.250	0.100	0.000	0.012	0.015	0.013
Road Preparation Materials Truck	10	15	0	261	11.57	4.61	0.01	0.58	0.70	0.602	0.499	0.199	0.001	0.025	0.030	0.026
General Materials Delivery Truck for General Construction	1	100	0	261	11.57	4.61	0.01	0.58	0.70	0.602	0.333	0.133	0.000	0.017	0.020	0.017
PV Module, Tracker, & Electrical component Delivery	12	100	0	261	11.57	4.61	0.01	0.58	0.70	0.602	3.996	1.593	0.005	0.200	0.241	0.208
Water Delivery Truck	2	0	7.5	261	11.57	4.61	0.01	0.58	0.70	0.602	0.050	0.020	0.000	0.002	0.003	0.003
Total											5.911	2.356	0.007	0.295	0.356	0.308

					2015 Heavy Duty Vehicle Emission Factors (g/mi)			2015 Heavy Duty Vehicle Emissions (tons)			
Heavy Duty Vehicle Details	**Maximum Quantity per day**	**Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day)**	**Max Daily Onsite Roundtrip Distance per Vehicle (miles/day)**	**Duration (days)**	**CO2**	**N2O**	**CH4**	**CO2**	**N2O**	**CH4**	**CO2e (metric tons)**
Concrete Delivery Truck for General Construction	2	80	0	261	1776.44	0.003	0.03	81.773	0.000	0.002	74.24
Dump Truck	1	0	7.5	261	1776.44	0.003	0.03	3.833	0.000	0.000	3.48
Flatbed Truck	5	0	7.5	261	1776.44	0.003	0.03	19.165	0.000	0.000	17.40
Staff & Security Truck	4	0	7.5	261	1776.44	0.003	0.03	15.332	0.000	0.000	13.92
Pickup Truck	10	0	7.5	261	1776.44	0.003	0.03	38.331	0.000	0.001	34.80
Road Preparation Materials Truck	10	15	0	261	1776.44	0.003	0.03	76.662	0.000	0.001	69.60
General Materials Delivery Truck for General Construction	1	100	0	261	1776.44	0.003	0.03	51.108	0.000	0.001	46.40
PV Module, Tracker, & Electrical component Delivery	12	100	0	261	1776.44	0.003	0.03	613.295	0.001	0.011	556.83
Water Delivery Truck	2	0	7.5	261	1776.44	0.003	0.03	7.666	0.000	0.000	6.96
Total								907.165	0.002	0.017	823.642

Moapa Solar PV Construction - On-Road Vehicle Exhaust - Heavy Duty Vehicles – Continued

					2015 Heavy Duty Vehicle Emission Factors (g/mi)															
Heavy Duty Vehicle Details	Maximum Quantity per day	Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day)	Max Daily Onsite Roundtrip Distance per Vehicle (miles/day)	Duration (days)	Benzene	Ethanol	MTBE	1,3-Butadiene	Form-aldehyde	Acet-aldehyde	Acrolein	2,2,4-Trimethyl-pentane	Ethyl Benzene	Hexane	Propion-aldehyde	Styrene	Toluene	Xylene	Naphthalene	PAH (less Naphthalene)
Concrete Delivery Truck for General Construction	2	80	0	261	0.007	0.002	0.000	0.002	0.043	0.019	0.003	0.002	0.003	0.003	0.002	0.001	0.009	0.008	0.005	0.003
Dump Truck	1	0	7.5	261	0.007	0.002	0.000	0.002	0.043	0.019	0.003	0.002	0.003	0.003	0.002	0.001	0.009	0.008	0.005	0.003
Flatbed Truck	5	0	7.5	261	0.007	0.002	0.000	0.002	0.043	0.019	0.003	0.002	0.003	0.003	0.002	0.001	0.009	0.008	0.005	0.003
Staff & Security Truck	4	0	7.5	261	0.007	0.002	0.000	0.002	0.043	0.019	0.003	0.002	0.003	0.003	0.002	0.001	0.009	0.008	0.005	0.003
Pickup Truck	10	0	7.5	261	0.007	0.002	0.000	0.002	0.043	0.019	0.003	0.002	0.003	0.003	0.002	0.001	0.009	0.008	0.005	0.003
Road Preparation Materials Truck	10	15	0	261	0.007	0.002	0.000	0.002	0.043	0.019	0.003	0.002	0.003	0.003	0.002	0.001	0.009	0.008	0.005	0.003
General Materials Delivery Truck for General Construction	1	100	0	261	0.007	0.002	0.000	0.002	0.043	0.019	0.003	0.002	0.003	0.003	0.002	0.001	0.009	0.008	0.005	0.003
PV Module, Tracker, & Electrical component Delivery	12	100	0	261	0.007	0.002	0.000	0.002	0.043	0.019	0.003	0.002	0.003	0.003	0.002	0.001	0.009	0.008	0.005	0.003
Water Delivery Truck	2	0	7.5	261	0.007	0.002	0.000	0.002	0.043	0.019	0.003	0.002	0.003	0.003	0.002	0.001	0.009	0.008	0.005	0.003

	2015 Heavy Duty Vehicle Emissions (tons)																
Heavy Duty Vehicle Details	Benzene	Ethanol	MTBE	1,3-Butadiene	Form-aldehyde	Acet-aldehyde	Acrolein	2,2,4-Trimethyl-pentane	Ethyl Benzene	Hexane	Propion-aldehyde	Styrene	Toluene	Xylene	Naphthalene	PAH (less Naphthalene)	Total HAPs
Concrete Delivery Truck for General Construction	0.000	0.000	0.000	0.000	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005
Dump Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Flatbed Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
Staff & Security Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
Pickup Truck	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002
Road Preparation Materials Truck	0.000	0.000	0.000	0.000	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005
General Materials Delivery Truck for General Construction	0.000	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003
PV Module, Tracker, & Electrical component Delivery	0.002	0.001	0.000	0.001	0.015	0.007	0.001	0.001	0.001	0.001	0.001	0.000	0.003	0.003	0.002	0.001	0.039
Water Delivery Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	0.003	0.001	0.000	0.001	0.022	0.010	0.002	0.001	0.001	0.001	0.001	0.000	0.005	0.004	0.002	0.002	0.057

Notes:

1 - Per the Project, construction of the SPGF, from site preparation and grading to commercial operation, will be expected to take 18 months (mid-2014-end 2015). Construction will generally occur between 7 a.m. and 7 p.m., Monday through Friday.

2 - Emission factors developed using MOVES

3 - Heavy duty vehicle emission factors based on the default MOVES national mix of single-unit and combination long- and short-haul trucks for year 2014 travelling at an average speed of 35 mph.

4 - The type of heavy duty vehicle, maximum quantity per day, and Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day) provided from the K Road Solar Project.

5 - Roundtrip mileage for Max Daily Onsite Roundtrip Distance per Vehicle (miles/day) based on (1) information from draft EIS: 2.5-mile gravel access road connecting the SPGF to the existing paved frontage road adjacent to I-15, and (2) the assumption that the distance per day = 5 miles per roundtrip (on 2.5-mile gravel access road) + 2.5 miles per roundtrip (distance traveled in and out on 1,000 acre site if site is 1.25 miles X 1.25 miles) = 7.5 miles per roundtrip.

Moapa Solar PV Construction - On-Road Vehicle Exhaust - Commute Vehicles

Expected Construction Start	7/1/2014	
Expected Construction End	12/31/2015	
2014 Construction Duration	131	days
2015 Construction Duration	261	days

			2014 Worker Commute Emission Factors (g/mi)						2014 Worker Commute Emissions (tpy)					
Worker Passenger Vehicles	**Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day)**	**Duration (days)**	NOx	CO	SOx	VOC	PM10	PM2.5	NOx	CO	SOx	VOC	PM10	PM2.5
300	100	131	0.695	3.05	0.007	0.134	0.048	0.028	3.012	13.210	0.031	0.581	0.209	0.119

			2014 Worker Commute Emission Factors (g/mi)			2014 Worker Commute Emissions (tpy)			
Worker Passenger Vehicles	**Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day)**	**Duration (days)**	**CO2**	**N2O**	**CH4**	**CO2**	**N2O**	**CH4**	**CO2e (metric tons)**
300	100	131	394.712	0.004	0.008	1709.897	0.019	0.033	1556.94

			2014 Worker Commute Emission Factors (g/mi)															
Worker Passenger Vehicles	**Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day)**	**Duration (days)**	**Benzene**	**Ethanol**	**MTBE**	**1,3-Butadiene**	**Form-aldehyde**	**Acet-aldehyde**	**Acrolein**	**2,2,4-Trimethyl-pentane**	**Ethyl Benzene**	**Hexane**	**Propion-aldehyde**	**Styrene**	**Toluene**	**Xylene**	**Naphthalene**	**PAH (less Naphthalene)**
300	100	131	0.004	0.003	0.000	0.001	0.002	0.002	0.000	0.002	0.002	0.002	0.000	0.000	0.011	0.009	0.000	0.000

	2014 Worker Commute Emissions (tons)																
Worker Passenger Vehicles	**Benzene**	**Ethanol**	**MTBE**	**1,3-Butadiene**	**Form-aldehyde**	**Acet-aldehyde**	**Acrolein**	**2,2,4-Trimethyl-pentane**	**Ethyl Benzene**	**Hexane**	**Propion-aldehyde**	**Styrene**	**Toluene**	**Xylene**	**Naphthalene**	**PAH (less Naphthalene)**	**Total HAPs**
300	0.019	0.014	0.000	0.003	0.009	0.008	0.000	0.010	0.011	0.010	0.001	0.001	0.048	0.039	0.001	0.001	0.172

Moapa Solar PV Construction - On-Road Vehicle Exhaust - Commute Vehicles – Continued

			2015 Worker Commute Emission Factors (g/mi)						2015 Worker Commute Emissions (tpy)					
Worker Passenger Vehicles	**Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day)**	**Duration (days)**	NOx	CO	SOx	VOC	PM10	PM2.5	NOx	CO	SOx	VOC	PM10	PM2.5
300	100	261	0.629	2.84	0.007	0.120	0.047	0.027	5.433	24.535	0.060	1.033	0.407	0.230

			2015 Worker Commute Emission Factors (g/mi)			2015 Worker Commute Emissions (tpy)			
Worker Passenger Vehicles	**Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day)**	**Duration (days)**	**CO2**	**N2O**	**CH4**	**CO2**	**N2O**	**CH4**	**CO2e (metric tons)**
300	100	261	389.064	0.004	0.007	3357.993	0.034	0.061	3056.64

			2015 Worker Commute Emission Factors (g/mi)															
Worker Passenger Vehicles	**Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day)**	**Duration (days)**	**Benzene**	**Ethanol**	**MTBE**	**1,3-Butadiene**	**Form-aldehyde**	**Acet-aldehyde**	**Acrolein**	**2,2,4-Trimethyl-pentane**	**Ethyl Benzene**	**Hexane**	**Propion-aldehyde**	**Styrene**	**Toluene**	**Xylene**	**Naphthalene**	**PAH (less Naphthalene)**
300	100	261	0.004	0.003	0.000	0.001	0.002	0.002	0.000	0.002	0.002	0.002	0.000	0.000	0.010	0.008	0.000	0.000

	2015 Worker Commute Emissions (tons)																
Worker Passenger Vehicles	**Benzene**	**Ethanol**	**MTBE**	**1,3-Butadiene**	**Form-aldehyde**	**Acet-aldehyde**	**Acrolein**	**2,2,4-Trimethyl-pentane**	**Ethyl Benzene**	**Hexane**	**Propion-aldehyde**	**Styrene**	**Toluene**	**Xylene**	**Naphthalene**	**PAH (less Naphthalene)**	**Total HAPs**
300	0.033	0.024	0.000	0.005	0.016	0.014	0.001	0.017	0.019	0.018	0.001	0.001	0.084	0.068	0.003	0.001	0.306

Notes:

1 - Per the Project, construction of the SPGF, from site preparation and grading to commercial operation, will be expected to take 18 months (mid-2014-end 2015). Construction will generally occur between 7 a.m. and 7 p.m., Monday through Friday.

2 - Emission factors developed using MOVES

3 - Worker commute emission factors are based on the default MOVES national mix of passenger cars and trucks for year 2014 travelling at an average speed of 35 mph.

4 - The number of worker passenger vehicles, and the Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day) provided from the K Road Solar Project.

Moapa Solar PV Construction - Fugitive Dust from Travel on Paved Roads

Expected Construction Start	7/1/2014	
Expected Construction End	12/31/2015	
2014 Construction Duration	131	days
2015 Construction Duration	261	days

Paved Roads emission factors from AP-42, Section 13.2.1: *Paved Roads* (Final Section 1/11)		
	E=	k(sL)^0.91 * (W)^1.02
where:		
E=		Particulate emission factor
k =	0.0022	lb/VMT [Table 13.2.1-1, particle size multiplier for PM_{10}]
k =	0.00054	lb/VMT [Table 13.2.1-1, particle size multiplier for $PM_{2.5}$]
sL =	0.6	[road surface silt loading (grams per square meter (g/m2)), Table 13.2.1-2] Assumed less than 500 average daily traffic to represent the project.
W=	2	tons [weighted average vehicle weight]
$E_{(PM10)}$=	0.003	lb/VMT
$E_{(PM2.5)}$=	0.0006	lb/VMT

											2014 Emissions (tons)		**2015 Emissions (tons)**	
Vehicle Details	**Vehicle Weight (tons)**	**Maximum Quantity per day**	**Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day)**	**Max Daily Onsite Roundtrip Distance per Vehicle (miles/day)**	**2014 Duration (days)**	**2015 Duration (days)**	**2014 Total Vehicle Miles Traveled on Paved Roads (VMT)**	**2015 Total Vehicle Miles Traveled on Paved Roads (VMT)**	**2014 Total Vehicle Miles Traveled * Vehicle Weight (tons)**	**2015 Total Vehicle Miles Traveled * Vehicle Weight (tons)**	**PM10 Emissions (tons)**	**PM2.5 Emissions (tons)**	**PM10 Emissions (tons)**	**PM2.5 Emissions (tons)**
Concrete Delivery Truck for General Construction	20	2	80	0	131	261	20,960	41,760	419,200	835,200	0.03	0.01	0.05	0.01
Dump Truck	20	1	0	6.375	131	261	835	1,664	16,703	33,278	0.00	0.00	0.00	0.00
Flatbed Truck	10	5	0	6.375	131	261	4,176	8,319	41,756	83,194	0.01	0.00	0.01	0.00
Staff & Security Truck	2.25	4	0	6.375	131	261	3,341	6,656	7,516	14,975	0.00	0.00	0.01	0.00
Pickup Truck	4	10	0	6.375	131	261	8,351	16,639	33,405	66,555	0.01	0.00	0.02	0.01
Road Preparation Materials Truck	20	10	15	0	131	261	19,650	39,150	393,000	783,000	0.03	0.01	0.05	0.01

General Materials Delivery Truck for General Construction	20	1	100	0	131	261	13,100	26,100	262,000	522,000	0.02	0.00	0.03	0.01
PV Module, Tracker, & Electrical component Delivery	10	12	100	0	131	261	157,200	313,200	1,572,000	3,132,000	0.20	0.05	0.41	0.10
Water Delivery Truck	30	2	0	6.375	131	261	1,670	3,328	50,108	99,833	0.00	0.00	0.00	0.00
Worker Passenger Vehicles	1.25	300	100	0	131	261	3,930,000	7,830,000	4,912,500	9,787,500	5.10	1.25	10.15	2.49
Total							4,159,283	8,286,815	7,708,187	15,357,534	5.39	1.32	10.74	2.64
								Weighted average vehicle wt (tons)	1.85	1.85				

Notes:

1 - Per the Project, construction of the SPGF, from site preparation and grading to commercial operation, will be expected to take 18 months (mid-2014-end 2015). Construction will generally occur between 7 a.m. and 7 p.m., Monday through Friday.

2 - The type of heavy duty vehicle, maximum quantity per day, vehicle weight, and Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day) provided from the K Road Solar Project.

3 - Roundtrip mileage for Max Daily Onsite Roundtrip Distance per Vehicle (miles/day) based on (1) information from draft EIS: 2.5-mile gravel access road connecting the SPGF to the existing paved frontage road adjacent to I-15, and (2) the assumption that the distance per day = 5 miles per roundtrip (on 2.5-mile gravel access road) + 2.5 miles per roundtrip (distance traveled in and out on 1,000 acre site if site is 1.25 miles X 1.25 miles) = 7.5 miles per roundtrip.

4 - Per client, 85% of roads onsite (access roads) are paved.

Moapa Solar PV Construction - Fugitive Dust from Travel on Unpaved Roads

Expected Construction Start	7/1/2014	
Expected Construction End	12/31/2015	
2014 Construction Duration	131	days
2015 Construction Duration	261	days

Unpaved Roads emission factor from AP-42, Section 13.2.2: *Unpaved Roads* (11/06)

$E = [k(s/12)^a(W/3)^b]$

where:

s =	8.5	surface material silt content (%) [Table 13.2.2-1, Construction sites mean silt content %]
W =	8	tons [weighted average vehicle weight]
k =	1.5	lb/VMT [Table 13.2.2-2, for PM_{10}]
k =	0.15	lb/VMT [Table 13.2.2-2, for $PM_{2.5}$]
a =	0.9	constant [Table 13.2.2-2, for PM_{10} and $PM_{2.5}$]
b =	0.45	constant [Table 13.2.2-2, for PM_{10} and $PM_{2.5}$]
$E_{(PM10)}$=	1.72	lb/VMT
$E_{(PM2.5)}$=	0.17	lb/VMT

										2014 Emissions (tons)		2015 Emissions (tons)	
Vehicle Details	**Vehicle Weight (tons)**	**Maximum Quantity per day**	**Max Daily Onsite Roundtrip Distance per Vehicle (miles/day)**	**2014 Duration (days)**	**2015 Duration (days)**	**2014 Total Vehicle Miles Traveled on Unpaved Roads (VMT)**	**2015 Total Vehicle Miles Traveled on Unpaved Roads (VMT)**	**2014 Total Vehicle Miles Traveled * Vehicle Weight (tons)**	**2015 Total Vehicle Miles Traveled * Vehicle Weight (tons)**	**PM10 Emissions (tons)**	**PM2.5 Emissions (tons)**	**PM10 Emissions (tons)**	**PM2.5 Emissions (tons)**
Concrete Delivery Truck for General Construction	20	2	0	131	261	0	0	0	0	0.00	0.00	0.00	0.00
Dump Truck	20	1	1.125	131	261	147	294	2,948	5,873	0.13	0.01	0.25	0.03
Flatbed Truck	10	5	1.125	131	261	737	1,468	7,369	14,681	0.63	0.06	1.26	0.13
Staff & Security Truck	2.25	4	1.125	131	261	590	1,175	1,326	2,643	0.51	0.05	1.01	0.10
Pickup Truck	4	10	1.125	131	261	1,474	2,936	5,895	11,745	1.27	0.13	2.53	0.25
Road Preparation Materials Truck	20	10	0	131	261	0	0	0	0	0.00	0.00	0.00	0.00
General Materials Delivery Truck for General Construction	20	1	0	131	261	0	0	0	0	0.00	0.00	0.00	0.00
PV Module, Tracker, & Electrical component Delivery	10	12	0	131	261	0	0	0	0	0.00	0.00	0.00	0.00
Water Delivery Truck	30	2	1.125	131	261	295	587	8,843	17,618	0.25	0.03	0.51	0.05
Worker Passenger Vehicles	1.25	300	0	131	261	0	0	0	0	0.00	0.00	0.00	0.00
Total						3,242	6,460	26,380	52,559	2.79	0.28	5.57	0.56
							Weighted average vehicle wt (tons)	8.14	8.14				

Notes:

1 - Per the Project, construction of the SPGF, from site preparation and grading to commercial operation, will be expected to take 18 months (mid-2014-end 2015). Construction will generally occur between 7 a.m. and 7 p.m., Monday through Friday.

2 - The type of heavy duty vehicle, maximum quantity per day, vehicle weight, and Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day) provided from the K Road Solar Project.

3 - Roundtrip mileage for Max Daily Onsite Roundtrip Distance per Vehicle (miles/day) based on (1) information from draft EIS: 2.5-mile gravel access road connecting the SPGF to the existing paved frontage road adjacent to I-15, and (2) the assumption that the distance per day = 5 miles per roundtrip (on 2.5-mile gravel access road) + 2.5 miles per roundtrip (distance traveled in and out on 1,000 acre site if site is 1.25 miles X 1.25 miles) = 7.5 miles per roundtrip.

4 - Per client, 85% of roads onsite (access roads) are paved, which means 15% are unpaved.

Moapa Solar PV Construction - Fugitive Dust from Construction Activities

						2014 Emissions	
Construction Activity	**Area Disturbed (acres)**	**Amount of Soil Disturbed (tons)**	**PM10 Emission Factor (lb/ton)**	**PM10 Emissions (tons)**	**Dust Control Efficiency (%)**	**PM10 (tons)**	**PM2.5 (tons)**
Access Road Construction	200	435,600	0.058	12.63	50%	6.32	1.31
Parking and Laydown	100	108,900	0.058	3.16	50%	1.58	0.33
Site Grading	200	217,800	0.058	6.32	50%	3.16	0.66
Total						11.05	2.30

								2014 Emissions		2015 Emissions	
Construction Activity	**Amount of Soil Excavated (cf)**	**Amount of Soil Excavated (tons)**	**Amount of Soil Backfilled (tons)**	**Total Amount of Soil (tons)**	**PM10 Emission Factor (lb/ton)**	**PM10 Emissions (tons)**	**Dust Control Efficiency (%)**	**PM10 (tons)**	**PM2.5 (tons)**	**PM10 (tons)**	**PM2.5 (tons)**
Excavation	135,000	6,750	6,750	13,500	0.058	0.39	50%	0.10	0.02	0.10	0.02
Total								0.10	0.02	0.10	0.02
Grand Total								11.15	2.32	0.10	0.02

Notes:

1 - Area disturbed for access road construction assumed to be 20% of 1,000 acre site, 10% for parking and laydown, and 20% for site grading. Depth disturbed for access road construction assumed to 12 inches, 6 inches for parking and laydown, and 6 inches for site grading. Access road construction, parking and laydown, and site grading assumed to occur in 2014. Amount of soil disturbed uses 100 lb/cf soil density and conversion of 43,560 sq ft = 1 acre.

*2 - Assumption that can be made: 15,000 cf per mile of transmission line based on an average volume excavated from a recent transmission line project for 4.5 structures per mile of 345 kV double circuit lattice tower and 5.5 structures per mile of 230 kV double circuit tubular poles. Using info from draft EIS, "Approximately 7.5 miles of single-circuit 230-kV overhead transmission line from the SPGF to the Harry Allen 230-kV Substation" and "Approximately 1.5 miles of single-circuit 500-kV overhead transmission line from the SPGF to the 500 kV Crystal Valley Substation" = 9 total miles of transmission lines. 9 * 15,000 cf per mile of transmission line = 135,000 cf of soil excavated.*

3 - Disturbance emission factors from AP-42, Table 11.9-4 (dated 7/98), assuming 100% of TSP is PM10.

4 - PM10 emissions are conservatively assumed to be 100% of TSP.

5 - PM2.5 emissions were calculated following the SCAQMD Particulate Matter (PM) 2.5 Significance Thresholds and Calculation Methodology, October 2006. For construction and demolition fugitive dust sources, 20.8% of the PM10 would be PM2.5.

6 - PM emissions are controlled by watering or use of other tackifier, control efficiency assumed to be 50%

Summary of PV Operational Emissions

Operation Emission Category	NOx (tons)	CO (tons)	SO2 (tons)	VOC (tons)	PM10 (tons)	PM2.5 (tons)	CO2 (tons)	N2O (tons)	CH4 (tons)	SF6 (tons)	CO2e (metric tons)	TOTAL HAP (tons)
Paved Roads	-	-	-	-	0.58	0.14	-	-	-	-	-	-
Unpaved Roads	-	-	-	-	3.74	0.37	-	-	-	-	-	-
On-Road Vehicle Exhaust - Heavy Duty Vehicles	0.40	0.16	0.00	0.02	0.02	0.02	61.33	1.19E-04	1.14E-03	-	55.68	3.88E-03
On-Road Vehicle Exhaust - Commute Vehicles	0.36	1.64	4.03E-03	0.07	0.03	0.02	223.87	2.30E-03	4.05E-03	-	203.78	0.02
Circuit Breaker SF6 Emissions	-	-	-	-	-	-	-	-	-	0.005	97.55	-
Diesel Fire-Pump Emissions	0.20	0.05	0.01	1.76E-02	0.02	0.02	8.21	0.02	0.01	-	7.47	5.02E-04
Diesel Generator Emissions	0.59	0.14	0.04	5.08E-02	0.05	0.05	23.68	0.06	0.02	-	21.56	1.45E-03
Total	**1.56**	**1.98**	**0.06**	**0.16**	**4.43**	**0.61**	**317.09**	**0.08**	**0.03**	**4.50E-03**	**386.04**	**0.03**

Moapa Operation Emissions - SF6 Emissions from Circuit Breaker Leakage

Circuit Breakers		SF6 (tons/year)	CO2e (metric tons/year)
Number	Size		
3	230 kV	0.005	97.55

Circuit Breaker Size (kV)	Leak Rate Range (lbs SF6/yr) Low	High
230	1.5	3

Notes:

Assumption: 230kV Breakers: 160 lbs. gas, leaking about 1.5 to 3 lbs. of gas per year

High end of leak rate range used in calculations.

*Example calculation: # of circuit breakers * lbs SF6/yr for kV / 2000 lb/yr*

The Climate Registry Electric Power Sector Protocol, Version 1.1, March 2009.

SF6 has a GWP of 23,900

Moapa Operation Emissions - Diesel Fire-Pump Emissions

Emission Factors		
NOx + HC:	4.41	lb/MMBtu
CO:	0.95	lb/MMBtu
SO_2:	0.290	lb/MMBtu
VOC:	0.350	lb/MMBtu
PM:	0.31	lb/MMBtu

Heat Input (MMBtu/hr)	2.0
Diesel Heating Value (Btu/lb)	19,300
Fuel Use (lb/hr)	104
Fuel Density (lb/gal)	7.05
Fuel Use (gal/hr)	14.8
Fuel Use (gal/yr)	740

					PTE	
Pollutant	EF Source	Emission Factor		Emissions (lb/hr)	Op. Hrs	tpy
NO_x	AP-42, Table 3.3-1	4.06	lb/MMBtu	8.18	50	0.20
CO	AP-42, Table 3.3-1	0.95	lb/MMBtu	1.91	50	0.05
SO2	AP-42, Table 3.3-1	0.29	lb/MMBtu	0.5840	50	0.01
VOC	AP-42, Table 3.3-2	0.35	lb/MMBtu	0.70	50	0.02
PM	AP-42, Table 3.3-1	3.10E-01	lb/MMBtu	0.62	50	0.02
HCHO	AP-42, Table 3.3-2	1.18E-03	lb/MMBtu	2.38E-03	50	5.94E-05
Acetaldehyde	AP-42, Table 3.3-2	7.67E-04	lb/MMBtu	1.54E-03	50	3.86E-05
Acrolein	AP-42, Table 3.3-2	9.25E-05	lb/MMBtu	1.86E-04	50	4.66E-06
Benzene	AP-42, Table 3.3-2	9.33E-04	lb/MMBtu	1.88E-03	50	4.70E-05
Propylene	AP-42, Table 3.3-2	2.58E-03	lb/MMBtu	5.20E-03	50	1.30E-04
Toluene	AP-42, Table 3.3-2	4.09E-04	lb/MMBtu	8.24E-04	50	2.06E-05
Naphthalene	AP-42, Table 3.3-2	8.48E-05	lb/MMBtu	1.71E-04	50	4.27E-06
Xylene	AP-42, Table 3.3-2	2.85E-04	lb/MMBtu	5.74E-04	50	1.43E-05
Methanol	AP-42, Table 3.3-2	2.50E-03	lb/MMBtu	5.03E-03	50	1.26E-04
n-Hexane	AP-42, Table 3.3-2	1.11E-03	lb/MMBtu	2.24E-03	50	5.59E-05
1,3-Butadiene	AP-42, Table 3.3-2	3.91E-05	lb/MMBtu	7.87E-05	50	1.97E-06
Total HAPs						0.00

Moapa Operation Emissions - Diesel Fire-Pump Emissions - Continued

Greenhouse Gas Emissions

Pollutant	EF Source	Emission Factor		Emissions (lb/hr)	PTE Op. Hrs	PTE tpy
CO_2	EPA MRR Table C-1	73.96	kg/MMBtu	328	50	8
CH_4 (as CO_2e)	EPA MRR Table C-2	0.003	kg/MMBtu	0.28	50	0.01
N_2O (as CO_2e)	EPA MRR Table C-2	0.0006	kg/MMBtu	0.83	50	0.02
CO_2e				329		8

Notes: Emission factors as per 40 CFR Part 98, Tables C-1 and C-2

Moapa Operation Emissions - Diesel Generator Emissions

Emission Factors		
NOx + HC:	4.41	lb/MMBtu
CO:	0.95	lb/MMBtu
SO_2:	0.290	lb/MMBtu
VOC:	0.350	lb/MMBtu
PM:	0.31	lb/MMBtu

Heat Input (MMBtu/hr)	5.8
Diesel Heating Value (Btu/lb)	19,300
Fuel Use (lb/hr)	301
Fuel Density (lb/gal)	7.05
Fuel Use (gal/hr)	42.7
Fuel Use (gal/yr)	2,135

					PTE	
Pollutant	EF Source	Emission Factor		Emissions (lb/hr)	Op. Hrs	tpy
NO_x	AP-42, Table 3.3-1	4.06	lb/MMBtu	23.59	50	0.59
CO	AP-42, Table 3.3-1	0.95	lb/MMBtu	5.52	50	0.14
SO2	AP-42, Table 3.3-1	0.29	lb/MMBtu	1.6849	50	0.04
VOC	AP-42, Table 3.3-2	0.35	lb/MMBtu	2.03	50	0.05
PM	AP-42, Table 3.3-1	3.10E-01	lb/MMBtu	1.80	50	0.05
HCHO	AP-42, Table 3.3-2	1.18E-03	lb/MMBtu	6.86E-03	50	1.71E-04
Acetaldehyde	AP-42, Table 3.3-2	7.67E-04	lb/MMBtu	4.46E-03	50	1.11E-04
Acrolein	AP-42, Table 3.3-2	9.25E-05	lb/MMBtu	5.37E-04	50	1.34E-05
Benzene	AP-42, Table 3.3-2	9.33E-04	lb/MMBtu	5.42E-03	50	1.36E-04
Propylene	AP-42, Table 3.3-2	2.58E-03	lb/MMBtu	1.50E-02	50	3.75E-04
Toluene	AP-42, Table 3.3-2	4.09E-04	lb/MMBtu	2.38E-03	50	5.94E-05
Naphthalene	AP-42, Table 3.3-2	8.48E-05	lb/MMBtu	4.93E-04	50	1.23E-05
Xylene	AP-42, Table 3.3-2	2.85E-04	lb/MMBtu	1.66E-03	50	4.14E-05
Methanol	AP-42, Table 3.3-2	2.50E-03	lb/MMBtu	1.45E-02	50	3.63E-04
n-Hexane	AP-42, Table 3.3-2	1.11E-03	lb/MMBtu	6.45E-03	50	1.61E-04
1,3-Butadiene	AP-42, Table 3.3-2	3.91E-05	lb/MMBtu	2.27E-04	50	5.68E-06
Total HAPs						0.00

Moapa Operation Emissions - Diesel Generator Emissions - Continued

Greenhouse Gas Emissions

Pollutant	EF Source	Emission Factor		Emissions (lb/hr)	PTE Op. Hrs	PTE tpy
CO_2	EPA MRR Table C-1	73.96	kg/MMBtu	947	50	24
CH_4 (as CO_2e)	EPA MRR Table C-2	0.003	kg/MMBtu	0.81	50	0.02
N_2O (as CO_2e)	EPA MRR Table C-2	0.0006	kg/MMBtu	2.38	50	0.06
CO_2e				951		24

Notes: Emission factors as per 40 CFR Part 98, Tables C-1 and C-2

Moapa Solar Operation - Fugitive Dust from Travel on Paved Roads

Annual Operation 261 days

Paved Roads emission factors from AP-42, Section 13.2.1: *Paved Roads* (Final Section 1/11)									
	E=	k(sL)^0.91 * (W)^1.02							
where:									
E=		Particulate emission factor							
k =	0.0022	lb/VMT [Table 13.2.1-1, particle size multiplier for PM_{10}]							
k =	0.00054	lb/VMT [Table 13.2.1-1, particle size multiplier for $PM_{2.5}$]							
sL =	0.6	[road surface silt loading (grams per square meter (g/m2)), Table 13.2.1-2] Assumed less than 500 average daily traffic to represent the project.							
W=	2	tons [weighted average vehicle weight]							
$E_{(PM10)}$=	0.002	lb/VMT							
$E_{(PM2.5)}$=	0.0005	lb/VMT							

Annually

Vehicle Details	**Vehicle Weight (tons)**	**Maximum Quantity per day**	**Max Daily Offsite Round trip Distance per Vehicle within general area (miles/ day)**	**Max Daily Onsite Round trip Distance per Vehicle (miles/ day)**	**Duration (days)**	**Total Vehicle Miles Traveled on Paved Roads (VMT)**	**Total Vehicle Miles Traveled * Vehicle Weight (tons)**	**PM10 Emissions (tons)**	**PM2.5 Emissions (tons)**
Staff & Security Truck	2.25	4	0	6.375	261	6,656	14,975	0.01	0.00
Pickup Truck	4	10	0	6.375	261	16,639	66,555	0.02	0.00

Water Delivery Truck	30	2	0	6.375	261	3,328	99,833	0.00	0.00
Worker Passenger Vehicles	1.25	20	100	0	261	522,000	652,500	0.55	0.14
Total						548,622	833,862	0.58	0.14
						Weighted average vehicle wt (tons)	1.52		

Notes:

1 - Operation assumed to be 7 a.m. and 7 p.m., Monday through Friday.

2 - The type of vehicle, maximum quantity per day, vehicle weight, and Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day) provided from the K Road Solar Project and modified into assumptions for operation (i.e. 20 workers).

3 - Roundtrip mileage for Max Daily Onsite Roundtrip Distance per Vehicle (miles/day) based on (1) information from draft EIS: 2.5-mile gravel access road connecting the SPGF to the existing paved frontage road adjacent to I-15, and (2) the assumption that the distance per day = 5 miles per roundtrip (on 2.5-mile gravel access road) + 2.5 miles per roundtrip (distance traveled in and out on 1,000 acre site if site is 1.25 miles X 1.25 miles) = 7.5 miles per roundtrip.

4 - Per client, 85% of roads onsite (access roads) are paved.

Moapa Solar Operation - Fugitive Dust from Travel on Unpaved Roads

Annual Operation 261 days

Unpaved Roads emission factor from AP-42, Section 13.2.2: *Unpaved Roads* (11/06)

$$E = [k(s/12)^a(W/3)^b]$$

where:

s =	8.5	surface material silt content (%) [Table 13.2.2-1, Construction sites mean silt content %]
W =	7	tons [weighted average vehicle weight]
k =	1.5	lb/VMT [Table 13.2.2-2, for PM_{10}]
k =	0.15	lb/VMT [Table 13.2.2-2, for $PM_{2.5}$]
a =	0.9	constant [Table 13.2.2-2, for PM_{10} and $PM_{2.5}$]
b =	0.45	constant [Table 13.2.2-2, for PM_{10} and $PM_{2.5}$]
$E_{(PM10)}$=	1.59	lb/VMT
$E_{(PM2.5)}$=	0.16	lb/VMT

Vehicle Details	Vehicle Weight (tons)	Maximum Quantity per day	Max Daily Onsite Roundtrip Distance per Vehicle (miles/day)	Duration (days)	Total Vehicle Miles Traveled on Unpaved Roads (VMT)	Total Vehicle Miles Traveled * Vehicle Weight (tons)	Annually PM10 Emissions (tons)	Annually PM2.5 Emissions (tons)
Staff & Security Truck	2.25	4	1.125	261	1,175	2,643	0.93	0.09
Pickup Truck	4	10	1.125	261	2,936	11,745	2.34	0.23
Water Delivery Truck	30	2	1.125	261	587	17,618	0.47	0.05
Worker Passenger Vehicles	1.25	20	0	261	0	0	0.00	0.00
Total					4,698	32,005	3.74	0.37
					Weighted average vehicle wt	6.81		

(tons)

Notes:

1 - Operation assumed to be 7 a.m. and 7 p.m., Monday through Friday.

2 - The type of vehicle, maximum quantity per day, vehicle weight, and Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day) provided from the K Road Solar Project and modified into assumptions for operation (i.e. 20 workers).

3 - Roundtrip mileage for Max Daily Onsite Roundtrip Distance per Vehicle (miles/day) based on (1) information from draft EIS: 2.5-mile gravel access road connecting the SPGF to the existing paved frontage road adjacent to I-15, and (2) the assumption that the distance per day = 5 miles per roundtrip (on 2.5-mile gravel access road) + 2.5 miles per roundtrip (distance traveled in and out on 1,000 acre site if site is 1.25 miles X 1.25 miles) = 7.5 miles per roundtrip.

4 - Per client, 85% of roads onsite (access roads) are paved, which means 15% are unpaved.

Moapa Solar Operation - On-Road Vehicle Exhaust - Heavy Duty Vehicles

Annual Operation 261 days

					2015 Heavy Duty Vehicle Emission Factors (g/mi)						Annual Heavy Duty Vehicle Emissions (tons)					
Heavy Duty Vehicle Details	**Maximum Quantity per day**	**Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day)**	**Max Daily Onsite Roundtrip Distance per Vehicle (miles/day)**	**Duration (days)**	NOx	CO	SOx	VOC	PM10	PM2.5	NOx	CO	SOx	VOC	PM10	PM2.5
Staff & Security Truck	4	0	7.5	261	11.57	4.61	0.01	0.58	0.70	0.602	0.100	0.040	0.000	0.005	0.006	0.005
Pickup Truck	10	0	7.5	261	11.57	4.61	0.01	0.58	0.70	0.602	0.250	0.100	0.000	0.012	0.015	0.013
Water Delivery Truck	2	0	7.5	261	11.57	4.61	0.01	0.58	0.70	0.602	0.050	0.020	0.000	0.002	0.003	0.003
Total											0.400	0.159	0.000	0.020	0.024	0.021

					2015 Heavy Duty Vehicle Emission Factors (g/mi)			Annual Heavy Duty Vehicle Emissions (tons)			
Heavy Duty Vehicle Details	**Maximum Quantity per day**	**Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day)**	**Max Daily Onsite Roundtrip Distance per Vehicle (miles/day)**	**Duration (days)**	**CO2**	**N2O**	**CH4**	**CO2**	**N2O**	**CH4**	**CO2e (metric tons)**
Staff & Security Truck	4	0	7.5	261	1776.44	0.003	0.03	15.332	0.000	0.000	13.92
Pickup Truck	10	0	7.5	261	1776.44	0.003	0.03	38.331	0.000	0.001	34.80
Water Delivery Truck	2	0	7.5	261	1776.44	0.003	0.03	7.666	0.000	0.000	6.96
Total								61.329	0.000	0.001	55.683

Moapa Solar Operation - On-Road Vehicle Exhaust - Heavy Duty Vehicles – Continued

					2015 Heavy Duty Vehicle Emission Factors (g/mi)															
Heavy Duty Vehicle Details	Maximum Quantity per day	Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day)	Max Daily Onsite Roundtrip Distance per Vehicle (miles/day)	Duration (days)	Benzene	Ethanol	MTBE	1,3-Butadiene	Form-aldehyde	Acet-aldehyde	Acrolein	2,2,4-Trimethyl-pentane	Ethyl Benzene	Hexane	Propion-aldehyde	Styrene	Toluene	Xylene	Naphthalene	PAH (less Naphthalene)
Staff & Security Truck	4	0	7.5	261	0.007	0.002	0.000	0.002	0.043	0.019	0.003	0.002	0.003	0.003	0.002	0.001	0.009	0.008	0.005	0.003
Pickup Truck	10	0	7.5	261	0.007	0.002	0.000	0.002	0.043	0.019	0.003	0.002	0.003	0.003	0.002	0.001	0.009	0.008	0.005	0.003
Water Delivery Truck	2	0	7.5	261	0.007	0.002	0.000	0.002	0.043	0.019	0.003	0.002	0.003	0.003	0.002	0.001	0.009	0.008	0.005	0.003

	Annual Heavy Duty Vehicle Emissions (tons)																
Heavy Duty Vehicle Details	Benzene	Ethanol	MTBE	1,3-Butadiene	Form-aldehyde	Acet-aldehyde	Acrolein	2,2,4-Trimethyl-pentane	Ethyl Benzene	Hexane	Propion-aldehyde	Styrene	Toluene	Xylene	Naphthalene	PAH (less Naphthalene)	Total HAPs
Staff & Security Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
Pickup Truck	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002
Water Delivery Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	0.000	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.88E-03

Notes:

1 - Operation assumed to be 7 a.m. and 7 p.m., Monday through Friday.

2 - Emission factors developed using MOVES. Year 2015 was used.

3 - Heavy duty vehicle emission factors based on the default MOVES national mix of single-unit and combination long- and short-haul trucks for year 2014 travelling at an average speed of 35 mph.

4 - The type of heavy duty vehicle, maximum quantity per day, and Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day) provided from the K Road Solar Project and modified into assumptions for operation.

5 - Roundtrip mileage for Max Daily Onsite Roundtrip Distance per Vehicle (miles/day) based on (1) information from draft EIS: 2.5-mile gravel access road connecting the SPGF to the existing paved frontage road adjacent to I-15, and (2) the assumption that the distance per day = 5 miles per roundtrip (on 2.5-mile gravel access road) + 2.5 miles per roundtrip (distance traveled in and out on 1,000 acre site if site is 1.25 miles X 1.25 miles) = 7.5 miles per roundtrip.

Moapa Solar Operation - On-Road Vehicle Exhaust - Commute Vehicles

Annual Operation 261 days

			2015 Worker Commute Emission Factors (g/mi)						Annual Worker Commute Emissions (tpy)					
Worker Passenger Vehicles	**Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day)**	**Duration (days)**	NOx	CO	SOx	VOC	PM10	PM2.5	NOx	CO	SOx	VOC	PM10	PM2.5
20	100	261	0.629	2.84	0.007	0.120	0.047	0.027	0.362	1.636	0.004	0.069	0.027	0.015

			2015 Worker Commute Emission Factors (g/mi)			Annual Worker Commute Emissions (tpy)			
Worker Passenger Vehicles	**Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day)**	**Duration (days)**	**CO2**	**N2O**	**CH4**	**CO2**	**N2O**	**CH4**	**CO2e (metric tons)**
20	100	261	389.064	0.004	0.007	223.866	0.002	0.004	203.78

			2015 Worker Commute Emission Factors (g/mi)															
Worker Passenger Vehicles	**Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day)**	**Duration (days)**	**Benzene**	**Ethanol**	**MTBE**	**1,3-Butadiene**	**Form-aldehyde**	**Acet-aldehyde**	**Acrolein**	**2,2,4-Trimethyl-pentane**	**Ethyl Benzene**	**Hexane**	**Propion-aldehyde**	**Styrene**	**Toluene**	**Xylene**	**Naphthalene**	**PAH (less Naphthalene)**
20	100	261	0.004	0.003	0.000	0.001	0.002	0.002	0.000	0.002	0.002	0.002	0.000	0.000	0.010	0.008	0.000	0.000

	Annual Worker Commute Emissions (tons)																
Worker Passenger Vehicles	**Benzene**	**Ethanol**	**MTBE**	**1,3-Butadiene**	**Form-aldehyde**	**Acet-aldehyde**	**Acrolein**	**2,2,4-Trimethyl-pentane**	**Ethyl Benzene**	**Hexane**	**Propion-aldehyde**	**Styrene**	**Toluene**	**Xylene**	**Naphthalene**	**PAH (less Naphthalene)**	**Total HAPs**
20	0.002	0.002	0.000	0.000	0.001	0.001	0.000	0.001	0.001	0.001	0.000	0.000	0.006	0.005	0.000	0.000	0.020

Notes:

1 - Operation assumed to be 7 a.m. and 7 p.m., Monday through Friday.

2 - Emission factors developed using MOVES. Year 2015 was used.

3 - Worker commute emission factors are based on the default MOVES national mix of passenger cars and trucks for year 2015 travelling at an average speed of 35 mph.

4 - The type of vehicle, maximum quantity per day, and Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day) provided from the K Road Solar Project and modified into assumptions for operation.

Summary of Decommission Emissions

Decommission Emission Category	NOx (tons)	CO (tons)	SO2 (tons)	VOC (tons)	PM10 (tons)	PM2.5 (tons)	CO2 (tons)	N2O (tons)	CH4 (tons)	CO2e (metric tons)	TOTAL HAP (tons)
Construction Equipment Exhaust	0.82	0.49	1.07E-03	0.11	0.08	0.08	-	-	-	-	-
On-Road Vehicle Exhaust - Heavy Duty Vehicles	0.07	0.03	9.15E-05	3.72E-03	4.49E-03	3.87E-03	11.42	2.22E-05	2.12E-04	10.36	7.22E-04
On-Road Vehicle Exhaust - Commute Vehicles	0.08	0.34	8.50E-04	1.45E-02	5.72E-03	3.23E-03	47.17	4.84E-04	8.53E-04	42.94	4.30E-03
Fugitive Dust from Travel on Paved Roads	-	-	-	-	0.14	0.04	-	-	-	-	-
Fugitive Dust from Travel on Unpaved Roads	-	-	-	-	0.47	0.05	-	-	-	-	-
Total	**0.97**	**0.87**	**0.00**	**0.13**	**0.71**	**0.17**	**58.59**	**0.00**	**0.00**	**53.31**	**0.01**

Moapa Solar Decommission - Construction Equipment Exhaust

Construction Duration 22 days Mon-Fri 12 hours/day

Model Equipment Types	Fuel Type	Horsepower (hp)	Number	Duration (days)	Duration (hours)	2015 Construction Equipment Emission Factors (g/hp-hr)						2015 Construction Equipment Emissions (tons)					
						NOx	CO	SOx	VOC	PM10	PM2.5	NOx	CO	SOx	VOC	PM10	PM2.5
Aerial Lifts	Diesel	50	1	22	264	5.59	6.32	0.004	1.643	0.907	0.907	0.081	0.092	0.000	0.024	0.013	0.013
Concrete/Industrial Saws	Diesel	50	1	22	264	4.05	1.23	0.004	0.230	0.197	0.197	0.059	0.018	0.000	0.003	0.003	0.003
Cranes	Diesel	175	1	22	264	2.48	0.647	0.003	0.209	0.156	0.156	0.127	0.033	0.000	0.011	0.008	0.008
Dumpers/Tenders	Diesel	50	1	22	264	5.38	5.59	0.004	1.379	0.849	0.849	0.078	0.081	0.000	0.020	0.012	0.012
Excavators	Diesel	175	2	22	264	1.82	0.797	0.003	0.174	0.192	0.192	0.186	0.081	0.000	0.018	0.020	0.020
Off-Highway Trucks	Diesel	300	1	22	264	1.13	0.274	0.003	0.141	0.045	0.045	0.099	0.024	0.000	0.012	0.004	0.004
Rough Terrain Forklifts	Diesel	75	1	22	264	3.73	2.54	0.004	0.284	0.294	0.294	0.081	0.055	0.000	0.006	0.006	0.006
Tractors/Loaders/Backhoes	Diesel	75	1	22	264	5.00	5.03	0.004	0.879	0.728	0.728	0.109	0.110	0.000	0.019	0.016	0.016
Total												0.82	0.49	0.001	0.113	0.082	0.082

Notes:

1 - Decommission assumed to last 1 month, 7 a.m. and 7 p.m., Monday through Friday.

2 - Construction equipment emission factors developed using EPA NONROAD model. Year 2015 was used because decommission year not yet known.

3 - Construction equipment number, type, and HP rating was assumed: A mid-range HP value was chosen for each equipment category.

Moapa Solar Decommission - On-Road Vehicle Exhaust - Heavy Duty Vehicles

Construction Duration 22 days

					2015 Heavy Duty Vehicle Emission Factors (g/mi)						2015 Heavy Duty Vehicle Emissions (tons)					
Heavy Duty Vehicle Details	**Maximum Quantity per day**	**Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day)**	**Max Daily Onsite Roundtrip Distance per Vehicle (miles/day)**	**Duration (days)**	NOx	CO	SOx	VOC	PM10	PM2.5	NOx	CO	SOx	VOC	PM10	PM2.5
Dump Truck	1	0	7.5	22	11.57	4.61	0.01	0.58	0.70	0.602	0.002	0.001	0.000	0.000	0.000	0.000
Flatbed Truck	5	0	7.5	22	11.57	4.61	0.01	0.58	0.70	0.602	0.011	0.004	0.000	0.001	0.001	0.001
Staff & Security Truck	4	0	7.5	22	11.57	4.61	0.01	0.58	0.70	0.602	0.008	0.003	0.000	0.000	0.001	0.000
Pickup Truck	10	0	7.5	22	11.57	4.61	0.01	0.58	0.70	0.602	0.021	0.008	0.000	0.001	0.001	0.001
General Materials Delivery Truck	1	100	0	22	11.57	4.61	0.01	0.58	0.70	0.602	0.028	0.011	0.000	0.001	0.002	0.001
Water Delivery Truck	2	0	7.5	22	11.57	4.61	0.01	0.58	0.70	0.602	0.004	0.002	0.000	0.000	0.000	0.000
Total											0.074	0.030	0.000	0.004	0.004	0.004

					2015 Heavy Duty Vehicle Emission Factors (g/mi)			2015 Heavy Duty Vehicle Emissions (tons)			
Heavy Duty Vehicle Details	**Maximum Quantity per day**	**Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day)**	**Max Daily Onsite Roundtrip Distance per Vehicle (miles/day)**	**Duration (days)**	**CO2**	**N2O**	**CH4**	**CO2**	**N2O**	**CH4**	**CO2e (metric tons)**
Dump Truck	1	0	7.5	22	1776.44	0.003	0.03	0.323	0.000	0.000	0.29
Flatbed Truck	5	0	7.5	22	1776.44	0.003	0.03	1.615	0.000	0.000	1.47
Staff & Security Truck	4	0	7.5	22	1776.44	0.003	0.03	1.292	0.000	0.000	1.17
Pickup Truck	10	0	7.5	22	1776.44	0.003	0.03	3.231	0.000	0.000	2.93
General Materials Delivery Truck	1	100	0	22	1776.44	0.003	0.03	4.308	0.000	0.000	3.91
Water Delivery Truck	2	0	7.5	22	1776.44	0.003	0.03	0.646	0.000	0.000	0.59
Total								11.416	0.000	0.000	10.365

Moapa Solar Decommission - On-Road Vehicle Exhaust - Heavy Duty Vehicles

Heavy Duty Vehicle Details	Maximum Quantity per day	Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day)	Max Daily Onsite Roundtrip Distance per Vehicle (miles/day)	Duration (days)	2015 Heavy Duty Vehicle Emission Factors (g/mi)															
					Benzene	Ethanol	MTBE	1,3-Butadiene	Form-aldehyde	Acet-aldehyde	Acrolein	2,2,4-Trimethyl-pentane	Ethyl Benzene	Hexane	Propion-aldehyde	Styrene	Toluene	Xylene	Naphthalene	PAH (less Naphthalene)
Dump Truck	1	0	7.5	22	0.007	0.002	0.000	0.002	0.043	0.019	0.003	0.002	0.003	0.003	0.002	0.001	0.009	0.008	0.005	0.003
Flatbed Truck	5	0	7.5	22	0.007	0.002	0.000	0.002	0.043	0.019	0.003	0.002	0.003	0.003	0.002	0.001	0.009	0.008	0.005	0.003
Staff & Security Truck	4	0	7.5	22	0.007	0.002	0.000	0.002	0.043	0.019	0.003	0.002	0.003	0.003	0.002	0.001	0.009	0.008	0.005	0.003
Pickup Truck	10	0	7.5	22	0.007	0.002	0.000	0.002	0.043	0.019	0.003	0.002	0.003	0.003	0.002	0.001	0.009	0.008	0.005	0.003
General Materials Delivery Truck	1	100	0	22	0.007	0.002	0.000	0.002	0.043	0.019	0.003	0.002	0.003	0.003	0.002	0.001	0.009	0.008	0.005	0.003
Water Delivery Truck	2	0	7.5	22	0.007	0.002	0.000	0.002	0.043	0.019	0.003	0.002	0.003	0.003	0.002	0.001	0.009	0.008	0.005	0.003

Heavy Duty Vehicle Details	2015 Heavy Duty Vehicle Emissions (tons)																
	Benzene	Ethanol	MTBE	1,3-Butadiene	Form-aldehyde	Acet-aldehyde	Acrolein	2,2,4-Trimethyl-pentane	Ethyl Benzene	Hexane	Propion-aldehyde	Styrene	Toluene	Xylene	Naphthalene	PAH (less Naphthalene)	Total HAPs
Dump Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Flatbed Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Staff & Security Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Pickup Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
General Materials Delivery Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Water Delivery Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	7.22E-04

Notes:

1 - Decommission assumed to last 1 month, 7 a.m. and 7 p.m., Monday through Friday.

2 - Emission factors developed using MOVES. Year 2015 was used because decommission year not yet known.

3 - Heavy duty vehicle emission factors based on the default MOVES national mix of single-unit and combination long- and short-haul trucks for year 2014 travelling at an average speed of 35 mph.

4 - The type of heavy duty vehicle, maximum quantity per day, and Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day) provided from the K Road Solar Project and modified into assumptions for decommissioning.

5 - Roundtrip mileage for Max Daily Onsite Roundtrip Distance per Vehicle (miles/day) based on (1) information from draft EIS: 2.5-mile gravel access road connecting the SPGF to the existing paved frontage road adjacent to I-15, and (2) the assumption that the distance per day = 5 miles per roundtrip (on 2.5-mile gravel access road) + 2.5 miles per roundtrip (distance traveled in and out on 1,000 acre site if site is 1.25 miles X 1.25 miles) = 7.5 miles per roundtrip.

Moapa Solar Decommission - On-Road Vehicle Exhaust - Commute Vehicles

2015 Construction Duration 22 days

			2015 Worker Commute Emission Factors (g/mi)						2015 Worker Commute Emissions (tpy)					
Worker Passenger Vehicles	**Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day)**	**Duration (days)**	NOx	CO	SOx	VOC	PM10	PM2.5	NOx	CO	SOx	VOC	PM10	PM2.5
50	100	22	0.629	2.84	0.007	0.120	0.047	0.027	0.076	0.345	0.001	0.015	0.006	0.003

			2015 Worker Commute Emission Factors (g/mi)			2015 Worker Commute Emissions (tpy)			
Worker Passenger Vehicles	**Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day)**	**Duration (days)**	**CO2**	**N2O**	**CH4**	**CO2**	**N2O**	**CH4**	**CO2e (metric tons)**
50	100	22	389.064	0.004	0.007	47.175	0.000	0.001	42.94

			2015 Worker Commute Emission Factors (g/mi)															
Worker Passenger Vehicles	**Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day)**	**Duration (days)**	**Benzene**	**Ethanol**	**MTBE**	**1,3-Butadiene**	**Form-aldehyde**	**Acet-aldehyde**	**Acrolein**	**2,2,4-Trimethyl-pentane**	**Ethyl Benzene**	**Hexane**	**Propion-aldehyde**	**Styrene**	**Toluene**	**Xylene**	**Naphthalene**	**PAH (less Naphthalene)**
50	100	22	0.004	0.003	0.000	0.001	0.002	0.002	0.000	0.002	0.002	0.002	0.000	0.000	0.010	0.008	0.000	0.000

	2015 Worker Commute Emissions (tons)																
Worker Passenger Vehicles	**Benzene**	**Ethanol**	**MTBE**	**1,3-Butadiene**	**Form-aldehyde**	**Acet-aldehyde**	**Acrolein**	**2,2,4-Trimethyl-pentane**	**Ethyl Benzene**	**Hexane**	**Propion-aldehyde**	**Styrene**	**Toluene**	**Xylene**	**Naphthalene**	**PAH (less Naphthalene)**	**Total HAPs**
50	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.004

Notes:

1 - Decommission assumed to last 1 month, 7 a.m. and 7 p.m., Monday through Friday.

2 - Emission factors developed using MOVES. Year 2015 was used because decommission year not yet known.

3 - Worker commute emission factors are based on the default MOVES national mix of passenger cars and trucks for year 2014 travelling at an average speed of 35 mph.

4 - The type of heavy duty vehicle, maximum quantity per day, and Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day) provided from the K Road Solar Project and modified into assumptions for decommissioning (i.e. 50 workers).

Moapa Solar Decommission - Fugitive Dust from Travel on Paved Roads

Construction Duration 22 days

Paved Roads emission factors from AP-42, Section 13.2.1: *Paved Roads* (Final Section 1/11)		
	E=	k(sL)^0.91 * (W)^1.02
where:		
E=		Particulate emission factor
k =	0.0022	lb/VMT [Table 13.2.1-1, particle size multiplier for PM_{10}]
k =	0.00054	lb/VMT [Table 13.2.1-1, particle size multiplier for $PM_{2.5}$]
sL =	0.6	[road surface silt loading (grams per square meter (g/m2)), Table 13.2.1-2] Assumed less than 500 average daily traffic to represent the project.
W=	2	tons [weighted average vehicle weight]
$E_{(PM10)}$=	0.003	lb/VMT
$E_{(PM2.5)}$=	0.0006	lb/VMT

Vehicle Details	Vehicle Weight (tons)	Maximum Quantity per day	Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day)	Max Daily Onsite Roundtrip Distance per Vehicle (miles/day)	2015 Duration (days)	2015 Total Vehicle Miles Traveled on Paved Roads (VMT)	2015 Total Vehicle Miles Traveled * Vehicle Weight (tons)	2015 Emissions (tons) PM10 Emissions (tons)	2015 Emissions (tons) PM2.5 Emissions (tons)
Dump Truck	20	1	0	6.375	22	140	2,805	0.00	0.00
Flatbed Truck	10	5	0	6.375	22	701	7,013	0.00	0.00
Staff & Security Truck	2.25	4	0	6.375	22	561	1,262	0.00	0.00
Pickup Truck	4	10	0	6.375	22	1,403	5,610	0.00	0.00
General Materials Delivery Truck	20	1	100	0	22	2,200	44,000	0.00	0.00
Water Delivery Truck	30	2	0	6.375	22	281	8,415	0.00	0.00
Worker Passenger Vehicles	1.25	50	100	0	22	110,000	137,500	0.14	0.03
Total						115,286	206,605	0.14	0.04
						Weighted average vehicle wt (tons)	1.79		

Notes:

1 - Decommission assumed to last 1 month, 7 a.m. and 7 p.m., Monday through Friday.

2 - The type of vehicle, maximum quantity per day, vehicle weight, and Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day) provided from the K Road Solar Project and modified into assumptions for decommissioning (i.e. 50 workers).

3 - Roundtrip mileage for Max Daily Onsite Roundtrip Distance per Vehicle (miles/day) based on (1) information from draft EIS: 2.5-mile gravel access road connecting the SPGF to the existing paved frontage road adjacent to I-15, and (2) the assumption that the distance per day = 5 miles per roundtrip (on 2.5-mile gravel access road) + 2.5 miles per roundtrip (distance traveled in and out on 1,000 acre site if site is 1.25 miles X 1.25 miles) = 7.5 miles per roundtrip.

4 - Per client, 85% of roads onsite (access roads) are paved.

Moapa Solar Decommission - Fugitive Dust from Travel on Unpaved Roads

Construction Duration 22 days

Unpaved Roads emission factor from AP-42, Section 13.2.2: *Unpaved Roads* (11/06)

$E = [k(s/12)^a(W/3)^b]$

where:

s =	8.5	surface material silt content (%) [Table 13.2.2-1, Construction sites mean silt content %]
W =	8	tons [weighted average vehicle weight]
k =	1.5	lb/VMT [Table 13.2.2-2, for PM_{10}]
k =	0.15	lb/VMT [Table 13.2.2-2, for $PM_{2.5}$]
a =	0.9	constant [Table 13.2.2-2, for PM_{10} and $PM_{2.5}$]
b =	0.45	constant [Table 13.2.2-2, for PM_{10} and $PM_{2.5}$]
$E_{(PM10)}$=	1.72	lb/VMT
$E_{(PM2.5)}$=	0.17	lb/VMT

							2015 Emissions (tons)	
Vehicle Details	**Vehicle Weight (tons)**	**Maximum Quantity per day**	**Max Daily Onsite Roundtrip Distance per Vehicle (miles/day)**	**2015 Duration (days)**	**2015 Total Vehicle Miles Traveled on Unpaved Roads (VMT)**	**2015 Total Vehicle Miles Traveled * Vehicle Weight (tons)**	**PM10 Emissions (tons)**	**PM2.5 Emissions (tons)**
Dump Truck	20	1	1.125	22	25	495	0.02	0.00
Flatbed Truck	10	5	1.125	22	124	1,238	0.11	0.01
Staff & Security Truck	2.25	4	1.125	22	99	223	0.09	0.01
Pickup Truck	4	10	1.125	22	248	990	0.21	0.02
General Materials Delivery Truck	20	1	0	22	0	0	0.00	0.00
Water Delivery Truck	30	2	1.125	22	50	1,485	0.04	0.00
Worker Passenger Vehicles	1.25	50	0	22	0	0	0.00	0.00
Total					545	4,430	0.47	0.05
					Weighted average vehicle wt (tons)	8.14		

Notes:

1 - Decommission assumed to last 1 month, 7 a.m. and 7 p.m., Monday through Friday.

2 - The type of vehicle, maximum quantity per day, vehicle weight, and Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day) provided from the K Road Solar Project and modified into assumptions for decommissioning (i.e. 50 workers).

3 - Roundtrip mileage for Max Daily Onsite Roundtrip Distance per Vehicle (miles/day) based on (1) information from draft EIS: 2.5-mile gravel access road connecting the SPGF to the existing paved frontage road adjacent to I-15, and (2) the assumption that the distance per day = 5 miles per roundtrip (on 2.5-mile gravel access road) + 2.5 miles per roundtrip (distance traveled in and out on 1,000 acre site if site is 1.25 miles X 1.25 miles) = 7.5 miles per roundtrip.

4 - Per client, 85% of roads onsite (access roads) are paved, which means 15% are unpaved.

Summary of CSP Construction Emissions

2014 Construction Emissions

Construction Emission Category	NOx (tons)	CO (tons)	SO2 (tons)	VOC (tons)	PM10 (tons)	PM2.5 (tons)	CO2 (tons)	N2O (tons)	CH4 (tons)	CO2e (metric tons)	TOTAL HAP (tons)
Construction Equipment Exhaust	5.53	3.35	0.01	0.74	0.57	0.57	-	-	-	-	-
On-Road Vehicle Exhaust - Heavy Duty Vehicles	3.22	1.27	0.00	0.16	0.19	0.17	455.29	0.00	0.01	413.37	0.03
On-Road Vehicle Exhaust - Commute Vehicles	3.01	13.21	0.03	0.58	0.21	0.12	1709.90	0.02	0.03	1556.94	0.17
Fugitive Dust from Travel on Paved Roads	-	-	-	-	5.39	1.32	-	-	-	-	-
Fugitive Dust from Travel on Unpaved Roads	-	-	-	-	2.79	0.28	-	-	-	-	-
Fugitive Dust from Construction Activities	-	-	-	-	12.38	2.56	-	-	-	-	-
Total	**11.77**	**17.83**	**0.04**	**1.48**	**21.53**	**5.02**	**2,165**	**0.02**	**0.04**	**1,970**	**0.20**

2015 Construction Emissions

Construction Emission Category	NOx (tons)	CO (tons)	SO2 (tons)	VOC (tons)	PM10 (tons)	PM2.5 (tons)	CO2 (tons)	N2O (tons)	CH4 (tons)	CO2e (metric tons)	TOTAL HAP (tons)
Construction Equipment Exhaust	9.74	5.86	0.01	1.34	0.97	0.97	-	-	-	-	-
On-Road Vehicle Exhaust - Heavy Duty Vehicles	5.91	2.36	0.01	0.30	0.36	0.31	907.17	0.00	0.02	823.64	0.06
On-Road Vehicle Exhaust - Commute Vehicles	5.43	24.54	0.06	1.03	0.41	0.23	3357.99	0.03	0.06	3056.64	0.31
Fugitive Dust from Travel on Paved Roads	-	-	-	-	10.74	2.64	-	-	-	-	-
Fugitive Dust from Travel on Unpaved Roads	-	-	-	-	5.57	0.56	-	-	-	-	-
Fugitive Dust from Construction Activities	-	-	-	-	0.22	0.04	-	-	-	-	-
Total	**21.08**	**32.76**	**0.08**	**2.67**	**18.27**	**4.74**	**4,265**	**0.04**	**0.08**	**3,880**	**0.36**

Moapa Solar CSP Construction - Construction Equipment Exhaust

Expected Construction Start	7/1/2014				
Expected Construction End	12/31/2015				
2014 Construction Duration	131	days	Mon-Fri	12	hours/day
2015 Construction Duration	261	days	Mon-Fri	12	hours/day

Model Equipment Types	Fuel Type	Horsepower (hp)	Number	Duration (days)	Duration (hours)	2014 Construction Equipment Emission Factors (g/hp-hr)						2014 Construction Equipment Emissions (tons)					
						NOx	CO	SOx	VOC	PM10	PM2.5	NOx	CO	SOx	VOC	PM10	PM2.5
Aerial Lifts	Diesel	50	1	131	1,572	5.77	6.78	0.005	1.776	0.968	0.968	0.500	0.588	0.000	0.154	0.084	0.084
Concrete/Industrial Saws	Diesel	50	1	131	1,572	4.25	1.48	0.004	0.253	0.246	0.246	0.369	0.128	0.000	0.022	0.021	0.021
Cranes	Diesel	175	1	131	1,572	2.86	0.727	0.003	0.227	0.174	0.174	0.868	0.220	0.001	0.069	0.053	0.053
Dumpers/Tenders	Diesel	50	1	131	1,572	5.58	6.13	0.005	1.528	0.922	0.922	0.484	0.531	0.000	0.132	0.080	0.080
Excavators	Diesel	175	2	131	1,572	2.19	0.949	0.003	0.187	0.229	0.229	1.329	0.575	0.002	0.114	0.139	0.139
Off-Highway Trucks	Diesel	300	1	131	1,572	1.53	0.444	0.003	0.151	0.082	0.082	0.798	0.231	0.001	0.078	0.042	0.042
Rough Terrain Forklifts	Diesel	75	1	131	1,572	3.90	2.82	0.004	0.316	0.340	0.340	0.506	0.366	0.000	0.041	0.044	0.044
Tractors/Loaders/Backhoes	Diesel	75	1	131	1,572	5.21	5.44	0.005	0.967	0.797	0.797	0.678	0.707	0.001	0.126	0.104	0.104
Total												5.53	3.35	0.007	0.736	0.567	0.567

Model Equipment Types	Fuel Type	Horsepower (hp)	Number	Duration (days)	Duration (hours)	2015 Construction Equipment Emission Factors (g/hp-hr)						2015 Construction Equipment Emissions (tons)					
						NOx	CO	SOx	VOC	PM10	PM2.5	NOx	CO	SOx	VOC	PM10	PM2.5
Aerial Lifts	Diesel	50	1	261	3,132	5.59	6.32	0.004	1.643	0.907	0.907	0.966	1.090	0.001	0.284	0.157	0.157
Concrete/Industrial Saws	Diesel	50	1	261	3,132	4.05	1.23	0.004	0.230	0.197	0.197	0.700	0.212	0.001	0.040	0.034	0.034
Cranes	Diesel	175	1	261	3,132	2.48	0.647	0.003	0.209	0.156	0.156	1.501	0.391	0.002	0.126	0.094	0.094
Dumpers/Tenders	Diesel	50	1	261	3,132	5.38	5.59	0.004	1.379	0.849	0.849	0.929	0.965	0.001	0.238	0.146	0.146
Excavators	Diesel	175	2	261	3,132	1.82	0.797	0.003	0.174	0.192	0.192	2.204	0.963	0.004	0.210	0.232	0.232
Off-Highway Trucks	Diesel	300	1	261	3,132	1.13	0.274	0.003	0.141	0.045	0.045	1.175	0.284	0.003	0.146	0.046	0.046
Rough Terrain Forklifts	Diesel	75	1	261	3,132	3.73	2.54	0.004	0.284	0.294	0.294	0.967	0.656	0.001	0.074	0.076	0.076
Tractors/Loaders/Backhoes	Diesel	75	1	261	3,132	5.00	5.03	0.004	0.879	0.728	0.728	1.294	1.302	0.001	0.228	0.189	0.189
Total												9.74	5.86	0.013	1.345	0.974	0.974

Notes:

1 - Per the Project, construction of the SPGF, from site preparation and grading to commercial operation, will be expected to take 18 months (mid-2014-end 2015). Construction will generally occur between 7 a.m. and 7 p.m., Monday through Friday.

2 - Construction equipment emission factors developed using EPA NONROAD model.

3 - Construction equipment number, type, and HP rating was assumed: A mid-range HP value was chosen for each equipment category.

Moapa Solar CSP Construction - On-Road Vehicle Exhaust - Heavy Duty Vehicles

Expected Construction Start	7/1/2014	
Expected Construction End	12/31/2015	
2014 Construction Duration	131	days
2015 Construction Duration	261	days

					2014 Heavy Duty Vehicle Emission Factors (g/mi)						**2014 Heavy Duty Vehicle Emissions (tons)**					
Heavy Duty Vehicle Details	**Maximum Quantity per day**	**Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day)**	**Max Daily Onsite Roundtrip Distance per Vehicle (miles/day)**	**Duration (days)**	NOx	CO	SOx	VOC	PM10	PM2.5	NOx	CO	SOx	VOC	PM10	PM2.5
Concrete Delivery Truck for General Construction	2	80	0	131	12.6	4.96	0.01	0.62	0.75	0.66	0.290	0.114	0.000	0.014	0.017	0.015
Dump Truck	1	0	7.5	131	12.6	4.96	0.01	0.62	0.75	0.66	0.014	0.005	0.000	0.001	0.001	0.001
Flatbed Truck	5	0	7.5	131	12.6	4.96	0.01	0.62	0.75	0.66	0.068	0.027	0.000	0.003	0.004	0.004
Staff & Security Truck	4	0	7.5	131	12.6	4.96	0.01	0.62	0.75	0.66	0.054	0.021	0.000	0.003	0.003	0.003
Pickup Truck	10	0	7.5	131	12.6	4.96	0.01	0.62	0.75	0.66	0.136	0.054	0.000	0.007	0.008	0.007
Road Preparation Materials Truck	10	15	0	131	12.6	4.96	0.01	0.62	0.75	0.66	0.272	0.107	0.000	0.014	0.016	0.014
General Materials Delivery Truck for General Construction	1	100	0	131	12.6	4.96	0.01	0.62	0.75	0.66	0.182	0.072	0.000	0.009	0.011	0.009
PV Module, Tracker, & Electrical component Delivery	12	100	0	131	12.6	4.96	0.01	0.62	0.75	0.66	2.178	0.859	0.002	0.108	0.131	0.114
Water Delivery Truck	2	0	7.5	131	12.6	4.96	0.01	0.62	0.75	0.66	0.027	0.011	0.000	0.001	0.002	0.001
Total											3.222	1.270	0.004	0.160	0.193	0.168

					2014 Heavy Duty Vehicle Emission Factors (g/mi)			**2014 Heavy Duty Vehicle Emissions (tons)**			
Heavy Duty Vehicle Details	**Maximum Quantity per day**	**Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day)**	**Max Daily Onsite Roundtrip Distance per Vehicle (miles/day)**	**Duration (days)**	**CO2**	**N2O**	**CH4**	**CO2**	**N2O**	**CH4**	**CO2e (metric tons)**
Concrete Delivery Truck for General Construction	2	80	0	131	1776.3	0.004	0.03	41.040	0.000	0.001	37.26
Dump Truck	1	0	7.5	131	1776.3	0.004	0.03	1.924	0.000	0.000	1.75
Flatbed Truck	5	0	7.5	131	1776.3	0.004	0.03	9.619	0.000	0.000	8.73
Staff & Security Truck	4	0	7.5	131	1776.3	0.004	0.03	7.695	0.000	0.000	6.99
Pickup Truck	10	0	7.5	131	1776.3	0.004	0.03	19.238	0.000	0.000	17.47
Road Preparation Materials Truck	10	15	0	131	1776.3	0.004	0.03	38.475	0.000	0.001	34.93
General Materials Delivery Truck for General Construction	1	100	0	131	1776.3	0.004	0.03	25.650	0.000	0.000	23.29
PV Module, Tracker, & Electrical component Delivery	12	100	0	131	1776.3	0.004	0.03	307.801	0.001	0.005	279.46
Water Delivery Truck	2	0	7.5	131	1776.3	0.004	0.03	3.848	0.000	0.000	3.49
Total								455.290	0.001	0.008	413.368

Moapa Solar CSP Construction - On-Road Vehicle Exhaust - Heavy Duty Vehicles – Continued

Heavy Duty Vehicle Details	Maximum Quantity per day	Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day)	Max Daily Onsite Roundtrip Distance per Vehicle (miles/day)	Duration (days)	2014 Heavy Duty Vehicle Emission Factors (g/mi)															
					Benzene	Ethanol	MTBE	1,3-Butadiene	Form-aldehyde	Acet-aldehyde	Acrolein	2,2,4-Trimethyl-pentane	Ethyl Benzene	Hexane	Propion-aldehyde	Styrene	Toluene	Xylene	Naphthalene	PAH (less Naphthalene)
Concrete Delivery Truck for General Construction	2	80	0	131	0.007	0.002	0.000	0.002	0.046	0.021	0.004	0.003	0.003	0.003	0.002	0.001	0.010	0.009	0.005	0.003
Dump Truck	1	0	7.5	131	0.007	0.002	0.000	0.002	0.046	0.021	0.004	0.003	0.003	0.003	0.002	0.001	0.010	0.009	0.005	0.003
Flatbed Truck	5	0	7.5	131	0.007	0.002	0.000	0.002	0.046	0.021	0.004	0.003	0.003	0.003	0.002	0.001	0.010	0.009	0.005	0.003
Staff & Security Truck	4	0	7.5	131	0.007	0.002	0.000	0.002	0.046	0.021	0.004	0.003	0.003	0.003	0.002	0.001	0.010	0.009	0.005	0.003
Pickup Truck	10	0	7.5	131	0.007	0.002	0.000	0.002	0.046	0.021	0.004	0.003	0.003	0.003	0.002	0.001	0.010	0.009	0.005	0.003
Road Preparation Materials Truck	10	15	0	131	0.007	0.002	0.000	0.002	0.046	0.021	0.004	0.003	0.003	0.003	0.002	0.001	0.010	0.009	0.005	0.003
General Materials Delivery Truck for General Construction	1	100	0	131	0.007	0.002	0.000	0.002	0.046	0.021	0.004	0.003	0.003	0.003	0.002	0.001	0.010	0.009	0.005	0.003
PV Module, Tracker, & Electrical component Delivery	12	100	0	131	0.007	0.002	0.000	0.002	0.046	0.021	0.004	0.003	0.003	0.003	0.002	0.001	0.010	0.009	0.005	0.003
Water Delivery Truck	2	0	7.5	131	0.007	0.002	0.000	0.002	0.046	0.021	0.004	0.003	0.003	0.003	0.002	0.001	0.010	0.009	0.005	0.003

Heavy Duty Vehicle Details	2014 Heavy Duty Vehicle Emissions (tons)																
	Benzene	Ethanol	MTBE	1,3-Butadiene	Form-aldehyde	Acet-aldehyde	Acrolein	2,2,4-Trimethyl-pentane	Ethyl Benzene	Hexane	Propion-aldehyde	Styrene	Toluene	Xylene	Naphthalene	PAH (less Naphthalene)	Total HAPs
Concrete Delivery Truck for General Construction	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003
Dump Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Flatbed Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
Staff & Security Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
Pickup Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
Road Preparation Materials Truck	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003
General Materials Delivery Truck for General Construction	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002
PV Module, Tracker, & Electrical component Delivery	0.001	0.000	0.000	0.000	0.008	0.004	0.001	0.000	0.001	0.000	0.000	0.000	0.002	0.001	0.001	0.001	0.021
Water Delivery Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	0.002	0.001	0.000	0.001	0.012	0.005	0.001	0.001	0.001	0.001	0.001	0.000	0.003	0.002	0.001	0.001	0.031

Moapa Solar CSP Construction - On-Road Vehicle Exhaust - Heavy Duty Vehicles – Continued

Heavy Duty Vehicle Details	Maximum Quantity per day	Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day)	Max Daily Onsite Roundtrip Distance per Vehicle (miles/day)	Duration (days)	2015 Heavy Duty Vehicle Emission Factors (g/mi)						2015 Heavy Duty Vehicle Emissions (tons)					
					NOx	CO	SOx	VOC	PM10	PM2.5	NOx	CO	SOx	VOC	PM10	PM2.5
Concrete Delivery Truck for General Construction	2	80	0	261	11.57	4.61	0.01	0.58	0.70	0.602	0.533	0.212	0.001	0.027	0.032	0.028
Dump Truck	1	0	7.5	261	11.57	4.61	0.01	0.58	0.70	0.602	0.025	0.010	0.000	0.001	0.002	0.001
Flatbed Truck	5	0	7.5	261	11.57	4.61	0.01	0.58	0.70	0.602	0.125	0.050	0.000	0.006	0.008	0.006
Staff & Security Truck	4	0	7.5	261	11.57	4.61	0.01	0.58	0.70	0.602	0.100	0.040	0.000	0.005	0.006	0.005
Pickup Truck	10	0	7.5	261	11.57	4.61	0.01	0.58	0.70	0.602	0.250	0.100	0.000	0.012	0.015	0.013
Road Preparation Materials Truck	10	15	0	261	11.57	4.61	0.01	0.58	0.70	0.602	0.499	0.199	0.001	0.025	0.030	0.026
General Materials Delivery Truck for General Construction	1	100	0	261	11.57	4.61	0.01	0.58	0.70	0.602	0.333	0.133	0.000	0.017	0.020	0.017
PV Module, Tracker, & Electrical component Delivery	12	100	0	261	11.57	4.61	0.01	0.58	0.70	0.602	3.996	1.593	0.005	0.200	0.241	0.208
Water Delivery Truck	2	0	7.5	261	11.57	4.61	0.01	0.58	0.70	0.602	0.050	0.020	0.000	0.002	0.003	0.003
Total											5.911	2.356	0.007	0.295	0.356	0.308

Heavy Duty Vehicle Details	Maximum Quantity per day	Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day)	Max Daily Onsite Roundtrip Distance per Vehicle (miles/day)	Duration (days)	2015 Heavy Duty Vehicle Emission Factors (g/mi)			2015 Heavy Duty Vehicle Emissions (tons)			
					CO2	N2O	CH4	CO2	N2O	CH4	CO2e (metric tons)
Concrete Delivery Truck for General Construction	2	80	0	261	1776.44	0.003	0.03	81.773	0.000	0.002	74.24
Dump Truck	1	0	7.5	261	1776.44	0.003	0.03	3.833	0.000	0.000	3.48
Flatbed Truck	5	0	7.5	261	1776.44	0.003	0.03	19.165	0.000	0.000	17.40
Staff & Security Truck	4	0	7.5	261	1776.44	0.003	0.03	15.332	0.000	0.000	13.92
Pickup Truck	10	0	7.5	261	1776.44	0.003	0.03	38.331	0.000	0.001	34.80
Road Preparation Materials Truck	10	15	0	261	1776.44	0.003	0.03	76.662	0.000	0.001	69.60
General Materials Delivery Truck for General Construction	1	100	0	261	1776.44	0.003	0.03	51.108	0.000	0.001	46.40
PV Module, Tracker, & Electrical component Delivery	12	100	0	261	1776.44	0.003	0.03	613.295	0.001	0.011	556.83
Water Delivery Truck	2	0	7.5	261	1776.44	0.003	0.03	7.666	0.000	0.000	6.96
Total								907.165	0.002	0.017	823.642

Moapa SolarCSP Construction - On-Road Vehicle Exhaust - Heavy Duty Vehicles – Continued

Heavy Duty Vehicle Details	Maximum Quantity per day	Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day)	Max Daily Onsite Roundtrip Distance per Vehicle (miles/day)	Duration (days)	2015 Heavy Duty Vehicle Emission Factors (g/mi)																	
					Benzene	Ethanol	MTBE	1,3-Butadiene	Form-aldehyde	Acet-aldehyde	Acrolein	2,2,4-Trimethyl-pentane	Ethyl Benzene	Hexane	Propion-aldehyde	Styrene	Toluene	Xylene	Naphthalene	PAH (less Naphthalene)
Concrete Delivery Truck for General Construction	2	80	0	261	0.007	0.002	0.000	0.002	0.043	0.019	0.003	0.002	0.003	0.003	0.002	0.001	0.009	0.008	0.005	0.003
Dump Truck	1	0	7.5	261	0.007	0.002	0.000	0.002	0.043	0.019	0.003	0.002	0.003	0.003	0.002	0.001	0.009	0.008	0.005	0.003
Flatbed Truck	5	0	7.5	261	0.007	0.002	0.000	0.002	0.043	0.019	0.003	0.002	0.003	0.003	0.002	0.001	0.009	0.008	0.005	0.003
Staff & Security Truck	4	0	7.5	261	0.007	0.002	0.000	0.002	0.043	0.019	0.003	0.002	0.003	0.003	0.002	0.001	0.009	0.008	0.005	0.003
Pickup Truck	10	0	7.5	261	0.007	0.002	0.000	0.002	0.043	0.019	0.003	0.002	0.003	0.003	0.002	0.001	0.009	0.008	0.005	0.003
Road Preparation Materials Truck	10	15	0	261	0.007	0.002	0.000	0.002	0.043	0.019	0.003	0.002	0.003	0.003	0.002	0.001	0.009	0.008	0.005	0.003
General Materials Delivery Truck for General Construction	1	100	0	261	0.007	0.002	0.000	0.002	0.043	0.019	0.003	0.002	0.003	0.003	0.002	0.001	0.009	0.008	0.005	0.003
PV Module, Tracker, & Electrical component Delivery	12	100	0	261	0.007	0.002	0.000	0.002	0.043	0.019	0.003	0.002	0.003	0.003	0.002	0.001	0.009	0.008	0.005	0.003
Water Delivery Truck	2	0	7.5	261	0.007	0.002	0.000	0.002	0.043	0.019	0.003	0.002	0.003	0.003	0.002	0.001	0.009	0.008	0.005	0.003

Heavy Duty Vehicle Details	2015 Heavy Duty Vehicle Emissions (tons)																
	Benzene	Ethanol	MTBE	1,3-Butadiene	Form-aldehyde	Acet-aldehyde	Acrolein	2,2,4-Trimethyl-pentane	Ethyl Benzene	Hexane	Propion-aldehyde	Styrene	Toluene	Xylene	Naphthalene	PAH (less Naphthalene)	Total HAPs
Concrete Delivery Truck for General Construction	0.000	0.000	0.000	0.000	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005
Dump Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Flatbed Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
Staff & Security Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
Pickup Truck	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002
Road Preparation Materials Truck	0.000	0.000	0.000	0.000	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005
General Materials Delivery Truck for General Construction	0.000	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003
PV Module, Tracker, & Electrical component Delivery	0.002	0.001	0.000	0.001	0.015	0.007	0.001	0.001	0.001	0.001	0.001	0.000	0.003	0.003	0.002	0.001	0.039
Water Delivery Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	0.003	0.001	0.000	0.001	0.022	0.010	0.002	0.001	0.001	0.001	0.001	0.000	0.005	0.004	0.002	0.002	0.057

Notes:

1 - Per the Project, construction of the SPGF, from site preparation and grading to commercial operation, will be expected to take 18 months (mid-2014-end 2015). Construction will generally occur between 7 a.m. and 7 p.m., Monday through Friday.

2 - Emission factors developed using MOVES

3 - Heavy duty vehicle emission factors based on the default MOVES national mix of single-unit and combination long- and short-haul trucks for year 2014 travelling at an average speed of 35 mph.

4 - The type of heavy duty vehicle, maximum quantity per day, and Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day) provided from the K Road Solar Project.

5 - Roundtrip mileage for Max Daily Onsite Roundtrip Distance per Vehicle (miles/day) based on (1) information from draft EIS: 2.5-mile gravel access road connecting the SPGF to the existing paved frontage road adjacent to I-15, and (2) the assumption that the distance per day = 5 miles per roundtrip (on 2.5-mile gravel access road) + 2.5 miles per roundtrip (distance traveled in and out on 1,000 acre site if site is 1.25 miles X 1.25 miles) = 7.5 miles per roundtrip.

Moapa Solar CSP Construction - On-Road Vehicle Exhaust - Commute Vehicles

Expected Construction Start	7/1/2014	
Expected Construction End	12/31/2015	
2014 Construction Duration	131	days
2015 Construction Duration	261	days

			2014 Worker Commute Emission Factors (g/mi)						2014 Worker Commute Emissions (tpy)					
Worker Passenger Vehicles	**Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day)**	**Duration (days)**	NOx	CO	SOx	VOC	PM10	PM2.5	NOx	CO	SOx	VOC	PM10	PM2.5
300	100	131	0.695	3.05	0.007	0.134	0.048	0.028	3.012	13.210	0.031	0.581	0.209	0.119

			2014 Worker Commute Emission Factors (g/mi)			2014 Worker Commute Emissions (tpy)			
Worker Passenger Vehicles	**Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day)**	**Duration (days)**	**CO2**	**N2O**	**CH4**	**CO2**	**N2O**	**CH4**	**CO2e (metric tons)**
300	100	131	394.712	0.004	0.008	1709.897	0.019	0.033	1556.94

			2014 Worker Commute Emission Factors (g/mi)															
Worker Passenger Vehicles	**Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day)**	**Duration (days)**	**Benzene**	**Ethanol**	**MTBE**	**1,3-Butadiene**	**Form-aldehyde**	**Acet-aldehyde**	**Acrolein**	**2,2,4-Trimethyl-pentane**	**Ethyl Benzene**	**Hexane**	**Propion-aldehyde**	**Styrene**	**Toluene**	**Xylene**	**Naphthalene**	**PAH (less Naphthalene)**
300	100	131	0.004	0.003	0.000	0.001	0.002	0.002	0.000	0.002	0.002	0.002	0.000	0.000	0.011	0.009	0.000	0.000

	2014 Worker Commute Emissions (tons)																
Worker Passenger Vehicles	**Benzene**	**Ethanol**	**MTBE**	**1,3-Butadiene**	**Form-aldehyde**	**Acet-aldehyde**	**Acrolein**	**2,2,4-Trimethyl-pentane**	**Ethyl Benzene**	**Hexane**	**Propion-aldehyde**	**Styrene**	**Toluene**	**Xylene**	**Naphthalene**	**PAH (less Naphthalene)**	**Total HAPs**
300	0.019	0.014	0.000	0.003	0.009	0.008	0.000	0.010	0.011	0.010	0.001	0.001	0.048	0.039	0.001	0.001	0.172

Moapa Solar CSP Construction - On-Road Vehicle Exhaust - Commute Vehicles – Continued

Worker Passenger Vehicles	Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day)	Duration (days)	2015 Worker Commute Emission Factors (g/mi) NOx	CO	SOx	VOC	PM10	PM2.5	2015 Worker Commute Emissions (tpy) NOx	CO	SOx	VOC	PM10	PM2.5
300	100	261	0.629	2.84	0.007	0.120	0.047	0.027	5.433	24.535	0.060	1.033	0.407	0.230

Worker Passenger Vehicles	Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day)	Duration (days)	2015 Worker Commute Emission Factors (g/mi) CO2	N2O	CH4	2015 Worker Commute Emissions (tpy) CO2	N2O	CH4	CO2e (metric tons)
300	100	261	389.064	0.004	0.007	3357.993	0.034	0.061	3056.64

Worker Passenger Vehicles	Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day)	Duration (days)	2015 Worker Commute Emission Factors (g/mi) Benzene	Ethanol	MTBE	1,3-Butadiene	Form-aldehyde	Acet-aldehyde	Acrolein	2,2,4-Trimethyl-pentane	Ethyl Benzene	Hexane	Propion-aldehyde	Styrene	Toluene	Xylene	Naphthalene	PAH (less Naphthalene)
300	100	261	0.004	0.003	0.000	0.001	0.002	0.002	0.000	0.002	0.002	0.002	0.000	0.000	0.010	0.008	0.000	0.000

Worker Passenger Vehicles	2015 Worker Commute Emissions (tons) Benzene	Ethanol	MTBE	1,3-Butadiene	Form-aldehyde	Acet-aldehyde	Acrolein	2,2,4-Trimethyl-pentane	Ethyl Benzene	Hexane	Propion-aldehyde	Styrene	Toluene	Xylene	Naphthalene	PAH (less Naphthalene)	Total HAPs
300	0.033	0.024	0.000	0.005	0.016	0.014	0.001	0.017	0.019	0.018	0.001	0.001	0.084	0.068	0.003	0.001	0.306

Notes:

1 - Per the Project, construction of the SPGF, from site preparation and grading to commercial operation, will be expected to take 18 months (mid-2014-end 2015). Construction will generally occur between 7 a.m. and 7 p.m., Monday through Friday.

2 - Emission factors developed using MOVES

3 - Worker commute emission factors are based on the default MOVES national mix of passenger cars and trucks for year 2014 travelling at an average speed of 35 mph.

4 - The number of worker passenger vehicles, and the Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day) provided from the K Road Solar Project.

Moapa Solar CSP Construction - Fugitive Dust from Travel on Paved Roads

Expected Construction Start	7/1/2014	
Expected Construction End	12/31/2015	
2014 Construction Duration	131	days
2015 Construction Duration	261	days

Paved Roads emission factors from AP-42, Section 13.2.1: *Paved Roads* (Final Section 1/11)		
	E=	k(sL)^0.91 * (W)^1.02
where:		
E=		Particulate emission factor
k =	0.0022	lb/VMT [Table 13.2.1-1, particle size multiplier for PM_{10}]
k =	0.00054	lb/VMT [Table 13.2.1-1, particle size multiplier for $PM_{2.5}$]
sL =	0.6	[road surface silt loading (grams per square meter (g/m2)), Table 13.2.1-2] Assumed less than 500 average daily traffic to represent the project.
W=	2	tons [weighted average vehicle weight]
$E_{(PM10)}$=	0.003	lb/VMT
$E_{(PM2.5)}$=	0.0006	lb/VMT

Vehicle Details	Vehicle Weight (tons)	Maximum Quantity per day	Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day)	Max Daily Onsite Roundtrip Distance per Vehicle (miles/day)	2014 Duration (days)	2015 Duration (days)	2014 Total Vehicle Miles Traveled on Paved Roads (VMT)	2015 Total Vehicle Miles Traveled on Paved Roads (VMT)	2014 Total Vehicle Miles Traveled * Vehicle Weight (tons)	2015 Total Vehicle Miles Traveled * Vehicle Weight (tons)	2014 Emissions (tons) PM10 Emissions (tons)	2014 Emissions (tons) PM2.5 Emissions (tons)	2015 Emissions (tons) PM10 Emissions (tons)	2015 Emissions (tons) PM2.5 Emissions (tons)
Concrete Delivery Truck for General Construction	20	2	80	0	131	261	20,960	41,760	419,200	835,200	0.03	0.01	0.05	0.01
Dump Truck	20	1	0	6.375	131	261	835	1,664	16,703	33,278	0.00	0.00	0.00	0.00
Flatbed Truck	10	5	0	6.375	131	261	4,176	8,319	41,756	83,194	0.01	0.00	0.01	0.00
Staff & Security Truck	2.25	4	0	6.375	131	261	3,341	6,656	7,516	14,975	0.00	0.00	0.01	0.00
Pickup Truck	4	10	0	6.375	131	261	8,351	16,639	33,405	66,555	0.01	0.00	0.02	0.01
Road Preparation Materials Truck	20	10	15	0	131	261	19,650	39,150	393,000	783,000	0.03	0.01	0.05	0.01

General Materials Delivery Truck for General Construction	20	1	100	0	131	261	13,100	26,100	262,000	522,000	0.02	0.00	0.03	0.01
PV Module, Tracker, & Electrical component Delivery	10	12	100	0	131	261	157,200	313,200	1,572,000	3,132,000	0.20	0.05	0.41	0.10
Water Delivery Truck	30	2	0	6.375	131	261	1,670	3,328	50,108	99,833	0.00	0.00	0.00	0.00
Worker Passenger Vehicles	1.25	300	100	0	131	261	3,930,000	7,830,000	4,912,500	9,787,500	5.10	1.25	10.15	2.49
Total							4,159,283	8,286,815	7,708,187	15,357,534	5.39	1.32	10.74	2.64
								Weighted average vehicle wt (tons)	1.85	1.85				

Notes:

1 - Per the Project, construction of the SPGF, from site preparation and grading to commercial operation, will be expected to take 18 months (mid-2014-end 2015). Construction will generally occur between 7 a.m. and 7 p.m., Monday through Friday.

2 - The type of heavy duty vehicle, maximum quantity per day, vehicle weight, and Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day) provided from the K Road Solar Project.

3 - Roundtrip mileage for Max Daily Onsite Roundtrip Distance per Vehicle (miles/day) based on (1) information from draft EIS: 2.5-mile gravel access road connecting the SPGF to the existing paved frontage road adjacent to I-15, and (2) the assumption that the distance per day = 5 miles per roundtrip (on 2.5-mile gravel access road) + 2.5 miles per roundtrip (distance traveled in and out on 1,000 acre site if site is 1.25 miles X 1.25 miles) = 7.5 miles per roundtrip.

4 - Per client, 85% of roads onsite (access roads) are paved.

Moapa Solar CSP Construction - Fugitive Dust from Travel on Unpaved Roads

Expected Construction Start	7/1/2014	
Expected Construction End	12/31/2015	
2014 Construction Duration	131	days
2015 Construction Duration	261	days

Unpaved Roads emission factor from AP-42, Section 13.2.2: *Unpaved Roads* (11/06)

$$E = [k(s/12)^a (W/3)^b]$$

where:

s =	8.5	surface material silt content (%) [Table 13.2.2-1, Construction sites mean silt content %]
W =	8	tons [weighted average vehicle weight]
k =	1.5	lb/VMT [Table 13.2.2-2, for PM_{10}]
k =	0.15	lb/VMT [Table 13.2.2-2, for $PM_{2.5}$]
a =	0.9	constant [Table 13.2.2-2, for PM_{10} and $PM_{2.5}$]
b =	0.45	constant [Table 13.2.2-2, for PM_{10} and $PM_{2.5}$]
$E_{(PM10)}$=	1.72	lb/VMT
$E_{(PM2.5)}$=	0.17	lb/VMT

Vehicle Details	Vehicle Weight (tons)	Maximum Quantity per day	Max Daily Onsite Roundtrip Distance per Vehicle (miles/day)	2014 Duration (days)	2015 Duration (days)	2014 Total Vehicle Miles Traveled on Unpaved Roads (VMT)	2015 Total Vehicle Miles Traveled on Unpaved Roads (VMT)	2014 Total Vehicle Miles Traveled * Vehicle Weight (tons)	2015 Total Vehicle Miles Traveled * Vehicle Weight (tons)	2014 Emissions (tons) PM10 Emissions (tons)	2014 Emissions (tons) PM2.5 Emissions (tons)	2015 Emissions (tons) PM10 Emissions (tons)	2015 Emissions (tons) PM2.5 Emissions (tons)
Concrete Delivery Truck for General Construction	20	2	0	131	261	0	0	0	0	0.00	0.00	0.00	0.00
Dump Truck	20	1	1.125	131	261	147	294	2,948	5,873	0.13	0.01	0.25	0.03
Flatbed Truck	10	5	1.125	131	261	737	1,468	7,369	14,681	0.63	0.06	1.26	0.13
Staff & Security Truck	2.25	4	1.125	131	261	590	1,175	1,326	2,643	0.51	0.05	1.01	0.10
Pickup Truck	4	10	1.125	131	261	1,474	2,936	5,895	11,745	1.27	0.13	2.53	0.25
Road Preparation Materials Truck	20	10	0	131	261	0	0	0	0	0.00	0.00	0.00	0.00
General Materials Delivery Truck for General Construction	20	1	0	131	261	0	0	0	0	0.00	0.00	0.00	0.00
PV Module, Tracker, & Electrical component Delivery	10	12	0	131	261	0	0	0	0	0.00	0.00	0.00	0.00
Water Delivery Truck	30	2	1.125	131	261	295	587	8,843	17,618	0.25	0.03	0.51	0.05
Worker Passenger Vehicles	1.25	300	0	131	261	0	0	0	0	0.00	0.00	0.00	0.00
Total						3,242	6,460	26,380	52,559	2.79	0.28	5.57	0.56
							Weighted average vehicle wt (tons)	8.14	8.14				

Notes:

1 - Per the Project, construction of the SPGF, from site preparation and grading to commercial operation, will be expected to take 18 months (mid-2014-end 2015). Construction will generally occur between 7 a.m. and 7 p.m., Monday through Friday.

2 - The type of heavy duty vehicle, maximum quantity per day, vehicle weight, and Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day) provided from the K Road Solar Project.

3 - Roundtrip mileage for Max Daily Onsite Roundtrip Distance per Vehicle (miles/day) based on (1) information from draft EIS: 2.5-mile gravel access road connecting the SPGF to the existing paved frontage road adjacent to I-15, and (2) the assumption that the distance per day = 5 miles per roundtrip (on 2.5-mile gravel access road) + 2.5 miles per roundtrip (distance traveled in and out on 1,000 acre site if site is 1.25 miles X 1.25 miles) = 7.5 miles per roundtrip.

4 - Per client, 85% of roads onsite (access roads) are paved, which means 15% are unpaved.

Moapa Solar CSP Construction - Fugitive Dust from Construction Activities

Construction Activity	Area Disturbed (acres)	Amount of Soil Disturbed (tons)	PM10 Emission Factor (lb/ton)	PM10 Emissions (tons)	Dust Control Efficiency (%)	2014 Emissions PM10 (tons)	2014 Emissions PM2.5 (tons)
Access Road Construction	220	479,160	0.058	13.90	50%	6.95	1.45
Parking and Laydown	110	119,790	0.058	3.47	50%	1.74	0.36
Site Grading	220	239,580	0.058	6.95	50%	3.47	0.72
Total						12.16	2.53

Construction Activity	Amount of Soil Excavated (cf)	Amount of Soil Excavated (tons)	Amount of Soil Backfilled (tons)	Total Amount of Soil (tons)	PM10 Emission Factor (lb/ton)	PM10 Emissions (tons)	Dust Control Efficiency (%)	2014 Emissions PM10 (tons)	2014 Emissions PM2.5 (tons)	2015 Emissions PM10 (tons)	2015 Emissions PM2.5 (tons)
Excavation	135,000	6,750	6,750	13,500	0.058	0.39	50%	0.10	0.01	0.10	0.01
Water Line Excavation	166,320	8,316	8,316	16,632	0.058	0.48	50%	0.12	0.03	0.12	0.03
Total								0.22	0.04	0.22	0.04
Grand Total								12.38	2.56	0.22	0.04

Notes:

1 - Area disturbed for access road construction assumed to be 20% of 1,000 acre site, 10% for parking and laydown, and 20% for site grading. Depth disturbed for access road construction assumed to 12 inches, 6 inches for parking and laydown, and 6 inches for site grading. Access road construction, parking and laydown, and site grading assumed to occur in 2014. Amount of soil disturbed uses 100 lb/cf soil density and conversion of 43,560 sq ft = 1 acre.

*2 - Assumption that can be made: 15,000 cf per mile of transmission line based on an average volume excavated from a recent transmission line project for 4.5 structures per mile of 345 kV double circuit lattice tower and 5.5 structures per mile of 230 kV double circuit tubular poles. Using info from draft EIS, "Approximately 7.5 miles of single-circuit 230-kV overhead transmission line from the SPGF to the Harry Allen 230-kV Substation" and "Approximately 1.5 miles of single-circuit 500-kV overhead transmission line from the SPGF to the 500 kV Crystal Valley Substation" = 9 total miles of transmission lines. 9 * 15,000 cf per mile of transmission line = 135,000 cf of soil excavated.*

3 - Disturbance emission factors from AP-42, Table 11.9-4 (dated 7/98), assuming 100% of TSP is PM10.

4 - PM10 emissions are conservatively assumed to be 100% of TSP.

5 - PM2.5 emissions were calculated following the SCAQMD Particulate Matter (PM) 2.5 Significance Thresholds and Calculation Methodology, October 2006. For construction and demolition fugitive dust sources, 20.8% of the PM10 would be PM2.5.

6 - PM emissions are controlled by watering or use of other tackifier, control efficiency assumed to be 50%

Summary of CSP Operational Emissions

Operation Emission Category	NOx (tons)	CO (tons)	SO2 (tons)	VOC (tons)	PM10 (tons)	PM2.5 (tons)	CO2 (tons)	N2O (tons)	CH4 (tons)	SF6 (tons)	CO2e (metric tons)	TOTAL HAP (tons)
Paved Roads	-	-	-	-	0.58	0.14	-	-	-	-	-	-
Unpaved Roads	-	-	-	-	3.74	0.37	-	-	-	-	-	-
On-Road Vehicle Exhaust - Heavy Duty Vehicles	0.40	0.16	0.00	0.02	0.02	0.02	61.33	1.19E-04	1.14E-03	-	55.68	3.88E-03
On-Road Vehicle Exhaust - Commute Vehicles	0.72	3.27	8.07E-03	0.14	0.05	0.03	447.73	4.59E-03	8.09E-03	-	407.55	0.04
Circuit Breaker SF6 Emissions	-	-	-	-	-	-	-	-	-	0.005	97.55	-
Wet Cooling Tower	-	-	-	-	4.60	0.03	-	-	-	-	-	-
Diesel Fire-Pump Emissions	0.20	0.05	0.01	1.76E-02	0.02	0.02	8.21	0.02	0.01	-	7.47	5.02E-04
Diesel Generator Emissions	0.59	0.14	0.04	5.08E-02	0.05	0.05	23.68	0.06	0.02	-	21.56	1.45E-03
Total	**1.92**	**3.62**	**0.07**	**0.23**	**9.05**	**0.66**	**540.95**	**0.08**	**0.04**	**4.50E-03**	**589.82**	**0.05**

Moapa Operation Emissions - SF6 Emissions from Circuit Breaker Leakage

Circuit Breakers		SF6 (tons/year)	CO2e (metric tons/year)
Number	Size		
3	230 kV	0.005	97.55

Circuit Breaker Size (kV)	Leak Rate Range (lbs SF6/yr) Low	High
230	1.5	3

Notes:

Assumption: 230kV Breakers: 160 lbs. gas, leaking about 1.5 to 3 lbs. of gas per year

High end of leak rate range used in calculations.

*Example calculation: # of circuit breakers * lbs SF6/yr for kV / 2000 lb/yr*

The Climate Registry Electric Power Sector Protocol, Version 1.1, March 2009.

SF6 has a GWP of 23,900

Moapa Operation Emissions - Cooling Tower PM10/PM2.5 Calculation

Water Circulation Rate (Q)	7000	gpm
Cycles of Concentration	10	(Evaporation + Other Losses [leaks, drift, etc]) / Other Losses
TDS in Make Up	500	mg/l or ppmw - relative to "clean" make up water added to circulating water
HAP/TAP Concentration	0	mg/l or ppmw - typically metals or biocides
Number of cells (outlet fans)	6	
Drift Rate	0.0200	percent of Q
PM10 Fraction	0.30	see worksheet "Cool-Tow-PM-Spec"
PM2.5 Fraction	0.0018	see worksheet "Cool-Tow-PM-Spec"

TDS in Circulation

$$500 \frac{\text{mg}}{\text{l}} * 10 \text{ cycles} = 5{,}000 \frac{\text{mg}}{\text{l}}$$

Recirculating Rate Conversions

$$7{,}000 \frac{\text{gal}}{\text{min}} * 60 \frac{\text{min}}{\text{hr}} = 420{,}000 \frac{\text{gal}}{\text{hr}}$$

$$420{,}000 \frac{\text{gal}}{\text{hr}} * 8.34 \frac{\text{lb}}{\text{gal}} = 3{,}502{,}800 \frac{\text{lb}}{\text{hr}}$$

Total Drift Calculation

$$3{,}502{,}800 \frac{\text{lb recirc}}{\text{hr}} * \frac{0.0200}{100} \frac{\text{lb drift}}{\text{lb recirc}} = 700.56 \frac{\text{lb drift}}{\text{hr}}$$

Drift Particulate Matter Calculation (TDS = 5,000 ppm)

$$700.56 \frac{\text{lb drift}}{\text{hr}} * \frac{5{,}000}{1{,}000{,}000} \frac{\text{lb PM}}{\text{lb drift}} = 3.50 \frac{\text{lb PM}}{\text{hr}}$$

Calculated PM10 Fraction 29.97%

3.50	lb PM / hr	*	0.2997		=	1.050	lb PM10 / hr	
						0.175	lb PM10 / hr	per cell
1.05	lb PM / hr	*	8,760 / 2000	hr-ton / yr-lb	=	4.598		ton PM10 / yr
Calculated PM2.5 Fraction			0.18%					
3.50	lb PM / hr	*	0.0018		=	0.006	lb PM2.5 / hr	
						0.001	lb PM2.5 / hr	per cell
0.006	lb PM / hr	*	8,760 / 2000	hr-ton / yr-lb	=	0.027		ton PM2.5 / yr
HAP/TAP Emissions			0.00%					
3.50	lb PM / hr	*	- / 500	ppmw / ppmw	=		-	HAP/TAP / hr
-	lb PM / hr	*	8,760 / 2000	hr-ton / yr-lb	=		-	HAP/TAP / yr

Moapa Operation Emissions - Cooling Tower PM10/PM2.5 Calculation - Continued

TDS= 5,000 mg/l

EPRI Droplet Diameter (µm) [1]	Droplet Volume (µm3)	Droplet Mass (µg)	Particle Mass (Solids) (µg)	Solid Particle Volume (µm3)	Solid Particle Diameter (µm)	EPRI % Mass Smaller [1]	PM10 % Mass Smaller	PM2.5 % Mass Smaller
10	524	5.24E-04	2.62E-06	1.19	1.31	0		0.177
20	4189	4.19E-03	2.09E-05	9.52	2.63	0.196		
30	14137	1.41E-02	7.07E-05	32.13	3.94	0.226		
40	33510	3.35E-02	1.68E-04	76.16	5.26	0.514		
50	65450	6.54E-02	3.27E-04	148.75	6.57	1.816		
60	113097	1.13E-01	5.65E-04	257.04	7.89	5.702		
70	179594	1.80E-01	8.98E-04	408.17	9.20	21.348	29.971	
90	381704	3.82E-01	1.91E-03	867.51	11.83	49.812		
110	696910	6.97E-01	3.48E-03	1583.89	14.46	70.509		
130	1150347	1.15E+00	5.75E-03	2614.42	17.09	82.023		
150	1767146	1.77E+00	8.84E-03	4016.24	19.72	88.012		
180	3053628	3.05E+00	1.53E-02	6940.06	23.67	91.032		
210	4849048	4.85E+00	2.42E-02	11020.56	27.61	92.468		
240	7238229	7.24E+00	3.62E-02	16450.52	31.55	94.091		
270	10305995	1.03E+01	5.15E-02	23422.72	35.50	94.689		
300	14137167	1.41E+01	7.07E-02	32129.92	39.44	96.288		
350	22449298	2.24E+01	1.12E-01	51021.13	46.02	97.011		
400	33510322	3.35E+01	1.68E-01	76159.82	52.59	98.34		
450	47712938	4.77E+01	2.39E-01	108438.50	59.16	99.071		
500	65449847	6.54E+01	3.27E-01	148749.65	65.74	99.071		
600	113097336	1.13E+02	5.65E-01	257039.40	78.89	100		

Data from "Calculating Realistic PM10 Emissions from Cooling Towers"

Moapa Operation Emissions - Cooling Tower PM10/PM2.5 Calculation - Continued

Assumed data for cooling tower water use

total groundwater use (from DEIS)	800	ac-ft/yr
	3.26E+05	gal/ac-ft
	2.61E+08	gal/yr
	496.042618	gal/min
percent of total for cooling tower makeup water	75%	
makeup water	372.031963	gal/min
cycles of concentration	10	
blowdown	37.2031963	gal/min
evaporation	334.828767	gal/min
evaporation percent of recirculating flow	5%	
recirculating flow	6696.57534	gal/min

USGS groundwater data for local wells	TDS (mg/l [ppm])
Well BW-01	608
Well SHV-01	478

Moapa Operation Emissions - Diesel Fire-Pump Emissions

Emission Factors		
NOx + HC:	4.41	lb/MMBtu
CO:	0.95	lb/MMBtu
SO_2:	0.290	lb/MMBtu
VOC:	0.350	lb/MMBtu
PM:	0.31	lb/MMBtu

Heat Input (MMBtu/hr)	2.0
Diesel Heating Value (Btu/lb)	19,300
Fuel Use (lb/hr)	104
Fuel Density (lb/gal)	7.05
Fuel Use (gal/hr)	14.8
Fuel Use (gal/yr)	740

					PTE	
Pollutant	EF Source	Emission Factor		Emissions (lb/hr)	Op. Hrs	tpy
NO_x	AP-42, Table 3.3-1	4.06	lb/MMBtu	8.18	50	0.20
CO	AP-42, Table 3.3-1	0.95	lb/MMBtu	1.91	50	0.05
SO2	AP-42, Table 3.3-1	0.29	lb/MMBtu	0.5840	50	0.01
VOC	AP-42, Table 3.3-2	0.35	lb/MMBtu	0.70	50	0.02
PM	AP-42, Table 3.3-1	3.10E-01	lb/MMBtu	0.62	50	0.02
HCHO	AP-42, Table 3.3-2	1.18E-03	lb/MMBtu	2.38E-03	50	5.94E-05
Acetaldehyde	AP-42, Table 3.3-2	7.67E-04	lb/MMBtu	1.54E-03	50	3.86E-05
Acrolein	AP-42, Table 3.3-2	9.25E-05	lb/MMBtu	1.86E-04	50	4.66E-06
Benzene	AP-42, Table 3.3-2	9.33E-04	lb/MMBtu	1.88E-03	50	4.70E-05
Propylene	AP-42, Table 3.3-2	2.58E-03	lb/MMBtu	5.20E-03	50	1.30E-04
Toluene	AP-42, Table 3.3-2	4.09E-04	lb/MMBtu	8.24E-04	50	2.06E-05
Naphthalene	AP-42, Table 3.3-2	8.48E-05	lb/MMBtu	1.71E-04	50	4.27E-06
Xylene	AP-42, Table 3.3-2	2.85E-04	lb/MMBtu	5.74E-04	50	1.43E-05
Methanol	AP-42, Table 3.3-2	2.50E-03	lb/MMBtu	5.03E-03	50	1.26E-04
n-Hexane	AP-42, Table 3.3-2	1.11E-03	lb/MMBtu	2.24E-03	50	5.59E-05
1,3-Butadiene	AP-42, Table 3.3-2	3.91E-05	lb/MMBtu	7.87E-05	50	1.97E-06
Total HAPs						0.00

Moapa Operation Emissions - Diesel Fire-Pump Emissions - Continued

Greenhouse Gas Emissions

Pollutant	EF Source	Emission Factor		Emissions (lb/hr)	PTE Op. Hrs	PTE tpy
CO_2	EPA MRR Table C-1	73.96	kg/MMBtu	328	50	8
CH_4 (as CO_2e)	EPA MRR Table C-2	0.003	kg/MMBtu	0.28	50	0.01
N_2O (as CO_2e)	EPA MRR Table C-2	0.0006	kg/MMBtu	0.83	50	0.02
CO_2e				329		8

Notes: Emission factors as per 40 CFR Part 98, Tables C-1 and C-2

Moapa Operation Emissions - Diesel Generator Emissions

Emission Factors		
NOx + HC:	4.41	lb/MMBtu
CO:	0.95	lb/MMBtu
SO_2:	0.290	lb/MMBtu
VOC:	0.350	lb/MMBtu
PM:	0.31	lb/MMBtu

Heat Input (MMBtu/hr)	5.8
Diesel Heating Value (Btu/lb)	19,300
Fuel Use (lb/hr)	301
Fuel Density (lb/gal)	7.05
Fuel Use (gal/hr)	42.7
Fuel Use (gal/yr)	2,135

					PTE	
Pollutant	EF Source	Emission Factor		Emissions (lb/hr)	Op. Hrs	tpy
NO_x	AP-42, Table 3.3-1	4.06	lb/MMBtu	23.59	50	0.59
CO	AP-42, Table 3.3-1	0.95	lb/MMBtu	5.52	50	0.14
SO2	AP-42, Table 3.3-1	0.29	lb/MMBtu	1.6849	50	0.04
VOC	AP-42, Table 3.3-2	0.35	lb/MMBtu	2.03	50	0.05
PM	AP-42, Table 3.3-1	3.10E-01	lb/MMBtu	1.80	50	0.05
HCHO	AP-42, Table 3.3-2	1.18E-03	lb/MMBtu	6.86E-03	50	1.71E-04
Acetaldehyde	AP-42, Table 3.3-2	7.67E-04	lb/MMBtu	4.46E-03	50	1.11E-04
Acrolein	AP-42, Table 3.3-2	9.25E-05	lb/MMBtu	5.37E-04	50	1.34E-05
Benzene	AP-42, Table 3.3-2	9.33E-04	lb/MMBtu	5.42E-03	50	1.36E-04
Propylene	AP-42, Table 3.3-2	2.58E-03	lb/MMBtu	1.50E-02	50	3.75E-04
Toluene	AP-42, Table 3.3-2	4.09E-04	lb/MMBtu	2.38E-03	50	5.94E-05
Naphthalene	AP-42, Table 3.3-2	8.48E-05	lb/MMBtu	4.93E-04	50	1.23E-05
Xylene	AP-42, Table 3.3-2	2.85E-04	lb/MMBtu	1.66E-03	50	4.14E-05
Methanol	AP-42, Table 3.3-2	2.50E-03	lb/MMBtu	1.45E-02	50	3.63E-04
n-Hexane	AP-42, Table 3.3-2	1.11E-03	lb/MMBtu	6.45E-03	50	1.61E-04
1,3-Butadiene	AP-42, Table 3.3-2	3.91E-05	lb/MMBtu	2.27E-04	50	5.68E-06
Total HAPs						0.00

Moapa Operation Emissions - Diesel Generator Emissions - Continued

Greenhouse Gas Emissions

Pollutant	EF Source	Emission Factor		Emissions (lb/hr)	PTE Op. Hrs	PTE tpy
CO_2	EPA MRR Table C-1	73.96	kg/MMBtu	947	50	24
CH_4 (as CO_2e)	EPA MRR Table C-2	0.003	kg/MMBtu	0.81	50	0.02
N_2O (as CO_2e)	EPA MRR Table C-2	0.0006	kg/MMBtu	2.38	50	0.06
CO_2e				951		24

Notes: Emission factors as per 40 CFR Part 98, Tables C-1 and C-2

Moapa Solar Operation - Fugitive Dust from Travel on Paved Roads

Annual Operation 261 days

Paved Roads emission factors from AP-42, Section 13.2.1: *Paved Roads* (Final Section 1/11)										
	E=	k(sL)^0.91 * (W)^1.02								
where:										
E=		Particulate emission factor								
k =	0.0022	lb/VMT [Table 13.2.1-1, particle size multiplier for PM_{10}]								
k =	0.00054	lb/VMT [Table 13.2.1-1, particle size multiplier for $PM_{2.5}$]								
sL =	0.6	[road surface silt loading (grams per square meter (g/m2)), Table 13.2.1-2] Assumed less than 500 average daily traffic to represent the project.								
W=	2	tons [weighted average vehicle weight]								
$E_{(PM10)}$=	0.002	lb/VMT								
$E_{(PM2.5)}$=	0.0005	lb/VMT								

Annually

Vehicle Details	**Vehicle Weight (tons)**	**Maximum Quantity per day**	**Max Daily Offsite Round trip Distance per Vehicle within general area (miles/day)**	**Max Daily Onsite Round trip Distance per Vehicle (miles/day)**	**Duration (days)**	**Total Vehicle Miles Traveled on Paved Roads (VMT)**	**Total Vehicle Miles Traveled * Vehicle Weight (tons)**	**PM10 Emissions (tons)**	**PM2.5 Emissions (tons)**
Staff & Security Truck	2.25	4	0	6.375	261	6,656	14,975	0.01	0.00
Pickup Truck	4	10	0	6.375	261	16,639	66,555	0.02	0.00

Water Delivery Truck	30	2	0	6.375	261	3,328	99,833	0.00	0.00
Worker Passenger Vehicles	1.25	20	100	0	261	522,000	652,500	0.55	0.14
Total						548,622	833,862	0.58	0.14
						Weighted average vehicle wt (tons)	1.52		

Notes:

1 - Operation assumed to be 7 a.m. and 7 p.m., Monday through Friday.

2 - The type of vehicle, maximum quantity per day, vehicle weight, and Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day) provided from the K Road Solar Project and modified into assumptions for operation (i.e. 20 workers).

3 - Roundtrip mileage for Max Daily Onsite Roundtrip Distance per Vehicle (miles/day) based on (1) information from draft EIS: 2.5-mile gravel access road connecting the SPGF to the existing paved frontage road adjacent to I-15, and (2) the assumption that the distance per day = 5 miles per roundtrip (on 2.5-mile gravel access road) + 2.5 miles per roundtrip (distance traveled in and out on 1,000 acre site if site is 1.25 miles X 1.25 miles) = 7.5 miles per roundtrip.

4 - Per client, 85% of roads onsite (access roads) are paved.

Moapa Solar Operation - Fugitive Dust from Travel on Unpaved Roads

Annual Operation	261	days

Unpaved Roads emission factor from AP-42, Section 13.2.2: *Unpaved Roads* (11/06)

$E = [k(s/12)^a (W/3)^b]$

where:

s =	8.5	surface material silt content (%) [Table 13.2.2-1, Construction sites mean silt content %]
W =	7	tons [weighted average vehicle weight]
k =	1.5	lb/VMT [Table 13.2.2-2, for PM_{10}]
k =	0.15	lb/VMT [Table 13.2.2-2, for $PM_{2.5}$]
a =	0.9	constant [Table 13.2.2-2, for PM_{10} and $PM_{2.5}$]
b =	0.45	constant [Table 13.2.2-2, for PM_{10} and $PM_{2.5}$]
$E_{(PM10)}$=	1.59	lb/VMT
$E_{(PM2.5)}$=	0.16	lb/VMT

							Annually	
Vehicle Details	**Vehicle Weight (tons)**	**Maximum Quantity per day**	**Max Daily Onsite Roundtrip Distance per Vehicle (miles/day)**	**Duration (days)**	**Total Vehicle Miles Traveled on Unpaved Roads (VMT)**	**Total Vehicle Miles Traveled * Vehicle Weight (tons)**	**PM10 Emissions (tons)**	**PM2.5 Emissions (tons)**
Staff & Security Truck	2.25	4	1.125	261	1,175	2,643	0.93	0.09
Pickup Truck	4	10	1.125	261	2,936	11,745	2.34	0.23
Water Delivery Truck	30	2	1.125	261	587	17,618	0.47	0.05
Worker Passenger Vehicles	1.25	20	0	261	0	0	0.00	0.00
Total					4,698	32,005	3.74	0.37
					Weighted average vehicle wt	6.81		

(tons)

Notes:

1 - Operation assumed to be 7 a.m. and 7 p.m., Monday through Friday.

2 - The type of vehicle, maximum quantity per day, vehicle weight, and Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day) provided from the K Road Solar Project and modified into assumptions for operation (i.e. 20 workers).

3 - Roundtrip mileage for Max Daily Onsite Roundtrip Distance per Vehicle (miles/day) based on (1) information from draft EIS: 2.5-mile gravel access road connecting the SPGF to the existing paved frontage road adjacent to I-15, and (2) the assumption that the distance per day = 5 miles per roundtrip (on 2.5-mile gravel access road) + 2.5 miles per roundtrip (distance traveled in and out on 1,000 acre site if site is 1.25 miles X 1.25 miles) = 7.5 miles per roundtrip.

4 - Per client, 85% of roads onsite (access roads) are paved, which means 15% are unpaved.

Moapa Solar Operation - On-Road Vehicle Exhaust - Heavy Duty Vehicles

Annual Operation 261 days

					2015 Heavy Duty Vehicle Emission Factors (g/mi)						Annual Heavy Duty Vehicle Emissions (tons)					
Heavy Duty Vehicle Details	**Maximum Quantity per day**	**Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day)**	**Max Daily Onsite Roundtrip Distance per Vehicle (miles/day)**	**Duration (days)**	NOx	CO	SOx	VOC	PM10	PM2.5	NOx	CO	SOx	VOC	PM10	PM2.5
Staff & Security Truck	4	0	7.5	261	11.57	4.61	0.01	0.58	0.70	0.602	0.100	0.040	0.000	0.005	0.006	0.005
Pickup Truck	10	0	7.5	261	11.57	4.61	0.01	0.58	0.70	0.602	0.250	0.100	0.000	0.012	0.015	0.013
Water Delivery Truck	2	0	7.5	261	11.57	4.61	0.01	0.58	0.70	0.602	0.050	0.020	0.000	0.002	0.003	0.003
Total											0.400	0.159	0.000	0.020	0.024	0.021

					2015 Heavy Duty Vehicle Emission Factors (g/mi)			Annual Heavy Duty Vehicle Emissions (tons)			
Heavy Duty Vehicle Details	**Maximum Quantity per day**	**Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day)**	**Max Daily Onsite Roundtrip Distance per Vehicle (miles/day)**	**Duration (days)**	**CO2**	**N2O**	**CH4**	**CO2**	**N2O**	**CH4**	**CO2e (metric tons)**
Staff & Security Truck	4	0	7.5	261	1776.44	0.003	0.03	15.332	0.000	0.000	13.92
Pickup Truck	10	0	7.5	261	1776.44	0.003	0.03	38.331	0.000	0.001	34.80
Water Delivery Truck	2	0	7.5	261	1776.44	0.003	0.03	7.666	0.000	0.000	6.96
Total								61.329	0.000	0.001	55.683

Moapa Solar Operation - On-Road Vehicle Exhaust - Heavy Duty Vehicles – Continued

Heavy Duty Vehicle Details	Maximum Quantity per day	Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day)	Max Daily Onsite Roundtrip Distance per Vehicle (miles/day)	Duration (days)	2015 Heavy Duty Vehicle Emission Factors (g/mi)															
					Benzene	Ethanol	MTBE	1,3-Butadiene	Form-aldehyde	Acet-aldehyde	Acrolein	2,2,4-Trimethyl-pentane	Ethyl Benzene	Hexane	Propion-aldehyde	Styrene	Toluene	Xylene	Naphthalene	PAH (less Naphthalene)
Staff & Security Truck	4	0	7.5	261	0.007	0.002	0.000	0.002	0.043	0.019	0.003	0.002	0.003	0.003	0.002	0.001	0.009	0.008	0.005	0.003
Pickup Truck	10	0	7.5	261	0.007	0.002	0.000	0.002	0.043	0.019	0.003	0.002	0.003	0.003	0.002	0.001	0.009	0.008	0.005	0.003
Water Delivery Truck	2	0	7.5	261	0.007	0.002	0.000	0.002	0.043	0.019	0.003	0.002	0.003	0.003	0.002	0.001	0.009	0.008	0.005	0.003

Heavy Duty Vehicle Details	Annual Heavy Duty Vehicle Emissions (tons)																
	Benzene	Ethanol	MTBE	1,3-Butadiene	Form-aldehyde	Acet-aldehyde	Acrolein	2,2,4-Trimethyl-pentane	Ethyl Benzene	Hexane	Propion-aldehyde	Styrene	Toluene	Xylene	Naphthalene	PAH (less Naphthalene)	Total HAPs
Staff & Security Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
Pickup Truck	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002
Water Delivery Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	0.000	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.88E-03

Notes:

1 - Operation assumed to be 7 a.m. and 7 p.m., Monday through Friday.

2 - Emission factors developed using MOVES. Year 2015 was used.

3 - Heavy duty vehicle emission factors based on the default MOVES national mix of single-unit and combination long- and short-haul trucks for year 2014 travelling at an average speed of 35 mph.

4 - The type of heavy duty vehicle, maximum quantity per day, and Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day) provided from the K Road Solar Project and modified into assumptions for operation.

5 - Roundtrip mileage for Max Daily Onsite Roundtrip Distance per Vehicle (miles/day) based on (1) information from draft EIS: 2.5-mile gravel access road connecting the SPGF to the existing paved frontage road adjacent to I-15, and (2) the assumption that the distance per day = 5 miles per roundtrip (on 2.5-mile gravel access road) + 2.5 miles per roundtrip (distance traveled in and out on 1,000 acre site if site is 1.25 miles X 1.25 miles) = 7.5 miles per roundtrip.

Moapa Solar Operation - On-Road Vehicle Exhaust - Commute Vehicles

Annual Operation 261 days

			2015 Worker Commute Emission Factors (g/mi)						Annual Worker Commute Emissions (tpy)					
Worker Passenger Vehicles	**Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day)**	**Duration (days)**	NOx	CO	SOx	VOC	PM10	PM2.5	NOx	CO	SOx	VOC	PM10	PM2.5
40	100	261	0.629	2.84	0.007	0.120	0.047	0.027	0.724	3.271	0.008	0.138	0.054	0.031

			2015 Worker Commute Emission Factors (g/mi)			Annual Worker Commute Emissions (tpy)			
Worker Passenger Vehicles	**Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day)**	**Duration (days)**	**CO2**	**N2O**	**CH4**	**CO2**	**N2O**	**CH4**	**CO2e (metric tons)**
40	100	261	389.064	0.004	0.007	447.732	0.005	0.008	407.55

			2015 Worker Commute Emission Factors (g/mi)															
Worker Passenger Vehicles	**Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day)**	**Duration (days)**	**Benzene**	**Ethanol**	**MTBE**	**1,3-Butadiene**	**Form-aldehyde**	**Acet-aldehyde**	**Acrolein**	**2,2,4-Trimethyl-pentane**	**Ethyl Benzene**	**Hexane**	**Propion-aldehyde**	**Styrene**	**Toluene**	**Xylene**	**Naphthalene**	**PAH (less Naphthalene)**
40	100	261	0.004	0.003	0.000	0.001	0.002	0.002	0.000	0.002	0.002	0.002	0.000	0.000	0.010	0.008	0.000	0.000

	Annual Worker Commute Emissions (tons)																
Worker Passenger Vehicles	**Benzene**	**Ethanol**	**MTBE**	**1,3-Butadiene**	**Form-aldehyde**	**Acet-aldehyde**	**Acrolein**	**2,2,4-Trimethyl-pentane**	**Ethyl Benzene**	**Hexane**	**Propion-aldehyde**	**Styrene**	**Toluene**	**Xylene**	**Naphthalene**	**PAH (less Naphthalene)**	**Total HAPs**
40	0.004	0.003	0.000	0.001	0.002	0.002	0.000	0.002	0.003	0.002	0.000	0.000	0.011	0.009	0.000	0.000	0.041

Notes:

1 - Operation assumed to be 7 a.m. and 7 p.m., Monday through Friday.

2 - Emission factors developed using MOVES. Year 2015 was used.

3 - Worker commute emission factors are based on the default MOVES national mix of passenger cars and trucks for year 2015 travelling at an average speed of 35 mph.

4 - The type of vehicle, maximum quantity per day, and Max Daily Offsite Roundtrip Distance per Vehicle within general area (miles/day) provided from the K Road Solar Project and modified into assumptions for operation.

Appendix M

Raven Control Plan

Final
Raven Control Plan

Moapa Solar Energy Center

February 2014

Table of Contents

List of Acronyms and Abbreviations

ACEC	Area of Critical Environmental Concern
APLIC	Avian Power Line Interaction Committee
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
CORA	Common Raven
I-15	Interstate 15
kV	Kilovolt
MBTA	Migratory Bird Treaty Act
Mph	Miles per Hour
MW	Megawatt
NDOW	Nevada Department of Wildlife
RCP	Raven Control Plan
ROW	Right of way
SPGP	Solar Power Generation Plant
USFWS	U.S. Fish and Wildlife Service

1. Introduction

1.1 Background

Moapa Solar Power, LLC (Moapa Solar) proposed to construct and operate the Moapa Solar Energy Center (MSEC). The MESC will include a variety of major components, including the Solar Power Generating Facility (SPGF), an onsite substation, a Gen-Tie transmission line, a water pipeline, and access road. The proposed project site is in Clark County, Nevada approximately 20 miles northeast of Las Vegas, Nevada. The MSEC would be located on 850 acres of leased land on the Moapa River Indian Reservation. The associated Gen-Tie Lines and access road would occur on lands administered by the Tribe and by the Bureau of Land Management (BLM). The proposed water pipeline would be located on Tribal lands with a portion of it located within a designated utility corridor administered by the BLM.

This Raven Control Plan (RCP) addresses activities that will occur during construction and operation of the Project regarding control of ravens as a nuisance species. Unless otherwise noted, the construction and operation activities and best management practices described in this RCP apply to all components of the Project.

The desert tortoise (*Gopherus agassizii*) is a federally-listed threatened species known to occur in and proximal to the project area. The proposed project area is not located in designated Critical Habitat for the desert tortoise or in any BLM Area of Critical Environmental Concern (ACEC). This RCP has been developed as a mitigation measure to reduce the effects of common raven (*Corvus corax*:CORA) and other avian predation on the desert tortoise and other native wildlife species as a result of increased human presence, the addition of potential roost and nest site structures, increased availability of water sources and facility operation.

This RCP lists procedures to follow for the protection of wildlife species, such as the desert tortoise, from predation by other species that may be attracted to the Project as a result of construction or operation activities. This RCP is being submitted to the Bureau of Land Management (BLM), Nevada Division of Wildlife (NDOW), United States Fish and Wildlife Service (USFWS), and Bureau of Indian Affairs (BIA) for approval prior to implementation. Once approved, the Applicant will be responsible for implementing the plan for the entire project.

Avian predators such as CORA, loggerhead shrikes (*Lanius ludovicianus*), and American kestrels (*Falco sparverius*) may be drawn to the Project Area (the solar electric power generating facility and the Gen-Tie Line) due to the increase in food sources such as garbage cans and nesting/perching areas such as the site perimeter fence and Gen-Tie Line structures. While the solar generating facility site does not provide habitat for the Desert tortoise, occupied habitat for the desert tortoise is located close to the solar electric power generating facility and within the access roads and the Gen-Tie Line alignments on BLM-managed land. Avian predators drawn to the Project site may forage nearby. An increase in avian predators within a project area is a known secondary negative project effect on the desert tortoise. Implementing this RCP is intended to reduce this potential impact.

1.2 Purpose of this Plan

The purpose of this RCP is to offset direct and indirect environmental impacts to the desert tortoise and other species of wildlife from Project development by implementing specific measures designed to limit wildlife attractions and discourage avian and other scavengers that may prey on wildlife (including sensitive species) in and around the Project area. This includes, but is not limited to, collecting and disposing of all litter and trash found or produced at the solar facility and along the Gen-Tie Line route as well as limiting the availability of water. All employees will be familiar with the RCP, and littering will not be permitted. The project proponent and its approved contractors would be responsible for implementing aspects of this RCP. This RCP is applicable to the construction and operation of the proposed project.

1.3 Project Description

1.3.1 Project Area

The Proposed Project would be located approximately 20 miles northeast of Las Vegas in Clark County, Nevada (**Figure 1**). The main project site, including the Solar Power Generating Facility (SPGF), would be located on 850 leased acres within the Reservation in Mount Diablo Meridian, Township 16 South, Range 64 East, Sections 29, 30, 31,and 32.

Portions of the Gen-Tie Lines and access road would be located on lands administered by the Tribe and BLM. A water pipeline associated with the Project would be located on Reservation lands north and east of the SPGF. **Figure 2** shows the location of the Proposed Project and associated facilities.

The proposed project would occur in the Basin and Range physiographic province in a part of the Mojave Desert. This physiographic province is characterized by the hundreds of long, narrow, and nearly parallel mountain ranges that are separated by deep valleys. These features of the province are visible at the proposed project site, with nearly parallel mountain ranges on the western and eastern sides of the site and a broad and gently sloping valley between. The proposed project site occurs in the Mojave Desert Scrub biome and is dominated by plants common to this biome including creosote bush (*Larrea tridentata*), and white bursage (*Ambrosia dumosa*).

1.3.2 Proposed Project

The following sections describe the major features of the proposed project. For a comprehensive description of the proposed project, refer to the associated environmental impact statement (EIS).

Solar Power Generation Facility

The SPGF would be located wholly on lands within the Reservation. It would be developed using photovoltaic (PV) technology and would generate up to 200 Megawatts (MWs) of energy.

Onsite Substation

A substation with medium voltage (12.5-kV or 34.5-kV) to high voltage (230-kV/500-kV) step-up transformer(s) with mineral oil, breakers, buswork, protective relaying, supervisory control and data acquisition (SCADA), and associated substation equipment would be located on the SPGF. The substation will be fenced for safety per codes, and one or more structures may be outside the fence for meters and control equipment.

The communication system for the substation may include above or below ground fiber optic cable or microwave tower. The project will be interconnected to the regional transmission system from this on-site substation/switchyard via the Gen-Tie interconnections described in subsection below.

Gen-Tie Transmission Line and Interconnections

The construction of a new transmission line is necessary to deliver the power generated by the proposed project to the electrical grid. Two Gen-Tie transmission lines will be constructed to the Harry Allen Substation (via a 230 kV transmission line) and the Crystal Substation (via a 500 kV transmission line) as different entities can be accessed from each location. The 230 kV or 500 kV transmission line will originate at the Project substation located on the SPGF site.

The Gen-Tie Lines would be located on both the Reservation and BLM lands and would consist of the following:

- Approximately 7.3 miles of single-circuit 230-kV overhead transmission line from the SPGF to the Harry Allen 230-kV Substation
- Approximately 1.6 miles of single-circuit 500-kV overhead transmission line from the SPGF to the 500 kV Crystal Valley Substation.

The 230 kV-line to Harry Allen would head south from the SPGF site for approximately 2.5 miles until meeting an existing 500-kV transmission line. The proposed transmission line would then follow, on the north side, the existing transmission line for approximately 3.2 miles and then turn west and southwest for about 1.1 miles to be routed around the Harry Allen 500-kV Substation. Approximately 0.3 mile past the substation, the proposed line would cross an existing 500-kV transmission line at a 90-degree angle and proceed for another 0.5 miles before turning northeast and connecting into the Harry Allen 230-kV Substation on the north side of the substation. This route is approximately 7.3 miles long.

The maintenance road associated with the existing 500 kV line will be used to the extent possible for construction and maintenance of the proposed 230 kV transmission line. The design, construction, operation, and maintenance of the transmission lines will meet requirements of the National Electrical Safety Code (NESC); U.S. Department of Labor, Occupational Safety and Health Standards; and the Resource Management Plan's requirements for safety and protection of landowners and their property. Transmission line design will also be consistent with recommendations for reducing negative impacts of power lines on birds found in *Suggested Practices for Avian Protection on Power Lines: The State ofthe Art in 2006* by Edison Electric Institute and the Avian Power Line Interaction Committee (APLIC 2006), and their more recent publication "*Reducing Avian Collisions with Power Lines* (APLIC 2012).

Access Road

The Project would require vehicular access for construction, operation, and maintenance. A 2.5-mile gravel access road connecting the SPGF to the existing paved frontage road adjacent to I-15 would be constructed on BLM-administered lands. From the existing paved frontage road west of I-15, the proposed site access road would follow an existing dirt road for approximately 2.0 miles until it reaches the proposed 230 kV Gen-Tie transmission line ROW which it would follow approximately 0.5 mile north to the SPGF site.

The access road would be designed to accommodate equipment deliveries, the construction workforce, and, ultimately, the operational needs of the Project. The surface of the road is proposed to be 24 feet wide, would be two lanes, and would have adjacent shoulders and drainage swales on either side. The Applicant has requested a 100-foot-wide ROW so the existing road can be straightened if needed in some places. Final design for the access road would be consistent with BLM and Clark County road standards. The road would be maintained as a component of the Project.

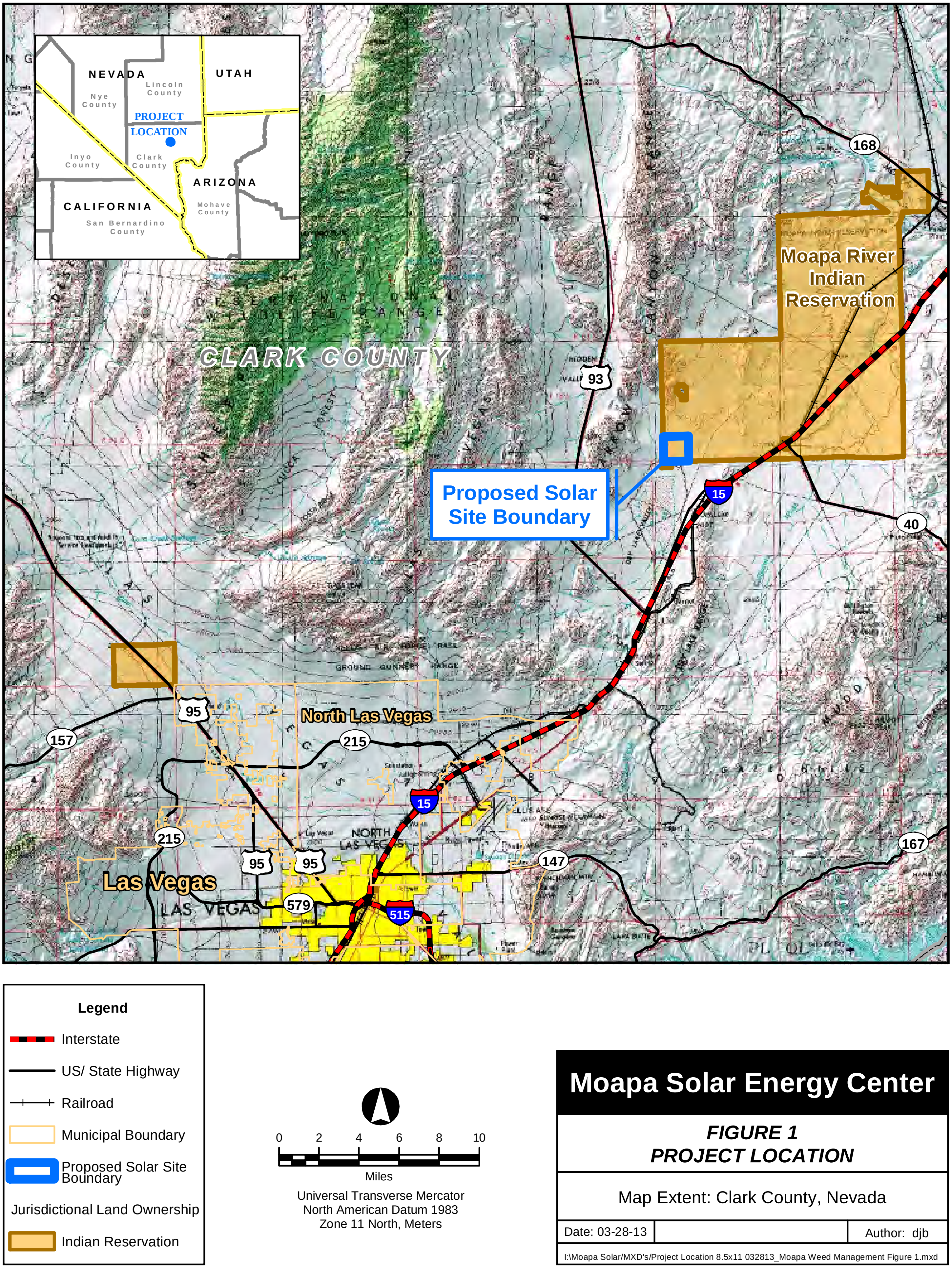
Water Pipeline

Water for the Project would be provided by the Tribe from an existing well located northeast of the SPGF site. It would travel from the southeast corner of the Proposed Project site for approximately 5.4 miles and connect with the existing Reservation well. Water uses for a PV project includes panel washing, service water, potable water, and fire protection. The water pipeline is located entirely on Tribal lands.

Fire Prevention

The Project's fire protection water system will be supplied from a dedicated raw water storage tank, holding a minimum of 2-hours of full flow runtime, located on the SPGF. One electric and one diesel-fueled backup firewater pump will be installed to deliver water to the fire protection water-piping network. Fire protection pump flowrates will be in accordance with applicable standards. A smaller electric motor-driven jockey pump will maintain pressure in the piping network. If the jockey pump is unable to maintain a set operating pressure in the piping network, a main fire protection pump starts automatically. All fire protection system pumps must be shut off manually.

The piping network will be configured in a loop so that a piping failure can be isolated with shutoff valves without interrupting the supply of water to a majority of the loop. Portable fire extinguishers of appropriate sizes and types will be located throughout the plant site.



Universal Transverse Mercator
North American Datum 1983
Zone 11 North, Meters

Moapa Solar Energy Center

FIGURE 1
PROJECT LOCATION

Map Extent: Clark County, Nevada

Date: 03-28-13		Author: djb

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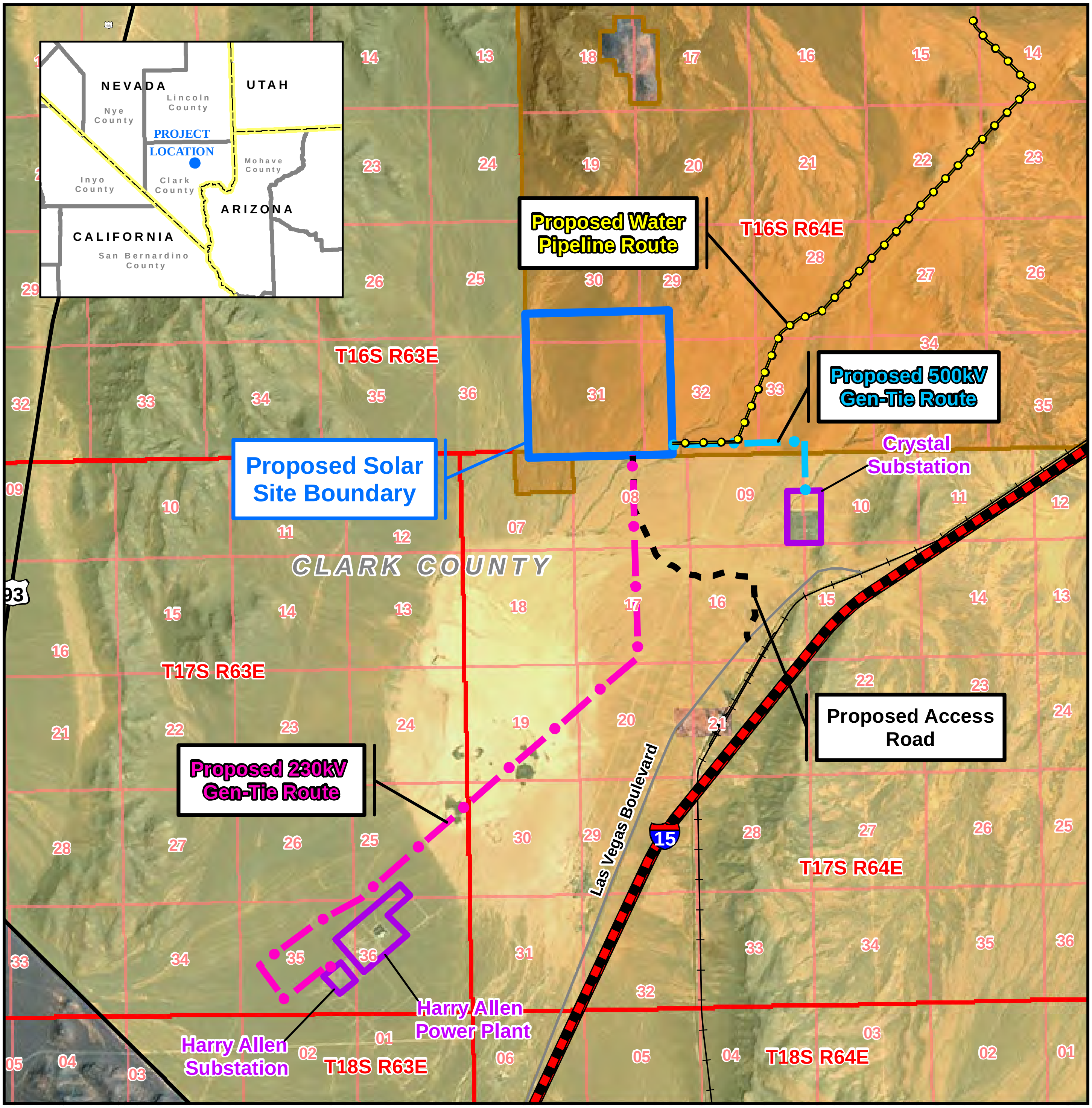
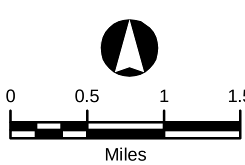


Legend

Interstate	Township/Range Boundary
US/State Highway	Section Line
Local Road	Existing Substation Boundary
Railroad	Proposed Solar Site Boundary
Proposed Water Pipeline	Jurisdictional Land Ownership
Proposed 230kV Gen-Tie	Bureau of Land Management Land
Proposed 500kV Gen-Tie	
Proposed Access Road	Indian Reservation



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Moapa Solar Energy Center

FIGURE 2
PROPOSED PROJECT FACILITIES

Map Extent: Clark County, Nevada

Date: 03-28-13		Author: djb

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2. Raven Management

2.1 Introduction

The raven management measures provided in this section were designed to discourage the presence of common ravens and other avian scavengers by limiting the availability of anthropogenic (human-caused) food and water resources, as well as roost and nest site opportunities on the Moapa SPGF and along the Gen-Tie Line. Implementing the raven management measures will be the responsibility of the Project owner. Responsible parties, including Field Contact Representatives, biological monitors, etc. would be determined with agency approval prior to operation of the Project. References to “ravens” or “CORA” in this RCP should be interpreted to mean ravens and other avian scavengers.

2.2 Prevent Access to Anthropogenic Food and Water Resources

Ravens are opportunistic feeders with a varied diet and are known to make long-distance daily flights of up to 65 kilometers in a single day and several hundred kilometers over multiple days in search of food and water (Engel and Young, 1992; Boarman, 2003). Currently, garbage associated with existing land uses in the nearby town of Las Vegas provides a consistent local source of food for ravens.

Project construction activities and the Gen-Tie structures are likely to attract ravens. To prevent the addition of food and water subsidies, as well as to avoid attracting ravens to the Project site, the Applicant will implement the following measures.

2.2.1 Garbage Management

All garbage associated with the Project during construction and operation will be contained in secure receptacles to prevent the introduction of food resources that could potentially attract or support ravens, coyotes, and other predators or scavengers. Secure, wildlife proof self-closing waste bins will be used during construction for all organic waste. To reduce the possibility of ravens or other scavengers, such as coyotes, from ripping into bags and exposing the garbage, plastic bags containing garbage will not be left out for pickup. All such waste material must be in secure waste bins or dumpsters at all times.

2.2.2 Prohibitions on Intentionally Feeding Ravens

Project personnel will be prohibited from intentionally feeding ravens and other wildlife on and in the vicinity of the Project site. The Worker Environmental Education program will inform project personnel that they are prohibited from intentionally feeding ravens and will explain why feeding wildlife is detrimental to wildlife, including sensitive species, in and around the Project site.

2.2.3 Limit Availability of Water

Water is a valuable resource in the desert and predictably limited during the late spring and summer. Unnatural water sources such as evaporation ponds and retention basins have the potential to facilitate a higher raven population by providing water during the driest times of the year. In order to ensure that Project activities do not create an unnatural water source during construction, operation, maintenance, and decommissioning, water will be used in a manner that does not result in ponding or puddling, excluding evaporation ponds and storm water detention/retention basins, which will be designed to eliminate standing water within the basins within several days after even the worst expected storm events.Truck cleaning areas will be kept free of standing water during construction. Water used for dust suppression during construction will be applied at a rate that discourages ponding or puddling. If PV module washing is necessary, it will be conducted in a manner that avoids ponding or puddling of water during times that ravens are active, which are the early morning and later afternoon hours. During construction and operations and maintenance project personnel will immediately remove areas of ponding or puddling water.

The Proposed Project includes evaporation ponds that will collect wastewater from the water treatment system. The addition of a new water source to an area where water sources are sparse may result in the attraction of ravens to the Project area. Evaporation ponds may collect rainwater during the construction phase, which could serve as an attractant to ravens. Monitoring will evaluate the presence of ravens during construction. If ravens are identified in the evaporation ponds, hazing will be employed to discourage use.

Because the ponds need to remain uncovered to maximize evaporation rates, completely covering the ponds is not a preferred option. However, a series of avian deterrence measures are being incorporated into the design and operation of the evaporation ponds in order to discourage access to the ponds by ravens. The operational design of the ponds would include a minimum depth of 2 feet and a minimum freeboard of 2 feet. If water needs to be rerouted to specific ponds in order to maintain a 2-foot minimum depth, the remaining ponds would be pumped dry. In addition, the interior sides of the ponds would be relatively steep at a 33 percent slope (3:1, horizontal: vertical).

Netting of the ponds may also be implemented if other design measures do not prove to be effective. Other options for preventing use of these ponds by ravens include the use of anti-perching devices placed at strategic locations along the perimeter of the ponds in order to exclude ravens and other birds from accessing the edge of the ponds.

2.3 Prevent Nesting

To prevent nesting on Project structures, the Applicant will implement the following measures:

1. **Limiting Raptor Enhancement Measures.** Utility pole and tower construction will not include raptor-friendly designs or retrofits (outlined in the Avian Power Line Interaction Committee guidelines [APLIC 2006]) that are intended to encourage or enhance the potential for raptor nests that could also be used by ravens.
2. **Utility and building structures.** Acquire a MBTA Depredation Permit in order to remove any raven nests that are found on project structures. Nest removal will be at the direction of the Project's Designated Biologist, in cooperation with U.S. Fish and Wildlife Service (USFWS), BLM and the Nevada Department of Wildlife (NDOW).
3. **Hazing**. Focus on limiting raven attractants rather than hazing. Unless implemented properly, hazing could have unintended consequences. Therefore, hazing will be implemented only under the direction of USFWS in situations where it is considered the best course of action.
4. **Structure removal following decommission.** Elevated structures including utility poles will be removed when decommissioned and dormant.
5. **Perch deterrents.** To reduce perching along segments of the transmission line, perch deterrents would be installed during construction. Anti-perching and nesting devices are important tools for reducing the risk of avian electrocution and keeping the entire electrical system running smoothly. These deterrents also eliminate the use of transmission lines and transmission line towers as hunting perches for raptor species, limiting the predation of other avian species or animals that use surrounding vegetation for foraging and nesting. Exact

locations of perch deterrent poles would be determined in consultation with wildlife agencies prior to construction of the line.

6. **Annual inspections.** Inspections of lines and other areas where raptor or corvids (crows and ravens) might nest along the transmission lines would be conducted annually during the breeding season. Non-active nests are not protected by MBTA, and removal would be conducted prior to the next breeding season. Should nesting activity become a long-term issue, alternate measures to discourage nesting activities should be implemented. Prior to removing or relocating any nests, facility personnel would consult with USFWS and when necessary, proper permissions via USFWS would be obtained. Nests would be removed for the life of the project.

2.4 Discourage Roosting

Power poles and towers typically associated with transmission line structures can provide roosting opportunities in areas where roosting opportunities are otherwise limited. Elevated roost locations offer ravens a view of their surroundings and prey below. If ravens are strongly attracted to the Project site by available food and/or water sources, it will be difficult to eliminate or control perching on Project structures or other nearby structures, such as existing transmission line towers. Ravens can be very persistent, and even if Project design features effectively discourage perching on the Project site or Gen-Tie Lines, ravens attracted to the area will likely find other perching opportunities immediately adjacent to the Project site. Anti-perching activities, therefore, are more focused on preventing activities that will attract ravens to the Project vicinity (Boarman 2002), which include:

- **Roost prevention as a contingency.** To avoid the introduction of new roost and nest locations for ravens (and consequently non-target avian species), the Applicant will ensure perch enhancements are not installed. The SPGF and Gen-Tie Lines will be monitored to identify frequently used line/tower perching locations for CORA. Contingency measures will be implemented on a case-by-case basis, in consultation with BLM, when it becomes apparent that a particular structure is providing a favorable location for daytime perches or evening roosting. This could include, for example, installation of triangles, plastic owls, and/or spikes to discourage nesting, per the APLIC Guidelines (APLIC 2006).

- **Structure removal following decommissioning.** All Project-relatedelevated structures, including the Gen-Tie Line towers, will be removed when the Project is decommissioned.

- **Limit speed limits to under 25 mph.** This would reduce the potential for road kill, which attracts birds and increases roosting.

3. Raven Monitoring and Reporting

3.1 Monitoring

Raven monitoring will be conducted following the construction of the Gen-Tie Line and prior to completion of the SPGF. The objective of the surveys will be to characterize raven presence in the Project vicinity and to monitor abundance and behavior in those areas over time. The purpose of the surveys will be to identify the local sources of human-created resources and raven activity relative to the Project. The investigation will consist of driving surveys of the SPGF and the nearby Gen-Tie Line corridors.

The roads will be driven slowly (10 mph). Binoculars and spotting scopes will be used to observe raven activity within two kilometers of the site. All raven observations will be documented, including date, time, location, habitat, number of individuals, and behavior, as well as locations of occupied and potential nests. Survey visits will occur once monthly during the breeding season (February to August) the year following completion of construction for a total of 3 years and once annually during O&M. Each survey visit will consist of a two day effort. Each day the survey route will be driven once in the early morning (starting 30 minutes prior to sunrise), a second time in the midday (starting between noon and 2 p.m.), and a third time in the evening (completed within one hour following sunset).

If a raven or other avian scavenger nest is located within the Gen-Tie Line ROW, it will be monitored for sign of desert tortoise predation, if accessible. The desert tortoise mortality monitoring will cover a 30-meter radius from the nest location. This area will be walked with 10-meter belt-transects. The location of all desert tortoise carcasses or other sign of predation will be mapped and photographed and reported to the BLM and USFWS within 48 hours if dead tortoises are found. Transects will be walked twice per month for as long as the nest remains active.

Incidental reporting of raven or nest sightings will also occur by biologists on the Project site conducting clearance surveys, monitoring construction activity, monitoring environmental compliance, translocating desert tortoise, and monitoring translocated desert tortoise. Biologists will be instructed to document raven observations during those surveys. Incidental raven or desert tortoise observations will be included in the monitoring reports.

3.2 Reporting

The Applicant will submit monitoring summary reports to the BIA, BLM, NDOW, and USFWS. The report will include:

- The number and behavior of observed ravens
- Raven nest and perch locations
- Results of the management techniques
- The observed effectiveness of the techniques in minimizing raven presence
- Suggestions for improving raven management
- Wildlife mortality attributed to predators

Observations of raven predation of desert tortoise (including sign) and occupied raven nests will be reported to the designated contacts atthe BIA, BLM, NDOW, and USFWS by an electronic mail message within two days of the observation.

3.3 Adaptive Management

The agencies will review the results of raven control efforts and in cooperation with the Project owner will determine if changes in the plan are warranted following the first year of commercial operation of the Project. If the agencies determine that the raven management program is effective, and the potential for ravens to adversely affect the local wildlife population is less than significant, then the raven surveying and reporting requirement may be discontinued. Components of the Raven Control Plan, such as preventing access to anthropogenic food and water resources, preventing nesting, and discouraging roosting will remain effective throughout the lifetime of the Project.

4. References

Avian Power Line Interaction Committee (APLIC). 2006. *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006*. Edison Electric Institute, APLIC, and the California Energy Commission. Washington, D.C. and Sacramento, California.

APLIC. 2012. Reducing Avian Collisions with Power Lines. The State of the Art in 2012. Washington, D.C. and Sacramento, CA: Edison Electric Institute and Avian Power Line Interaction Committee

Boarman, W. I. 2002. *Reducing Predation by Common Ravens on Desert Tortoises in the Mojave and Colorado Deserts*. Prepared for the United States Bureau of Land Management. United States Geological Survey Western Ecological Research Center. San Diego, California.

Boarman, W. I. 2003. Managing a subsidized predator population: reducing common raven predation on desert tortoises. *Environmental Management*. 32:205-217.

Engel, K. A. and L. S. Young. 1992. Movements and habitat use by Common Ravens from roost sites in southwestern Idaho. *Journal of Wildlife Management* 56: 596-602.

Appendix N

Biological Assessment

Biological Assessment for the Moapa Solar Energy Center

November 2013

1 Introduction

This Biological Assessment (BA) has been prepared in accordance with legal requirements set forth under Section 7 of the Endangered Species Act (ESA; 16 United States Code [U.S.C.] 1536(c)) to address potential effects associated with the construction, operation, decommissioning of a solar power generation facility and associated infrastructure known as the Moapa Solar Energy Center (MSEC or Proposed Action") on federally listed threatened and endangered species and their designated critical habitat. This BA addresses the potential effects associated with the construction, operation, and maintenance of the Proposed Action on the desert tortoise (*Gopherus agassizii*; a federally threatened species) and the Moapa dace (*Moapa coriacea*; a federally endangered species).

The Bureau of Indian Affairs (BIA) is the lead federal agency for National Environmental Policy Act (NEPA) compliance and an Environmental Impact Statement (EIS) is being prepared concurrent with this BA. The Bureau of Land Management (BLM) is a cooperating agency on the EIS along with the Environmental Protection Agency (EPA), National Park Service (NPS), U.S. Fish and Wildlife Service (USFWS), and the Tribe.

The MSEC site was selected due to its high solar insolation, relatively flat terrain, and contiguous acreage in close proximity to existing infrastructure. Facilities located within the solar power generation facility (SPGF) boundary would occupy a footprint of approximately 850 acres and would utilize photovoltaic (PV) technology to generate up to 200 MWs of energy. The Project site would include the PV solar field, an office and maintenance building, parking area, lay-down area, switchyard, and a wastewater evaporation/detention pond. The Proposed Action would also include a site access road, two gen-tie transmission lines, and a water pipeline.

1.1 Purpose and Need

1.1.1 Purpose of the Proposed Action

Moapa Solar LLC (The Applicant) has entered into an agreement with the Moapa Band of Paiutes Indians (Tribe) to lease land, up to 30 years, on the Moapa River Indian Reservation (Reservation) for the purposes of constructing and operating a solar generating facility and associated infrastructure (the MSEC). The Tribe is federally recognized and has a Constitution approved by the Secretary of the Interior on April 17, 1942. The tribal lands originally set aside in 1874 consisted of two million acres; in 1876 it was reduced to a thousand acres. Then, in December 1980, Congress added approximately 70,000 acres to the Tribal land base. The current total land base is 71,954 acres and is held in trust by the U.S. government for the Tribe.

The Proposed Action would generate electricity using photovoltaic (PV) technology and would generate up to 200 megawatts (MW) of energy. The Proposed Action would have impacts to resources on the Reservation and on Bureau of Land Management (BLM) land (for rights-of-way). The 850-acre solar generation facility, the water pipeline, and parts of the other linear facilities would be within the Reservation. The ROW impacts on BLM land include two transmission lines (230 kV and a 500 kV), and an access road.

The Proposed Project is dependent upon approval by the Bureau of Indian Affairs (BIA). Pursuant to 25 U.S.C. §415, of the BIA must approve the solar energy ground lease and associated ROW agreements for the transmission line (500kV), and water pipeline on Reservation land between the Tribe and Applicant

(BIA's Proposed Action).

BLM's purpose and need for the Proposed Project is to respond to the Applicant's application under Title V of the Federal Land Policy and Management Act (FLPMA) (43 U.S.C. 1761(a)) for ROW grants to construct, operate, maintain, and decommission electric transmission line(s), water pipeline, and access road ROWs on BLM-administered land and Reservation land (BLM ROW application N-88870). These ROWs would be in compliance with FLPMA, BLM ROW regulations, and other applicable federal law (BLM Proposed Action).

The water pipeline and a portion of the 500 kV line would lie partially within the existing utility corridor managed by BLM but located on the Reservation. This portion of the utility corridor on Reservation land is administered by the BLM in accordance with P.L. 96-491 (the Moapa Utility Corridor and the Moapa Act) and reserved to the BLM under Public Law 96-491-Dec. 2, 1980. The portion of the water pipeline within an existing utility corridor on the Reservation but managed by BLM includes about 4.7 miles and the portion of the 500 kV line to the Crystal substation on Reservation lands includes approximately 1.0 miles.

The BLM Proposed Action also includes BLM approval of the ROW grants under Title V of the Federal Land Policy Management Act (FLPMA) to construct, operate, maintain and terminate the proposed electric transmission lines and access road pursuant to 43 CFR 2800 for the transmission lines and access road on federal lands managed by BLM (also part of BLM ROW application N-88870). The transmission lines would include a 230 kV line crossing about 7.2 miles of BLM land from the Project site to the Harry Allen substation and a 500 kV line that would cross about 0.4 miles of BLM land to the Crystal substation. The proposed access road would cross about 2.4 miles of BLM-administered land connecting the Project site to the I-15 frontage road.

BLM's Proposed Action, if approved, would assist BIA in addressing the management objectives in the Energy Policy Act of 2005 (Title II, Section 211) and Secretarial Order 3285A1 (March 11, 2009) that establishes the development of environmentally responsible renewable energy as a priority for the Department of the Interior. The BLM will decide whether to deny the proposed ROWs, grant the ROWs, or grant the ROWs with modifications. Modifications may include modifying the proposed use or changing the route or location of the proposed ROWs (43 CFR 2805.10(a)(1)).

The water supply required for the Proposed Project would be leased from the Tribe and provided from the Tribe's existing production wells on the Reservation. It would be delivered to the solar generating facility via an underground water pipeline located wholly on the Reservation.

Because the BIA has a jurisdictional trust responsibility over Indian lands and the BLM has land management responsibilities under FLPMA, the Proposed Project is a major Federal action and compliance under the National Environmental Policy Act of 1969 is required. The Tribe, BLM, EPA, and NPS are cooperating agencies on the Proposed Project. The BIA and BLM will use the EIS to make their respective decisions.

1.1.2 Need for the Proposed Action

The primary need for the Proposed Project is creating economic development opportunity for the Tribe as well as providing lease income as a long-term economically viable revenue source, creating new jobs and employment opportunities for Tribal members, and the development of sustainable renewable resources. The Proposed Project would also assist the Federal government, the state of Nevada and neighboring states meet their renewable energy goals by providing clean renewable electricity generation from the Tribe's solar resources that can be efficiently connected to the regional grid in a way that minimizes environmental impacts.

Prior to the 1800s, the Moapa People were a culturally well-adapted people who combined farming with hunting and gathering. They used the resources of the land with great ingenuity. Most domestic objects of their ancestors were various forms of intricately designed basketry, including water jars, winnowing and parching trays, cradle boards, cooking baskets and seed beaters. They had great skill in the use of animal skins and plants. Their knowledge of nutritional and medicinal uses of plants was extensive (Moapa Paiutes, n.d.).

The Tribe identified the solar facility development as meeting its economic development goals, as it would provide much needed revenue to the Tribe, afford employment opportunity, and occupy only a small portion of the Reservation (<1 percent). The Proposed Project would provide long-term economic benefit and employment opportunities for the Tribe and its members through a project that is consistent with the Tribe's tradition of respect for the land and fulfills the purposes for which the 70,000 acres were restored to the Tribe by the Federal Government in 1980 (Moapa Paiutes, n.d.). Also, the use of the Tribe's water by the Project would help the Tribe better establish its rights to this water.

The Reservation was selected as the location of the Proposed Project due to its solar resource, the availability of suitable land, transmission accessibility, and avoids designated conservation areas (i.e., Desert Wildlife Management Areas (DWMAs), Areas of Critical Environmental Concern (ACECs), designated Wilderness Areas, Wilderness Study Areas (WSAs), Land with Wilderness Characteristics (LWC) and other restrictive land use designations).

The site of the Proposed Project would minimize environmental impacts, infrastructure needs, and costs by being located near existing infrastructure, and contribute to the local economy by creating employment opportunities, generating lease income for the Tribe, and encouraging expenditures in local businesses.

The Proposed Project would also help meet the goals of the Federal Government to eliminate or reduce greenhouse gas (GHG) emissions and promote the deployment of renewable energy technologies. Renewable energy produced by the Proposed Project would help reduce the need for older fossil-fuel electric generating facilities including those currently affecting the Reservation which would contribute to the reduction of GHG emissions.

2 Project Description

This section provides a detailed description of the Proposed Action. It describes the various components of the MSEC and includes discussions of the proposed construction process, operations and maintenance procedures, and decommissioning.

The proposed MSEC would consist of a solar power generation facility (SPGF), gen-tie lines that would interconnect the project to the regional electrical transmission grid, an access road between the SPGF and a frontage road along the west side of Interstate 15 (I-15), and a water pipeline. The SPGF and water pipeline would be located entirely on lands within the Moapa River Indian Reservation, the gen-tie lines would be located on both Reservation and BLM-administered lands, and the access road would be located primarily on BLM-administered lands.

2.1 Location and Setting

The Proposed Project would be located approximately 20 miles northeast of Las Vegas in Clark County, Nevada (**Figure 1**). The SPGF would be located on approximately 850 leased acres within the Reservation in Mount Diablo Meridian, Township 16 South, Range 64 East, Sections 29, 30, 31,and 32.

The gen-tie lines and access road would be located on BLM-administered lands south and east of the SPGF site within Township 17 South, Range 63 East and Township 17 South, Range 64 East. A water pipeline would be located on Reservation lands north and east of the SPGF in Township 16 South, Range 64 East. **Figure 2** shows the Proposed Action. The table below provides a summary of the agency lands and jurisdiction associated with the proposed Project.

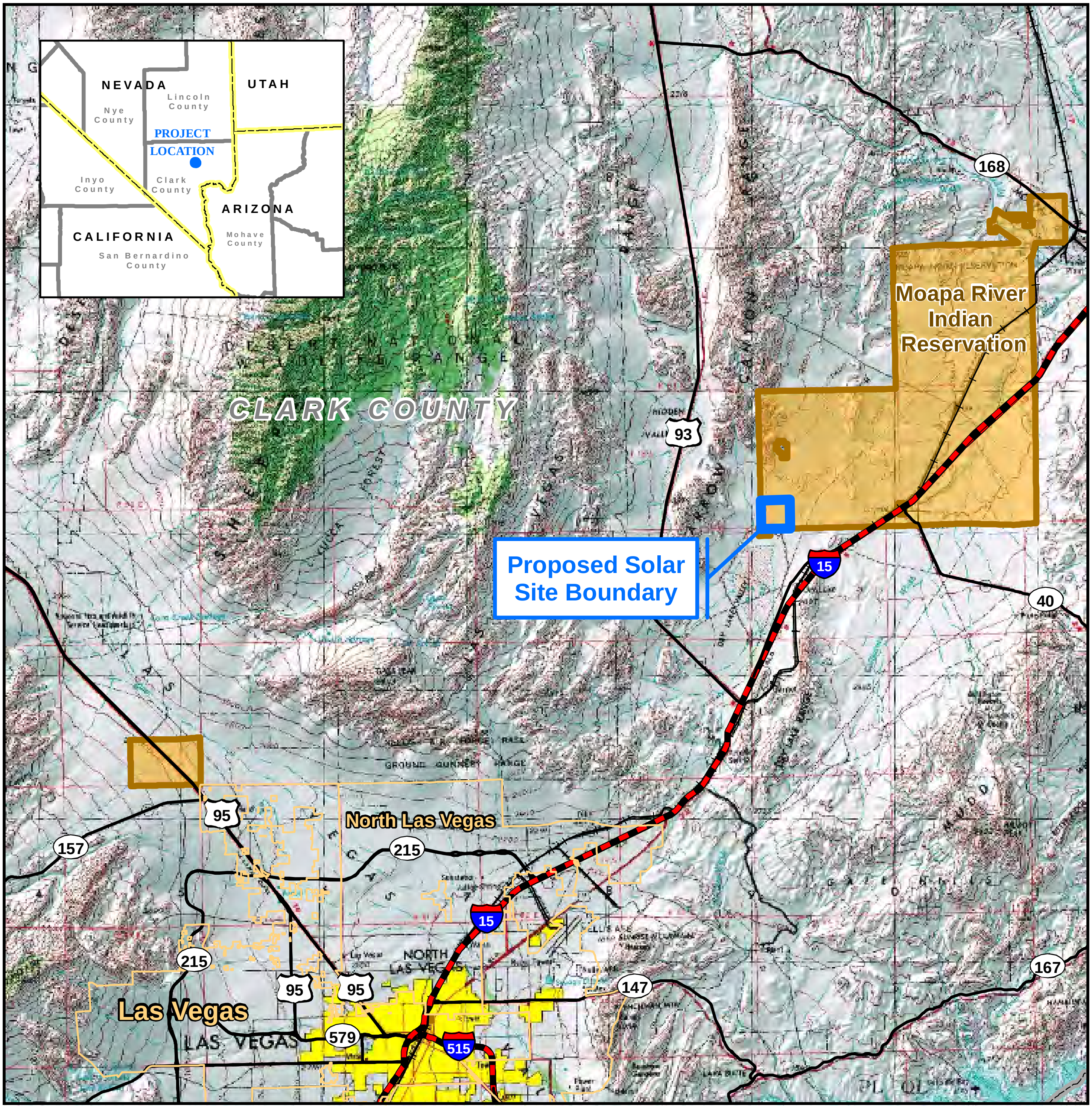
SUMMARY OF AGENCY LANDS / JURISDICTION PROPOSED MSEC PROJECT				
Agency	**Project Component**	**Location**	**Agency Action**	**Acreage/ Mileage**
BIA	SPGF	Reservation	Lease	850 acres
	Water Pipeline	Reservation outside BLM-administered utility corridor	ROW	0.7 mile / 4.2 acres
	230 kV Line	Reservation	ROW	0.1 mile / 1.8 acres
	500 kV Line	Reservation outside BLM-administered utility corridor	ROW	0.2 mile / 3.6 acres
	Access Road	Reservation	ROW	0.1 mile / 1.2 acres
BLM	Water Pipeline	Reservation within BLM-administered utility corridor	ROW	4.7 miles / 28.5 acres
	230 kV Line	Federal lands managed by BLM	ROW	7.2 miles / 132.4 acres
	500 kV Line	Reservation within BLM-administered utility corridor	ROW	1.0 mile / 18.2 acres
		Federal lands managed by BLM	ROW	0.4 mile / 7.3 acres
	Access Road	Federal lands managed by BLM	ROW	2.4 miles / 29.1 acres

2.2 Project Components

The following sections describe the various components of the Proposed Action.

2.2.1 Solar Power Generation Facility (SPGF)

The MSEC SPGF would be located wholly on lands within the Reservation. It would be developed using photovoltaic (PV) technology to generate up to 200 Megawatts (MWs) of energy.



Legend

- Interstate
- US/ State Highway
- Railroad
- Municipal Boundary
- Proposed Solar Site Boundary

Jurisdictional Land Ownership

- Indian Reservation

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Miles

Universal Transverse Mercator
North American Datum 1983
Zone 11 North, Meters

Moapa Solar Energy Center

FIGURE 1
PROJECT LOCATION

Map Extent: Clark County, Nevada

Date: 03-28-13		Author: djb

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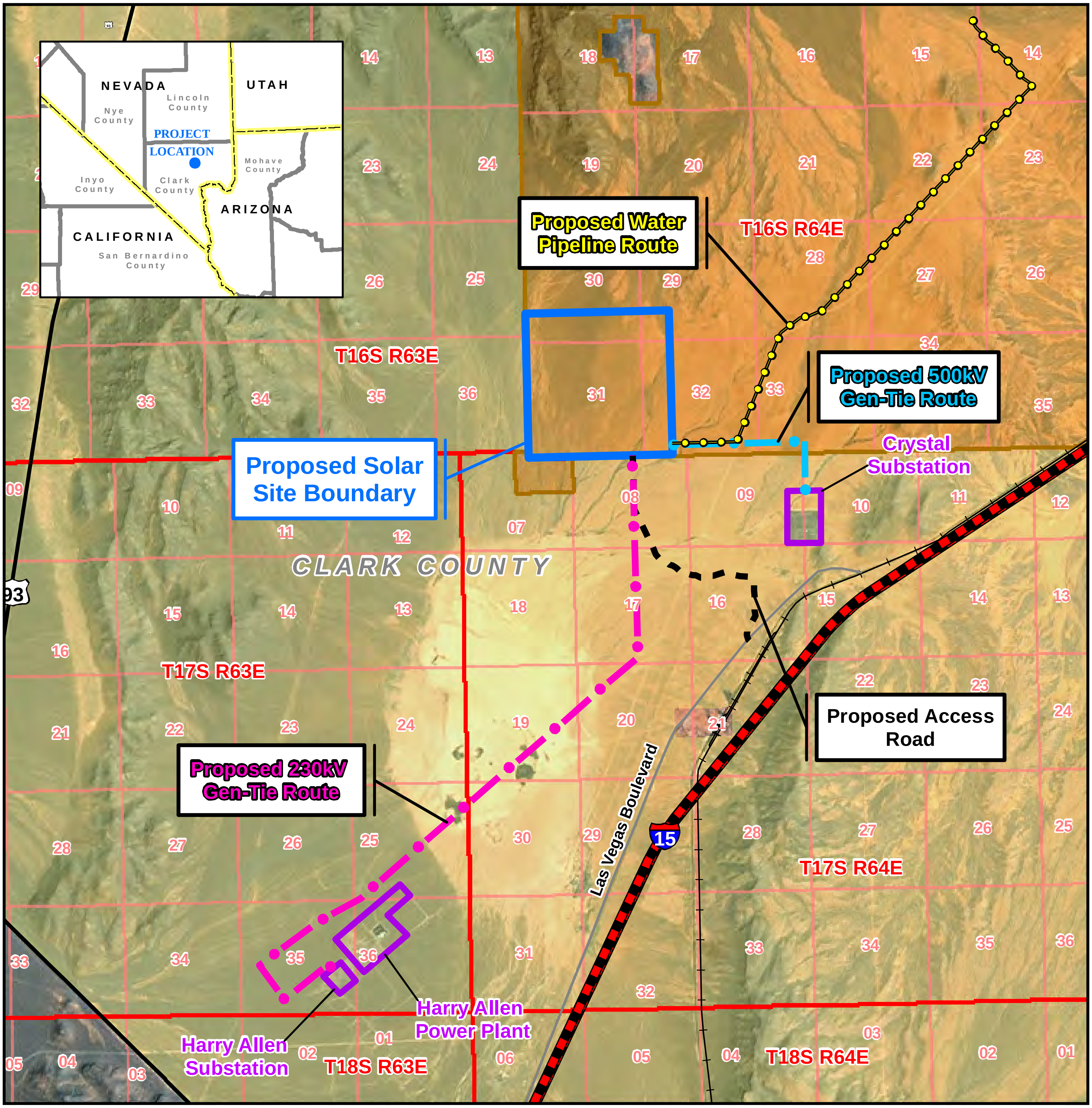

Legend

- Interstate
- US/State Highway
- Local Road
- Railroad
- Proposed Water Pipeline
- Proposed 230kV Gen-Tie
- Proposed 500kV Gen-Tie
- Proposed Access Road
- Township/Range Boundary
- Section Line
- Existing Substation Boundary
- Proposed Solar Site Boundary

Jurisdictional Land Ownership

- Bureau of Land Management Land
- Indian Reservation

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Miles

Universal Transverse Mercator
North American Datum 1983
Zone 11 North, Meters

Moapa Solar Energy Center

FIGURE 2
PROPOSED PROJECT FACILITIES

Map Extent: Clark County, Nevada

Date: 03-28-13		Author: djb

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2.2.1.1 PV Solar Technology

Background

Solar PV technology converts sunlight directly into direct current (DC) electricity. The process starts with PV cells that make up photovoltaic modules. There are several types of PV solar cells. The two major types of cells are wafer-based silicon cells and thin-film cells. A number of solar cells electrically connected to each other and mounted in a single support structure or frame is called a module. Several modules can be wired together to form an array and arrays can be connected in both series and parallel electrical arrangements to produce any required voltage and current combination.

The DC from the array is collected at inverters where the DC is converted to alternating current (AC). The voltage of the electricity is increased by a transformer at each inverter. Medium voltage electric lines (underground and/or overhead) are used to collect the electricity from each transformer and transmit it to the facility substation, where the voltage is further increased by a high voltage transformer to be transmitted to the electric grid.

Solar Field

The proposed PV project would be up to 200 MW in size and would utilize crystalline silicon or thin-film PV panels that would be mounted on single-axis trackers. Using single-axis trackers, the panels will be oriented in north-south rows with the panels moving to track the sun as it moves across the sky during the day.

The highest point on the single axis-trackers would be about 6 to 12 feet occurring during the morning and evening hours when the panels are tilted to face the rising or setting sun. This is based on a 2 or 3-panel mounting system. The degree of tilt will change over the course of each day for the single-axis trackers. The PV units will be mounted on driven pile foundations to support the panel mounting system. The electrical equipment (inverters and transformers) will be in enclosures or covered by shade structures approximately 8 to 10 feet high.

The Project will also include one or more small meteorological monitoring stations to track solar insolation, temperature, wind direction, and speed. These stations will have a height of approximately 10 feet.

Operations and Maintenance Area

An Operations and Maintenance (O&M) building would be developed on the site that would contain administrative offices, parts storage, a maintenance shop, plant security systems, and plant monitoring equipment with adjacent worker parking. The O&M building will likely consist of one or more single story buildings with a maximum height of approximately 18 feet. The building will have exterior lighting on motion sensors and will have fire and security alarms.

Water Use/Water System

The PV Project would be expected to use up to 30 acf/y. Water will be provided to the Project by the Tribe from an existing well located on Reservation lands north of the SPGF site. Water from the developed well will be piped to the site via the pipeline described below.

Two (2) onsite raw water storage tanks will provide 12-hours of water supply to the facility. A portion of one (1) tank will be dedicated to the fire protection water system.

Water Supply/Pipeline

Water for the Project would be provided to the Project by the Tribe from an existing well located in Section 15 about 5.4 miles northeast of the SPGF site. It would be delivered to the SPGF site via a water pipeline. The pipeline would originate at the well and would follow existing roads and ROWs from the well to the SPGF site. **Figure 2** shows the proposed location of the water pipeline.

The water pipeline would be 8 to 12 inches in diameter and would be buried below the ground surface.

Wastewater Management

The Project will generate wastewater streams including neutralized wastewater from the ion exchange pretreatment system. Process wastewater will be piped to lined, evaporation ponds that will be located within the fenced SPGF site. The ponds will be sized to retain all solids generated during the life of the Project. However, if required for maintenance, dewatered residues from the ponds will be sent to an appropriate offsite landfill as non-hazardous waste. The evaporation pond would cover up to 5 acres and would be located entirely within the fenceline of the SPGF. The evaporation ponds will be designed to minimize the amount of discharge and to provide best management and control of the discharge. To eliminate avian and bat use of the evaporation ponds, the ponds would be covered with bird proof netting.

2.2.1.2 Project Support Systems

The following project support systems would be developed for the Project and would be located entirely within the SPGF.

Site Substation

A substation with medium voltage (12.5-kV or 34.5-kV) to high voltage (230-kV/500-kV) step-up transformer(s) with mineral oil, breakers, buswork, protective relaying, supervisory control and data acquisition (SCADA), and associated substation equipment would be located within the SPGF. The substation will be fenced for safety per codes and one or more structures may be outside the fence for meters and control equipment. The communication system for the substation may include above or below ground fiber optic cable or microwave tower. The project will be interconnected to the regional transmission system from this on-site substation/switchyard via the gen-tie interconnections described in subsection below.

Fencing

The SPGF perimeter will be secured with a minimum 8-foot tall, chain link metal-fabric security fencing with 1-foot barbed wire or razor wire on top. Controlled access gates will be located at the SPGF entrance. Permanent desert tortoise exclusionary fencing would also be installed around the perimeter of the SPGF and would comply with USFWS standards for tortoise fencing.

Fire Protection System

The Project's fire protection water system will be supplied from a dedicated raw water storage tank, holding a minimum of 2-hours of full flow runtime (amount to be determined during final design), located on the SPGF site. One electric and one diesel-fueled backup firewater pump will be installed to deliver water to the fire protection water-piping network. Fire protection pump flowrates will be in accordance with applicable standards. A smaller electric motor-driven jockey pump will maintain pressure in the piping network. If the jockey pump is unable to maintain a set operating pressure in the piping network, a main fire protection pump starts automatically. All fire protection system pumps must be shut off manually.

The piping network will be configured in a loop so that a piping failure can be isolated with shutoff valves without interrupting the supply of water to a majority of the loop. Portable fire extinguishers of appropriate sizes and types will be located throughout the plant site.

Security

As mentioned above, the SPGF site will be fenced with a chain-link security fence. Site security will be provided via a small guard station provided at the gated access point to the site. Security cameras will be deployed throughout the site and monitored at the guard station and remotely by a security service at night. Lights, triggered by motion sensors and powered by station power with backup battery power, will also be installed at each entry gate and at each inverter.

Perimeter signage will also be provided and installed at intervals along the perimeter fence stating, in both English and Spanish, the following: “Danger, Keep Out!”, and “Hazardous Voltage Inside”.

Lighting

The Project’s lighting system will provide operation and maintenance personnel with illumination for both normal and emergency conditions near the main entrance and the Project substation. Lighting will be designed to provide the minimum illumination needed to achieve safety and security objectives and will be downward facing and shielded to focus illumination on the desired areas only. There will be no lighting in the solar field. Therefore, light trespass on surrounding properties will be minimal. If lighting at individual solar panels or other equipment is needed for night maintenance, portable lighting will be used.

Erosion Control and Stormwater Drainage

The Project Site will be graded as needed to provide the required clearances for construction and operation of the solar field. Where grading is not necessary, vegetation will be trimmed as needed to allow the surface soils and local drainage to be left undisturbed. The stormwater collection system, including interception ditches, the collection ditch, retention ponds, and all ancillary facilities will be designed to meet applicable standards.

The majority of the site will continue to be drained by sheet flow to on- and off-site drainages. Areas of the facility that have the potential for release of contaminates, such as the O&M building, delivery areas, and paved roads will be provided with storm water containment that will be directed to an on-site retention basin. The basin will be designed to accommodate runoff from a 100-year storm event.

Erosion on the site will be controlled through the implementation of best management practices that will be detailed in stormwater pollution prevention plans (SWPPPs) that will developed for the construction and operational phases of the project.

Spill Prevention/Containment

Local area containments will be provided around certain locations, such as oil-filled transformers and chemical storage areas, in order to prevent water that may come in contact with oil or chemicals from leaving the site. The water from these areas and from other plant drains will be collected and sent to an onsite oil-water separator. The oil-free water would be added to the plant water and oil-water separator waste would be hauled offsite to an appropriate treatment facility.

A spill prevention control and countermeasure plan (SPCC) will be prepared to meet the requirements of the regulations administered by the EPA.

2.2.2 Gen-Tie Transmission Line and Interconnections

The construction of new gen-tie transmission lines is necessary to deliver the power generated by the MSEC to the electrical grid. Two gen-tie transmission lines will be constructed - one to the Harry Allen Substation (via a 230-kV transmission line) and the other to the Crystal Substation (via a 500-kV transmission line) as different entities can be accessed from each location. The 230-kV and 500-kV transmission lines will originate at the Project substation located on the SPGF site.

The gen-tie lines would consist of the following:

- Approximately 7.3 miles of single-circuit 230-kV overhead transmission line from the SPGF to the Harry Allen 230-kV Substation.
- Approximately 1.6 miles of single-circuit 500-kV overhead transmission line from the SPGF to the 500-kV Crystal Valley Substation

The 230-kV line to Harry Allen would head south from the SPGF site for approximately 2.0 miles until meeting an existing 500-kV transmission line. The proposed transmission line would then follow, on the north side, the existing transmission line for approximately 3.3 miles and then turn west and southwest for about 1.1 miles to be routed around the Harry Allen 500-kV Substation to accommodate its planned future expansion. The maintenance road associated with the existing 500 kV line would be used to the extent possible for construction and maintenance of the proposed 230 kV transmission line. Approximately 0.3 mile past the substation, the proposed line would cross the existing 500-kV transmission line at a 90-degree angle and proceed for another 0.5 mile before turning northeast for another 0.4 miles and connecting into the Harry Allen 230-kV Substation on the north side of the substation (**Figure 2**).

The design, construction, operation, and maintenance of the transmission lines will meet requirements of the National Electrical Safety Code (NESC); U.S. Department of Labor, Occupational Safety and Health Standards; and the Resource Management Plan’s requirements for safety and protection of landowners and their property. Transmission line design will also be consistent with recommendations for reducing negative impacts of power lines on birds found in *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* and *Reducing Avian Collisions with Power Lines* by Edison Electric Institute and the Avian Power Line Interaction Committee (APLIC 2006, 2012).

The Project is considering the steel monopole type of transmission structures for the 230-kV line to the Harry Allen Substation. These structures for the 230-kV line would range in height from 60 feet to 100 feet. The structures for the 500-kV line to the Crystal Substation would also be steel monopoles.

2.2.3 Access Road

The Project would require vehicular access for construction, operation, and maintenance. A 2.5-mile gravel access road connecting the SPGF to the existing paved frontage road adjacent to I-15 would be constructed on BLM-administered lands.

From the existing paved frontage road west of I-15, the proposed site access road would follow an existing dirt road for approximately 2.0 miles until it reaches the proposed 230-kV gen-tie transmission line ROW which it would follow approximately 0.5 mile north to the SPGF site (**Figure 2**).

The access road would be designed to accommodate equipment deliveries, the construction workforce, and, ultimately, the operational needs of the Project. The roadway section would consist of two travel lanes, 24 feet wide with 5-foot shoulders and drainage swales on either side. The Applicant has requested a 100-foot-wide ROW so the existing road can be straightened if needed in some places. Final design for the access road would be consistent with BLM and Clark County road standards. The road would be maintained by the Project.

2.3 Construction

2.3.1 SPGF Construction

2.3.1.1 Grading/Site Preparation

Prior to the initiation of Project construction, the SPGF site will be surveyed and staked. Preconstruction survey work would consist of locating the site and right-of-way boundaries, the locations of proposed facilities, and the centerlines of linear features, and access roads. Intensive field surveys would also be conducted prior to construction to determine the presence of cultural resources and special-status species within potentially affected areas. These surveys would be initiated following site survey and marking. Prior to the initiation of any preconstruction surveys, the necessary survey permits for rights-of-entry would be obtained from the BLM or the Tribe (if necessary).

After all staking and surveying is complete, vegetation would be removed from the SPGF site where needed prior to grading. This removed vegetation will be handled in accordance with a plan that will be prepared in consultation with the Tribe and BIA. It will either be hauled off-site for disposal or possibly used to create wildlife habitats on off-site lands.

The SPGF site will be graded as needed to facilitate the construction and operation of the PV tracking system. Any needed grading would take advantage of the existing slope of the site, while eliminating any abrupt grade changes. Where grading is not needed, vegetation would be trimmed if needed to allow installation and operation of PV tracking system. This will allow those areas to retain the local undisturbed soil surface and local drainage. The final grading and drainage plan would be in compliance with all applicable stormwater standards and BMPs for erosion control.

2.3.1.2 Construction Sequencing

Construction of the SPGF, from site preparation and grading to commercial operation, will be expected to take 18 months. This schedule is conceptual and subject to change, including potential acceleration, depending on market conditions within the regional power markets.

Construction will generally occur between 7 a.m. and 7 p.m., Monday through Friday. Additional hours may be necessary to make up schedule deficiencies, or to complete critical construction activities. For instance, during hot weather, it may be necessary to start work earlier to avoid pouring concrete during high ambient temperatures.

The construction phases of the Project are expected to be as follows:

- **Clearing—**Vegetation removal for installation of the SPGF facilities will be completed only as necessary to advance ahead of equipment installation, but conducted to minimize the amount of disturbed ground surface at any one time.

- **Parking and Laydown**—Parking areas for construction workers and laydown areas for construction materials will be prepared inside the solar field area. Detailed information regarding the location of the laydown and parking areas within the solar field will be developed after a contractor is hired to construct the facility.
- **Access Road**—Construction access road beds will typically be 24 feet wide and surfaced with gravel, with 5-foot-wide crushed rock shoulders.
- **Site Grading**—Because of the relatively flat topography at the site, relatively minimal volumes of soil would be moved as a result of grading.
- **Module Installation**—The solar modules will be assembled and erected at an onsite erection facility.
- **Balance of Plant (BOP)**—With the major equipment in place, the remaining field work will be, electrical, and smaller component installations.
- **Testing and Commissioning**—Testing of subsystems will be done as they are completed. Modules will be tested once all supporting subsystems are installed and tested.
- **Site Stabilization**—Disturbed areas will be stabilized during construction to minimize wind and water erosion and fugitive dust by watering and/or use of dust palliatives. Permanent roads will be either paved or graveled. Cleared and graded surfaces that will not be subject to future disturbance will be revegetated. Revegetation will be conducted as soon as practicable, based on seasonal weather conditions, to maximize revegetation success.
- **Demobilization**— All temporary fabrication and construction facilities will be removed from the site once construction is complete.

2.3.1.3 Site Access and Traffic

All equipment, permanent materials, and commodities for the Project will be transported to the site via rail and/or local highways. Any heavy equipment will be shipped via rail to the nearest active railroad spur for offloading and transported by truck to the Project site. All equipment and material deliveries will utilize the site access route.

On-site roads will be surfaced with asphalt, aggregate base, or left surfaced with the native soil and treated with a dust palliative (only BLM approved palliatives would be used). The roads that are expected to see heavy use will be surfaced with asphalt; the primary roads within the solar fields will be surfaced with aggregate base; and the secondary roads within the solar fields will be graded native soils treated with dust palliative to minimize dust.

There is currently little traffic on any of the roads bordering or in the immediate vicinity of the project. The use on these roads is associated with the nearby energy infrastructure in the area. Construction of the Project is expected to take up to 24 months. Daily trip generation during construction of the project would be generated by delivery of equipment and supplies and the commuting of the construction workforce. The number of workers expected on the site during construction of the Project would vary over the construction period and is expected to average up to approximately 300 each day, generating about 100 daily round trips. Deliveries of equipment and supplies to the site would also vary over the construction period but are expected to average about 10 to 20 daily trips. All project related parking will be onsite during construction, moving within the solar field as it is developed.

2.3.2 Gen-Tie Construction

Mobile construction equipment access would be required at each transmission structure. The Project would likely use a combination of new and existing access roads, and spur roads to place construction equipment at each structure.

To access the ROW, construction vehicles would use the existing access road off the existing paved unnamed frontage road adjacent to I-15 going to the Harry Allen and Crystal Substations. This primary access road is maintained by NV Energy and minimal to no improvements would be necessary to facilitate gen-tie construction.

Existing secondary access roads would be used to access the ROW where possible. Once within the ROW, spur roads maybe used to access structure locations. The secondary access and spur roads are not routinely maintained and at some locations may require minimal improvements; they could be up to 12 feet wide. Typical improvements would consist of minor grading and possibly limited addition of road base or rock in areas to allow safe vehicle travel. If used, spur roads would be staked and flagged. To the extent possible, drainages would be crossed at grade. Standard road design techniques such as installing water bars and dips to control erosion may be used in sloped areas as necessary.

2.3.2.1 Geotechnical Testing

Geotechnical investigations are needed to determine the site soil conditions and to provide geotechnical engineering data for the foundation design of the proposed gen-tie lines. Right of entry and geotechnical field work would require limited access to locations along the gen-tie routes.

Prior to final design of the lines, analysis of soil borings must be conducted along the proposed alignment to establish the design parameters for structural foundations. Up to ten test locations would occur at proposed structure locations mostly on BLM land. The testing process begins with field survey staking of each test location. This will be done from a standard light-duty pickup truck and a one or two-person survey crew. Test locations will be marked with wooden stakes and flagged. Once marked, a two or three-person drilling crew will collect samples via a truck-mounted drill rig at various depths along the boring. Samples collected from the borings will be analyzed to determine soil classification, moisture content, density, depth to groundwater and other characteristics. Each boring will be approximately 6 inches in diameter and 50 feet deep.

Work areas surrounding each geotechnical boring location that would be needed for construction equipment, vehicles, and personnel during geotechnical activities will be confined to a 30 x 40 foot area. After each test boring is completed, the spoils will be hand-backfilled into the boring hole and lightly compacted. After backfill, the test location will be smoothed and hand-graded as necessary to return the area to the pre-test grade.

2.3.2.2 Structure Site Clearing

Adequately sized work areas would be required at each structure location to safely operate construction equipment and conduct construction activities (approximately 160 by 200 feet for 230 kV structures and 200 by 200 feet for 500 kV). In typical flat terrain, a work area would not be required outside the permanent ROW for cranes to erect structures except at turning structure locations. Each conductor pulling and tensioning work area would require an additional work area. The following describes the temporary work areas anticipated for each gen-tie line:

- 500kV Line – An estimated eight structures would be required, each having a 200 foot by 200 foot work area. Two 200 foot by 600 foot pull sites would be required along with the access road paralleling the line.
- 230kV Line – Up to 51 structure locations are estimated to be required, each having a 200 foot by 160 foot work area. Approximately six 100 foot by 200 foot pull sites would be needed and access to structure locations would be required by existing and new adjacent access roads.

Dead-end structures may be required in areas where the transmission line turns at a large angle or crosses major obstacles such as large valleys, or in areas where the line ends. Two areas may be required at each dead-end structure to provide adequate space for vehicle turnaround.

Each dead-end and angle structure would be stabilized with either screw-anchor or plate-anchor guy wires. Plate anchors would be installed where soil stability is inadequate for screw-in anchors. Plate anchors would require trench excavation and potentially vegetation clearing. The number and location of dead-end structures will be determined during transmission line engineering and design.

Vegetation at each structure location and work area would be cleared only to the extent necessary as required to maintain safe working conditions at each location. Grading would not be conducted unless needed to provide a safe work area for equipment. Following construction, surface disturbance at work areas and structure locations on BLM-administered lands would be rehabilitated using seed mixtures and techniques developed in consultation with BLM. Surface disturbance on Tribal lands would be rehabilitated according to Tribal specifications. Permanent surface disturbance at structure locations would be minimized.

2.3.2.3 Hole Excavation and Foundation Installation

Power equipment would be used to excavate holes for installing transmission structures. In extremely sandy areas, soils may be stabilized with water or gelling agents approved by the USFWS prior to and during excavation. Where soil conditions permit, a vehicle-mounted power auger would be used. In rocky areas, holes may be excavated by drilling. The need for blasting is not anticipated. Holes for guy-wire anchors would be dug with a backhoe.

Excavated materials would be stockpiled in the work area and used for backfill following structure placement. Backfill would be compacted with hydraulic or pneumatic compaction equipment. Excess backfill soil would be spread onsite or removed to an approved disposal area if required.

Concrete anchor-bolt foundations are expected to be used only with steel structures. Cast-in-place foundations would be used to install concrete foundations. The cast-in-place foundations would be installed by placing reinforcing steel and anchor bolt clusters into the foundation hole, positioning the anchor bolt cluster, and encasing it in concrete. Spoil material would be used for fill where suitable. The foundation excavation and installation would require a power auger or drill, crane, material trucks, and concrete trucks. Where concrete is required, concrete truck chutes would be washed at the structure location in an excavated depression within the work area. Inactive open excavations would be temporarily guarded with high-visibility plastic fencing.

2.3.2.4 Temporary Work Areas

Transmission line construction would require several types of temporary work areas defined by function and location:

- Material storage, construction staging, and laydown
- Transmission structure installation
- Conductor pulling and tensioning

After completing construction, temporary work areas on BLM-administered lands would be rehabilitated using seed mixtures and techniques developed in consultation with BLM. Noxious weed control would continue onsite during the rehabilitation process according to the specifications stipulated by BLM. The prevention of weedy and exotic species invasion would be addressed throughout construction. The weed management plan that was developed for the Project would be followed to minimize impacts from weed species. Temporary work areas located on Tribal lands would be rehabilitated according to Tribal specifications.

2.3.2.5 Transmission Structure Hauling, Assembly, and Erection

Conventional construction methods would be used to haul, assemble, and erect the transmission structures. Trucks would be used to transport materials to each structure location. Structure materials would include:

- Steel and wooden poles
- Steel cross arms
- Insulators
- Hardware
- Stringing sheaves

Steel structures would be assembled onsite and hoisted into place with a crane. In contrast, wooden poles would be placed in holes by the crane and then assembled.

It is estimated that construction of the transmission line would occur over a period of approximately 4 to 6 months.

2.3.3 Access Road Construction

The proposed access road would include both upgrades to existing roads and development of new sections of road. Construction of the access road would be conducted using the proposed techniques identified below and discussed in the following subsections. Any significant modifications to the proposed construction techniques described in this section that arise during construction on BLM lands will be approved by the BLM prior to implementation to determine potential impacts and appropriate mitigation measures. The primary construction activities and areas of potential impact will be confined to the proposed road ROW.

Coordination with existing ROW grant holders for the existing access roads will be conducted and affected agencies would be consulted before construction begins.

The existing roads would be widened and sections of new road would be constructed using a bulldozer or grader. Front-end loaders would be used to move the soil locally. The road surface would be widened or developed to 24 feet and a 5-foot shoulder would be constructed on each side to facilitate drainage and to blend into the adjacent topography.

Following grading, the surface 12 inches of the subgrade of the road would be scarified and moisture-conditioned and compacted by a roller to compact and smooth the ground surface. Approximately 14 inches of Class 2 road base would be placed above the compacted subgrade and it also would be moisture-conditioned and compacted.

After project construction, this upgraded permanent access road would be used to provide access to the SPGF and also continue to be used by the existing road users who have ROWs from the BLM. The construction contractor selected to build this Project will be required to submit a specific Access Road Use Plan. The plan would address continued use of the existing roads by the current ROW grant holders. The installation of culverts and other road improvement amenities would be reviewed and addressed on a site-by-site basis.

Disturbed areas where vegetation was removed during construction activities and that are no longer needed for future operation and maintenance will be restored in a manner consistent with BLM and Tribal requirements to encourage natural revegetation.

2.4 Proposed Operation and Maintenance

2.4.1 Solar Project

Operation and maintenance activities associated with the PV Project are minimal. The Project is expected to require up to 20 personnel during operations. Daily operation of the plant begins when there is sufficient sunlight to begin operation of the solar trackers. The panels will be facing east in the morning and rotate on the single axis to follow the sun throughout the day. In the evening, the trackers will be rotated back to the east using power from the electrical grid so that the panels are once again in position to receive the morning sun.

Maintenance and administrative staff typically work 8-hour days, Monday through Friday. Security and some maintenance staff will be on site on a 24-hour basis. Periods when non-routine maintenance or major repairs are in progress, the maintenance force may work longer hours and contract labor may be utilized as necessarily.

No heavy equipment will be used during normal plant operation. Operation and maintenance vehicles will include trucks (pickups, flatbeds, and dump trucks), forklifts, and loaders for routine and unscheduled maintenance, and occasionally water trucks for solar panel washing. Large heavy-haul transport equipment may be brought to the site infrequently for equipment repair or replacement.

2.5 Decommissioning

The Project would operate at a minimum for the life of its Power Purchase Agreement (PPA) or other energy contracts. It is possible, because much of the needed electrical infrastructure will have been developed, the SPGF would continue to be upgraded and used to generate solar energy even beyond the term of the initial energy purchase agreements. Therefore, it is possible that the SPGF site would remain in solar energy production for the foreseeable future.

If the Project were to be decommissioned, the solar field, support structures, and electrical equipment would be removed from the SPGF site and it would be revegetated with native species to a condition similar to the original condition of the Site.

A restoration and revegetation plan would include the following information:

- Goals and objectives of the plan
- Methods to be used to achieve site restoration
- Criteria to be used to determine the success or failure of the restoration
- Monitoring and maintenance of the site during and periodically after restoration
- What facilities and access routes are to be removed, reclaimed, and or restored
- How facilities and access routes would be removed, and the disturbed areas restored
- The time of year the facilities and access routes would be removed and restored
- Noxious weed control during rehabilitation
- Stabilization and reclamation techniques to be used during restoration
- Annual reporting procedures
- Restoration implementation and monitoring schedule

2.6 Avoidance, Minimization, Mitigation, and Monitoring

The following sections summarize measures being proposed by the Applicant to avoid, minimize, and/or compensate for the potential impacts of the Proposed Action on federally listed species. These measures may be modified and/or supplemented based on discussions with the various permitting agencies (i.e., during the consultation process with USFWS or during the NEPA process with the BLM and BIA).

2.6.1 Construction Monitoring

The Applicant will provide construction monitoring under the direction of biologists approved by the USFWS. The biologists will be given authority to supervise the functions listed below.

- Oversee establishment and functionality of sediment control devices as outlined in the Storm Water Pollution Prevention Plan (SWPPP). Ensure that Best Management Practices (BMPs) are in place and working properly on a weekly basis.
- Awareness training for desert tortoise will be provided to everyone onsite (performed by qualified personnel only).
- Biologists will monitor the construction activities daily during the initial site disturbance (including installation of temporary and permanent desert tortoise exclusion fencing) and at weekly intervals after all tortoises have been removed from the site. Biologists shall be onsite daily to respond to tortoise issues. Exclusionary fencing will be checked monthly and after any substantial rain event to ensure that they are effective barriers for desert tortoise.
- Implement controls at entry locations to facilitate weed management and invasive species control in order to minimize infestation within the Action Area from an outside source. Trucks and other large equipment would be randomly checked before entering the site for any invasive species debris or seed.

2.6.2 Focused Mitigation for Desert Tortoise

The following conservation measures will be performed by the Applicant.

- A permanent perimeter of tortoise-exclusionary fencing will be constructed around the solar facility boundary. Pre-construction clearance surveys to remove tortoises from the construction area will be conducted following USFWS protocol (2010). Construction of the exclusionary fence will be monitored by a qualified biologist in order to eliminate impacts to tortoise burrows or live tortoises. The fence shall be maintained in accordance with Service standards. Tortoise guards shall be placed at all road access points, where desert tortoise-proof fencing is interrupted, to exclude desert tortoises from the road and solar facility.

- Biological monitors to monitor the various construction crews in the active construction areas will be assigned until 100% tortoise clearance is confirmed. Biological monitoring would also occur during access road improvements and gen-tie and water pipeline construction in occupied desert tortoise habitat.
- The Applicant will pay a fee based on acreage of disturbance to the Tribe for disturbance of Tribal lands and to the BLM for disturbance of BLM lands. The fees will be assessed at a rate to be determined by the Tribe, BLM, and Service who will agree upon how the funds will be spent prior to initiation of consultation and included in the proposed action for the Biological Opinion. Funds will be used to implement conservation measures established in the Reservation-wide desert tortoise management and conservation plan prepared for the KRoad Moapa Solar Project and approved by the Tribe, BIA, and Service.
- A biological monitor will be present during maintenance activities if occurring outside of the perimeter fence. Pre-maintenance clearance surveys followed by temporary exclusionary fencing may also be required in desert tortoise habitat, if the maintenance action requires ground or vegetation disturbance.
- Speed limits within the Action Area will be restricted to less than 25 miles per hour (mph) during construction and operation. Speed limit signs will be posted along the access road. Lower speed limits may be imposed to protect tortoises if determined necessary by the USFWS.
- Lighting will be focused in toward the solar facility and downward to avoid lighting habitats beyond the Action Area perimeter.
- Any trenches or excavations would be covered if left overnight or have escape ramps to allow wildlife to safely exit.
- A Raven Control Plan (RCP) will be prepared for the project. This plan will prescribe the following measures to limit the impacts of common ravens and other avian scavengers on desert tortoise:
    - Monitoring for the presence of ravens and other potential human subsidized predators of special status wildlife will be conducted.
    - BMPs to discourage the presence of ravens onsite include trash management, elimination of available water sources, designing structures to discourage potential nest sites, use of hazing to discourage raven presence, and active monitoring of the site for presence of ravens.
    - If ravens are seen building nests, this nesting material would be removed prior to an egg being laid.
    - To minimize activities that attract prey and predators during construction and operations, garbage will be placed in approved containers with lids and removed promptly when full to avoid creating attractive nuisances for wildlife. Open containers that may collect rainwater will also be removed or stored in a secure or covered location to not attract birds.
- A Weed Management Plan, which must be approved by the BIA, BLM, and the Tribe will be implemented prior to the initiation of ground disturbing activities. Mitigation measures in the

Weed Management Plan include: worker awareness training; limiting ground disturbance to designated areas only; maintenance of vehicle wash and inspection stations and close monitoring of materials brought onto the site to minimize the potential for weed introduction; re-establishment of native vegetation in disturbed areas to prevent weeds from colonizing newly disturbed areas; and, regularly scheduled monitoring to quickly detect new infestations of weeds, coupled with rapid implementation of control measures to prevent further infiltration.

- A designated field contact representative (FCR) will be assigned to the construction phase of the solar project components; additional FCRs will be assigned for the linear project components including the transmission line and water pipeline,
- Desert tortoises will be relocated to BLM-managed lands or Tribal lands following the Terms and Conditions in the Biological Opinion issued by the USFWS. Reporting of relocations and other information pertaining to desert tortoise will be completed per the Terms and Conditions in the Biological Opinion issued by the USFWS. Desert tortoise relocation would be considered a take and will require an incidental take authorization from the USFWS.
- If a tortoise is injured as a direct or indirect result of project activities, it shall be immediately transported to a veterinarian or wildlife rehabilitation facility.
- Tortoises within the solar facility footprint will be translocated to secure areas outside the fence as approved by the USFWS. The disposition of displaced desert tortoises will be evaluated and reported on following the Terms and Conditions of the Biological Opinion.
- Any project-related activity that may endanger a desert tortoise shall cease if a desert tortoise is found on the project site. Project activities may resume after an authorized desert tortoise biologist removes the desert tortoise from danger or after the desert tortoise has moved to a safe area.
- The Applicant and Tribe will coordinate to salvage and relocate cacti, yuccas, and shrubs on linear ROWs and plant them back on temporarily disturbed portions of the ROWs similar to the efforts undertaken on adjacent BLM lands. If the Tribe chooses to salvage plants from the solar facility, these plants may be held in a nursery or other temporary holding location until needed; no monitoring is required for these plants.
- All work area boundaries will be conspicuously staked, flagged, or otherwise marked to minimize surface disturbance activities. All workers, equipment, vehicles, and construction materials shall remain within the ROW, existing roads, and designated areas. Staging areas will be located in previously-disturbed areas whenever possible.
- The Applicant will develop a habitat restoration plan to be implemented for all temporary disturbances associated with construction of the project to be approved by the BIA, BLM (for disturbance of BLM land), Tribe, and the USFWS.
- The Tribe will implement the Reservation-wide desert tortoise conservation plan that was required under Term and Condition 5.h. in the K Road Moapa Solar Project.

2.6.3 Focused Mitigation for Moapa Dace

The following conservation measures will be performed by the Applicant.

- Water use will be minimized to the extent possible during construction and operation of the Project.

3 Environmental Baseline

3.1 Biological Setting

The Action Area is located within the Mojave Desert approximately 20 miles north of Las Vegas, Nevada, largely within the Moapa River Indian Reservation. The Mojave Desert is cooler and wetter than the Sonoran Desert to the south and warmer and drier than the high-elevation Great Basin Desert to the north (Brown 1994).

The Mojave Desert occupies portions of southeastern California, southern Nevada, southwestern Utah and northwestern Arizona. The Mojave Desert region, and the area surrounding the Action Area specifically, displays typical basin and range topography.

The Mojave Desert is characterized by the creosotebush – white bursage plant community and Joshua trees (*Yucca brevifolia*) at the higher elevations; considered an indicator species for this desert (Gucker 2006). The desert is believed to support between 1,750 and 2,000 species of plants.

The Mojave Desert receives less than 13 inches (254 mm) of rain a year and is generally between 3,000 and 6,000 feet (910 and 1,800 m) in elevation. The Mojave Desert is an area with temperature extremes and four distinct seasons. Winter months bring temperatures dipping to below 20°F (-7°C) on valley floors, and below 0°F (-18°C) at higher elevations. Storms moving from the Pacific Northwest can bring rain and snow across the region — more often, the rain shadow created by the Sierra Nevada as well as mountain ranges within the desert such as the Spring Mountains result in storms that bring only clouds and wind. In longer periods between storm systems, winter temperatures in valleys can approach 80°F (27°C).

3.1.1 Vegetation Communities Present

Vegetation within the Action Area is composed primarily of Mojave Desert creosote bush scrub as defined by Holland (1986) classification of plant communities. Disturbed areas, both within and adjacent to the Action Area, are associated with multiple dirt roads and less impacted off road vehicle trails, adjacent railroad and interstate highway (to the east) and adjacent transmission line and natural gas line corridors (to the north and west). **Table 1** lists the acreages of the various vegetative cover types occurring within the project area.

Table 1 – Vegetative covertypes within the Project area – SPGF site and Linear ROWs.

Project Component	Vegetative Covertype	Acreage
SPGF	Creosotebush-White Bursage	817.6
	Disturbed	2.5
	Xeroriparian	29.8
	TOTAL	**849.9**
230kV ROW	Creosotebush-Cactus/Yucca	52.8
	Creosotebush-White Bursage	37.4
	Disturbed	2.4
	Mesquite	2.8
	Playa Lake	22.1
	Saltbush	10.4
	Xeroriparian	6.3
	TOTAL	**134.2**
500kV ROW	Creosotebush-White Bursage	25.8
	Disturbed	1.6
	Xeroriparian	0.3
	TOTAL	**27.7**
Proposed Access ROW	Creosotebush-White Bursage	23.9
	Disturbed	3.5
	Xeroriparian	2.7
	TOTAL	**30.1**
Alt Access ROW	Creosotebush-White Bursage	26.4
	Disturbed	4.8
	Xeroriparian	0.8
	TOTAL	**32.0**
Pipeline ROW	Creosotebush-White Bursage	21.4
	Disturbed	10.4
	Xeroriparian	0.7
	TOTAL	**32.5**
PROJECT AREA TOTAL		**1106.4**

3.1.1.1 Creosotebush Series

Creosotebush-White Bursage

This community is dominated by creosotebush shrubs (*Larrea tridentata)* and white bursage (*Ambrosia dumosa)*, 0.5-3m tall, widely spaced, usually with bare ground between. Many species of ephemeral herbs may flower in late March and April if the winter rains are sufficient. This plant community is usually found on well drained secondary soils with very low water-holding capacity on slopes, fans, and valleys.

Other, less numerous species of annuals appear following summer thundershowers. This creosotebush scrub is typical of the Mojave Desert. Nearly the entire SPGF and most of the gen-tie transmission routes, access road, and water pipeline are covered by this vegetation community.

Creosotebush-Cactus/Yucca

Creosotebush-Cactus/yucca is also present and concentrated near the south end of the 230-kV gen-tie line. Cactus species observed during the biological surveys were the barrel cactus (*Ferocactus acanthodes*), beavertail cactus (*Opuntia basilaris*), cottontop cactus (*Echinocactus polycephalus*), hedgehog cactus (*Echinocereus engelmannii* var. *chrysocentrus*), pencil cholla (*Opuntia ramosissima*), silver cholla (*Opuntia echinocarpa*), grizzlybear prickly pear (*Opuntia polyacantha* var. *erinacea*), and teddybear cholla (*Opuntia bigelovii*). Most cacti were concentrated in ephemeral washes as well as on a sloping bajada near the Harry Allen Substation.

Xeroriparian

Xeroriparian habitats were associated with the several small washes that cross the various portions of the project area. These habitats generally resembled the Creosotebush-white bursage habitats but had a higher overall density of vegetation as well as a greater abundance of big galleta grass. Other species included cholla, cheesebush (*Hymenoclea salsola*) and ephedra (*Ephedra* sp.).

3.1.1.2 Saltbush

Approximately 10.4 acres of saltbush occurs within the ROW of the 230-kV gen-tie line and is found at the margins of the playa lake. These areas include small but monotypic stands of saltbush (*Atriplex* sp.) and form the transition between the surrounding upland habitats and the playa lake.

3.1.1.3 Playa Lake

The 230-kV gen-tie transmission line crosses a large playa lake. This habitat type consists of unvegetated habitats with highly compacted soils. This lake is likely subject to ephemeral flooding following large precipitation events.

3.1.1.4 Mesquite

Several small mesquite bosques are located within the perimeter of the playa lake. These areas represent monotypic stands of mesquite (*Prosopis* sp.) with no understory species.

3.1.1.5 Disturbed

Disturbed habitats include all areas with little or no native vegetation as a result of anthropogenic disturbance. These areas include existing roads, transmission line pole sites, pipeline right-of-ways and other areas that have been significantly altered.

3.2 Soils

Typical of soils in arid environments, local soils are poorly developed and shallow, almost completely absent in some areas. In general, the local soils are typically only four inches deep and rarely more than 18 inches in depth over an underlying caliche layer.

The 1,000-acre SPGF site contains two soil series - the Grapevine series which covers approximately 95 percent and the Ireteba series that makes up the remaining 5 percent. Soils where the proposed gen-tie transmission line corridors, access road and water pipeline are located include the Anthony, Bard, Mormon Mesa, St. Thomas, and Tonopah series.

3.2.1 Soil Series Descriptions

The U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) soil survey maps (USDA NRCS 2006) were used to determine the soil information for the Action Area.

3.2.1.1 Anthony Series (Af)

The Anthony series consists of very deep, well drained soils formed in stratified alluvium. Anthony soils are on alluvial fans and floodplains and have slopes of 0 to 15 percent. Vegetation is creosotebush, white bursage, cacti, palo verde, bush muhly, spike dropseed, Pima pappusgrass, fourwing saltbush and annual forbs and grasses.

3.2.1.2 Bard Series (BHC, BMD, BNB, BRB)

The Bard series consists of shallow soils over cemented material, well-drained soils that formed in alluvium derived predominantly from limestone and dolomite with some sandstone and quartzite. The Bard soils are on dissected valley fill terraces, alluvial fans and fan remnants. Slope ranges from 0 to 15 percent. The vegetation is mainly creosotebush, white bursage, annual buckwheat, cholla, and other cacti.

3.2.1.3 Glendale Series (Gs)

The Glendale series consists of very deep well drained soils formed in stratified alluvium. Glendale soils are on alluvial fans, flood plains, and stream terraces and have slopes of 0 to 5 percent. Glendale soils are used for livestock grazing and irrigated cropland. The present vegetation is creosotebush, mesquite, palo verde, ironwood, salt cedar, cacti, annual forbs and grasses.

3.2.1.4 Grapevine Series (Gv)

The Grapevine series consists of deep, well-drained, fine sand soils that formed in mixed alluvium with some gypsum. Grapevine soils occur on fan piedmonts and alluvial flats. Elevations are 1,700 to 3,600 feet and slopes range from 0 to 15 percent. The soil surface is covered by approximately 10 percent gravel. The present vegetation is mainly creosotebush, white bursage, and Indian ricegrass.

3.2.1.5 Ireteba Series (Ir, It)

Ireteba soils occur on the smooth, nearly level lower margins of alluvial fans and in flat basins. The slope gradients are commonly less than 0.2 percent, but may include slopes up to 1 percent. They have developed in loamy alluvium derived from mixed rock sources including assorted volcanic and sedimentary rocks. Vegetation consists mainly of creosotebush, white bursage, and desert sage. The plant density is about 2 percent.

3.2.1.6 Mormon Mesa Series (MOB)

The Mormon Mesa series consist of shallow over petrocalcic, well drained soils that formed in material influenced by calcareous loess over mixed alluvium from predominantly limestone sources. The Mormon Mesa soils are on summits of fan remnants and mesas. Slope ranges from 0 to 15 percent. The vegetation is scattered white bursage, yucca, and creosotebush with some big galleta and Indian ricegrass.

3.2.1.7 St. Thomas Series (RTF)

The St. Thomas series consists of very shallow and shallow, well drained soils that formed in residuum and colluvium derived from limestone and dolomite. The St. Thomas soils are on hills and mountains. Slope ranges from 2 to 75 percent. The present vegetation is mainly creosotebush, white bursage, big galleta, and indian ricegrass.

3.2.1.8 Tonopah Series (CTC, THB, TMB)

The Tonopah series consists of very deep, excessively to well-drained soils that formed in mixed alluvium. Tonopah soils are on fan remnants and fan piedmonts. Slope ranges from 0 to 15 percent. The present vegetation is mainly creosotebush and white bursage.

3.3 Water Resources

The Proposed Action lies in a northeastern portion of the Mojave Desert in the internally drained Garnet Valley (Dry Lake Valley) groundwater basin within the watershed of the Colorado River. To the west and north, the area is bound by Paleozoic limestone outcrops that are the limits of the Arrow Canyon Range. The area is flanked to the east by the North Muddy Mountains that are the extent of the California Wash drainage basin. The Moapa Valley lies to the northeast. To the southeast, the main course of California Wash flows northeast to the Muddy River. The elevation within the site ranges from about 1,960 feet to 2,080 feet above sea level.

3.3.1 Surface Water

A field investigation conducted in May 2010 identified seven ephemeral drainages and one playa in the Action Area. No surface water was identified within the drainage features or within the playa feature.

Ephemeral drainages provide natural distribution of water and sediments, recharge of groundwater in the area, and a sporadic but local water supply for wildlife. A playa is defined as the flat-floored bottom of an undrained desert basin that becomes at times a shallow lake. Playas collect water from drainages or precipitation and collected surface water typically evaporates leaving deposits of salt or gypsum on the soil surface (CH2M Hill 2010). The ephemeral drainages all drain into the California Wash located approximately 3 miles east of the Action Area on the east side of I-15. The Action Area does not contain or drain to a wild and scenic river (Wild & Scenic River Council 2009). The SPGF site is not within the FEMA 100-year floodplain; however the gen-tie transmission lines connecting to the Harry Allen Substation would cross a 100-year floodplain.

3.3.2 Ground Water

The Proposed Action is in the Colorado River Basin Region of Nevada's Hydrographic Regions. The Colorado River Basin is one of the larger hydrographic regions in Nevada, covering 5,612 square miles and includes 27 hydrographic areas. The Action Area is located in and around the area called Arrow Canyon Range Cell. The hydrogeology of the Arrow Canyon Range Cell is recognized as unique yet poorly understood in terms of detailed documentation. Seven groundwater management basins are superimposed on the Arrow Canyon Range field. The Arrow Canyon Range Cell is composed of a series of north-south trending structural blocks related to extensional faulting that are almost entirely composed of Paleozoic carbonate rock (K Road FEIS 2012). As mentioned earlier, the Action Area is located within the California Wash hydrographic basin, which is an unconsolidated sand and gravel aquifer.

The basin is a westward-thickening section of Paleozoic carbonate rocks, in part unconformably overlain by generally fine-grained sediments of the Muddy Creek Formation (Longwell et al. 1965; Bohannon 1983). The carbonate-rock terrain that constitutes the Arrow Canyon Range Cell incorporates both recharge areas and one major spring discharged area, and is bounded by generally less permeable basin or bedrock lithologies. The California Wash Basin around the Action Area is around 5,000 feet thick (K

Road FEIS 2012). Regional patterns of precipitation combined with terrain elevation results in the highest mountain ranges receiving the majority of precipitation that becomes recharge. The carbonate terrain is efficient in retaining a relatively high percentage of precipitation as recharge.

Groundwater data from several Reservation monitoring and test wells in the vicinity of the Action Area indicate the static water level ranges in depth from 354 to 526 feet below the surface and the wells yielding over 1,000 gallons per minute (gpm; K Road FEIS 2012). Pump and step- drawdown testing of the carbonate aquifer yielded a range of transmissivity of 50,000 to 100,000 ft./day, hydraulic conductivity of 20 ft./day and specific yield (Sy) of 0.03 to 0.008 (K Road FEIS 2012).

3.4 Topography/Geology

The Action Area is located in the Dry Lake Valley basin in the northeastern portion of the Mojave Desert. It lies within the Basin and Range Region of the southwestern U.S. with topography that is characterized by linear, north and south trending valleys and normal fault-block mountain ranges resulting from extension of the Earth's crust. The climate is typically semi-arid and deserts form in the rain shadows of linear mountain ranges. Precipitation, which drains to interior closed basins results in the formation of evaporite playa lakes, such as Dry Lake Playa in the southern portion of the Action Area (Benson and Darrow 1981; Longwell et al. 1965).

The mountains which border the Dry Lake Valley include the Arrow Canyon Range to the west, and the Dry Lake Range to the east. The Arrow Canyon Range is composed primarily of carbonate rocks of the Bird Spring Formation that are Ordovician to Permian in age (Longwell et al. 1965; Stewart and Carlson 1977). Elevations across the Action Area range from approximately 1,960 feet to 2,080 feet.

4 Description of Species

Only one federally listed species under the ESA was documented within or near the MSEC: the desert tortoise (*Gopherus agassizii*). **Section 4.2** lists details of the implemented survey protocol and the results. Moapa dace are endemic to the Muddy River, located approximately 12 miles north of the Proposed Action. The Muddy River and associated springs would be in the area of effects for groundwater pumping associated with the Proposed Action. Other species considered for analysis are described in **Section 4.1**.

No Designated Critical Habitat for any listed plant or animal species occurs within the Action Area, though critical habitat units for the desert tortoise occur approximately 2.5-4 miles west of the Action Area on the west side of the Arrow Canyon Range.

4.1 Endangered, Threatened, Proposed, or Candidate Species removed from further consideration

A total of 13 species listed under the ESA were considered for analysis: three (3) candidates for listing, two (2) species listed as threatened, and eight (8) species listed as endangered. All species except for the desert tortoise and Moapa dace were considered to be absent from the site, no suitable habitat was present on site, or the species' habitat is far removed from the Proposed Action and would not potentially be affected by groundwater pumping. This section contains an account of each species that was excluded from further analysis.

4.1.1 Pahrump Poolfish

Pahrump poolfish (*Empetrichthys latos*) was listed Endangered in its entire range on March 11, 1967 (32 FR 4001). Originally called the Pahrump killifish, this species is a member of the Goodeidae family. This species reaches about 5.1cm at maturity, and is omnivorous, feeding on a wide variety of available plant and animal material. The Pahrump poolfish has been extirpated from its native range (a single headwater spring) and is only known from two transplant springs, one of which (Corn Creek Springs) is within Clark County, approximately 25 miles west of the Action Area. This spring is not within the area of effects for the proposed groundwater water withdrawals. Therefore, the Pahrump poolfish is excluded from further analysis.

4.1.2 Lahontan Cutthroat Trout

Lahontan cutthroat trout (*Oncorhynchus clarki henshawi*) was listed Endangered on October 13, 1970 (35 FR 16047 16048), reclassified as Threatened on July 16, 1975 (40 FR 29863 29864). A Recovery Plan for the species was approved on January 30, 1995. The Lahontan cutthroat trout is an inland subspecies of cutthroat trout belonging to the Salmonidae family. Stream-dwellers generally live less than 5 years, and lake-dwellers live between 5 and 9 years. Lahontan cutthroat trout range between 10 and 15 inches in length, and feed on terrestrial and aquatic insects. The species is native to the Lahontan Basin in northwestern Nevada; there is an introduced population of Lahontan cutthroat trout in Carpenter Canyon approximately 49 miles southwest of the Action Area. This watershed is not within the area of effects for the proposed groundwater water withdrawals. Therefore, the Lahontan cutthroat trout is excluded from further analysis.

4.1.3 Woundfin

The Woundfin (*Plagopterus argentissimus*) was listed Endangered on October 13, 1970 (35 FR 16047

16048), Critical Habitat listed on January 26, 2000 (65 FR 4140 4156). Its Recovery Plan was approved on April 19, 1995. Woundfin is a member of the Cyprinidae family. The woundfin is considered the most highly specialized species in the genus Plagopterini (Miller and Hubbs 1960). The species rarely achieves a standard length of more than 3-inches. Woundfin are opportunistic omnivores, and will feed on filamentous algae, detrital material, tamarisk seeds, and insects depending on availability. The woundfin's current distribution is limited to the mainstem of the Virgin River from Pah Tempe Springs downstream to Lake Mead. The species is believed to be extirpated form the Moapa (Muddy) River. The Virgin River is not within the area of effects for the proposed groundwater water withdrawals. Therefore, the woundfin is excluded from further analysis.

4.1.4 Virgin River Chub

Virgin River Chub (*Gila seminude*) was listed Endangered on August 24, 1989 (54 FR 35305- 35311). The Recovery Plan was approved on April 19, 1995. The Virgin River Chub is a subspecies of *Gila robusta* of the Cyprinidae family, and is considered the rarest native fish in the Virgin River. It is silvery, medium-sized, and is typically 20 cm, but can grow up to 45 cm. Riverine habitat for the Virgin River chub typically includes areas of slow to moderate flow with deep runs or pools where large boulders or root snags provide instream cover.

The Virgin River chub historically occurred in the Virgin River from La Verken Springs, Utah, downstream to the confluence of the Virgin River with the Colorado River in Nevada (USFWS 1995). Presently, this species is known to occur in the Virgin River from La Verken Springs, Utah, downstream to the Mesquite Diversion in Nevada. The Virgin River chub is also known to occur in the Muddy River, but this separate population is not listed as endangered.

The Virgin River (and, thus, the only listed portion of the Virgin River chub population) is not within the area of effects for the proposed groundwater water withdrawals. Therefore, this species is excluded from further analysis.

4.1.5 Bonytail Chub

Bonytail chub (*Gila elegans*) was listed Endangered (45 FR 27710 27713, 1980 April 23) with Critical Habitat (59 FR 13374 13400, 1994 March 21). The Recovery Plan was completed September 4, 1990. The body of an adult bonytail chub is highly streamlined; a greenish-grey, dusky color on its back with silvery sides, and a white belly. The bonytail chub may reach up to 24 inches in length and weigh over 2 pounds. The closest known population of bonytail chub is in Lake Mohave, approximately 66 miles south of the Action Area. Lake Mohave is not within the area of effects for the proposed groundwater withdrawals. Therefore, the bonytail chub is excluded from further analysis.

4.1.6 Razorback Sucker

Razorback sucker (*Xyrauchen texanus*) was listed Endangered (56 FR 54957 54967, 1991 October 23) with Critical Habitat (59 FR 13374 13400, 1994 March 21). The Recovery Plan was completed December 23, 1998. The razorback sucker, also known as the humpback sucker, is a member of the Catostomidae family. The species can grow more than 2 feet in length, weigh more than 6 pounds, and live 40+ years. Examination of stomach contents of adult razorback suckers from Lake Mohave indicates that the species is a benthic feeder, whose diet includes planktonic crustaceans, diatoms, filamentous algae, and detritus (USFWS 1991). The razorback sucker is known to occur in Lake Mead, approximately 23 miles east of the Action Area. Water withdrawals may affect flows within the Muddy

River, which flows into Lake Mead. However the reduction of flows within the Muddy River compared to the amount of water within Lake Mead would be negligible; therefore, the razorback sucker is excluded from further analysis.

4.1.7 Yuma Clapper Rail

The Yuma clapper rail (*Rallus longirostris yumanensis*) was listed as an endangered species on March 11, 1967 (32 FR 4001). The Recovery Plan was finalized in 1983 and portions of the Action Plan were initiated over the ensuing years. The Yuma clapper rail is one of the smaller subspecies of clapper rail, with adult males standing eight inches tall and weighing 266.8 grams on average (Todd 1986). Females are slightly smaller. Adult Yuma Clapper Rails of both sexes are similar in plumage; they possess a long, slender bill and long legs and toes compared to body size (Todd 1986).

The present range of the Yuma clapper rail in the U.S. includes portions of Arizona, California, and Nevada. The Yuma clapper rail lives in freshwater marshes dominated by cattail (*Typha* sp.) and bulrush (*Scirpus* ssp.) with a mix of riparian tree and shrub species (*Salix exigua*, *S. gooddingii*, *Tamarix* sp., *Tessaria serica*, and *Baccaris* sp.) along the shoreline of the marsh (Eddleman 1989). No habitat for this species occurs within the Action Area. This species is known to occur along the Muddy River within the Overton Wildlife Management Area. While groundwater withdrawals may result in insignificant reductions in flow in the Muddy River, the magnitude of effects would be too small to affect Yuma clapper rail habitat (e.g., hydrophytic vegetation).. Therefore, the Yuma clapper rail was eliminated from further analysis.

4.1.8 Yellow-billed Cuckoo

The Yellow-billed cuckoo (*Coccyzus americanus*) is a proposed threatened species under the ESA (FR 78: 61622-61666). The yellow-billed cuckoo has always been rare in Nevada and while there are still small areas of suitable habitat within the state, breeding populations of the species are apparently extirpated from Nevada (Center for Biological Diversity 1998). Because of recent habitat loss and further decline in numbers, the USFWS has raised the listing priority for the Western Continental U.S. Distinct Population Segment of this species (FR 70: 24875). Yellow-billed Cuckoos may still utilize remnant habitats present within the state during migration.

Based on historic accounts, the species was widespread and locally common in California and Arizona, locally common in a few river reaches in New Mexico, locally common in Oregon and Washington, generally local and uncommon in scattered drainages of the arid and semiarid portions of western Colorado, western Wyoming, Idaho, Nevada, and Utah. The scattered cottonwoods on the Colorado River tributaries (Virgin, Muddy, and Pahranagat) are the last places in Nevada where the Yellow-billed Cuckoo can potentially occur.

While groundwater withdrawals may result in insignificant reductions in flow in the Muddy River, the magnitude of effects would be too small to affect yellow-billed cuckoo or cuckoo habitat (e.g., hydrophytic and riparian vegetation). Therefore, the yellow-billed cuckoo was eliminated from further analysis.

4.1.9 Southwestern Willow Flycatcher

The southwestern willow flycatcher (*Empidonax traillii extimus)* was listed by the USFWS as an endangered species within its entire range on February 27, 1995 (FR 60: 10693-10715). Critical habitat for the species was originally established in 1997 (FR 62: 39129-39147) but subsequently vacated and incidental protection provided along the Virgin River and its 100-year floodplain from the Arizona/Nevada border to Halfway Wash in Nevada (FR 65: 4140-4156).

Critical habitat was again proposed on October 12, 2004 (FR 69: 60706-60736) and redefined and re-instituted in 2005 (FR 70: 60886-61009). Critical habitat was redefined again, as a Final Rule, in January, 2013 (FR 78: 343-534). Critical habitat for the southwestern willow flycatcher in Nevada is currently limited to portions of the Virgin River above its confluence with the Muddy River (FR 70: 60886-61 009).

For nesting, southwestern willow flycatchers require dense riparian habitats with microclimatic conditions dictated by the local surroundings. Saturated soils, standing water, or nearby streams, pools, or cienegas are a component of nesting habitat that also influences the microclimate and density of the vegetation component. No riparian or microhabitat conditions exist within the Action Area. The closest known breeding habitat for this species is located along the Muddy River, approximately 12 to 24 miles north and northeast of the Action Area. While groundwater withdrawals may result in insignificant reductions in flow in the Muddy River, the magnitude of effects to southwestern willow flycatchers or flycatcher habitat (including hydrophytic vegetation) would be insignificant and discountable. Therefore, the southwestern willow flycatcher was eliminated from further analysis.

4.1.10 Relict Leopard Frog

The relict leopard frog is a candidate for listing under the ESA. In May 2002, the USFWS was petitioned to list the relict leopard frog as an endangered species under the ESA (Center for Biological Diversity and Southern Utah Wilderness Alliance 2002). The petition was largely based on the restricted distribution of the known populations and low numbers of individuals of the species.

The relict leopard frog (*Lithobates onca*) is a medium-sized frog (1.75-3.5 inches in length) in the family Ranidae (true frogs). Generally, the relict leopard frog is brown to grey above with greenish brown spots that are often reduced or obscure on the front of the body. Leopard frogs generally require shallow water with emergent vegetation for foraging and basking, and deeper water, root masses, undercut banks, and debris piles for cover and hibernacula. Relict leopard frogs are currently known to occur only in seven natural and eight translocated sites within two general areas in Nevada: near the Overton Arm area of Lake Mead (approximately 24 miles southeast of the Action Area), and Black Canyon below Lake Mead (approximately 29 miles south of the Action Area; Bradford *et al.* 2004).

Water withdrawals may result in insignificant reductions in flow in the Muddy River, which flows into the Overton Arm of Lake Mead. However the reduction of flows within the Muddy River compared to the amount of water within Lake Mead would be negligible; therefore, the relict leopard frog is excluded from further analysis.

4.1.11 Las Vegas Buckwheat

The Las Vegas buckwheat (*Eriogonum corymbosum var. nilesii*) is a woody perennial shrub that grows up to four feet high and has a mounding shape. The subspecies is distinguished from closely related plants by leaves that are densely hairy on one or both surfaces and at least twice as long as they are wide, with dense hairs spread along the stem. The numerous flowers are small and yellow with small bract-like leaves at their bases.

The Las Vegas buckwheat has a distinct preference for soils with high gypsum content. Typically, gypsum soil outcroppings occupied by Las Vegas buckwheat are sparsely vegetated with exposed soils covered with a cryptogamic (living) soil crust. This plant is confined to extremely limited areas in the counties of Clark and Lincoln, Nevada.

Soils within the Action Area are generally not suitable for the Las Vegas buckwheat. Rare plant surveys did not detect this species (Nevada Biological Consulting 2010) and there are no records of this species occurring within the Action Area. Therefore, the Las Vegas buckwheat was excluded from further analysis.

4.2 Desert Tortoise

The desert tortoise consists of two species: the Sonoran (*Gopherus morafkai*) and Mojave (*Gopherus agassizii*). The Sonoran population is found in most of Arizona, western New Mexico and south through Sonora to northern Sinaloa, Mexico. The Sonoran population of the desert tortoise also occurs on Isla Tiburon, in the Sea of Cortez (Germano et al. 1994). The Mojave population of the desert tortoise is found in southern Nevada, southeastern California, the Beaver Dam Mountains and Virgin River area of southwestern Utah and northwestern Arizona. This population is restricted to areas north and west of the Colorado River.

The Mojave population has been divided into six distinct population segments or Evolutionarily Significant Units (ESU), each designated as a recovery unit. Each recovery unit was delineated based on variations in genetic, morphological, ecological, physiological, and behavioral traits (USFWS 1994). Some of the six recovery units were further subdivided into DWMAs. A total of 6.4 million acres of Critical Habitat was designated in 1994 (59 FR 5820-5866). Within those six recovery units, DWMAs were identified, where populations of tortoises facing similar threats would be managed with the same strategies (59 FR 5820-5866).

Among the most important recovery actions implemented pursuant to the 1994 Recovery Plan has been formalizing DWMAs through Federal land use planning processes. On Bureau of Land Management lands, DWMAs are administered and designated as Areas of Critical Environmental Concern (ACEC). These ACECs define specific management areas based on the general recommendations for DWMAs in the 1994 Recovery Plan. Boundaries of the ACECs were refined slightly from the critical habitat designation based on various management and biological considerations. The Bureau of Land Management DWMAs/ACECs, together with National Park Service lands, designated wilderness areas, other lands allocated for resource conservation, as well as restricted-access military lands, provide an extensive network of habitats that are managed either directly or indirectly (*e.g.*, wilderness areas outside desert tortoise ACECs) for desert tortoise conservation (USFWS 2011c).

The Proposed Action is located within the *Northeast Mojave – North* Recovery Unit. The Proposed Action is not within a DWMA; it is largely contained within the boundary of the Moapa Band of Paiutes Reservation within the Dry Lake Valley west of Interstate Highway 15. The nearest DWMA (Mormon Mesa) to the Action Area is located approximately 2.4 miles to the west, on the west slope of the Arrow Canyon Range.

4.2.1 Species Description

The desert tortoise was first described by Cooper in 1863 as *Xerobates agassizii*, named after Louis

Agassiz. Over the years, it has been known under different genera including *Scaptochelys* (Bramble 1971), *Xerobates* (Lamb et al. 1989), and *Gopherus* (Crumley 1994), the genus under which it is now recognized.

The desert tortoise has a domed carapace and a relatively flat, unhinged plastron. Adults will reach a carapace length of 8 to 15 inches and shell height of 4 to 6 inches. Adults typically weigh 8 to 15 pounds. When hatchlings emerge from their eggs, they are approximately 2 inches long (Ernst et al. 1994).

The desert tortoise is greenish-gray to dark brown with tan scute centers. Their forelimbs have heavy, conical scales and are flattened for digging and burrowing. Hind limbs are more elephantine. When limbs pull in, they block the openings of the shell (Ernst et al. 1994).

4.2.2 Distribution and Life History

The Mojave population of the desert tortoise is found primarily in Mojave desert scrub and is also found, to a lesser extent, in the Lower Colorado River Subdivision of Sonoran desert scrub in southeastern California. They are generally associated with communities dominated by creosote bush, often with other shrubs such as white bursage or saltbush (*Atriplex* spp.) occurring as co-dominants with small cacti present (AGFD 2001). Some parts of their habitat may contain abundant Joshua trees (*Yucca brevifolia*). In contrast to the Sonoran population, Mojave population desert tortoises prefer sandy loam or rocky soils in valleys, bajadas, and hills. They may be found at elevations below sea level in Death Valley, California, and up to about 5,000 feet at Yucca Mountain, Nevada (AGFD 2001).

Adequate shelter is a critical habitat component for the Mojave desert tortoise. Like the Sonoran population, the Mojave population use burrows to avoid extreme hot or cold temperatures.

Mojave desert tortoises are more likely to excavate burrows under vegetation than in rocky areas, and their burrows can be up to 10 meters (33 feet) in length (AGFD 2001). The utilization of burrows by the Mojave desert tortoise aids in body temperature regulation through higher humidity and the resultant evaporative cooling effects within the burrow (Lawler, no date).

The annual cycle of the Mojave desert tortoise begins in February or March when they emerge from hibernation (AGFD 2001). Mating generally takes place in the spring, and 2 to 14 eggs are laid in an excavated nest near a shrub or burrow entrance between May and July (Lawler, no date). Young tortoises emerge from the eggs after incubating for 70 to 135 days (Lawler, no date). Hatchling and juvenile mortalities are very high; it has been estimated that only one hatchling for every 15 to 20 nests will survive to reach sexual maturity (Lawler, no date). Average age of sexual maturity of females is primarily a function of animal size, but is usually between the ages of 12 and 25 years. Members of the Mojave population produce from one to three clutches of eggs per year, but the total number of eggs laid may be similar to the single larger clutch produced by Sonoran population tortoises.

Desert tortoises are primarily herbivores, consuming a wide variety of plant materials including dicot annuals, grasses, herbaceous perennials, trees, shrubs, subshrubs/woody vines, and succulents (AGFD 2001). A study of their food habits in the Mojave Desert found that they used 43 plant species, including 37 annuals and 6 perennials (Jennings 1997). Some of the preferred plants were dwarf white milkvetch (*Astragulus didymocarpus*), widow's milkvetch (*A. Zayneue*), Booth evening primrose (*Camissonia boothii*), rattlesnake weed (*Camissonia* [Euphorbia] *albomarginata*), foothill deervetch (*Lotus* *humistratus*), Bigelow four o'clock (*Mirabilis bigelovii*), and brightwhite (*Prenanthella exigua*). Tortoise diet in this study showed a very strong preference for native plants (95.3 percent), and some of their preferred food plants were uncommon to rare (Jennings 1997).

A study on juvenile tortoises (Spangenberg 1995) found a preference for non-native invasive plant species such as Mediterranean grass (*Schismus barbatus*) and filaree (*Erodium cicutarium*). These two species comprised 64 percent of the juvenile tortoise diet. This study also revealed a difference in diet between wet and dry summers. During a very dry summer, tortoises were observed foraging on only three species, while they used 15 species during a wet summer (Spangenberg 1995). Tortoises may forage selectively, sampling several possibilities before consumption (Lawler, no date). Selective food preferences for individual tortoises within a population make plant species diversity an important constituent of preferred tortoise habitat (Tracy 2001). They will also ingest rocks, bones, and soil, possibly to maintain intestinal bacteria, to provide additional minerals, or as gastroliths to aid digestion (Lawler, no date).

The Mojave population of desert tortoise occurs primarily on flats and bajadas with soils ranging from sand to sandy-gravel, characterized by scattered shrubs and abundant space for growth of herbaceous plants. They occur in creosote bush, alkali sink, and tree yucca habitats in valleys, on alluvial fans, and in low rolling hills at elevations ranging from sea level to 5,000 feet. They appear to prefer bajadas and desert washes where soils range from sandy-loam to light gravel-clay which is optimal for burrow construction. Shelter sites often occur on lower bajadas and basins in burrows dug in soil, cavities in sides of washes and depressions under shrubs.

4.2.3 Threats to the Species

In general, downward trends in desert tortoise numbers and habitats result from urban development, long-term livestock grazing, mining, off-highway vehicle use, and collecting. Mortimer and Schneider (1983) suggested a Nevada die-off in the early 1980s was due in part to drought conditions and that habitat had been adversely impacted by long-term grazing intensities. D'Antonio and Vitouseki (1992) found that the increasing incidence and severity of fires combined with changes in vegetative community types, primarily increases in exotic ephemerals, have adversely affected desert tortoises. Habitat fragmentation is another major contributor to population declines (Berry 1986). Populations have been fragmented and isolated by urban development, highway construction, and development within powerline corridors.

The most serious problems facing the Mojave population of the desert tortoise are the "cumulative effects of human and disease-related mortality accompanied by habitat destruction, degradation, and fragmentation" (USFWS 1994). Human contact includes a number of threats. Among the most common are collection for food, pets, commercial trade, and medicinal uses, as well as being struck and killed by on-and-off road vehicles. Illegal shooting is another significant source of mortality in the species. Berry (1990) found that between 1981-1987, 40 percent of the tortoises found dead on a study plot in Freemont Valley, California, had been killed by gunshot or by off-road vehicles.

Predation is another factor implicated in population declines of the desert tortoise. Predation by common ravens has become a major threat to desert tortoise populations in some areas. Ravens are known to prey on juvenile tortoise from 1.3 to 4.9 inches in length (Berry 1985). Between 1968 and 1992, raven populations in the Mojave Desert have increased by more than 1,000 percent due to the increase in resource subsidies (e.g., food, water, nesting substrate) that are provided by increasing human populations (Boarman and Berry 1995). Elevated perches are typically scarce in the Mojave Desert, and such manmade substitutes provide perching sites for predatory birds. Farrell (1989) documented ravens utilizing power line towers for perches while consuming juvenile tortoises (USFWS 1994). Human predation in the form of highway mortality and illegal removal of adult tortoises for pets are also factors in the decreasing numbers of desert tortoises (USFWS 1994; Lovich 1999). Tortoises will urinate in response to harassment and this jeopardizes their survival through the summer due to water loss.

An upper respiratory tract disease, discovered in 1990, is currently a major cause of mortality in the western Mojave Desert population. Predisposing factors, such as habitat degradation, poor nutrition, and drought, have only served to compound the problem (USFWS 2011).

Habitat destruction, degradation, and fragmentation are also threats. Over the last 150 years, there have been substantial decreases in perennial grasses and native annuals and an increase in exotics, which serve as fire hazards. Perennial shrubs and grasses used for cover and food have been diminished and have been replaced by inedible exotic ephemerals. Also, as the habitat becomes increasingly fragmented, desert tortoises are forced to forage over larger areas and are thus exposed to greater dangers. Finally, grazing by domesticated animals damages the soil, reduces water filtration, promotes erosion, and invites invasion by exotic vegetation (USFWS 1994).

Invasion by exotic plants can have a significant negative impact on tortoises due to changes in the native plant community. Red brome, for example, a European import, competes with native perennial grasses, shrubs, and annuals. Recurrent fires due to presence of exotic ephemerals such as red brome can reduce the abundance and diversity of native forbs on which the tortoises depend (National Park Service 2001). The increased fires also aggravate habitat fragmentation, which is a major contributor to tortoise population declines (USFWS 1994).

4.2.4 Protocol Survey Methodology

The desert tortoise survey methodology employed was designed to determine presence/absence and abundance of desert tortoises within the Action Area. It is the *Pre-project Field Survey Protocol for Potential Desert Tortoise Habitats* (USFWS protocol) described in the *Preparing For Any Action That May Occur Within The Range Of The Mojave Desert Tortoise (Gopherus agassizii*; USFWS 2010). The information gathered is intended to:

1. Determine the appropriate level of consultation with the U.S. Fish and Wildlife Service (USFWS) and Nevada Department of Wildlife (NDOW);
2. Determine the amount of incidental take of Desert Tortoises resulting from the Project as defined by the Endangered Species Act (ESA) and state laws; and
3. Assess the distribution of Desert Tortoises to help minimize and avoid take.

Based on the most recent USFWS protocol (USFWS 2010), a site assessment is conducted within the survey area to determine the suitability of the habitat for Desert Tortoise. Pursuant to the protocol, if the survey area is large (> 40 acres), surveys should be conducted during the Desert Tortoise's most active periods (April through May or September through October) when air temperatures are lower than 104°F. The USFWS guidance also indicates that projects smaller than 2,789 acres that are located within the North-East Mojave - North Recovery Unit must complete 100% coverage surveys. Therefore, probabilistic sampling was not an option for the Project so ten-meter wide belt transects were used during the survey and were designed to cover the entire Action Area (100 percent coverage; Heritage 2013;

Appendix A). The sampling protocol implemented for this survey was reviewed and approved by the USFWS prior to implementation.

Occurrences of either live desert tortoises or desert tortoise sign in the survey area were used to indicate desert tortoise presence. The Project site, transmission line ROWs, water pipeline, and access road ROWs were surveyed with ten-meter transects ensuring 100 percent coverage of those areas. If neither actual desert tortoises nor sign thereof were encountered during the surveys in any given portion of the Project (e.g. a particular transmission interconnection corridor), three additional 10-m belt transects at 200-m intervals parallel to and/or encircling the Action Area perimeter (200- m, 400-m, and 600-m from the perimeter of the Project site) were also surveyed. These "buffer" transects were used to determine the presence/absence of desert tortoise but they were not included in the estimation of desert tortoise abundance.

Four separate desert tortoise surveys were conducted. The first survey took place in May of 2010 and surveyed the SPGF, access road and the 230-kV gen-tie transmission line. This survey is now out of date and incomplete and the methods described below refer only to the second and third surveys conducted on the site. The second survey took place in May of 2012 and covered the SPGF, access road and gen-tie transmission lines. The third survey was conducted in October of 2012 and covered the water pipeline**.** The fourth survey took place in October of 2013 and covered the route modification of the 230kV transmission line near the Harry Allen 230kV substation (Heritage 2013). All observed desert tortoise sign was mapped and recorded. Sign included scat, burrows, live tortoises, carcasses, shell fragments, eggshells, tracks, courtship rings, and drinking depressions.

Desert tortoise population estimates were generated based on recommended methodologies contained in USFWS (2010). These estimates were generated for all Project components for which there were detections of adult desert tortoise. Population estimates were generated using the following equation:

$$\hat{N} = \frac{n}{(P_a)(P_d)} \times \frac{(A)}{(a)}$$

Where $\hat{N}$ is the corrected population estimate, n is the number of Desert Tortoises observed, P_a is the probability a Desert Tortoise in the Action Area would be above ground based on previous winter precipitation per USFWS (2010). For the "Table 3" calculation of the May 2012 Project survey and the October 2012 survey, a value of 0.8 was used (Western Regional Climate Center 2012), P_d is the probability that an above-ground Desert Tortoise would be detected (0.63), A is the size of the Action Area, and a is the size of the area surveyed. Corrected estimates are reported here with 95% confidence intervals (CI) per USFWS (2010).

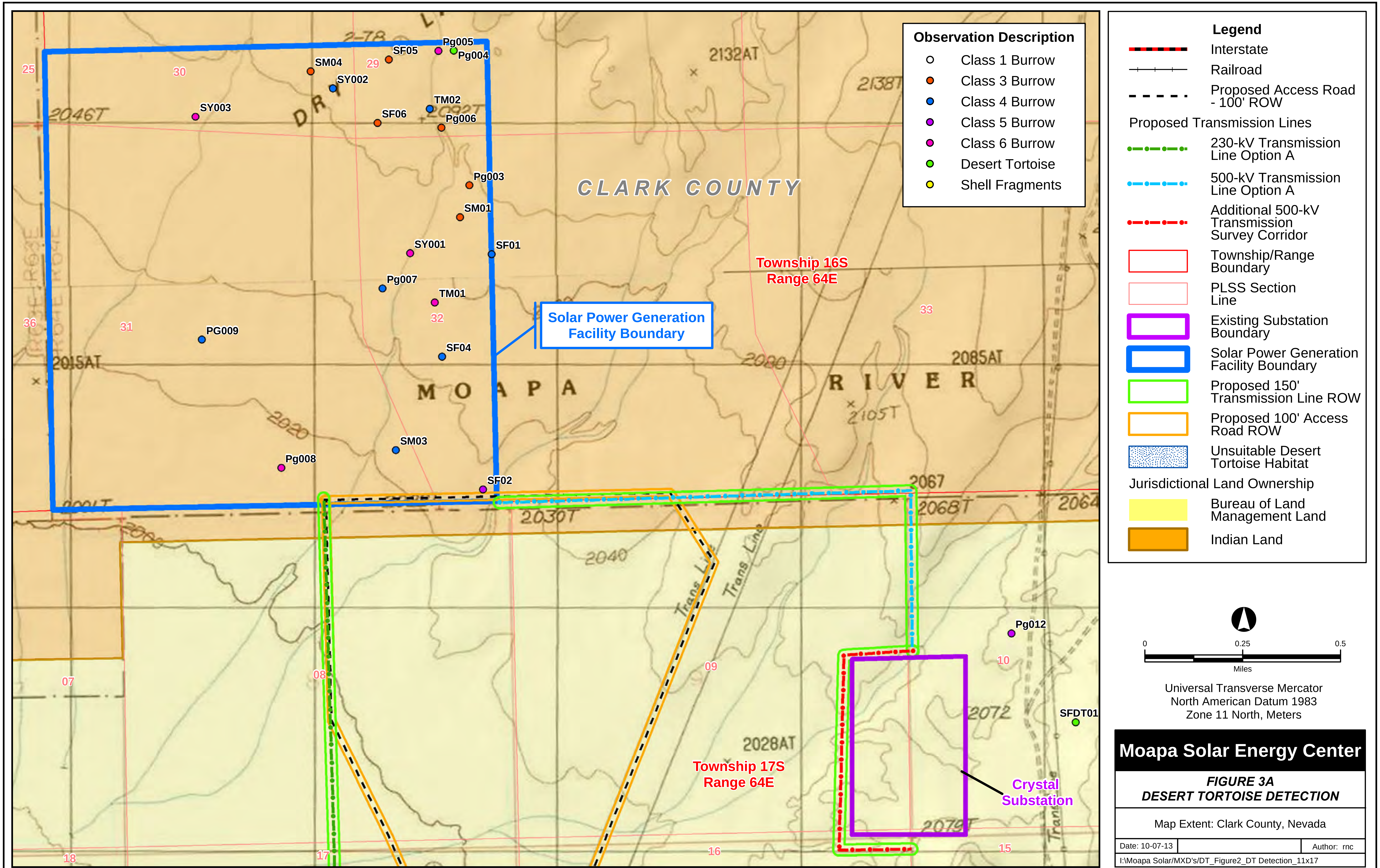
4.2.5 Protocol Survey Results

The following sections discuss the results of the 2012 surveys. Results of the 2010 surveys are out of date (since survey results expire after one year). Most of the Action Area represents potentially suitable habitat for the desert tortoise. The Action Area is largely dominated by Mojave creosote-bush scrub vegetation. This vegetation class includes Mojave mixed scrub and creosote-bursage vegetation. Dominant species associated with this vegetation community include shadscale (*Atriplex confertifolia*), brittlebrush (*Encelia farinosa*), creosote (*Larrea tridentata*), bursage (*Ambrosia dumosa*), and desert saltbush (*Atriplex polycarpa*) that occur on lower slopes and in washes. Associate species also included Mojave yucca (*Yucca schidigera*), Mormon tea (*Ephedra nevadensis*), range ratany (*Krameria parvifolia*), desert trumpet (*Eriogonum inflatum*), big galleta (*Hilaria rigida*), and Indian ricegrass (*Oryzopsis hymenoides*).

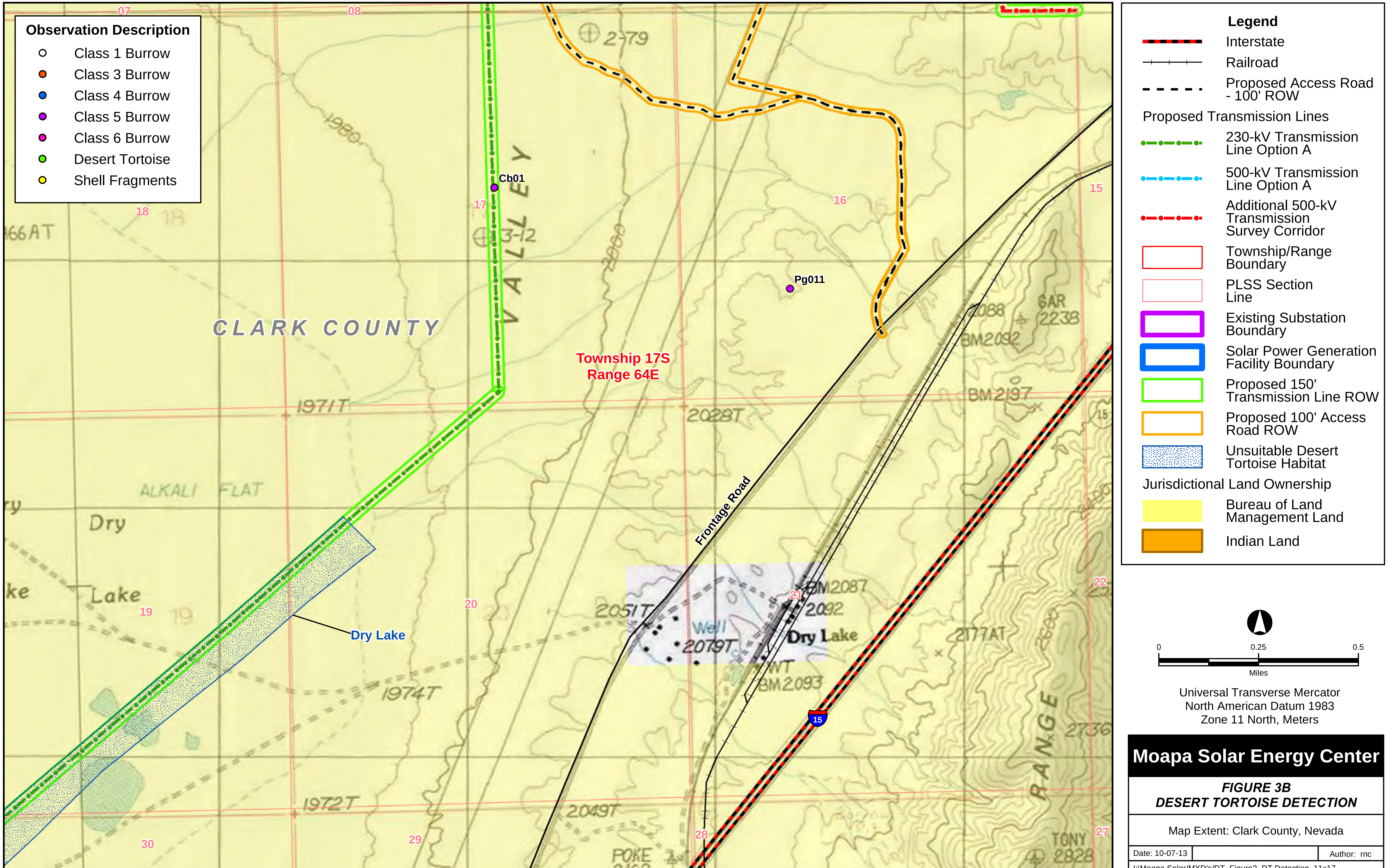
The portion of the 230-kv gen-tie transmission route to the Harry Allen Substation (approximately 1.7 miles in length) that traverses Dry Lake is not suitable desert tortoise habitat and was not surveyed. This area was almost completely unvegetated with hard-packed soils, often with an alkali crust. Based on the lack of vegetation, there is no forage or cover present for desert tortoises. This portion of Dry Lake is also occasionally completely inundated; precluding tortoises from occupying burrows. Small portions of this area were spot sampled – suitable burrows were not found, nor were soil conditions conducive for burrow excavation. The vegetated margins of the lake bed were surveyed since these areas represented potentially suitable foraging areas; though soils in these areas were still extremely hard packed.

Near the south end of the transmission interconnection, the habitat becomes steeper with rockier soils and greater components of cholla (*Cylindropuntia* sp.), Mojave yucca and prickly pear (*Opuntia* sp.). This area is crossed by several small ephemeral drainages originating from a large sloping bajada extending from the southwest.

Desert tortoise and desert tortoise sign were observed in the Action Area. An adult desert tortoise and suitable desert tortoise burrows were observed within the SPGF; desert tortoise sign and potentially suitable burrows were observed along the 230-kV gen-tie transmission line; an adult desert tortoise and potentially suitable burrows were observed along the buffer transects associated with the 500-kV gen-tie transmission line; one potentially suitable burrow occurred along the access road, two adult and one subadult desert tortoise and fourteen suitable burrows were observed along the pipeline ROW; and, one adult tortoise, 19 suitable desert tortoise burrows, and two desert tortoise shells/shell fragments were observed along the 230 kV transmission reroute (**Tables 2a, 2b, and 2c, Figures 3a, 3b, 3c, 4 and 5**).



Observation Description
Class 1 Burrow
Class 3 Burrow
Class 4 Burrow
Class 5 Burrow
Class 6 Burrow
Desert Tortoise
Shell Fragments
Legend
Interstate
Railroad
Proposed Access Road - 100' ROW
Proposed Transmission Lines
230-kV Transmission Line Option A
500-kV Transmission Line Option A
Additional 500-kV Transmission Survey Corridor
Township/Range Boundary
PLSS Section Line
Existing Substation Boundary
Solar Power Generation Facility Boundary
Proposed 150' Transmission Line ROW
Proposed 100' Access Road ROW
Unsuitable Desert Tortoise Habitat
Jurisdictional Land Ownership
Bureau of Land Management Land
Indian Land
CLARK COUNTY
MOAPA RIVER
Township 16S
Range 64E
Township 17S
Range 64E
Solar Power Generation Facility Boundary
Crystal Substation
Pg005
Pg004
SF05
SM04
SY002
SY003
TM02
SF06
Pg006
Pg003
SM01
SY001
SF01
Pg007
TM01
PG009
SF04
SM03
Pg008
SF02
Pg012
SFDT01
0
0.25
0.5
Miles
Universal Transverse Mercator
North American Datum 1983
Zone 11 North, Meters
Moapa Solar Energy Center
FIGURE 3A
DESERT TORTOISE DETECTION
Map Extent: Clark County, Nevada
Date: 10-07-13
Author: rnc
I:\Moapa Solar/MXD's/DT_Figure2_DT Detection_11x17



Moapa Solar Energy Center

FIGURE 3B
DESERT TORTOISE DETECTION

Map Extent: Clark County, Nevada

Date: 10-07-13 | Author: rnc

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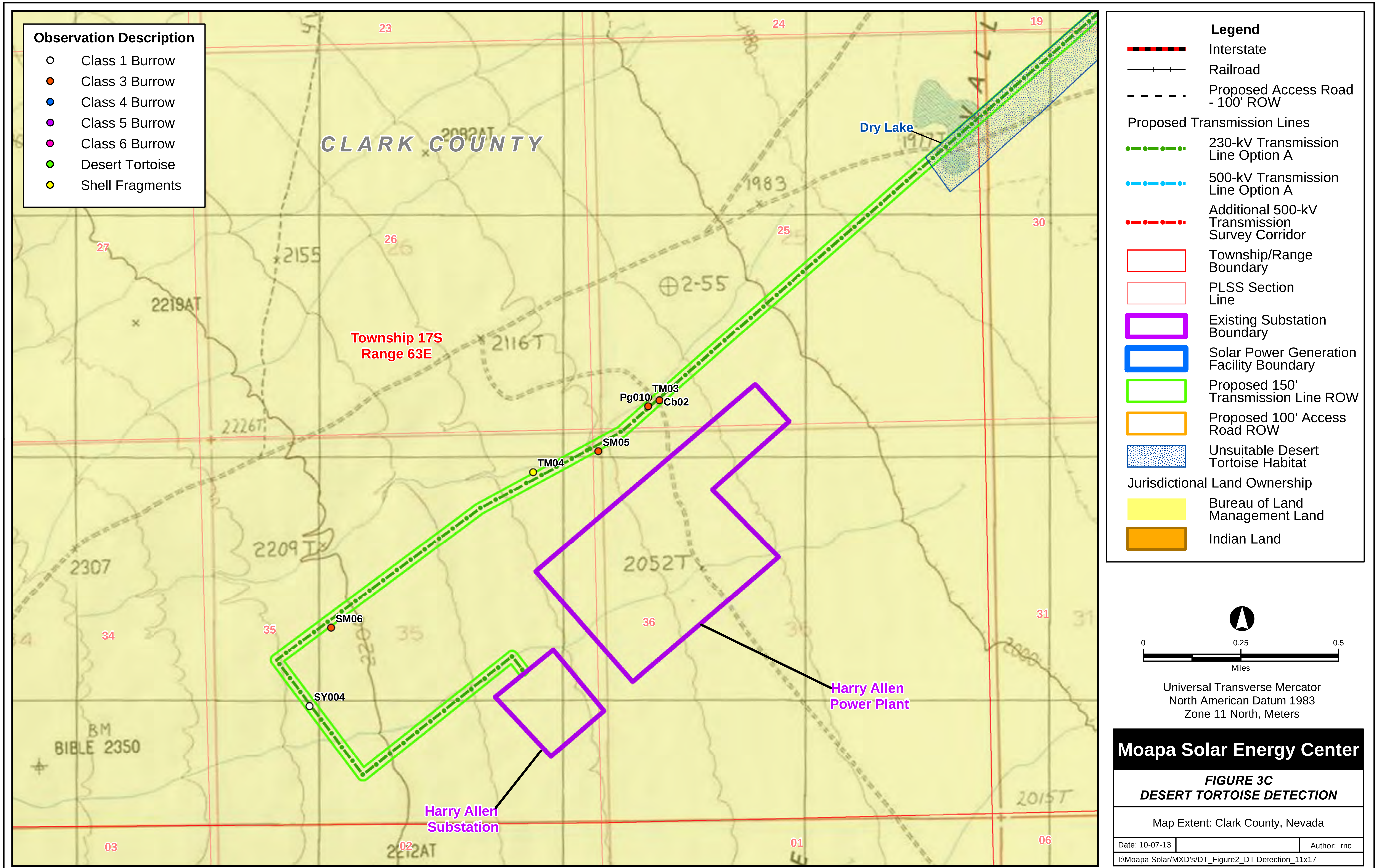

Moapa Solar Energy Center

FIGURE 3C
DESERT TORTOISE DETECTION

Map Extent: Clark County, Nevada

Date: 10-07-13 | Author: rnc

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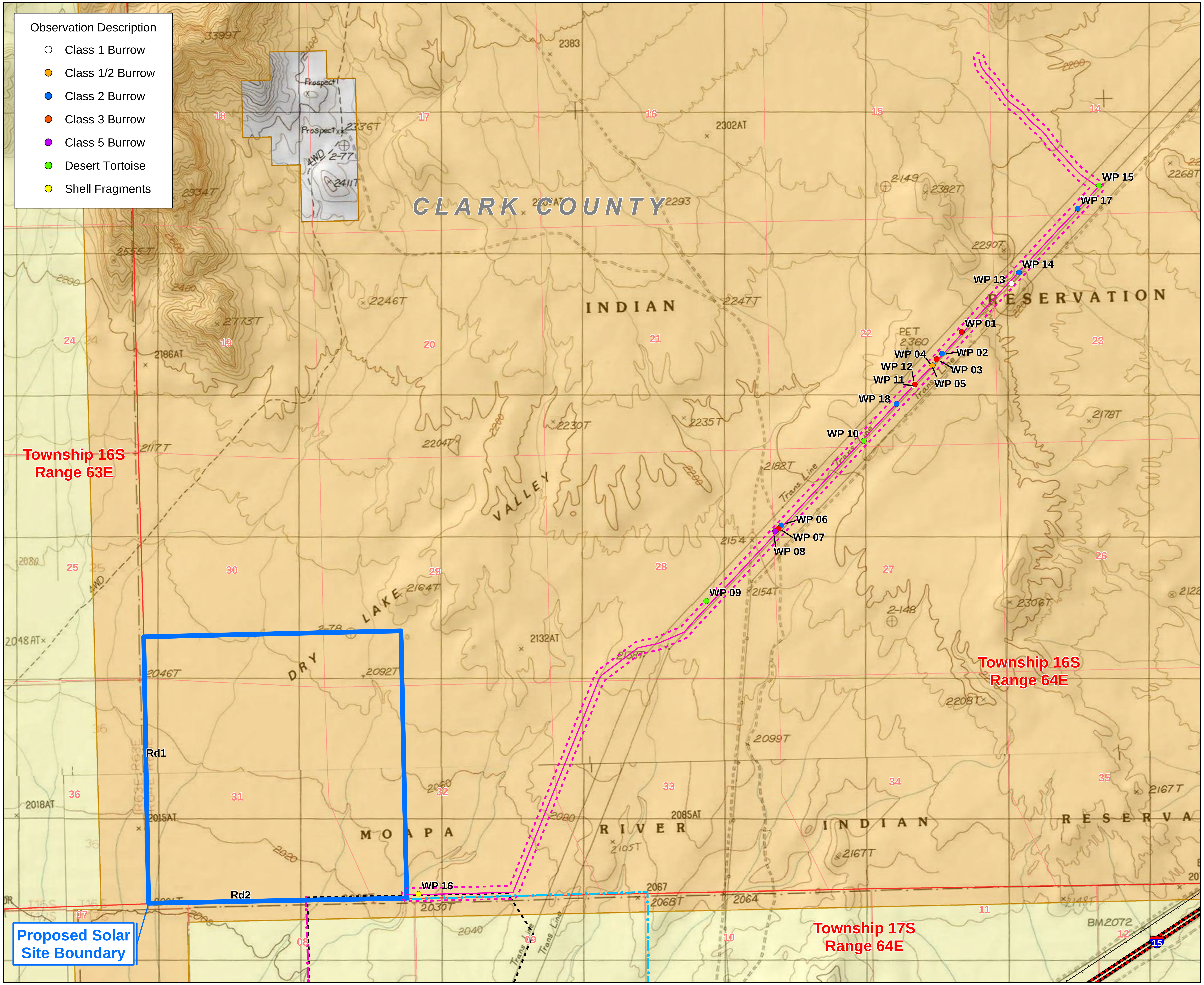

Legend

- Interstate
- Railroad
- Proposed Access Road
- Water Pipeline
- Option A to Harry Allen Substation
- Path 1 to Crystal Substation
- Water Pipeline ROW
- Township/Range Boundary
- PLSS Section Line
- Proposed Solar Site Boundary

Jurisdictional Land Ownership

- Bureau of Land Management Land
- Indian Land

0 0.5 1
Miles

Universal Transverse Mercator
North American Datum 1983
Zone 11 North, Meters

Moapa Solar Energy Center

Figure 4 - Water Pipeline Desert Tortoise Observations

Map Extent: Clark County, Nevada

Date: 10-07-13		Author: rnc

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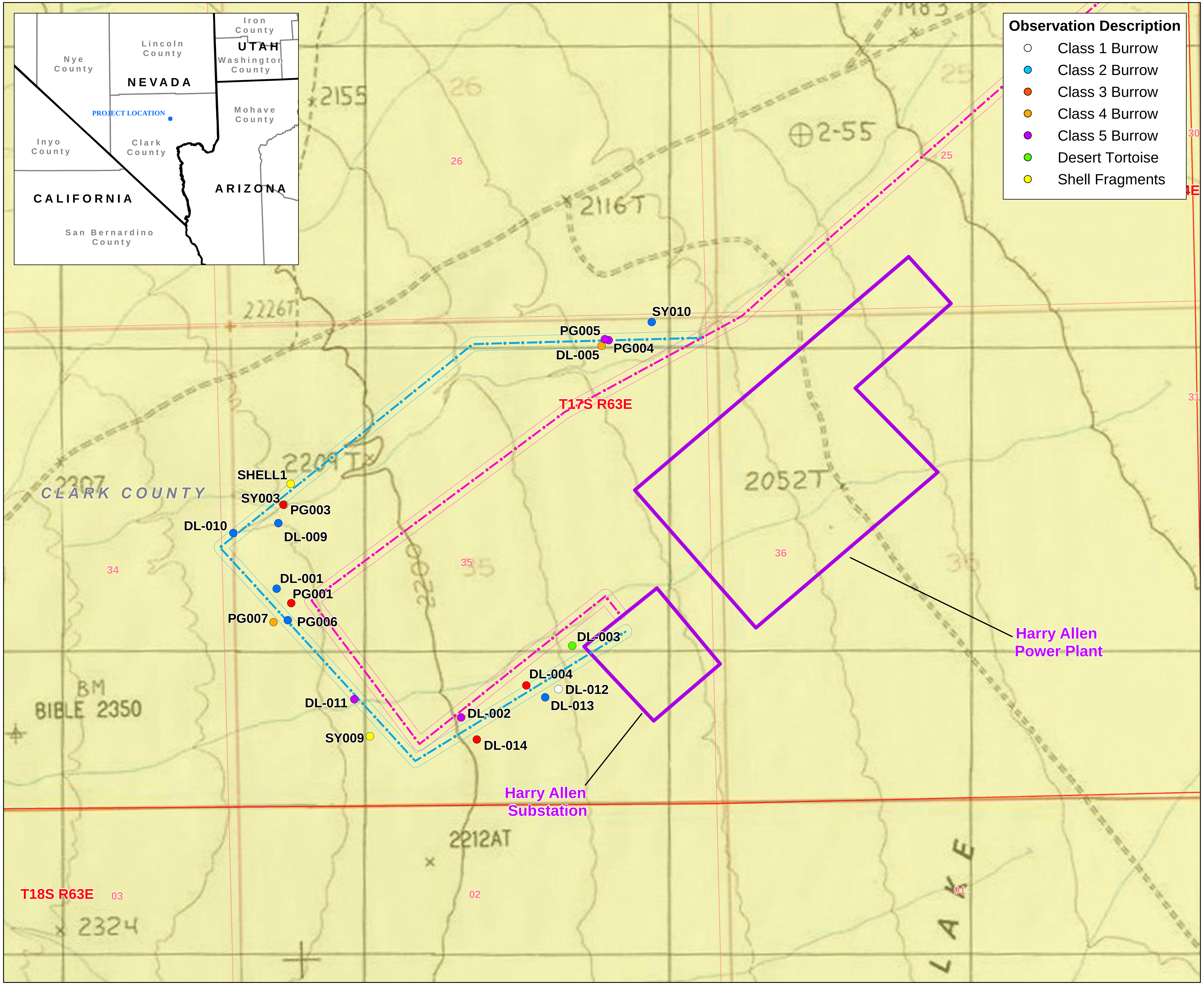

Legend

- Proposed 230-kV T-Line
- Proposed 230-kV T-Line Reroute
- Township/Range Boundary
- PLSS Section Line
- Existing Substation Boundary
- Proposed 230-kV T-Line ROW
- Proposed 230-kV T-Line Reroute ROW

Jurisdictional Land Ownership

- Bureau of Land Management Land

0 1,000 2,000 3,000
Feet

Universal Transverse Mercator
North American Datum 1983
Zone 11 North, Meters

Moapa Solar Energy Center

Figure 5 – 23kV Transmission Option Desert Tortoise Observations

Map Extent: Clark County, Nevada

Date: 10-07-13		Author: rnc

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Table 2a – Desert Tortoise Sign and Observations. May 2012 Survey

Transect	Project Component	Observation Description[1]	GPS ID	Notes
1	Solar Power Generating Facility	Class 4 burrow	SF001	
6	Solar Power Generating Facility	Class 5 burrow	SF002	
10	Solar Power Generating Facility	Class 3 burrow	PG003	Scat present
12	Solar Power Generating Facility	Class 3 burrow	SM001	Scat present
14	Solar Power Generating Facility	Desert Tortoise	PG004	Tortoise not in burrow; 280mm MCL
19	Solar Power Generating Facility	Class 3 burrow	PG006	Egg fragments present; in wash
20	Solar Power Generating Facility	Class 5 burrow	PG005	Located in small rivulet
21	Solar Power Generating Facility	Class 4 burrow	SF004	
23	Solar Power Generating Facility	Class 5 burrow	TM001	No sign
	Solar Power Generating Facility	Class 4 burrow	TM002	Scat present
32	Solar Power Generating Facility	Class 5 burrow	SY001	
38	Solar Power Generating Facility	Class 3 burrow	SF005	
40	Solar Power Generating Facility	Class 4 burrow	SM003	
43	Solar Power Generating Facility	Class 4 burrow	PG007	No sign
45	Solar Power Generating Facility	Class 3 burrow	SF006	
62	Solar Power Generating Facility	Class 4 burrow	SY002	

70	Solar Power Generating Facility	Class 3 burrow	SM004	Creosote flat
85	Solar Power Generating Facility	Class 5 burrow	PG008	Partially filled in
115	Solar Power Generating Facility	Class 4 burrow	PG009	Near coyote den
116	Solar Power Generating Facility	Class 5 burrow	SY003	
Access 400W	Access Road	Class 5 burrow	PG011	No sign; near rivulet
Crystal 400N	500-kV Transmission Line (buffer)	Class 5 burrows (x2)	PG012	Two burrows; no sign
Crystal 600N	500-kV Transmission Line (buffer)	Desert Tortoise	SFDT01	Desert tortoise in burrow; 250mm MCL
HA1	230-kV Transmission Line	Shell fragments and scutes	TM003	Estimated time since death: >4 years
HA1	230-kV Transmission Line	Shell fragments	TM004	Estimated time since death: >4 years
HA2	230-kV Transmission Line	Class 1 burrow	SY004	Very fresh sign at entrance
HA3	230-kV Transmission Line	Class 3 burrow	PG010	Shell fragments
HA4	230-kV Transmission Line	Class 5 burrow	CB001	
HA4	230-kV Transmission Line	Class 3 burrow	CB002	
HA5	230-kV Transmission Line	Class 3 burrow	SM005	No sign; upper bajada
HA5	230-kV Transmission Line	Class 3 burrow	SM006	No sign: upper bajada near wash

Table 2b – Desert Tortoise Sign and Observations. Oct. 2012 Survey

Transect	Project Component	Observation Description[1]	GPS ID	Notes
1	Pipeline	Desert Tortoise	WP 09	Subadult. Not in burrow
2	Pipeline	Class 3 burrow	WP 01	No sign
2	Pipeline	Class 2 burrow	WP 02	No sign
2	Pipeline	Class 3 burrow	WP 03	No sign
2	Pipeline	Class 2 burrow	WP 04	No sign
2	Pipeline	Class 1-2 burrow	WP 05	Tracks
2	Pipeline	Class 2 burrow	WP 06	No sign
2	Pipeline	Class 3 burrow	WP 07	No sign
2	Pipeline	Class 5 burrow	WP 08	No sign
3	Pipeline	Class 2 burrow	WP 18	No sign
3	Pipeline	Class 2 burrow	WP 17	No Sign
3	Pipeline	Shell Frags	WP 16	Carcass
4	Pipeline	Desert Tortoise	WP 10	Adult. Not in Burrow
4	Pipeline	Desert Tortoise	WP 15	Adult .Not completely in burrow
5	Pipeline	Class 1 burrow	WP 11	Scat
5	Pipeline	Class 3 burrow	WP 12	No sign
5	Pipeline	Class 1 burrow	WP 13	No sign
5	Pipeline	Class 2 burrow	WP 14	No sign

Table 2c – Desert Tortoise Sign and Observations. Oct. 2013 Survey

Transect	Project Component	Observation Description[1]	GPS ID	Notes
1	230 kV Reroute	Class 3 Burrow	PG001	No sign
1	230 kV Reroute	Class 2 Burrow	DL009	No sign
2	230 kV Reroute	Class 2 Burrow	DL001	No sign
2	230 kV Reroute	Class 5 Burrow	DL002	
2	230 kV Reroute	Class 1 Burrow/Desert Tortoise	DL003	Adult observed inside burrow entrance
4	230 kV Reroute	Class 1 Burrow	PG003	Burrow found near midden containing DT scat; 10”x 3” satellite burrow (Class 3, collapsed)
4	230 kV Reroute	Class 3 Burrow	SY003	No sign
5	230 kV Reroute	Class 3 Burrow	DL004	No sign
5	230 kV Reroute	Class 4 Burrow	DL005	No sign
7	230 kV Reroute	Class 5 Burrow	PG004	No sign
7	230 kV Reroute	Class 5 Burrow	PG005	No sign
7	230 kV Reroute	Class 2 Burrow	PG006	No sign
8	230 kV Reroute	Shell fragments	Shell-01	Fully intact, recent (<1 year old)
8	230 kV Reroute	Class 2 Burrow	DL010	No sign
8	230 kV Reroute	Class 5 Burrow	DL011	No sign
10	230 kV Reroute	Class 4 Burrow	PG007	No sign

11	230 kV Reroute	Class 1 Burrow	DL012	Fresh spoils suggest recent DT use
11	230 kV Reroute	Class 2 Burrow	DL013	No sign
11	230 kV Reroute	Class 3 Burrow	DL014	No sign
12	230 kV Reroute	Shell (Carapace & plastron)	SY009	Some scutes starting to delaminate; entirely intact (~2yrs old)
12	230 kV Reroute	Class 2 Burrow	SY010	No sign

[1]Burrow Class 1 – Definitely Desert Tortoise – currently active with desert tortoise or recent desert tortoise sign; Class 2 – Definitely Desert Tortoise – good condition, no evidence of recent use; Class 3 – Definitely Desert Tortoise – Deteriorated (includes collapsed); Class 4 – Possibly Desert Tortoise – good condition but unsure of species; Class 5 – Possibly Desert Tortoise – deteriorated (includes collapsed)

As detailed in the 2010 USFWS protocol, corrected desert tortoise estimates are calculated upon completion of the field surveys. These calculations were performed using the USFWS interactive "Table 3", included in the *2010 Pre-project Survey Protocol* (USFWS 2010). This table calculates desert tortoise populations based on the number of adult tortoises observed during surveys, as described above. Results from the May 2012 "Table 3" calculations indicate approximately 2.0 Desert Tortoises are expected to occupy the SPGF site (95%CI: 0.36-10.64). Results from the October 2012 "Table 3" calculations indicate approximately 6.8 Desert Tortoises are expected to occupy the pipeline ROW (95%CI: 1.98-23.11). Finally, results from the October 2013 "Table 3" calculations indicate that approximately 2.0 desert tortoises are expected to occupy the rerouted portion of the 230 kV transmission line ROW (95% CI: 0.37-10.77).

Accurate estimates of numbers of juvenile tortoises or tortoise eggs are difficult to make and involve uncertainty. Turner et. al (1987) estimated that juvenile and hatchling tortoises accounted from 19- to 81-percent of the overall population. If this assumption is used, the expected number of juvenile and/or hatchling tortoises expected on the SPGF would between 0.44 and 56.00; the expected number of juvenile or hatchling tortoises within the water pipeline ROW would be between 2.44 and 121.63; and the expected number of juvenile and/or hatchling tortoises along the rerouted portion of the 230-kV transmission line ROW would be between 0.46 and 56.68.

During May and June, the project area would be expected to contain desert tortoise eggs. Assuming a 1:1 sex ratio, there are between 0.18 and 5.32 female tortoises in the SPGF; between 0.99 and 11.56 female tortoises in the pipeline ROW; and between 0.19 and 5.39 female tortoises in the rerouted portion of the 230-kV transmission line ROW. Female tortoises lay an average of 1.6 clutches per year (Turner et. al 1984) and each clutch contains an average of 5.38 eggs (Turner et. al 1986). Thus, between 1.55 and 45.79 eggs would be expected within the SPGF; between 8.52 and 99.50 eggs would be expected within the pipeline ROW; and between 1.64 and 46.40 eggs would be expected within the rerouted portion of the 230-kV transmission line ROW.

Desert tortoises are expected to be present along the proposed access road and the 500-kV transmission route based on the presence of sign and/or suitable burrows, though population estimates along these routes are not possible because adult desert tortoises were not detected. An adult desert tortoise was observed in the buffer area associated with the 500-kV transmission line; however, tortoises located in buffer areas are not used to generate relative abundance estimates.

4.2.6 Critical Habitat

No designated critical habitat exists within the Action Area. The closest critical habitat for the desert tortoise is located approximately 4.5 miles west of the Action Area on the west slope of the Arrow Canyon Range.

4.3 Moapa Dace

4.3.1 Species Description

The Moapa dace (*Moapa coriacea*) occurs in the Muddy River system and is listed as endangered under the ESA. Since the Moapa dace represents a monotypic genus, this species was assigned a recovery priority of 1 (highest ranking) by the USFWS in 1995. The original recovery plan for this species was prepared in 1983 and subsequently revised in 1995.

The Moapa dace was first discovered in 1938 (Hibbs and Miller 1948). The maximum size for the species is approximately 4.7 inches. Moapa dace have been recorded living as long as 4 years.

4.3.2 Distribution and Life History

The Moapa dace is endemic to the upper Muddy River and its tributary thermal springs. Originally, this species may have inhabited up to 25 spring systems in the Warm Springs area and as much as 10 miles of stream habitat within the Moapa River.

The Moapa dace inhabits a variety of habitats throughout its several life stages. As individuals age, they occupy habitats with increasing flow velocities such that larval dace are apparently limited to slackwater portions of the upper reaches of tributaries of the Moapa River, whereas adults can be found in the river's mainstem. The species prefers warmer temperatures (67-89.6°F), and cooler temperatures in the middle portion of the Moapa River mainstem may function as a barrier to downstream movements (USFWS 1996).

The species is omnivorous; stomach contents have included beetles, moths, butterflies, true flies, leaf hoppers, true bugs, caddisflies, mayflies, damselflies, dragonflies, worms, scuds, crustaceans, snails, filamentous algae, vascular plants, detritus and sand (Scoppettone et al. 1987, 1992). The dace primarily forages on drift items but will also forage on the stream or spring substrate. The species often forages from drift stations in large groups (up to 30 individuals). These sites are often characterized by overhanging vegetation or particularly deep areas (USFWS 1996).

4.3.3 Threats to the Species

Threats to the Moapa dace include habitat loss and alteration, introduction of non-native species, and parasites. Habitat loss and alteration has been ongoing in the Warm Springs areas for the purposes of recreational, industrial and municipal projects. Several headwater springs were completely channelized or diverted for use as swimming pools. Irrigation for agricultural purposes historically had impacts on headwater springs in the Warm Springs area, though agricultural activity in the area has declined.

Two impoundments constructed within the Moapa River have altered habitats on both sides of the dam/weir and present barriers to movement. These barriers have the effect of creating genetic isolation in two stretches of the river (upstream and downstream of Nevada Power Company diversion dam; and upstream and downstream, of the Bureau of Reclamation's Cipoletti weir gaging station).

Several species of non-native fishes have been introduced to the Moapa River. These fishes may compete with Moapa dace, may prey directly on the dace, and/or may spread parasites to the dace. Non-native species include the mosquitofish (*Gambusia affinis*), shortfin mollies (*Poecilia mexicana*), common carp (*Cyprinus carpio*), channel catfish (*Ictalurus punctatus*), largemouth bass (*Micropterus salmonoides*), green sunfish (*Lepomis cyanellus*), red shiner (*Cyprinella lutrensis*), fathead minnow (*Pimephales promelas*), black bullhead (*Ameiurus melas*), blue tilapia (*Tilapia aurea*) and Koi (*C. carpio* domestic var.).

4.3.4 Critical Habitat

There is no designated critical habitat for the Moapa dace.

5 Effects of the Action

The below sections will discuss the direct, indirect and cumulative impacts of the proposed action upon the desert tortoise and Moapa dace. Impacts resulting from the implementation of the Proposed Action include:

- Incidental take of desert tortoises;
- Temporary stress on desert tortoises from handling during relocation efforts;
- Constriction of movement corridors for desert tortoise;
- Disturbance from vibration during construction that could affect tortoise in burrows near the boundary of the Action Area;
- Temporary or permanent loss of desert tortoise habitat and burrows along and within the Action Area;
- Disturbance and displacement of desert tortoise during construction of the associated access roads, gen-tie transmission routes and water pipeline;
- Potential noise and lighting effects on tortoise behavior and movement;
- Introduction of weeds and invasive species within the buffer area of the Action Area boundary during construction and operation, and therefore affects to desert tortoise; and
- Potential increases in ravens and other predators of desert tortoise occupying adjacent lands as a result of perches provided by the solar structures, transmission lines and towers, and perimeter fencing, and human introduction of trash within or near the Action Area boundary.
- Groundwater use from the same hydrographic basin that supports the Moapa dace (incremental or additive effects).

5.1 Desert Tortoise

5.1.1 Estimate of Incidental Take

A federal take of a species listed pursuant to the federal ESA is defined as “Take – to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct” (50 CFR 17.3). An estimated 10.8 adult desert tortoise (95% CI = 2.71-44.52) occur within the Action Area (based on 2010 USFWS protocol calculations). In addition to adult tortoise, between 3.34 and 234.31 juvenile and/or hatchling tortoise are estimated to occur within the project area and an estimated 11.71 to 191.69 eggs are estimated to occur within the project area during May and June.

For planning purposes, construction of the Proposed Action may result in the take of up to 45 (44.52) adult desert tortoise and 234 (234.31) juvenile/hatchling tortoise through harassment, direct mortality, and impacts on desert tortoise habitat. If initial ground disturbing activities take place during May and/or June, the proposed action could also result in the take of up to 192 (191.69) desert tortoise eggs. Desert tortoise exclusion fencing will be installed prior to construction and desert tortoise will be relocated via clearance surveys before the construction phase of the project. Relocation of desert tortoise can potentially represent take via harassment and/or mortality, as there is a possibility for tortoises to be killed or injured as a result of this process. Desert tortoise will be relocated to BLM managed lands or Tribal lands immediately adjacent to the Action Area, or they will be relocated to one of three recipient sites that were described in the K-Road Moapa Solar Generation Facility Desert Tortoise Translocation Plan (Arcadis 2012). Based on the tortoise estimates derived from the most recent survey data, a translocation plan for the project may be needed. It is expected that most tortoises will be able to be captured and safely released outside the exclusion fence adjacent to the project site, but there may be a few individuals that need to be moved to a recipient site. If needed, the project would use the same recipient site used for the K Road project. If a translocation plan is deemed necessary for the project, the K Road translocation plan would be adapted for this project.

Beside the initial construction, the use of the site access road as well as operation and maintenance activities outside the SPGF fenceline could represent a source of ongoing mortality. No tortoises were located along the access road and biological monitors would accompany all construction activities occurring outside the SPGF fenceline. As such, direct take of desert tortoise resulting from these activities is expected to be very low.

5.1.2 Loss of Occupied Habitat

The Proposed Action includes the installation of permanent desert tortoise exclusion fencing along the entire SPGF boundary (approximately 4.6 miles), utilizing gates and cattle guards (with ramps) at ingress/egress locations. A total of approximately 881.6 acres of occupied desert tortoise habitat would be permanently disturbed and up to approximately 69.9 acres would be temporarily disturbed as a result of project implementation (**Table 3**). Because recovery of vegetation in the desert can take decades or longer, the USFWS considers all ground-disturbing impacts associated with the proposed project to be long-term/permanent. Therefore, total long-term disturbance of occupied desert tortoise habitat from the project would be approximately 951.5 acres.

Approximately 849.9 acres of the SPGF are considered suitable desert tortoise habitat. The SPGF would be fenced to exclude desert tortoise and would be considered a permanent loss of habitat for the species. Other permanent impacts are associated with the 2.5-mile access road (approximately 15 acres), and gen-tie transmission pole locations and access roads (approximately 50.4 acres for the 230-kV transmission line and 16.6 acres for the 500-kV transmission line). Disturbance acreages are described in **Table 3**.

Construction equipment will not operate beyond the fenced boundary with the exception of the access road and the gen-tie and pipeline ROWs. Roads that are not designated as open by the Applicant and Tribe are not to be used by project personnel unless accompanied by a biological monitor.

Temporary loss (though it is considered permanent in this BA) of desert tortoise habitat may result from the construction of the proposed water pipeline, the 500-kV line, and the 230-kV lines. The water pipeline would be installed using trenching techniques that may impact existing burrows. This may be only a temporary loss given that the pipeline would be buried; however, vegetation re-growth over the pipeline would be slow. It is assumed that a 50-foot wide construction ROW would be utilized. A loss of desert tortoise habitat on approximately 22.1 acres would occur within the water pipeline ROW; however, no overall loss to desert tortoise territory would occur as a result of the construction of the pipeline.

Similarly, the gen-tie transmission lines would most likely be constructed using direct burial of steel or wooden poles. The pole locations could directly affect existing desert tortoise burrows as well as impacts from access roads and construction vehicles. A loss of desert tortoise habitat would occur for temporary work areas associated with both gen-tie options. Approximately 13.2 acres would be temporarily disturbed under the 500-kV line (includes construction areas and pull sites), while approximately 34.6 acres would be temporarily disturbed under the 230-kV line (includes construction areas and pull sites). These acreages were previously included in disturbance acreages of 50.4 acres and 16.6 acres cited above.

Project impacts are described in **Table 3**.

Table 3 – Impacts from the Proposed Action to Desert Tortoise Habitat

Project Component		Covertype	Long-Term Impacts (acres)	Temporary Impacts (acres)	Total Impacts (acres)
Solar Site		Creosotebush-White Bursage	817.6	0.0	817.6
		Xeroriparian	29.8	0.0	29.8
		TOTAL	**847.4**	**0.0**	**847.4**
230kV Gen-Tie	230kV Pole Structures	Creosotebush-Cactus/Yucca	3.9	0.0	3.9
		Creosotebush-White Bursage	2.6	0.0	2.6
		Saltbush	0.7	0.0	0.7
		Xeroriparian	0.1	0.0	0.1
		TOTAL	**7.3**	**0.0**	**7.3**
	230kV 12ft Road	Creosotebush-Cactus/Yucca	4.2	0.0	4.2
		Creosotebush-White Bursage	3.0	0.0	3.0
		Saltbush	0.8	0.0	0.8
		Xeroriparian	0.5	0.0	0.5
		TOTAL	**8.5**	**0.0**	**8.5**
	230kV Construction Area	Creosotebush-Cactus/Yucca	0.0	15.9	15.9
		Creosotebush-White Bursage	0.0	10.2	10.2
		Saltbush	0.0	2.8	2.8
		Xeroriparian	0.0	1.1	1.1
		TOTAL	**0.0**	**30.0**	**30.0**
	230kV Pull Site	Creosotebush-White Bursage	0.0	0.9	0.9
		Creosotebush-Cactus/Yucca	0.0	3.7	3.7
		TOTAL	**0.0**	**4.6**	**4.6**
500kV Gen-Tie	500kV Pole Structures	Creosotebush-White Bursage	1.1	0.0	1.1
		Xeroriparian	0.2	0.0	0.2
		TOTAL	**1.3**	**0.0**	**1.3**
	500kV 12ft Road	Creosotebush-White Bursage	2.1	0.0.	2.1
		Xeroriparian	0.0	0.0	0.0
		TOTAL	**2.1**	**0.0**	**2.1**
	500kV Construction Area	Creosotebush-White Bursage	0.0	6.2	6.2
		Xeroriparian	0.0	0.2	0.2
		TOTAL	**0.0**	**6.4**	**6.4**
	500kV Pull Site	Creosotebush-White Bursage	0.0	6.8	6.8
		TOTAL	**0.0**	**6.8**	**6.8**
Proposed Access Road		Creosotebush-White Bursage	13.4	0.0	13.4
		Xeroriparian	1.6	0.0	1.6

Project Component	Covertype	Long-Term Impacts (acres)	Temporary Impacts (acres)	Total Impacts (acres)
	TOTAL	15.0	0.0	15.0
Water Pipeline	Creosotebush-White Bursage	0.0	21.4	21.4
	Xeroriparian	0.0	0.7	0.7
	TOTAL	0.0	22.1	22.1
PROJECT TOTALS		881.6	69.9	951.5

*Acreage estimates were rounded independently – totals may not sum exactly.
**Table includes all habitats present within the MSEC project area except disturbed, playa lake and mesquite which do not represent suitable habitat for the desert tortoise.

5.1.3 Constriction of Movement

The Proposed Action is currently located in an area where desert tortoise movement is generally unrestricted. Topography in the area is gently sloping to rolling with no major barriers to movement. The extensive disturbance in the vicinity resulting from the numerous transmission lines, access roads, pipelines, substation and power generation facilities may affect tortoise movement via avoidance during construction, but generally do not directly restrict tortoise movement (with the exception of the substations and power generation facilities which actively exclude tortoises). Interstate 15 to the east and the Arrow Canyon Range likely represent barriers to movement out of the Dry Lake Valley to the east or west. North and/or south movement within the valley is generally unrestricted.

Exclusionary fencing would be installed around the perimeter of the entire SPGF in order to exclude tortoises. The exclusionary fencing would restrict desert tortoise movement on the site but would not preclude north-south movement through the Dry Lake Valley. No permanent exclusionary fencing would be used on the access road, gen-tie transmission lines, or water pipeline. These areas would experience temporary disturbance that could affect tortoise movement but would not directly restrict it.

Biological monitors would be in place along the access road during construction and/or temporary fencing utilized during the construction period to minimize any impacts from vehicles during construction. Once exclusion fencing has been installed and clearance surveys completed, biological monitors would not be required.

5.1.4 Vibration

Equipment that will cause surface disturbance and otherwise operate during construction will be limited to what would be needed to develop dirt access roads that are generally at landform grades, equipment to install solar arrays and poles, trenching equipment for installation of cable and wiring and equipment to install the small operations building and the proposed electric substation. Areas outside of the exclusion fence may experience short-term vibrations that could potentially disturb desert tortoise. Vibration is unlikely to be noticeable farther than a few tens of feet beyond the source of the vibration. Construction taking place near the perimeter edge of the exclusion fence is limited. Activity during operations will be substantially less than during construction of the Proposed Action, such that no adverse effects from ground vibration on desert tortoise are expected to occur during operation of the Proposed Action.

5.1.5 Dust

Construction activities and operational vehicle traffic on the roads within the Action Area could generate dust that would affect vegetation adjacent to the Action Area in the short-term; long-term adverse effects on vegetation are not expected to occur. The buildup of dust on plant leaves could affect photosynthetic productivity and nutrient and water uptake resulting in loss of potential foraging plants for desert tortoise. It is assumed that this low level dusting effect during construction would be minimal and most likely washed away during rainstorms. Construction BMPs would be in place to monitor and decrease dust pollution if required by use of polymeric stabilizers in the soil or with frequent watering with water trucks or other means.

5.1.6 Noise

Noise sources around the Proposed Action include road traffic (I-15), railroad traffic (Union Pacific Railroad), aircraft flyover (primarily from Nellis Air Force Base in North Las Vegas), and industrial activities (Harry Allen Generating Station). On the basis of the rural nature of the area and low population density, the day–night average noise level (Ldn or DNL) is estimated to be within the range of 33 to 47 dBA Ldn typical of a rural area (Eldred 1982; Miller 2002).

Noise measurements and analyses were conducted for the nearby K Road Solar Project in 2011. These measurements (Ldn, A-weighted) indicated an Ldn of 54.4 dBA and a 24 hour Leq of 50.4 dBA. Because the proposed MSEC Project is further away than the K Road solar project from most noise sources, it can be assumed that overall noise levels will be lower than those identified for the K Road Solar Project.

Project operation will generate an increase in ambient noise of 10 to 20 dBA. The amount of noise during operation will not represent a significant change from the current ambient levels.

Noise generated during construction is not a significant change from existing conditions near the interstate and the railroad, but does represent an increase at locations furthest from these sources towards the western border of the SPGF. Desert tortoises outside of the proposed solar facility boundary may be tolerant of noise, given desert tortoise home range and vicinity to the interstate and railroad, and therefore, resident nearby and adjacent individuals are not expected to be substantially affected by temporary construction noise levels.

5.1.7 Lighting

The Project’s lighting system will provide operation and maintenance personnel with illumination for both normal and emergency conditions near the main entrance and the Project substation. Lighting will be designed to provide the minimum illumination needed to achieve safety and security objectives and will be downward facing and shielded to focus illumination on the desired areas only. There will be no lighting in the solar field. Therefore, light trespass on surrounding properties will be minimal. If lighting at individual solar panels or other equipment is needed for night maintenance, portable lighting will be used. Project lighting is not expected to have a more than negligible effect on desert tortoise near and adjacent to the Proposed Action

5.1.8 Edge Effects

The edge effect is the effect of the juxtaposition or placing side by side of contrasting environments on an ecosystem. This term is commonly used in conjunction with the boundary between natural habitats and disturbed or developed land. The Proposed Action includes placement of a permanent exclusionary fence along the SPGF boundary. Other than impacted burrows or desert tortoises that need to be relocated during fence construction we assume that there will be no permanent or long term edge effects as a result of the Proposed Action. The fence may create roosting sites for ravens or birds of prey; these effects would be mitigated through the preparation and implementation of a Raven Control Plan (see **Section 5.1.10**).

5.1.9 Introduction of Weeds and Invasive Species

Introduction of weeds and invasive species to the Proposed Action and surrounding area will be controlled using the approved weed management plan and will prevent the spread/colonization of weeds onsite and off-site. Invasive species could be introduced to the area via transport by construction vehicles and equipment. The ground would be disturbed during construction providing increased opportunity for weed establishment. The weed management plan will identify management and operational practice to avoid the introduction or spread of existing invasive species within the Action Area. The goal of this plan would be to minimize potential effects from weeds and invasive species within the Action Area and adjacent lands, as well as to avoid adverse effects on desert tortoise foraging habitat off-site. Implementation of this plan would result in no adverse effects on desert tortoise from weeds or invasive species within the Action Area or on adjacent lands.

5.1.10 Attraction of Human Subsidized Predators

Avian predators and scavengers such as the common raven (*Corvus corax*) benefit from a myriad of resource subsidies provided by human activities as a result of substantial development within the desert as compared to undeveloped desert landscapes (Boarman et al. 2006). These subsidies can include food (e.g. garbage), water (e.g. detention ponds), nesting substrates (e.g. transmission lines and fencing), and safety from inclement weather or predators (e.g. office buildings). Raven and other predators may be attracted to elevated structures associated with the Proposed Action such as the perimeter fencing, transmission line and poles, and operational buildings onsite. There is a potential for increased sources of food or water both during construction and operation of the project particularly at facilities where people will concentrate; however, agency approved BBCS and Raven Control Plans (RCP) were developed and will be approved prior to the initiation of construction activities which will reduce or eliminate potential raven (or other avian predators) related impacts to desert tortoise. Education regarding control of food/trash sources and minimization of water resources and potential ‘perching’ areas is the main focus of the plan.

5.1.11 Determination

Implementation of the Proposed Action “**may affect, and is likely to adversely affect**” the desert tortoise in the Action Area. This determination is based on the following considerations:

- Construction-related impacts on the desert tortoise could include direct mortality or injury as a result of being crushed by vehicles and disturbance of soil. During pedestrian surveys of the Action Area, desert tortoise sign (e.g., scat, tracks, burrows, shell fragments) as well as live tortoises were observed. In addition to the direct and indirect effects of construction on the tortoise, temporary and permanent disturbance to desert tortoise habitat would occur.

Based on all of the foregoing, it is concluded that the project is likely to adversely affect the desert tortoise. However, the project would not jeopardize the continued survival or future recovery of the desert tortoise.

5.2 Moapa Dace

The Moapa dace is only known to occur in the Muddy River and several associated headwater springs in the Warm Springs area. Those springs represent the primary water source for the Muddy River to which the Moapa dace is endemic. The Proposed Action would include the withdrawal of up to 30 acre-feet per year (afy) from the EC-1 well, approximately 12-miles north of the project. Groundwater withdrawals represent the only potential effect to Moapa dace from the Proposed Action.

5.2.1 Water Drawdowns

The entire flow of the Muddy River is derived from the discharge from the regional carbonate aquifer, except during infrequent precipitation events that increase River flows for up to a few days. Historic flow records indicate that about 51 cubic feet per second (cfs) of groundwater discharge sustain the spring and river flows. Currently, consumptive uses related to 1) natural evapotranspiration, 2) surface-water diversions, and 3) groundwater diversions reduce the Muddy River flows to about 25,000 afy (35 cfs) at the Warm Springs Road gaging station, located about 3 km downstream of the spring area. Thus, about 32% (12,000 afy) of the regional flux to the area is consumptively removed from the system above the gage. Of this, about 3,600 afy (~25%) is estimated to be lost by evapotranspiration from the well-vegetated areas of the headwater channels and springs, and the rest is removed through pipelines by Moapa Valley Water District (MVWD) and Nevada Power Company (NPC) for use elsewhere.

Several groundwater models were created to predict the range of potential impacts resulting from the withdrawal of up to approximately 30 afy at the EC-1 well. Several regional groundwater scenarios may be possible based on current uncertainty about connectivity between portions of the field and the role of adjacent areas on the edges of field. The various models were used to predict the various potential scenarios that could arise given these uncertainties. The models used 2001 flows as the model baseline (40.5 cfs).

Estimates of flow reduction ranged from a 0.006% reduction in 10 years (0.036% reduction in 75 years) to a 0.008% reduction in 10 years (0.073% reduction in 75 years). Experimental and observation evidence suggest that the model predicting the lowest impacts is likely the most plausible. Thus, for the purposes of this analysis the values of 0.006% in 10 years/0.036% in 75 years will be used. These reductions would result in flows in the Muddy River of 40.26 cfs in 10 years (39.04 cfs in 75 years), compared to the baseline flow of 40.5 in 2001.

On July 14, 2005 a Memorandum of Agreement (MOA) was signed by the Southern Nevada Water Authority (SNWA), Meadow Valley Wash Water District (MVWWD), (CSI), the Tribe and the USFWS regarding the withdrawal of 16,100 afy from the regional carbonate aquifer in Coyote Spring Valley and California Wash Basins that included conservation measures for the Moapa dace. The MOA outlined specific conservation actions that each party would complete in order to minimize potential impacts to the Moapa dace should water levels decline in the Muddy River system as a result of the cumulative withdrawal of 16,100 aft of groundwater from the two basins. On January 20, 2006 the USFWS concluded intra-service consultation and issued a programmatic biological opinion (PBO) entitled the *Intra-Service Programmatic Biological Opinion for the Proposed Muddy River Memorandum of Agreement Regarding the Groundwater Withdrawal of 16,100 Acre-Feet per Year from the Regional Carbonate Aquifer in Coyote Spring Valley and California Wash Basins, and Establish Conservation Measures for the Moapa Dace, Clark County, Nevada* (Programmatic Biological Opinion; PBO). The MOA and PBO include the following conservation measures:

1. Implement restoration of Moapa dace habitat on the USFWS's Apcar Unit of the Moapa Valley

National Wildlife Refuge (MVNWR);
2. Develop a Recovery Implementation Program (Recovery Program), which will be used to effectuate the goals of the MOA by implementing measures necessary to accomplish the protection and promote the recovery of the Moapa dace, as well as, outline the development of regional water facilities and include additional parties as appropriate. The Recovery Program will be developed for the purposes of continuing to identify the key conservation actions that, when implemented, would continue to contribute to off-set any pumping impacts that may result from groundwater pumping;
3. Assist in developing an ecological study designed specifically to determine effects of groundwater pumping on the Moapa dace and other aquatic dependent species in the Muddy River system;
4. Construct fish barriers in order to prevent additional non-native fishes from migrating into Moapa dace habitat;
5. Eradicate non-native fish, such as tilapia from the historic range of Moapa dace;
6. Restore Moapa dace habitat outside the boundary of the MVNWR;
7. Provide the use of the Tribal greenhouse to cultivate native plants for restoration actions in the Muddy River area;
8. Provide access to Tribal lands for the construction and maintenance of at least one fish barrier;
9. Dedication of an existing 1.0 cfs Jones Spring water right (MVWD) towards establishing and maintaining in-stream flows in the Apcar tributary system that empties into the Muddy River as outlined in Attachment B; and

Dedication of 460 afy of water rights (portion of CSI appropriated water rights) to the survival and recovery of the Moapa dace, in perpetuity. In addition, minimum in-stream flow levels were also established in the MOA that trigger various conservation actions should those predetermined levels be reached. The flow levels will be measured at the Warm Springs West Flume located on MVNWR. These automatic actions are identified in the MOA and are summarized below:

1. Should the water flows reach 3.2 cfs, the signatories will meet to discuss the issue and compare/evaluate hydrology data;
2. Should the water flows reach 3.0 cfs, during the pendency of the pump test, the Arrow Canyon well will shut down and SNWA will provide the MVWD with the sufficient water quantity necessary to meet their municipal demands. In addition, SNWA and CSI will take necessary actions to geographically redistribute groundwater pumping in Coyote Springs Valley if flows levels continue to decline;
3. Should the water flows reach 3.0 cfs or less but greater than 2.9 cfs, SNWA and CSI will restrict groundwater pumping from MX-5 and RW-2 wells, and CSI Well #1 (Permit 70430) and CSI Well #2 (Permit 70429) and other wells in Coyote Spring Valley, in combination, to 8,050 afy;
4. Should the water flows reach 2.9 cfs or less but greater than 2.8 cfs, SNWA and CSI will restrict groundwater pumping from MX-5 and RW-2 wells, and CSI Well #1 (Permit 70430) and CSI Well #2 (Permit 70429) and other wells in Coyote Spring Valley, in combination, to 6,000 afy, and the Tribe will restrict their pumping (under permit number 54075) in the California Wash basin to 2,000 afy;
5. Should the water flows reach 2.8 cfs or less but greater than 2.7 cfs, SNWA and CSI will restrict groundwater pumping from MX-5 and RW-2 wells, and CSI Well #1

(Permit 70430) and CSI Well #2 (Permit 70429) and other wells in Coyote Spring Valley, in combination, to 4,000 afy, and the Tribe will restrict their pumping (under permit number 54075) in the California Wash basin to 1,700 afy;
6. Should the water flows reach 2.7 cfs or less, SNWA and CSI will restrict groundwater pumping from MX-5 and RW-2 wells, and CSI Well #1 (Permit 70430) and CSI Well #2 (Permit 70429) and other wells in Coyote Spring Valley, in combination, to 724 afy, and the Tribe will restrict their pumping (under permit number 54075) in the California Wash basin to 1,250 afy.

The PBO indicated that the adverse effects associated with the withdrawal of 16,100 afy of groundwater would not result in "jeopardy" for the Moapa dace. The USFWS estimated that the incidental take of Moapa dace at the programmatic level would be a 22-percent loss in riffle habitat and a 16-percent loss in pool habitat.

Current monitoring data indicate that the instream flow at the Warm Springs West Flume is 3.4 cfs, which represents a 0.2 cfs reduction in flows since pumping began. As such, no instream flow trigger points have been reached.

The Moapa dace will not be directly affected by the construction or operation and maintenance of the proposed action. However, groundwater withdrawals associated with the proposed action would indirectly affect the Moapa dace. The effects of these groundwater withdrawals were previously analyzed in the 2006 PBO which evaluated the cumulative effects associated with the withdrawal of up to 16,100 afy from the carbonate aquifer in Coyote Spring Valley and California Wash basins. The Tribe is one of several parties that would withdraw water under this analysis. Up to 2,500 afy of Tribal withdrawals were included in the total 16,100 analyzed in the 2006 PBO; the 30 afy of withdrawals proposed as part of the MSEC would be included in the previously permitted 2,500 afy. The use of these 30 afy would contribute to ongoing adverse effects to Moapa dace as was analyzed in the 2006 PBO to which this document tiers.

5.2.2 Determination

Groundwater pumping associated with the Proposed Action "**may affect, and is likely to adversely affect**" Moapa dace because the withdrawal of 30 afy would contribute to ongoing adverse effects as analyzed in the 2006 PBO.

5.3 Cumulative Effects Analysis

Cumulative effects are effects resulting from future Tribe, State or private activities, not involving Federal activities that are reasonably certain to occur within the Action Area of the Federal action subject to consultation.

Because the Tribe (BIA), BLM and NPS administer much of the land surrounding the Action Area, many of the actions that are reasonably expected to occur would be subject to the requirements of Section 7 consultation. The Tribe has no future projects planned for the area surrounding the Action Area that would not incorporate BIA as the lead agency; therefore, the cumulative effects analysis is not warranted.

The implementation of the Proposed Action "may affect, and is likely to adversely affect the desert tortoise". Take would occur in the form of harassment, potential mortality, and loss of occupied habitat.

Implementation of a preconstruction survey, biological monitoring, a project-specific RCP, worker environmental awareness training and exclusionary fencing is intended to minimize direct mortality of desert tortoise. Based on the amount of suitable habitat that would be impacted and estimated population based on 100 percent desert tortoise surveys, within the Action Area, up to 45 adult ddesert tortoise, up to 234 juvenile and/or hatchling desert tortoise and up to 192 desert tortoise eggs and 952 acres of potential tortoise habitat may be affected by the Proposed Action (881.6 acres of permanent impacts and 69.9 acres of temporary impacts).

Implementation of the Proposed Action is expected to have adverse effects on the Moapa dace. The Proposed Action would contribute to ongoing cumulative effects to this species as was analyzed in the 2006 PBO to which this BA tiers.

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Appendix A – Desert Tortoise Survey Report

Desert Tortoise Survey Report

Moapa Solar Energy Project

UPDATED REPORT (Revision 2)

October 2013

Prepared by:

Heritage Environmental Consultants, LLC

Table of Contents

<u>APPENDICES</u>

INTRODUCTION

Moapa Solar LLC (Moapa) proposes to construct and operate the Moapa Solar Energy Center (Project) in northeastern Clark County in southern Nevada. The Project would consist of a solar power generation facility (SPGF), water pipeline, gen-tie lines that would interconnect the Project to the regional electrical transmission grid, and an access road between the SPGF and a frontage road along the west side of Interstate 15 (I-15). The SPGF and water pipeline would be located entirely on lands within the Moapa River Indian Reservation, the gen-tie lines would be located on both Reservation and BLM-administered lands, and the access road would be located primarily on BLM-administered lands (**Figures 1 and 2**).

Solar Power Generation Facility

The solar power generation facility (SPGF) would be located on the Moapa River Indian Reservation, approximately 20 miles northeast of Las Vegas, Nevada, near Apex, Nevada. Specifically, the SPGF will be located on approximately 850 acres of leased tribal lands owned by the Moapa Band of Paiutes. It would be developed using photovoltaic (PV) technology producing up to 200 Megawatts (MWs) in size. The proposed PV project would utilize crystalline silicon or thin-film PV panels that would be mounted on single-axis trackers. Using single-axis trackers, the panels will be oriented in north-south rows with the panels moving to track the sun as it moves across the sky during the day.

Water Supply/Pipeline

Water for the Project would be provided by the Tribe from an existing groundwater well located in Section 15, about 5.4 miles northeast of the SPGF site. It would be delivered to the SPGF site via a water pipeline located wholly on the Reservation. The pipeline would originate at the well and would follow existing roads and ROWs from the well to the SPGF site. The water pipeline would be 8 to 12 inches in diameter and would be buried 3 to 6 feet below the ground surface. A portion of this pipeline (about 4.7 miles) would be within a designated utility corridor administered by the BLM.

Transmission Lines

The construction of new transmission lines is necessary to deliver the power generated by the MSEC Project to the electrical grid. Two gen-tie transmission lines will be constructed for the power generated at the SPGF to be delivered to the Harry Allen Substation (via a 230 kV transmission line) and the Crystal Substation (via a 500 kV transmission line). The 230 kV and 500 kV transmission lines would originate at the Project substation located on the SPGF site.

The gen-tie lines would consist of the following:

- Approximately 7.5 miles of single-circuit 230-kV overhead transmission line from the SPGF to the Harry Allen 230-kV Substation
- Approximately 1.5 miles of single-circuit 500-kV overhead transmission line from the SPGF to the 500 kV Crystal Valley Substation.

The 230 kV line to Harry Allen would head south from the SPGF site for approximately 2.5 miles until intersecting an existing 500-kV transmission line. The proposed transmission line would then follow, on the north side, the existing transmission line for approximately 3.8 miles and then stay north of the Harry Allen 500-kV Substation. Approximately 0.3 mile past the substation, the proposed line would cross an existing 500-kV transmission line at a 90-degree angle and proceed for another 0.4 mile before turning northeast and connecting into the Harry Allen 230-kV Substation on the north side of the substation. This route is approximately 7.5 miles long (**Figure 1**).

A modified route for the 230 kV line as it approaches the Harry Allen 230 kV substation has been developed to accommodate the proposed expansion of the existing substation west of the Harry Allen Power Plant. This route modification would follow the above described alignment until adjacent to the Harry Allen Power Plant where it would turn due west for approximately 0.5 miles before heading southwest for approximately 0.65 miles, then southeast for approximately 0.6 miles, then turning northeast for approximately 0.45 miles where it would enter the Harry Allen 230 kV substation on the southwest side (**Figure 3**).

The maintenance road associated with the existing 500 kV line will be used to the extent possible for construction and maintenance of the proposed 230 kV transmission line.

The design, construction, operation, and maintenance of the transmission lines will meet requirements of the National Electrical Safety Code (NESC); U.S. Department of Labor, Occupational Safety and Health Standards; and the Resource Management Plan's requirements for safety and protection of landowners and their property. Transmission line design will also be consistent with recommendations for reducing negative impacts of power lines on birds found in Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006 by Edison Electric Institute and the Avian Power Line Interaction Committee (APLIC, 2006).

The Project is planning to use steel monopole transmission structures for the 230 kV line to the Harry Allen Substation. The monopole structures for the 230 kV line would range in height from 60 feet to 100 feet. The structures for the 500 kV line to the Crystal Substation would also be steel monopole structures.

Access Road

The Project would require vehicular access for construction, operation, and maintenance. A 2.5-mile gravel access road connecting the SPGF to the existing paved frontage road adjacent to I-15 would be constructed on BLM-administered lands. From the existing paved frontage road west of I-15, the proposed site access road would follow an existing dirt road for approximately 2.0 miles until it reaches the proposed 230 kV gen-tie transmission line ROW which it would follow approximately 0.5 mile north to the SPGF site (**Figure 1**).

The access road would be designed to accommodate equipment deliveries, the construction workforce, and, ultimately, the operational needs of the Project. The surface of the road is proposed to be 24 feet wide, would be two lanes, and would have adjacent shoulders and drainage swales on either side. The Applicant has requested a 100-foot-wide ROW so the existing road can be straightened if needed in some places. Final design for the access road would be consistent with BLM and Clark County road standards. The road would be maintained by the Project.

Legal Description

The SPGF is located in T17S, R64E; and T17S, R63E Mount Diablo Base and Meridian. The legal description, township/range, section, and subdivision for the BLM-administered lands crossed by the transmission lines and access road are shown in **Table 1**.

Table 1 - Township/Range, Section, and Subdivision Information

Township/Range	Section	Subdivision	Project Element
T17S, R64E	8	E 1/2 of W 1/2	Transmission Line Route Access Road
		NE 1/4	Access Road
	16	W 1/2	Access Road
	17	E 1/2 of W 1/2	Transmission Line Route
	20	NW 1/4	Transmission Line Route
	19	SE 1/4 of NE 1/4, SE 1/4, SE 1/4 of SW 1/4	Transmission Line Route
	30	NW 1/4	Transmission Line Route
T17S, R63E	25	S 1/2 of NE 1/4, NW 1/4 of SE 1/4, SW 1/4	Transmission Line Route
	36	NW 1/4 NW 1/4	Transmission Line Route
	35	NE 1/4, SE 1/4 of NW 1/4, SW 1/4, SE 1/4	Transmission Line Route
		SE 1/4 of SE 1/4	Transmission Line Route
	36	W 1/2 of NE 1/4, SE 1/4 of NW 1/4, SW 1/4	Transmission Line Route

T17S R64E	9	E ½ of SE	Transmission Line Route
	10	W ½ of SW	
T16S, R64E	15	SE 1/4, NE 1/4	Pipeline
	14	SW 1/4, NW 1/4	Pipeline
		NW 1/4, SW 1/4	Pipeline
		SE 1/4, SW 1/4	Pipeline
	23	NW 1/4, NW 1/4	Pipeline
		SW 1/4. NW1/4	Pipeline
	22	SE 1/4, NE 1/4	Pipeline
		NE 1/4, SE 1/4	Pipeline
		SW 1/4, SE 1/4	Pipeline
		SE 1/4, SW 1/4	Pipeline
	27	NE 1/4, NW 1/4	Pipeline
		NW 1/4, NW1/4	Pipeline
	28	SE 1/4, NE 1/4	Pipeline
		NE 1/4, SE 1/4	Pipeline
		NW 1/4, SE 1/4	Pipeline
		SE 1/4, SW 1/4	Pipeline
		SW 1/4, SW1/4	Pipeline
	33	NW 1/4, NW 1/4	Pipeline
		SE 1/4, SE1/4	Pipeline
		SW1/4, SE1/4	Pipeline
		SE 1/4, SW1/4	Pipeline
		SW 1/4, SW 1/4	Pipeline

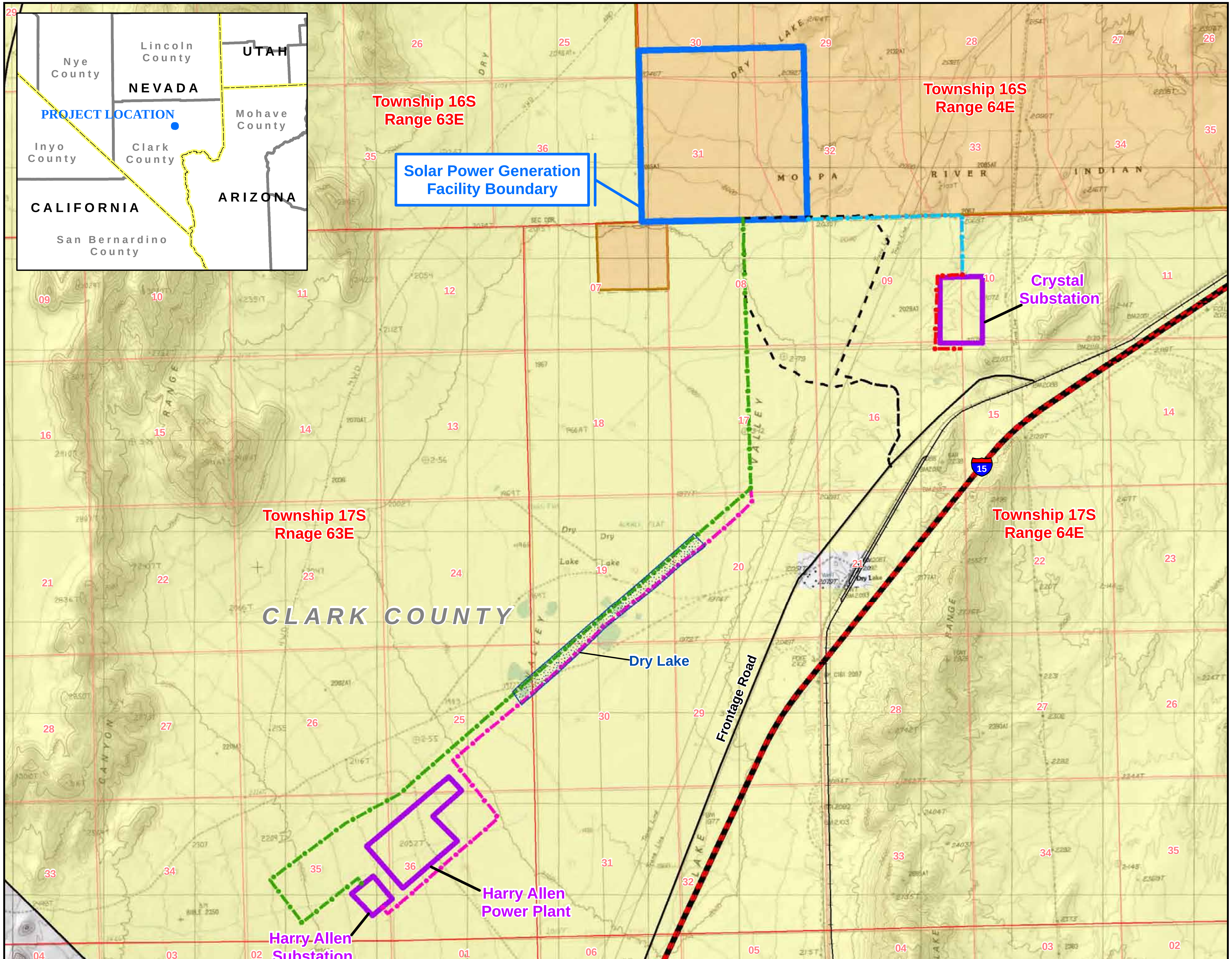
Surveyed Species

Desert tortoise (*Gopherus agassizii*), Burrowing Owl (*Athene cunicularia*) and gila monster (*Heloderma suspectum*) were identified by the BLM as species of concern for the Project and they requested that desert tortoise surveys be conducted to determine presence/absence and relative densities within the proposed Project area and alternatives. The BLM also requested that incidental observations of Burrowing Owls and gila monsters be recorded during the desert tortoise survey (Slaughter 2012). Biological surveys for these species were conducted previously in 2010 (Nevada Biological Consulting 2010) but because desert tortoise surveys expire after one year, the results of these 2010 surveys became invalid during the spring of 2011.

This report documents the results of spring and fall 2012 surveys, and fall 2013 surveys targeting the aforementioned species on tribal and federal lands to be used by the Project and associated transmission interconnection and access road options.

Agency Consultation History

The Project and Project biologists participated in several phone calls with the USFWS and BLM prior to surveys in 2012. Patrick Golden contacted Michael Burrows, Fish and Wildlife Biologist, USFWS in February 2012 and again in April 2012 to verify the use of the 2010 survey protocol and to verify the appropriate survey timing. Mr. Golden also contacted Mark Slaughter, Wildlife Biologist, BLM in April 2012 to verify which special status species, in addition to the desert tortoise, should be surveyed concurrently with desert tortoise surveys. The applicant contacted the USFWS in October 2012 to discuss the Fall 2012 survey plan. Mr. Golden also spoke with Susan Cooper, Fish and Wildlife Biologist, USFWS and Melanie Cota, Wildlife Biologist, BLM in September 2013 prior to initiating the survey.



Legend

Interstate

Railroad

Proposed Access Road - 100' ROW

Proposed Transmission Lines

230-kV Transmission Line Option A

230-kV Transmission Line Option B

500-kV Transmission Line Option A

Additional 500-kV Transmission Survey Corridor

Township/Range Boundary

PLSS Section Line

Existing Substation Boundary

Solar Power Generation Facility Boundary

Unsuitable Desert Tortoise Habitat

Jurisdictional Land Ownership

Bureau of Land Management Land

Indian Land

0 0.5 1 1.5
Miles

Universal Transverse Mercator
North American Datum 1983
Zone 11 North, Meters

Moapa Solar Energy Center

FIGURE 1 - PROJECT AREA

Map Extent: Clark County, Nevada

Date: 09-26-12 | Author: djb

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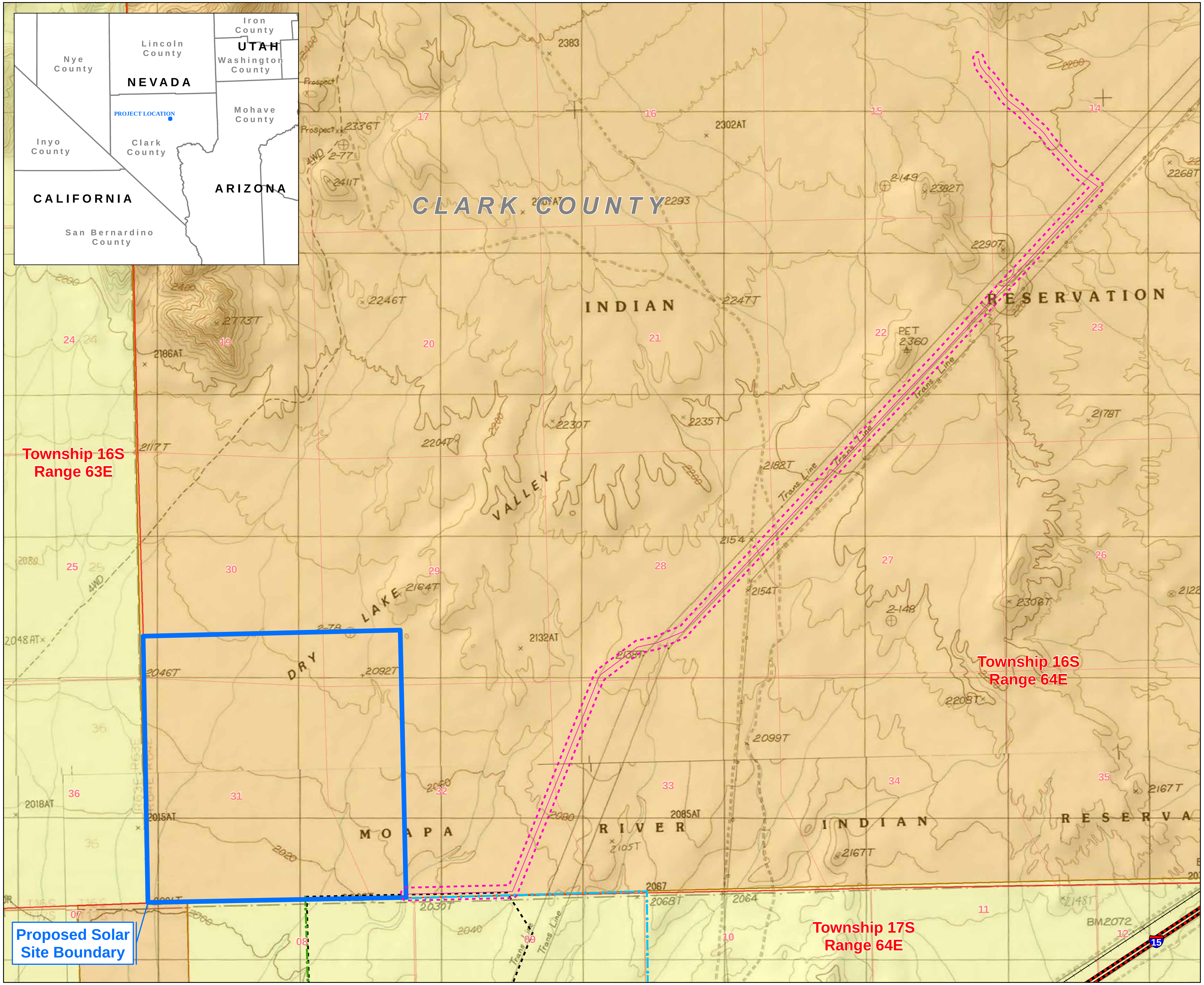

Moapa Solar Energy Center

Figure 2 - Water Pipeline Project Area

Map Extent: Clark County, Nevada

Date: 11-20-12 Author: rnc

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Moapa Solar Energy Center

Figure 3 – 230kv Transmission Re-Route

Map Extent: Clark County, Nevada

Date: 10-07-13 | Author: rnc

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METHODS

Desert Tortoise

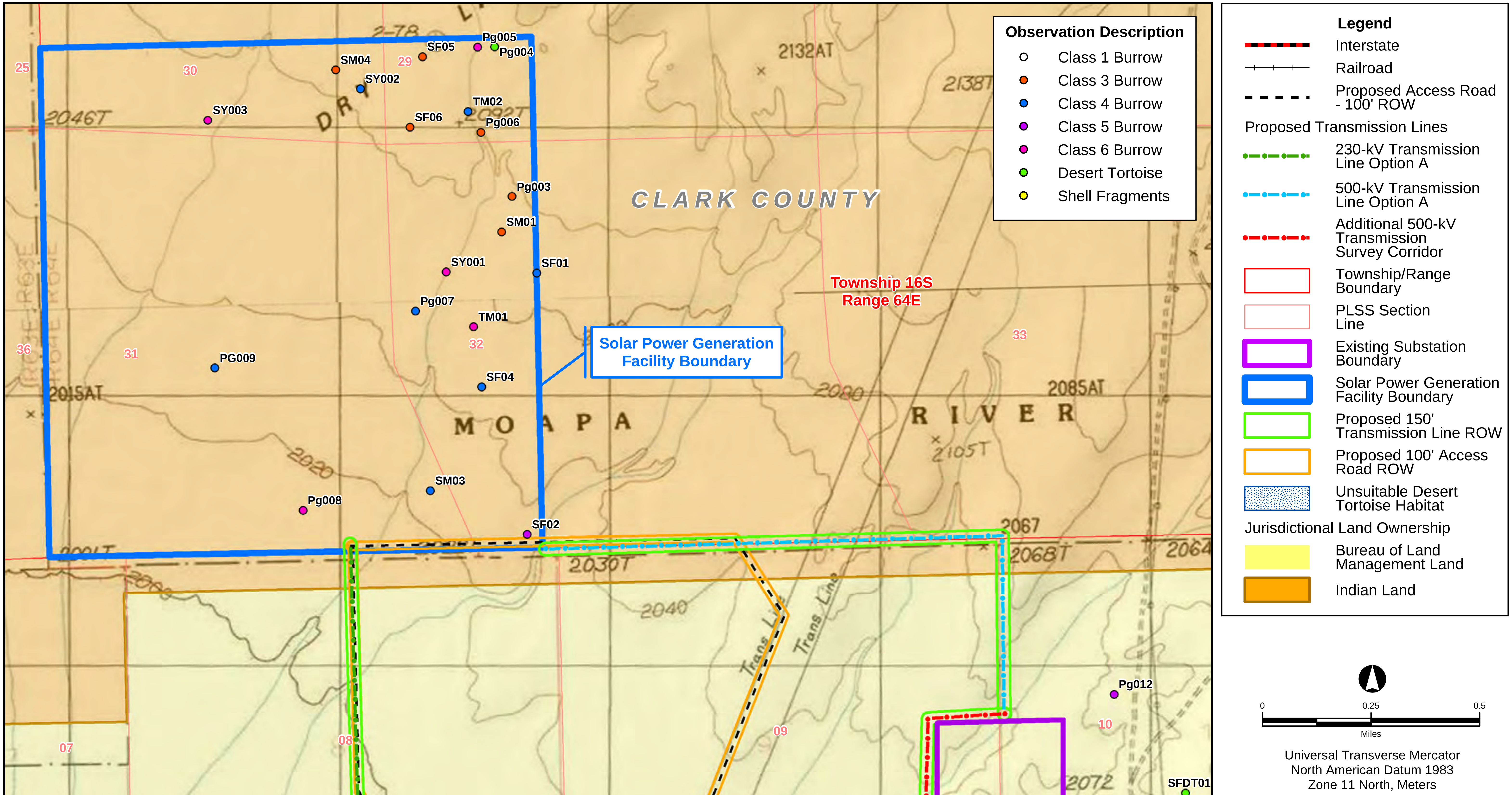
The desert tortoise survey methodology employed was designed to determine presence/absence and abundance of desert tortoises within the Project area. It is the *Pre-project Field Survey Protocol for Potential Desert Tortoise Habitats* (USFWS protocol) described in the *Preparing For Any Action That May Occur Within The Range Of The Mojave Desert Tortoise (Gopherus agassizii*; USFWS 2010). The information gathered is intended to:

1. Determine the appropriate level of consultation with the U.S. Fish and Wildlife Service (USFWS) and Nevada Department of Wildlife (NDOW);
2. Determine the amount of incidental take of Desert Tortoises resulting from the Project as defined by the Endangered Species Act (ESA) and state laws; and
3. Assess the distribution of Desert Tortoises to help minimize and avoid take.

Based on the most recent USFWS protocol (USFWS 2010), a site assessment is conducted within the survey area to determine the suitability of the habitat for Desert Tortoise. Pursuant to the protocol, if the survey area is large (>40 acres), surveys should be conducted during the Desert Tortoise's most active periods (April through May or September through October) when air temperatures are lower than 104°F. The USFWS guidance also indicates that projects smaller than 2,789 acres that are located within the North-East Mojave: North Recovery Unit must complete 100% coverage surveys. Therefore, probabilistic sampling was not an option for the Project. Ten-meter wide belt transects were used during the survey and were designed to cover the entire Project area (100 percent coverage). The sampling protocol implemented for this survey was reviewed and approved by the USFWS prior to implementation.

Occurrences of either live desert tortoises or desert tortoise sign in the survey area were used to indicate desert tortoise presence. The Project site, transmission line ROWs, and access road ROWs were surveyed with ten-meter transects ensuring 100 percent coverage of those areas. If neither actual desert tortoises nor sign thereof were encountered during the surveys in any given portion of Project (e.g. a particular transmission interconnection corridor), three additional 10-m belt transects at 200-m intervals parallel to and/or encircling the Project area perimeter (200- m, 400-m, and 600-m from the perimeter of the Project site) were also surveyed. These transects were used to determine the presence/absence of desert tortoise but they were not included in the estimation of desert tortoise abundance.

Three separate desert tortoise surveys were conducted. The first survey took place in May of 2012 and surveyed the SPGF, access roads and transmission lines (**Figures 4a, 4b, and 4c)**. The second survey was conducted in October of 2012 and covered the water pipeline (**Figure 5).** The third survey took place in October of 2013 and covered the route modification of the 230 kV transmission line near the Harry Allen 230 kV substation (**Figure 6**). Twelve 10-meter wide belt transects were surveyed during the route modification survey (an area 120 meters, or 395 feet, wide). All observed desert tortoise sign were mapped and recorded. Sign included scat, burrows, live tortoises, carcasses, shell fragments, eggshells, tracks, courtship rings, and drinking depressions.



Moapa Solar Energy Center

FIGURE 4A
DESERT TORTOISE DETECTION

Map Extent: Clark County, Nevada

Date: 10-07-13 | Author: rnc

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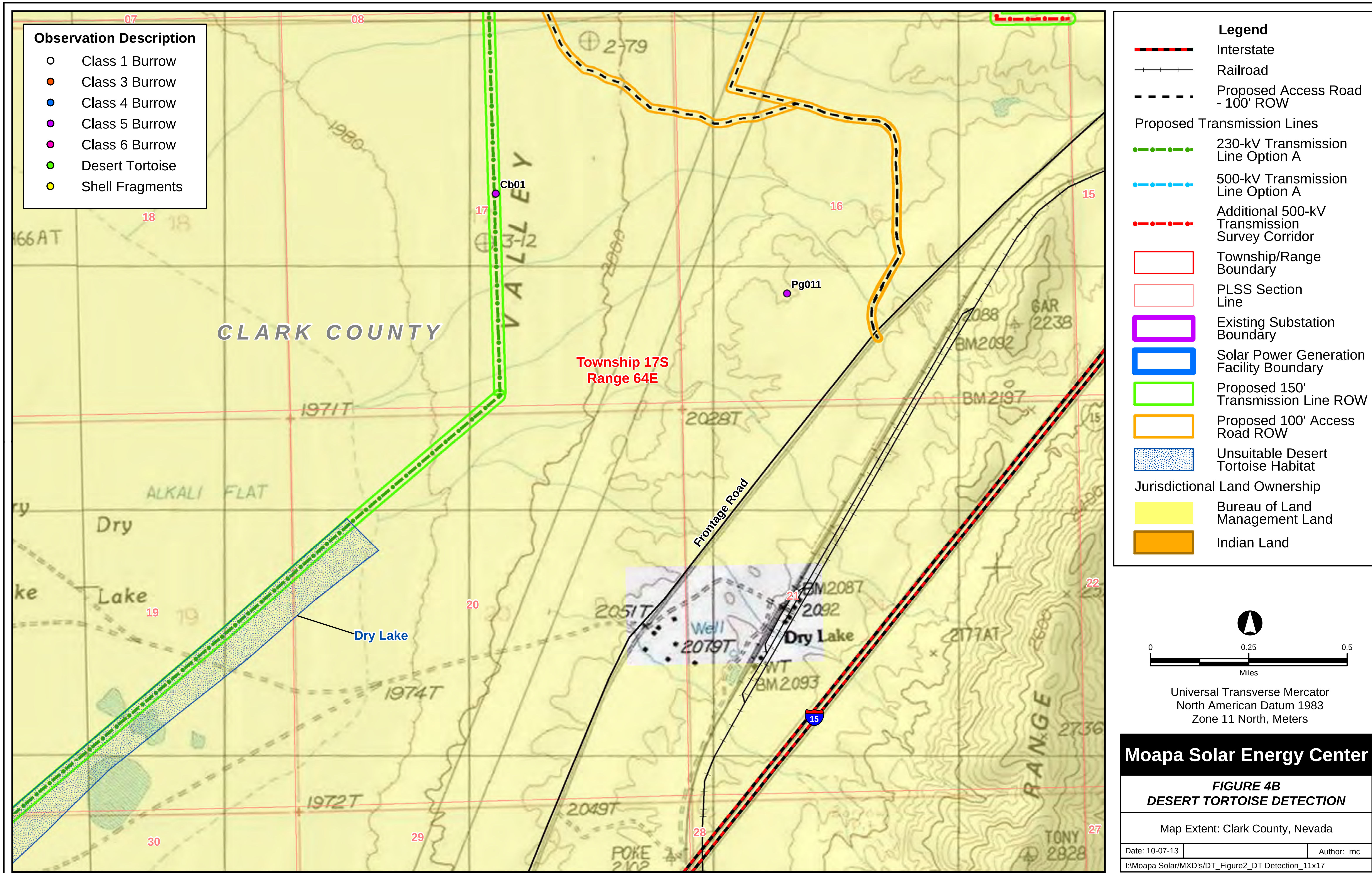
Observation Description
Class 1 Burrow
Class 3 Burrow
Class 4 Burrow
Class 5 Burrow
Class 6 Burrow
Desert Tortoise
Shell Fragments
Cb01
Pg011
CLARK COUNTY
Township 17S
Range 64E
Frontage Road
Dry Lake
ALKALI FLAT
Legend
Interstate
Railroad
Proposed Access Road - 100' ROW
Proposed Transmission Lines
230-kV Transmission Line Option A
500-kV Transmission Line Option A
Additional 500-kV Transmission Survey Corridor
Township/Range Boundary
PLSS Section Line
Existing Substation Boundary
Solar Power Generation Facility Boundary
Proposed 150' Transmission Line ROW
Proposed 100' Access Road ROW
Unsuitable Desert Tortoise Habitat
Jurisdictional Land Ownership
Bureau of Land Management Land
Indian Land
0
0.25
0.5
Miles
Universal Transverse Mercator
North American Datum 1983
Zone 11 North, Meters
Moapa Solar Energy Center
FIGURE 4B
DESERT TORTOISE DETECTION
Map Extent: Clark County, Nevada
Date: 10-07-13
Author: rnc
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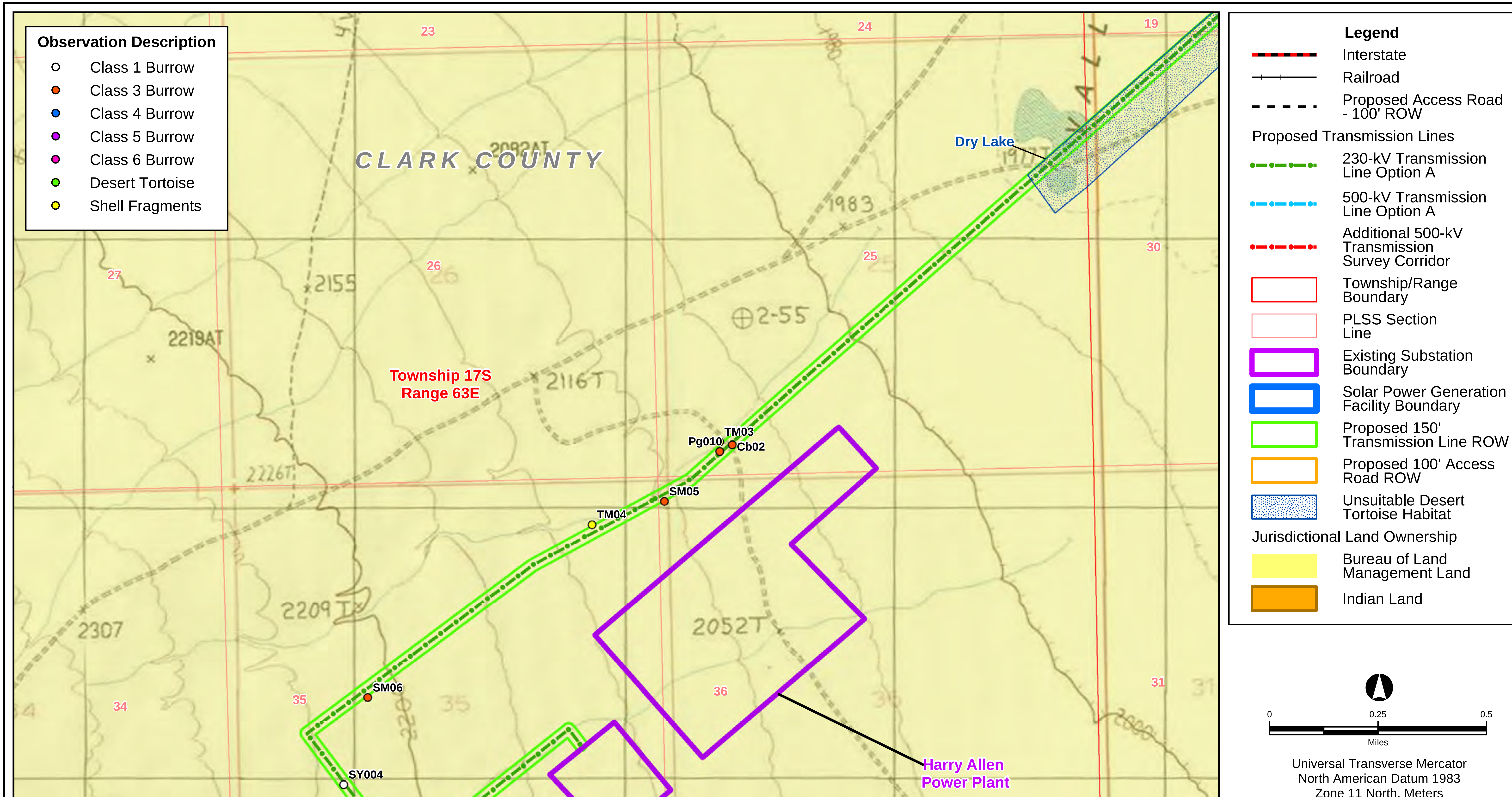

Moapa Solar Energy Center

FIGURE 4C
DESERT TORTOISE DETECTION

Map Extent: Clark County, Nevada

Date: 10-07-13 | Author: rnc

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Observation Description
Class 1 Burrow
Class 1/2 Burrow
Class 2 Burrow
Class 3 Burrow
Class 5 Burrow
Desert Tortoise
Shell Fragments
CLARK COUNTY
INDIAN
RESERVATION
VALLEY
DRY
LAKE
MOAPA
RIVER
INDIAN
RESERVA
Township 16S
Range 63E
Township 16S
Range 64E
Township 17S
Range 64E
Proposed Solar
Site Boundary
Rd1
Rd2
WP 01
WP 02
WP 03
WP 04
WP 05
WP 06
WP 07
WP 08
WP 09
WP 10
WP 11
WP 12
WP 13
WP 14
WP 15
WP 16
WP 17
WP 18
Legend
Interstate
Railroad
Proposed Access Road
Water Pipeline
Option A to Harry Allen Substation
Path 1 to Crystal Substation
Water Pipeline ROW
Township/Range Boundary
PLSS Section Line
Proposed Solar Site Boundary
Jurisdictional Land Ownership
Bureau of Land Management Land
Indian Land
0
0.5
1
Miles
Universal Transverse Mercator
North American Datum 1983
Zone 11 North, Meters
Moapa Solar Energy Center
Figure 5 - Water Pipeline
Desert Tortoise Observations
Map Extent: Clark County, Nevada
Date: 10-07-13
Author: rnc
I:\Moapa Solar/MXD's/Water Pipeline DTObservations_112012.mxd

Moapa Solar Energy Center

Figure 6 – 23kV Transmission Option Desert Tortoise Observations

Map Extent: Clark County, Nevada

Date: 10-07-13 | Author: rnc

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Relative Abundance Calculation

Desert tortoise population estimates were generated based on recommended methodologies contained in USFWS (2010). These estimates were generated for all Project components for which there were detections of adult desert tortoise. Population estimates were generated using the following equation:

$$\hat{N} = \frac{n}{(P_a)(P_d)} \times \frac{(A)}{(a)}$$

Where $\hat{N}$ is the corrected population estimate, *n* is the number of Desert Tortoises observed, P_a is the probability a Desert Tortoise in the Project area would be above ground based on previous winter precipitation per USFWS (2010). For the Table 3 calculation of the May 2012 survey, the October 2012 pipeline survey, and the October 2013 230 kV reroute survey, a value of 0.8 was used (Western Regional Climate Center 2012). P_d is the probability that an above-ground Desert Tortoise would be detected (0.63); *A* is the size of the Project area, and *a* is the size of the area surveyed. Corrected estimates are reported here with 95% confidence intervals (CI) per USFWS (2010).

Other Sensitive Species

Surveys for Burrowing Owls and gila monsters were conducted concurrently with desert tortoise surveys. Individuals and/or sign were recorded and mapped. In the case of Burrowing Owls, potentially suitable burrows were checked for owl sign (prey items, scratches, scat, pellets, feathers, etc.).

RESULTS

Desert Tortoise

Most of the Project area represents potentially suitable habitat for the desert tortoise. The Project area is largely dominated by Mojave creosote-bush scrub vegetation. This vegetation class includes Mojave mixed scrub and creosote-bursage vegetation. Dominant species associated with this vegetation community include shadscale (*Atriplex confertifolia*), brittlebrush (*Encelia farinosa*), creosote (*Larrea tridentata*), bursage (*Ambrosia dumosa*), and desert saltbush (*Atriplex polycarpa*) that occur on lower slopes and in washes. Associate species also included Mojave yucca (*Yucca schidigera*), Mormon tea (*Ephedra nevadensis*), range ratany (*Krameria parvifolia*), desert trumpet (*Eriogonum inflatum*), big galleta (*Hilaria rigida*), and Indian ricegrass (*Oryzopsis hymenoides*).

The portion of the transmission interconnection (approximately 1.7 miles in length) that traverses Dry Lake is not suitable desert tortoise habitat and was not surveyed (**Figures 1, 4B, and 4C**). This area was almost completely unvegetated with hard-packed soils, often with an alkali crust. Based on the lack of vegetation, there is no forage or cover present for desert tortoises. This portion of Dry Lake is also occasionally completely inundated; precluding tortoises from occupying burrows. Small portions of this area were spot sampled – suitable burrows were not found, nor were soil conditions conducive for burrow excavation. The vegetated margins of the lake bed were surveyed since these areas represented potentially suitable foraging areas; though soils in these areas were still extremely hard packed.

Near the south end of the 230 kV transmission interconnection, the habitat becomes steeper with rockier soils and greater components of cholla (*Cylindropuntia* sp.), Mojave yucca and prickly pear (*Opuntia* sp.). This area is crossed by several small ephemeral drainages that extend from a large sloping bajada extending from the southwest.

Desert tortoise and desert tortoise sign were observed in the Project area. An adult desert tortoise and suitable desert tortoise burrows were observed within the Solar Power Generating Facility site; desert tortoise sign and potentially suitable burrows were observed along the 230-kV Transmission Line Alternative; an adult desert tortoise and potentially suitable burrows were observed along the buffer transects associated with the 500-kV Transmission Line Alternative; one potentially suitable burrow occurred along the access road, two adult and one subadult desert tortoise and fourteen suitable burrows were observed along the pipeline ROW; and, one adult tortoise, 19 suitable desert tortoise burrows, and two desert tortoise shells/shell fragments were observed along the 230 kV transmission reroute (**Tables 2a, 2b, and 2c, Figures 4a, 4b, 4c, 5, and 6**).

Table 2a – Desert Tortoise Sign and Observations. May 2012 Survey

Transect	Project Component	Observation Description[1]	GPS ID	Notes
1	Solar Power Generating Facility	Class 4 burrow	SF001	
6	Solar Power Generating Facility	Class 5 burrow	SF002	
10	Solar Power Generating Facility	Class 3 burrow	PG003	Scat present
12	Solar Power Generating Facility	Class 3 burrow	SM001	Scat present
14	Solar Power Generating Facility	Desert Tortoise	PG004	Tortoise not in burrow; 280mm MCL
19	Solar Power Generating Facility	Class 3 burrow	PG006	Egg fragments present; in wash
20	Solar Power Generating Facility	Class 6 burrow	PG005	Located in small rivulet
21	Solar Power Generating Facility	Class 4 burrow	SF004	
23	Solar Power Generating Facility	Class 6 burrow	TM001	No sign
	Solar Power Generating Facility	Class 4 burrow	TM002	Scat present
32	Solar Power Generating Facility	Class 6 burrow	SY001	
38	Solar Power Generating Facility	Class 3 burrow	SF005	
40	Solar Power Generating Facility	Class 4 burrow	SM003	
43	Solar Power Generating Facility	Class 4 burrow	PG007	No sign
45	Solar Power Generating Facility	Class 3 burrow	SF006	

62	Solar Power Generating Facility	Class 4 burrow	SY002	
70	Solar Power Generating Facility	Class 3 burrow	SM004	Creosote flat
85	Solar Power Generating Facility	Class 6 burrow	PG008	Partially filled in
115	Solar Power Generating Facility	Class 4 burrow	PG009	Near coyote den
116	Solar Power Generating Facility	Class 6 burrow	SY003	
Access 400W	Access Road	Class 5 burrow	PG011	No sign; near rivulet
Crystal 400N	500-kV Transmission Line (buffer)	Class 5 burrows (x2)	PG012	Two burrows; no sign
Crystal 600N	500-kV Transmission Line (buffer)	Desert Tortoise	SFDT01	Desert tortoise in burrow; 250mm MCL
HA1	230-kV Transmission Line	Shell fragments and scutes	TM003	Estimated time since death: >4 years
HA1	230-kV Transmission Line	Shell fragments	TM004	Estimated time since death: >4 years
HA2	230-kV Transmission Line	Class 1 burrow	SY004	Very fresh sign at entrance
HA3	230-kV Transmission Line	Class 3 burrow	PG010	Shell fragments
HA4	230-kV Transmission Line	Class 5 burrow	CB001	
HA4	230-kV Transmission Line	Class 3 burrow	CB002	
HA5	230-kV Transmission Line	Class 3 burrow	SM005	No sign; upper bajada
HA5	230-kV Transmission Line	Class 3 burrow	SM006	No sign: upper bajada near wash

Table 2b – Desert Tortoise Sign and Observations. Oct. 2012 Survey

Transect	Project Component	Observation Description[1]	GPS ID	Notes
1	Pipeline	Desert Tortoise	WP 09	Subadult. Not in burrow
2	Pipeline	Class 3 burrow	WP 01	No sign
2	Pipeline	Class 2 burrow	WP 02	No sign
2	Pipeline	Class 3 burrow	WP 03	No sign
2	Pipeline	Class 2 burrow	WP 04	No sign
2	Pipeline	Class 1-2 burrow	WP 05	Tracks
2	Pipeline	Class 2 burrow	WP 06	No sign
2	Pipeline	Class 3 burrow	WP 07	No sign
2	Pipeline	Class 5 burrow	WP 08	No sign
3	Pipeline	Class 2 burrow	WP 18	No sign
3	Pipeline	Class 2 burrow	WP 17	No Sign
3	Pipeline	Shell Frags	WP 16	Carcass
4	Pipeline	Desert Tortoise	WP 10	Adult. Not in Burrow
4	Pipeline	Desert Tortoise	WP 15	Adult .Not completely in burrow
5	Pipeline	Class 1 burrow	WP 11	Scat
5	Pipeline	Class 3 burrow	WP 12	No sign
5	Pipeline	Class 1 burrow	WP 13	No sign
5	Pipeline	Class 2 burrow	WP 14	No sign

Table 2c – Desert Tortoise Sign and Observations. Oct. 2013 Survey

Transect	Project Component	Observation Description[1]	GPS ID	Notes
1	Harry Allen Reroute	Class 3 Burrow	PG001	No sign
1	Harry Allen Reroute	Class 2 Burrow	DL009	No sign
2	Harry Allen Reroute	Class 2 Burrow	DL001	No sign
2	Harry Allen Reroute	Class 5 Burrow	DL002	
2	Harry Allen Reroute	Class 1 Burrow/Desert Tortoise	DL003	Adult observed inside burrow entrance
4	Harry Allen Reroute	Class 1 Burrow	PG003	Burrow found near midden containing DT scat; 10"x 3" satellite burrow (Class 3, collapsed)
4	Harry Allen Reroute	Class 3 Burrow	SY003	No sign
5	Harry Allen Reroute	Class 3 Burrow	DL004	No sign
5	Harry Allen Reroute	Class 4 Burrow	DL005	No sign
7	Harry Allen Reroute	Class 5 Burrow	PG004	No sign
7	Harry Allen Reroute	Class 5 Burrow	PG005	No sign
7	Harry Allen Reroute	Class 2 Burrow	PG006	No sign
8	Harry Allen Reroute	Shell fragments	Shell-01	Fully intact, recent (<1 year old)
8	Harry Allen Reroute	Class 2 Burrow	DL010	No sign
8	Harry Allen Reroute	Class 5 Burrow	DL011	No sign
10	Harry Allen Reroute	Class 4 Burrow	PG007	No sign

11	Harry Allen Reroute	Class 1 Burrow	DL012	Fresh spoils suggest recent DT use
11	Harry Allen Reroute	Class 2 Burrow	DL013	No sign
11	Harry Allen Reroute	Class 3 Burrow	DL014	No sign
12	Harry Allen Reroute	Shell (Carapace & plastron)	SY009	Some scutes starting to delaminate; entirely intact (~2yrs old)
12	Harry Allen Reroute	Class 2 Burrow	SY010	No sign

[1]Burrow Class 1 – Definitely Desert Tortoise – currently active with desert tortoise or recent desert tortoise sign; Class 2 – Definitely Desert Tortoise – good condition, no evidence of recent use; Class 3 – Definitely Desert Tortoise – Deteriorated (includes collapsed); Class 4 – Possibly Desert Tortoise – good condition but unsure of species; Class 5 – Possibly Desert Tortoise – deteriorated (includes collapsed)

Relative Abundance Calculation

Desert tortoises are expected to be present within the SPGF area, proposed access road, pipeline ROW, and the transmission routes (both 500-kV route as well as 230-kV route – including the reroute near Harry Allen). This is based on the presence of sign and/or suitable burrows, though population estimates were not always possible because adult desert tortoises were not detected in all project components. An adult desert tortoise was observed in the buffer area associated with the 500-kV Transmission Line alternative but tortoises located in buffer areas are not used to generate relative abundance estimates.

As detailed in the 2010 USFWS protocol, corrected desert tortoise estimates are calculated upon completion of the field surveys. These calculations were performed using the USFWS interactive Table 3, included in the *2010 Pre-project Survey Protocol* (USFWS 2010). This table calculates desert tortoise populations based on the number of adult tortoises observed during surveys, as described in the **Relative Abundance Calculation** section, above. Results from the May 2012 “Table 3” calculations indicate approximately 2.0 Desert Tortoises are expected to occupy the SPGF Project area (95%CI: 0.36-10.64). Results from the October 2012 “Table 3” calculations indicate approximately 6.8 Desert Tortoises are expected to occupy the pipeline ROW (95%CI: 1.98-23.11). Finally, results from the October 2013 “Table 3” calculations indicate that approximately 2.0 desert tortoises are expected to occupy the rerouted portions of the 230 kV transmission line ROW (95% CI: 0.37-10.77). Copies of the completed “Table 3’s” are included in **Appendix 3**.

Other Sensitive Species

No gila monster or Burrowing Owl sign or individuals were observed in or immediately adjacent to any project components during the 2012 or 2013 surveys. The Project area represents potentially suitable habitat for Burrowing Owls. Potentially suitable Burrowing Owl burrows were relatively scarce, though present at the Project site. None of these burrows showed evidence of recent occupancy by Burrowing Owls (scat, scratches, feathers, prey items, pellets, etc.). No Burrowing Owl individuals were observed during pedestrian desert tortoise surveys or incidentally while driving in the Project area. A single Burrowing Owl and apparently occupied burrow was incidentally observed approximately 1.25 miles north of the 230 kV reroute.

Gila monsters are known to occupy a variety of vegetation types across their range including desert scrub, thorn scrub, pinyon-juniper or oak woodlands and rarely agricultural habitats. Most frequently, this species is found on low slopes or canyon bottoms with relatively steep rocky slopes. Burrows are important for this species as is temporary shelter. Gila monsters spend 95-98% of their lives underground (NatureServ 2012). Several potentially suitable burrows were observed during the surveys but no sign of gila monster activity was observed at any of these burrows. No gila monster individuals were observed, though sightings of individuals are relatively uncommon given the amount of time spent underground. May is considered their most active month for gila monsters in Nevada (Nevada Department of Wildlife 2012).

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Appendix 1 – Survey Data Sheets

USFWS 2010 DESERT TORTOISE PRE-PROJECT SURVEY DATA SHEET

Please submit a completed copy to the action agency and local USFWS office within 30-days of survey completion

Date of survey: 30, Sept, 2013 (day, month, year) Survey biologist(s): Pat Golden (303) 618-7910 pgolden@heritage-el.org, Scott Yancey, Daniel Livigni (name, email, and phone number)

Site description: 230-KV ReRoute for Moapa Solar Energy Center (project name and size; general location)

County: Clark Quad: ________ Location: ________ (UTM coordinates, lat-long, and/or TRS; map datum)

Circle one: 100% coverage or Sampling Area size to be surveyed: 2.25 miles x 120 meters Transect #: 1-6 Transect length: 2.25 miles

GPS Start-point: 11S 688062 4034188 637 m (easting, northing, elevation in meters) Start time: 1200 am/pm

GPS End-point: 11S 687651 4033205 655 m (easting, northing, elevation in meters) End time: 1438 am/pm

Start Temp: 30 °C End Temp: 33 °C

Live Tortoises

	Detection number	GPS location Easting	Northing	Time	Tortoise location (*in burrow*: all of tortoise beneath plane of burrow opening, or *not in burrow*)	Approx MCL >160-mm? (*Yes, No or Unknown*)	Existing tag # and color, if present
DL003	1	687615	4033208	1317	not in burrow	Yes	N/A, transect 2
	2						
	3						
	4						
	5						
	6						
	7						
	8						

Tortoise Sign (burrows, scats, carcasses, etc)

	Detection number	GPS location Easting	Northing	Type of sign (*burrows, scats, carcass, etc*)	Description and comments
DL001	1	686638	4033397	Burrow	Class 2, Transect 2
PG001	2	686686	4033349	Burrow	Class 3, Transect 1
DL002	3	687247	4032971	Burrow	Class 5, Transect 2
DL003	4	687615	4033208	Burrow	adult DT observed just Transect 2 Class 1: outside entrance, fresh urine left from burrow
DL004	5	687463	4033077	Burrow	Class 3, Transect 5
DL005	6	687711	4034199	Burrow	Class 4, Transect 5
	7				
	8				

Transect number: 1-6

USFWS 2010 DESERT TORTOISE PRE-PROJECT SURVEY DATA SHEET

Please submit a completed copy to the action agency and local USFWS office within 30-days of survey completion

Date of survey: 2, Oct, 2013 (day, month, year) Survey biologist(s): See page 1 of 3 (name, email, and phone number)

Site description: See page 1 of 3 (project name and size; general location)

County: Clark Quad: ______ Location: ______ (UTM coordinates, lat-long, and/or TRS; map datum)

Circle one: 100% coverage or Sampling Area size to be surveyed: See page 1 of 3 Transect #: 6-12 Transect length: 2.25 miles

GPS Start-point: 115 688055 4034247 657 m (easting, northing, elevation in meters) Start time: 0706 am/pm

GPS End-point: 115 687683 4033158 655 m (easting, northing, elevation in meters) End time: 0955 am/pm

Start Temp: 19 °C End Temp: 29 °C

Live Tortoises

Detection number	GPS location Easting	Northing	Time	Tortoise location (*in burrow*: all of tortoise beneath plane of burrow opening, or *not in burrow*)	Approx MCL >160-mm? (*Yes, No or Unknown*)	Existing tag # and color, if present
1						
2						
3						
4						
5						
6						
7						
8						

Tortoise Sign (burrows, scats, carcasses, etc)

	Detection number	GPS location Easting	Northing	Type of sign (*burrows, scats, carcass, etc*)	Description and comments
PG004	1	687735	4034217	Burrow	Class 5, Transect 7
PG005	2	687722	4034221	Burrow	Class 5, Transect 7
DL010	3	686495	4033581	Burrow	Class 2, Transect 8
PG006	4	686675	4033293	Burrow	Shallow (~2 ft. deep) Transect 7 Class 2, appears to be under construction
DL011	5	686895	4033031	Burrow	Class 5, Transect 8
DL012	6	687569	4033065	Burrow	Fresh spoils indicate Class 1, recent DT use Transect 11
DL013	7	687525	4033038	Burrow	Class 2, Transect 11
DL014	8	687299	4032888	Burrow	Class 3, Transect 11

Transect number: 6-12

USFWS 2010 Desert Tortoise Pre-Project Survey Data Sheet

Please submit a completed copy to the action agency and local USFWS office within 30-days of survey completion

Date of survey: 2, Oct, 2013 (day, month, year) Survey biologist(s): See page 1 of 3 (name, email, and phone number)

Site description: See page 1 of 3 (project name and size; general location)

County: Clark Quad: ______ Location: ______ (UTM coordinates, lat-long, and/or TRS; map datum)

Circle one: 100% coverage or Sampling Area size to be surveyed: See page 1 of 3 Transect #: 6-12 Transect length: 2.25 miles

GPS Start-point: 11S 688055 4034247 637 m (easting, northing, elevation in meters) Start time: 0706 am/pm

GPS End-point: 11S 687683 4033158 655 m (easting, northing, elevation in meters) End time: 0855 am/pm

Start Temp: 19 °C End Temp: 27 °C

Live Tortoises

Detection number	GPS location Easting	Northing	Time	Tortoise location (*in burrow*: all of tortoise beneath plane of burrow opening, or *not in burrow*)	Approx MCL >160-mm? (*Yes, No or Unknown*)	Existing tag # and color, if present
1						
2						
3						
4						
5						
6						
7						
8						

Tortoise Sign (burrows, scats, carcasses, etc)

	Detection number	GPS location Easting	Northing	Type of sign (*burrows, scats, carcass, etc*)	Description and comments
SY009	1	686947	4032909	Shell	- Carapace & plastron intact (225 mm MCL) - Scutes delaminating (~2 yrs since death)
PG007	2	686628	4033286	Burrow	Class 4, Transect 10
SY010	3	687877	4034277	Burrow	Class 2, Transect 12
	4				
	5				
	6				
	7				
	8				

Transect number: 6-12

Appendix 2 – Photographs

Representative creosote bush-white bursage scrub on solar site (May 2012)

Tortoise in burrow on 230 kV transmission route (May 2012)

Representative habitat near Harry Allen substation (May 2012)

Dry lakebed on 230 kV transmission route (unsuitable habitat) (May 2012)

Example of suitable burrow on water pipeline ROW (Oct 2012)

Representative habitat on the water pipeline ROW (Oct 2012)

Live desert tortoise observed on water pipeline ROW (Oct 2012)

Representative habitat on the 230 kV re-route ROW (Oct 2013)

Desert tortoise shell located on 230 kV re-route (Oct 2013)

Appendix 3 – USFWS “Table 3” Relative Abundance Calculation

Table 3. USFWS Desert Tortoise Pre-Project Survey Guidance

What is the estimated number of tortoises and associated 95% confidence interval for the action area?

INSTRUCTIONS ***Use this tab when all your transects were of equal length.***

Enter the appropriate values from the survey into the yellow cells below. The number of tortoises and assocated 95% confidence interval for the action area will be calculated.

N =	**2.0**
Lower 95%CI =	**0.36**
Upper 95%CI =	**10.64**
Total action area (acres)	**850**
Prob that a tort is above ground given winter rainfall (Pa from Table 2) =	**0.800**
Total length of transects walked (L, km) =	**348**
Transect length (km)	**2**
Number of transects walked (k) =	**174**
Number of tortoises found during surveys (n) =	**1**

Transects all the same length

Number of tortoises (n_i)	Number of transects on which (n_i) tortoises were
0	173
1	1
2	0
3	0
4	0
5	0
6	0
7	0
8	0
9	0

October 2012 Survey

Table 3. USFWS Desert Tortoise Pre-Project Survey Guidance What is the estimated number of tortoises and associated 95% confidence interval for the action area?	
INSTRUCTIONS ***Use this tab when all your transects were of equal length.*** *Enter the appropriate values from the survey into the yellow cells below. The number of tortoises and assocated 95% confidence interval for the action area will be calculated.*	
N =	6.8
Lower 95%CI =	1.98
Upper 95%CI =	23.11
Total action area (acres)	177
Prob that a tort is above ground given winter rainfall (Pa from Table 2) =	0.800
Total length of transects walked (L, km) =	42
Transect length (km)	8
Number of transects walked (k) =	5
Number of tortoises found during surveys (n) =	2

Transects all the same length

Number of tortoises (n_i)	Number of transects on which (n_i) tortoises were seen
0	3
1	2
2	0
3	0
4	0
5	0
6	0
7	0
8	0
9	0

Table 3. USFWS Desert Tortoise Pre-Project Survey Guidance

What is the estimated number of tortoises and associated 95% confidence interval for the action area?

INSTRUCTIONS ***Use this tab when all your transects were of equal length.***

Enter the appropriate values from the survey into the yellow cells below. The number of tortoises and assocated 95% confidence interval for the action area will be calculated.

N =	**2.0**
Lower 95%CI =	**0.37**
Upper 95%CI =	**10.77**
Total action area (acres)	**103**
Prob that a tort is above ground given winter rainfall (Pa from Table 2) =	**0.800**
Total length of transects walked (L, km) =	**42**
Transect length (km)	**3**
Number of transects walked (k) =	**12**
Number of tortoises found during surveys (n) =	**1**

Transects all the same length

Number of tortoises (n_i)	Number of transects on which (n_i) tortoises were
0	11
1	1
2	0
3	0
4	0
5	0
6	0
7	0
8	0
9	0

Appendix O

Bird and Bat Conservation Strategy (BBCS)

Final

Moapa Solar Energy Center

Bird and Bat Conservation Strategy

Prepared by:

HERITAGE ENVIRONMENTAL CONSULTANTS, LLC

February 2014

Table of Contents

Appendices

1 Introduction

This Bird and Bat Conservation Strategy (BBCS) is a voluntary, project-specific document that outlines a plan to reduce the risks that result from bird and bat interactions with components of the Proposed Project. The goal of this, and any, BBCS is to reduce, and ultimately eliminate bird and bat mortality (USFWS 2012). The statutory authority for addressing effects to birds stems primarily from the Migratory Bird Treaty Act (MBTA), the Bald and Golden Eagle Protection Act (BGEPA), as well as the Endangered Species Act (ESA); for bats, the United States Fish and Wildlife Service's (USFWS) statutory authority arises primarily from the ESA (USFWS 2010a).

1.1 Purpose

This BBCS has been prepared in compliance with state and federal regulations to outline project- specific practices and measures for reducing avian and bat impacts potentially resulting from operation of the Moapa Solar Energy Center (MSEC or the "Proposed Project"). Two of the greatest concerns with respect to the Project is the potential for avian and, to a lesser degree, bat collision with power lines, as well as the permanent loss of golden eagle (*Aquila chrysaetos*) foraging habitat. This plan presents a mitigation and monitoring scheme, which would allow the MSEC to evaluate potential causes of take and implement appropriate minimization and avoidance measures.

1.2 Goals

Implementation of this BBCS would fulfill multiple goals in an effort to reduce avian and bat mortality throughout the life of this Project. The goals specific to this BBCS are to:

1. Identify and isolate where avian and bat mortality has the potential to occur and reduce the potential for avian and bat mortality by implementing specific mortality reduction actions;
2. Design Project electric lines to be raptor safe in accordance with Avian Power Line Interaction Committee (APLIC) design standards (APLIC 2006, 2012), including ensuring that electrified systems do not present an electrocution risk and minimizing the risk of collisions with transmission lines and associated infrastructure;
3. Conduct preconstruction surveys to avoid impacts to nesting birds;
4. Conduct post-construction monitoring within the solar field, gen-tie lines, and other infrastructure such as evaporation ponds;
5. Establish an avian and bat reporting system to document incidents of electrocution and collision mortality;
6. Assist the Applicant in compliance with state and federal laws regarding avian and bat species to avoid the threat of penalties and fines;
7. Reduce Project effect on avian and bat species through adaptive management or other actions.

2 Laws, Regulations, and Cultural Traditions

Native birds and bats in Nevada are protected primarily under three pieces of legislation: the ESA, MBTA, and BGEPA. The Moapa Band of Paiutes (Tribe) does not have tribal guidance or regulations concerning birds and bats within the Moapa River Indian Reservation (Reservation).

2.1 Migratory Bird Treaty Act

The Migratory Bird Treaty Act of 1918 (16 US Code [USC] 703-712) is administered by the U.S. Fish and Wildlife Service (USFWS 1998) and is the cornerstone of migratory bird conservation and protection in the U.S. The Act authorizes the Secretary of the Interior to regulate the taking of migratory birds; and provides that it shall be unlawful, except as permitted by regulations, "to pursue, take, or kill any migratory bird, or any part, nest or egg of any such bird" (16 USC 703). The list of species protected by the Act was revised in March 2010, and includes almost all bird species that are native to the US.

2.2 Endangered Species Act

Section 9 of the ESA prohibits everyone, private person and federal agency alike, from "taking" endangered and threatened wildlife. "Take" is defined to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct. "Harm" is further defined by USFWS to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering. "Harass" is defined by USFWS as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering (USFWS 1998). Any activity that may result in the "incidental take" of threatened or endangered species requires permission from the USFWS under ESA Sections 7 or 10.

2.3 Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act of 1940 (as amended 1959, 1962, 1972, and 1978) prohibits the take, disturbance or possession of bald and golden eagles with limited exceptions. Take, in the Act, is defined as "to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." Disturb is defined in the Act as, "to agitate or bother a bald or golden eagle to a degree that causes or is likely to cause, based on the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding or sheltering behavior." Important eagle-use areas include eagle nests, foraging areas, or roost sites that eagles rely on for breeding, sheltering, or feeding, and the landscape features surrounding such nests, foraging areas, or roost sites that are essential for the continued viability of the site for breeding, feeding, or sheltering eagles.

3 Proposed Project

3.1 Project Area and Description

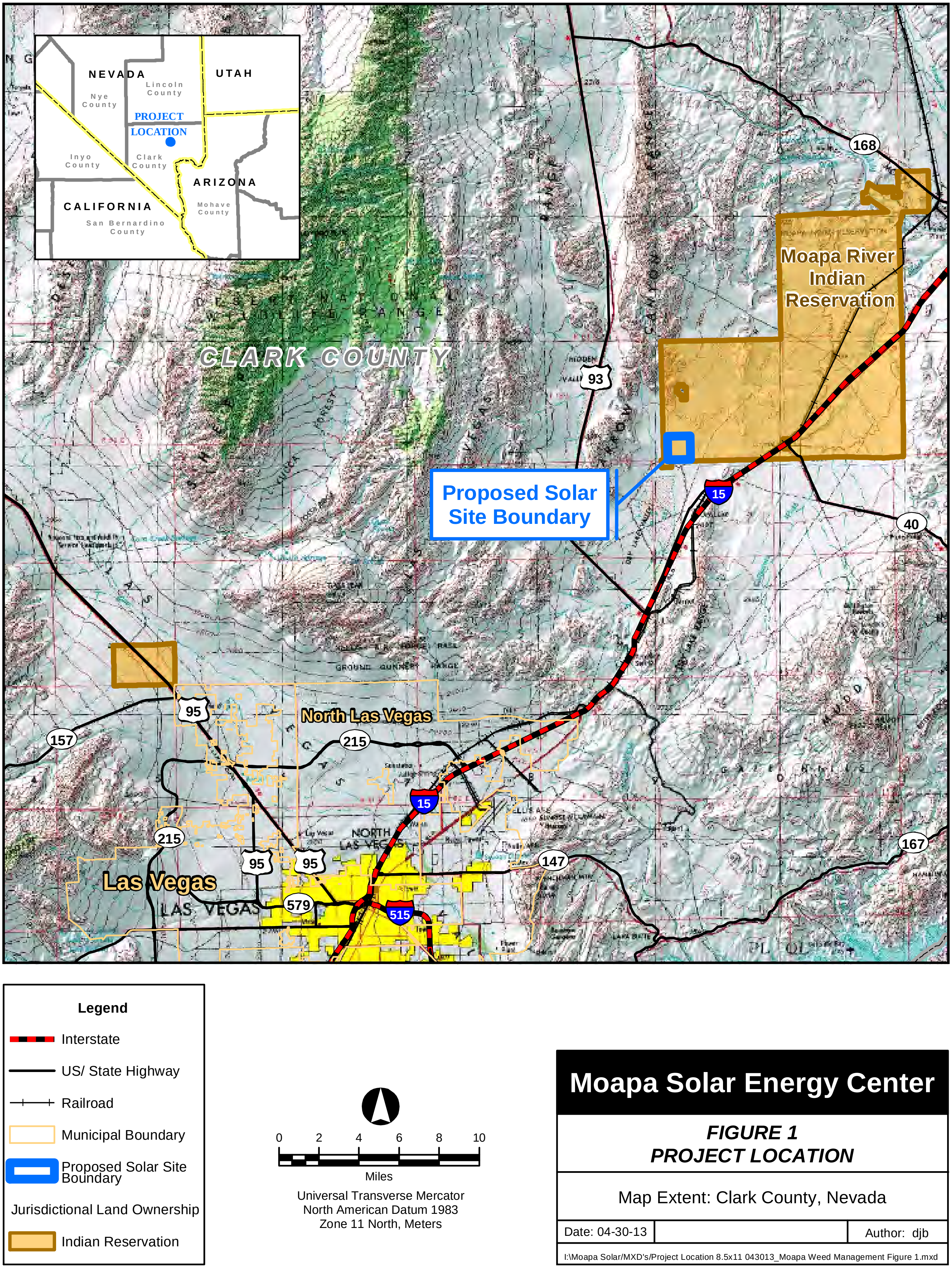
The Proposed Project would be located approximately 20 miles northeast of Las Vegas in Clark County, Nevada (**Figure 1**) on 850 leased acres within the Moapa Paiute Indian Reservation. The Reservation in Clark County, Nevada, consists of 71,954 acres of land located approximately 25 miles northeast of Las Vegas. Clark County extends over 8,091 square miles.

The 850-acre solar power generating facility (SPGF) would be located wholly on lands within the Reservation. The Gen-Tie lines and access road would be located on Bureau of Land Management (BLM) administered lands south of the SPGF site. A water pipeline associated with the Project would be located on Reservation lands north and east of the SPGF. **Figure 2** shows the location of the Proposed Project and associated facilities. It would be developed using photovoltaic (PV) technology to generate up to 200 Megawatts (MWs) of energy.

The Project is located in the Basin and Range physiographic province in the north central portion of the Mojave Desert. Basin and Range structure in the Mojave Desert is characterized by abrupt mountain ranges, generally of moderate height. The Project site is situated in the north end of the Dry Lake Valley. The SGPF consists primarily of low-profile bajada slopes and ephemeral washes, which drain to Dry Lake, a closed basin playa. Elevations across the Proposed Project Area range from approximately 1,960 to 2,080 feet.

The general ecological setting of the Project is consistent with Mojave Desert scrub. The area is dominated by open stands of creosote bush (*Larrea tridentata*) and white bursage (*Ambrosia dumosa*). Desert saltbush (*Atriplex* spp) scrub habitat and cactus-yucca scrub are also present and concentrated within ephemeral washes. A more detailed description of the project area can be found in the Draft Environmental Impact Statement for the Moapa Solar Energy Center.

The Project facilities would disturb approximately 900 acres of the Reservation and 81 acres of BLM land. The 500kV transmission line corridor would have a length of approximately 1.6 miles; the water pipeline would have a length of approximately 5.4 miles; the 230kV transmission line would have a length of approximately 7.3 miles. The access road would be 2.5 miles in length. The Project location allows efficient connection of the energy from solar resources to existing transmission infrastructure. The selected site is adjacent to an existing transmission corridor that has a direct path to the Harry Allen Substation and to the Crystal Substation.



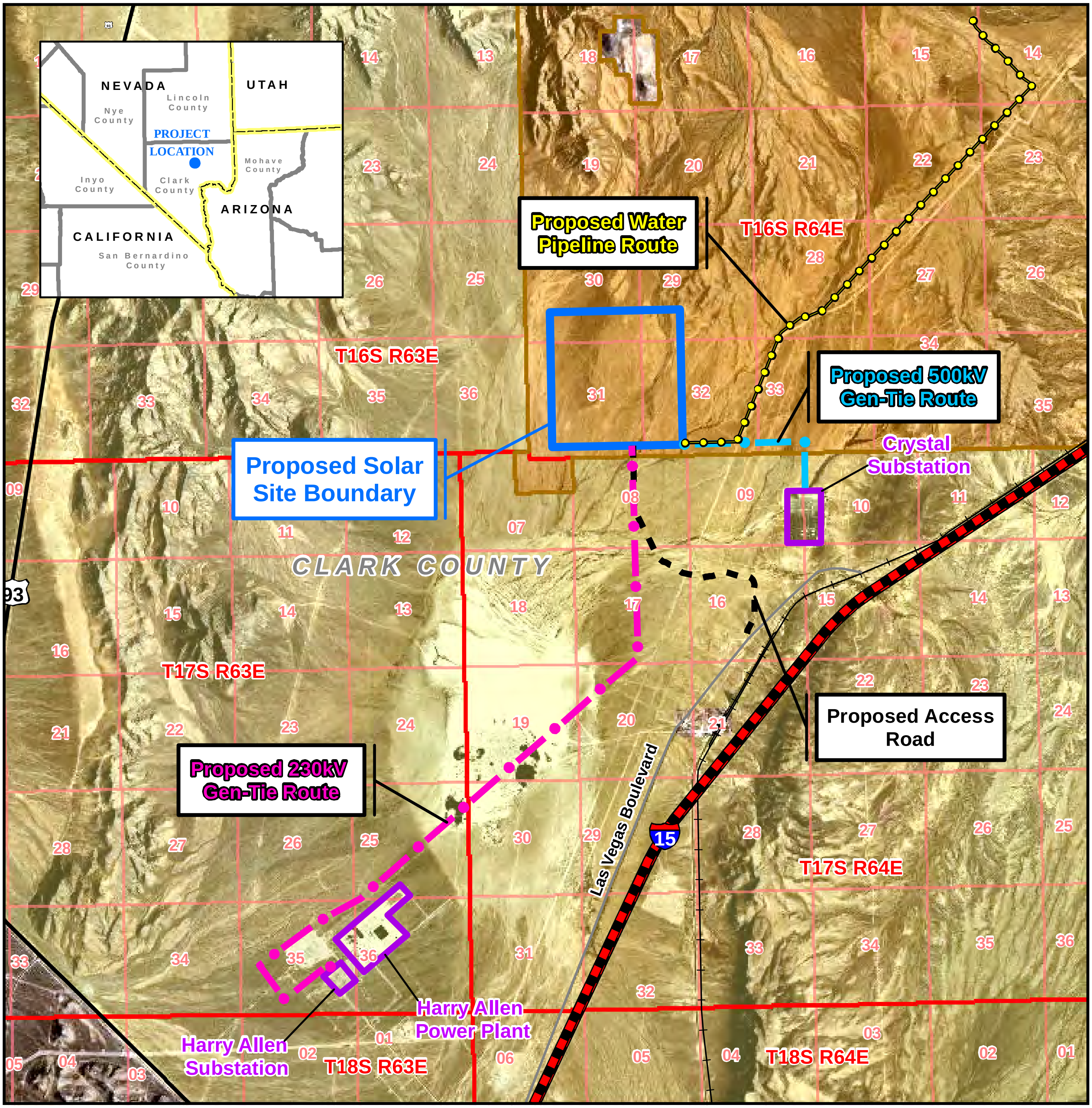
Moapa Solar Energy Center

FIGURE 1
PROJECT LOCATION

Map Extent: Clark County, Nevada

Date: 04-30-13		Author: djb

I:\Moapa Solar/MXD's/Project Location 8.5x11 043013_Moapa Weed Management Figure 1.mxd



Legend

- Interstate
- US/State Highway
- Local Road
- Railroad
- Proposed Water Pipeline
- Proposed 230kV Gen-Tie
- Proposed 500kV Gen-Tie
- Proposed Access Road
- Township/Range Boundary
- Section Line
- Existing Substation Boundary
- Proposed Solar Site Boundary
- Jurisdictional Land Ownership
- Bureau of Land Management Land
- Indian Reservation

0 0.5 1 1.5

Miles

Universal Transverse Mercator
North American Datum 1983
Zone 11 North, Meters

Moapa Solar Energy Center

FIGURE 2
PROPOSED PROJECT FACILITIES

Map Extent: Clark County, Nevada

Date: 04-30-13		Author: djb

I:\Moapa Solar/MXD's/Proposed Project Facilities 8.5x11 043013_EIS Figure 2-1.mxd

3.2 Project Components

The Project would include the following main elements:

- PV solar modules
- Single tracking systems mounted on embedded pier ballast or foundations
- Power inverters
- On-site substation
- An approximately 7.3-mile interconnection to the Harry Allen substation via an up to 230kV transmission line
- An approximately 1.6-mile interconnection to the Crystal substation via an up to 500kV transmission line
- Modifications to the Crystal substation
- Water pipeline extending approximately 5.4 miles
- An Operation and Management (O&M) area to accommodate the O&M building, parking area, temporary laydown area, evaporation/retention ponds, and other construction associated facilities
- An approximately 2.5-mile access road
- Drainage controls to facilitate and/or slow drainage to existing ephemeral washes
- Storm water controls within drainage features to slow flash flood flow to nearby railroad culverts
- Approximately 5 miles of perimeter fence

3.2.1 Substation, Transmission Line and Interconnections

The Project includes the construction of an on-site substation (within the 850-acre solar facility) with medium voltage (12.5-kV or 34.5-kV) to high voltage (230-kV/500-kV) step-up transformer(s) with mineral oil, breakers, buswork, protective relaying, supervisory control and data acquisition (SCADA), and associated substation equipment.

3.2.1.1 500-kV Gen-Tie Transmission Line

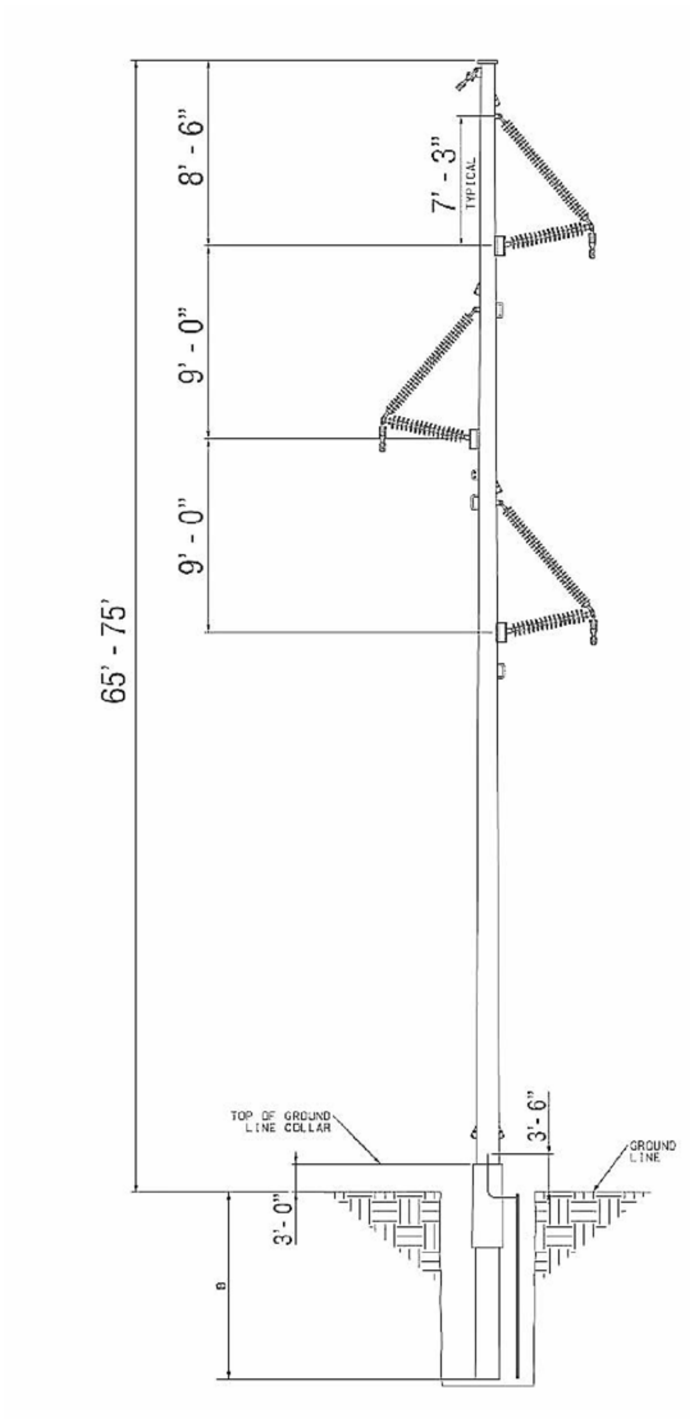
The 500-kV Gen-Tie transmission line would exit the solar facility at the southwest corner and travel east along the southern boundary of the Reservation before turning 90-degrees to the South before entering the northern boundary of the Crystal Substation 500-kV yard (**Figure 2)**.

3.2.1.2 230-kV Gen-Tie Transmission Line

The 230 kV-line to Harry Allen would head south from the SPGF site for approximately 2.5 miles until meeting an existing 500-kV transmission line. The proposed transmission line would then follow, on the north side, the existing transmission line for approximately 3.2 miles and then turn west and southwest for about 1.1 miles to be routed around the Harry Allen 500-kV Substation. Approximately 0.3 mile past the substation, the proposed line would cross an existing 500-kV transmission line at a 90-degree angle and proceed for another 0.5 miles before turning northeast and connecting into the Harry Allen 230-kV Substation on the north side of the substation. This route is approximately 7.3 miles long (**Figure 2**).

3.2.1.3 Transmission Line Poles

The Project is considering steel monopole transmission structures for the 230-kV line to the Harry Allen Substation (**Figure 3)** . The structures for the 230-kV line would range in height from 60 feet to 100 feet. The structures for the 500-kV line to the Crystal Substation would also be steel monopoles.



Moapa Solar Energy Center EIS

FIGURE 3
TYPICAL 230 kV MONOPOLE STRUCTURE

Date: 03-31-13		Author: djb

I:\Moapa Solar/MXD's/Typical 230kV Monopole 8.5x11 033013_Figure 3.mxd

3.2.2 Solar Field

The solar field would utilize PV technology and would cover approximately 850 acres on the Reservation. The PV modules, inverters, and transformers would be grouped into approximately 1 to 2 megawatts of alternating current (MWac) blocks.

3.2.3 Water Pipeline

Water for the Project would be provided to the Project by the Tribe from an existing well located northeast of the SPGF site (**Figure 2)**. A water pipeline would travel from the southeast corner of the Proposed Project site for approximately 5.4 miles and connect with the existing Reservation well. Water uses for a PV project includes needs for panel cleaning, service water, potable water and fire protection water. The expected water use for the Project is approximately 30 acre-feet/year (acf/y) at average ambient operating conditions.

3.2.4 Evaporation Pond

Evaporation ponds covering approximately 5 acres are planned to allow plant operations to continue in event that a pond needs to be taken out of service.

3.2.5 Artificial Lighting

The Project's lighting system will provide operation and maintenance personnel with illumination for both normal and emergency conditions near the main entrance and the Project substation. Lighting will be designed to provide the minimum illumination needed to achieve safety and security objectives and will be downward facing and shielded to focus illumination on the desired areas only. There will be no lighting in the solar field. Therefore, light trespass on surrounding properties will be minimal. If lighting at individual solar panels or other equipment is needed for night maintenance, portable lighting will be used.

3.2.6 Access Road

The Project would require vehicular access for construction, operation, and maintenance. A 2.5-mile gravel access road connecting the SPGF to the existing paved frontage road adjacent to I-15 would be constructed on BLM-administered lands. From the existing paved frontage road west of I-15, the proposed site access road would follow an existing dirt road for approximately 2.0 miles until it reaches the proposed 230-kV Gen-Tie transmission line ROW which it would follow approximately 0.5 mile north to the SPGF site (**Figure 2).**

4 Species of Concern

The Proposed Project site supports suitable nesting and/or foraging habitat for several avian species and potentially suitable foraging habitat for several species of bat. The following section describes the known and predicted occurrences of avian and bat resources in and around the Proposed Project site.

4.1 Bat Species

No bats are currently listed by the USFWS or the Nevada Natural Heritage Program as threatened or endangered in Clark County, Nevada (USFWS 2013; Nevada Natural Heritage 2010). Twelve species of bat could occur within the Proposed Project site, and the BLM has designated all twelve as sensitive species. If present at all, these species are only expected to be present within the Proposed Project site during nocturnal foraging events and are addressed in **Table 1.** Based on surveys of the site and surrounding areas, there are no known or expected roosting locations or hibernacula within or in the immediate vicinity of the Proposed Project site.

TABLE 1 – BAT SPECIES WITH THE POTENTIAL TO OCCUR IN THE PROJECT AREA

Common Name	Scientific Name	Status	Habitat	Potential to Occur
California leaf-nosed bat	*Macrotus californicus*	N, NP	Inhabits low deserts, caves, mines, buildings.	Low potential to occur. Occurs at lower elevations.
California myotis	*Myotis californicus*	N	Semiarid deserts and grasslands, forests, coastal forests and montane forests.	Moderate potential to occur. Common. May forage within Project Area.
Townsend's big-eared bat	*Corynorhinus townsendii*	N, NP	Salt desert scrub, sagebrush and pinyon-juniper mahogany. Will not live in extreme desert environments	Low potential to occur. Mine and cave obligates. Foraging habitat not present within the project area.
Western red bat	*Lasiurus blossevillii*	N, NP	Woodland habitats, Muddy River area.	Low potential to occur. No suitable habitat.
Big free-tailed bat	*Nyctinomops macrotis*	N	Inhabits rocky terrain, roosts in rocky cliffs, weather rock fissures including desert shrubs.	Low potential to occur. Rare.

Fringed myotis	*Myotis thysanodes*	N, NP	Low desert scrub to high elevation coniferous forests.	Low potential to occur. Reliance on cave roosts.
Cave myotis	*Myotis velifer*	N,	Cave dwelling; will roost in rock or wall crevices, old buildings and under bridges.	Low potential to occur. Rare.
Pallid bat	*Antrozous pallidus*	N, NP	Arid deserts and grasslands. Shallow caves and crevices, rock outcrops buildings, and tree cavities.	Low potential to occur. Reliance on tree roosts.
Spotted bat	*Euderma maculatum*	N, NP	Desert scrub to forest habitats. Roosts in caves and crevices.	Low potential to occur, prefer riparian areas for foraging.
Allen's lappet-eared bat	*Idionycteris phyllotis*	N, NP	Uses a variety of habitats including Mojave desert scrub, coniferous forests, and riparian woodlands.	Low potential to occur. Prefers high coniferous forest.
Western pipistrelle	*Pipistrellus hesperus*	N	Desert habitats of blackbrush, creosote bush, salt desert shrub and sagebrush	Moderate potential to occur. Common.
Brazilian free-tailed bat	*Tadarida brasiliensis*	N, NP	Roosts in caves, man-made structures. Found from low desert to high mountains.	Moderate potential to occur. Abundant species in southern Nevada.

Altenbach et al 2002, NNHP 2010
N BLM Nevada Special Status Species - designated Sensitive by State Office
NP Nevada State Protected Species protected under NRS 501.

4.2 Federally Protected Avian Species Likely to Occur in the Project Area

4.2.1 Golden Eagles

The golden eagle is protected under the BGEPA, which includes the September 11, 2009 Eagle Rule (Rule) 50 CFR parts 13 and 22, as well as the MBTA. Periodic helicopter surveys by NDOW indicate that suitable nesting and remnant nests occur in the approximately 4.4 to 6.6 miles north and west of the Proposed Project.

The entire Proposed Project site is considered suitable foraging habitat for golden eagles and the species is likely to occasionally forage within the Proposed Project site. No suitable nesting habitat is present in the Proposed Project site and no known active nests occur closer than 4.4 miles from the project area. The construction and O&M of the Project is not expected to result in take. However, the potential for collision would be increased by the construction of this project if proper precautions are not taken.

4.3 Special Status Avian Species

In addition to the BGEPA and MBTA, the BLM and the State of Nevada have additional protection for endemic avian species. **Table 2** addresses these special status species that could be found in the Proposed Project site, the protection afforded these species, the associated habitat and the likelihood of occurrence.

TABLE 2 – SPECIAL STATUS AVIAN SPECIES WITH THE POTENTIAL TO OCCUR IN THE PROJECT AREA

Common Name	Scientific Name	Status	Habitat	Potential to Occur
Golden eagle	*Aquila chrysaetos*	NP, N, BGEPA	Mountainous and open terrain. Generally nests in rocky outcrops	Moderate likelihood to occur. See in depth discussion below.
Yellow-billed cuckoo	*Coccyzus americanus*	C, NP	Open woodland, parks, deciduous riparian woodland; nests in tall cottonwood and willow riparian woodland.	Low likelihood to occur. No suitable habitat.
Western burrowing owl	*Athene cunicularia hypugaea*	NP, N	Open grasslands, desert scrub, agricultural lands and open stages of pinyon-juniper habitat. Utilizes abandoned burrows.	Moderate likelihood to occur. May forage or nest in the Project Area. None detected during biological surveys.
Ferruginous hawk	*Buteo regalis*	N, NP	Open grasslands, sagebrush flats, low foothills and fingers of pinyon-juniper habitat	Low likelihood to occur. Little suitable habitat present.
Swainson's hawk	*Buteo swainsoni*	N, NP	Agricultural valleys with cotton, elm or other suitable nest trees.	Low likelihood to occur. No suitable habitat present.
Western snowy plover	*Charadrius alexandrinus nivosus*	N, NP	Beaches, dry mud or salt flats, sandy shores of rivers, lakes, and ponds.	Low likelihood to occur. No suitable habitat present.
Southwestern willow flycatcher	*Empidonax traillii extimus*	LE, S, NP	Thickets, scrubby and brushy areas, open second growth, swamps, and open woodland.	Low likelihood to occur. No suitable habitat present.
Peregrine falcon	*Falco peregrinus*	N, NP	Mountains, open forested regions, and human population centers	Low likelihood to occur. Little suitable foraging habitat present; no suitable nesting habitat.

Pinyon jay	*Gymnorhinus cyanocephalus*	N, NP	Pinyon-juniper woodland, less frequently pine, also occurs in scrub oak and sagebrush	Low likelihood to occur. No suitable habitat present.
Loggerhead shrike	*Lanius ludovicanus*	N, NP	Open country with scattered trees and shrubs, savanna, desert scrub.	Moderate likelihood to occur. May forage within the Project Area.
Lewis' woodpecker	*Melanerpes lewis*	N, NP	Open forest and woodland, often logged or burned, including oak, coniferous forest.	Low likelihood to occur. No suitable habitat present.
Yuma clapper rail	*Rallus longirostris yumanensis*	LE, S, NP	Freshwater marshes containing dense stands of cattails and bulrushes.	Low likelihood to occur. No suitable habitat present.
LeConte's thrasher	*Toxostoma lecontei*	N, NP	Habitat consists of sparsely vegetated desert flats, dunes, alluvial fans, or gently rolling hills.	Moderate likelihood to occur. Suitable habitat present.
Brewer's sparrow	*Spizella breweri*	NP	Strongly associated with sagebrush in areas with scattered shrubs and short grass.	Low likelihood to occur. Little suitable habitat present.
Bald eagle	*Hailiaeetus leucocephalus*	S, BGEPA	Large bodies of water for feeding. Mature trees for roosting.	Low likelihood to occur. No suitable habitat present.
Bendire's thrasher	*Toxostoma bendirei*	NP	Variety of desert habitats with fairly large shrubs or cacti and open ground, or open woodland with scattered shrubs and trees	Low likelihood to occur. Rare.

NatureServe 2013, NNHP 2010

S BLM Nevada Special Status Species - USFWS listed, proposed or candidate
N BLM Nevada Special Status Species - designated Sensitive by State Office
NP Nevada State Protected Species protected under NRS 501.
LE USFWS Listed Endangered
C USFWS Candidate
BGEPA Bald and Golden Eagle Protection Act

5 Areas of Risk

This section outlines potential risks to bird and bats resulting from the Proposed Project. **Section 6** provides methods to avoid or minimize these risks through Project design, construction, and operation measures, **Section 7** addresses how the Applicant will monitor and prevent avian and bat species mortality and **Section 8** outlines Adaptive Management and supplemental measures for consideration.

Based on the results of the wildlife surveys completed for the Project, potential Project related risks associated with the construction and operation would include collision with overhead electric lines, solar panels and other features, electrocution, loss of foraging habitat and habitat fragmentation, nest and roost site disturbance, and disturbance due to ongoing human presence at the facility.

As an approach to continue to assess risk during construction and operation stages the Applicant will conduct reviews quarterly for the first year following construction to track, develop and manage issues.

5.1 Collision Risk

Vulnerability to collision depends on many factors including bird behavior and maneuverability, topography, weather, and power line design and placement. Bird collision with power lines has been documented for decades, and risk of collision is considered highest in areas where birds congregate, such as power lines that bisect daily flight paths to meadows, wetlands and river valleys (APLIC 2006).

Birds may have significant “blind spots,” increasing risk of collision even during daylight hours. Scanning below for prey or roost sites can render them blind to objects in the direction of travel (Martin and Shaw 2010). Transmission lines are the Project components that present the greatest risk of avian collision. Given that the utility corridor is currently populated with seven electric transmission lines ranging in size from 230-kV to 500-kV it is assumed that the addition of two proposed lines on the east side of the existing utility corridor would not have a cumulative effect on in-air collisions. The existing lines have been in place for many years and foraging flight patterns have most likely adapted to the vast size of the utility infrastructure.

While there are no peer-reviewed publications documenting fatality risks to birds associated with PV arrays, there is growing suspicion that PV panels may pose a collision risk to some groups of birds. FWS has developed a database of these mortalities in an effort to better understand the circumstances surrounding these mortalities. Bird mortalities in PV solar fields have been documented over the past year. Avian species found at other facilities include primarily waterbirds, and passerines (Nicolai pers. comm.). Because quantitative risk models for PV arrays have not been developed, precise estimates of avian mortality as a result of collision with PV panels are not possible at this time.

5.2 Electrocution

Power lines are present in many wildlife habitats and may result in the electrocution of raptors and other bird species (APLIC 2006; Lehman et al., 2010; and references therein). The potential for electrocutions depends on the arrangement and spacing of energized and grounded components of poles and towers that are sometimes used for perching, nesting and other activities (APLIC 2006, 2012). However, nearly all electrocutions occur on smaller, more tightly spaced residential and commercial electrical distribution lines that are less than 69-kV (APLIC 2006, 2012).

To protect avian species from electrocution, APLIC has established guidelines for electric line design. Incorporating appropriate design standards into the Gen-Tie Line and collector lines on the SPGF will minimize electrocution risk. The Gen-Tie Line and overhead collector lines will have clearances between electrical components as recommended by APLIC (2006, 2012), e.g., at least 60 inches of horizontal separation and a vertical separation of 40 inches between phase conductors, which is greater than the physical dimensions of all large birds, including eagles, that could potentially use the structures for perching. In situations where particular hardware would present an electrocution risk (e.g., jumpers, cutouts, arrestors, transformers, etc.), perch guards and/or insulators will be installed, per APLIC guidelines, to minimize electrocution risk. Therefore, electrocution of all birds including raptors would be highly unlikely.

5.3 Territory Abandonment and Nest Disturbance

The Tribe, Bureau of Indian Affairs (BIA) or the BLM do not have regulations quantitatively limiting noise generation or effects from the Project during the temporary construction phases or operational phase. The EPA has developed and published a criterion to be used as an acceptable guideline when no other local, tribal, county, or state standard has been established. The Project would affect ambient noise and vibration levels if it would result in the generation of noise levels or exposure of sensitive species to noise levels or ground-borne vibration in excess of standards established in applicable federal, state, and local general plans or noise ordinances.

There is the potential for golden eagles, as well as other bird species, to use the Project area for foraging and other birds for nesting. Birds would be susceptible to noise disturbance as described above, potentially resulting in alteration of foraging and/or nesting behaviors. There is potential for nest disturbance of migratory birds including burrowing owl burrows during the construction phase of the project due to noise, removal of vegetation, and leveling the ground. Known golden eagle nesting areas are located 4 to 6 miles from the Project. It is not expected that noise and other construction activity would affect nesting behavior of these known nests at this distance.

Short term impacts could result to birds; however, the area within the fenced solar facility would be void of sensitive or listed species. Impacts to vegetation and presence of humans and machinery would deter most birds from within the solar facility and therefore noise impacts to wildlife would be focused upon species immediately adjacent to the facility. Given the location of the facility, it is assumed that only short-term impacts would occur from noise and vibration during the construction phase. Most non-listed bird species would return to the area after construction if significant habitat and foraging opportunity exists.

5.4 Habitat Loss and Fragmentation

An estimated 889 acres considered suitable foraging habitat for Golden Eagles and other avian/bat species discussed in this BBCS would be permanently affected by the Project, with additional temporary losses of an estimated 71.3 acres foraging habitat during construction activities. Loss of foraging habitat could impact foraging behaviors of these avian and bat species. The Proposed Project permanent impact of 960 acres of this habitat is very small (0.04% assuming 10-mile foraging area) in comparison to available habitat within Dry Lake Valley.

The Project Area currently supports suitable nesting and foraging habitat for some avian species, and foraging habitat for some bats. These species could potentially be adversely affected during construction and operation activities. Bird nesting could also occur in the limited vegetation in the Project Area and in ground burrows in or near the Project Area. In the vicinity of the Project, the avian nesting season for most bird species is from late February to early July. The human activity at the SPGF site or along the Gen-Tie Line could attract undesired species, such as ravens, that could affect the ability of other species to nest in the area. Workers will be trained to avoid activities that attract ravens and other scavengers/predators such as coyotes (*Canis latrans)* to the Project Area, per the Project's Raven Control Plan.

Bat roosts or nursery colonies can occur in a variety of natural substrates or manmade structures that provide specific thermal properties and protection from predators. Typically these are large, stable structures, uninhabited or with minimal use by humans, such as buildings, barns, bridges, or caves, mines, and trees. Likewise, aquatic features that produce insects can be an important resource for foraging bats. No bat roosting habitat currently exists for sensitive bat species within or near the Proposed Project site but the site potentially provides bat foraging habitat. Because bats do not forage during daylight hours the potential for Project-related construction or operations impacts on bats is limited but some nighttime construction could occur.

Direct habitat loss will occur from the Project, and habitat fragmentation may reduce the functionality of this area for birds and bats; however, because an abundance of similar lands are available in the vicinity to provide habitat for any avian individuals displaced from the Project site, and since this Project site is not located in a sensitive, unique, or significant area of ecological importance to bird or bat species, the impacts are likely to be small and have no significant population level effects on any bird or bat species in the area.

5.5 Artificial Lighting

Additional light sources during the operation of the MSEC could result in concentrated foraging locations of avian and bat species that feed on insects nocturnally since the artificial lighting could attract insects. Artificial lighting also has the potential to negatively affect migration patterns of migratory birds and bats that move through the area. Lighting impacts would be reduced by focusing light sources downward. If lighting at individual solar panels or other equipment is needed for night maintenance, portable lighting will be used.

5.6 Evaporation Pond

Evaporation ponds covering approximately 5 acres are planned to allow plant operations. The ponds could accumulate organic chemicals that could potentially harm birds or bats if used as a water source. Netting could be used to deter avian and bat species from foraging in and around the evaporation ponds, though the netting itself presents a risk for entanglement by birds or bats. Harassment techniques such as auditory deterrents or visual repellents may also be implemented. If the netting were deemed to be an entanglement hazard, the biological monitors would then use Adaptive Management strategies outlined in **Section 8** to reduce the hazard

5.7 Ongoing Human Disturbance

Maintenance would consist of dust control and grounds upkeep, cleaning and repair of modules, repair and upkeep of all transformers, inverters and wiring collection systems, control systems upkeep, building maintenance and water treatment, and permanent storm water controls and maintenance.

Routine Preventative Maintenance (PM) activities would be scheduled in accordance with the frequencies outlined in the Original Equipment Manufacturer (OEM) specifications. O&M would require the use of vehicles and equipment including but not limited to welding, re-fueling, lubricating, panel washing equipment, forklifts, manlifts, and chemical sprayers for weed abatement. Flatbed trucks and pick-up trucks as well as utility vehicles would be used on a daily basis during construction at the facility and on-site.

Major equipment maintenance and overhauls would be completed at intervals of approximately 5-10 years. Replacement of non-functioning equipment may require the use of heavy haul transport equipment and large overhead cranes. Noise and activity disturbance would occur as a result of the O&M activities, but the impacts would be minor and intermittent in nature and are expected to have little or no added impacts to birds or bats in the area.

6 Mitigation Measures

As discussed in **Section 4**, the Proposed Project Area supports suitable habitat avian species, thereby creating a potential for impacts on these species from construction and O&M activities. The potential for impacts to bats is low because they are not known to breed in the Proposed Project Area.

The following construction and operation measures will be implemented to minimize potential impacts on avian and bat species.

6.1 Collision

Areas along the Gen-Tie transmission options where a high degree of mortalities are observed during post-construction mortality monitoring (**Section 7.4**), if any, would incorporate bird flight diverters on the static line to make it more visible. Static lines are the smallest diameter lines, and potentially the most difficult for birds to see and avoid. Flight diverters offer a strong deterrent to avian species at relatively low cost. Where any pole requiring guy wires is located near areas of concentrated bird activity, guy wires would be marked to increase visibility where possible. Currently, guy wires are not anticipated. Post construction monitoring and adaptive management (**Section 8**) will clarify areas of concentrated avian and/or bat use as well as areas experiencing a high degree of avian or bat mortality. Additional flight diverters will be installed through adaptive management measures if collision is verified as a cause of mortality. Flight diverter types and locations would be determined through consultation with the BLM, USFWS, and/or NDOW. The number of structures needing the use of guy wires would be kept to a minimum. Any collision mortalities would be reported to the USFWS and BLM within 48 hours.

6.2 Electrocution

All transmission towers and poles would be designed to be avian-safe in accordance with the *Suggested Practices for Avian Protection on Power Lines: the State of the Art in 2006* (APLIC 2006) and *Reducing Avian Collisions with Power Lines* by the U.S. Fish and Wildlife Service and the APLIC (APLIC, 2012). All aspects of the substations, switching stations, transformers and power lines (steel monopole structures) would be constructed utilizing avian-safe practices as suggested by APLIC using industry standards (APLIC 2006). Any potential electrocution caused mortality to avian or bat species would be captured under the reporting system (**Appendix A**).

6.3 Anti-Perching and Nesting

To reduce perching along segments of the transmission line, perch deterrents would be installed during construction. Anti-perching and nesting devices are important tools for reducing the risk of avian electrocution, protecting desert tortoise from increased predation, and keeping the entire electrical system running smoothly. Because conductor spacing on both the 230-kV and the 500-kV transmission lines would be so great as to preclude avian electrocution, perch deterrents are expected to be used primarily to eliminate the use of transmission lines and transmission line towers as hunting perches for raptor species. Deterring this kind of perching would limit the predation of other avian species or animals which use surrounding vegetation for foraging and nesting. Exact locations of perch deterrents would be determined in consultation with USFWS and NDOW prior to construction of the line.

Inspections of lines and other areas where raptor or corvids (crows and ravens) might nest along the transmission lines would be conducted monthly during the breeding season (February 15 to August 31st) for the first 3 years of operation. Inactive nests are not protected by MBTA and removal would be conducted prior to the next breeding season. Should nesting activity become a long-term issue, alternate measures to discourage nesting activities should be implemented. Prior to removing or relocating any nests, facility personnel would consult with USFWS and when necessary, proper USFWS permits would be obtained. Reporting of nests and nest relocation would be completed using forms found in **Appendix B**. Removal of inactive nests discovered by O&M staff would occur for the life of the project.

Any hollow mine claim markers discovered on site would also be removed to prevent birds from becoming entrapped.

6.4 Habitat Loss and Fragmentation

Construction of the linear water pipeline and electric transmission lines would have a temporary effect on vegetation, but the areas would be allowed to re-vegetate or would be actively restored with BLM-approved weed-free seed mixes, and wildlife species would be able to utilize them for habitat and foraging. Use of the existing utility corridor for access and transmission largely restricts the impact to a previously impacted area, and aids in reduction of impacts to historically undisturbed areas within the Reservation and on BLM-managed lands. All vegetation disturbance would occur outside the avian breeding season (February 15 – August 31), if practical, to avoid impacts to nesting birds; if clearing outside the breeding season is not practical, pre-construction surveys for bird nests would be performed.

A Weed Management Plan (WMP) has been prepared and will be submitted to the BIA, BLM and the Tribe for review and approval before construction begins. Methods of noxious weed and invasive species identification, prevention and treatment for the Project are outlined in the WMP. The WMP recognizes the Project's impact on vegetation and defines the expected treatments and activities necessary to both maintain the determined desired conditions for the vegetation community within the Reservation, and control the weeds that may arise within the 850-acre SPGF footprint.

6.5 Lighting

Lighting would be designed to provide minimum illumination needed to achieve O&M objectives and not emit excessive light to the night sky by installing light absorbing shields on top of all light fixtures, and focusing desired light in a downward direction (Reed et al. 1985). This would reduce the visibility of the lights to migratory birds traveling through the area. Downward facing lights would also reduce the number of insects attracted to lights resulting in a decrease of potential concentrated feeding areas for bats. Any additional lighting needed to perform activities such as repairs would be kept to a minimum and only used when these actions are in progress.

6.6 Nest Disturbance and Territory Abandonment

Vegetation clearing and ground disturbing activities would be conducted outside the migratory bird nesting season when practical. If ground-disturbing activities cannot be avoided during this time period, pre-construction nest surveys shall be conducted by a qualified biological monitor within 3 days prior to the initiation of ground disturbing activities. For all non-raptor bird species, surveys would cover all potential nesting habitat in and within 300 feet of the area to be disturbed. Any disturbance or harm to active nests would be reported within 24 hours to the USFWS and the BLM, if on BLM lands. The biological monitor would halt work if it is determined that active nests are being disturbed by construction activities and the appropriate agencies would be consulted.

If vegetation clearing is proposed to begin during the breeding season, a qualified biologist would conduct pre-construction nest surveys within 3 days prior to any vegetation clearing activities to identify all active nests within the construction area, and the vegetation and habitat type in which each nest is found will be recorded. Nest locations would be marked using handheld GPS (but not marked in the field in order to avoid attracting potential nest predators); an avoidance area would be clearly marked on the ground in order to prevent equipment from impacting the nest. Environmental monitors would be in place during the entire construction period to minimize impacts to natural resources. During clearing activities associated with construction, qualified biologists would destroy bird nests only after young have fledged and perform any mitigation measures necessary to reduce or eliminate negative effects on avian species inhabiting the construction area. Activities associated with the removal of nests or relocation of Burrowing Owls are regulated by the USFWS under the MBTA.

Golden eagle nests located within one mile of any construction activities would be monitored by a qualified biologist. If an active golden eagle nest is located within one mile of a construction area, a one-mile avoidance buffer zone would be established. Construction may commence once a qualified biologist has determined the young have fledged or the nest is no longer active. Disturbance buffers for other raptors would follow the USFWS Utah Field Office Guidelines for Raptor Protection from Human and Land Use Disturbances (1999) to determine appropriate survey areas and disturbance buffers for active nests.

A qualified biologist would conduct pre-construction surveys within 30 days prior to construction for western burrowing owl within suitable habitat prior to breeding season. All areas within 250 feet of the Project would be surveyed, per USFWS 2007 Burrowing Owl guidance. If an active nest is identified, there would be no construction activities within 250 feet of the nest location to prevent disturbance until the chicks have fledged or the nest has been abandoned, as determined by a qualified biologist. The occurrence and location of any Western Burrowing Owl would be documented by biological monitors in daily reports and submitted to the authorized biologist on a daily basis. The authorized biologist would report all incidents of disturbance or harm to Western Burrowing Owls within 24 hours to the USFWS and report any incidence of mortality on the proper form (**Appendix A**).

When removal of occupied burrows is unavoidable, the following mitigation measures shall be implemented outside of the breeding season:

- Passive relocation methods are to be used by the biological monitors to move the owls out of the impact zone. This includes covering or excavating all unoccupied burrows and installing one-way doors into occupied burrows. This will allow any animals inside to leave the burrow, but will exclude any animals from re-entering the burrow. A period of at least 48 hours is required after the relocation effort to allow the birds to leave the impacted area before excavation of the burrow can begin. The burrows should then be excavated and filled in to prevent their reuse.

- The removal of active burrows on-site requires construction of new burrows or the enhancement of existing unsuitable burrows (i.e., enlargement or clearing of debris) at a mitigation ratio of 2:1 at least 50 meters from the impacted area and must be constructed as part of the above-described relocation efforts.

6.7 Evaporation Pond

Multiple evaporation ponds covering approximately 5 acres are planned to allow plant operations to continue in the event that a pond needs to be taken out of service. The ponds could accumulate organic chemicals that could potentially harm birds or bats if used as a water source. To eliminate avian and bat use of the evaporation pond at the project site, the pond would be covered with bird proof netting. The netting itself poses a small risk of entanglement because a small mesh size would be used that has a low likelihood of ensnaring birds (<1 inch). The netting used would be a fine black twine mesh (as opposed to monofilament). Netting would be suspended more than 5 feet above the water surface upon installation so that the net will not dip into the water should sagging develop later on. During the biological monitoring of SPGF (addressed in **Section 7)** the Applicant would also include an assessment of the netting, ensuring that no birds or bats are entangled and no holes have developed that would increase the risk of indigestion of dissolved solids or entanglement in the netting. If the netting were deemed to be an entanglement hazard, the biological monitors would then use Adaptive Management strategies outlined in **Section 8** to reduce the hazard. After the designated biological monitoring ceased at the Proposed Project site, O&M staff at the SPGF would regularly check and maintain the netting to ensure no holes would develop.

6.8 Litter Disposal and Removal

To minimize activities that attract prey and predators during construction and operations, garbage will be placed in approved containers with lids and removed promptly when full to avoid creating attractive nuisances for birds and bats. Open containers that may collect rainwater will also be removed or stored in a secure or covered location to not attract birds.

7 Monitoring

Bird mortalities observed during construction of the Project would be documented and reported to the USFWS within 48 hours. Post-construction monitoring would occur for three years after completion in order to determine whether the mitigation measures being used are effective or if they need to be adapted to better fit the needs of the Project. Monitoring periods could be extended if proper progress is not being made in reduction or elimination of avian and bat related incidents. Post construction mortality monitoring is discussed in greater detail in **Section 7.4**.

7.1 Pre-construction Avian Monitoring

Pre-construction nest surveys would be conducted by qualified biologists prior to, but within 3 days of construction. Active nests would be recorded and a buffer area would be placed around the nest location until the nest is inactive. Removal or relocation of burrowing owl nests would only occur after the young have fledged, and adults are excluded from the burrows.

Biological monitors would be assigned to the Project in areas of sensitive biological resources. The monitors would be responsible for ensuring that impacts to special status species, native vegetation, wildlife habitat, or unique resources would be avoided to the fullest extent possible. Where appropriate, monitors would flag the boundaries of areas where activities would need to be restricted to protect the species of concern discussed in this BBCS as well as other plant and animal species not listed. Those restricted areas would be monitored to ensure their protection during construction.

7.2 Permit Compliance

The Proponents may find it necessary in some situations to obtain federal and state permits regarding avian and bat species, including nest removal or relocation permits (depredation permit). In such situations, the Proponent may seek to obtain them by working with the federal and state resource agencies to determine which permits are necessary. Under no circumstances would the Proponent perform any activity requiring a permit without first obtaining the proper permit or authorization to do so. The project will apply for a Special Purpose Utility Permit (SPUT) from the USFWS.

7.3 Training

A Worker Environmental Awareness Program (WEAP) would be prepared and implemented. All construction crews and contractors would be required to participate in WEAP training prior to starting work on the Project. The WEAP training would include a review of the special status species and other sensitive resources that could exist in the Project area, the locations of sensitive biological resources and their legal status and protections, and measures to be implemented for avoidance of these sensitive resources. A record of all trained personnel would be maintained.

7.4 Avian and Bat Mortality Surveys

The Applicant will monitor the SPGF and Gen-Tie Lines to document and report avian mortalities within 48 hours, which can help identify areas of concern by tracking both the specific locations where mortalities occur, as well as the quantity of such mortalities. Any dead or injured birds or bats observed by personnel conducting O&M activities within the SPGF and along the Gen-Tie Lines will be reported in accordance with the existing USFWS Bird Fatality/Injury Reporting Program (https://birdreport.fws.gov/). Bat mortalities will also be reported to USFWS, BLM and the Tribe. Data forms for recording bird and/or bat mortalities can be found in **Appendix A**.

All bird collisions and electrocutions discovered by construction and operations staff will be recorded using a two-page reporting form that identifies date, time, and location of the incident. Data will be entered into the USFWS-approved avian mortality reporting spreadsheet. Carcasses will be photographed from at least two angles. All raptor mortalities will be reported to BLM/BIA and/or USFWS within 24 hours of discovery or notification of a carcass. Additionally, the Applicant or its representatives will perform post-construction avian and bat mortality monitoring during at least the first three years of operation of the Project to demonstrate that the level of incidental injury and/or mortality does not result in an unanticipated long-term decline of any avian populations in the region.

The monitoring report will be updated seasonally (every 3 months) for the first year of monitoring, then annually for years 2 and 3. Copies of the monitoring report will be sent to the USFWS and the wildlife agencies at the addresses provided below.

USFWS:
Chris Nicolai, PhD
USFWS - Region 8 Migratory Bird Biologist
1340 Financial Blvd.
Reno, NV 89502
Phone: (775) 861-6333

Susan Cooper
Fish and Wildlife Biologist
US Fish and Wildlife Service
4701 North Torrey Pines Drive
Las Vegas, Nevada 89130
Phone: (702) 515-5230
Fax: (702) 515-5231

Heather Beeler
Eagle Permit Specialist
US Fish and Wildlife Service
2800 Cottage Way W-2606

Sacramento, CA 95825
Phone: (916) 414-6651
Fax: (916) 414-6486

Biomonitor (to be assigned at start of construction)
Southern Nevada Field Office
4701 North Torrey Pines Drive
Las Vegas, Nevada 89130

NDOW:
Anthony Miller
Wildlife Biologist
4747 Vegas Dr.
Las Vegas, NV 89108
Phone: (702) 486-5127 x3613

BLM:
Melanie Cota
Wildlife Biologist
BLM Southern Nevada District Office
4701 North Torrey Pines
Las Vegas Nevada 89130
Phone: 702-515-5233
Fax: 702-515-5155

BIA:
Environmental Protection Specialist
Western Regional Office
400 North 5th Street, 12th Floor
Phoenix, Arizona 85004

Monitoring will be completed by qualified observers. The monitoring program for the Proposed Project is based on the USFWS guidance entitled *Monitoring Migratory Bird Take at Solar Power Facilities: An Experimental Approach* (USFWS 2011) with modifications (no double-observer, no increase in sampling proportion for low-mortality results, use of Program facilityCMR for corrected estimates instead of the Warren-Hicks estimator).

<u>Transect Sampling:</u> For each kilometer of Gen-Tie Line, 300-meter transects will be randomly established along the Gen-Tie Line, allowing for approximately 30 percent of the Gen-Tie Line to be sampled. The transects will be positioned along the centerline of the Gen-Tie Line. Transects will also be positioned to result in approximately 30-percent coverage of the SPGF. Transect selection will be either randomized or systematic randomized. The entire perimeter of the solar facility will also be surveyed during each survey period in addition to the interior transects.

Though netting will be in place, the immediate edges of the evaporation pond would be walked to monitor floating carcasses or carcasses which have been washed to shore to determine the effectiveness of the nest. If multiple ponds occur, efforts would be made to sample each pond.

Transects will be surveyed for 7 consecutive days each month. Each transect will be surveyed once daily. One qualified observer will walk along the pre-determined transects searching for bird/bat carcasses. When a carcass is observed, a GPS location will be recorded at the carcass (for DISTANCE analysis), the species identified and information regarding carcass condition, as per USFWS (2012) utilizing an electronic data dictionary or paper datasheets. Each carcass will be marked uniquely and inconspicuously with tape and permanent marker to assess “recapture” rates. All carcasses will be left exactly as found and USFWS will be notified of all mortalities within 24- hours. Once data are collected at a carcass, the observer will return to the pre-determined transect and continue with the survey. All sampling periods will be 7 consecutive days, and observers will continue to record presence, location (using universal transverse Mercator [UTM]), and condition of all observed carcasses. Shapefiles of the transects, fatalities, and solar development Project features will be provided to USFWS, along with electronic data or copies of completed paper data sheets.

Scavenger removal trials will be performed following the methods outlined in USFWS (2012b). Scavenger removal trials will use carcasses of wild birds of several size classes mimicking the suite of species present in the vicinity of the project area. Carcasses will be checked daily until the carcass is removed (defined as less than 5 feathers remaining at the carcass location). Scavenger removal trials will be conducted at least twice annually; once during the hot season and once during the cool season. Scavenger removal rates will be estimated following Warren-Hicks et al. (2012).

Searcher proficiency trials will be conducted following the methods outlined in USFWS (2012b). Searcher proficiency trials will be conducted unbeknownst to the observers being tested. Carcasses will be randomly placed along transects and discreetly marked in order to not alert the searcher that a trial is being conducted. All searchers participating in mortality monitoring will be tested.

Analysis and Reporting: Two primary analyses will be conducted. The first will use Program DISTANCE to determine the most effective transect width to search for carcasses. The second will use Program MARK to estimate total number of mortalities controlling for detection rate, scavenging rate, and proximity to Project components. The following additional steps will be taken:

- Necropsies will only be completed in cases where mortalities are suspected to be unrelated to project infrastructure.
- Mortality monitoring may additionally be conducted on nearby lands that are not included in the project in order to establish an estimate of the background mortality rate in the vicinity

of the project.

- Searcher bias and scavenger removal rates will be calculated using carcass detection and removal trials using the facility CMR program estimator; results will be adjusted to account for these factors.
- The results of the mortality analysis reports will be provided to both BLM and USFWS.

If the post-construction mortality monitoring indicates that the Project is resulting in unanticipated and unacceptable impacts on any avian population (especially special status species), the Applicant will enhance study efforts and/or provide supplemental mitigation as described in **Section 8**, Adaptive Management

7.5 Nest Surveys

If an active nest is identified within the Gen-Tie ROW or the SPGF, the Applicant will monitor the facilities for any avian interactions, including breeding and nesting activities, and will document the monitoring results, which can help identify areas of concern by tracking the specific locations where nesting might occur. Monitoring of active migratory bird nests by the Applicant will continue during the life of the Project's operation.

All nesting activities will be recorded using a two-page reporting form that identifies date, time, and location of the activity (**Appendix B**).

If the reports submitted under this section indicate that the Project results in a level of incidental injury and mortality to nesting birds that constitutes a substantial impact on the breeding population, The Applicant will take corrective action or undertake supplemental compensatory measures to support regional conservation of migratory birds in accordance with measures presented in **Section 8,** Adaptive Management.

7.6 Reporting

The Proponent would implement a Wildlife Reporting and Response System (WRRS). The purpose of the WRRS is to standardize the actions taken by the Proponent or subcontractors in response to any wildlife fatalities or injuries observed within the Project boundary. Any dead or injured animals found within the Project boundary by Project employees would be marked and its location reported immediately to the qualified biologist on-duty, and a coincidental mortality report form would be filled out (**Appendix A**). The qualified biologist would proceed to the site of the discovery, would complete an incident report, and take photographs. The carcass or injured animal would not be moved or removed by any individual who does not have the appropriate SPUT permit. If an endangered or threatened species, or an eagle, is found dead or injured on the site, the qualified biologist would immediately notify the USFWS of the discovery. All bird mortalities would be reported to the USFWS and BLM within 48 hours

8 Adaptive Management

8.1 Agency Collaboration

Adaptive management will ensure an ongoing open communication between the Proponent and the agencies. The parties will cooperatively evaluate the plan doing what is necessary for its long- term success. The Applicant will work collaboratively with the BIA, BLM and USFWS to comply with legal requirements as well as the requirements contained within the MSEC BBCS. This BBCS is a "living" document.

8.2 Agency Coordination

To facilitate evaluations of impacts on regional avian and bat populations, study results will be provided to USFWS, BIA and BLM on a quarterly basis.

The Project Owner will be available for annual meetings with BLM, BIA and USFWS to discuss Project related issues under the jurisdiction of each agency.

8.3 Supplemental Measures for Consideration

If the reports submitted indicate that mitigation measures and avoidance and minimization measures proposed in **Section 6.0** are not sufficient in addressing Project impacts, the Project owner will consider taking additional corrective actions or implementing supplemental measures agreed upon in coordination with the various agencies.

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Appendix A – Mortality Reporting Data Form

MOAPA SOLAR ENERGY PROJECT

MORTALITY REPORTING FORM

DATE: ____________ TIME: __________ OBSERVER: ____

PROXIMAL TO PROJECT COMPONENT: ____

CARCASS POSITION

GPS COORDINATES East: ____________________________ North: __________________________________

BEARING (degrees) to PROJECT COMPONENT: ________________

DISTANCE (meters) to PROJECT COMPONENT: _______________

CARCASS DESCRIPTION

SPECIES: _____________________________

SEX (*circle*): M F U AGE (*circle*): A J U Tag/Band Number: ____________________________

CONDITION (*circle*): intact scavenged dismembered feather spot injured

ESTIMATED TIME SINCE DEATH/INJURY (no. of days): <1 1 2 3 4 5 6 7 7+

CAUSE OF DEATH: ____

____

OBSERVABLE INJURIES: ____

____

SUBSTRATE/GROUND COVER (*at carcass location)*:_____________________________

DISPOSITION OF CARCASS[1] (*circle*): left in place removed collected for trials collected for other:

____

SHIPPED TO:

[name of institution] ____

[physical address] ____

[phone/email] ____

WEATHER CONDITIONS

AIR TEMPERATURE (degrees Fahrenheit): ________

PRECIPITATON (last 24 hours, *circle*): none light rain rain heavy rain hail snow

CLOUD COVER (*circle*): clear mostly clear partly cloudy mostly cloudy cloudy

WIND DIRECTION: _____ SPEED (mph, *circle*): 0-10 10-20 20-30 30+ gusty

NOTES (describe noteworthy weather conditions since last search, including high wind, fog, precipitation, and storm events):

____

____

____

____

PHOTOGRAPHS[2]:

Close Up: Photo 1 ____________________ Photo 2 ____________________

Landscape: Photo 3 ____________________ Photo 4 ____________________

PHOTO NOTES:____

____

NOTIFICATION[3]:

DATE: ______________________________ TIME: ______________________________

NAME: ______________________________ AGENCY/ASSOCIATION: ____________________

NOTES:

____

____

____

____

[1] Permit required to handle bird carcasses.

[2] At least four photographs should be taken. Two should be close-in shots of the carcass and should be taken from at least two different angles. Two should be shots taken farther away showing the landscape (project components, surrounding habitat, etc.) and should be taken from at least two different angles).

[3] Indicate who was notified of the event, date, time, etc.

Appendix B – Nest Reporting Data Form

MOAPA SOLAR ENERGY PROJECT
NEST REPORTING FORM

DATE: ____________ TIME: __________ OBSERVER: ____

PROXIMAL TO PROJECT COMPONENT: ____

NEST POSITION

GPS COORDINATES East: ________________________________ North: ________________________________

BEARING (degrees) to PROJECT COMPONENT: _______________

DISTANCE (meters) to PROJECT COMPONENT: ______________

NEST DESCRIPTION

SPECIES: ___________________________

SEX OF INDIVIDUALS AT NEST (*circle all that apply*): M F U

AGE (*circle all that apply*): A J U

ESTIMATED NUMBER OF EGGS/CHICKS (IF APPLICABLE) ________________________

GENERAL DESCRIPTION OF NEST SITE

Substrate (e.g., cliff or outcrop [rock type], tree/shrub [species, live/dead], ground, artificial structure [type]):

____

Estimated height of substrate: _______(m) Estimated height of nest above ground: ______(m)

Nest type and location on substrate (e.g., stick nest in upper/lower canopy stick nest on/in ledge, pothole, or crevice; scrape on/in ledge, pothole, or crevice; stick nest on artificial platform mounted in tree; tree cavity; burrow; etc.):

____

Protection from weather (YES/NO; describe nature of protection, e.g., tree canopy, cliff backdrop, pothole/crevice, burrow, etc.):

____

Approximate compass direction of exposure to elements (wind, sun, etc.): ______________________

Nest size—indicate whether estimated or measured: ____________

Height (top to bottom)______ Width (left to right)______ Depth (back to front)______ (meters)

Known or probable alternative nests within territory and associated nest #'s:

____

____

PHOTOGRAPHS[1]:

Close Up: Photo 1 ____________________ Photo 2________________________________

Landscape: Photo 3 ____________________ Photo 4________________________________

PHOTO NOTES:____

____

NOTIFICATION[2]:

DATE: ____________________________________ TIME: ____________________________________

NAME: ____________________________________ AGENCY/ASSOCIATION: _________________

NOTES:

____

____

____

[1] At least four photographs should be taken. Two should be close-in shots of the nest and should be taken from at least two different angles. Two should be shots taken farther away showing the landscape (project components, surrounding habitat, etc.) and should be taken from at least two different angles).

[2] Indicate who was notified of the event, date, time, etc.

Appendix P

Traffic Management Plan

Traffic and Parking Management Plan

Moapa Solar Energy Center Project (MSEC)

Clark County, Nevada

Prepared For:

U.S. Bureau of Indian Affairs
U.S. Bureau of Land Management

Prepared By:

CH2MHILL

May 2013

1. Project Information

1.1. Background

Moapa Solar LLC proposes to develop and operate the Moapa Solar Energy Center project (MSEC or Project) on the Moapa Indian Reservation (Reservation). The proposed MSEC Project would consist of a solar power generation facility (SPGF), gen-tie lines that would interconnect the Project to the regional electrical transmission grid, and an access road between the SPGF and a frontage road along the west side of Interstate 15 (I-15). The SPGF would be located entirely on lands within the Moapa River Indian Reservation, the gen-tie lines would be located on both Reservation and Bureau of Land Management (BLM)-administered lands, and the access road would be located primarily on BLM-administered lands.

The Applicant has entered into an agreement with the Moapa Band of Paiute Indians (Tribe) to lease land, up to 30 years, on the Reservation for the purposes of constructing and operating a solar energy center. The MSEC would utilize photovoltaic (PV) technology to generate up to 200 megawatts (MW) of energy. The electricity generated from the Project would be sold to a customer via a Power Purchase Agreement (PPA) or on a merchant plant basis.

1.2. Location

The Proposed Project would be located approximately 20 miles northeast of Las Vegas in Clark County, Nevada **(Figure 1)**. The SPGF would be located on 850 leased acres within the Reservation in Mount Diablo Meridian.

The Proposed Project site is accessible from Exit 64 on I-15. Traffic will exit I-15 and travel a short distance westbound on Highway 93 until reaching the frontage road. Traffic will then turn northbound on the frontage road and parallel I-15. The first 5.8 miles of the frontage road is maintained by the Nevada Department of Transportation (NDOT), and the remaining 2 miles of paved road stretches up to the South Crystal Valley Substation Access Road. Beyond the South Crystal Valley Substation, the roadway becomes an unpaved utility corridor.

1.3. Scope of Work and Schedule

The Proposed Project is anticipated to begin construction during the first quarter of 2014 and achieve commercial operation in the first quarter of 2015. The Project would consist of four linear ancillary facilities on federal lands managed by the BLM, including a 1.6 mile overhead 500-kV transmission line to the Harry Allen Substation, a site access road, and a 5.4 mile water pipeline **(Figure 2)**.

Construction would occur concurrently at various locations along the transmission line right-of-way (ROW). It is anticipated that construction would begin in 2014, and the overall project will be constructed over a period of 24 months for the PV Project. The construction of the transmission line portion will be approximately 4 to 6 months of the total construction schedule. Initial construction activities would involve the improvement of existing public access and spur roads where necessary. Although minimal improvements are expected, some road widening and additional gravel may be required.

The K Road Moapa Solar LLC is constructing a similar solar generating facility east of the Proposed Project with construction having begun in 2012 and expected to finish in 2016. This project is anticipated to improve the frontage road to accommodate construction traffic for that project, and it is anticipated that these improvements will be in place prior to the start of construction for the MSEC project. The final project completion date for the K Road Moapa Solar Facility is scheduled for the end of 2016, but the road improvements were completed at the end of 2012.

1.4. Need for the Proposed Project

The Proposed Project will create an economic development opportunity for the Tribe. The Project will provide a diverse and long-term economically viable revenue stream from lease income, will create new jobs and employment opportunities for Tribal members, and will develop sustainable renewable resources. The lease for a solar energy center will optimize the use of Tribal lands while providing economic benefits. Also, the Tribe would provide water that could be used for the Project. The use of the Tribe's water by the Project would help the Tribe better establish its rights to this water. Another need satisfied by the Proposed Project would be to assist the federal government, Nevada, and neighboring states meet their renewable energy goals by providing clean renewable electricity generation from the Tribe's solar resources that can be efficiently connected to the regional grid.

The Tribe identified the solar energy center development as meeting its economic development goals, as it would provide much needed revenue to the Tribe, afford employment opportunities, and possibly strengthen their water rights. The Proposed Project would provide these benefits while occupying only a small portion of the Reservation (one percent). The Project also minimizes environmental impacts and needs for new infrastructure based on the location and the proximity to existing facilities.

1.5. Purpose of the Traffic and Parking Management Plan

The Traffic and Parking Management Plan (TPMP) outlines steps to minimize the impacts and delays to traffic associated with the Proposed Project. The TPMP describes the measures that may be used to address any traffic and parking impacts identified, including public outreach.

1.6. Personnel

The person with the primary responsibility for implementation of this Transportation Management Plan is:

Daniel Menahem
Daniel.Menahem@res-americas.com

1.7. Existing Highway Facility

The Proposed Project site is located west of I-15 between Exit 64 (Highway 93) and Exit 74 (Moapa Paiute Travel Plaza). I-15 provides access to the project site from Las Vegas to the south and Saint George and Salt Lake City to the north. Highway 93 runs northeast concurrent with I-15 from Las Vegas and then departs at Exit 64 where it turns north. See

Table 1-1 for more detailed information on the transportation routes and annual average daily traffic volumes (AADT) in the vicinity of the Proposed Project.

Table 1-1
Summary of Existing Roads in the Vicinity of the Proposed Project

Roadway	Direction	# of lanes	Roadway Type	Segment	2012 AADT	Description
I-15	North-South	2 each direction	Interstate (paved)	North of Exit 64	19,500	I-15 provides a connection from Las Vegas, Nevada north to Salt Lake City, Utah. Provides direct access to the Proposed Project site via US 93.
				South of Exit 64	26,500	
US 93	North-South	1 each direction	Principal Arterial (paved)	North of I-15	2,300	Through Las Vegas, US 93 runs concurrent with I-15. North of Las Vegas, US 93 is a major Highway connecting Las Vegas to the Great Basin National Park and to Ely and Wells further north.
				NB Off-Ramp	3,000	
				NB On-Ramp	1,000	
				SB Off-Ramp	850	
				SB On-Ramp	2,800	
North Las Vegas Boulevard (Frontage Road)	North-South	1 each direction	Arterial State Route (paved for 2 miles north of US 93and unpaved to the project site)	North of US 93	320 [a]	The frontage road parallels I-15 from North Las Vegas to US 93. North of US 93, the frontage road continues to the Proposed Project site as well as other power generating facilities.
				South of US 93	1700	

Source: NDOT TRINA - Traffic Records Information Access Data

[a] *Notes: Estimated AADT based on the NDOT 2010 traffic data for adjacent roadways*

2. Traffic Impacts

2.1. Major Transportation Routes

2.1.1. Construction Phase

The roadways listed in **Table 1-1** are anticipated to be impacted by the Proposed Project. The impacts to these roadways include increased wear on the road from the construction loads, increased traffic volumes during construction, and added delay during the construction peak periods.

Increased volumes for the construction personnel and the material deliveries will impact traffic flows throughout the duration of the project. The on-site construction workforce would consist of project and site management, laborers, skilled craft, and startup personnel. The number of workers expected on the site during construction of the Project would vary over the construction period and is expected to average up to approximately 300 each day, generating about 300 daily round trips. The number of workers expected on the site during construction would vary over the duration of the Project. To account for the variability during peak periods a more conservative estimate assuming no carpooling was used. Deliveries of equipment and supplies to the site would also vary over the construction period but are expected to average about 50 daily round trips. Construction equipment would typically include augers, bulldozers, various trucks, trailers, tractors, and cranes. All project related parking will be onsite during construction, moving within the solar field as it is developed. The estimated project construction trips projected to be generated by the proposed Project are presented in **Table1-2**.

Table 1-2
Project Construction Trip Generation

Vehicle Type	Total Daily Trips	AM Peak Trips			PM Peak Trips		
		Inbound	Outbound	Total	Inbound	Outbound	Total
Construction Worker Vehicles	600	300	0	300	0	300	300
Trucks	100	50	0	50	0	50	50

It is anticipated that the construction workforce for the K Road Moapa Solar Facility will overlap with the construction workforce for the MSEC Proposed Project. To prevent drastic increases in traffic during the peak hours, it is assumed that the two projects will coordinate the start and end times to be offset such that the increases in volume will not multiply the impacts of each individual project.

Construction will generally occur between 7 a.m. and 7 p.m. Monday through Friday. Additional hours may be necessary to make up schedule deficiencies, or to complete critical construction activities. For instance, during hot weather, it may be necessary to start work earlier to avoid pouring concrete during high ambient temperatures. Work shifts will be staggered in 20 minute intervals as much as practical to reduce traffic impacts along the Frontage Road and at the intersection with Highway 93.

The Proposed Project will increase traffic on I-15, Highway 93, and the Frontage Road by a maximum of 700 vehicle trips daily (600 daily worker trips and 100 daily truck trips). There are 3 two-way stop controlled intersections which will also experience increased traffic from the Proposed Project:

- Highway 93 and Northbound I-15 Ramps
- Highway 93 and Southbound I-15 Ramps
- Highway 93 and Frontage Road

Intersection delay (in seconds per vehicle) and Level of Service (LOS) were determined for each of the study area intersections for both the A.M. and P.M. peak hours using the Synchro software program, implementing the Highway Capacity Manual (HCM) methodology. LOS is a term that describes the congestion on the basis of ratings from A to F. LOS A reflects minimum delay at an intersection and LOS F reflects long delays at an intersection. LOS C is considered desirable for peak hour operations. For this analysis, the LOS at unsignalized intersections is measured using the methodology contained in the HCM. The HCM methodology utilizes average delay per vehicle based on peak hourly traffic volumes, peak hour factors, number of lanes, type of operation (signalized or unsignalized), and other standard variables in the calculation. For side-street stop-controlled intersections, delay is typically represented in seconds for each movement from the minor street approaches and the left turns from the major street.

The results of the traffic analysis indicate that all of the three intersections will operate at LOS C or better in the AM peak hour with the addition of the construction traffic. While there will be an increased delay from the existing conditions the delay does not cause the LOS to exceed the desirable threshold. In the PM Peak Hour, the LOS for the Southbound left turns (the construction traffic) drops to a LOS D, which is acceptable but not desirable. All other movements for the background traffic operate at LOS C or better. The construction traffic will experience a delay during the PM peak hour when the workforce is at its highest number. The Synchro output results in **Appendix A**.

2.1.2. Operations Phase

When the site becomes operational, it is anticipated that the site would generate up to an additional 26 trips per day (13 entering in the morning peak hour and 13 departing in the evening peak hour) with the PV technology and 50 trips per day (25 entering in the morning peak hour and 25 departing in the evening peak hour) with the CSP technology. Both scenarios would have very few heavy vehicles. The site is anticipated to be operational for 25 to 30 years. The existing roadways have very low traffic volumes with limited forecasted growth. Because the increases in traffic are very minor during the Operations Phase, and the Construction Phase volumes did not have significant impacts, the operational analysis was not performed. The intersections are projected to operate at acceptable levels during the Operations Phase.

2.2. Minor Access Transportation Routes

2.2.1. Construction Phase

There is currently little traffic on any of the roads bordering or in the immediate vicinity of the project. The use on these roads is associated with the energy infrastructure in the area.

The portion of the Frontage Road that is north of the NDOT maintenance jurisdiction is the only existing minor transportation route that may be affected by the Proposed Project. This portion of the Frontage Road will experience the same increase in daily vehicle trips (700 vehicles) during construction of the Proposed Project.

The K Road Moapa Solar LLC is constructing a similar solar generating facility east of the Proposed Project with construction having begun in 2012 and expected to finish in 2016. The early stage of this construction includes improvements to the Frontage Road north of the NDOT maintenance jurisdiction beyond the Crystal Substation and potential Proposed Access Road intersection. These improvements updated the roadway to meet the Clark County standards and added truck turn outs to facilitate passing. Thus, no additional improvements to the Frontage Road are anticipated for the Proposed Project.

A 2.5-mile gravel access road connecting the SPGF to the existing paved frontage road adjacent to I-15 would be constructed on BLM-administered lands. From the existing paved frontage road west of I-15, the proposed site access road would continue to follow the existing unpaved Frontage Road for approximately 2.0 miles until it reaches the proposed 230 kV gen-tie transmission line ROW which it would follow approximately 0.5 mile north to the SPGF site.

The Proposed Access Road will be constructed to meet the Clark County Construction Management Division of Public Works guidelines. The proposed access would be an unpaved roadway with approximately 10 foot lanes and 5 foot shoulders. The road will have a proposed ROW of 100 feet.

2.2.2. Operations Phase

The minor roads will experience similar impacts as the major roads during the Operations Phase. The existing Frontage Road, the Proposed Access Road, and the site routes will be built to accommodate the anticipated 100 daily trips (50 entering and 50 departing) with some maintenance potentially required in the future to ensure the roadway surface conditions satisfy the needs of the site for the duration of the operations.

3. Traffic Control Scenarios

3.1. Traffic Control Scenarios

Traffic Control will be required during the construction of the Proposed Access Road, internal roads, and parking facilities. Traffic Control may include one lane roads with flaggers regulating the traffic flows one direction at a time. The delays to the traffic will only impact the construction personnel and will not last more than 15 minutes. All roadways shall accommodate two-way traffic at the end of the work hours, or the roadways shall be closed to traffic when flaggers are not present. Traffic control shall meet the requirements in the Manual of Uniform Traffic Control Devices (MUTCD).

Emergency personnel will be allowed access through the construction site at all times.

The Proposed Project does not anticipate improvements on the existing transportation facilities, and the majority of the vehicles on the adjacent roads would be construction traffic. Thus the only traffic control on these facilities would be signing to inform travelers of the construction activities and access routes approaching the Proposed Project Site.

4. Mitigation of Traffic Impacts – Best Management Practices

The traffic impacts identified in the previous sections may cause added delay to travelers in the Proposed Project vicinity. This section describes potential measures which could be used to reduce the delay caused by the Proposed Project. These measures are recommended in the PM peak hour as the LOS drops below the desirable condition without any mitigation.

4.1. Motorist Information and Construction Area Signs

Informing the road users is one way to help reduce the impacts from construction. Drivers will be informed about the construction and any major delays and/or detours, allowing them to modify their travel choices. Both static and variable message signs (VMS) can be used to inform users coming from each direction that there may be delays due to construction. It is recommended to add appropriate signage on both US 93 and the Frontage Road on both ends approaching the project site.

4.2. Construction Staging

To mitigate the impacts to the construction workforce during the project, the construction will be sequenced such that the site has adequate capacity for the workforce required for the next stage. The preliminary construction stages include clearing the existing vegetation for a temporary access and constructing the parking area and staging area for storing materials and equipment needed for the roadway construction. These stages will be followed by construction of the Proposed Access Road which will provide access suitable for the remaining construction activities.

All construction signing shall meet the MUTCD requirements.

4.3. Carpooling

Carpooling can reduce the total number of trips entering the site, and in turn the overall delay. The construction manager can coordinate with the workforce to determine the best location and time to coordinate carpooling to the site to minimize traffic and parking requirements. Another possible option is to organize a shuttle which takes the workers from a centralized point such as the Moapa Travel Plaza to the site. Carpooling with a minimum of two people per vehicle would reduce the delay cause by the construction to a desirable LOS.

4.4. Public Information and the Media

Updates to the local communities through the radio, the internet, or the newspaper can provide information to the users who may be impacted by the Proposed Project. Radio announcements can be made on the local stations. A project website or a social media page can be set up for the project to allow individuals to subscribe to daily updates. Newspaper bulletins can provide information on the upcoming work and areas of impact to local users.

Stakeholders such as K Road Moapa Solar LLC, NV Power Company, NDOT, Clark County, Moapa Valley Community Center, Great Basin Transmission LLC, LA and SL RR Co., Intermountain Power Project, Holly Energy Partners, FTV Comm C/O Level 3, Kern River Gas Transmission Company, Desert Conservation Program, City of Mesquite, and Century Link can be informed with outreach letters prior to construction. The letter will provide a description of the project and the time frame as well as outline the restrictions that may impact the stakeholders. The letters will also provide contact information for any stakeholders who may have questions.

4.5. Off-Peak Hour Activities

The construction workforce will arrive and depart during the morning and evening peak hours, respectively. To minimize the additional trips during this time, deliveries will attempt to be scheduled during the off-peak hours as feasible.

5. Adverse Effects to the Public

5.1. Adverse Effects on Specific Vehicle Types

5.1.1. Bicycles and Pedestrians

Bicycles and pedestrians are rare in the vicinity of the Proposed Project; however, occasionally a bicycle or pedestrian may be present. The existing routes will accommodate the bicycles or pedestrians, and the construction workforce will have 5-foot shoulders to traverse on the Proposed Access Road.

5.1.2. Delivery and Service Vehicles

I-15 serves delivery and service vehicles traveling between Las Vegas and Salt Lake City. These vehicles use Love's Truck Stop at Exit 64 and the Moapa Travel Plaza at Exit 74. The Proposed Project may cause increased traffic volumes at these locations and along US 93 approaching the truck stop, but the delays due to this increased volume will be minor on the delivery and service vehicles.

5.1.3. Emergency Services

Emergency vehicles dispatched through 911 services for ambulance, sheriff, State Highway Patrol, and the local Fire Departments use the routes within the Project vicinity. Clark County Fire Department has an agreement with the Tribe to provide fire protection and emergency medical services to the Reservation. The existing emergency services will not be interrupted by the proposed project. The Clark County Fire Department will be notified of any expected delays that the project may induce.

6. Conclusion

The construction of the Proposed Project may have impacts on the existing transportation networks by increasing the volumes during the construction and operation periods. The construction period volumes will increase delays along I-15, the ramps at Exit 64, US 93, and the Frontage Road north of US 93. The volumes will also impact the three existing intersections. Delays are within the acceptable ranges for the AM peak hour, so no mitigation is required. Mitigation is recommended for the PM peak hour as the SB left turn experiences increase delay that results in a LOS D. The Operations Phase will increase the volumes along the same routes and at the three existing intersections, but these increases are even less in magnitude than the Construction Phase. Thus, the intersections all operate at acceptable levels of service, and no mitigation is required. Potential mitigation measures have been offered in Section 4.

This report assumes that the concurrent project at the K Road Moapa Solar Facility will have completed the roadway improvements along the Frontage Road to meet the Clark County requirements, and those improvements will still be applicable to both projects. Thus no improvements to the existing roadways will be required.

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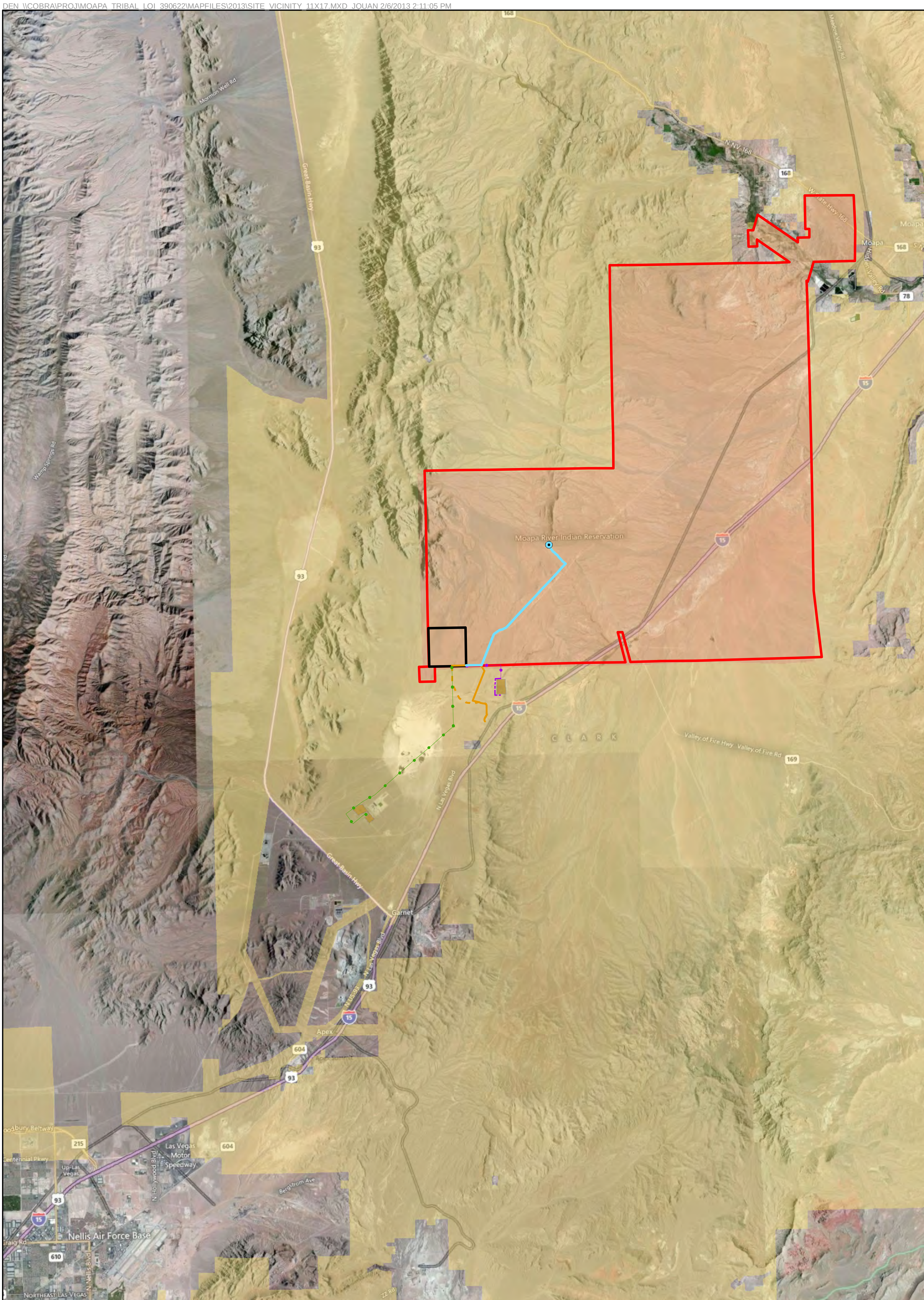

Legend

- Proposed Transmission Line to Harry Allen Substation
- Proposed Access Road
- Alternate Access Road
- Proposed Transmission Line to South Crystal Valley Substation- Option A
- Proposed Transmission Line to South Crystal Valley Substation- Option B
- Existing Groundwater Well
- Proposed Water Pipeline
- Moapa Reservation Boundary
- Proposed Solar Facility
- Existing Substation

Land Ownership

- BLM
- STATE
- BIA

Figure 1
Site Vicinity
Moapa Solar Energy Center

N

Note: Map compiled from multiple data sources and may not meet National Map Accuracy Standards

0 2 4 Miles

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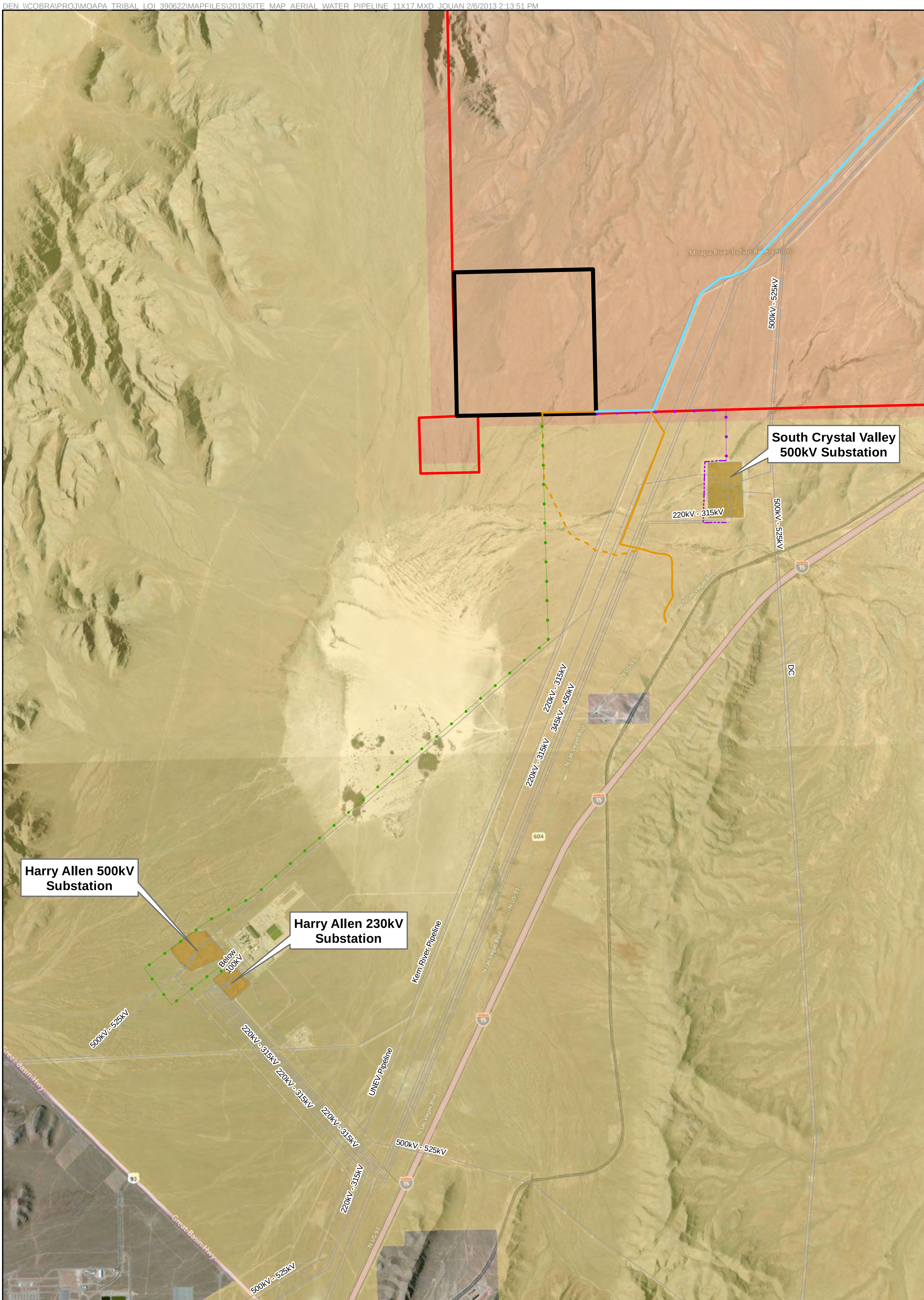

Legend

- Proposed Transmission Line to Harry Allen Substation
- Proposed Access Road
- Alternate Access Road
- Proposed Transmission Line to South Crystal Valley Substation- Option A
- Proposed Transmission Line to South Crystal Valley Substation- Option B
- Existing Groundwater Well
- Proposed Water Pipeline
- Existing Facilities
- Moapa Reservation Boundary
- Proposed Solar Facility
- Existing Substation

Land Ownership

- BLM
- STATE
- BIA

Figure 2
Project Ancillary Facility Locations
Moapa Solar Energy Center

N

Note: Map compiled from multiple data sources and may not meet National Map Accuracy Standards

0 0.5 1 Miles

Appendix A- Synchro Report Output

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	40	10	0	0	60	10	405	10	20	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	43	11	0	0	65	11	440	11	22	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	76			11			168	174	11	196	168	71
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	76			11			168	174	11	196	168	71
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			100			43	98	98	100	100	100
cM capacity (veh/h)	1523			1608			778	699	1070	723	704	992

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	54	76	473
Volume Left	43	0	440
Volume Right	0	11	22
cSH	1523	1700	786
Volume to Capacity	0.03	0.04	0.60
Queue Length 95th (ft)	2	0	103
Control Delay (s)	6.0	0.0	16.3
Lane LOS	A		C
Approach Delay (s)	6.0	0.0	16.3
Approach LOS			C

Intersection Summary			
Average Delay	13.3		
Intersection Capacity Utilization	40.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	55	120	30	435	0	0	0	0	10	0	100
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	60	130	33	473	0	0	0	0	11	0	109
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	473			190			772	663	125	663	728	473
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	473			190			772	663	125	663	728	473
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			98			100	100	100	97	100	82
cM capacity (veh/h)	1089			1384			254	373	926	368	342	591

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	190	505	120
Volume Left	0	33	11
Volume Right	130	0	109
cSH	1700	1384	560
Volume to Capacity	0.11	0.02	0.21
Queue Length 95th (ft)	0	2	20
Control Delay (s)	0.0	0.7	13.2
Lane LOS		A	B
Approach Delay (s)	0.0	0.7	13.2
Approach LOS			B

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	51.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	105	25	65	125	355	30	5	60	10	0	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	114	27	71	136	386	33	5	65	11	0	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	522			141			614	802	128	677	622	329
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	522			141			614	802	128	677	622	329
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			95			92	98	93	97	100	99
cM capacity (veh/h)	1045			1442			384	300	922	322	381	713

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	147	592	103	16
Volume Left	5	71	33	11
Volume Right	27	386	65	5
cSH	1045	1442	595	394
Volume to Capacity	0.01	0.05	0.17	0.04
Queue Length 95th (ft)	0	4	16	3
Control Delay (s)	0.4	1.4	12.3	14.5
Lane LOS	A	A	B	B
Approach Delay (s)	0.4	1.4	12.3	14.5
Approach LOS			B	B

Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	54.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	95	0	0	0	60	10	125	10	20	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	95	0	0	0	60	10	125	10	20	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	70			0			255	260	0	280	255	65
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	70			0			255	260	0	280	255	65
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	94			100			81	98	98	100	100	100
cM capacity (veh/h)	1531			1623			665	605	1085	621	608	999

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	95	70	155
Volume Left	95	0	125
Volume Right	0	10	20
cSH	1531	1700	695
Volume to Capacity	0.06	0.04	0.22
Queue Length 95th (ft)	5	0	21
Control Delay (s)	7.5	0.0	11.7
Lane LOS	A		B
Approach Delay (s)	7.5	0.0	11.7
Approach LOS			B

Intersection Summary			
Average Delay	7.9		
Intersection Capacity Utilization	27.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	125	400	25	155	0	0	0	0	10	0	35
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	125	400	25	155	0	0	0	0	10	0	35
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	155			525			565	530	325	530	730	155
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	155			525			565	530	325	530	730	155
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			98			100	100	100	98	100	96
cM capacity (veh/h)	1425			1042			411	444	716	451	341	891

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	525	180	45
Volume Left	0	25	10
Volume Right	400	0	35
cSH	1700	1042	732
Volume to Capacity	0.31	0.02	0.06
Queue Length 95th (ft)	0	2	5
Control Delay (s)	0.0	1.4	10.2
Lane LOS		A	B
Approach Delay (s)	0.0	1.4	10.2
Approach LOS			B

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	41.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	105	25	65	125	5	30	5	60	360	0	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	5	105	25	65	125	5	30	5	60	360	0	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	130			130			390	388	118	448	398	128
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	130			130			390	388	118	448	398	128
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			96			94	99	94	23	100	99
cM capacity (veh/h)	1455			1455			545	521	934	467	514	923

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	135	195	95	365
Volume Left	5	65	30	360
Volume Right	25	5	60	5
cSH	1455	1455	737	470
Volume to Capacity	0.00	0.04	0.13	0.78
Queue Length 95th (ft)	0	4	11	171
Control Delay (s)	0.3	2.8	10.6	34.6
Lane LOS	A	A	B	D
Approach Delay (s)	0.3	2.8	10.6	34.6
Approach LOS			B	D

Intersection Summary			
Average Delay	18.0		
Intersection Capacity Utilization	54.7%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix Q

Comments on DEIS / Responses

Moapa Solar Energy Center

Draft Environmental Impact Statement

COMMENT REPORT

Prepared for:

Bureau of Indian Affairs
Western Regional Office
2600 North Central Avenue
Phoenix, AZ 85004

and

Bureau of Indian Affairs
Southern Paiute Agency
P.O. Box 720
St. George, UT 84771

TABLE OF CONTENTS

APPENDICES

APPENDIX A – NOTICE OF AVAILABILITY

APPENDIX B – LETTERS/NOTICES

APPENDIX C – PUBLIC MEETING MATERIALS

APPENDIX D – CODED COMMENT LETTERS

APPENDIX E – COMMENT/RESPONSE MATRIX

1.0 INTRODUCTION

The purpose of the Proposed Project is to construct a 200 megawatt (MW) solar electric generation facility, water line, and associated infrastructure on the Reservation, and obtain a right-of-way (ROW) grant on BLM lands for a 230 kV and 500 kV transmission line and associated access roads. The primary need for the Proposed Project is to provide land lease income, sustainable renewable resources, new jobs and other benefits for the Tribe by using solar resources on Reservation lands. A secondary need for the Proposed Project is to assist utilities in meeting their renewable energy goals by providing electricity generated from on Tribal lands that are efficiently connected to the transmission system in a way that minimizes adverse impacts.

The proposed Federal action is the BIA approval of a solar energy ground lease and agreements entered into by the Tribe with Moapa Solar LLC (Applicant), and approval of ROWs and easements for the Applicant to construct, operate and maintain an up-to 200 MW solar photovoltaic (PV) electricity generating facility and water pipeline on the Reservation. The proposed Federal action also includes the BLM approval of ROWs for the 230 kV and 500 kV transmission lines and access roads on BLM-administered Federal lands, and the BLM approval of ROWs for the portions of the 500 kV transmission line and water pipeline located within an existing utility corridor located on the Reservation.

The BIA and BLM will use the EIS to make decisions on the land lease and ROW applications under their respective jurisdiction; the EPA and NPS may use the EIS to make decisions under their authorities; the Tribe may use the EIS to make decisions under their Tribal Environmental Policy Ordinance; and the U.S. Fish and Wildlife Service may use the EIS to support its decision under the Endangered Species Act.

The purpose of this report is to describe the various methods for soliciting and receiving public input on the DEIS and to present a summary of the comments received along with responses to those comments. All comments that are substantive and within the scope of the agencies' decisions are addressed in the Final EIS.

All comments are given equal consideration, regardless of the method of their transmittal.

2.0 SOLICITATION OF COMMENTS ON THE DRAFT EIS

During the public comment period, the BIA solicited comments on the Moapa Solar Energy Center DEIS from the public, landowners, Government agencies, tribes and interested stakeholders by informing them about the availability of the Draft EIS and also announcing the scheduled public meetings.

The Draft EIS and public meetings were publicized in the *Federal Register*, in letters mailed to interested stakeholders, through public notices published in local newspapers, on the project website (http://www.moapasolarenergycentereis.com/). These outreach and notification activities are described in more detail in the following subsections.

FEDERAL REGISTER

The public comment period officially began with the publication of the Notice of Availability (NOA) in the Federal Register on September 5, 2013. The NOA announced that the DEIS was available for public review, described the project, announced the time and locations for public meetings, identified locations whether the Draft EIS was available for review, and outlined the ways to provide comments on the Draft EIS. Two additional Federal Register Notices were published extending the public comment period for the Draft EIS to December 10, 2013 - one on Friday October 25, 2013 and a second one (in order to amend/correct the October 25th notice) on Friday November 1, 2013. The NOAs can be found in **Appendix A**.

PROJECT WEBSITE

A project website is available for access by anyone at any time during the EIS process. The Draft EIS was made available on this website and the site also provides a mechanism for submitting comments. In addition, an announcement for extending the comment period on the Draft EIS was also posted on this site. The website will remain active for the duration of the EIS process and can be accessed at http://www.moapasolarenergycentereis.com/.

NOTIFICATION LETTERS

Notification letters were sent by the BIA to Government agencies, various non-Governmental organizations and other interested stakeholders. The letters briefly explained the project, announced the availability of the DEIS, identified the Federal review process, announced the public meetings, and described the various ways to provide comments. Over 100 notification letters were mailed on September 3, 2013. A second notification letter announcing the comment period extension was mailed on October 18, 2013. The notification letters can be found in **Appendix B**.

NEWSPAPER ADVERTISEMENTS

A public notice announcing the availability for the DEIS and the public meetings was published in three local newspapers on September 11, 2013. A second public notice was published in the same newspapers on October 23 and 24, 2013 announcing the comment period extension. The publications included: Las Vegas Review Journal, Las Vegas Sun and Moapa Valley Progress. Copies of the published public notice are in **Appendix B**.

PUBLIC MEETINGS

The BIA and BLM hosted public meetings in Moapa Town on the reservation and in Las Vegas at the BLM office to discuss and gather public comments on the Draft EIS. The two public meetings were held at the times and locations listed below:

Meeting Date and Time	City/State	Address	Attendance
September 25, 2013 5:30PM to 7:30PM	Moapa Town, NV	Moapa River Indian Reservation Tribal Hall, One Lincoln Street	59
September 26, 2013 5:30PM to 7:30PM	Las Vegas, NV	BLM Conference Room, Southern Nevada District Office, 4701 North Torrey Pines Drive	6
TOTAL ATTENDANCE			65

The public meetings were a combination of open house and formal presentation. Attendees were greeted at the entrance and asked to sign in. Handouts were available for the public and posters were on display that described the Proposed Action, Alternatives and how to participate. Attendees were able to ask questions to the agency and project representatives while viewing posters. This was followed by a formal presentation recorded by a stenographer.

HAND-OUTS

The following handouts were available at the public meetings:

- Public notification letter
- Comment form

The handouts available at meetings can be found in **Appendix C**.

PRESENTATION

Following an open house of approximately 15 minutes, a formal presentation was provided. Both public meetings followed the same agenda. Ms. Heuslein gave a presentation and explained the various ways to provide comments on the Draft EIS, the purpose of the public meeting and the NEPA process.

Mr. Randy Schroeder of the EIS consultant team then presented an overview of the Draft EIS, proposed action and alternatives as well as the environmental issues addressed. Following the presentation, the attendees were invited to provide verbal comments or ask questions about the Draft EIS. A court reporter was present at both meetings to record transcripts of the presentations and public comments expressed.

INFORMATION STATIONS

Both public meetings included the display boards presented at these stations are included in **Appendix C**.

METHODS FOR SUBMITTING COMMENTS

The BIA encouraged interested parties to submit comments through a variety of methods:

- Individual letters could be hand delivered or mailed via the U.S. Postal Service to Mr. Paul Schlafly, Natural Resource Officer, BIA, Southern Paiute Agency, 180 North 200 East Suite 111, or P.O. Box 720, St George, Utah, 84771; or to Ms. Amy Heuslein, Regional Environmental Protection Officer, BIA Western Regional Office, Branch of EQS, 2600 North Central Avenue, 4th Floor Mail Room, Phoenix, AZ 85004-3008.

- Comments could be submitted via "submit comment" tab on the project website at http://www.moapasolarenergycentereis.com/

- Comments could be provided via email, phone or fax to either Mr. Paul Schlafly, at paul.schlafly@bia.gov; telephone: (435) 674-9720; fax (435) 674-9714 or Ms. Amy Heuslein, at amy.heuslein@bia.gov; telephone: (602) 379-6750 extension 1257; fax (602) 379-3833

- Comments could be provided at the public meetings either orally or by filling out a comment form provided at the meetings (that could be handed in at the meeting or mailed in at a later date).

3.0 COMMENTS RECEIVED

COMMENTS RECEIVED

The comment period began on September 5, 2013 when the NOA was published in the *Federal Register* and closed on December 10, 2013. In addition to comments received at the two public meetings, there were 5 comment letters/forms received through a variety of means (see “Methods for Submitting Comments” for more details). All comments were reviewed and coded. Copies of all comments and their coding are contained in **Appendix D**.

4.0 RESPONSES TO COMMENTS

A comment/response matrix (Responses to Comments on the Draft EIS) is contained in **Appendix E**. A total of 30 comments/topics were identified within the five comment documents. Each document received is identified by the name, affiliation, and address of the commentor and each specific comment within each document was summarized. A response was prepared for each comment and the specific location (chapter and section number) of any required change in the Final EIS was listed.

All comments were given equal weight.

APPENDIX A – NOTICE OF AVAILABILITY AND FEDERAL REGISTER NOTICES

Transportation in Executive Order 12777, section 8(g) (see 56 FR 54757; October 22, 1991) for purposes of certifying advisory councils, or groups, subject to the Act. On March 3, 1992, the Secretary redelegated that authority to the Commandant of the Coast Guard (USCG) (see 57 FR 8582; March 11, 1992). The Commandant redelegated that authority to the Chief, Office of Marine Safety, Security and Environmental Protection (G–M) on March 19, 1992 (letter #5402).

On July 7, 1993, the USCG published a policy statement, 58 FR 36504, to clarify the factors that shall be considered in making the determination as to whether advisory councils, or groups, should be certified in accordance with the Act.

The Assistant Commandant for Marine Safety and Environmental Protection (G–M), redelegated recertification authority for advisory councils, or groups, to the Commander, Seventeenth Coast Guard District on February 26, 1999 (letter #16450).

On September 16, 2002, the USCG published a policy statement, 67 FR 58440 that changed the recertification procedures such that applicants are required to provide the USCG with comprehensive information every three years (triennially). For each of the two years between the triennial application procedures, applicants submit a letter requesting recertification that includes a description of any substantive changes to the information provided at the previous triennial recertification. Further, public comment is not solicited prior to recertification during streamlined years, only during the triennial comprehensive review.

On October 10, 2012, the Coast Guard recertified the Cook Inlet Regional Citizen's Advisory Council through August 31, 2013. Under the Oil Terminal and Oil Tanker Environmental Oversight Act of 1990 (33 U.S.C. 2732), the Coast Guard may certify, on an annual basis, an alternative voluntary advisory group for Cook Inlet, Alaska. This advisory group monitors the activities of terminal facilities and crude oil tankers under the Cook Inlet Program established by Congress, 33 U.S.C. 2732(b).

Recertification

By letter dated 12 AUG 2013, the Commander, Seventeenth Coast Guard certified that the CIRCAC qualifies as an alternative voluntary advisory group under 33 U.S.C. 2732(o). This recertification terminates on August 31, 2014.

Dated: August 12, 2013.

T.P. Ostebo,

Rear Admiral, U.S. Coast Guard Commander, Seventeenth Coast Guard District.

[FR Doc. 2013–21633 Filed 9–4–13; 8:45 am]

BILLING CODE 9110–04–P

DEPARTMENT OF THE INTERIOR

Office of the Secretary

[XXXD5198NI DS61100000 DNINR0000.000000 DX61104]

Exxon Valdez Oil Spill Public Advisory Committee

AGENCY: Office of the Secretary, Interior.

ACTION: Meeting notice.

SUMMARY: The Department of the Interior, Office of the Secretary is announcing a public meeting of the *Exxon Valdez* Oil Spill Public Advisory Committee.

DATES: October 3, 2013, at 9:30 a.m.

ADDRESSES: First floor conference room, Glenn Olds Hall, 4210 University Drive, Anchorage, Alaska.

FOR FURTHER INFORMATION CONTACT: Ms. Pamela Bergmann, Department of the Interior, Office of Environmental Policy and Compliance, 1689 ''C'' Street, Suite 119, Anchorage, Alaska, (907) 271–5011.

SUPPLEMENTARY INFORMATION: The *Exxon Valdez* Oil Spill Public Advisory Committee was created by Paragraph V.A.4 of the Memorandum of Agreement and Consent Decree entered into by the United States of America and the State of Alaska on August 27, 1991, and approved by the United States District Court for the District of Alaska in settlement of *United States of America* v. *State of Alaska,* Civil Action No. A91–081 CV.

The agenda will include a discussion about the Annual Work Plan and an opportunity for public comments. The final agenda and materials for the meeting will be posted on the *Exxon Valdez* Oil Spill Trustee Council Web site at www.evostc.state.ak.us. All *Exxon Valdez* Oil Spill Public Advisory Committee meetings are open to the public.

Willie R. Taylor,

Director, Office of Environmental Policy and Compliance.

[FR Doc. 2013–21569 Filed 9–4–13; 8:45 am]

BILLING CODE 4310–RG–P

DEPARTMENT OF THE INTERIOR

Bureau of Indian Affairs

[AAK6006201 134A2100DD AOR3B3030.999900]

Draft Environmental Impact Statement for the Proposed RES Americas Moapa Solar Energy Center, Clark County, Nevada

AGENCY: Bureau of Indian Affairs, Interior.

ACTION: Notice of availability.

SUMMARY: This notice advises the public that the Bureau of Indian Affairs (BIA), as the lead Federal agency, with the Bureau of Land Management (BLM), the Environmental Protection Agency (EPA), the National Park Service (NPS), and the Moapa Band of Paiute Indians (Tribe) as Cooperating Agencies, intends to file a draft environmental impact statement (DEIS) for the proposed RES Americas Moapa Solar Energy Center on the Moapa River Indian Reservation (Reservation) in Clark County, Nevada. This notice also announces that the DEIS is now available for public review and that public meetings will be held to solicit comments on the DEIS.

DATES: The date and locations of the public meetings will be announced at least 15 days in advance through notices in the following local newspapers: Las Vegas Sun, Las Vegas Review Journal and the Moapa Valley Progress and on the following Web site: *www.MoapaSolarEnergyCenterEIS.com.* In order to be fully considered, written comments on the DEIS must arrive no later than 45 days after EPA publishes its Notice of Availability in the **Federal Register**.

ADDRESSES: You may mail, email, hand carry or telefax written comments to Ms. Amy Heuslein, Regional Environmental Protection Officer, BIA Western Regional Office, Branch of Environmental Quality Services, 2600 North Central Avenue, 4th Floor Mail Room, Phoenix, Arizona 85004–3008; fax (602) 379–3833; email: *amy.heuslein@bia.gov.*

FOR FURTHER INFORMATION CONTACT: Ms. Amy Heuslein or Mr. Garry Cantley, BIA Western Regional Office, Branch of Environmental Quality Services, 2600 North Central Avenue, Phoenix, Arizona 85004–3008, telephone (602) 379–6750.

SUPPLEMENTARY INFORMATION: The purpose of the Proposed Project is to construct a 200 megawatt (MW) solar electric generation facility, water line, and associated infrastructure on the Reservation, and obtain a right-of-way (ROW) grant on BLM lands for a 230 kV and/or 500 kV transmission line and associated access roads. The primary need for the Proposed Project is to provide land lease income, sustainable renewable resources, new jobs and other benefits for the Tribe by using solar resources on Reservation lands where there is high potential for solar electric generation. A secondary need for the Proposed Project is to assist utilities in meeting their renewable energy goals by providing electricity generated from solar resources from Tribal lands that may be efficiently connected to existing transmission lines in a manner that minimizes adverse site impacts.

The proposed Federal action is the BIA approval of a solar energy ground lease and agreements entered into by the Tribe with Moapa Solar LLC (Applicant), and approval of ROWs and easements for the Applicant to construct, operate and maintain an up-to 200 MW solar photovoltaic (PV) electricity generating facility and water pipeline on the Reservation. The proposed Federal action also includes the BLM approval of ROWs for the 230 kV and 500 kV transmission lines and access roads on BLM-administered Federal lands, and the BLM approval of ROWs for the portions of the 500 kV transmission line and water pipeline located within an existing utility corridor located on the Reservation.

The BIA and BLM will use the EIS to make decisions on the land lease and ROW applications under their respective jurisdiction; the EPA and NPS may use the document to make decisions under their authorities; the Tribe may use the EIS to make decisions under their Tribal Environmental Policy Ordinance; and the U.S. Fish and Wildlife Service may use the EIS to support its decision under the Endangered Species Act.

Directions for Submitting Comments: Please include your name, return address and the caption ''DEIS Comments, Proposed Moapa Solar Energy Center'' on the first page of your written comments.

Locations where the DEIS is Available for Review: The DEIS will be available for review at: BIA Western Regional Office, 2600 North Central Avenue, 12th Floor, Suite 210, Phoenix, Arizona; BIA Southern Paiute Agency, 180 North 200 East, Suite 111, St. George, Utah; and the BLM Southern Nevada District Office, 4701 N. Torrey Pines Drive, Las Vegas, Nevada. The DEIS is also available on line at: *www.MoapaSolarEnergyCenterEIS.com.* To obtain a compact disk copy of the DEIS, please provide your name and address in writing or by voicemail to Ms. Amy Heuslein or Mr. Garry Cantley. Their contact information is listed in the **FOR FURTHER INFORMATION CONTACT** section of this notice. Individual paper copies of the DEIS will be provided only upon request.

Public Comment Availability: Written comments, including names and addresses of respondents will be available for public review at the BIA mailing addresses shown in the **ADDRESSES** section during regular business hours, 8 a.m. to 4:30 p.m., Monday through Friday, except holidays. Before including your address, telephone number, email address, or other personal identifying information in your comment, you should be aware that your entire comment—including your personal identifying information—may be made publicly available at any time. While you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

Authority: This notice is published in accordance with section 1503.1 of the Council on Environmental Quality regulations (40 CFR 1500 et seq.) and the Department of the Interior Regulations (43 CFR part 46) implementing the procedural requirements of the National Environmental Policy Act (42 U.S.C. 4321 et seq.), and in accordance with the exercise of authority delegated to the Assistant Secretary—Indian Affairs by part 209 of the Department Manual.

Dated: August 30, 2013.

Kevin K. Washburn,

Assistant Secretary—Indian Affairs.

[FR Doc. 2013–21652 Filed 9–4–13; 8:45 am]

BILLING CODE 4310–W7–P

DEPARTMENT OF THE INTERIOR

Bureau of Indian Affairs

[DR.5B711.IA000813]

Indian Gaming

AGENCY: Bureau of Indian Affairs, Interior.

ACTION: Notice of extension of Tribal—State Class III Gaming Compact.

SUMMARY: This publishes notice of the Extension of the Class III gaming compact between the Yankton Sioux Tribe and the State of South Dakota.

DATES: *Effective Date:* September 5, 2013.

FOR FURTHER INFORMATION CONTACT: Paula L. Hart, Director, Office of Indian Gaming, Office of the Deputy Assistant Secretary—Policy and Economic Development, Washington, DC 20240, (202) 219–4066.

SUPPLEMENTARY INFORMATION: Pursuant to 25 CFR 293.5, an extension to an existing tribal-state Class III gaming compact does not require approval by the Secretary if the extension does not include any amendment to the terms of the compact. The Yankton Sioux Tribe and the State of South Dakota have reached an agreement to extend the expiration of their existing Tribal-State Class III gaming compact to October 31, 2013.

Dated: August 30, 2013.

Kevin K. Washburn,

Assistant Secretary—Indian Affairs.

[FR Doc. 2013–21644 Filed 9–4–13; 8:45 am]

BILLING CODE 4310–4N–P

DEPARTMENT OF THE INTERIOR

Bureau of Indian Affairs

[134A2100DDAAK300000/A01500000.000000]

Miami Tribe of Oklahoma—Liquor Control Ordinance

AGENCY: Bureau of Indian Affairs, Interior.

ACTION: Notice.

SUMMARY: This notice publishes the Miami Tribe of Oklahoma—Liquor Control Ordinance. This Ordinance allows for the possession and sale of alcoholic beverages within the jurisdiction of the Miami Tribe of Oklahoma, increases the ability of the tribal government to control the distribution and possession of liquor on their trust land, provides an important source of revenue and strengthens tribal government and the delivery of tribal services.

DATES: *Effective Date:* This Ordinance is effective September 5, 2013.

FOR FURTHER INFORMATION CONTACT: Diane Buck, Acting Tribal Government Officer, Eastern Oklahoma Regional Office, Bureau of Indian Affairs, P.O. Box 8002, Muskogee, OK 74402, Telephone: (918) 781–4685; Fax: (918) 781–4649: or De Springer, Office of Indian Services, Bureau of Indian Affairs, 1849 C Street NW., MS–4513–MIB, Washington, DC 20240; Telephone (202) 513–7641.

SUPPLEMENTARY INFORMATION: Pursuant to the Act of August 15, 1953, Public Law 83–277, 67 Stat. 586, 18 U.S.C. 1161, as interpreted by the Supreme Court in *Rice v. Rehner,* 463 U.S. 713 (1983), the Secretary of the Interior shall certify and publish in the **Federal Register** notice of adopted liquor ordinances for the purpose of regulating liquor transactions in Indian country.

Commission) and will not have the right to seek court review of the Commission's final order.

The Commission strongly encourages electronic filings of comments, protests, and interventions via the Internet in lieu of paper. See 18 CFR 385.2001(a) (1) (iii) and the instructions on the Commission's Web site (*www.ferc.gov*) under the ''e-Filing'' link. Persons unable to file electronically should submit an original and 7 copies of the protest or intervention to the Federal Energy Regulatory Commission, 888 First Street NE., Washington, DC 20426. See, 18 CFR 385.2001(a)(1)(iii) and the instructions on the Commission's Web site under the ''e-Filing'' link.

Dated: October 18, 2013.

Kimberly D. Bose,

Secretary.

[FR Doc. 2013–25048 Filed 10–24–13; 8:45 am]

BILLING CODE 6717–01–P

DEPARTMENT OF ENERGY

Federal Energy Regulatory Commission

[Docket No. OR14–3–000]

Enable Bakken Crude Services, LLC; Notice of Request For Waiver

Take notice that on October 9, 2013, Enable Bakken Crude Services, LLC requested waiver of the verified statement requirements under 18 CFR 342.4(c) that would otherwise require a verified statement in support of initial committed rates, or subsequent contractual adjustments to those rates, filed pursuant to the declaratory order framework approved in Docket No. OR13–21.[1]

Any person desiring to intervene or to protest in this proceedings must file in accordance with Rules 211 and 214 of the Commission's Rules of Practice and Procedure (18 CFR 385.211 and 385.214) on or before 5:00 p.m. Eastern time on the specified comment date. Protests will be considered by the Commission in determining the appropriate action to be taken, but will not serve to make protestants parties to the proceeding. Anyone filing a motion to intervene or protest must serve a copy of that document on the Petitioner.

The Commission encourages electronic submission of protests and interventions in lieu of paper, using the FERC Online links at *http://www.ferc.gov.* To facilitate electronic service, persons with Internet access who will eFile a document and/or be listed as a contact for an intervenor must create and validate an eRegistration account using the eRegistration link. Select the eFiling link to log on and submit the intervention or protests.

Persons unable to file electronically should submit an original and 14 copies of the intervention or protest to the Federal Energy Regulatory Commission, 888 First St. NE., Washington, DC 20426.

The filings in the above proceedings are accessible in the Commission's eLibrary system by clicking on the appropriate link in the above list. They are also available for review in the Commission's Public Reference Room in Washington, DC. There is an eSubscription link on the Web site that enables subscribers to receive email notification when a document is added to a subscribed docket(s). For assistance with any FERC Online service, please email *FERCOnlineSupport@ferc.gov* or call (866) 208–3676 (toll free). For TTY, call (202) 502–8659.

Comment Date: 5:00 p.m. Eastern time on October 25, 2013.

Dated: October 17, 2013.

Kimberly D. Bose,

Secretary.

[FR Doc. 2013–25051 Filed 10–24–13; 8:45 am]

BILLING CODE 6717–01–P

[1] *CenterPoint Energy Bakken Crude Services, LLC,* 144 FERC ¶ 61,130 (2013).

ENVIRONMENTAL PROTECTION AGENCY

[ER–FRL–9011–6]

Environmental Impact Statements; Notice of Availability

Responsible Agency: Office of Federal Activities, General Information (202) 564–7146 or *http://www.epa.gov/compliance/nepa/.*

Weekly receipt of Environmental Impact Statements

Filed 09/30/2013 Through 10/18/2013

Pursuant to 40 CFR 1506.9.

Notice

Section 309(a) of the Clean Air Act requires that EPA make public its comments on EISs issued by other Federal agencies. EPA's comment letters on EISs are available at: *http://www.epa.gov/compliance/nepa/eisdata.html.*

EIS No. 20130300, Revised Draft EIS, FWS, CA, South Farallon Islands Invasive House Mouse Eradication Project, Farallon National Wildlife Refuge, *Comment Period Ends:* 12/09/2013, *Contact:* Gerry McChesney 510–792–0222 ext. 222.

EIS No. 20130301, Draft EIS, USAF, OK, KC–46A Formal Training Unit (FTU) and First Main Operating Base (MOB 1) Beddown, *Comment Period Ends:* 12/09/2013, *Contact:* Jean Reynolds 210–572–9324.

EIS No. 20130302, Draft EIS, FERC, NY, Rocaway Delivery Lateral and Northeast Connector Projects, *Comment Period Ends:* 12/09/2013, *Contact:* Kara Harris 202–502–6296.

EIS No. 20130303, Final Supplement, FTA, HI, Honolulu Rail Transit Project, *Review Period Ends:* 11/25/2013, *Contact:* Ted Matley 415–744–3133.

EIS No. 20130304, Draft Supplement, BOEM, TX, Gulf of Mexico OCS Oil and Gas Lease Sales: 2014–2016 Western Planning Area Lease Sales 238, 246, and 248, *Comment Period Ends:* 12/09/2013, *Contact:* Gary Goeke 504–736–3233.

EIS No. 20130305, Final Supplement, USFS, CA, Tehachapi Renewable Transmission Project, *Review Period Ends:* 11/25/2013, *Contact:* Lorraine Gerchas 626–574–5281.

Amended Notices

EIS No. 20130249, Draft EIS, USACE, LA, West Shore Lake Pontchartrain Hurricane and Storm Damage Risk Reduction, *Comment Period Ends:* 10/25/2013, *Contact:* William Klein 504–862–2540. Revision to FR Notice Published 08/23/2013; Extended Comment Period from 10/07/2013 to 10/24/2013.

EIS No. 20130250, Draft EIS, USACE, FL, Central Everglades Planning Project, *Comment Period Ends:* 11/01/2013, *Contact:* Gretchen Ehlinger 904–232–1682. Revision to FR Notice Published 08/30/2013; Extending Comment Period from 10/15/2013 to 11/01/2013.

EIS No. 20130255, Draft EIS, NOAA, 00, Amendment 7 to the 2006 Consolidated Atlantic Highly Migratory Species (HMS) Fishery Management Plan (FMP), *Comment Period Ends:* 12/10/2013, *Contact:* Thomas A. Warren 978–281–9260. Revision to FR Notice Published 08/30/2013; Extending Comment Period from 10/23/2013 to 12/10/2013.

EIS No. 20130260, Draft EIS, BIA, NV, Moapa Solar Energy Center, *Comment Period Ends:* 10/21/2013, *Contact:* Amy Heuslein 602–379–6750. Revision to FR Notice Published 08/30/2013; Extending Comment Period from 10/23/2013 to 12/10/2013.

EIS No. 20130264, Final EIS, FHWA, CO, Interstate 25 Improvements through Pueblo, *Review Period Ends:* 10/31/2013, *Contact:* Chris Horn 720–963–3017. Revision to FR Notice pursue the Join SPP option. Comments submitted in response to this notice should include the following information:

1. Name and general description of the entity submitting the comment.

2. Name, mailing address, telephone number, and email address of the entity's primary contact.

3. Identification of any specific recommendation the comment references.

Environmental Compliance

In compliance with the National Environmental Policy Act (NEPA) of 1969 (42 U.S.C. 4321–4347), Council on Environmental Quality regulations (40 CFR parts 1500–1508), and DOE NEPA regulations (10 CFR part 1021), Western is in the process of determining whether an environmental assessment or an environmental impact statement should be prepared or if this action can be categorically excluded from those requirements. Further environmental review actions will be posted to *http://www.wapa.gov/ugp/Environment/default.htm.*

Dated: October 29, 2013.

Mark A. Gabriel,

Administrator.

[FR Doc. 2013–26079 Filed 10–31–13; 8:45 am]

BILLING CODE 6450–01–P

ENVIRONMENTAL PROTECTION AGENCY

[ER–FRL–9011–7]

Environmental Impact Statements; Notice of Availability

Responsible Agency: Office of Federal Activities, General Information (202) 564–7146 or *http://www.epa.gov/compliance/nepa/.*

Weekly receipt of Environmental Impact Statements

Filed 10/21/2013 Through 10/25/2013

Pursuant to 40 CFR 1506.9.

Notice

Section 309(a) of the Clean Air Act requires that EPA make public its comments on EISs issued by other Federal agencies. EPA's comment letters on EISs are available at: *http://www.epa.gov/compliance/nepa/eisdata.html*.

EIS No. 20130306, Second Final EIS, USCG, 00, Tiering FEIS—U.S. Coast Guard Rulemaking for Dry Cargo Residue Discharges in the Great Lakes, Review Period Ends: 12/02/2013, Contact: Timothy P. O'Brien 202–372–1539.

EIS No. 20130307, Final EIS, BLM, WY, Gas Hills In-Situ Recovery Uranium Project, Review Period Ends: 12/02/2013, Contact: Tom Sunderland 307–332–8400.

EIS No. 20130308, Draft EIS, USACE, NC, Morehead City Harbor Integrated Dredged Material Management Plan, Port of Morehead City, Comment Period Ends: 12/16/2013, Contact: Hugh Heine 910–251–4070.

EIS No. 20130309, Draft EIS, DOE, NY, Champlain Hudson Power Express Transmission Line Project, Comment Period Ends: 12/16/2013, Contact: Brian Mills 202–586–8267.

EIS No. 20130310, Draft EIS, BLM, UT, Utah Greater Sage-Grouse Draft Land Use Plan Amendment, Comment Period Ends: 01/29/2014, Contact: Quincy Bahr 801–539–4122.

EIS No. 20130311, Draft EIS, BLM, NV, Nevada and Northeastern California Greater Sage-Grouse Planning, Comment Period Ends: 01/29/2014, Contact: Joe Tague 775–861–6556.

The U.S. Department of the Interior's Bureau of Land Management and the U.S. Department of Agriculture's Forest Service are Joint Lead Agencies for the above project.

EIS No. 20130312, Draft EIS, BLM, ID, Idaho and Southwestern Montana Greater Sage-Grouse Draft Land Use Plan, Comment Period Ends: 01/29/2014, Contact: Brent Ralston 208–373–3812.

EIS No. 20130313, Draft EIS, USFS, ID, Lost Creek-Boulder Creek Landscape Restoration Project, Comment Period Ends: 12/16/2013, Contact: Holly Hutchinson 208–347–0325.

EIS No. 20130314, Final EIS, DOE, IL, FutureGen 2.0 Project, Review Period Ends: 12/02/2013, Contact: Cliff Whyte 304–285–2098.

EIS No. 20130315, Draft EIS, FERC, AZ, Sierrita Pipeline Project, Comment Period Ends: 12/16/2013, Contact: David Hanobic 202–502–8312.

EIS No. 20130316, Final EIS, NPS, CA, Restoration of the Mariposa Grove of Giant Sequoias, Review Period Ends: 12/02/2013, Contact: Kimball Koch 209–379–1364.

EIS No. 20130317, Draft Supplement, USACE, NC, NC–1409 (Military Cutoff Road) Extension and Proposed US 17 Hampstead Bypass, Comment Period Ends: 12/16/2013, Contact: Brad Shaver 910–251–4611.

Amended Notices

EIS No. 20130221, Draft Supplement, BLM, CA, Palen Solar Electrical Generating System, Comment Period Ends: 11/14/2013, Contact: Frank McMenimen 760–833–7150.

Revision to FR Notice Published 07/26/2013; Extending Comment Period from 10/24/2013 to 11/14/2013.

EIS No. 20130260, Draft EIS, BIA, NV, Moapa Solar Energy Center, Comment Period Ends: 11/12/2013, Contact: Amy Heuslein 602–379–6750.

Revision to FR Notice Published 09/13/2013; Extending Comment Period from 10/21/2013 to 11/12/2013.

EIS No. 20130261, Draft Supplement, NPS, CA, Golden Gate National Recreation Area Draft Dog Management Plan, Comment Period Ends: 01/13/2014, Contact: Michael B. Edwards 303–969–2694.

Revision to FR Notice Published 09/06/2013; Extending Comment Period from 12/04/2013 to 01/11/2014.

EIS No. 20130266, Draft EIS, USN, GU, The Mariana Islands Training and Testing, Comment Period Ends: 12/06/2013, Contact: John Van Name 808–471–1714.

Revision to FR Notice Published 10/25/2013; Extending Comment Period from 11/12/2013 to 12/12/2013.

EIS No. 20130269, Draft EIS, NRC, 00, Generic—Waste Confidence, Comment Period Ends: 12/20/2013, Contact: Sarah Lopas 301–287–0675.

Revision to FR Notice Published 09/13/2013; Extending Comment Period from 11/27/2013 to 12/20/2013.

EIS No. 20130277, Final Supplement, BLM, NV, Silver State Solar South Project Proposed Resource Management Plan Amendment, Review Period Ends: 11/06/2013, Contact: Nancy Christ 702–515–5136.

Revision to FR Notice Published 09/20/2013; Extending Comment Period from 10/21/2013 to 11/06/2013.

EIS No. 20130280, Draft EIS, BLM, NV, 3 Bars Ecosystem and Landscape Restoration Project, Comment Period Ends: 11/29/2013, Contact: Chad Lewis 775–635–4000.

Revision to FR Notice Published 09/27/2013; Extending Comment Period from 11/12/2013 to 11/29/2013.

EIS No. 20130284, Draft Supplement, GSA, CA, San Ysidro Land Port of Entry Improvements Project, Comment Period Ends: 11/29/2013, Contact: Osmahn Kadri 415–522–3617.

Revision to the FR Notice Published 09/27/2013; Extending Comment Period from 11/12/2013 to 11/29/2013.

EIS No. 20130290, Draft EIS, NPS, CA, Restoration of Native Species in High Elevation Aquatic Ecosystems Plan, Sequoia and Kings Canyon National Parks, Comment Period Ends: 12/17/

APPENDIX B – LETTERS/NOTICES

United States Department of the Interior

BUREAU OF INDIAN AFFAIRS
WESTERN REGIONAL OFFICE
2600 North Central Avenue
Phoenix, Arizona 85004-3008

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:
Environmental Quality Services

SEP 03 2013

DEPARTMENT OF THE INTERIOR
Bureau of Indian Affairs

RE: Notice of Availability and Notice of Public Meetings: Draft Environmental Impact Statement for the Proposed Moapa Solar Energy Center, Clark County, Nevada

Dear Interested Party:

This notice advises the public that the Bureau of Indian Affairs (BIA), as Lead Agency, with the Moapa Band of Paiute Indians (Tribe), the Bureau of Land Management (BLM), the Environmental Protection Agency (EPA), and the National Park Service (NPS) as cooperating agencies, intends to file a Draft Environmental Impact Statement (DEIS) for the proposed Moapa Solar Energy Center on the Moapa River Indian Reservation (Reservation), Clark County, Nevada. This notice also announces a DEIS is now available for public review and that public meetings will be held at the Reservation and the BLM Southern Nevada District Office to solicit comments on the DEIS on the evenings of September 25 and 26, 2013, respectively.

The purpose of the Proposed Project is to construct an up-to 200 megawatt (MW) solar photovoltaic (PV) electric generation facility, water line, and associated infrastructure on the Reservation, and to obtain a right-of-way (ROW) grant on BLM administered lands for a 230 kV and/or 500 kV transmission line, water pipeline and associated access roads. The primary need for the Proposed Project is to provide land lease income, sustainable renewable resources, new jobs and other positive benefits for the Tribe by using solar resources that are abundant on Reservation lands. A secondary need for the Proposed Project is to assist utilities in meeting their renewable energy goals by providing electricity generated from solar resources on Tribal lands that can be efficiently connected to the regional transmission system.

The proposed Federal action before the BIA is approval of a solar energy ground lease and agreements entered into by the Tribe with Moapa Solar LLC (Applicant), and approval of ROWs and easements for the Applicant to construct, operate, maintain and terminate an up-to 200 MW PV electric generating facility and a water pipeline on the Reservation. The Applicant has proposed to BLM to construct, operate, maintain, and terminate transmission lines, water pipeline, and access roads on public land. The Federal action before BLM includes the approval of a ROW grant for a 230 kV and/or 500 kV transmission line, water pipeline and access roads on BLM-administered lands, and the BLM approval of ROW grants for the portions of the transmission line and water pipeline located within an existing BLM managed utility corridor on the Reservation. In addition to these facilities, the DEIS evaluates three solar technology alternatives, an access road alternative, and a No Action alternative.

The BIA and BLM will use the EIS to make decisions on the land lease and ROW applications under their respective jurisdiction; the EPA and NPS may use the document to make decisions under their authorities; the Tribe may use the EIS to make decisions under their Tribal Environmental Policy Ordinance; and the U.S. Fish and Wildlife Service may use the EIS to support its decision under the Endangered Species Act.

The DEIS will be available for review and comment at the project website www.MoapaSolarEnergyCenterEIS.com and at the following locations during business hours:

BIA Western Regional Office
Branch of Environmental Quality Services
2600 North Central Avenue, 12th Floor, Suite 210
Phoenix, Arizona 85004

BIA Southern Paiute Agency
180 North 200 East, Suite 111
St. George, Utah 84771

BLM Southern Nevada District Office
4701 N. Torrey Pines Drive
Las Vegas, Nevada 89130

Compact disks containing the DEIS are available from the BIA Western Regional Office Branch of Environmental Quality Services (EQS), the BIA Southern Paiute Agency and BLM Southern Nevada District Office addresses listed above. Due to the size of the document, printed copies are limited so we request that you utilize the methods above to review the DEIS before requesting a printed hard copy.

The BIA is requesting comments on the DEIS. In order to be fully considered at this stage of the environmental review process, comments on the DEIS must be received within 45 days from the date of publication of the Notice of Availability (NOA) by EPA in the Federal Register. We anticipate the NOA will be published on September 5, 2013. The comment period will end at the close of business on October 22, 2013.

A public meeting will be held at the Reservation on September 25, 2013, at the Tribal Hall, 1 Lincoln Street, Moapa, Nevada. A second public meeting will be held at the BLM Southern Nevada District Office at 4701 North Torrey Pines Drive, Las Vegas, Nevada, on September 26, 2013. Both public meetings will begin at 5:30 p.m. and end at 7:30 p.m. Notices will be published on the project website and in local newspapers announcing the times and locations of the meetings.

You may mail, email, hand carry or telefax written comments on the DEIS to either Ms. Amy Heuslein, Regional Environmental Protection Officer, BIA Western Regional Office, Branch of EQS, 2600 North Central Avenue, 4th Floor Mail Room, Phoenix, Arizona 85004-3008; telephone: (602) 379-6750 extention 1257; fax (602) 379-3833; email: amy.heuslein@bia.gov; or Mr. Paul Schlafly, Natural Resource Officer, BIA Southern Paiute Agency, 180 North 200 East, Suite 111 or P.O. Box 720, St. George, Utah 84771; telephone: (435) 674-9720; fax: (435) 674-9714; email: paul.schlafly@bia.gov. Comments can also be posted on the Project website. Please include your name, return address and the caption "DEIS Comments, Moapa Solar Energy Center" on the first page of your written comments. Individual respondents may request confidentiality and we will do so to the best of our ability. However, anonymous comments will not be considered.

Thank you for your interest and we look forward to receiving your comments on the Moapa Solar Energy Center DEIS.

Sincerely,

Regional Director

AFFIDAVIT OF PUBLICATION

STATE OF NEVADA)
COUNTY OF CLARK) SS:

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1155 ALBION ROAD
BOULDER CO 80305

Account # **29248**

Ad Number **0000014310**

Stacey Lewis, being 1st duly sworn, deposes and says: That she is the Legal Clerk for the Las Vegas Review-Journal and the Las Vegas Sun, daily newspapers regularly issued, published and circulated in the City of Las Vegas, County of Clark, State of Nevada, and that the advertisement, a true copy attached for, was continuously published in said Las Vegas Review-Journal and / or Las Vegas Sun in 1 edition(s) of said newspaper issued from 09/11/2013 to 09/11/2013, on the following days:

09 / 11 / 13

/S/ Stacey Lewis
LEGAL ADVERTISEMENT REPRESENTATIVE

Subscribed and sworn to before me on this 11th day of September, 2013

Notary Linda Espinoza

LINDA ESPINOZA
Notary Public State of Nevada
No. 00-64106-1
My Appt. Exp. July 17, 2016

Notice of Availability and Notice of Public Meetings on the Draft Environmental Impact Statement for the Moapa Solar Energy Center Project

The United States Bureau of Indian Affairs (BIA) and the Moapa Band of Paiute Indians (Tribe) announce the availability of the Draft Environmental Impact Statement (DEIS) for the proposed Moapa Solar Energy Center Project on the Moapa River Indian Reservation (Reservation) located approximately 20 miles northeast of Las Vegas in Clark County, Nevada. The purpose of the Proposed Project is to construct and operate a 200 megawatt solar energy generation facility, water pipeline, and associated infrastructure on the Tribe's Reservation and rights-of-way (ROWs) on Bureau of Land Management (BLM) lands for transmission lines and associated access roads. Federal actions include BIA approvals of a solar energy ground lease and ROWs on the Reservation and BLM approvals of ROWs on Federal lands and within a utility corridor on the Reservation.

The DEIS document is now available for a 45day public comment/review period. As part of the public comment/review period, the BIA invites you to attend public meetings to discuss and comment on the proposed Moapa Solar Energy Center DEIS. Written and verbal comments will be accepted during the public meetings. The two meetings are open to the public and all interested parties are encouraged to attend.

PLEASE PLAN TO ATTEND THE FOLLOWING MEETINGS:

Wednesday,
September 25, 2013
Moapa River Indian Reservation Tribal Hall,
One Lincoln Street,
Moapa, NV 89025-0340

Thursday,
September 26, 2013
BLM Southern Nevada District Office Conference Room,
4701 N. Torrey Pines Drive,
Las Vegas, NV 89130

BOTH MEETINGS WILL BE HELD BETWEEN 5:30 PM AND 7:30 PM WITH A BRIEF PRESENTATION AT 5:45 PM. LIGHT REFRESHMENTS WILL BE SERVED.

You may submit comments by mail or email to Ms. Amy Heuslein, BIA at the address below or on the project website:
http://www.MoapaSolarEnergyCenterEIS.com/
For more information on how to participate, contact Ms. Amy Heuslein, BIA Regional Environmental Protection Officer, 2600 North Center Avenue, 4th Floor, Mail Room, Phoenix, AZ 85004-3008 or via email at amy.heuslein@bia.gov (602.379.6750) or Mr Paul Schlafly, BIA Natural Resource Officer, paul.schlafly@bia.gov , (435.674.9720).

PUB: September 11, 2013
LV Review-Journal

Remember

from page 1

He recalled that Nellis went into a complete lock-down for a couple days after that.

"It was weird, the prisoners were turning to us for questions and the CO's were trying to calm them down," Perez recalled.

Perez was a part of the Disturbance Control in the federal prisons across the country, within 2 weeks they became mobilized.

"9/11 has changed my whole family's life," he said.

Perez was a part of the action to bring justice to those responsible for the horrible act.

"I was in Iraq in 2003 during the 'Shock & Awe'," Perez said. "I was there for the very first push and battles."

Perez found that in the time following the events of September 11, there was an outpouring of support for the U.S. military and the disabled veterans were treated better.

Local resident, Chris Wallace recalls that he was in middle school living in Las Vegas at the time.

"I was at my neighbors house waiting for my ride to school," he said. "I actually thought it was a movie and it wasn't until my parents took me out of school two hours later that I found out what was really happening."

Wallace graduated from Moapa Valley High School and is now serving in the Navy. He said he felt inspired by the outpouring of love after the events happened.

"Such a disgusting act was met with love and support to complete strangers," he said. "That is one of the many reasons I can be proud to serve my country. That when tragedy strikes, the American people do not falter. They pick each other up, and help each other out. Whether you agree with it or not."

Jerry Johnson said that he was teaching at the Salt Lake Community College when he heard the news.

"We closed down the college and held a meeting in the auditorium," Johnson said. "We showed the television coverage to the students and talked about it and how we were feeling. We tried to help them as much as they were helping us."

Dan Beckdahl was in a remote area in Alaska putting in telephone lines when the events at the World Trade Center took place.

"I knew it was going to happen," he said. "We have an America going to sleep and they don't care what happens unless it affects their pocket books."

Beckdaul spoke of how we need a strong military at all times for our safety.

Erin Cornwall's life was directly changed from that day on. She was actually living in New York City at the time and getting ready to go to work at the World Trade Center. She worked in the shopping mall in the basement of the first tower and was scheduled to work at 7:00 that morning. But due to a unexpected shift change she didn't have to be there until 10:00. This saved her from being there as those tragic events unfolded.

"The change it has made in my life is immeasurable," Cornwall said. "It was like a line was drawn in the sand. On one side was the life before 911 and the other was my life after."

Cornwall described the agony of getting back to normal life after the twin towers fell.

"For a long time we were all in shock and I think we all just leaned on each other and it made it better," she said. "Normal activities made it better and seeing people that mattered made it easier."

Cornwall spoke of the unimaginable twisted burning steel and rubble, and posters of missing people plastered along the New York subway.

"People were desperate to find family members that would never be found," she said.

There are so many stories to be told of experiences that happened on that day. Take a moment to ask your neighbor their experience and feeling about the events that happened when tragedy struck because, as American author Tim O'Brien said, "The thing about remembering is that you don't forget."

Bridge

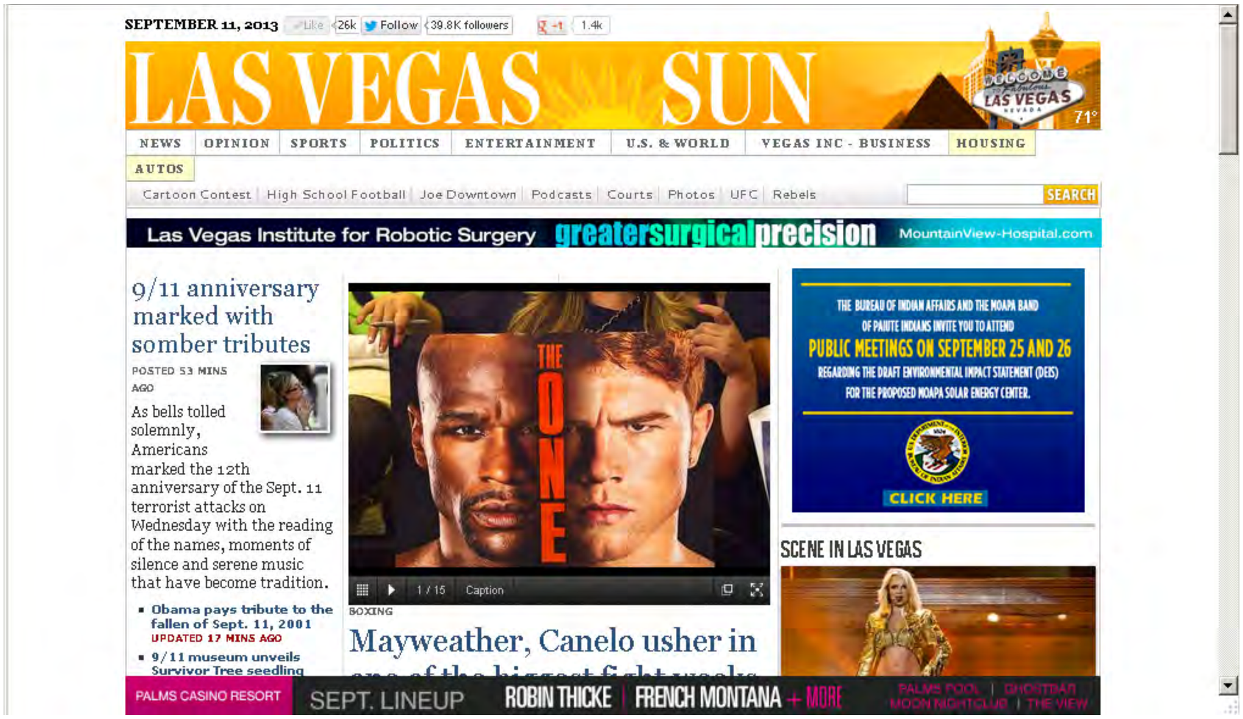
from page 5

"The bridge is close to the same alignment [as the current roadway] but raised up so that the water can go underneath," he said.

According to the designs, the bridge will be 256 feet long and 13 feet tall.

"It will provide all weather access," said Yatson. "It's all about the flood water going underneath the bridge in a concrete channel."

The concrete channel under the bridge will be 17 feet sloped from one side to the other.



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9/11 anniversary marked with somber tributes

POSTED 53 MINS AGO

As bells tolled solemnly, Americans marked the 12th anniversary of the Sept. 11 terrorist attacks on Wednesday with the reading of the names, moments of silence and serene music that have become tradition.

- Obama pays tribute to the fallen of Sept. 11, 2001 UPDATED 17 MINS AGO
- 9/11 museum unveils Survivor Tree seedling

THE ONE

1 / 15 Caption

BOXING

Mayweather, Canelo usher in one of the biggest fight weeks

SCENE IN LAS VEGAS

Notice of Availability and Ext

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Description

Notice of Availability and Extension of the Public Comment Period on the Draft Environmental Impact Statement for the Moapa Solar Energy Center Project The United States Bureau of Indian Affairs (BIA), Bureau of Land Management (BLM), and the Moapa Band of Paiute Indians (Tribe) announce an extension of the public comment period on the Draft Environmental Impact Statement (DEIS) for the proposed Moapa Solar Energy Center Project on the Moapa River Indian Reservation (Reservation) located approximately 20 miles northeast of Las Vegas in Clark County, Nevada. The purpose of this notice is to advise that the public comment/review period on the DEIS document is extended to November 12, 2013. The purpose of the Proposed Project is to construct and operate a 200 megawatt solar energy generation facility, water pipeline, and associated infrastructure on the Tribe's Reservation and rights-of-way (ROWs) on Bureau of Land Management (BLM) lands for transmission lines and associated access roads. Federal actions include BIA approvals of a solar energy ground lease and ROWs on the Reservation and BLM approvals of ROWs on Federal lands and within a utility corridor on the Reservation. The DEIS is available for review at the project website: http://www.MoapaSolarEnergyCenterEIS.com/. You may submit comments by mail or email to Ms. Amy Heuslein, BIA at the address below or on the project website. For more information on how to participate, contact Ms. Amy Heuslein, BIA Regional Environmental Protection Officer, 2600 North Center Avenue, 4th Floor, Mail Room, Phoenix, AZ 85004-3008 or via email at amy.heuslein@bia.gov (602.379.6750) or Mr Paul Schlafly, BIA Natural

Resource Officer, paul.schlafly@bia.gov, (435.674.9720). PUB: October 23, 2013 LV Review-Journal

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APPENDIX C – PUBLIC MEETING MATERIALS

Sign-in Sheet: Moapa Solar Energy Center

Draft Environmental Impact Statement Public Meeting - September 26, 2013

U.S. Bureau of Land Management (BLM) Conference Room, 4701 N. Torrey Pines Dr., Las Vegas, NV 89130

Name/Organization	Mailing Address	Email
Elspeth DiMarzio Sierra Club	708 S 6th Street LV NV 89101	elspeth.cadala@sierraclub.org
Frederick MARCELL BLM	Reno NV BLM STATE Office	fmarcell@BLM.gov
Andrew Decker - Construction Notebook	3131 Meade Ave. Ste. B, LV, NV	andyd@constructionnotebook.com
Gayle Marrs-Smith, BLM	4701 N Torrey Pines LV NV 89120	gmarrssm@blm.gov
AMEE HOWARD - NPS	601 NEVADA WAY Boulder City, NV 89005	AMEE_HOWARD@NPS.GOV
Kellie Youngbear BIA	180N ZONE Suite 111 St George, Utah	kellie.youngbear@bia.gov
KEN MACDONALD NewFields	8250 W CHARLESTON #100 LAS VEGAS NV 89117	KMACDONALD@NEWFIELDS.COM
ROB MROWKA		RMROWKA@BIOLOGICALDIVERSITY.ORG

Sign-in Sheet: Moapa Solar Energy Center

Draft Environmental Impact Statement Public Meeting - September 26, 2013

U.S. Bureau of Land Management (BLM) Conference Room, 4701 N. Torrey Pines Dr., Las Vegas, NV 89130

Name/Organization	Mailing Address	Email
Jane Feldman		feldman.jane@gmail.com
Thomas Miller / DOD	57 OSS Nellis AFB, NV 89191	Thomas.Miller2@Nellis.AF.Mil
Christina Varela BIA	PO Box 720 St George UT 84771	Christina.varela@bia.gov
Paul Schlafly	"	paul.schlafly@bia.gov
Joe Grennan/RES	11101 120th Ave Ste 400 Broomfield CO 80021	—
Brenda Wilhight	4701 N. Torrey Pines Dr Las Vegas NV 89081	bwilhigh@blm.gov
Nancy Shelton	51 W 3rd St Tempe AZ 85281	nshelton@logansimpson.com
Nancy Christ	BLM (PFO)	nchrist@blm.gov

Sign-in Sheet: Moapa Solar Energy Center

Draft Environmental Impact Statement Public Meeting - September 26, 2013

U.S. Bureau of Land Management (BLM) Conference Room, 4701 N. Torrey Pines Dr., Las Vegas, NV 89130

Name/Organization	Mailing Address	Email
Jennifer Carleton Brownstein Hyatt Farber Schreck	100 City Parkway Las Vegas, NV	jcarleton@bhfs.com
MARK Boatwright - BLM	4701 N Torrey Pines Dr LV NV 89130	mboatwri@blm.gov

Sign-in Sheet: Moapa Solar Energy Center

Draft Environmental Impact Statement Public Meeting - September 26, 2013

U.S. Bureau of Land Management (BLM) Conference Room, 4701 N. Torrey Pines Dr., Las Vegas, NV 89130

Request for DVD/CD to be mailed

Name/Organization	Mailing Address	Email
ROB MROWKA	4261 LILY GLEN CT NLV, NV 89032	What DVD

SIGN-IN SHEET: MOAPA SOLAR ENERGY CENTER

Draft Environmental Impact Statement Public Meeting – September 25, 2013

Moapa River Indian Reservation Tribal Hall, One Lincoln Street, Moapa, NV 89025-0340

Name/Organization	Mailing Address	Email
MARK BOATWRIGHT	4701 N. Torrey Pines DR LV NV 89130	mboatwri@blm.gov
VICKIE SIMMONS	PO BOX 93 Moapa NV 89025	mbopairprogram@mvdsl.com
Cynthia Dotson MBOP	PO BOX 236 Logandale, NV 89021	moapatribalcourt@mvdsl.com
BRENDA WILHIGHT	4701 N. Torrey Pines DR LV NV 89130	bwilhight@blm.gov
Mary Jane Levi	P.O. Box 216 Moapa NV 89025-0216	
Aletha Tom	PO BOX 346 Moapa, NV 89025	
Shawna Higgins	P.O. Box 788 Moapa NV.	
Delores D. Simmons	PO Box 207 Moapa, NV 89025	dobu96@gmail.com

SIGN-IN SHEET: MOAPA SOLAR ENERGY CENTER

Draft Environmental Impact Statement Public Meeting – September 25, 2013

Moapa River Indian Reservation Tribal Hall, One Lincoln Street, Moapa, NV 89025-0340

Name/Organization	Mailing Address	Email
Nancy Shelton Logan Simpson Design	51 W. 3rd St Tempe, AZ 85281	nshelton@logansimpson.com
Garry Cantley BIA	2600 N. Central Ave Phoenix, AZ 85004	Garry.Cantley@bia.gov
Christina Varela BIA - SPA	PO Box 720 St George UT 84771	Christina.varela @bia.gov
Eunice V. Ohte	PO Box 237 Moapa, NV 89025	
Gwen Tom	Box 63 Moapa NV 89025	
Ayona Segmiller	Box 251 Moapa NV 89025	
Scott Hardy	Box 721 Moapa NV 89025	
[illegible]	Box 76 Moapa NV 89025	

SIGN-IN SHEET: MOAPA SOLAR ENERGY CENTER

Draft Environmental Impact Statement Public Meeting – September 25, 2013

Moapa River Indian Reservation Tribal Hall, One Lincoln Street, Moapa, NV 89025-0340

Name/Organization	Mailing Address	Email
Katena Kay	Moapa NV 89025 p.o. box 63	Katenakay97@yahoocom
Janie Tom	Po Box 695 moapa NV 89025	
Duane Etsitty	P.O. Box 24121 Las Vegas, NV 89101	
Juanita Kinlichinie	P.O. Box 297 Moapa NV 89025	
Noez Tom	P.O. Box 676 Moapa, NV. 89025	
Iris DaVoda	P.O. Box MOAPA NV 89025	
VERNON ROBISON	PO Box ~~[illegible]~~ 430 Overton, NV 89040	progress@mvdsl.com
Narcica calderan	PO box 266 MOAPA, NV 89025	

Sign-in Sheet: Moapa Solar Energy Center

Draft Environmental Impact Statement Public Meeting – September 25, 2013

Moapa River Indian Reservation Tribal Hall, One Lincoln Street, Moapa, NV 89025-0340

Name/Organization	Mailing Address	Email
Sandra Bushhead	PO Box 721 Moapa NV	
Calista Casupang	PO Box 502 Moapa, NV	Kalista_702@Yahoo
Joie Etsitty	3811 Webfoot Rd 89115	
GREGORY T ANDERSON SR		southernbighorn@yahoo.com
Terry Bohl		terry.1hrc@gmail.com
Frank Oaboda	PO Box 112 Moapa NV 89025	
PATRICIA MEDINA	P.O. Box 501 Moapa, NV. 89025	
Miles Medina	P.O. Box 501 Moapa, Nv 89025	

SIGN-IN SHEET: MOAPA SOLAR ENERGY CENTER

Draft Environmental Impact Statement Public Meeting – September 25, 2013

Moapa River Indian Reservation Tribal Hall, One Lincoln Street, Moapa, NV 89025-0340

Name/Organization	Mailing Address	Email
Sylas	~~Sylaswalker@yahoo.com~~ lincon dosak P.O. 266	Sylaswalker@yahoo.com
Janet Bushhead	Bowlin st 23	—
Delia Grassrope	PO Box 92 Moapa NV 89025	black_sunshine_2001@yahoo.com
Jennifer Damon	27 Bowlin Street	
Bradley Sigary	#31 workiehway	
Shirley Ann [illegible]	21 Bowlin St.	
David Foster	7080 La Cienega St, Las Vegas, NV 89119	david.foster@nv.usda.gov

SIGN-IN SHEET: MOAPA SOLAR ENERGY CENTER

Draft Environmental Impact Statement Public Meeting – September 25, 2013

Moapa River Indian Reservation Tribal Hall, One Lincoln Street, Moapa, NV 89025-0340

Name/Organization	Mailing Address	Email
MILTON, WM BRY	P, 0248	MOAPA
Christy Dawahoya	PO Box 693	Disc. dawahoyac@yahoo.
Phil Swain	POB 152	St George, Ut 84771
Robert Tom	PO Box 2?? Moapa	
Ural S. Begay	#12 segmiller St POBox 4311 moapa	
Tyler Sanson		
Jeremy Shepard		
VINCENT BUSHHEAD		

SIGN-IN SHEET: MOAPA SOLAR ENERGY CENTER

Draft Environmental Impact Statement Public Meeting – September 25, 2013

Moapa River Indian Reservation Tribal Hall, One Lincoln Street, Moapa, NV 89025-0340

Name/Organization	Mailing Address	Email
NADINE JOHN & FAMILY	PO Box 206 MOAPA NV 89025	

SIGN-IN SHEET: MOAPA SOLAR ENERGY CENTER

Draft Environmental Impact Statement Public Meeting – September 25, 2013

Moapa River Indian Reservation Tribal Hall, One Lincoln Street, Moapa, NV 89025-0340

Name/Organization	Mailing Address	Email
Barry Daboda	PO Box 112 moapa, NV 89025	bdaboda@gmail.com
JEROME HENRY	P.O. Box 92 MOAPA, NV 89025	—
Sherri Henry	PO Box 631 Moapa NV 89025	sherri_henry2013@yahoo.com
Leonard Henry JR	" "	" "
Alley Bushead	Box 235	
Sarah Adler	1390 S. Curry Carson City NV 89703	sarah.adler@nv.usda.gov

SIGN-IN SHEET: MOAPA SOLAR ENERGY CENTER

Draft Environmental Impact Statement Public Meeting – September 25, 2013

Moapa River Indian Reservation Tribal Hall, One Lincoln Street, Moapa, NV 89025-0340

Request Hard Copy EIS

Name/Organization	Mailing Address	Email
Sylus Calderon-Walker	Lincon Dosak P.O. 266 89025	Hard Copy
[illegible]	[illegible]	

SIGN-IN SHEET: MOAPA SOLAR ENERGY CENTER

Draft Environmental Impact Statement Public Meeting – September 25, 2013

Moapa River Indian Reservation Tribal Hall, One Lincoln Street, Moapa, NV 89025-0340

Name/Organization	Mailing Address	Email
Dawn Bruce Social Services	Po Box 308 moapa NV 89025	mbopsocialservices@mvdsl.com
Randy Meyers	P.O. Box 897 Moapa, Nev 89025	
[illegible]	Box 260 moapa 89025	
[illegible]	26W Paiute Dr 89106	
Xochitl & Henry	PO. BOX 92 89025 Moapa NV	
Tina Johnson	—	tinarosejohnson@Yahoo.com
JOHN EVANS	4701 TORREY PINES DR. LAS VEGAS 89130	JHEVANS@BLM.GOV
DALTON TOM	member Moapa Las Vegas	dtom140294@aol.com

PUBLIC COMMENT FORM
Bureau of Indian Affairs

MOAPA SOLAR ENERGY CENTER PROJECT
www.MoapaSolarEnergyCenterEIS.com
Draft Environmental Impact Statement (DEIS)
Public Hearing Comments

NAME: ______________________________________

ADDRESS: ______________________________________

____

( ) I have no comments, please keep me informed.

( ) Please remove me from your mailing list for this Project.

( ) I have the following comments about the Moapa Solar Energy Center Project DEIS:

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Return to: Ms. Amy Heuslein, Regional Environmental Protection Officer, BIA Western Regional Office, 2600 North Central Avenue, 4th Floor Mailroom, Phoenix, AZ 85004 or Email: amy.heuslein@bia.gov

(Or fold, seal, and add a stamp to the back of the sheet)

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place
stamp
here

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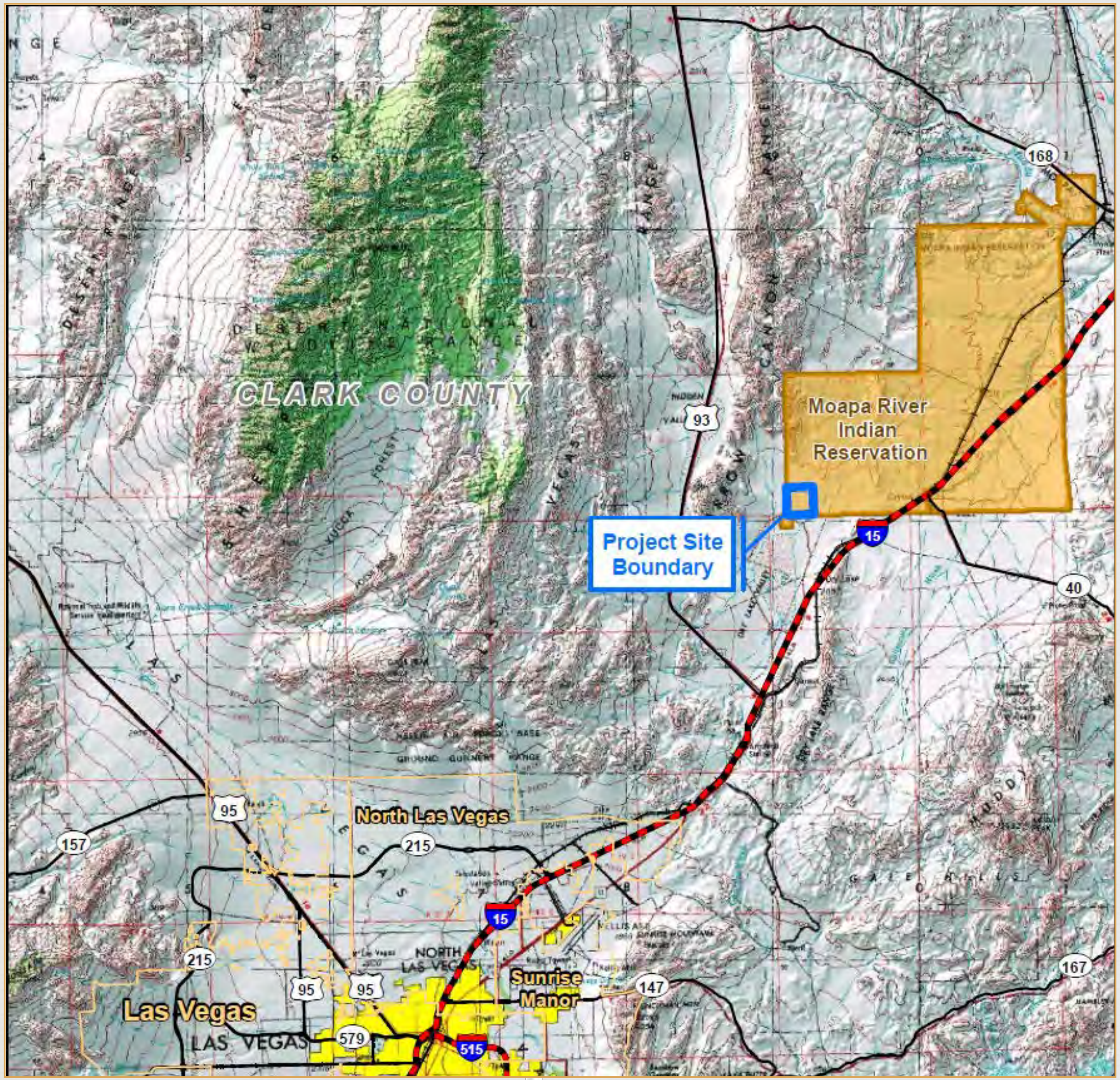
Ms. Amy Heuslein
Regional Environmental Protection Officer
BIA Western Regional Office
2600 North Central Avenue
4th Floor Mailroom
Phoenix, AZ 85004

EIS Process/Schedule

		Schedule:
BIA Notice of Intent	*NOI 8/6/12*	
Public Scoping	*8/21 & 8/22/12 Scoping Meetings*	August 2012
Draft EIS	*BIA NOA 9/5/13* *EPA NOA 9/6/13* *EPA Revised NOA 9/13/13*	September 2013
Agency/Public 45-day Comment Period	*Comment Period Ends 10/21/13*	October 2013
Final EIS		
Agency/Public 30-day Waiting Period	*9/25 & 9/26/13 DEIS Meetings*	December 2013
ROD		December 2013

We are here in the process → Agency/Public 45-day Comment Period

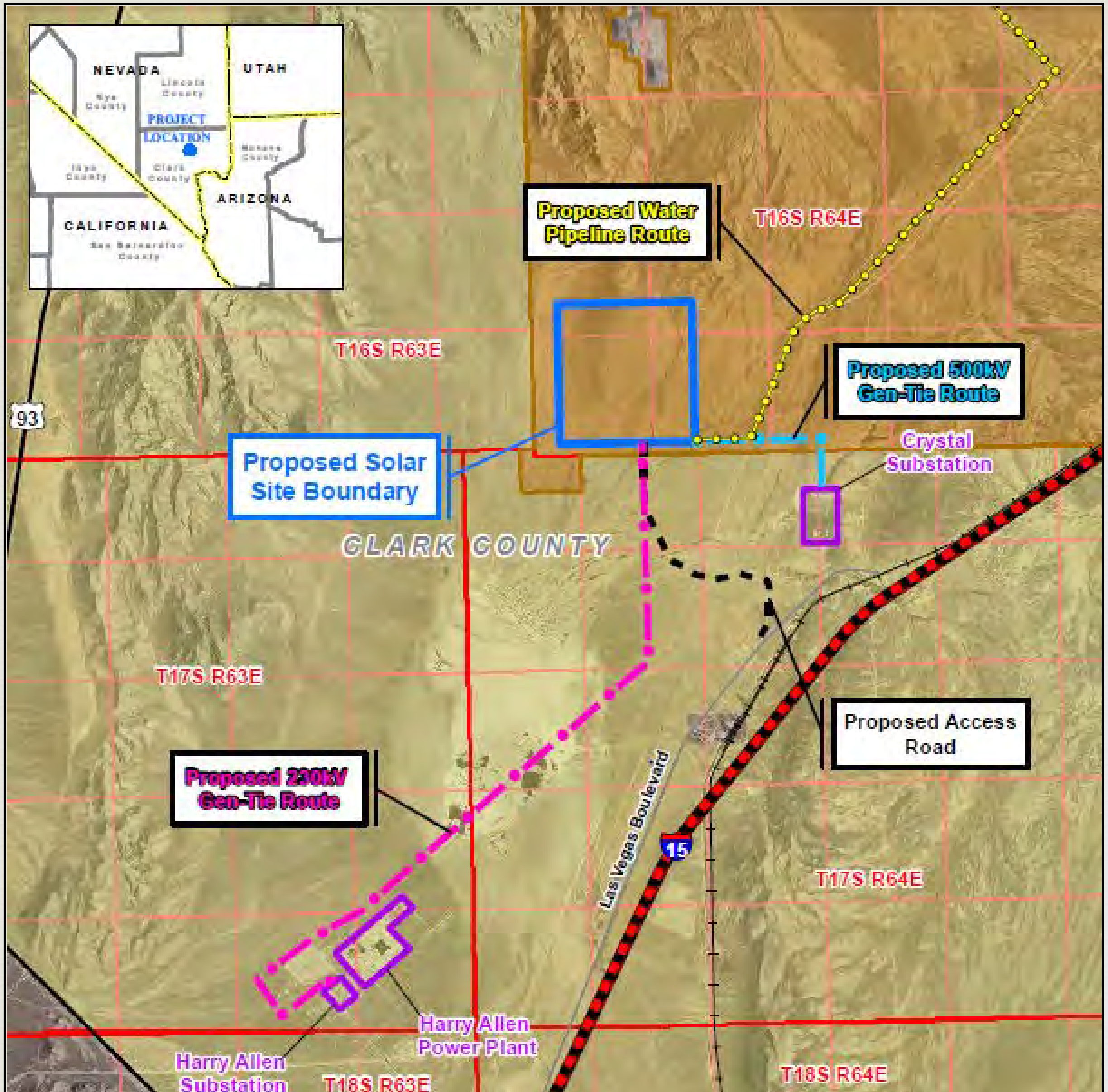
Photovoltaic (PV)

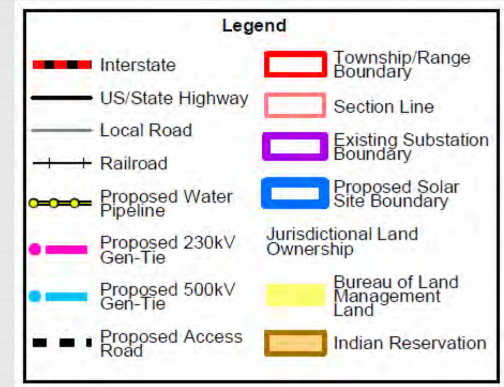


Project Location

Clark County, Nevada

Approximately 30 miles northeast of Las Vegas





- 850-acre Solar field wholly within the Moapa River Indian Reservation
- Two transmission lines on Reservation and BLM Lands
- 2.5 mile access road connecting to I-15 frontage road on BLM Lands
- Water pipeline on Reservation but within utility corridor managed by BLM

How to Participate

- Submit comments verbally at the end of the public meeting presentation
- Submit comments via comment form (leave behind or mail)
- Submit comments directly to court reporter
- Submit comments via email to:
  - Amy.Heuslein@bia.gov
  - Paul.Schlafly@bia.gov
- Submit written comments to BIA at Western Region Office address
- Submit comments via the Project Website at: www.MoapaSolarEnergyCenterEIS.com

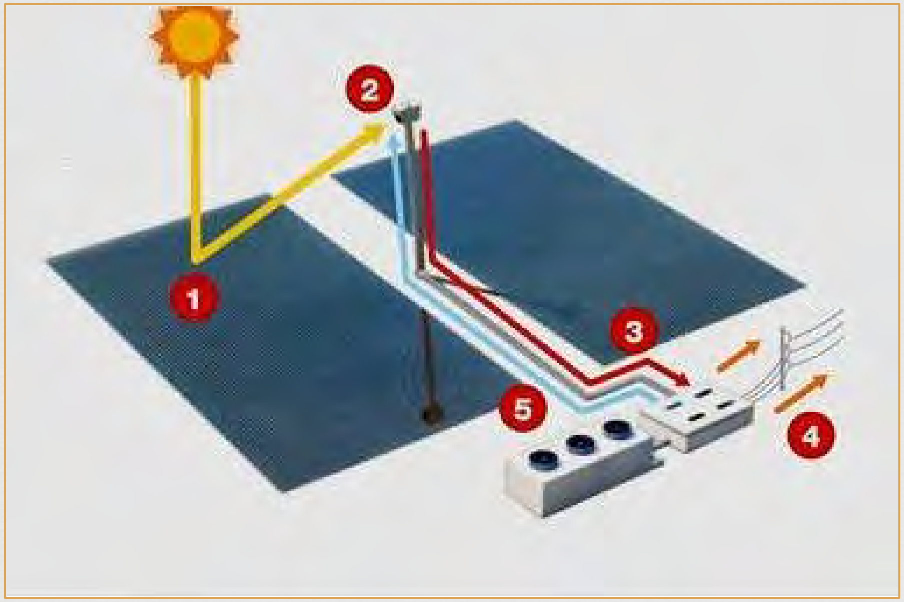
FIGURE 4
VISUAL SIMULATION OF PV PROJECT FROM KOP 3
LOOKING NORTHWEST FROM I-15 ABOUT 2.0 MILES SOUTHEAST OF THE MSEC SITE

FIGURE 4
VISUAL SIMULATION OF PV PROJECT FROM KOP 2
LOOKING NORTH FROM I-15 ABOUT 3.5 MILES SOUTH OF THE MSEC SITE

FIGURE 4
VISUAL SIMULATION OF eSOLAR CSP PROJECT FROM KOP 3
LOOKING NORTHWEST FROM I-15 ABOUT 2.0 MILES SOUTHEAST OF THE MSEC SITE

eSolar CSP

eSolar CSP Alternative

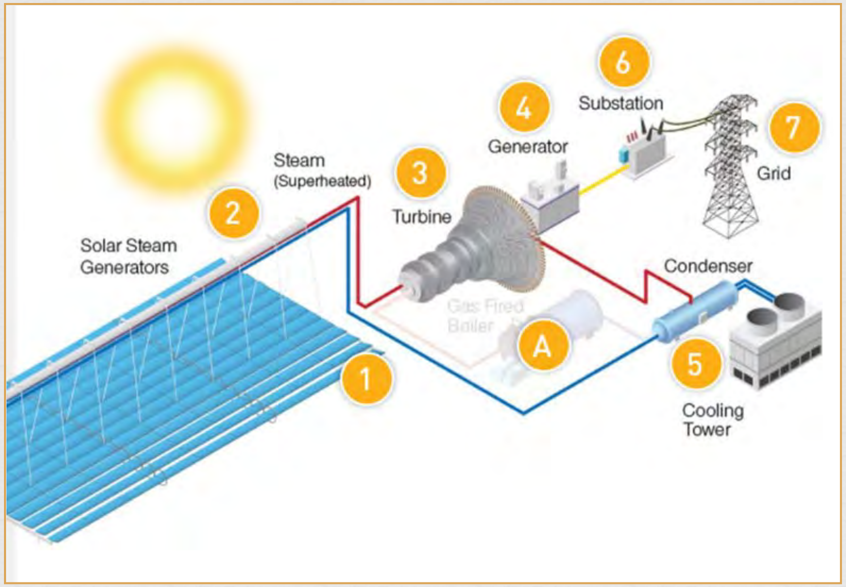


- SPGF
  - 850-acre site
  - 250 foot towers
  - Mirrors focus solar heat on towers, to boil water producing steam
  - Steam sent to turbine that generates electricity
  - Steam reverts to water and process repeats
  - Proposed wet-cooling
    - Uses 600-800 AFY of Water
- Same transmission lines, access road, and water pipeline as Proposed Action

Moapa Solar Energy Center

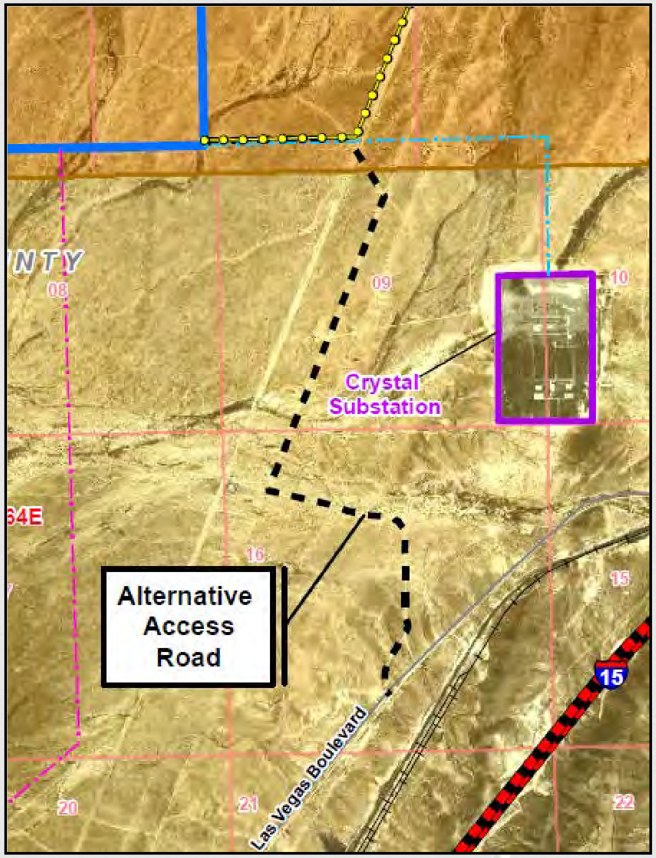
DRAFT EIS PUBLIC MEETING

Areva Solar CSP Alternative



- SPGF
  - 850-acre site
  - 80 foot tall receivers
  - Flat mirrors
  - Mirrors focus solar heat on elevated receivers, to boil water producing steam
  - Steam sent to turbine that generates electricity
  - Steam reverts to water and process repeats
  - Proposed wet-cooling
    - Uses 600-800 AFY of Water
- Same transmission lines, access road, and water pipeline as Proposed Action

Access Road Alternative



- Approximately 2.1 miles
  - On BLM and Reservation
  - Same as proposed access route for 0.8 miles
- Same 850-acre site as Proposed Action
- Same transmission lines and water pipeline as Proposed Action

APPENDIX D – CODED COMMENT LETTERS

A

COMMENT SUBMITTED VIA MSEC PROJECT WEBSITE
11/12/13

Submitted Information:

Name
Anthony Miller

Email
ajmiller@ndow.org

Comment
Draft Environmental Impact Statement: Moapa Solar Energy Center (DEIS)

Dear Ms. Heuslein:

The Nevada Department of Wildlife (NDOW) appreciates the opportunity to review the DEIS and recognizes the importance of solar energy generation for developing renewable energy resources. On September 5, 2012 (NDOW-SR#:13-029), NDOW commented on the preceding EIS documents through the formal public scoping process. We noted and appreciate our previous input and comments to the DEIS have been incorporated into the present documentation. The following recommendations are offered as additional productive input for development of the Final Environmental Impact Statement.

1
DEIS Volume 1 – Chapter 5, Mitigation, p. 5.9
NDOW appreciates the inclusion of measures intended to mitigate potential impacts to Gila monsters. The NDOW Gila monster protocol has been updated and can be accessed at: http://www.ndow.org/uploadedFiles/ndoworg/Content/Wildlife_Education/Publications/2012-Gila-Monster-Status-Identification-Reporting-Protocol-Observations.pdf

2
DEIS Volume 1 - Chapter 8, References, p. 8.3
The Nevada Wildlife Action Plan has been updated and can be accessed at: http://www.ndow.org/Nevada_Wildlife/Conservation/Nevada_Wildlife_Action_Plan/

3
DEIS Volume 2- Appendices, Appendix M, Raven Control Plan, List of Acronyms and Abbreviations
NDOW - Nevada Division of Wildlife should be corrected to read: Nevada Department of Wildlife.

3 DEIS Volume 2- Appendices, Appendix M, Raven Control Plan, 1. Introduction, 1.1 Background
Nevada Division of Wildlife should be corrected to read: Nevada Department of Wildlife.

4 DEIS Volume 2- Appendices, Appendix O, Bird and Bat Conservation Strategy (BBCS), p. 20
In addition to the USFWS 2007 Burrowing Owl guidance for pre-construction surveys, NDOW recommends utilizing the Arizona Fish and Game Department's "Burrowing Owl Project Clearance for Landowners." The document can be accessed at:
http://www.azgfd.gov/pdfs/w_c/owl/burrowingowlclearanceprotocol.pdf

5 DEIS Volume 2- Appendices, Appendix O, Bird and Bat Conservation Strategy (BBCS), p. 23
NDOW address correction:

Supervisory Habitat Biologist
Nevada Department of Wildlife
Southern Region
4747 Vegas Drive
Las Vegas, NV 89108

Thank you for this review opportunity. We look to the success of the project inclusive of implementing appropriate and reasonable actions for wildlife and wildlife-related values. For additional assistance, please contact Anthony Miller, Habitat Biologist, in the Las Vegas Office at (702) 486-5127 x3613 or ajmiller@ndow.org.

Address
4747 Vegas Drive

City
Las Vegas

Zip Code
89101

State
Nevada

Would you like to be included on our mailing list?
Yes

B

Callee Butcher
Manager
Land and Environmental

2755 E. Cottonwood Parkway #300
Salt Lake City, UT 84121
(801) 937-6056
Callee.Butcher@kernrivergas.com

November 11, 2013

Ms. Amy Heuslein
Regional Environmental Protection Officer
BIA Western Regional Office, Branch of EQS
2600 North Central Avenue, 4th Floor Mail Room
Phoenix, Arizona 85004-3008

Via email: **amy.heuslein@bia.gov**

RE: Comments of Kern River Gas Transmission Company on the Draft Environmental Impact Statement for the Moapa Solar Energy Center, Clark County, Nevada

Ms. Heuslein,

Kern River Gas Transmission Company (Kern River) owns and operates a natural gas pipeline system regulated by the Federal Energy Regulatory Commission (FERC). Kern River's system originates in southwestern Wyoming, continues through Utah and southern Nevada, and terminates at points in southern California. For most of its length, the system includes two parallel 36-inch-diameter pipelines. Including these parallel mainlines and smaller-diameter lateral pipelines, the systems consists of 1,717 miles of pipeline with a throughput design capacity of 2.17 billion cubic feet per day. In the general area of the proposed Moapa Solar Energy Center (MSEC), Kern River's facilities consist of two 36-inch-diameter pipelines located approximately 25 feet apart within a 75-foot-wide corridor pursuant to an existing right of way grant issued by the U.S. Bureau of Land Management (BLM).

Kern River has reviewed the proposed MSEC project facilities described in the Draft Environmental Impact Statement (DEIS) and taken note of several locations in which those facilities would either run parallel to or intersect the existing Kern River right of way (ROW).[1]
1 First, approximately 1.5 miles of MSEC's proposed water pipeline appears to parallel Kern River's ROW. Second, the proposed 500 kilovolt (kV) Gen-Tie Route crosses Kern River's ROW where the proposed water pipeline route turns to the west. Third, MSEC's proposed access

[1] In the DEIS map labeled Figure 2 – Proposed Project Facilities, Kern River's ROW is visible in a line running generally from the northeast to the southwest. For example, labels on Figure 2 identify its northeast corner as T16S R64E. In Sections 22, 23 and 27 of T16S R64E, Kern River's ROW is the lighter line offset from the proposed MSEC water pipeline. The two routes converge in Section 28 and run parallel to the southwest for approximately 1.5 miles. Where the MSEC water pipeline route turns west, Kern River's ROW is visible in the image continuing to the southwest generally parallel Interstate 15.

road crosses Kern River's ROW. And finally, the proposed 230 kV Gen-Tie Route comes close enough to the Kern River ROW that an analysis will be required to determine if that facility impacts Kern River.

To minimize encroachment conflicts and possible effects of high-voltage power transmission lines on its existing pipelines, Kern River would request that MSEC design all crossings of Kern River's pipelines at angles as close to 90 degrees as possible and that the MSEC and Kern River facilities be separated by 1,500 feet in segments where they parallel. To ensure the integrity of its facilities, Kern River will monitor the construction of facilities parallel to or intersecting the pipeline system.

Electric transmission lines that cross or run parallel to existing pipelines cause electrical interference that may cause corrosion to the pipelines. Kern River is required by the U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration, to identify and mitigate the effects to its pipeline system of alternating-current-induced corrosion. Kern River, therefore, requires proponents of new encroaching transmission lines to pay for studies to assess the effect of those lines on Kern River's system. The proponent of a new transmission line should also pay for any mitigation Kern River determines is necessary to protect Kern River's existing system from the effects of the new transmission line.

1 Kern River respectfully requests that the Final Environmental Impact Statement (FEIS) directs MSEC to consult with Kern River during MSEC's final route selection and to respect Kern River's encroachment standards in locations where the two projects intersect. For a project such as MSEC (with multiple crossings of and/or conflicts with the Kern River system), Kern River would enter into a Specific Encroachment Agreement (instead of an Encroachment Permit) with MSEC prior to MSEC commencing construction. That agreement and Kern River's encroachment standards are described in Kern River's Developer's Handbook, a copy of which is submitted with this letter.

The DEIS states at Section 2.2.2.3 that MSEC's proposed access road "would be designed to accommodate equipment deliveries, the construction workforce, and ultimately, the operation needs of the Project." Kern River agrees that an engineering analysis and design of the road is required, particularly since the road will cross Kern River's pipelines. Existing dirt roads in the area are not designed to accommodate the heavy industrial traffic inherent to the construction, operation or maintenance of a project like MSEC.

Kern River respectfully requests the FEIS directs MSEC to consult with Kern River as MSEC identifies any locations in which access roads necessary for construction, operation and maintenance of the MSEC project would cross Kern River's existing pipeline system. Kern River likewise requests the FEIS directs MSEC to respect Kern River's encroachment standards for crossing the Kern River system with heavy equipment during construction, operation and maintenance of the MSEC project to ensure that any such crossings are conducted safely. The Specific Encroachment Agreement would address the vehicle crossings of Kern River's system necessary for MSEC to construct, operate and maintain its project.

Kern River appreciates the opportunity to comment on this DEIS and will make its personnel available to evaluate potential impacts from specific crossings (be they crossings by the MSEC facilities themselves or crossings by heavy equipment during construction, operations or maintenance of the MSEC project) and other encroachments to ensure Kern River may continue to safely operate and maintain its existing pipeline system.

Respectfully submitted,

/s/

Callee Butcher

Enclosure: Kern River Gas Transmission Company, Developers' Handbook (January 2013)

United States Department of the Interior

BUREAU OF RECLAMATION
Lower Colorado Regional Office
P.O. Box 61470
Boulder City, NV 89006-1470

C

IN REPLY REFER TO:

OCT 21 2013

LC-2622
ENV-6.00

VIA ELECTRONIC MAIL

MEMORANDUM

To: Regional Environmental Protection Officer, Bureau of Indian Affairs Western Regional Office, Branch of EQS, Bureau of Indian Affairs, 2600 North Central Avenue, 4th Floor Mail Room, Phoenix, AZ 85004
Attn: Ms. Amy Heuslein, amy.heuslein@bia.gov

From: Valerie E. Simon
Chief, Resources Management Office

Subject: Bureau of Reclamation Comments on the Draft Environmental Impact Statement (EIS) for the Proposed Moapa Solar Energy Center

Thank you for informing Reclamation of the availability of the subject draft EIS. We have reviewed the draft EIS and have no comments.

Please maintain Reclamation on your project mailing list for future projects and reviews. Future correspondence should be sent to the Bureau of Reclamation, Attn: Ms. Valerie Simon, Chief, Resources Management Office, LC-2000, P.O. Box 61470, Boulder City, NV 89006.

If you have questions, please contact Mr. Marc Maynard, Manager, Environmental Compliance Group, at 702-293-8344 or mmaynard@usbr.gov.

D

DESERT TORTOISE COUNCIL
P.O. Box 1568
Ridgecrest, California 93556
www.deserttortoise.org

11 October 2013

Via email only

Mr. Paul Schlafly, Natural Resource Specialist
Bureau of Indian Affairs, Southern Paiute Agency
180 North 200 East Suite 111
P.O. Box 720
St. George, Utah 84770
paul.schlafly@bia.gov

Ms. Amy Heuslein
Regional Environmental Protection Officer
BIA Western Regional Office
2600 North Central Ave, 4th Floor Mailroom
Phoenix, Arizona 85004
amy.heuslein@bia.gov

RE: Moapa Solar Energy Center, Environmental Impact Statement

Dear Mr. Schlafly, Ms. Heuslein,

The Desert Tortoise Council (Council) is a private, non-profit organization comprised of hundreds of professionals and laypersons who share a common concern for wild desert tortoises and a commitment to advancing the public's understanding of this species. Established in 1976 to promote conservation of tortoises in the deserts of the southwestern United States and Mexico, the Council regularly provides information to individuals, organizations and regulatory agencies on matters potentially affecting the desert tortoise within its historical range.

The Council appreciates this opportunity to comment on the Draft Environmental Impact Statement (DEIS) and supporting documents for the Moapa Solar Energy Center (Project). Whereas our comments should not be construed as endorsement for this project, we believe that useful suggestions follow that would predictably alleviate impacts to desert tortoises, their habitats, and other biological resources should the pertinent regulatory agencies grant the project proponent authorization to proceed with Project development.

Impacts Associated with Translocating Tortoises

1 We understand from various documents that, *within the project footprint*, this project may directly impact up to 34 adult tortoises, 178 juvenile tortoises, and 357 eggs based on calculations using U.S. Fish and Wildlife (USFWS) formulas and cited documents within the primary facility, and associated transmission lines, access road, and water pipeline. Unfortunately, the DEIS only vaguely refers to translocating tortoises onto other Reservation lands or lands managed by the Bureau of Land Management (BLM) without providing any specific locations, field studies, or data describing tortoise occurrence on those lands.

Translocating 34 adult and 178 juvenile tortoises into other areas is only part of the impact; how many acres of occupied habitats and how many resident tortoises will be affected on the lands where translocated tortoises would be introduced? The DEIS is deficient in providing this information.

1 The DEIS indicates that all other potential facility locations on the Reservation either have too many tortoises or other conflicting issues, so there appear to be no low density areas into which these translocated tortoises may be placed. If that is so, where are the potential BLM lands on which these tortoises could be translocated? We feel that the full impacts of this proposed project cannot be fully assessed until the recipient tortoise population and habitats have been surveyed and included in the impacts assessment. It is not sufficient to say this will be done later; the impact must be disclosed and assessed before the project can proceed.

Alternatives That May Minimize Impacts

We see in various figures and maps that the proposed access road would take the shortest route to nearby Las Vegas Boulevard and/or Interstate 15. Is there any opportunity to co-locate one or both of the proposed transmission lines along this access road, and then follow the main transportation corridors? There are many documents reporting lower levels of tortoises alongside
2 well-travelled roads such as these, and situating the transmission line(s) along the access road would concentrate direct impacts to a smaller area and predictably have fewer adverse effects to both tortoises and habitats. Similarly, we note in Figure 2 of Appendix M that the proposed water pipeline alignment is situated alongside a dirt road. Is it possible to relocate the pipeline to either within this road or on contiguous lands devoid of vegetation?

Minimization of Common Raven Impacts

Has the proponent considered providing funds to the National Fish and Wildlife Foundation to implement regional management actions controlling common raven populations? We are not
3 sure if this program is available in Nevada, but it is being implemented throughout California Deserts as mitigation for projects that may subsidize ravens, and may provide another opportunity for the proponent to mitigate impacts.

Again, thank you for this opportunity to comment. We see in Section 6.3.2. that the Council is already on your list of Non-Governmental Organizations to which you provide opportunities for comment. We look forward to any other materials you may have for our review.

Regards,

Edward L., LaRue, Jr., M.S.
Desert Tortoise Council, Ecosystems Advisory Council, Chairperson

E

CENTER for BIOLOGICAL DIVERSITY

Because life is good.

Bureau of Indian Affairs
Western Regional Office, Branch of Environmental Quality
Attn: Ms. Amy Heuslein
2600 North Central Avenue, 4th Floor
Phoenix, AZ 85004-3008

October 16, 2013

Sent via e-mail: amy.heuslein@bia.gov
paul.schlafly@bia.gov

RE: Comments on DEIS - Moapa Solar Energy Center Project

Dear Ms. Heuslein:

On behalf of the Center for Biological Diversity ("Center"), please accept these comments on the draft environmental impact statement ("DEIS") for the Moapa Solar Energy Center Project ("MSEC").

The Center is a non-profit, public interest environmental organization dedicated to the protection of native species and their habitats through science, policy, and environmental law. The Center has over 625,000 members and on-line activists throughout Nevada and the United States.

We submit these comments on behalf of our members, activists, staff, and members of the general public who are interested in protecting native species and their habitats in Nevada and particularly those lands that would be impacted by the proposed action.

The development of renewable energy is a critical component of efforts to reduce carbon pollution and climate-warming gases, avoid the worst consequences of global warming, and to assist in meeting needed emission reductions. The Center strongly supports the development of renewable energy production, and the generation of electricity from solar power, in particular. However, like any project, proposed solar power projects should be thoughtfully planned to minimize impacts to the environment. In particular, renewable energy projects should avoid impacts to sensitive species and habitat, and should be sited in proximity to the areas of electricity end-use in order to reduce the need for extensive new transmission corridors and the efficiency loss associated with extended energy transmission. Only by maintaining the highest environmental standards with regard to local impacts, and effects on species and habitat, can renewable energy production be truly sustainable.

We are grateful that the proponent and Tribe have reconsidered the technology proposed in the scoping phase and have decided upon photovoltaic rather than concentrated solar technologies.

Arizona . California . Nevada . New Mexico . Alaska . Oregon . Montana . Illinois . Minnesota . Vermont . Washington, DC
4261 Lily Glen Ct . Las Vegas, NV 89032 tel: (702) 249.5821 fax: (702) 638.4261 www.BiologicalDiversity.org

This change in technologies directly addresses both our concerns over the choice of technologies as well as the need for ground water in an already over appropriated ground water basin.[1]

We are concerned with the proposed location of the access road, which would travel through an undisturbed wash to connect one segment to the existing maintenance road associated with a
1 powerline. We very much prefer the alternative routing that would utilize an existing powerline maintenance road into the Moapa Indian Reservation and then turn west and connect into the proposed waterline ROW road.

We are similarly concerned with the routing of the proposed 230kV Gen-Tie connection to the Harry Allen Substation. As proposed, the line would cut across and disturb the Apex Dry Lake ecosystem, including spring areas, native vegetation and unique flora and fauna.

During the Pleistocene, the Great Basin and Mojave Desert ecoregions were home to many large lakes that filled the valley floors. As the climate changed and became warmer and drier, these lakes eventually dried and became the intermittent wetlands now known as ephemeral lakes or playas.[2]

2 Playas are a rare feature on the landscape, constituting less than 6% of the land area. In their ecoregional assessment for the Mojave, The Nature Conservancy set as a goal the protection as conservation targets at least 80% of the available playa habitat in that area.[3]

Playas and ephemeral wetlands are more than the obvious dry lake bed. The function of this ecosystem depends heavily on the surrounding uplands and the hydrologic functions that deliver water and sediments to the playa.[4] [5] The most immediate threat to playas, aside from surface occupancy, is the diversion of water that would otherwise flow onto the playa bed. To protect the ecological function of the playa system, it needs to be managed at the scale of the entire playa and wetland system, including seasonally wetted perimeters and sources of water to the playa.[6]

---

[1] See Scoping Comments submitted by the Center via a letter dated September 5, 2012, which we ask be appended to these comments.

[2] Randall, J.M., S.S. Parker, J. Moore, B. Cohen, L. Crane, B. Christian, D. Cameron, J. MacKenzie, K. Klausmeyer and S. Morrison. 2010. Mojave Desert Ecoregional Assessment. Unpublished report. The Nature Conservancy, San Francisco, CA. 106 pages + Appendices. Page 15. Available at: http://conserveonline.org/workspaces/mojave/documents/mojave-desert-ecoregional-2010/@@view.html

[3] Ibid

[4] Levick, L., J. Fonseca, D. Goodrich, M. Hernandez, D. Semmens, J. Stromberg, R. Leidy, M. Scianni, D. P. Guertin, M. Tluczek, and W. Kepner. 2008. The Ecological and Hydrological Significance of Ephemeral and Intermittent Streams in the Arid and Semi-arid American Southwest. U.S. Environmental Protection Agency and USDA/ARS Southwest Watershed Research Center, EPA/600/R-08/134, ARS/233046, 116 pp.

[5] Leibowitz, S.G. 2003. Isolated wetlands and their functions: an ecological perspective. Wetlands 23:3, 517-531.

[6] Great Basin Bird Observatory. 2010. Nevada Comprehensive Bird Conservation Plan, ver. 1.0. Great Basin Bird Observatory, Reno, NV. Available at: www.gbbo.org/bird_conservation_plan.html

Due to their rarity on the landscape, playas add rare and unique endemism and biological diversity to desert ecosystems.[7] [8] Rare and endemic plants such as Parish's phacelia, iodinebush, black greasewood, spiny hopsage, saltgrass, Lemon's alkali grass, and Amargosa nitrophila are found on the playa or in the surrounding ecotone with the uplands.[9] [10]

2 Ephemeral wetlands and playas are also very important for some species of birds. Birds that depend on ephemeral wetlands have adapted to the annual variation in water conditions that are typical for these ecosystems, and rely on a network of playas and wetlands to meet their habitat needs from year to year.[11] Birds using playas for habitat include snowy plover, black-necked stilt, American avocet, Western sandpiper, least sandpiper, long-billed dowitcher, Wilson's phalarope, marbled godwit and cinnamon teal.[12]

Our concerns can re rectified by re-routing the proposed line further to the south to avoid the impacts to the playa ecosystem.

We remain concerned over impacts to the Mojave desert tortoise. The desert tortoise is protected as Threatened under the Endangered Species Act. The desert tortoise is continuing to decline throughout its range despite being under federal and state Endangered Species Acts protection as threatened.[13] The project area lies in the Northeastern Mojave Recovery Unit for the desert tortoise, within potential occupied habitat, and outside of areas designated as critical habitat.[14]

NEPA requires that a range of meaningful alternatives be explored in the environmental review process. 42 U.S.C. §§ 4332(C)(iii),(E). The agency must "study, develop, and describe appropriate alternatives to recommend courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources." 42 U.S.C. § 4332(2)(E); *see also* 40 C.F.R. § 1502.14 (requires the EIS to examine all reasonable alternatives to the proposal).

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[7] Ibid, GBBO 2010; Liebowitz, 2003;

[8] Comer, P., K. Goodin, A. Tomaino, G. Hammerson, G. Kittel, S. Menard, C. Nordman, M. Pyne, M. Reid, L. Sneddon, and K. Snow. 2005. Biodiversity Values of Geographically Isolated Wetlands in the United States. NatureServe, Arlington, VA.

[9] Ibid, Randall 2010.

[10] Crist, Patrick. 2010. Central Basin and Range Rapid Ecoregional Assessment – Final Memorandum I-1-C. Prepared for the USDI-BLM by NatureServe. Arlington, VA. Available at: http://www.blm.gov/wo/st/en/prog/more/climatechange/reas/cbasinrange.html.

[11] Ibid, GBBO 2010.

[12] Ibid, GBBO 2010.

[13] U.S. Fish & Wildlife Service. 2008. Draft range-wide monitoring of the Mojave population of the desert tortoise: 2007 annual report. Report by the Desert Tortoise Recovery Office, U.S. Fish and Wildlife Service, Reno, Nevada. Pgs. 50. Available at: http://www.fws.gov/Nevada/desert_tortoise/documents/reports/2007_Rangewide_Desert_Tortoise_Population_Monitoring_DRAFT.pdf

[14] U.S. Fish and Wildlife Service. 1994. Recovery plan for the Mojave population of the desert tortoise (*Gopherus agassizii*) at 21. U.S. Fish and Wildlife Service. http://www.fws.goc/endangered/recovery/index.html#plans .

The EIS must address the impacts of this project and other linked projects to the survival and recovery of desert tortoise in this recovery unit and take seriously the development of meaningful alternatives to this project that will avoid impacts to the species and its habitat. As the BIA is aware, it is increasingly difficult to find intact, high quality desert tortoise habitat in private ownership that could be purchased and conserved to provide some mitigation for the loss of other occupied desert tortoise habitat in the Northeastern Mojave Recovery Unit such as the lands proposed for this solar plant. Therefore, avoiding impacts to this essential habitat and maintaining the largest possible areas of intact, high quality habitat is absolutely critical for recovery of the species.

The FEIS must clearly address actions for avoiding, minimizing and mitigating impacts to the
desert tortoise and its habitat. The BIA must first look to ways to avoid impacts to desert
tortoise, for example, by identifying and analyzing alternative sites outside of tortoise occupied
habitat, areas that have already been severely disturbed by prior land use, or by employing the
3 alternative solar energy strategy of distributed power. The BIA must also look at ways to
minimize any impacts that it finds to be unavoidable, for example by requiring designs that
minimize ground disturbances, limiting access roads, and provide for functional tortoise access
across the site. Mitigation measures might include the acquisition of lands that would be
perpetually managed for conservation, the funding of conservation management measures on
federal lands, funding for the Desert Tortoise Conservation Center, or for tortoise research.

The Scientific Advisory Committee (SAC) of the U.S. Fish and Wildlife Service's Desert
Tortoise Recovery Office has recently concluded that "translocation is fraught with long-term
uncertainties, notwithstanding recent research showing short-term successes, and should not be
considered lightly as a management option. When considered, translocation should be part of a
strategic population augmentation program, targeted toward depleted populations in areas
containing "good" habitat. The SAC recognizes that quantitative measures of habitat quality
relative to desert tortoise demographics or population status currently do not exist, and a specific
4 measure of "depleted" (e.g., ratio of dead to live tortoises in surveys of the potential translocation
area) was not identified. Augmentations may also be useful to increase less depleted populations
if the goal is to obtain a better demographic structure for long-term population persistence.
Therefore, any translocations must be accompanied by specific monitoring or research to study
the effectiveness or success of the translocation relative to changes in land use, management, or
environmental condition." Translocation should be used as a tool to augment populations within
depleted recovery units, not as a mitigation strategy to allow for development in desert tortoise
habitat.[15]

Obviously, since this project has a federal nexus, consultation under the Endangered Species Act
would be required. Such consultations must consider climate change impacts, including the need
5 for maintaining habitat linkages between current and future desert tortoise habitat – see
discussion below. The EIS must thoroughly disclose and analyze the impacts on the desert

[15] U.S. Fish & Wildlife Service. 2009. Scientific Advisory Committee, Desert Tortoise Recovery Office. Meeting Summary, March 13, 2009, San Diego Wild Animal Park, Escondido, CA. pgs 4. Available at: http://www.fws.gov/Nevada/desert_tortoise/documents/sac/20090313_SAC_meeting_summary.pdf .

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tortoise and its recovery and consider meaningful alternatives that would avoid significant impacts to the tortoise and other resources.

In light of unprecedented climate change, animal and plant species will attempt to adapt by expanding their ranges north and upslope to cooler conditions mimicking their current habitats, and abandoning their present no longer hospitable ranges. At a 2008 Desert Manager Group symposium entitled, "Climate and Deserts Workshop", Wayne Spencer of the Conservation Biology Institute gave a compelling lecture on this likely scenario in which he called for the maintenance of broad ecological connectivity and the minimization of movement barriers to conserve species and ecological processes in the face climate change.[16] Such connectivity is not only important for the physical movement of species but perhaps more so for the conservation of genetic diversity and the prevention of genetic bottlenecks.

At the same workshop, Kirsten Ironside presented on predicting climate change impacts. She presented historic data and modeling that suggests that species found abundantly in California and southern Nevada, such as Joshua tree, will be rare or eliminated from their current ranges and given the means will be extending northward into Nevada and Utah.[17]

6

The US Fish and Wildlife Service ("FWS") has indicated that the revised Dry Lake SEZ was situated in an area that provides habitat and genetic connectivity between areas with greater habitat suitability, particularly between the Mormon Mesa Critical Habitat Unit west of the SEZ and portions of greater habitat suitability north and east of the SEZ. The FWS identified the entire revised SEZ as priority connectivity habitat for the desert tortoise through a least-cost pathway model (Ashe 2012) based upon the USGS model for desert tortoise predicted suitable habitat (Nussear et al. 2009).[18]

Given the MSEC adjacency to the Dry lake SEZ discussed above, it is highly likely that the project site could impose a significant barrier to future movement and gene flow between populations within the Northeastern Mojave Recovery Area, as well as with populations in other recovery areas. The EIS must disclose and analyze the projects' impacts to movement corridors and habitat connectivity taking into account the heightened importance of such corridors in light of climate change.

7

NEPA's implementing regulations state that agencies should consider similar, reasonably foreseeable actions together in the same environmental review document when the actions "have similarities that provide a basis for evaluating their environmental consequences together, such as common timing or geography," and the "best way to assess adequately [their] combined impacts […] or reasonable alternatives" is to consider them together. 40 C.F.R. 1508.25(a)(C). It is important for federal agencies to consider connected actions together in a single NEPA process as opposed to segmenting review. *Daly v. Volpe*, 514 F.2d 1106, 1110 (9th Cir. 1975)

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[16] Managing Landscape Linkages to Conserve Desert Wildlife During Climate Change, by Wayne Spencer at: http://www.dmg.gov/climate/agenda.html .

[17] Modeling Approaches for Predicting Climate Change Impacts on Natural Systems; From Inputs to Algorithms to Outputs and What They Can Tell Us, by Kirsten E. Ironside at: http://www.dmg.gov/climate/agenda.html .

[18] Ibid, page 11.3-41.

(where actions are interconnected in terms of fulfilling a joint purpose it may be necessary to conduct a single NEPA review). Here, the BIA should coordinate this NEPA process with the approval process for all of the connected actions including the transmission and water lines and substations that are proposed to serve this site. This would allow all of the projects' significant impacts to be fully considered together.

In particular, the BIA should consider together the additive impacts to biological resources,
including the desert tortoise and its habitat, from the proposed solar project and from the other
proposed projects in the area to ensure that the true extent of impacts are fully disclosed and
7 analyzed. BIA should not treat this critical analysis as a cumulative impacts question alone.
Because the currently proposed projects are linked and interdependent they should be evaluated together under NEPA. Most importantly, this project will have direct impacts on desert tortoise populations in the Northeastern Mojave Recovery Unit; around 900 acres of tortoise habitat will be taken if it is approved and permitted for development. BIA must look at those impacts in a comprehensive way that would allow it to formulate meaningful alternatives that could avoid many of the impacts of these linked projects and where impacts remain that cannot be avoided through alternatives, provide for comprehensive minimization and mitigation measures that will ensure that impacts to this recovery unit are appropriate. Ultimately, BIA must ensure that the approval of these linked projects does not impair the recovery of the desert tortoise populations in the Northeastern Mojave Recovery Unit.

The Center wishes to be an active stakeholder in this planning process and requests that we be added to any stakeholder notification list the BIA may develop.

Thank you for this opportunity to comments and we look forward to other opportunities to provide review and input.

Sincerely yours in conservation,

Rob Mrowka
Ecologist and Nevada Conservation Advocate

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NOV 12 2013

Amy Heuslein
Regional Environmental Protection Officer
Bureau of Indian Affairs
Western Regional Office
2600 North Central Avenue, 4th floor
Phoenix, AZ 85004-3008

Subject: Draft Environmental Impact Statement for the Proposed Moapa Solar Energy Center, Clark County, Nevada (CEQ #20130260)

Dear Ms. Heuslein:

The U.S. Environmental Protection Agency has reviewed the Draft Environmental Impact Statement for the Proposed Moapa Solar Energy Center. Our review and comments are provided pursuant to the National Environmental Policy Act, the Council on Environmental Quality Regulations (40 CFR Parts 1500-1508), and our NEPA review authority under Section 309 of the Clean Air Act.

EPA continues to support increasing the development of renewable energy resources in an expeditious and well-planned manner. Using renewable energy resources such as solar power can help the nation meet its energy requirements while reducing greenhouse gas emissions. We are also very supportive of tribal government interests in renewable energy as a means to help meet tribal economic development goals and help the nation's transition to cleaner energy.

EPA is a cooperating agency for the project and provided formal scoping comments on August 21, 2012. We also provided comments on preliminary draft chapters of the Administrative DEIS to the Bureau of Indian Affairs on December 13, 2012 and April 11, 2013. Our comments on the complete Administrative DEIS were sent to BIA on July 3, 2013.

Based on our review of the DEIS, we have rated the project and document as *Environmental Concerns – Insufficient Information* (EC-2) (see the enclosed "Summary of EPA Rating Definitions"). We commend the BIA for extensive early agency coordination on this project and were pleased to note a number of changes to the document in response to our comments to date. In particular, we support the decision to no longer include, as part of the proposed action, the use of water intensive, wet-cooled concentrating solar power (CSP) technology. This is a significant improvement and addresses our previously identified concerns regarding water use and impacts to groundwater resources. To help ensure minimal groundwater use for this project, the Final EIS should include a commitment from BIA to coordinate further with cooperating agencies on the project if wet-cooled CSP is again considered as part of the proposed action. We were also pleased to note the addition of recent groundwater modeling, analysis of potential groundwater drawdown and impacts to the endangered Moapa dace, and mitigation measures to reduce the risks to avian species.

Notwithstanding the positive aspects of the proposed project, some of our previously provided comments have not yet been fully addressed and are reiterated in the enclosed detailed comments. EPA remains concerned about the project's potential impacts to site hydrology, air quality, and endangered species, as well as the project's possible cumulative impacts when considering the additional energy and residential developments proposed in the area. We provide specific recommendations regarding analyses and documentation to assess potential significant direct, indirect, and cumulative impacts from the proposed project, and to minimize adverse impacts that cannot be avoided. We are available to further discuss the recommendations provided.

Please note that, EPA Headquarters no longer accepts paper copies or CDs of EISs for official filing purposes. Submissions must be made through the EPA's new electronic EIS submittal tool: *e-NEPA*. Electronic submission does not change requirements for distribution of EISs for public review and comment, and lead agencies should still provide one hard copy of each Draft and Final EIS released for public circulation to the EPA Region 9 office in San Francisco (Mail Code: CED-2).

EPA appreciates the opportunity to review this DEIS. If you have any questions, please contact Tom Plenys, the lead reviewer for this project. Tom can be reached at (415) 972-3238 or plenys.thomas@epa.gov.

Sincerely,

for Jeff Scott, Director, Waste Management Division and Communities and Ecosystems Division

Enclosures: Summary of EPA Rating Definitions
EPA's Detailed Comments

cc: Paul Schlafly, Natural Resource Officer, Bureau of Indian Affairs
Kellie Youngbear, Superintendent, Bureau of Indian Affairs
Darren Daboda, Environmental Director, Moapa Band of Paiutes
Alethe Tom, Acting Chairwoman, Moapa Band of Paiutes
Mark Chandler, Bureau of Land Management
Susan Cooper, U.S. Fish and Wildlife Service
Amee Howard, National Park Service

SUMMARY OF EPA RATING DEFINITIONS*

This rating system was developed as a means to summarize the U.S. Environmental Protection Agency's (EPA) level of concern with a proposed action. The ratings are a combination of alphabetical categories for evaluation of the environmental impacts of the proposal and numerical categories for evaluation of the adequacy of the Environmental Impact Statement (EIS).

ENVIRONMENTAL IMPACT OF THE ACTION

"LO" (Lack of Objections)

The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

"EC" (Environmental Concerns)

The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact. EPA would like to work with the lead agency to reduce these impacts.

"EO" (Environmental Objections)

The EPA review has identified significant environmental impacts that should be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

"EU" (Environmentally Unsatisfactory)

The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potentially unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the Council on Environmental Quality (CEQ).

ADEQUACY OF THE IMPACT STATEMENT

"Category 1" (Adequate)

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

"Category 2" (Insufficient Information)

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analysed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

"Category 3" (Inadequate)

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analysed in the draft EIS, which should be analysed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

*From EPA Manual 1640, Policy and Procedures for the Review of Federal Actions Impacting the Environment.

U.S. EPA DETAILED COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE PROPOSED MOAPA SOLAR ENERGY CENTER, CLARK COUNTY, NEVADA, NOVEMBER 12, 2013

Aquatic Resources

Drainages, Ephemeral Washes and Site Hydrology

According to the DEIS, construction activities causing ground disturbance, such as grading, would disrupt the soil surface, dislodge biological crusts that bind soil together, and increase the potential for wind and water erosion. These activities would likely have long-term adverse effects on the quality of local surface water flowing to the playa downstream of the proposed project (p. 4-15). The project site also has the potential for high winds and infrequent but strong rains that could cause erosion (p. 4-10). While we understand that drainage, grading and stormwater pollution prevention plans will be finalized prior to construction and operations (p. 2-6 and 2-8), their viability and potential effectiveness are not known, and the extent to which soil disturbance and grading will occur has not been quantified. For purposes of the analysis, the DEIS assumed the development would disturb up to the entire 850 acre site (p. ES-4, 4-41).

EPA is concerned that grading and disruption of natural flows on site could result in impacts to ephemeral washes, vegetation and site drainage without commensurate benefit to soil stability. Seven ephemeral drainages are located within the project area and drainage morphology ranges from 2-foot-wide single channels to features up to 30 feet wide (bank to bank) with multiple braided channels contained within their banks (p. 3-14). Ephemeral washes provide a wide range of functions that are critical to the health and stability of desert ecosystems and wildlife. The potential damage that could result from disturbance of flat-bottomed washes includes alterations to the hydrological functions that natural channels provide in arid ecosystems, such as adequate capacity for flood control, energy dissipation, and sediment movement; as well as impacts to valuable habitat for desert species and plant populations.

To decrease downstream peak flows, the DEIS indicates that concrete weirs or rock gabions would be constructed within the major drainages on the site at key locations to minimize velocity and decrease sediment transport. Sediment deposits on the upstream side of the gabions would be manually maintained throughout operations to ensure minimal downstream sedimentation (p. 4-16). Additionally, berms would be constructed to direct the surface flow around the project site and back into the seven drainages and playa downstream of the site (p. 4-15). These measures are included to prevent erosion on site and downstream sedimentation; however, EPA expects that, without established flow paths and increased vegetative roughness, the graded site could experience *increased* erosion.

While EPA acknowledges that the DEIS states full grading and clearing would occur only in those areas necessary to facilitate construction and operation of the photovoltaic (PV) tracking system (p. 4-40), we continue to recommend that any drainage reports and plans include designs to minimize disruption of natural flows as well as minimize erosion, local scour, sedimentation, and potential destabilization and damage that could result from installing equipment in drainages, as much as possible.

Recommendations:

The final grading and drainage plans should be completed prior to project implementation, so that
the additional information they would yield can inform any needed adjustments in the project
design. While we appreciate the mitigation measure identified: 'Existing vegetative buffers would
1 be maintained as much as practical along perimeter edges of major drainages' (p. 5-2), the seven
ephemeral drainages identified may warrant wider buffers so the channels may adjust to the new
hydraulic conditions without the need for major human-made structures and long-term active

maintenance. We recommend including the final detailed drainage and grading plans in the Final EIS (FEIS).

Discuss in further detail where berms would be used to direct surface flow around the project site and how berms would affect upstream and downstream hydrological conditions.

1 Clarify, in the FEIS, the flow path of exterior storm water flow, and summarize modeled impacts (hydraulics of flow, velocity, sediment transport, sediment delivery and potential stream channel changes) of diverting drainages.

Quantify the acreages to be graded under each alternative. Demonstrate that downstream flows would not be adversely impacted due to any proposed changes to natural washes resulting from proposed grading, drainage management measures or the addition of retention ponds.

Include a framework for an adaptive management plan in the FEIS, including a discussion of the criteria that will be used to evaluate effectiveness of the erosion and sedimentation control measures and what modifications are available to address typical problems, to serve as a
2 troubleshooting guide. For example, the framework should describe actions that could be taken if excessive erosion or sedimentation is observed.

Include, in the FEIS, permanent sediment and channel elevation monitoring stations to be established to assist in the adaptive management of erosion and sedimentation.

To ensure avoidance and to minimize direct and indirect impacts to ephemeral drainages, EPA recommends that the FEIS:

- Evaluate and commit to maximizing the retention of ephemeral drainages that can remain stable with project operation. Describe how the design flexibility of the proposed photovoltaic (PV) system technology has been used to site solar arrays outside of natural drainage areas. Solar arrays close to drainages could be installed using deeper support posts to help ensure they remain stable in the event the adjacent channel moves.
- Clarify that the types of "facilities" covered by the proposed mitigation measure "placing project facilities in washes would be avoided by all alternatives" (p. 5-2) would include all solar PV structures and supports, as well larger ancillary facilities on the site.
- 3 Evaluate and commit to minimizing the number of road crossings over washes and designing necessary crossings to provide adequate flow-through during storm events.
- Consider co-locating the proposed access road in an existing utility corridor, or along a proposed transmission line, to avoid crossing the major drainage to the south of the project site.
- Discuss the benefits of maintaining some or all of the ephemeral washes, including preserving important habitat, retaining ephemeral wash functions, potentially reducing erosion, reducing construction costs, and improving the implementation and success of closure plans after the site is retired from operation.

It is our understanding that other PV solar companies have proposed designs that reduce the need for site clearing and grading by mounting PV panels at sufficient height above ground to maintain vegetation, which could also minimize drainage disturbance, the need for site grading and generation of fugitive dust. As the site is relatively flat, the telescoping legs of the proposed solar modules appear to present an opportunity to eliminate the need for grading altogether. It remains our understanding that the proponents of the neighboring K-Road solar project had committed to proceed without grading.

Recommendation:

4 The FEIS should evaluate mounting PV panels at sufficient height above ground, utilizing the telescoping legs of the proposed solar modules, to maintain vegetation and minimize drainage disturbance. Quantify acreage of natural vegetation and soil that would not require clearing and grading as a result of using telescoping legs. Compare these results to existing alternatives, and incorporate project design changes into site design and conditions of certification, accordingly.

Fencing

The DEIS does not provide information about the effects of security fencing and desert tortoise fencing on drainage systems. By entraining debris and sediment, fencing can interfere with natural flow patterns. Fence design should address hydrologic criteria, as well as security and desert tortoise protection performance criteria.

Recommendation:

5 Describe, in the FEIS, where permanent fencing will be used and the potential effects of fencing on drainage systems. Ensure that the fencing proposed for this project will meet appropriate hydrologic performance standards.

Groundwater

In light of multiple ongoing and reasonably foreseeable projects in the area (including the Southern Nevada Water Authority proposed groundwater development project, the existing Harry Allen Power Plant and proposed expansion, the approved K-Road Moapa Solar Project, the proposed 960 MW Brightsource solar thermal-powered project, and the 111,000 residential unit Coyote Springs Investment Development Project on 21,400 acres), we are concerned about the potential groundwater drawdown and cumulative impacts to the California Wash Basin, and neighboring basins. We further note that the estimated perennial yield for the California Wash Basin is 2,300 acre-feet/year (AFY) (where the supply well for the project is located) and the committed use is over 3,000 AFY. The DEIS indicates that it is not known what sources of water would be used for most of the foreseeable projects, and thus it is not possible to assess the magnitude of the impacts. The DEIS indicates that future Endangered Species Act (ESA) Section 7 consultations for these projects would assess cumulate impacts to groundwater and associated biological concerns with potential decreases in flow to local springs (p. 4-115).

As raised by EPA in comments provided during earlier reviews of this project, the cumulative impacts to groundwater appear to have the potential to be significant considering the reasonably foreseeable projects identified and the cumulative effects that climate change could have on water resources, including higher temperatures and more frequent heat waves (p. 3-3). With regard to climate change impacts on water resources in the area, we note that the Nevada Climate Change Advisory Committee Final Report (2008) states that "the Colorado River basin is expected to see less precipitation overall, and a greater percentage will come as rain rather than snow. As the Las Vegas Valley receives over 90% of its drinking water from the Colorado River, this will present challenges to maintaining municipal water supply". The DEIS cites results from a Department of Interior (DOI) regional groundwater study that showed that, as pumping increased, both the regional groundwater levels and surface water flows would be more greatly affected. The DEIS summarizes that, if pumping were to increase to a rate equal to the total of all existing groundwater rights (Scenario 2), the Muddy River Springs, habitat for the endangered Moapa dace, would completely dry up in approximately 1,100 years. The scenarios with higher rates of pumping (3 through 7) showed an acceleration of time when the predicted impacts would occur, but the DEIS does not identify these impacts. The discussion also does not add in the cumulative effects of climate change on water resources in the desert and may not have estimated water usage from reasonably foreseeable projects mentioned above. Muddy River, located approximately 12 miles northeast of the proposed project, is the nearest perennial water source, is considered impaired and is on the 303(d) list as required by the Clean Water Act (p. 3-37).

Recommendations:

6 Include in the FEIS additional discussion of the cumulative effects on groundwater for all alternatives, including wet-cooled concentrated solar power (CSP) alternatives. Incorporate a discussion of the additive effects from climate change, more detail on future pumping scenarios from the DOI study, and estimates for water usage for reasonably foreseeable projects. It is important to understand how the value of water will increase in the future under continued groundwater development and a potentially hotter and drier climate.

Address, in the FEIS, what mitigation measures would be taken, and by whom, should groundwater resources in the basins become overextended to the point that further curtailment is necessary due to, for example, additional growth, the influx of large-scale solar projects (including in the neighboring solar energy study area), drought, climate change, or the utilization of existing or pending water rights in the basin.

EPA recognizes the proposed action would utilize less water during operations (30 AFY) as compared to the other alternatives evaluated in the DEIS. Although the DEIS did not provide a quantitative breakdown, panel washing would generate the majority of the water demand for the proposed project (p. 2-3). We have reviewed other PV projects that have committed to no water use for panel washing, such as First Solar's Desert Sunlight Solar Farm in Riverside County, CA. It is also our understanding that First Solar's Silver State facility in Nevada will not require PV panel washing.

Recommendation:

7 In light of the arid environment and potential additional stresses on water supplies in the future, discuss in the FEIS the technical feasibility of eliminating periodic washing of solar panels, and consider adopting, as a condition of certification in the FEIS and Record of Decision, that water will not be used for panel washing. Describe any measures that will be used to clean the solar panels, if applicable. Provide a quantitative breakdown for operational water usage in the FEIS.

<u>Air Quality</u>

The Las Vegas 1997 8-hour ozone nonattainment area excludes the Moapa River Indian Reservation; however, this nonattainment area surrounds the reservation and emissions from the project have the potential to impact it.[1] Therefore, emissions of ozone precursors such as volatile organic compounds (VOCs) and oxides of nitrogen (NOx) should be minimized through mitigation measures, especially during the construction phase.

Further, in light of the ongoing and reasonably foreseeable development projects previously mentioned, including the potential for future developments in the 5,700 acre Dry Lake Solar Energy Zone and the neighboring solar study area, EPA supports incorporating mitigation strategies to reduce or minimize fugitive dust emissions. We also advocate minimizing disturbance to vegetation and soils as much as possible, so that the need for measures to reduce fugitive dust emissions is minimized or eliminated.

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[1] The Las Vegas area was recently designated a 'maintenance area' for the 2008 8-hour ozone standard; however, the 1997 nonattainment designation currently still applies.

Recommendations:

8 We commend BIA for including a number of the mitigation measures we previously proposed. Any approvals made by BIA for the project should also include a condition that the lessee incorporate the following measures into construction contracts. For more information on nonroad mobile sources and mitigation, see at http://www.epa.gov/nonroad.

- Maintain and tune engines per manufacturer's specifications to perform at verified standards applicable to retrofit technologies, where applicable.
- Employ periodic, unscheduled inspections to limit unnecessary idling and to ensure that construction equipment is properly maintained.
- Prohibit any tampering with engines and require continuing adherence to manufacturer's recommendations.
- If practicable, lease new, clean (diesel or retrofitted diesel) equipment. In general, commit to the best available emissions control technology. Tier 4 engines should be used for project construction equipment to the maximum extent feasible[2]. The FEIS should indicate the expected availability of Tier 3 and Tier 4 engines for the construction equipment list provided on page 4-33.
- Install wind fencing capable of maintaining natural hydrological flows and phase grading operations where appropriate, and operate water trucks for stabilization of surfaces under windy conditions.
- When hauling material and operating non-earthmoving equipment, prevent spillage and limit speeds to 15 miles per hour and speed of earth-moving equipment to 10 mph.

9 Discuss, in the FEIS, whether fugitive dust emission estimates during operations were quantified for any other sources than unpaved roads. Discuss the impact that grading and vegetation removal may have on fugitive dust during constructions and operations. Provide additional support for the statement that the panels themselves would shield the ground from prevailing winds so surface soils could be less disturbed by windy conditions (p. 4-25). Update construction and operations emissions tables to reflect estimated fugitive dust emissions that would result for on site grading and vegetation removal.

10 Evaluate and discuss, in the FEIS, the benefits of maximizing natural vegetation under a higher PV panel clearance option, and the benefits of minimizing grading, in reducing fugitive dust.

Biological Resources

The development of the project site, utilities and transmission corridor could result in the long-term loss of approximately 960 acres of foraging and nesting habitat for species including the endangered Mojave desert tortoise and a number of migratory birds (p. 4-47). Such loss could alter breeding behavior of the tortoise and add pressure to food resources and foraging habitat in neighboring areas. The Biological Assessment, included in Appendix N, indicates the project could result in the take of up to 357 desert tortoise eggs and up to 24 adult desert tortoise (p. 54).

Further, as the DEIS notes, water drawdowns could affect instream flows in the Muddy River, the sole habitat for the endangered Moapa dace (p. 4-42). The DEIS concludes that while the Moapa dace would

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[2] Diesel engines < 25 hp rated power started phasing in Tier 4 Model Years in 2008. Larger Tier 4 diesel engines will be phased in depending on the rated power (e.g., 25 hp - <75 hp: 2013; 75 hp - < 175 hp: 2012-2013; 175 hp - < 750 hp: 2011 - 2013; and ≥ 750 hp 2011- 2015).

not be directly affected by the construction or operation and maintenance of the proposed project, the groundwater withdrawals associated with the proposed project would indirectly affect the Moapa dace (p. 4-59).

We understand that the Biological Opinion for this project has not yet been finalized. The Biological Opinion will play an important role in informing the decision on the commitments, terms, and conditions that must accompany the project.

Recommendations:

The FEIS should provide an update on the ESA Section 7 consultation process, and any relevant documents associated with the process, including the Biological Opinion, should be summarized and included in an appendix.

Include, in the FEIS, results of discussions with US Fish and Wildlife Service (USFWS) of whether adequate desert tortoise movement corridors would result for each alternative. Discuss, in the FEIS, how resulting habitat connectivity corridors would be preserved in light of foreseeable projects, including potential future development in the immediately adjacent solar study area.

11 Mitigation and monitoring measures that result from consultation with USFWS to protect sensitive biological resources, including desert tortoise and Moapa dace, should be included in the FEIS and, ultimately, the ROD.

Discuss, in the FEIS, potential impacts to wildlife movement in the area under future climate change scenarios.

Discuss and identify in the FEIS, as appropriate, available lands for compensatory habitat mitigation for impacts to the desert tortoise for the proposed project, as well as reasonably foreseeable projects identified in the DEIS. Clarify how the reservation-wide desert tortoise management and conservation plan prepared for the K Road Moapa Solar project, and approved by the tribe, BIA and USFWS, will be utilized for this project.

Regarding impacts to birds, we were pleased to see the latest Avian Power Line Interaction Committee (APLIC) recommendations were referenced in the DEIS to prevent bird fatalities associated with transmission lines. As previously noted in our Administrative DEIS comments, the Bird and Bat Conservation Strategies (BBCS) document in Appendix O states that "there is no scientific evidence of fatality risks to birds associated with solar PV arrays" (p. 15). We are aware, however, that there have been a number of unexpected bird fatalities at the photovoltaic Desert Sunlight Solar Project in Riverside County, CA. It is possible that birds are mistaking the PV panels for water but information is preliminary. It is our understanding that these fatalities, as well as those at the Ivanpah Solar Electric Generating System site, are currently under investigation. We understand that the USFWS is starting to gather information for recommendations to reduce mortality. We appreciate the commitment in the BBCS that the applicant will monitor and document avian mortalities (p. 23).

Recommendation:

Include, in the FEIS, any appropriate adaptive management measures to respond to bird fatalities,
based on discussions with avian experts at the USFWS, as appropriate. Note that as part of the
12 avian mortality monitoring, USFWS may request that developers apply for a Special Purpose
Utility Permit (SPUT) that will allow developers to collect dead bird carcasses on the site for the
purposes of data collection and research. We recommend consulting with USFWS on this issue to

determine whether obtaining a SPUT permit is appropriate to include as a mitigation measure.
12 The permit application is available at:
http://www.fws.gov/pacific/migratorybirds/Permits/salvage.html.

<u>Additional Comments</u>

- According to the DEIS, one or two gen-tie transmission lines would be constructed based on the customer for the power generated at the site (p. 2-6). We note the proposed 230 kV line crosses a Federal Emergency Management Agency (FEMA) Flood Zone A area and, according to Figure 3-
13 8, does not appear to be routed through a designated utility corridor. Further, figure 3C in Appendix H shows numerous desert tortoise burrows were found right along the anticipated route of the 230 kV line. As possible avoidance of impacts to desert tortoise, we recommend that the FEIS consider alternative routing of the 230 kV line to the Harry Allen substation either through the existing Section 368 Utility Corridor or through the BLM Utility Corridor.

APPENDIX E – COMMENT / RESPONSE MATRIX

RESPONSES TO COMMENTS ON THE DRAFT EIS

Commentor	Comment ID	Comment Summary	Response	Location of Change in FEIS
D. Bradford Hardenbrook Supervisory Habitat Biologist Nevada Department of Wildlife Southern Region 4747 Vegas Drive Las Vegas, Nevada 89108	A - 1	The NDOW Gila monster protocol has been updated and can be accessed at: http://www.ndow.org/uploadedFiles/ndoworg/Content/Wildlife_Education/Publications/2012-Gila-Monster-Status-Identification-Reporting-Protocol-Observations.pdf	The reference to the NDOW Gila monster protocol has been updated. Also, language from the updated protocol has been incorporated into the FEIS.	This reference update was made in the FEIS to Chapter 8 and in Section 4.8.4.1.8 - Gila Monsters.
	A - 2	DEIS Volume 1 - Chapter 8, References, p. 8.3 - The Nevada Wildlife Action Plan has been updated and can be accessed at: http://www.ndow.org/Nevada_Wildlife/Conservation/Nevada_Wildlife_Action_Plan/	The reference to the Nevada Wildlife Action Plan has been updated.	This reference update was made to Chapter 8 of the FEIS.
	A - 3	DEIS Volume 2- Appendices, Appendix M, Raven Control Plan, List of Acronyms and Abbreviations NDOW - Nevada Division of Wildlife should be corrected to read: Nevada Department of Wildlife.	The List of Acronyms and Abbreviations has been corrected to read: Nevada Department of Wildlife.	This update was made to Appendix M of the FEIS.
	A - 4	DEIS Volume 2- Appendices, Appendix O, Bird and Bat Conservation Strategy (BBCS), p. 20 In addition to the USFWS 2007 Burrowing Owl guidance for pre-construction surveys, NDOW recommends utilizing the Arizona Fish and Game Department's "Burrowing Owl Project Clearance for Landowners." The document can be accessed at: http://www.azgfd.gov/pdfs/w_c/owl/burrowingowlclearanceprotocol.pdf	The Arizona Game and Fish Department's "Burrowing Owl Project Clearance for Landowners" has been added as an additional reference for preconstruction Burrowing Owl surveys.	This was added to Appendix O of the FEIS.
	A - 5	DEIS Volume 2- Appendices, Appendix O, Bird and Bat Conservation Strategy (BBCS), p. 23 NDOW address correction: Supervisory Habitat Biologist Nevada Department of Wildlife Southern Region 4747 Vegas Drive Las Vegas, NV 89108	The NDOW address has been corrected as indicated.	This was added to Appendix O of the FEIS.
Callee Butcher Manager, Land and Environmental Kern River Gas Transmission Company 2755 E. Cottonwood Parkway #300 Salt Lake City, UT 84121	B - 1	Kern River has reviewed the proposed MSEC project facilities described in the Draft Environmental Impact Statement (DEIS) and taken note of several locations in which those facilities would either run parallel to or intersect the existing Kern River right of way (ROW). To minimize encroachment conflicts and possible effects of high-voltage power transmission lines on its existing pipelines, Kern River would request that the Final Environmental Impact Statement (FEIS) directs MSEC to consult with Kern River during MSEC's final route selection and to respect Kern River's encroachment standards in locations where the two projects intersect.	MSEC will consult with Kern River during final design of their ROWs. This is required as part of the BLM ROW process and this commitment has been added to the FEIS.	This was added to Section 5.7 of the FEIS.
Valerie E. Simon Chief, Resources Management Bureau of Reclamation Lower Colorado Regional Office P.O. Box 61470 Boulder City, NV 89006-1470	C	We have reviewed the draft EIS and have no comments. Please maintain Reclamation on your project mailing list for future projects and reviews.	None required	NA
Edward L., LaRue, Jr., M.S. Ecosystems Advisory Council, Chairperson Desert Tortoise Council P.O. Box 1568 Ridgecrest, California 93556	D - 1	The project may directly impact up to 34 adult tortoises, 178 juvenile tortoises, and 357 eggs. The DEIS only vaguely refers to translocating tortoises onto other Reservation lands or lands managed by the Bureau of Land Management (BLM) without providing any specific locations, field studies, or data describing tortoise occurrence on those lands. Recipient tortoise population and habitats need to be surveyed and included in the impacts assessment.	The BO and FEIS indicate that the USFWS is not requiring the development of a desert tortoise translocation plan for this project. However, desert tortoises that are captured in the SPGF or associated infrastructure will be relocated in accordance with each individual's Service-approved disposition plan. Based on the project size and configuration, the furthest distance a desert tortoise may be relocated from the SPGF is 966 m (0.6 mile).	The updated BA is included in Appendix N of the FEIS and the BO is included as Appendix R in the FEIS. This is also described in Section 4.8.4.1.1.1 in the FEIS.
	D – 2	Is there an opportunity to co-locate one or both of the proposed transmission lines along the access road, and then follow the main transportation corridors? The proposed water pipeline alignment is situated alongside a dirt road. Is it possible to relocate the pipeline to either within this road or on contiguous lands devoid of vegetation?	The proposed 230kV line would follow the proposed access road for a portion of its length and then follows and existing transmission line and its access road for the remainder of its length. The proposed 500kV line would follow the alternative access road for a portion of its length. Also see response to comment F-13. The pipeline is proposed to be located as closely adjacent to the existing road as possible.	Additional information was added to the FEIS in Section 2.2.2.2 - Gen-Tie Transmission Line and Interconnections for clarification. In addition, the relationship of the transmission lines to the existing roads can be seen on Figures 2-1 and 2-16.

Commentor	Comment ID	Comment Summary	Response	Location of Change in FEIS
	D – 3	Has the proponent considered providing funds to the National Fish and Wildlife Foundation to implement regional management actions controlling common raven populations as additional mitigation?	The applicant would pay a remuneration fee to the Tribe and BLM based on acreage of disturbance of Tribal lands and BLM lands, respectively. The fees would be assessed at a rate to be determined by the Tribe, BLM, and USFWS who have to agree upon how the funds would be spent prior to initiation of consultation and this is included in the proposed action for the Biological Opinion. Funds would be used to implement conservation measures established in the Reservation-wide desert tortoise management and conservation plan being prepared and approved by the Tribe, BIA, and USFWS. The BIA and Tribe could consider providing funds to NFWF as a potential use of the remuneration fees.	No change made to the FEIS.
Rob Mrowka Center for Biological Diversity 4261 Lily Glen Ct. Las Vegas, NV 89032	E - 1	Concerned with the proposed location of the access road because it would travel through an undisturbed wash - prefer the alternative routing for the access road that would utilize an existing powerline maintenance road.	The proposed access road crosses the same washes also crossed by the alternative access road that follows the powerline maintenance road (as can be seen in Figures 2-1 and 2-16). Where the proposed access road crosses the largest wash in the area, it is following an existing road. Similar design and construction would be needed to build or upgrade the road at any wash crossing location in order to maintain drainage flows and for all-weather access.	No change made to the FEIS.
	E - 2	Concerned with the routing of the proposed 230kV Gen-Tie connection to the Harry Allen Substation that would cut across and disturb the Apex Dry Lake ecosystem – suggest re-routing the proposed line further to the south to avoid the impacts to the playa ecosystem.	The proposed 230kV route is the most direct path from the site to the Harry Allen Substation. All potential transmission routes from the solar site to Harry Allen and all existing ROWs in the area between the solar site and Harry Allen cross the Dry Lake Playa floodplain if not the playa habitat itself. The playa is not suitable desert tortoise habitat and routes outside the playa are located within potentially suitable desert tortoise habitat, so the development of longer alternatives to avoid the playa would result in greater potential impact to desert tortoise habitat (see response to F-13 below).	No change made to the FEIS.
	E - 3	Concerned over impacts to the Mojave desert tortoise which is protected as Threatened under the Endangered Species Act. The BIA must first look to ways to avoid impacts to desert tortoise, for example, by identifying and analyzing alternative sites outside of tortoise occupied habitat, areas that have already been severely disturbed by prior land use, or by employing the alternative solar energy strategy of distributed power. The BIA must also look at ways to minimize any impacts that it finds to be unavoidable, for example by requiring designs that minimize ground disturbances, limiting access roads, and provide for functional tortoise access across the site. Mitigation measures might include the acquisition of lands that would be perpetually managed for conservation, the funding of conservation management measures on federal lands, funding for the Desert Tortoise Conservation Center, or for tortoise research.	The DEIS analyzed alternative sites and the Proposed Action would result in the least amount of impacts to desert tortoise based on the low number of tortoises found on the site and the close proximity to the electrical grid which minimizes the length of transmission to the shortest possible length. Through a cooperative process informed by the Applicant-proposed conservation measures and the BA, the USFWS has developed a Biological Opinion (BO) that includes the required mitigation needed to reduce impacts to the desert tortoise.	The updated BA is included in Appendix N of the FEIS and the BO is included as Appendix R in the FEIS.
	E - 4	Any desert tortoise translocations must be accompanied by specific monitoring or research to study the effectiveness or success of the translocation relative to changes in land use, management, or environmental condition.	The BO and FEIS indicate that the USFWS is not requiring the development of a desert tortoise translocation plan for this project. However, desert tortoises that are captured in the SPGF or associated infrastructure will be relocated in accordance with each individual’s Service-approved	The updated BA is included in Appendix N of the FEIS and the BO is included as Appendix R in the FEIS. This is also described in Section

Commentor	Comment ID	Comment Summary	Response	Location of Change in FEIS
			disposition plan. Based on the project size and configuration, the furthest distance a desert tortoise may be relocated from the SPGF is 966 m (0.6 mile).	4.8.4.1.1.1 in the FEIS.
	E - 5	Consultation under the Endangered Species Act must consider climate change impacts, including the need for maintaining habitat linkages between current and future desert tortoise habitat.	While climate change could potentially affect local tortoise habitat, the exact timing and locations of habitat changes cannot be predicted. The development of this solar energy facility would result in a net reduction of carbon emissions by off-setting emissions from fossil-fuel fired generation resulting in a potential net positive impact on climate change. Linkages to viable habitat would be maintained around the solar site even after development of the Project	No change made to the FEIS.
	E - 6	The FWS has indicated that the revised Dry Lake SEZ is in an area that provides habitat and genetic connectivity between areas with greater habitat suitability. Given the MSEC adjacency to the Dry lake SEZ, it is highly likely that the project site could impose a significant barrier to future movement and gene flow between populations within the Northeastern Mojave Recovery Area, as well as with populations in other recovery areas.	The proposed solar facility would be constructed in Dry Lake Valley and the overall importance of this area to tortoise population connectivity and recovery is unknown. However, Dry Lake Valley has not been identified as a linkage corridor in current modeling so it is not anticipated that the proposed project would significantly modify current opportunities for desert tortoise connectivity.	Additional information was on connectivity was added to Section 4.8.4.1.1.1 in the FEIS.
	E-7	BIA should coordinate this NEPA process with the approval process for all of the connected actions including the transmission and water lines and substations that are proposed to serve this site. The BIA should consider together the additive impacts to biological resources, including the desert tortoise and its habitat, from the proposed solar project and from the other proposed projects in the area to ensure that the true extent of impacts are fully disclosed and analyzed. BIA should not treat this critical analysis as a cumulative impacts question alone. Because the currently proposed projects are linked and interdependent they should be evaluated together under NEPA.	The identified connected actions are included as part of the proposed Project and are included and quantified in the Project impact analysis. Other solar projects and other projects in the area are included in the cumulative impact analysis.	No change made to the FEIS.
Jeff Scott Director, Waste Management Division and Communities and Ecosystems Division US Environmental Protection Agency Region IX 75 Hawthorne Street San Francisco, CA 94105	F - 1	The final grading and drainage plans should be completed prior to project implementation to determine any needed adjustments in project design such as buffers for the seven ephemeral drainages identified to avoid the need for major human-made structures and long-term active maintenance. Provide more detail where berms would be used to direct surface flow around the project site and how berms would affect upstream and downstream hydrological conditions. Clarify, in the FEIS, the flow path of exterior storm water flow, and summarize modeled impacts (hydraulics of flow, velocity, sediment transport, sediment delivery and potential stream channel changes) of diverting drainages. Quantify the acreages to be graded under each alternative. Demonstrate that downstream flows would not be adversely impacted due to any proposed changes to natural washes resulting from proposed grading, drainage management measures or the addition of retention ponds.	Final grading and drainage plans will be completed and submitted for approval prior to construction. Berms would be developed on the upstream side of the project site to direct off-site flow through or around the site via the retained drainages. The paths for all stormwater flows would be identified and modeled as part of the final grading and drainage plan. This commitment has been included in the FEIS. The entire 850-acre site would be graded for the CSP alternatives. The final acreage of grading for the prosed PV project (less than 850 acres) would be determined as part of the final grading and drainage plan. This plan would demonstrate any potential changes to the downstream washes. The current and proposed flows enter the closed Dry Lake Playa less than a mile downstream of the solar site.	This was added to Section 5.2 of the FEIS. This was added to Section 5.2 of the FEIS. No change made to the FEIS.
	F - 2	Include an adaptive management plan in the FEIS, including the criteria to be used to evaluate effectiveness of the erosion and sedimentation control measures and what modifications are available to address typical problems – for example if excessive erosion or sedimentation is observed. Include, in	Appendix E of the DEIS (Draft MSEC Restoration and Revegetation Plan) includes monitoring and corrective actions associated with reclamation and revegetation	The commitment to add permanent channel monitoring stations was added

Commentor	Comment ID	Comment Summary	Response	Location of Change in FEIS
		the FEIS, permanent sediment and channel elevation monitoring stations to be established to assist in the adaptive management of erosion and sedimentation.	measures. As indicated, implementation of these measures would be covered by a bond. In coordination with the grading and drainage plans developed prior to construction, two separate SWPPPs would be developed for each project component (one for construction and one for operations) that will also incorporate adaptive management of actions if erosion and sedimentation control measures are found to be insufficient (as indicated in Chapter 5 – Mitigation). These plans will be based on the final Project design. Permanent channel monitoring stations would be incorporated into the final SWPPPs and this commitment has been added to the FEIS.	to section 5.2 of the FEIS.
	F - 3	To ensure avoidance and to minimize direct and indirect impacts to ephemeral drainages, EPA recommends that the FEIS: • Evaluate and commit to maximizing the retention of ephemeral drainages that can remain stable with project operation. Describe how the design flexibility of the proposed photovoltaic (PV) system technology has been used to site solar arrays outside of natural drainage areas. Solar arrays close to drainages could be installed using deeper support posts to help ensure they remain stable in the event the adjacent channel moves. • Clarify that the types of' facilities covered by the proposed mitigation measure "placing project facilities in washes would be avoided by all alternatives" (p. 5-2) would include all solar PV structures and supports, as well larger ancillary facilities on the site. • Evaluate and commit to minimizing the number of road crossings over washes and designing necessary crossings to provide adequate flow-through during storm events. • Consider co-locating the proposed access road in an existing utility corridor, or along a proposed transmission line, to avoid crossing the major drainage to the south of the project site. • Discuss the benefits of maintaining some or all of the ephemeral washes, including preserving important habitat, retaining ephemeral wash functions, potentially reducing erosion, reducing construction costs, and improving the implementation and success of closure plans after the site is retired from operation.	These will be added as mitigation measures in the FEIS. As part of the minimization of grading in the final design, ephemeral drainages would be avoided to the extent practical. All larger ancillary facilities will be located outside of drainages. Some PV supports may be placed within ungraded drainages if technically feasible. The number of road crossings would be minimized and would be designed to accommodate adequate flow. The proposed access road does follow the proposed transmission line south of the site (see Figure 2-1 in the EIS). Additional discussion of these benefits has been added to the FEIS.	These commitments were added to section 5.2 of the FEIS. This has been added to Section 4.5.2.1.
	F - 4	The FEIS should evaluate mounting PV panels at sufficient height above ground, utilizing the telescoping legs of the proposed solar modules, to maintain vegetation and minimize drainage disturbance. Quantify acreage of natural vegetation and soil that would not require clearing and grading as a result of using telescoping legs. Compare these results to existing alternatives, and incorporate project design changes into site design and conditions of certification, accordingly.	The PV panels will be mounted at a height sufficient to avoid conflict with existing vegetation in areas where no grading is planned. These acreages would be determined as part of the final grading and drainage design.	Additional clarifying language was added in the FEIS to Section 2.2.3.1.1 - Grading / Site Preparation.
	F - 5	Describe, in the FEIS, where permanent fencing will be used and the potential effects of fencing on drainage systems. Ensure that the fencing proposed for this project will meet appropriate hydrologic performance standards.	As indicated in the DEIS (p. 2-5), the entire solar site would be fenced with a minimum 8-foot tall, chain link metal-fabric security fencing with 1-foot barbed wire or razor wire on top. No other areas outside the site perimeter would contain any permanent fencing. Where fencing would be built across drainages, breakaway fencing would be installed and would be designed to avoid interference with flows through those drainages. Breakaway fencing would	The commitment to use break-away fencing where crossing drainages was added to Section 5.2 of the FEIS.

Commentor	Comment ID	Comment Summary	Response	Location of Change in FEIS
			be inspected and repaired as needed within 48 hours of large flood events. An additional mitigation measure with this commitment has been added to the FEIS.	
	F - 6	Include in the FEIS additional discussion of the cumulative effects on groundwater for all alternatives, including wet-cooled concentrated solar power (CSP) alternatives. Incorporate a discussion of the additive effects from climate change, more detail on future pumping scenarios from the DOI study, and estimates for water usage for reasonably foreseeable projects. Address, in the FEIS, what mitigation measures would be taken, and by whom, should groundwater resources in the basins become overextended to the point that further curtailment is necessary due to, for example, additional growth, the influx of large-scale solar projects (including in the neighboring solar energy study area), drought, climate change, or the utilization of existing or pending water rights in the basin.	Additional information has been included for cumulative impacts to groundwater. The potential for groundwater resources in the area to be impacted by cumulative projects withdrawing water from the local aquifers was the driver for development of a Memorandum of Agreement (MOA) and the *Intra-Service Programmatic Biological Opinion* (PBO) for the Moapa dace. This MOA and PBO was developed through intra-service consultation and identifies the monitoring and mitigation measures that must be undertaken to address the potential impacts from cumulative groundwater withdrawals.	This additional information has been added to Section 4.15.4.3 in the FEIS addressing cumulative impacts to water resources. Detailed information on the MOA and PBO is included in Section 4.8.4.1.2 in the EIS. Cross-reference to this information has been added to Section 4.15.4.3 in the FEIS.
	F - 7	Discuss in the FEIS the technical feasibility of eliminating periodic washing of solar panels, and consider adopting, as a condition of certification in the FEIS and Record of Decision, that water will not be used for panel washing. Describe any measures that will be used to clean the solar panels, if applicable. Provide a quantitative breakdown for operational water usage in the FEIS.	The decision on PV panel washing is generally a trade-off of the costs / benefits of panel performance versus water use. Some owners, operators, and customers choose to emphasize performance and others choose to minimize water use. It is necessary to preserve the option for panel washing so that potential customers can provide input on the associated trade-offs. Under any circumstances, the Project would minimize the amount of washing to minimize the associated water use and the associated costs. Up to 65% percent of the water used during operations could be used for cleaning panels. The remainder would be used for potable uses and other operational uses such as dust control.	No change made to the FEIS. This has been added to the FEIS in Section 2.2.2.2.3 - Water Use.
	F - 8	Any approvals made by BIA for the project should also include a condition that the lessee incorporate the following measures into construction contracts. For more information on non-road mobile sources and mitigation, see at http://www.epa.gov/nonroad . • Maintain and tune engines per manufacturer's specifications to perform at verified standards applicable to retrofit technologies, where applicable. • Employ periodic, unscheduled inspections to limit unnecessary idling and to ensure that construction equipment is properly maintained. • Prohibit any tampering with engines and require continuing adherence to manufacturer's recommendations. • If practicable, lease new, clean (diesel or retrofitted diesel) equipment. In general, commit to the best available emissions control technology. Tier 4 engines should be used for project construction equipment to the maximum extent feasible. • The FEIS should indicate the expected availability of Tier 3 and Tier 4 engines for the construction equipment list provided on page 4-33. • Install wind fencing capable of maintaining natural hydrological flows and phase grading operations where appropriate, and operate water trucks for stabilization of surfaces under windy conditions.	The commitment to incorporate these measures into the Project's construction contracts has been included in the FEIS.	These measures are included Section 5.3 of the FEIS.

Commentor	Comment ID	Comment Summary	Response	Location of Change in FEIS
		• When hauling material and operating non-earthmoving equipment, prevent spillage and limit speeds to 15 miles per hour and speed of earth-moving _equipment to 10 mph.		
	F - 9	Discuss, in the FEIS, whether fugitive dust emission estimates during operations were quantified for any other sources than unpaved roads. Discuss the impact that grading and vegetation removal may have on fugitive dust during constructions and operations. Provide additional support for the statement that the panels themselves would shield the ground from prevailing winds so surface soils could be less disturbed by windy conditions (p. 4-25). Update construction and operations emissions tables to reflect estimated fugitive dust emissions that would result for on-site grading and vegetation removal.	The FEIS has been updated to more specifically identify emission sources associated with the three phases of the project including operations. Clarification has been added to better describe the effects of fugitive dust from grading and vegetation removal. Additional information and reference was included as to how the panels could act as a wind-break. Grading and vegetation removal was included in the fugitive dust calculations included in the DEIS and text was added in the FEIS to make this more clear.	Sections 4.6 and 4.6.2.1 in the FEIS were updated to provide the needed clarifications.
	F - 10	Evaluate and discuss, in the FEIS, the benefits of maximizing natural vegetation under a higher PV panel clearance option, and the benefits of minimizing grading, in reducing fugitive dust.	The benefits of minimizing grading for reducing fugitive dust has been included in the air quality section of the FEIS.	This has been added to Section 4.6.2.1 in the FEIS.
	F - 11	The FEIS should provide an update on the ESA Section 7 consultation process, and any relevant documents associated with the process, including the Biological Opinion, should be summarized and included in an appendix. • Include, in the FEIS, results of discussions with US Fish and Wildlife Service (USFWS) of whether adequate desert tortoise movement corridors would result for each alternative. Discuss, in the FEIS, how resulting habitat connectivity corridors would be preserved in light of foreseeable projects, including potential future development in the immediately adjacent solar study area. • Mitigation and monitoring measures that result from consultation with USFWS to protect sensitive biological resources, including desert tortoise and Moapa dace, should be included in the FEIS and, ultimately, the ROD. • Discuss, in the FEIS, potential impacts to wildlife movement in the area under future climate change scenarios. • Discuss and identify in the FEIS, as appropriate, available lands for compensatory habitat mitigation for impacts to the desert tortoise for the proposed project, as well as reasonably foreseeable projects identified in the DEIS. Clarify how the reservation-wide desert tortoise management and conservation plan prepared for the K Road Moapa Solar project, and approved by the tribe, BIA and USFWS, will be utilized for this project.	The updates resulting from the determinations made by the USFWS under the ESA Section 7 consultation process are included in the FEIS as are the final BA and BO. The USFWS only analyzes the proposed action in the BO and not any of the other alternatives that are discussed in the EIS.	The updated BA is included in Appendix N of the FEIS and the BO is included as Appendix R in the FEIS.
	F - 12	Include, in the FEIS, any appropriate adaptive management measures to respond to bird fatalities, based on discussions with avian experts at the USFWS, as appropriate. Note that as part of the avian mortality monitoring, USFWS may request that developers apply for a Special Purpose Utility Permit (SPUT) that will allow developers to collect dead bird carcasses on the site for the purposes of data collection and research. We recommend consulting with USFWS on this issue to determine whether obtaining a SPUT permit is appropriate to include as a mitigation measure. The permit application is available at: http://www.fws.gov/pacific/migratorybirds/Permits/salvage.html .	Updates to the BBCS have been made in response to USFWS review comments. Following consultation with USFWS, it is expected the Applicant would apply for a SPUT prior to the initiation of construction of the Project.	The updated BBCS is included in Appendix O of the FEIS.
	F - 13	We note the proposed 230 kV line crosses a Federal Emergency Management Agency (FEMA) Flood Zone A area and, according to Figure 3-8, does not appear to be routed through a designated utility corridor. Further, figure 3C in Appendix H shows numerous desert tortoise burrows were found right along the anticipated route of the 230 kV line. As possible avoidance of impacts to desert tortoise, we recommend that the FEIS consider alternative routing of the 230 kV line to the Harry Allen substation either through the existing Section 368 Utility Corridor or through the BLM Utility Corridor.	The proposed 230kV route is the most direct path from the site to the Harry Allen Substation. All potential transmission routes to Harry Allen would cross Flood Zone A (associated with the Dry Lake Playa). The desert tortoise burrows shown on Figure 3C in Appendix H are in the area near the Harry Allen Substation where the line is within the utility corridor. This southern portion of the line has recently been rerouted and updated desert tortoise survey information has been included in an updated survey report	The updated BA is included in Appendix N of the FEIS and the BO is included as Appendix R in the FEIS.

Commentor	Comment ID	Comment Summary	Response	Location of Change in FEIS
			and the final BA and will be incorporated into the USFWS' BO and the FEIS. All areas outside the playa contain potentially suitable desert tortoise habitat and would be expected to contain burrows and other tortoise sign while the playa itself is not suitable desert tortoise habitat. Therefore, other routes to Harry Allen would be longer (approximately 9.6 miles vs 7.3 miles for the proposed route) and would be likely to have more impacts to desert tortoise habitat (approximately 84.4 acres vs 50.4 acres for the proposed route) and to the desert tortoise.	

Appendix R

Biological Opinion

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

Date: January 21, 2014
File No. 2013-F-0301 &
1-5-05-FW-536, Tier 6

Memorandum

To: Superintendent, Southern Paiute Agency, Bureau of Indian Affairs, St. George, Utah

From: State Supervisor, Nevada Fish and Wildlife Office, Reno, Nevada

Subject: Biological Opinion for the Res Americas Moapa Solar Energy Center, Moapa River Indian Reservation, Clark County, Nevada

This transmits the Fish and Wildlife Service's (Service) biological opinion for the Res Americas Moapa Solar Energy Center. The Bureau of Indian Affairs (BIA) and Bureau of Land Management (BLM) determined that the proposed approval of a lease for the project by BIA on the Moapa River Indian reservation and issuance of a right-of-way grant by BLM for the subject project on BLM-administered lands may adversely affect the Mojave desert tortoise (*Gopherus agassizii*), a species listed as threatened under the Endangered Species Act of 1973, as amended (Act; 16 U.S.C. 1531 *et seq*.). The Moapa dace (*Moapa coriacea*), a species listed as endangered under the Act, may be adversely affected by groundwater withdrawal required for the project. No critical habitat will be adversely affected by the project.

The attached biological opinion is based on information provided in your memorandum dated August 1, 2013; November 2013 biological assessment for the project; January 30, 2006, programmatic biological opinion (File No. 1-5-05-FW-536); discussions and electronic transmissions among the Service, BIA, consultants, and BLM; desert tortoise survey reports from 2011 and 2013; *Draft Environmental Impact Statement, Moapa Solar Energy Center, August 2013*; and our files. A complete project file of this consultation is available in the Service's Nevada Fish and Wildlife Office in Las Vegas.

If you require additional assistance, please contact Susan Cooper in the Nevada Fish and Wildlife Office in Las Vegas at (702) 515-5230. Please reference File No. 84320-2013-F-0301 in future correspondence concerning this consultation.

Edward D. Koch

Edward D. Koch

cc:
Chairman, Moapa Band of Paiutes, Moapa, Nevada
Supervisory Biologist - Habitat, Nevada Department of Wildlife, Las Vegas, Nevada
Assistant Field Office Manager, Renewable Resources, Bureau of Land Management, Field Office, Las Vegas, Nevada
Amy Heuslein, Bureau of Indian Affairs, Western Region, Phoenix, Arizona

ATTACHMENT

BIOLOGICAL OPINION
FILE NO. 84320-2013-F-0301

CONSULTATION HISTORY

On January 20, 2006, the Fish and Wildlife Service (Service) concluded intra-Service consultation and issued a programmatic biological opinion (PBO) (File No. 1-5-05-FW-536) for execution of the *Proposed Muddy River Memorandum of Agreement (MOA) Regarding the Groundwater Withdrawal of 16,100 acre-feet per year (afy) from the Regional Carbonate Aquifer in the Coyote Spring Valley and California Wash Basins and Establishment of Conservation Measures for the Moapa Dace, Clark County, Nevada.* As the sole Federal signatory to the MOA, the Service would carry out actions and commitments in the MOA that may adversely affect the federally listed as endangered Moapa dace (*Moapa coriacea*). The Service anticipated that all future Federal actions and formal consultations that involve withdrawal of groundwater under the MOA be tiered to the PBO; therefore, this consultation is tiered to the 2006 PBO.

On April 8, 2010, the Service met with the Moapa River Band of Paiutes (Tribe), Bureau of Indian Affairs (BIA), Bureau of Land Management (BLM), and Res Americas or Moapa Solar LLC (Applicant) to discuss the proposed solar project. During the meeting, various options for environmental compliance were discussed including section 7 consultation through the BIA and the Tribe's Section 17 Corporate Charter.

On May 7, 2012, the Service received a request from the BIA to be a cooperating agency for the development of issues and alternatives, and to assist in the document review process for the Environmental Impact Statement for the project. On July 26, 2012, the Service sent a letter to the BIA confirming cooperation consistent with respective authorities of the Endangered Species Act, Fish and Wildlife Coordination Act, Migratory Bird Treaty Act, and Bald and Golden Eagle Protection Act, along with other appropriate laws and administrative guidance pertinent to the Department of the Interior.

On April 4, 2013, the BIA provided a draft biological assessment to the Service for review. The Service reviewed the document and provided final comments to BIA on July 25, 2013.

On August 5, 2013, the Service received the BIA's request for consultation and a final biological assessment for the proposed solar project. The Service determined that the information was sufficient and initiated formal consultation on that date.

On September 11, 2013, the BIA and BLM informed the Service that an adjustment to the transmission line route would need to be made, for which new desert tortoise surveys would be conducted, and the biological assessment would be revised. The Service received the revised final biological assessment from the BIA on November 13, 2013, and formal consultation was resumed on that date.

DESCRIPTION OF THE PROPOSED ACTION

Moapa Solar LLC (Applicant) has entered into an agreement with the Tribe to lease land and obtain rights-of-way, for up to 30 years, on the Moapa River Indian Reservation (Reservation), Clark County, Nevada, for the purposes of constructing and operating the Moapa Solar Energy Center (MSEC), a solar generating facility and associated infrastructure (Figure 1). Because the BIA has a jurisdictional trust responsibility over Indian lands and the BLM has land management responsibilities under FLPMA, the proposed project is a major Federal action and compliance under the National Environmental Policy Act of 1969 is required. The Tribe, BLM, U.S. Environmental Protection Agency (EPA), and National Park Service are cooperating agencies on the proposed project.

The proposed project would utilize photovoltaic (PV) technology and also would include a site access road, two gen-tie transmission lines, and a water pipeline (Table 1). The MSEC would have impacts to resources on the Reservation and on BLM land. The solar generation facility, water pipeline, and parts of the other linear facilities would be within the Reservation (Figure 1). Two transmission lines (230 kV and 500 kV) and an access road, all requiring Rights-of-Way (ROW) grants would occur on lands managed by the BLM. The solar power generation facility (SPGF) site would include the PV-solar field, an office and maintenance building, parking area, lay-down area, switchyard, and a wastewater evaporation and detention pond. Controlled access gates would be located at the SPGF entrance. Permanent desert tortoise exclusionary fencing would also be installed around the perimeter of the SPGF.

Table 1 – Habitat disturbance associated with the proposed action.

Project Component		Tribal Lands	BLM	Total Impacts (acres)
		Habitat Disturbance (acres)		
Solar Site		**847.4**	**0.0**	**847.4**
230kV Gen-Tie	230kV Pole Structures	**0.1**	**7.2**	**7.3**
	230kV 12ft Road	**0.1**	**8.4**	**8.5**
	230kV Construction Area	**0.0**	**30.0**	**30.0**
	230kV Pull Site	**0.0**	**4.6**	**4.6**
500kV Gen-Tie	500kV Pole Structures	**1.1**	**0.2**	**1.3**
	500kV 12ft Road	**1.7**	**0.4**	**2.1**
	500kV Construction Area	**5.5**	**0.9**	**6.4**
	500kV Pull Site	**6.8**	**0.0**	**6.8**
Proposed Access Road		**0.7**	**14.4**	**15.0**
Water Pipeline		**22.1**	**0.0**	**22.1**
PROJECT TOTALS		**885.4**	**66.1**	**951.5**

PROJECT COMPONENTS

Solar Field

The proposed project would be up to 200 MW in size and would utilize crystalline silicon or thin-film PV panels that would be mounted on single-axis trackers. Using single-axis trackers, the panels will be oriented in north-south rows with the panels moving to track the sun as it moves across the sky during the day. The highest point on the single axis-trackers would be about 6 to 12 feet occurring during the morning and evening hours when the panels are tilted to face the rising or setting sun. This is based on a 2 or 3-panel mounting system. The degree of tilt will change over the course of each day for the single-axis trackers. The PV units will be mounted on driven pile foundations to support the panel mounting system. The electrical equipment (inverters and transformers) will be in enclosures or covered by shade structures approximately 8 to 10 feet high.

The MSEC will also include one or more small meteorological monitoring stations to track solar insolation, temperature, wind direction, and speed. These stations will have a height of approximately 10 feet.

Operations and Maintenance Area

An Operations and Maintenance (O&M) building would be constructed on the site that would contain administrative offices, parts storage, a maintenance shop, plant security systems, and plant monitoring equipment with adjacent worker parking. The O&M building would likely consist of one or more single story buildings with a maximum height of approximately 18 feet. The building will have exterior lighting on motion sensors and will have fire and security alarms.

Water Use and Supply

During construction, up to 50 afy of water are estimated to be used for a total of 100 acre feet of water during construction. During operations, the MSEC would use up to 30 afy of water for a total of up to 750 acre feet of water over a 25-year period. The water supply required for the MSEC would be leased from the Tribe and provided from the Tribe's existing production wells on the Reservation located about 5.4 miles northeast of the SPGF. This well is located in the California Wash Basin of the Arrow Canyon Range Cell of the Carbonate-Rock Aquifer. Water would be delivered to the SPGF via a 5.4-mile underground water pipeline located on Reservation lands, but of which approximately 4.7 miles occurs within an existing utility corridor managed by the BLM. The water pipeline would be 8 to 12 inches in diameter and would be buried 3 to 6 feet below the ground surface.

Wastewater Management

The project would generate wastewater streams including neutralized wastewater from the ion exchange pretreatment system. Processed wastewater would be piped to lined, evaporation ponds that would be located within the fenced SPGF site. The ponds will be sized to retain all solids generated during the life of the Project. However, if required for maintenance, dewatered residues from the ponds will be sent to an appropriate offsite landfill as non-hazardous waste. The evaporation pond would cover up to 5 acres and would be located entirely within the fenced area of the SPGF. The evaporation ponds would be designed to minimize the amount of discharge and to provide best management and control of the discharge. Ponds would be covered with bird-proof netting.

Access Roads

The MSEC would require vehicular access for construction, operation, and maintenance. A 2.5-mile gravel access road would be constructed on BLM-managed lands to connect the SPGF to the existing paved frontage road adjacent to I-15. From the existing paved frontage road west of I-15, the proposed site access road would follow an existing dirt road for approximately 2.0 miles until it reaches the proposed 230-kV gen-tie transmission line ROW, which it would then follow approximately 0.5 mile north to the SPGF site (Figure 1). The Applicant has requested a 100-foot-wide ROW so the existing road can be straightened if needed in some places. The access road would be designed to accommodate equipment deliveries, the construction workforce, and, ultimately, the operational needs of the Project. The roadway section would consist of two travel lanes, 24 feet wide with 5-foot shoulders and drainage swales on either side.

Transmission Lines

Construction of a new gen-tie transmission line is required to deliver the power generated by the SPGF to the electrical grid. Two gen-tie transmission lines, a 230 kV and a 500 kV, would be constructed within a 150-foot wide ROW (Figure 1). Transmission line design would be consistent with recommendations for reducing negative impacts of power lines on birds (APLIC 2006, 2012). The steel monopole type of transmission structures would be used for both the 230-kV line and the 500-kV line and would range in height from 60 feet to 100 feet. The gen-tie lines would consist of approximately 7.3 miles of single-circuit 230-kV overhead transmission line from the SPGF to the Harry Allen 230-kV Substation, of which 6.9 miles occurs on BLM-managed land; and approximately 1.6 miles of single-circuit 500-kV overhead transmission line from the SPGF to the 500-kV Crystal Valley Substation, of which 0.4 mile occurs on BLM-managed land.

SPGF CONSTRUCTION

All necessary permits for rights-of-entry would be obtained from the BLM or the Tribe, accordingly, before any survey work for siting construction areas and other project components would be initiated. Construction of the SPGF, from site preparation and grading to commercial operation, is expected to take up to 24 months. Prior to construction, the following would be surveyed and staked: SPGF site; right-of-way boundaries; locations of proposed facilities; centerlines of linear features, including access roads. Following site survey and marking, field surveys would be conducted to determine the presence of cultural resources and special-status species within potentially affected areas.

Once surveys have been completed, vegetation would be removed from the SPGF site where needed prior to grading. This removed vegetation would be handled in accordance with a plan prepared in consultation with the Tribe and BIA and would either be hauled off-site for disposal or possibly used to create wildlife habitats on off-site lands.

The SPGF site would be graded, as needed, to facilitate the construction and operation of the PV tracking system. Any needed grading would take advantage of the existing slope of the site, while eliminating any abrupt grade changes. Where grading is not needed, vegetation would be trimmed or mowed, if needed, to allow installation and operation of PV tracking system. This would allow those areas to retain the local undisturbed soil surface and local drainage. The final grading and drainage plan would be in compliance with all applicable storm water standards and best management practices for erosion control.

Onsite roads would be surfaced with asphalt, aggregate base, or left surfaced with the native soil and treated with a dust palliative. Only BLM-approved palliatives would be used. The roads where heavy use is expected would be surfaced with asphalt; the primary roads within the solar fields would be surfaced with aggregate base; and the secondary roads within the solar fields would be graded native soils treated with dust palliative to minimize dust.

There is currently little traffic on any of the roads bordering or in the immediate vicinity of the project. The use on these roads is associated with the nearby energy infrastructure in the area. Daily trip generation during construction of the project would be generated by delivery of equipment and supplies and the commuting of the construction workforce. The number of workers expected on the site during construction of the Project would vary over the construction period and is expected to average up to approximately 300 each day, generating about 100 daily round trips. Deliveries of equipment and supplies to the site would also vary over the construction period but are expected to average about 10 to 20 daily trips. All project-related parking would be onsite during construction, moving within the solar field as it is developed.

Gen-Tie Construction

It is estimated that construction of the transmission lines would occur over a period of approximately 4 to 6 months. Mobile construction equipment access would be required at each transmission structure. The project would use a combination of new and existing access roads, and spur roads to place construction equipment at each structure.

To access the ROW, construction vehicles would use the existing access road off the existing paved unnamed frontage road adjacent to I-15 going to the Harry Allen and Crystal Substations. This primary access road is maintained by NV Energy and minimal to no improvements would be necessary to facilitate gen-tie construction.

Existing secondary access roads would be used to access the ROW where possible. Once within the ROW, spur roads may be used to access structure locations. The secondary access and spur roads are not routinely maintained and at some locations may require minimal improvements. Typical improvements would consist of minor grading and possibly limited addition of road base or rock in areas to allow safe vehicle travel. If used, spur roads would be staked and flagged. To the extent possible, drainages would be crossed at grade. Standard road design techniques such as installing water bars and dips to control erosion may be used in sloped areas as necessary.

Geotechnical Testing

Prior to final design of the lines, analysis of soil borings must be conducted along the proposed gen-tie line alignments to establish the design parameters for structural foundations. Up to ten test locations would occur at proposed structure locations mostly on BLM land. The testing process would involve survey staking each test location by a one- or two-person survey crew using a standard light-duty pickup truck. Test locations would be marked with wooden stakes and flagged. Once marked, a two- or three-person drilling crew would collect samples using a truck-mounted drill rig at various depths along the boring. Each boring would be approximately 6 inches in diameter and 50 feet deep and would be analyzed to determine soil classification, moisture content, density, depth to groundwater, and other characteristics.

Work areas surrounding each geotechnical boring location would be confined to a 30 by 40 foot area. After each test boring is completed, the spoil will be hand-backfilled into the boring hole and lightly compacted. After backfill, the test location will be smoothed and hand-graded as necessary to return the area to the pre-test grade.

Structure Site Clearing

Forty-seven structure locations requiring an approximately 160 by 200 foot work area for each structure would be needed for the 230 kV line. Eight structure locations requiring an approximately 200 by 200 foot work area would be required for the 500 kV line. Vegetation at each structure location and work area would be cleared only to the extent necessary as required to maintain safe working conditions at each location. Grading would not be conducted unless needed to provide a safe work area for equipment. Following construction, surface disturbance at work areas and structure locations on BLM-administered lands would be rehabilitated using seed mixtures and techniques developed in consultation with BLM. Surface disturbance on Tribal lands would be rehabilitated according to Tribal specifications. Permanent surface disturbance at structure locations would be minimized.

Temporary Work Areas

Transmission line construction would require several types of temporary work areas for material storage, construction staging, equipment laydown, transmission structure installation, and conductor pulling and tensioning. After completing construction, temporary work areas on BLM-administered lands would be rehabilitated using seed mixtures and techniques developed in consultation with BLM. Noxious weed control would continue onsite during the rehabilitation process according to the specifications stipulated by BLM. Temporary work areas located on Tribal lands would be rehabilitated according to Tribal specifications.

Access Road Construction

The proposed access road would include upgrades to existing roads and development of new sections of road. The existing roads would be widened, and sections of new road would be constructed using a bulldozer or grader. Front-end loaders would be used to move the soil locally. The road surface would be widened or developed to 24 feet, and a 5-foot shoulder would be constructed on each side to facilitate drainage.

Following grading, the surface 12 inches of the subgrade of the road would be scarified and moisture-conditioned and compacted by a roller to compact and smooth the ground surface. Approximately 14 inches of Class 2 road base would be placed above the compacted subgrade and it also would be moisture-conditioned and compacted.

After project construction, this upgraded permanent access road would be used to provide access to the SPGF and also continue to be used by the existing road users who have ROWs from the BLM. The installation of culverts and other road improvement amenities would be reviewed and addressed on a site-by-site basis.

Disturbed areas where vegetation was removed during construction activities and that are no longer needed for future operation and maintenance would be restored in a manner consistent with BLM and Tribal requirements to encourage natural revegetation.

Transmission Structure Hauling, Assembly, and Erection

Conventional construction methods would be used to haul, assemble, and erect the transmission structures. Trucks would be used to transport materials to each structure location. Structure materials would include transmission poles, steel cross arms, insulators, hardware, and stringing sheaves. Steel structures would be assembled onsite and hoisted into place with a crane.

OPERATION AND MAINTENANCE

Operation and maintenance activities associated with the MSEC are minimal. The MSEC is expected to require up to 20 personnel during operations. No heavy equipment would be used during normal plant operation. Operation and maintenance vehicles would include trucks (pickups, flatbeds, and dump trucks), forklifts, and loaders for routine and unscheduled maintenance, and occasionally water trucks for solar panel washing. Large heavy-haul transport equipment may be brought to the site infrequently for equipment repair or replacement.

DECOMMISSIONING

The project would operate at a minimum for the life of its Power Purchase Agreement or other energy contracts. It is possible, because much of the needed electrical infrastructure would have been developed, the SPGF would continue to be upgraded and used to generate solar energy even beyond the term of the initial energy purchase agreements. Therefore, the SPGF site could remain in solar energy production for the foreseeable future. If the MSEC were to be decommissioned, the solar field, support structures, and electrical equipment would be removed from the SPGF site, and the site would be revegetated with native species to a condition similar to the original condition in accordance with a restoration and revegetation plan that would be developed in the future.

CONSERVATION MEASURES AND MONITORING

The following sections summarize BIA, BLM, and Applicant-proposed measures to avoid, minimize, or compensate for the potential impacts of the Proposed Action on federally listed species. The Applicant proposes to provide construction monitoring under the direction of biologists approved by the Service. The biologists would be given authority to supervise the functions listed below.

1. Oversee establishment and functionality of sediment control devices as outlined in the Storm Water Pollution Prevention Plan. Ensure that Best Management Practices (BMPs) are in place and working properly on a weekly basis.
2. Awareness training for desert tortoise would be provided to everyone onsite and performed by qualified personnel only.
3. Biologists would monitor the construction activities daily during the initial site disturbance (including installation of temporary and permanent desert tortoise exclusion fencing) and at weekly intervals after all tortoises have been removed from the site. Biologists shall be onsite daily to respond to tortoise issues. Exclusionary fencing would be checked monthly and after any substantial rain event to ensure that they are effective barriers for desert tortoise.
4. Implement controls at entry locations to facilitate weed management and invasive species control in order to minimize infestation within the project area from an outside source. Trucks and other large equipment would be randomly checked before entering the site for any invasive species debris or seed.
5. A permanent perimeter of tortoise-exclusionary fencing will be constructed around the solar facility boundary. Pre-construction clearance surveys to remove tortoises from the construction area will be conducted following Service protocol (2010). Construction of the exclusionary fence will be monitored by a qualified biologist in order to eliminate impacts to tortoise burrows or live tortoises. The fence shall be maintained in accordance with Service standards. Tortoise guards shall be placed at all road access points, where desert tortoise-proof fencing is interrupted, to exclude desert tortoises from the road and solar facility.
6. Biological monitors to monitor the various construction crews in the active construction areas will be assigned until 100-percent tortoise clearance is confirmed. Biological monitoring will also occur during access road improvements and gen-tie and water pipeline construction in occupied desert tortoise habitat.
7. The Applicant will pay a fee based on acreage of disturbance to the Tribe for disturbance of Tribal lands and to the BLM for disturbance of BLM lands. The fees will be assessed at a rate to be determined by the Tribe, BLM, and Service. The Tribe, BLM, and Service have agreed that the funds will be used to implement conservation measures established in the Reservation-wide desert tortoise management and conservation plan prepared for the K Road Moapa Solar Project and approved by the Tribe, BIA, and Service.
8. A biological monitor will be present during maintenance activities if occurring outside of the perimeter fence. Pre-maintenance clearance surveys followed by temporary

exclusionary fencing may also be required in desert tortoise habitat if the maintenance action requires ground or vegetation disturbance.

9. Speed limits within the project area will be restricted to less than 25 miles per hour (mph) during construction and operation. Speed limit signs will be posted along the access road. Lower speed limits may be imposed to protect tortoises if determined necessary by the Service.
10. Lighting will be focused in toward the solar facility and downward to avoid lighting habitats beyond the SPGF perimeter.
11. Any trenches or excavations will be covered if left open overnight or have escape ramps to allow wildlife to safely exit.
12. A Raven Control Plan will be prepared for the project. This plan will prescribe the following measures to limit the impacts of common ravens and other avian scavengers on desert tortoise:
    a. Monitoring for the presence of ravens and other potential human-subsidized predators of special status wildlife will be conducted.
    b. BMPs to discourage the presence of ravens onsite include trash management, elimination of available water sources, designing structures to discourage potential nest sites, use of hazing to discourage raven presence, and active monitoring of the site for presence of ravens.
    c. If ravens are seen building nests, this nesting material will be removed prior to an egg being laid.
    d. To minimize activities that attract prey and predators during construction and operations, garbage will be placed in approved containers with lids and removed promptly when full to avoid creating attractive nuisances for wildlife. Open containers that may collect rainwater will also be removed or stored in a secure or covered location to not attract birds.
13. A Weed Management Plan, which must be approved by the BIA, BLM, and the Tribe, will be implemented prior to the initiation of ground disturbing activities. Mitigation measures in the Weed Management Plan include: worker awareness training; limiting ground disturbance to designated areas only; maintenance of vehicle wash and inspection stations and close monitoring of materials brought onto the site to minimize the potential for weed introduction; re- establishment of native vegetation in disturbed areas to prevent weeds from colonizing newly disturbed areas; and, regularly scheduled monitoring to quickly detect new infestations of weeds, coupled with rapid implementation of control measures to prevent further infiltration.
14. A designated field contact representative (FCR) will be assigned to the construction phase of the solar project components; additional FCRs will be assigned for the linear project components including the transmission line and water pipeline.
15. Desert tortoises will be relocated to BLM-managed lands or Tribal lands following the Terms and Conditions in this Biological Opinion. Reporting of relocations and other information pertaining to desert tortoise will be completed per the Terms and Conditions in this Biological Opinion issued by the Service. Desert tortoise relocation is considered

a take and requires an incidental take authorization from the Service.

16. If a tortoise is injured as a direct or indirect result of project activities, it shall be immediately transported to a veterinarian or wildlife rehabilitation facility.
17. Tortoises within the solar facility footprint will be translocated to secure areas outside the fence as approved by the Service. The disposition of displaced desert tortoises will be evaluated and reported on following the Terms and Conditions of this Biological Opinion.
18. Any project-related activity that may endanger a desert tortoise shall cease if a desert tortoise is encountered on the project site. Project activities may resume after an authorized desert tortoise biologist removes the desert tortoise from danger or after the desert tortoise has moved to a safe area.
19. The Applicant and Tribe will coordinate to salvage and relocate cacti, yuccas, and shrubs on linear ROWs and plant them back on temporarily disturbed portions of the ROWs similar to the efforts undertaken on adjacent BLM lands. If the Tribe chooses to salvage plants from the solar facility, these plants may be held in a nursery or other temporary holding location until needed; no monitoring is required for these plants.
20. All work area boundaries will be conspicuously staked, flagged, or otherwise marked to minimize surface disturbance activities. All workers, equipment, vehicles, and construction materials shall remain within the ROW, existing roads, and designated areas. Staging areas will be located in previously-disturbed areas whenever possible.
21. The Applicant will develop a habitat restoration plan to be implemented for all temporary disturbances associated with construction of the project to be approved by the BIA, BLM (for disturbance of BLM land), Tribe, and the Service.
22. All trenches and holes will be covered, fenced or backfilled to ensure desert tortoises do not become trapped unless alternate measures are in place as agreed to by the BIA, BLM, and Service. If trenches or holes are to remain open during construction, they will be checked for tortoises at least four times a day, at the start of day, at mid-morning, early afternoon, and at the end of the work day. The trenches or holes will also be checked immediately before backfilling regardless of the season. Tortoises encountered in the trench will be reported and moved out of harm's way in accordance with handling protocols (Service 2009). In addition, wildlife escape ramps in open trench segments will be no greater than every 0.25 mile.

Focused Conservation Measure for Moapa Dace

1. Water use will be minimized to the extent possible during construction and operation of the Project.

ANALYTICAL FRAMEWORK FOR THE JEOPARDY DETERMINATION

Section 7(a)(2) of the Endangered Species Act requires that Federal agencies ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of listed species. "Jeopardize the continued existence of" means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR §402.02).

The jeopardy analysis in this biological opinion relies on four components:

1. The status of the species, which describes the rangewide condition of the desert tortoise, the factors responsible for that condition, and its survival and recovery needs;
2. The environmental baseline, which analyzes the condition of the desert tortoise in the action area, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of the desert tortoise;
3. The effects of the action, which determine the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on the desert tortoise and designated critical habitat; and
4. The cumulative effects, which evaluates the effects of future, non-Federal activities in the action area on the desert tortoise.

In accordance with policy and regulation, the jeopardy determination is made by evaluating the effects of the proposed Federal action in the context of the rangewide status of the desert tortoise, taking into account any cumulative effects in the action area, to determine if implementation of the proposed action is likely to cause an appreciable reduction in the likelihood of both the survival and recovery of the desert tortoise in the wild. For the purposes of making the jeopardy determination, the analysis in this biological opinion places an emphasis on consideration of the rangewide survival and recovery needs of the desert tortoise and the role of the action area in the survival and recovery of the desert tortoise as the context for evaluating the significance of the effects of the proposed Federal action, together with cumulative effects.

Section 7(a)(2) of the Act also requires that Federal agencies ensure that any action they authorize, fund, or carry out does not result in the destruction or adverse modification of designated critical habitat. No designated critical habitat will be affected by the proposed action; therefore, no further analysis of critical habitat will be performed in this biological opinion.

STATUS OF THE SPECIES RANGEWIDE

MOAPA DACE

The Moapa dace was federally listed as endangered under the Endangered Species Preservation Act of 1966 on March 11, 1967 (32 Federal Register 4001), and has been protected under the Act since its inception in 1973. Critical habitat has not been designated for the Moapa dace. The Service assigned the Moapa dace the highest recovery priority because: it is the only species within the genus *Moapa*; the high degree of threat to its continued existence; and the high potential for its recovery (Service 1996). A final recovery plan was approved by the Service in 1996 (Service 1996).

The Moapa dace was first collected in 1938 and was described by Hubbs and Miller (1948). Key identification characteristics are a black spot at the base of the tail and small, embedded scales, which create a smooth leathery appearance. Coloration is olive-yellow above with indistinct blotches on the sides, with a white belly. A diffuse, golden-brown stripe is present. Maximum size is approximately 4.7 inches fork length. The oldest known specimen on record is over 4 years old (Scoppettone et al. 1992).

The Moapa dace is a member of the North American minnow family, *Cyprinidae*. The genus *Moapa* is regarded as being most closely related to the dace genera *Rhinichthys* (speckled dace) and *Agosia* (longfin dace) (Coburn and Cavender 1992). These three dace genera, along with the genera *Gila* (chub), *Lepidomeda* (spinedace), *Meda* (spikedace), and *Plagopterus* (woundfin), developed from a single ancestral type (monophyletic) and are only associated with the Colorado River Basin (Service 1996).

Moapa dace typically occur in waters ranging from 78.8 to 89.6° F (Hubbs and Miller 1948); however, one individual was collected in water temperatures of 67.1°F (Ono et al. 1983). Although Rinne and Minckley (1991) rarely observed the species below 86° F, Deacon and Bradley (1972) indicated that the species reaches its greatest abundance at warmer temperatures between 82.4 and 86.0° F.

Reproduction occurs year-round and is confined to the upper, spring-fed tributaries where the water temperatures vary from 84.2 to 89.9° F and dissolved oxygen concentrations vary between 4.1 and 6.2 parts per million (Scoppettone et al. 1992). Juveniles occur almost exclusively in the spring-fed tributaries, whereas adults occur in the mainstem of the Muddy River (Scoppettone et al. 1992). Adults show the greatest tolerance to cooler water temperatures, which appears to be 78.8° F (Scoppettone 1993). Given the species temperature tolerances and cooling pattern of the river in a downstream direction, its range appears to be restricted to the warmer waters of the upper springs and tributaries of the Warm Springs area (Deacon and Bradley 1972, Cross 1976, Scoppettone et al. 1992).

In 1983, the Service prepared a recovery plan for the Moapa dace which was updated in 1996, and identified various tasks to guide recovery (Service 1996). The plan also addresses the current status, threats, and recovery needs of seven other endemic aquatic species. These include three fishes: the Virgin River chub (*Gila seminuda*) [this species is currently listed as endangered in the Virgin River and is under review for listing in the Muddy River], Moapa speckled dace (*Rhinichthys osculus moapae*), Moapa White River springfish (*Crenichthys baileyi moapae*); Moapa pebblesnail (*Fluminicola avernalis*), grated tyronia (*Tryonia clathrata*), Moapa Warm Springs riffle beetle (*Stenelmis moapa*); and the Amargosa naucorid (*Pelocoris shoshone shoshone*) that co-exist with the Moapa dace in the Muddy River ecosystem.

Threats to Moapa dace habitat include non-native fishes (e.g., tilapia and mollies) and parasites; habitat loss from water diversions and impoundments; increased threat of fire due to encroachment of non-native plant species such as palm trees; and reductions to surface spring-flows resulting from groundwater development, which reduces spawning, nursery habitats, and the food base for the species. The Moapa dace is more vulnerable to catastrophic events due to its limited distribution in conjunction with these threats. The 2006 PBO provides an overview of the hydrogeological factors affecting the Moapa dace.

a. Warm Springs Natural Area

The Warm Springs Natural Area (WSNA) and the Moapa Valley National Wildlife Refuge (NWR) encompass about 20 springs that form the headwaters of the Muddy River. The springs and their outflows onto the WSNA are home to the majority of the Moapa dace population.

In September 2007, the Southern Nevada Water Authority (SNWA) purchased 1,179 acres of private property that encompasses several springs in the Muddy River headwaters area, including the former Warm Springs Ranch. The property includes 3.8 miles of the mainstream Muddy River. The WSNA is managed as a nature preserve for protection of Moapa dace; and restoration and management of the areas as an ecological reserve.

b. Current Distribution and Abundance

The Moapa dace is thermophilic and endemic to the headwaters of the WSNA (Figure 2). Moapa dace surveys have been conducted throughout the upper Muddy River system. The August 2013 survey data indicate that there were approximately 1,727 fish in the population occurring throughout the 5.6 miles of habitat in the upper Muddy River system. The entirety of the population occurred within one major tributary that includes 1.78 miles of spring complexes emanating from Pedersen, Plummer, and Apcar springs on the Moapa Valley NWR and their tributaries (upstream of the gabion barrier).

In 2008, the number of Moapa dace declined approximately 60 percent, from 1,172 fish in 2007 to 459 fish in 2008. Most of this decline was observed in the Pederson, Plummer, and Refuge stream areas which supported more than 92 percent of the population in 2007. The cause of the population decline is unknown, although beavers had recently changed stream characteristics in the Refuge and active vegetation management had recently occurred along the Pederson Unit. Habitat restoration projects have been implemented over the past few years in the Pederson and Plummer units of the Moapa Valley NWR, restoring the streams to a more natural state. Survey data since 2008 indicate an increasing population trend (Figure 3).

The overall trend in Moapa dace numbers suggests continued growth in the population since the lowest count in 2008. Restored areas continued to show increasing or stable numbers of Moapa dace (upper Apcar, lower Pederson, Goodchild [Little] Springs). Most recently, the largest concentrations have been documented on the lower Pederson spring tributaries, which supported about 18 percent of all Moapa dace observed in August 2013. The number of Moapa dace documented in August 2013 is the highest since consistent surveys were initiated in February 2005. An increase of about 41 percent was documented between the previous survey in February 2013 and the August 2013 survey (Figure 3).

DESERT TORTOISE

Status of the Species and Critical Habitat Rangewide

The rangewide status of the desert tortoise and its critical habitat consists of information on its listing history, species account, recovery plan, recovery and CHUs, distribution, reproduction, and numbers. This information is dated February 9, 2012, and provided on the Service's website at: http://www.fws.gov/nevada/desert_tortoise/dt/dt_life.html. If unavailable on this website, contact the Nevada Fish and Wildlife Office in Las Vegas at (702) 515-5230, and provide File No. 84320-2013-F-0301 along with the date of February 9, 2012. Additional information is provided in our 5-year review (Service 2010a) and revised recovery plan for the Mojave desert tortoise (Service 2011).

The Service designated critical habitat for the desert tortoise in portions of California, Nevada, Arizona, and Utah in a final rule, published February 8, 1994 (59 Federal Register 5820). Considering the proposed action will not result in adverse effects to critical habitat, any further discussion or evaluation of critical habitat will not be included in this biological opinion.

ENVIRONMENTAL BASELINE

ACTION AREA

The implementing regulations for section 7(a)(2) of the Act define the "action area" as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02).

The action area for the Moapa dace is defined as the entire range of the Moapa dace and the hydrogeomorphic basins which have hydrologic connectivity to the Muddy River ecosystem. These basins include the Muddy River Springs Area, Coyote Spring Valley, Garnet Valley, Hidden Valley, and California Wash where water pumping may result in impacts to the Muddy River Springs and Muddy River, and therefore, the Moapa dace.

The action area for the desert tortoise includes the 874-ac (1.3 square miles [mi^2]) solar facility site; 2.5-miles of access road; 1.6-miles 500-kV transmission line; 7.3-mile 230-kV transmission line; and 4.8-mile water pipeline; these project components are described in the Description of the Proposed Action section of this biological opinion. In addition, the action area includes a 0.5-mile wide buffer around the solar facility project boundary and along each side of linear project areas. We include a 0.5-mile buffer to address adverse effects to desert tortoises whose home ranges overlap the proposed solar facility and linear project areas; the buffer is based on reported home range sizes of male desert tortoises (26.4 hectares [0.10 mi^2], 210 hectares [0.81 mi^2]) which are variable depending on weather and other environmental factors (Duda et al. 1999, Harless et al. 2009). For situations where desert tortoises are moved less than 500 meters (1,640 feet), the buffer is based on the maximum straight-line distance that a male desert tortoise traveled in the first year following translocation [relocation] (Walde et al. 2008). For situations where desert tortoises are moved more than 1,640 feet, the buffer is based on the upper limits of the 95 percent confidence interval for the maximum straight-line distance that male and female desert tortoises were observed to disperse during the first year after release (Nussear 2004, Field et al. 2007, Gowan and Berry 2009).

STATUS OF THE MOAPA DACE IN THE ACTION AREA

The action area encompasses the entire range of the Moapa dace; therefore, the status of the Moapa dace in the action area is the same as the description of the rangewide status of the Moapa dace discussed above.

FACTORS AFFECTING THE MOAPA DACE IN THE ACTION AREA

a. Groundwater Use Memorandum of Agreement

On July 14, 2005, a MOA was signed by SNWA, Moapa Valley Water District (MVWD), Coyote Springs Investment, the Tribe, and the Service, regarding groundwater withdrawal of 16,100 afy from the regional carbonate aquifer in Coyote Spring Valley and California Wash Basins that included conservation measures for the Moapa dace. The MOA outlined specific conservation actions that each party would complete in order to minimize potential impacts to the Moapa dace should water levels decline in the Muddy River system as a result of the cumulative withdrawal of 16,100 afy of groundwater from two basins (Coyote Spring Valley and California Wash) within the regional carbonate aquifer system by SNWA (9,000 afy), MVWD, CSI (4,600 afy), and the Tribe (2,500 afy). The MOA and PBO include the following conservation measures:

1. Provide funding toward restoration of Moapa dace habitat on the Apcar Unit of the Moapa Valley NWR;
2. Develop a Recovery Implementation Program which will be used to effectuate the goals of the MOA by implementing measures necessary to accomplish the protection and promote the recovery of the Moapa dace, as well as, outline the development of regional water facilities and include additional parties as appropriate. The Recovery Program will be developed for the purposes of continuing to identify the key conservation actions that, when implemented, would continue to contribute to off-set any pumping impacts that may result from groundwater pumping;
3. Assist in developing an ecological model to investigate the effects of habitat change on the ecology of the Moapa dace;
4. Construct fish barriers in order to prevent additional non-native fishes from migrating into Moapa dace habitat;
5. Eradicate non-native fish, such as tilapia from the historic range of Moapa dace;
6. Restore habitat necessary for the Moapa dace, and take other steps to protect and recover the dace;
7. Provide the use of the Tribal greenhouse to cultivate native plants for restoration actions in the Muddy River area;
8. Provide access to Tribal lands for the construction and maintenance of at least one fish barrier;

9. Dedicate the existing Jones Spring water right (MVWD) with a flow rate of 1.0 cubic feet per second (cfs) towards establishing and maintaining in-stream flows in the Apcar tributary system that empties into the Muddy River; and
10. Dedicate 460 afy of CSI appropriated water rights to the survival and recovery of the Moapa dace, in perpetuity through a conservation easement to the Nevada State Engineer.
11. Establish a Hydrologic Review Team to develop and coordinate regional monitoring efforts of the groundwater pumping proposed under the MOA. Team members discuss and perform analyses of groundwater pumping effects and natural climatic variation on the Muddy River and Muddy Springs.
12. Develop the Muddy River Recovery Implementation Program to provide a comprehensive program for water resource management in the Coyote Spring Valley, Warm Springs, and Muddy River areas, while working toward recovery of the Moapa dace.

On January 30, 2006, the Service issued a non-jeopardy intra-Service PBO for the Proposed Muddy River MOA (File No. 1-5-05-FW-536). The Service estimated that the cumulative actions of parties to the MOA could result in 31 percent reduction in the flows at the Warm Springs West in the Pedresen Unit of the NWR, reducing the flows to 2.7 cfs. This translates roughly into a 22 percent loss in riffle habitat and 16 percent loss in pool habitat in that area for the Dace. Should flows at the Warm Springs West gage decline to a flow below 2.7 cfs, water use from those anticipated in the PBO would be reduced.

Five projects have been proposed under the PBO, four of which have moved forward and have been tiered to the PBO: 1) issuance of a Section 404 permit under the Clean Water Act of 1972, as amended, for the CSI residential development project (Tier 1); 2) for a ROW to SNWA to construct a water conveyance pipeline (Tier 2), 3) construction of a water pipeline from an existing well on the Moapa River Indian Reservation to the Moapa Valley of Fire Travel Plaza requiring 7 afy of groundwater (Tier 4); and 4) construction of the K-Road PV solar project on Tribal lands within the Moapa River Indian Reservation requiring 72 afy of water during construction and up to 40 afy of water during operations and maintenance (see *Factors Affecting the Desert Tortoise in the Action Area* below for more information). Tier 3 was a proposed cement plant which was withdrawn without a biological opinion being issued. Tiers 1 and 2 are major projects and are discussed in detail below.

- **Tier 1:** CSI is permitted to pump State-appropriated water from as many as 4 wells in Coyote Spring Valley for a combined duty of 4,600 afy in order to meet water demands for its proposed residential community, including an existing golf course. The Nevada State Engineer requires CSI to monitor groundwater levels in Coyote Spring Valley at its four production wells in a manner that complies with monitoring requirements under State Engineer Order 1169 (NSE 2002) and to report monthly production from each of its wells as a condition of their water right permits. State Engineer Order 1169, issued in 2002, ordered a study of a portion of the regional carbonate-rock aquifer that includes Coyote Spring Valley, the Muddy River Springs Area, and California Wash, among other basins, in the form of a 2-year pumping test (the 'Order 1169 pumping test') which was conducted from November 2010 to December 2012 to evaluate how groundwater withdrawals in this portion of the carbonate-rock aquifer impact the aquifer system, including discharge from the Muddy River Springs and to the Muddy River. Impacts to the springs and river, in turn, have the potential to impact the Muddy River ecosystem. Monitoring by CS1 at their four production wells as a condition of their water right permits continues to inform assessments of pumping impacts on the carbonate-rock aquifer, springs, and river under the MOA following completion of the Order 1169 pumping test.

- **Tier 2:** This project involves SNWA constructing a pipeline to convey groundwater withdrawals from southern Coyote Spring Valley to Reed Bowman Reservoir and eventually to Lake Mead for return flow credits by way of the lower Muddy River. SNWA is currently permitted to pump State-appropriated water from two carbonate production wells in southern Coyote Spring Valley, MX-5 and CSI-2 located approximately 1.3 miles northwest of MX-5, at a combined rate of 9,000 afy for municipal water supply in Las Vegas and vicinity. At present, only carbonate production well MX-5 is connected to the pipeline; production from MX-5 is limited by the size of the pump installed in the well to roughly 3,800 gallons per minute or a maximum annual rate of about 6,100 afy. Pumping of MX-5 was temporarily stopped by SNWA in late April 2013 following completion of the Order 1169 pumping test. During the 2-year pumping test, SNWA's MX-5 production well was pumped at an average rate of 4,072 afy; the average rate of pumping from the carbonate-rock aquifer in Coyote Spring Valley was 5,383 afy during the test (the combination of MX-5 and CSI pumping). CSI pumping from the carbonate-rock aquifer continues in Coyote Spring Valley to meet demand for their planned community (i.e., the golf course).

  The State Engineer requires SNWA to monitor groundwater levels at as many as 9 carbonate and 6 basin-fill monitoring wells in Coyote Spring Valley in a manner that complies with monitoring requirements under State Engineer Order 1169 and to report monthly production from each of its production well(s) as a condition of their water right permits. Groundwater level and production monitoring by SNWA in Coyote Spring Valley continues to inform assessments of pumping impacts on the carbonate-rock aquifer, Muddy River Springs, and Muddy River under the MOA following the completion of the Order 1169 pumping test.

The Service reviewed the updated monitoring information including instream flow criteria established in the MOA. The minimum instream flow criteria measured at the Warm Springs West gage on Pederson Stream in the National Wildlife Refuge determine thresholds that would trigger certain conservation actions including reductions in groundwater pumping in the Muddy River Springs Area and Coyote Spring Valley. Currently, the first instream flow at the Warm Springs West gage that would trigger a reduction in groundwater pumping is 3.0 cfs. This instream flow would trigger the cessation of MVWD pumping at the Arrow Canyon carbonate production wells located in the Muddy River Springs Area approximately 3 miles northwest of the Pederson springs and a redistribution of pumping by SNWA and CSI in Coyote Spring Valley. Additionally, the MOA provides that at this instream flow total pumping by SNWA and CSI in Coyote Spring Valley would be limited to 8,050 afy. At present, this would not be likely to result in a significant, if any, reduction in pumping in Coyote Spring Valley since the pumping capacity of SNWA's MX-5 well is approximately 6,100 afy and CSI's demand for water is roughly 2,000 afy or less. The next instream flow at the Warm Springs West gage that would trigger a reduction in groundwater pumping under the MOA is 2.9 cfs. This would restrict SNWA and CSI's combined pumping in Coyote Spring Valley to 6,000 afy, a modest reduction if SNWA was pumping the MX-5 production well at full capacity at the time, but no reduction compared to the average level of pumping imposed during the Order 1169 pumping test. Additionally, pumping by the Moapa Band of Pauites in California Wash would be limited to 2,000 afy (which is well above the current level of pumping). Finally, instream flows of 2.8 and 2.7 cfs at the Warm Spring West gage trigger the restriction of pumping by SNWA and CSI in Coyote Spring Valley to a combined 4,000 and 724 afy, respectively, under the MOA, the latter representing a significant reduction in the rate of pumping from the carbonate-rock aquifer in Coyote Spring Valley compared to levels imposed during the Order 1169 pumping test. Instream flow at the Warm Springs West Flume as of December 2013 is 3.4 cfs (USGS 2013). Therefore, based on the monitoring information provided, we have not reached any instream flow trigger points analyzed in the biological opinion as of yet.

During the 2-year pumping test, the greatest impacts occurred at the highest elevation springs in the Muddy River Springs Area (Pederson and Pederson East springs) where large reductions in the flow of these springs were documented (NDWR 2012). More importantly, we concluded through interpretation of the pumping test that the majority of impacts to spring discharge were still developing as of the end of the 2-year pumping test (Service et al. 2013), and the final impacts to the springs would not fully culminate for at least months following the cessation of the test pumping (as has so far been confirmed by observation) (Service et al. 2013).

Environmental baseline information for the Moapa dace prior to 2006 can be obtained in the PBO; updated information since 2006 is provided below.

b. Habitat Acquisition

In February 2006, the Secretary of the Interior approved funding through the Southern Nevada Public Lands Management Act for SNWA to purchase 1,218 acres of land historically known as the Warm Springs Ranch, located in the Moapa Valley. In 2007, the SNWA completed the purchase and committed to protect and preserve the property as a natural area. By purchasing the property, the SNWA was able to protect the majority of the Moapa dace population and its habitat, and prevent the property from being developed for residential purposes.

c. Habitat Improvement Projects and Predator Control

On July 17, 2008, the Service issued a biological opinion (File No. 84320-2008-F-0417) to the U.S. Army Corps of Engineers for their proposed issuance of a permit to SNWA for habitat restoration, establishment, and enhancement activities in the Lower Pederson Stream of the Warm Springs Natural Area. The permit would allow SNWA to restore part of the lower Pederson channel to a pre-modified alignment and construct an artificial channel connecting the stream to the channel. Incidental take of all Moapa dace occurring in the project area may be harassed during the course of activities, which is estimated to be approximately 100 fish. An additional 20 Moapa dace may be harmed (wounded or killed) during the course of salvage activities. An unknown number of Moapa dace eggs and/or larvae may be harmed during the course of activities due to desiccation of approximately 3,229 square feet of sheet flow.

d. Kane Springs Valley Groundwater Development Project

On October 29, 2008, the Service issued a non-jeopardy biological opinion (File No. 84320-2008-F-0007) to the Ely District Office of the Bureau of Land Management for the purpose of permitting the construction of groundwater production and monitoring wells, water pipelines, storage, tanks, power transmission lines and substations, access roads, and fiber optic lines by the Lincoln County Water District (LCWD), Lincoln County Power District Number 1, and the Lincoln County Telephone Company. The proposed action also included the pumping of 1,000 afy of water from the Kane Springs Valley aquifer, which is within the low-gradient, high-transmissivity zone that connects Kane Springs Valley, Coyote Springs Valley, and the Warm Springs Area Basins. The analysis stated it would be difficult to determine effects resulting specifically from this project from those resulting from the 2006 PBO (described above). However, concurrent monitoring of the Kane Springs well was required in addition to the monitoring required in the 2006 PBO. The project proponents also agreed 1) to reduce groundwater pumping by half in the Kane Springs Valley should stream flows reach 3.15 cfs or less but greater than 3.0 cfs at the Warm Springs West gage; and 2) to stop pumping in Kane Springs Valley should stream flows reach 3.0 cfs or less at the Warm Springs West gage. Results from the 2-year pumping test described above includes impacts from groundwater pumping from this project.

e. Wildfires

Since the PBO was issued in 2006, a major wildfire occurred on July 1, 2010, affecting the Moapa dace. According to population survey data, up to 60 percent of the existing Moapa dace occurred within the action area at the time the fire started. Post-fire survey data indicate that most dace within the affected area quickly moved to safer areas in response to the fire. Although the number of dace that were lost during the fire is unknown, the Service estimates that less than 50 individuals were lost during the event and in the immediate aftermath.

f. Reproductive ecology study

On December 28, 2012, the Service issued a biological opinion (84320-2013-F-0029) for issuance of a recovery permit to the University of Arizona for the capture of up to 40 adult Moapa dace in order to study their reproductive ecology to determine whether and how the species can be bred successfully in captivity. The consultation was reinitiated, and the Service issued a second biological opinion (84320-2013-F-0029-R001) on December 3, 2013, to include the capture and study of an additional 30 dace. The Service determined that neither action were likely to jeopardize the continued existence of the Moapa dace because enough dace would remain in the wild population to compensate for the loss.

STATUS OF THE DESERT TORTOISE IN THE ACTION AREA

Habitat

The project is located in Dry Lake Valley of the Northeastern Mojave Recovery Unit for the desert tortoise. Most of the habitat in the Action Area is potentially suitable for the desert tortoise and is largely dominated by Mojave creosote-bush scrub vegetation and includes Mojave mixed scrub and creosote-bursage vegetation. Dominant species associated with this vegetation community include shadscale (*Atriplex confertifolia*), brittlebrush (*Encelia farinosa*), creosote (*Larrea tridentata*), bursage (*Ambrosia dumosa*), and desert saltbush (*Atriplex polycarpa*) that occur on lower slopes and in washes. Associate species also included Mojave yucca (*Yucca schidigera*), Mormon tea (*Ephedra nevadensis*), range ratany (*Krameria parvifolia*), desert trumpet (*Eriogonum inflatum*), big galleta (*Hilaria rigida*), and Indian ricegrass (*Oryzopsis hymenoides*).

The portion of the 230-kV gen-tie transmission route to the Harry Allen Substation (approximately 1.7 miles in length) that traverses Dry Lake is almost completely unvegetated with hard-packed soils, often with an alkali crust. Based on the lack of vegetation, there is no forage or cover present for desert tortoises. This portion of Dry Lake occasionally becomes completely inundated.

Near the south end of the transmission interconnection, the habitat becomes steeper with rockier soils and greater components of cholla (*Cylindropuntia* sp.), Mojave yucca and prickly pear (*Opuntia* sp.). This area is crossed by several small ephemeral drainages originating from a large sloping bajada extending from the southwest.

Desert Tortoises in the Action Area

All survey results are based on information in the BIA's 2013 biological assessment. Three separate desert tortoise surveys were conducted within the project action area. In May 2012, surveys covered the SPGF, access road, and gen-tie transmission lines. The water pipeline was surveyed in October 2012. Where the 230-KV gen-tie transmission line traverses Dry Lake, protocol surveys were not conducted because it is not suitable desert tortoise habitat. Small portions of this area were spot sampled; suitable burrows were not observed, and soil conditions were not conducive for burrow excavation. The vegetated margins of the lake bed were surveyed since these areas represented potentially suitable foraging areas; though soils in these areas were still extremely hard packed. In October 2013, a modification of the 230-kV route near the Harry Allen substation was surveyed (BIA 2013). All observed desert tortoise sign were mapped and recorded. Sign included scat, burrows, live tortoises, carcasses, shell fragments, eggshells, tracks, courtship rings, and drinking depressions. Desert tortoise and desert tortoise sign were observed in the Action Area (Table 2). Although considered expired, results from surveys of these project areas from 2010 are consistent with the 2012 and 2013 survey results (BIA 2010, 2013).

Table 2. Desert tortoise sign observed during surveys of the proposed solar facility and associated project components (BIA 2013).

Sign	Solar Field	Water Pipeline ROW	230-kV Transmission Line	500-kV Transmission Line	Access Road	Totals
Burrows	19	14	23	2	1	59
Carcasses[1]	0	1	3	0	0	4
Live tortoises ≥160 mm MCL	1	2	1	1	0	5
Live tortoises <160 mm MCL	0	1	0	0	0	1

[1]Carcass totals include individual locations of whole carcasses and shells or their parts.

One adult desert tortoise and 14 suitable desert tortoise burrows were observed on the SPGF area; one adult tortoise, 23 suitable desert tortoise burrows, and three desert tortoise shells or shell fragments were observed along the 230-kV transmission line; one adult desert tortoise and two potentially suitable burrows were observed along the buffer transects associated with the 500-kV gen-tie transmission line; one potentially suitable burrow occurred along the access road; and two adult and one subadult desert tortoise and fourteen suitable burrows were observed along the pipeline ROW.

Based on Table 3 in the 2010 Service protocol (Service 2010b), the following number of desert tortoise are estimated to occur within the area of each specific project components: 2 (95%CI: 0.36-10.64) in the SPGF site; 7 (95%CI: 1.98-23.11) in the pipeline ROW; and 2 (95% CI: 0.37-10.77) in the 230-kV transmission line ROW.

Accurate estimates of numbers of juvenile tortoises or tortoise eggs are difficult to make and involve uncertainty. Turner et al. (1987) estimated that juvenile and hatchling tortoises accounted from 19- to 81-percent of the overall population. If this assumption is used, the expected number of juvenile and hatchling tortoises expected on the SPGF would be between 0 and 56 (0.44-56.00); the expected number of juvenile or hatchling tortoises within the water pipeline ROW would be between 2 and 122 (2.44-121.63); and the expected number of juvenile and hatchling tortoises along the rerouted portion of the 230-kV transmission line ROW would be between 0 and 57 (0.46-56.68).

During May and June, the project area would be expected to contain desert tortoise eggs (Turner et al. 1984, Wallis et al. 1999). Assuming a 1:1 sex ratio, there are between 0.18 and 5.32 female tortoises in the SPGF; between 0.99 and 11.56 female tortoises in the pipeline ROW; and between 0.19 and 5.39 female tortoises in the rerouted portion of the 230-kV transmission line ROW. Female tortoises lay an average of 1.6 clutches per year (Turner et al. 1984) and each clutch contains an average of 5.38 eggs (Turner et al. 1986). Thus, between 1.55 and 45.79 eggs would be expected within the SPGF; between 8.52 and 99.50 eggs would be expected within the pipeline ROW; and between 1.64 and 46.40 eggs would be expected within the rerouted portion of the 230-kV transmission line ROW.

Desert tortoises are expected to be present along the proposed access road and the 500-kV transmission route based on the presence of sign and/or suitable burrows, though population estimates along these routes are not possible because adult desert tortoises were not detected. An adult desert tortoise was observed in the buffer area associated with the 500-kV transmission line; however, tortoises located in buffer areas are not used to generate relative abundance estimates.

FACTORS AFFECTING THE DESERT TORTOISE IN THE ACTION AREA

a. Kern River Gas Transmission (KRGT) Project

Two parallel natural gas pipelines operated by Kern River traverse the southeastern portion of the proposed primary recipient area and proposed BLM ROW for the project power transmission line. Features of the pipeline ROWs that co-occur in the action area for the solar project include the utility (main) access road where the road crosses over the ROWs in two locations. The pipeline projects required a license from the Federal Energy Regulatory Commission (FERC), ROWs from BLM, and permit from the Army Corps of Engineers. The biological opinion for the first KRGT pipeline was issued to FERC on December 21, 1990 (File No. 1-1-87-F-36R). The Service concluded that 45 desert tortoises may be killed or injured; 424 desert tortoises harassed; and 93 desert tortoise nests destroyed. As of June 24, 1991, approximately 23 deaths and 253 captures/movements of desert tortoise were recorded by Kern River along the pipeline ROW. Problems associated with vehicular traffic on the ROW and access roads may have contributed to the mortalities in combination with high desert tortoise activity levels that were not anticipated. Consequently, on June 24, 1991, FERC requested reinitiation of formal consultation for the project based on a high incidence of desert tortoise mortality and captures/movements on the pipeline project, which exceeded those limits established in the incidental take statement. The Service responded by letter dated June 28, 1991, and under reinitiation of consultation, imposed additional minimization measures, increased the capture/movement limits for desert tortoise from 294 to an unlimited number, and injury/mortality limits from 25 to 35.

On July 9, 2002, the Service issued a biological opinion (File No. 1-5-02-F-476) to FERC for construction, operation, and maintenance of the second KRGT pipeline, adjacent to the first pipeline. The second pipeline project approximates the previous pipelines constructed under the 1990/1991 biological opinions. The pipeline ROW crosses approximately 318.8 miles of potential desert tortoise habitat, of which about 102.9 miles traverse desert tortoise critical habitat. Pipeline construction resulted in disturbance of 4,182 acres of desert tortoise habitat including 1,333 acres of desert tortoise critical habitat. Approximately 50 feet of the construction ROW overlapped the previously disturbed land that was affected by construction of the first KRGT pipeline. During construction of the second KRGT pipeline project, over 840 desert tortoises were encountered and one was killed as a direct result of project activities which includes only one desert tortoise in Utah; and approximately 380 tortoises in Nevada. One tortoise was killed on June 8, 2011, as a result of maintenance operations. Consequently, BLM and the Service agreed that the requirement for reinitiation of consultation had been triggered for O&M activities due to a desert tortoise mortality and additional effects to the desert tortoise due to a large-scale translocation project in the pipeline action area. On September 28, 2011, the Service issued a biological opinion to BLM for O&M of the KRGT pipelines (File No. 84320-2011-F-0337). The Service is still waiting for a final report from FERC for this project.

b. Calpine Corporation Natural Gas-Fired Power Plant

On December 20, 2001, the Service issued a biological opinion to the BIA for their proposed approval of a lease of Tribal land to Calpine Corporation for construction, operation, and maintenance of a natural gas-fired power plant. The lease would involve approximately 65 acres for the proposed 760 MW baseload natural gas-fired combined cycle power plant. An additional 33 acres of Tribal land may be used as borrow sites for construction activities which would require BIA approval. Peaking capacity of the plant may reach 1,100 MW. The project would be constructed, operated, and maintained under a long-term lease (25 years with a 20-year option) with Calpine Corporation for Tribal land and water use.

The project would include 500 kV electrical transmission lines and access roads on Tribal and BLM lands. The EPA proposed to issue an authority to construct permit to Calpine Corporation under the Prevention of Significant Deterioration program at 40 CFR§52.21. The U.S. Army Corps of Engineers proposed to permit Calpine Corporation under section 404 of the Clean Water Act. BIA was the lead Federal agency for the consultation. No construction occurred and this project has not moved forward.

c. Sampling and Geotechnical Investigation for Proposed Cement Plant

In 2005, Ash Grove Cement Company, in cooperation with the Tribe, proposed to conduct preliminary studies in support of a proposed cement plant and limestone quarry on the Reservation. On August 24, 2005, the Service issued a biological opinion (File No. 1-5-05-F-497) to the BIA for their approval of the cement project. The project would locate suitable materials to develop the cement plant. The proposed project involved 23.7 acres of disturbance within a 298-acre area.

Area 1 of the proposed cement plant overlaps a portion of the western portion of the solar facility site. Surveys of Siting Area 1 occurred March 24 through 31, 2005. Desert tortoise sign observed during the survey include: 63 burrows, 11 carcasses, 26 scats, and 12 live tortoises. In addition to the 63 typical Mojave desert tortoise burrows that were excavated in soil, there were numerous areas where outcroppings of cap rock with caliche caves and other naturally occurring cavities are present. The abundance of these naturally occurring caves would increase the number of useable tortoise dens from 63, to 100 to 120.

Desert tortoise surveys and tortoise removal from haul and construction road areas began in March 2006. These areas occur outside the action area for the proposed solar project. The cement plant project did not go forward; no biological opinion was issued.

d. Tribal Travel Plaza Water Pipeline

On August 6, 2007, the Service issued a biological opinion (File No. 1-5-05-FW-536, Tier 3) to the U.S. Department of Housing and Urban Development for their proposed funding to construct a water pipeline from an existing well to the existing Tribal Travel Plaza approximately 3 miles away. Construction of the water pipeline resulted in 17.57 acres of desert tortoise habitat disturbance. No desert tortoises were reported taken as a result of the project.

e. UNEV Pipeline

On November 13, 2009, the Service issued a biological opinion to the BLM for ROW grants to construct, operate, and maintain the UNEV petroleum pipeline (File No. 6-UT-09-F-023. The UNEV gas pipeline project aligns with the previous KRGT pipeline ROWs and crosses the main access road as described above for the KRGT Project. On April 8, 2011, a desert tortoise was killed after being buried under a spoil pile. A second tortoise was crushed by a project vehicle and killed on May 9, 2011. A third tortoise died on June 29, 2011, when it fell into an open project trench, exceeding the incidental take exempted in the biological opinion. Consultation was reinitiated, and the Service issued a second biological opinion on July 1, 2011, exempting three additional desert tortoise mortalities or injuries (five in total). On July 18, 2011, BLM reported a fourth desert tortoise mortality when a project vehicle ran over and crushed a very small tortoise in the road. On August 20, 2011, UNEV reported the fifth tortoise mortality, a crushed desert tortoise on their ROW. The mortality report concluded that the mortality was caused by an unauthorized, private vehicle that illegally accessed the ROW.

On August 31, 2011, BLM requested a second reinitiation of consultation in response to the additional desert tortoise mortalities. On September 29, 2011, the Service issued a biological opinion for the UNEV pipeline project. The Service exempted incidental take of 12 desert tortoises through injury or mortality, including the 5 previously killed and 237 desert tortoises captured and moved from harm's way.

On March 21, 2012, the BLM submitted a memorandum to the Service describing a newly discovered Sahara mustard (*Brassica tournefortii*) infestation in the ROW of the UNEV pipeline; a plan to treat the infestation; minimization measures to protect the desert tortoise during the treatment; and a post-application monitoring plan. The infestation occurred approximately from Meadow Valley Wash in Clark County (milepost 371) to the Beaver Dam Slope (milepost 325) at the Nevada and Utah state line. This situation constituted emergency consultation; thus, consultation was reinitiated for the third time and resulted in the Service issuing a biological opinion for this emergency consultation on July 19, 2012.

f. K Road Moapa Solar Energy Project

In 2012, the Service issued a biological opinion (File Nos. 84320-2011-F-0430) to the BIA for the K Road Moapa solar energy project under the intra-Service PBO for the Proposed Muddy River MOA (File No. 1-5-05-FW-536, Tier 5). The project involved the Tribe leasing land to a private applicant for the construction of a PV solar generating station 30 miles northeast of Las Vegas in Clark County. The BIA approvals included the lease of Tribal land and grant of easement for ROW for the access road, 12-kV transmission line, and water pipeline. The BLM issued ROW grants for an up to 500-kV transmission line and improvement of an existing access road. The BLM ROW occurs within an existing utility corridor, of which 5.0 miles is located on the Reservation and 0.5 mile on BLM land just south of the Reservation boundary. The project area is located on approximately 2,241 acres of land within the Reservation and 12 acres on BLM land within the utility corridor (total of 2,153 acres). All components, with the exception of power transmission lines, access roads, firebreak, and water pipeline, will be developed within the fenced 2,000-ac solar facility. Power and water transmission lines include an approximate 5.5-mile electric transmission line corridor (200 feet wide), an approximate 1-mile water pipeline corridor (25 feet wide), and an approximate 3-mile 12-kV transmission line (25 feet wide) to the Moapa Travel Plaza. The project also includes a 6,000-ac site to receive displaced tortoises and two additional evaluation areas for short-term use (i.e., 5 years or less) associated with translocation of the tortoises. The Tribe will conserve the established home ranges of most translocated tortoises, up to 6,000 acres, at least until the lease on the 2,000-ac solar site ends, and the Service determines that the site is available and suitable.

Desert tortoise pre-project surveys estimated that 25 to 103 adult and sub-adult desert and 20 to 83 hatchling and juvenile tortoises would occur in the 2,000-acre K Road solar facility boundary; thus, the biological opinion identified a threshold of 103 adult and subadult and 83 hatchling and juvenile desert tortoises could be taken by capture within this area of the project. On April 13, 2013, the BIA reinitiated consultation for the project because 98 of the 103 subadult and adult desert tortoises had been captured in the solar facility boundary, and the final capture number was anticipated to exceed the identified 103 threshold. Based on the information in the reinitiation request, the Service revised the incidental take threshold and identified that no more than 120 adult and subadult tortoises would be captured and translocated from the solar facility boundary (File No. 84320-2011-F-0430.R001). As was reported on July 29, 2013, final clearance surveys of the solar facility area resulted in the capture of 105 adults and subadults and 49 hatchlings and juveniles; these tortoises have been or will be translocated according to the translocation plan for the project (BIA 2011).

g. Other Existing Linear Disturbances and Anthropogenic Features

The Union Pacific Railroad crosses through the Reservation east of the solar site. I-15 occurs outside the Reservation, south and east of the solar site. I-15 has been fenced to exclude tortoises and thus restricts east-west movement of tortoises in the area. The railroad also presents a barrier to tortoise movement but tortoises are likely capable of crossing the railroad at certain locations. Several large culverts exist that allow tortoise passage underneath the levee for the railroad. Unpaved roads and the access road that extends beyond the paved portion of Las Vegas Boulevard provides public, Tribal, and project access to the action area. A northeast to southwest BLM utility corridor occurs within the Reservation, west and north of the solar site and recipient areas.

h. BLM PBOs in the Action Area

On November 25, 1997, the Service issued a PBO (File No. 1-5-97-F-251) to BLM for implementation of various land management programs within the Las Vegas District planning area excluding desert tortoise critical habitat and areas of critical environmental concern (ACECs), and outside the Las Vegas Valley. Activities proposed that may affect the desert tortoise in the action area include issuance of a ROW, Recreation and Public Purposes Act leases, mineral material sales and leases, and mining plans of operation. The programmatic consultation is limited to activities which may affect up to 240 acres per project, and a cumulative total of 10,000 acres excluding land exchanges and sales. Only land disposals by sale or exchange in Clark County but outside the Las Vegas Valley are covered under the consultation up to a cumulative total of 14,637 acres. Thus, a maximum total of 24,637 acres of desert tortoise habitat may be affected by the proposed programmatic activities.

On June 18, 1998, the Service issued a PBO (File No. 1-5-98-F-053) to BLM for implementation of various land management programs within desert tortoise habitat and the Las Vegas planning area, including desert tortoise critical habitat and ACECs. Activities that were proposed that may affect the desert tortoise in the action area include recreation; designation of utility corridors and mineral material extraction areas and designation of the desert tortoise ACECs.

On June 17, 2010, the BLM submitted a programmatic biological assessment to the Service to request consultation for program-level and project level actions that may affect, and are likely to adversely affect 19 threatened and endangered species, including the desert tortoise and Moapa dace, and of which 13 have designated critical habitat within the BLM's action area. On January 2, 2013, the Service issued a non-jeopardy PBO to the BLM based on review of these activities. While the BLM's 1998 resource management plan remains in effect, the 2013 PBO replaces the Service's 1998 document, which covered a 10-year period.

EFFECTS OF THE PROPOSED ACTION

Effects of the action refer to the direct and indirect effects of the proposed action on the species or critical habitat that would be added to the environmental baseline, along with the effects of other activities that are interrelated or interdependent with that action. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification.

Interdependent actions are those that have no independent utility apart from the action under consideration. Indirect effects are those that are caused by the proposed action and are later in time, but are still reasonably certain to occur. Indirect effects can be both spatial and temporal in nature. In contrast to direct effects, indirect effects can often be more subtle, and may affect species and habitat quality over an extended period, long after project activities have been completed. Indirect effects are of particular concern for long-lived species such as the desert tortoise, because project-related effects may not become evident in individuals or populations until years later.

MOAPA DACE

The Moapa dace will not be directly affected by the physical construction and maintenance of the proposed action; however, groundwater pumping activities associated with the action are interrelated actions. The effects of the proposed groundwater pumping associated with the project on the Moapa dace were previously analyzed in the 2006 PBO, which evaluated the effects on the endangered Moapa dace from cumulative groundwater withdrawal of 16,100 afy from the carbonate aquifer in Coyote Spring Valley and California Wash. The Tribe is only one of multiple parties that will be withdrawing groundwater from the Coyote Spring Valley and California Wash basins under the programmatic action. To date, biological opinions for site-specific actions that have been tiered to the 2006 PBO and are still active included analyses for 1) CSI's appropriated water rights of 4,600 afy from the Coyote Spring Valley basin (Tier 01); 2) SNWA's appropriated water right of 9,000 afy from the Coyote Spring Valley basin (Tier 02); 7 afy of the Tribe's appropriated 2,500 afy of water (Tier 03); and 72 afy of water during 5 years of construction and 40 afy during O&M of the Tribe's appropriated 2,500 afy of water for the K Road Solar Energy Project (Tier 04). During construction of the K Road Solar Energy project, 2421 afy of water appropriated for use by the Tribe would still be available. The highest use of water for the MSEC project would be during construction when 50 afy of water would be needed for two years; therefore, 2371 afy of water appropriated for use by the Tribe would then be available. The anticipated effects from the Moapa Solar Energy Project are consistent with those anticipated in the PBO. The use of up to 50 afy of water during 2 years of construction and up 30 afy during the 25 years of O&M of the proposed solar project will contribute to adverse effects on the Muddy River Springs area discharge and subsequently the Moapa dace as analyzed in the 2006 PBO. Use of groundwater for the project will become part of the environmental baseline for future groundwater withdrawals for the affected aquifer.

DESERT TORTOISE

Direct Effects

Construction and O&M Effects

We estimate that all life stages of desert tortoise that occur within the SPGF area and in harm's way on other project areas, as described above, may be adversely affected by the proposed action. Our estimates of the numbers of desert tortoises and eggs that are likely to occur in the action area are based mostly on pre-project survey data.

Death and injury of desert tortoises could result from excavation activities such as clearing and grubbing of vegetation; trenching activities and entrapment in open trenches and pipes; and collisions with or crushing by vehicles or heavy equipment, including individuals that take shelter under parked vehicles and are killed or injured when vehicles are moved. Desert tortoises that enter or attempt to cross project access roads may be struck resulting in death or injury. Mortality also may result from individual desert tortoises or their eggs being crushed or buried in burrows during construction and O&M-related activities. Because of increased human presence in the area, desert tortoises may be killed or injured due to collection or vandalism associated with increased encounters with workers, visitors, and unauthorized pets. Desert tortoises also may be attracted to the construction area by application of water to control dust, placing them at higher risk of death or injury.

Prior to ground disturbance, the Applicant will install desert tortoise exclusion fencing and security fencing around the SPGF and remove all desert tortoises that are encountered during clearance surveys. Based on pre-project surveys, two (but up to 10 tortoises may be moved without triggering reinitiation, see Table 3) tortoises are expected to need to be relocated from the SPGF area (BIA 2013). While fencing the SPGF will overall reduce direct mortality of tortoises during construction within the fence, in some cases, desert tortoises that have been fenced out of their home territories may make repeated efforts to return and may follow fence lines for long periods of time. If these desert tortoises are exposed to harsh conditions (i.e., cold or hot temperatures) while pacing fences, they may die. We expect that desert tortoises whose home territories have been reduced by the SPGF would be the animals most likely to pace fences. An unknown number of tortoises occur adjacent to the SPGF, and the installation of fencing may reduce the home range size of some of these individuals. This reduction could result in future injury or mortality of these individuals as they expand their home range into adjacent areas where unknown threats may occur or where adverse social or competitive interactions may occur with neighboring desert tortoises.

Prior to ground disturbance for the SPGF perimeter fencing and prior to other ground-disturbing activities within and outside the SPGF (transmission lines, water pipeline, access roads), the Applicant will perform desert tortoise clearance surveys and move all desert tortoises encountered out of harm's way. Therefore, we anticipate that construction activities are likely to kill a small number, if any, adult or subadult individuals larger than 160 millimeters (mm) midline carapace length (MCL) (Table 3). We acknowledge, however, that not all individuals killed or injured during construction, operations, and maintenance activities will be detected by biological monitors or project staff and subsequently reported to us. The inability to detect all tortoises is largely due to their cryptic nature, fossorial habits, and limited abundance; and in the case of juveniles and eggs, detection probabilities are reduced due to their small size and location underground. An additional confounding factor reducing the detection of all project-related tortoise mortalities is that scavengers may locate, consume, or remove carcasses before monitors can locate them.

Overall, we expect death and injury of most subadult and adult tortoises to be avoided during construction and O&M activities through implementation and compliance of Conservation Measures 2, 3, 5, 6, 8, 9, 11, 15, 17, and 22.

Project Access Effects

Primary access to the proposed solar site would be via I-15. A 2.5-mile gravel access road connecting the SPGF to the existing paved frontage road adjacent to I-15 would be constructed, resulting in 14.4 acres and 0.7 acres of habitat disturbance on BLM and BIA-administered lands, respectively. Project-related vehicles and equipment will operate only within the fenced boundary and access road within the utility corridor. Roads that are not designated as open by the Applicant and Tribe will not be used by project personnel unless accompanied by an authorized biologist.

The primary effect of project access on desert tortoises is the risk of vehicle strikes. Access to project work areas outside of the fenced SPGF may kill or injure desert tortoises due to increased vehicular use of existing routes. Implementation of Conservation Measures 2, 3, 6, 8, and 9 is expected to minimize impacts to desert tortoises from access effects. Because all workers will participate in the WEAP (Conservation Measure 2), and speed limits will be limited to 25 mph

(Conservation Measure 9), workers may be less likely to strike desert tortoises than a casual user. In addition, clearance surveys (Conservation Measure 6) and the use of authorized desert tortoise biologists and monitors during construction of the access roads (Conservation Measures 3, 6, 8, and 9).

While no desert tortoises were observed along the access road during pre-project surveys (BIA 2013), we cannot predict how many individuals will be killed or injured due to project-related access because of variables such as weather conditions, the nature and condition of roads, public use which may be confused with project use, and activity patterns of desert tortoises at the time the roads are in use; however, we expect this number to be small, if any.

Effects of Loss of Habitat

The proposed project includes the installation of permanent desert tortoise exclusion fencing along the entire solar facility boundary (approximately 4.6 miles), making the 847 acres within the SPGF entirely unavailable to tortoise. Approximately 952 acres of occupied desert tortoise habitat would be permanently disturbed or unavailable to desert tortoises as a result of the proposed project (Table 1).

Because recovery of vegetation in the desert can take decades or longer, we consider all ground-disturbing impacts associated with the proposed project to be long-term. Lovich and Bainbridge (1999) identified various types of anthropogenic impacts to desert ecosystems which may take 50 to 300 years to recover to pre-disturbance plant cover levels. Vasek et al. (1975) demonstrated that in the Mojave Desert, transmission line construction and O&M activities resulted in a unvegetated maintenance road, enhanced vegetation along the road edge and between tower sites (often dominated by nonnative species), and reduced vegetation cover under the towers, which recovered significantly but not completely in about 33 years. Webb (2002) determined that absent active restoration following extensive disturbance and compaction in the Mojave Desert, soils in this environment could take between 92 and 124 years to recover. Based on a quantitative review of studies evaluating post-disturbance plant recovery and success in the Mojave and Sonoran deserts, Abella (2010) demonstrated that reestablishment of perennial shrub cover (to amounts occurring on undisturbed areas) generally occurs within 100 years but no fewer than 40 years in some situations. He also determined that a number of variables likely affect vegetation recovery times, including but not limited to climate (e.g., precipitation and temperatures), invasion by nonnative plant species, and the magnitude and extent of ongoing disturbance.

Based on the work by Nussear et al. (2009), we calculated that approximately 3,462,505 acres or 67.8 percent of the 5,106,939 acres within the Northeastern Mojave Recovery Unit is considered habitat modeled at the 0.5 or greater "predicted habitat potential level" for desert tortoise (Don Harper, 2011, pers. comm.). The habitat that would be disturbed on a long-term basis (i.e., up to 951.5 acres) constitutes less than 0.01 percent of the modeled habitat at the 0.5 level in the Northeastern Mojave Recovery Unit. While the model does not take into account anthropomorphic disturbances that have historically or are currently affecting the species, it is unlikely that consideration of these would result in a substantial change in this estimate.

While this percentage does not constitute a numerically significant portion of the Northeastern Mojave Recovery Unit, we do not have the ability to place a numerical value on edge effects, habitat degradation, and overall fragmentation that the proposed action may cause or that occurs in the recovery unit as a whole. As a result, the low percentage of habitat within the recovery unit that would be lost underestimates impact of the proposed project on the desert tortoise, especially in light of existing land uses, changes in species composition and fire regimes due to establishment of nonnative plant species, existing and increasing disease and predation rates, and the expansion of human occupancy in what were once remote desert landscapes. The revised recovery plan (Service 2011) and 5-year review (Service 2010a) provide detailed discussions of these and other past, present, and future threats facing the desert tortoise.

If the facility is decommissioned instead of transferred to the Tribe at the end of the lease, the Applicant would implement restoration activities such as decompacting soils, seeding, and nonnative species control. Because we do not have sufficient information regarding the method or extent of these activities, we cannot determine the level of take that would be associated. Consequently, we are not granting an exemption from the prohibitions against take for these activities. These actions would require reinitiating consultation.

Desert Tortoise Handling and Relocation Effects

Capturing, handling, and moving tortoises for the purposes of relocating them out of the SPGF or moving them out of harm's way on other components of the project may result in accidental death or injury if these methods are performed improperly, such as during extreme temperatures, or if individuals void their bladders and are not rehydrated. Averill-Murray (2002) determined desert tortoises that voided their bladders during handling had lower overall survival rates (0.81 to 0.88) than those that did not void (0.96). If multiple desert tortoises are handled by biologists without the use of appropriate protective measures and procedures, such as using new latex gloves for each new tortoise handled, pathogens may be spread among individuals. Because the Applicant would employ desert tortoise biologists approved by the Service (See *Conservation Measures and Monitoring* section above) and adhere to the most recent Service guidance in addition to implementing the conservation measures outlined in the proposed action, we anticipate it is unlikely that relocating or moving individuals will result in their mortality or injury.

Based on pre-project survey results, we expect 2 (and up to 10) adult and subadult (≥160 mm MCL) tortoises and 0 to 56 juvenile and hatchling (<160 mm MCL) tortoises will be captured and relocated from harm's way as a result of the development of the SPGF; we estimate between 1 and 46 eggs occur in the SPGF area. Because of the difficulty in locating juvenile desert tortoises and eggs, some but not all are likely to be relocated from the SPGF. We anticipate that no individuals larger than 160 mm MCL will be unobserved in the SPGF; therefore, all individuals occurring in the SPGF in this age class will be relocated. Effects to juvenile desert tortoises and eggs that are undetected on the project sites are discussed later in this section.

We anticipate that the Applicant will capture and relocate all adult and subadult desert tortoises from the fenced SPGF and from any portion of the action area where individuals may be in harm's way of project activities. Based on pre-project survey results, we expect up to 9 adult and subadult desert tortoises may be encountered, captured, and moved from harm's way on the linear ROWs of the project; however, if this number is exceeded, the Applicant will capture and move any additional tortoises that are encountered in harm's way. Desert tortoises that are encountered on linear features of the project in harm's way will be moved the minimal distance out of harm's way to secure and appropriate habitat but no more than 1,000 feet in accordance with the Desert Tortoise Field Manual (Service 2009). Desert tortoises will not be unnecessarily handled (e.g., no marking, no manipulating the tortoise beyond relocating it) or result in an increase in the time necessary to relocate the individual. Because the protocol in the Desert Tortoise Field Manual will be followed; tortoises will be minimally handled; and the distance an individual tortoise is moved is expected to be within its home range, we do not anticipate moving individual tortoises in harm's way will result in mortality or injury of that individual. We do not expect the level of activities during O&M to require an authorized desert tortoise biologist.

Based on the number of tortoises estimated to occur within the solar facility project area and draft Service guidance (Service 2012), development of a desert tortoise translocation plan for this project is not being required. However, desert tortoises that are captured in the SPGF will be relocated in accordance with each individual's Service-approved disposition plan (Conservation Measure 17), which may require temporarily holding tortoises in a facility while health assessments are completed. Information and data from translocation projects have informed this biological opinion; therefore, for the purposes of these analyses, we use the words relocate and translocate interchangeably to describe desert tortoises that will be removed from the SPGF and relocated outside the facility's fence.

All tortoises will be relocated from the fenced SPGF to suitable habitat in as close proximity to the point where they are encountered as possible. Based on the project size and configuration, the furthest distance a desert tortoise may be encountered from the nearest edge of the SPGF is 966 m (0.6 mile). Thus, we do not expect tortoises will need to be relocated much further than 0.6 mile. Prior to relocating tortoises captured in the SPGF, health assessments, which include visual inspection relative to body condition, clinical signs of disease, and collection of biological samples for disease screening (i.e., blood samples to test for antibodies to pathogens), will be completed for each individual in accordance with the most recent Service guidance (Service 2013) and a disposition plan will be prepared. All areas to which tortoises will be relocated from the SPGF will be approved by the Service prior to the tortoise's release to ensure habitat suitability (Conservation Measures 15 and 17). After disease screening results, and approval of disposition plans, the Applicant will relocate all desert tortoises to their respective relocation area. Capture and relocation of individual desert tortoises occurring in the SPGF may result in accidental death and injury due to stress or disease transmission associated with handling; and stress associated with moving individuals outside of their established home range. Relocated individuals and residents in the relocation area may be adversely impacted by resource competition or stress from artificially increasing the density of tortoises in areas outside the SPGF.

Following release, desert tortoises are expected to disperse, but we cannot predict the movement patterns that all relocated individuals are likely to exhibit. Dispersal distances following relocation appear to be influenced by several variables including the distance they are moved from their home range and the availability of resources in the area to which they are moved.

Desert tortoises moved relatively short distances (i.e., less than 1,640 ft) from their home ranges tend to travel shorter distances from their release points than desert tortoises moved more than 1,640 feet. Nussear (2004) reported that for adult desert tortoises moved greater than 1,640 feet, the mean straight-line dispersal distance for both males and females ranged from 0.6 to 3.7 miles. Walde et al. (2008) reported that the mean straight-line dispersal distances for adult desert tortoises using two experimental treatments was approximately 1.6 miles and 2.6 miles for males and 0.9 mile and 1.4 miles for females. Maximum straight-line dispersal distances for translocated adult males ranged from 3.9 miles (Field et al. 2007) to 7.8 miles in the first year following translocation (Walde et al. 2008). Based on the SPGF's size and configuration and the small number of tortoises estimated to occur in the SPGF, we anticipate a small number (e.g., <5), if any, tortoises will be relocated more than 1,640 feet.

The degree to which relocated desert tortoises expand the area they use depends on whether tortoises are released into typical or atypical habitat; that is, if the relocation area supports habitat that is similar to that of the source area, desert tortoises are likely to move less (Nussear 2004). Translocated desert tortoises appear to reduce movement distances following their first post-translocation hibernation to a level that is not significantly different from resident populations (Field et al. 2007; Nussear 2004). As time increases from the date of translocation, most desert tortoises alter their movement patterns from dispersed, random patterns to more constrained patterns, which may indicate establishment of a new home range (Nussear 2004). Just as we cannot predict the distances translocated desert tortoises will move, we also cannot predict the direction these individuals are likely to move. Berry (1986) observed that translocated desert tortoises have exhibited a tendency to orient toward the location of their capture and attempt to move in that direction, and Hinderle (2011) determined that translocation distance but not sex had an effect on the ability of a tortoise to navigate home; other research showed no discernible homing tendency in translocation individuals (Field et al. 2007). Data specific to short-distance relocation indicate that at least some individuals will attempt to return to their former home ranges after release (Rakestraw 1997, Stitt et al. 2003).

Previous translocation studies generally have shown that straight-line dispersal distances from release points vary during the first year following translocation. While the mean straight-line distances reported for several studies are close to or less than 1.6 miles, some translocated desert tortoises move much farther (Nussear 2004, Field et al. 2007, and Gowan and Berry 2009). Based on our analysis of the available data, we expect the movements of most tortoises relocated more than 1,640 feet to remain within 4.0 miles of their release points. This distance was derived by examining the upper limits of the 95 percent confidence intervals for available data. However, as mentioned above, relocated individuals also significantly expand the area they occupy in the first year following translocation (e.g., 3.9 to 6.9 mi^2 at a Nevada site and from 0.2 to 10.3 mi^2 at a Utah site). The distance of 4 miles was chosen to define the maximum anticipated dispersal area for recipient areas.

In one study, the majority of dispersal movement away from the release site occurred during the first 2 weeks after translocation (Field et al. 2007). During this time and over the period prior to establishment of a new home range, translocated desert tortoises may experience higher potential for mortality because they are moving through unfamiliar habitats and are less likely to have established cover sites that provide protection. Studies have documented various sources of mortality for translocated individuals, including predation, exposure, fire, disease, and flooding (Nussear 2004; Field et al. 2007; Berry 1986; U.S. Army 2009, 2010). Of these, mammal predation appeared to be the primary source of mortality in most translocation studies (Nussear 2004; Field et al. 2007; U.S. Army 2009, 2010).

Various studies have documented mortality rates of 0, 15, 21, and 21.4 percent of translocated desert tortoises in other areas (Nussear 2004, Field et al. 2007). Nussear (2004) demonstrated that mortality rates among translocated desert tortoises were not statistically different from that observed in resident populations. However, this study did not compare mortality rates in resident populations to those in control groups; therefore, we cannot determine if the translocation caused increased mortality rates in the resident population. Recent studies in support of the Fort Irwin expansion (U.S. Army 2009 and 2010) compared mortality rates associated with resident and translocated desert tortoise populations with that of control populations; preliminary results indicated translocation did not increase mortality above natural levels (Esque et al. 2010). This and other fieldwork indicate that desert tortoise mortality is most likely to occur during the first year after release. After the first year, translocated individuals are likely to establish new home ranges and mortality is likely to decrease.

Juvenile desert tortoises will comprise a portion of the overall mortality predicted within resident and translocated populations. In general, this life stage experiences higher mortality rates than subadults and adults under natural circumstances and are more susceptible to predation. We estimate that the Applicant will locate and move half of the 20 to 83 juvenile desert tortoises on the proposed solar site. Because of the difficulty in locating juvenile desert tortoises, individuals that are not translocated are likely to die during construction. However, as stated above for direct effects from construction and O&M, based on the estimated desert tortoises expected to occur within the action area and the conservation measures that have been identified for each project component, we conclude that death and injury resulting from translocation of juvenile desert tortoises will not appreciably reduce the desert tortoise population or reproductive success within the Northeastern Mojave Recovery Unit.

Based on the available data on translocation and consistent with the findings in Esque et al. (2010), we conclude that mortality rates in the resident and relocated tortoises are unlikely to be elevated above levels that these populations would experience in the absence of capture and relocation of tortoises in the SPGF. Therefore, we anticipate that death or injury of a small number (see Table 3), if any, subadults, adults, juveniles, or eggs will be the direct result of relocation.

In conclusion, we do not anticipate that moving desert tortoises out of harm's way from the SPGF or the project's linear ROWs would result in death or injury because these individuals would remain near or within their existing home range, which is not likely to result in significant social or competitive impacts to resident desert tortoises in the area. Following release of a desert tortoise relocated outside of its home range, a small number may die due to exposure, stress, dehydration, inadequate food resources, and increased predation. We anticipate most of this mortality is likely to occur in the first year after release, during the period that relocated animals are attempting to adjust or establish new home ranges. However, we cannot determine if mortality rates in relocated individuals would be above natural mortality levels.

Based on draft Service guidance (Service 2012), we are not requiring relocated desert tortoises to be monitored using radiotelemetry after release. However, we will require the exterior of SPGF desert tortoise fence to be monitored on a daily basis during the active desert tortoise season (mid-March through May and September through mid-November) for a minimum of one year post-construction to document any desert tortoises that may be in the area or in stress. If tortoises are still being documented along the fence at the end of the first year, additional monitoring may need to be required. Fencing will be checked monthly and after precipitation that could result in erosion along the base of the fence for the life of the project (See Term and Condition 3.b. below for more information).

Indirect Effects

Indirect effects of the proposed project also result in death or injury to desert tortoises. Some of these effects include increased predation by common ravens, loss or fragmentation of habitat linkages important to maintaining population and genetic connectivity, degradation of habitat and the diet of desert tortoises from the spread of nonnative plant species, and noise and lighting from project construction and operations.

Predator Subsidies

Common ravens and coyotes are attracted to human activities in the desert because food and water subsidies, and roosting and nesting substrates that would otherwise be unavailable. Human activities also facilitate expansion of raven and coyote populations into areas where they were previously absent or in low abundance. Ravens likely will frequent the project areas because of the potential availability of such subsidies. Aside from the Tribal community, no other human communities occur in the action area. Road-kill of wildlife along I-15 provides additional attractants and subsidies for opportunistic predators and scavengers; road-kill is not likely to increase appreciably as a result of the project as I-15 is a heavily traveled highway.

Facility infrastructure, such as power poles, fences, buildings, and other structures on the project site, may provide perching, roosting, and nesting opportunities for ravens and other avian predators. Natural predation rates may be altered or increased when natural habitats are disturbed or modified. As stated above, common raven populations in some areas of the Mojave Desert have increased 1,500 percent from 1968 to 1988 in response to expanding human use of the desert (Boarman 2002). Since ravens were scarce in the Mojave Desert prior to 1940, the existing level of raven predation on juvenile desert tortoises is considered an unnatural occurrence (BLM 1990). In addition to ravens, feral dogs have emerged as significant predators of desert tortoises adjacent to residential areas. Though feral dogs may range several miles into the desert and have been observed digging up and killing tortoises (Evans 2001), we are not aware of any reports of feral dogs in the project area.

To avoid and minimize the availability of project sources of subsidies for predators, subsidies will be minimized by Conservation Measure 12 which proposes monitoring for the presence of ravens and other predators. A predator-control plan will be implemented if predator densities substantially increase in the vicinity of the facility. Specific minimization actions to be implemented include onsite trash management, elimination of available water sources, designing structures to discourage potential nest sites, use of hazing to discourage raven presence, and active monitoring of the site for presence of ravens.

Nonnative Plant Species

Another indirect effect from the development of the proposed project is the potential introduction and spread of nonnative, potentially invasive plant species into habitats adjacent to the project sites. Construction and O&M activities of the proposed project components may increase distribution and abundance of nonnative species within the action area due to ground-disturbing activities that favor these species. Project equipment may transport nonnative propagules into the project area where they may become established and proliferate. In addition, the introduction of nonnative plant species may lead to increased wildfire risk, which ultimately may result in future habitat losses (Brooks et al. 2003) and changes in forage opportunities for desert tortoises.

The Applicant proposed conservation measures as part of the proposed action to address the potential effects from nonnative plant species. Conservation Measure 4 includes controls at entry locations to facilitate weed management and invasive species control from offsite sources. Trucks and other large equipment would be randomly checked before entering the site for any invasive species debris or seed. Conservation Measure 13 describes a Weed Management Plan, which will be approved by the BIA, BLM, and the Tribe which will be implemented prior to the initiation of ground-disturbing activities. Measures in the Weed Management Plan include: worker awareness training; limiting ground disturbance to designated areas only; maintenance of vehicle wash and inspection stations and close monitoring of materials brought onto the site to minimize the potential for weed introduction; reestablishment of native vegetation in disturbed areas to prevent weeds from colonizing newly disturbed areas; and, regularly scheduled monitoring to quickly detect new infestations of weeds, coupled with rapid implementation of control measures to prevent further infiltration.

While we cannot reasonably predict the increase in nonnative species abundance that this project may cause within the action area, the degradation of habitat due to spread of nonnative plants would be minimized through the measures outlined above and in the Weed Management Plan.

Edge Effects

Increased noise levels, ground vibrations, and artificial lighting may affect desert tortoise behavior during construction and O&M of the MSEC over a 30-year period. Effects from construction noise would occur primarily during the 24 months that construction of the MSEC project is expected to take (BIA 2013). While limited data exist on the effect of noise on desert tortoises, Bowles et al. (1999) demonstrated that the species has relatively sensitive hearing (mean = 34 dB SPL), but few physiological effects were observed with short-term exposures to jet aircraft noise and sonic booms. These results cannot be extrapolated to chronic exposures over the lifetime of an individual or a population. In addition during the construction period, traffic would be the primary source of ground vibrations affecting the desert tortoise. Although variable throughout the construction period, approximately 100 daily round trips are expected. Effects from artificial lighting would occur during O&M primarily near the main entrance to the

SPGF and the substations. The Service's 1994 Recovery Plan cited noise and vibration as having potentially significant effects on the desert tortoise's behavior, communication, and hearing apparatus, but limited additional data have been obtained regarding these issues (Service 1994). Noise, ground vibrations, and artificial lighting can affect wildlife in various manners that include physiological damage, masking and behavioral disruption, and chronic stress (Ruby et al. 1994, Longcore and Rich 2004, Blickley and Patricelli 2010). However, we do not have sufficient data documenting the effects of construction noise, ground vibrations, or artificial lighting on desert tortoise behavior and therefore, cannot reasonably predict the magnitude of effects from noise, ground vibrations, or artificial lighting on desert tortoise populations. Based on the ability of other species to adapt to disturbance from noise (Rabin et al. 2003); noise attenuation as distance from the project increases; the short time period when traffic volume will be high; and limited lighting which will be focused downward to avoid lighting habitat beyond the SPGF (Conservation Measure 10), we do not expect any desert tortoises to be injured or killed as a result of project-related noise impacts.

Because few data exist relative to edge effects from noise, vibrations, and lighting during construction and O&M activities, we cannot determine how these potential impacts may affect desert tortoise populations adjacent to the development sites. The lack of information is especially relevant when evaluating effects to individuals that would be impacted by the proposed project. Thus, the magnitude and extent of these edge effects cannot be articulated at this time, but conceivably could disturb individual desert tortoises to the extent that they abandon all or a portion of their established home ranges temporarily or permanently and move elsewhere.

Effects on Population Connectivity

We expect minimal effects to local tortoise population connectivity. Landscape genetic analysis performed by Latch et al. (2011) identified both natural (slope) and anthropogenic (roads) landscape variables that significantly influenced desert tortoise gene flow of a local population. Although they determined a higher correlation of genetic distance with slope compared to roads, desert tortoise pairs from the same side of a road exhibited significantly less genetic differentiation than tortoise pairs from opposite sides of a road. Project access roads are not anticipated to decrease local population connectivity substantially beyond the existing conditions. However, we expect the fenced SPGF could limit habitat connectivity and tortoise movement at a local level (see *Construction and O&M Effects* section above for additional information). We are unaware of existing data to inform a determination of the magnitude and extent of these effects, but we expect movement patterns of individual tortoises occurring in the Action Area could be altered once the fence for the SPGF is installed.

As discussed in the revised recovery plan (Service 2011) and elsewhere, habitat linkages are essential to maintaining rangewide genetic variation (Edwards et al. 2004, Segelbacher et al. 2010) and the ability to shift distribution in response to environmental stochasticity, such as climate change (Ricketts 2000, Fischer and Lindenmayer 2007, EPA 2009). Natural and anthropomorphic constrictions (e.g., I-15) can limit gene flow and the ability of desert tortoises to move between larger blocks of suitable habitat and populations.

Averill-Murray et al. (2013) modeled habitat linkages between [desert] tortoise conservation areas (TCAs). Protection of habitat within TCAs is expected 1) to ensure tortoise populations remain distributed throughout the species' historic range and 2) to conserve the genetic breadth of the species (Service 2011). TCAs are considered to be the minimum baseline areas within which recovery efforts should be focused (Service 2011). Therefore, the preservation of the habitat linkages identified by Averill-Murray et al. (2013) is expected to maintain the movement and therefore gene flow of tortoises between TCAs, thereby increasing the functionality of TCAs and potentially desert tortoise recovery.

The proposed solar facility would be constructed in Dry Lake Valley, a closed northeast-trending basin, bounded on the northwest by the Arrow Canyon Range and on the southeast by the Dry Lake Range (BLM 2012). These topographic features may to some extent isolate the desert tortoises in Dry Lake Valley from other adjacent populations, and Dry Lake Valley was not identified in modeling least-cost pathways for desert tortoise gene flows based on geographic distance, barriers to dispersal, and landscape friction (Hagerty et al. 2010). We do not know what the overall importance of Dry Lake Valley to tortoise population connectivity and recovery is, but Dry Lake Valley where the Action Area is has not been identified as a linkage corridor in current modeling or as a TCA (Averill-Murray et al. 2013). Therefore, based on the information currently available, we do not anticipate the proposed project would significantly modify current opportunities for desert tortoise connectivity. However, we cannot predict how the importance of the proposed project area and Dry Lake Valley may change as development resulting in habitat loss continues within the modeled habitat linkages or as new information regarding effects from climate change within these linkages becomes available (Averill-Murray et al. 2013).

Effectiveness of Conservation Measures at Minimizing Potential Effects to Desert Tortoises

Below is a summary of the effectiveness expected to result from the implementation of the BIA, BLM, and applicant-proposed conservation measures in minimizing potential project effects to the desert tortoise.

Conservation Measure 1: Establish sediment control devices and implement BMPs.

Sediment controls will allow existing water flow patterns to remain and maintain natural sediment transport and flow speeds through and off the site. Silt fence or hay bales will be placed around stock piles to prevent erosion during rain events. Slopes and ravine edges susceptible to sheet flow will be protected by installing control measures such as silt fence, hay bales or gravel bags. Stabilize non-active areas as soon as practicable after construction and no later than 14 days after activity on that portion of the site has temporarily or permanently ceased. Place covers over stockpiled dirt prior to storm or high wind events. Gabions will be constructed and placed within drainages at engineered locations to minimize flow velocity and sediment transport downstream. Construction will be planned so that vegetation is left undisturbed until immediately prior to grading. Sediment control measures would minimize erosion and habitat degradation.

Conservation Measure 2: Worker environmental awareness program (WEAP).

The WEAP will be administered to all onsite personnel prior to starting work on the project. The WEAP would enhance the effectiveness of onsite personnel to improve detection and avoidance of desert tortoises, provide instruction to workers if a tortoise is observed, and ensure compliance with the measures in this biological opinion during construction and O&M activities. The record of participants in the WEAP will provide a means to ensure that all workers have been trained.

Conservation Measures 3, 5, 6, 8, and 22: Monitor construction activities.

Authorized desert tortoise biologists and monitors will be provided and responsible for ensuring that all measures in this biological opinion are properly implemented including: reporting all non-compliance issues; all tortoises encountered in harm's way will be moved to safe areas and reported; project vehicles and equipment activity remain in designated areas; and minimizing the risk to tortoises on project access roads. This measure would reduce the risk to desert tortoises that were not encountered during clearance surveys or enter project areas from adjacent habitat.

Conservation Measures 4 and 13: Weed-control.

Introduction of weeds and invasive species into project and surrounding areas will be controlled using a weed management plan including management and operational measures to avoid the introduction or spread of invasive non-native species in the action area.

Conservation Measures 5 and 25: Install tortoise exclusionary fencing and remove tortoises; Conservation Measures 15 and 17: Desert tortoise relocation and health assessments.

Prior to construction, the solar facility boundary would be permanently fenced with desert tortoise exclusion fencing. Surveys will be conducted prior to habitat disturbance for each phase to locate all desert tortoises within the solar facility site. Tortoises located would be handled by authorized desert tortoise biologists in accordance with Service (2009) protocols and relocated to designated areas. The health status of all tortoises proposed for relocation from the SPGF will be evaluated to minimize the potential spread of disease. The goal of these measures is to ensure that all tortoises are moved from harm's way into suitable habitat and are healthy. The disposition plan will describe in detail the specific procedures that will be implemented to achieve this goal.

The fence would prevent tortoises from entering the project site during construction and O&M activities, including tortoises displaced from the project site. Monitoring fence construction would minimize impacts to tortoises that may occur along the fence.

Conservation Measure 7: Fees.

The Applicant will pay remuneration fees based on acres of anticipated disturbance to the Tribe (885.4 acres) and BLM (66.1 acres). The fees provided to the Tribe will be used for tortoise conservation in consultation with the Service (See Term and Condition 5.h below). BLM actions may involve habitat acquisition, population or habitat enhancement, increasing knowledge of the species biological requirements, reducing loss of individual animals, documenting the species' current status and trends, and preserving distinct population attributes.

Conservation Measure 9: Speed limits.

The proposed speed limit of 25 mph for vehicles and equipment would allow operators more time to see a desert tortoise in their path or harm's way. Low speeds increase the ability of operators to see tortoises in the path of their vehicle or equipment thus avoiding collision with the tortoise.

Conservation Measure 10: Lighting.

The effects of artificial lighting on desert tortoises are not well known. Potential lighting effects would be minimized by focusing lighting toward the solar facility and downward to avoid lighting areas beyond the project perimeter.

Conservation Measure 12: Ravens and other subsidized tortoise predators.

The presence of ravens and other potential human subsidized predators will be monitored and controlled if predator densities substantially increase in the vicinity of the facility. Attraction of ravens and other subsidized predators will be minimized by onsite trash management, elimination of available water sources, designing structures to discourage potential nest sites, and use of hazing.

Conservation Measure 19: Salvage cacti and yuccas; Conservation Measure 20: Mark work areas and locate staging activities in previously-disturbed areas; and Conservation Measure 21: Restore temporary disturbances.

Cacti and yuccas that cannot be avoided during construction on linear ROWs will be salvaged and used to restore temporary disturbances, particularly along the linear project areas, which will speed the recovery of disturbed habitat. To the extent possible, staging areas will be located in previously disturbed areas, minimizing new disturbance. Visibly delineating works areas would inform workers where they may conduct activities and minimize the potential egress of activity beyond these areas. Restoration of disturbances will minimize the habitat loss and minimize spread of non-native plants on the ROW. Where feasible, perennial vegetation will be avoided, thus reducing the loss of shelter and cover habitat for desert tortoises in the action area.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

Increased development would cause continued habitat loss, degradation, and fragmentation for the local desert tortoise population; as well as increased harm and harassment of individual desert tortoises, contributing to the cumulative degradation of the area. Planned future actions such as future transmission line and road corridors, electrical power substations, and industrial solar power plants would likely continue this trend. However, we know of no specific proposal by any non-Federal entity in the action area. The Service determined that most other future actions in the action area would likely require section 7 consultation since the action area is managed by the BIA or BLM.

CONCLUSION

After reviewing the current status of the Moapa dace and the Mojave desert tortoise, the environmental baseline for the action area, the effects of the proposed action and the cumulative effects, it is the Service's biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of these species. We have reached this conclusion based on the following factors:

- The effects of the proposed action on the Moapa dace are within the scope of the actions and effects analyzed in the associated non-jeopardy PBO (File No. 1-5-05-FW-536).

- The BIA, BLM, the applicant, and their contractors will implement numerous conservation measures outlined above to ensure that most tortoises are located and moved out of harm's way and potential desert tortoise injury and mortality is minimized on project work sites (e.g., clearance surveys, authorized desert tortoise biologists, desert tortoise monitors). Since these measures will be implemented, we anticipate that the level of take of desert tortoises will be low (Table 3).

- The BIA, BLM, the applicant, and their contractors will implement measures that are outlined above to ensure that impacts to desert tortoise habitat are minimized.

- The project would not significantly affect the rangewide number, distribution, population connectivity, or reproduction of the desert tortoise; desert tortoises that are moved out of harm's way and placed within their home range will remain in the wild with no long-term adverse effects to survival and reproduction; and the number of tortoises moved out of harm's way and out of their home ranges will be small.

- The potential spread of non-native plant species would be minimized through implementation of an invasive weed management plan.

- Compensation requirements through the BIA, Tribe, and BLM would result in implementing recovery actions for the desert tortoise, as identified by the BIA, Tribe, the BLM, and Service.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act, and Federal regulation pursuant to section 4(d) of the Act, prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined as intentional or negligent actions that create the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not the purpose of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described below for desert tortoises are non-discretionary and must be undertaken by the BIA and BLM so that they become binding conditions of any grant or permit issued to the applicants/permittees, as appropriate, for the exemption in section 7(o)(2) to apply. The BIA and BLM have a continuing duty to regulate the activity covered by this incidental take statement. If the BIA or BLM: 1) fail to assume and implement the terms and conditions; or 2) fail to require the Applicant to adhere to the terms and conditions of the incidental take statement through enforceable stipulations that are incorporated into the permit or grant document, the protective coverage of section 7(o)(2) may lapse. To monitor the impact of incidental take, the BIA and BLM must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR § 402.14(i)(3)].

AMOUNT AND EXTENT OF TAKE

Moapa Dace

The Service anticipates that incidental take of Moapa dace through harm (i.e., habitat modification or degradation that results in death or injury) will occur, but the actual death or injury of fish will be difficult to detect for the following reasons: the species has a small body size and finding a dead or impaired specimen is unlikely in a flowing stream environment. On the other hand, significant habitat modification or degradation that could result in take of Moapa dace will be detectable and measurable. Therefore, we are expressing take of Moapa dace in terms of habitat loss resulting from changes in habitat characteristics, such as water temperature or chemistry and water flows. Although the extent of effects to the species as a result of the proposed action is not yet known, future and on-going biological/hydrological studies will assist us in determining how flow reductions and thermal load losses will affect Moapa dace habitat, food availability, reproduction, and fecundity.

Perhaps the most significant impact to Moapa dace habitat that could result from implementation of the proposed action, as a result of decreased discharge and subsequent wetted area, is the reduction of overall volume of water that would be available to the species within the channel, thereby limiting the chance for long-term survival. Larger water volumes provide the habitat necessary for increased food production and subsequently larger fish, thus greater fecundity. Hence, more numerous, larger eggs provide a better opportunity for species long-term survival.

We have estimated that withdrawal of 50 afy of groundwater estimated to be needed during the 2 years of construction of the proposed project and 30 afy of groundwater estimated to be needed during 25 years of O&M of the MSEC will contribute to the incidental take of Moapa dace by potentially reducing riffle and pool habitat as described in the 2006 PBO. However, habitat loss and associated incidental take of Moapa dace specific to the proposed solar project is difficult to separate from the other parties simultaneously withdrawing groundwater from different locations within the same carbonate aquifer. Given this, the most accurate way to establish habitat loss and associated incidental take of Moapa dace is by evaluating the impacts to Moapa dace habitat on a landscape level, as was done in the PBO. In that parent document, the cumulative withdrawal of 16,100 afy by the parties associated with the MOA predicted a loss of approximately 22 percent riffle and 16 percent pool habitat (as measured at the Warm Springs West gage downstream from the Pedersen Unit) when the flows reach 2.7 cfs. Incidental take is not authorized under the 2006 PBO but deferred to project-specific (tiered) opinions. However, as described above, measuring take of dace is difficult; therefore, the total amount of incidental take of Moapa dace anticipated for the cumulative actions of parties to the MOA is that which is associated with 22 percent loss in riffle habitat and 16 percent loss in pool habitat. Should flows at the Warm Springs West gage decline to a flow below 2.7 cfs, the amount of incidental take for all tiered actions under the MOA, including the MSEC, would be exceeded for the Moapa dace.

Desert Tortoise

The proposed action will result in take (primarily by capture) of all desert tortoises that occur within the fenced perimeter of the proposed solar facility and in harm's way within the development areas of the transmission lines, water pipeline, and access road; and areas where tortoise exclusion fencing would be installed. Table 3 identifies the incidental take threshold for all age classes of desert tortoises during construction activities. Additional desert tortoises in the action area, including buffer areas, may be affected by the project to the extent that incidental take may occur; however, such effects are anticipated to be minor and involve mostly alteration in feeding, sheltering, and reproduction behavior due to reduction or fragmentation of their home ranges.

We acknowledge that we cannot precisely quantify the amount of take that will occur during all project activities. Some of the constraints that make it difficult to determine desert tortoise densities and abundance include the cryptic nature of the species (i.e., individuals spend much of their lives underground or concealed under shrubs), inactivity in years of low rainfall, and low abundance across a broad distribution within several different habitat types. In addition, population numbers and distribution of individuals fluctuate in response to weather patterns and other biotic and abiotic factors over time. The number of juvenile desert tortoises and eggs is even more difficult to quantify because of small size, their location underground, and low detection probabilities during surveys. The following paragraphs define the form of take and the number of individuals we anticipate will be taken by project activities.

All desert tortoises and most nests with eggs within the proposed fence perimeter for the solar facility will be taken as result of the project. The actual number of individuals missed during clearance surveys and killed during construction is unknown. We expect most tortoises missed would be hatchlings and juveniles. Locating the carcasses of small tortoises or egg fragments is unlikely. To address this issue, we have used the threshold for capture of subadult and adult individuals (up to 10 tortoises) on the proposed project sites as a surrogate measure of mortality of the smaller size classes and eggs. Using this threshold as a surrogate assumes that our method of calculating the number of reproductive females, which is based on the estimated abundance of subadult and adult desert tortoises on the proposed project sites, allows us to also calculate the number of juveniles and eggs that may be affected. Consequently, detecting more than 10 subadult and adult desert tortoises on the solar facility site would indicate that a larger number of juveniles and eggs may be killed or destroyed during construction.

The following take of tortoises is based on the pre-project desert tortoise survey data, the proposed action, and the measures proposed by the BIA and BLM. Up to 10 adult and sub-adults and up to 56 juvenile tortoises may be captured within the SPGF fence perimeter and relocated; and 1 adult or sub-adult desert tortoise may be incidentally killed or injured. As discussed above, an unknown number of hatchlings and juveniles will be killed or injured, and an unknown number of tortoise eggs will be destroyed as a result of the project.

We do not know how many desert tortoises will be encountered in harm's way outside the fenced solar site along the ROWs; however, *take* in the form of capture and relocation of all desert tortoises resulting from these incidental encounters is exempted to ensure mortality and injury of desert tortoises is minimized. Based on the survey data and tortoise encounters of similar projects, we estimate that 9 subadult and adult desert tortoises would be captured and moved out of harm's way along the linear ROWs and outside the fenced SPGF and no more than one subadult or adult desert tortoise and two hatchling or juvenile tortoises would be killed or injured during construction activities. Should the number of desert tortoises captured and moved on the linear components of the MSEC be exceeded, the Service should be notified by the BIA or BLM in order to determine if consultation of the proposed action should be reinitiated.

O&M activities may result in incidental take, in the form of mortality or injury, of no more than one subadult or adult desert tortoise for the life of the project; one hatchling or juvenile desert tortoise in a single year, not to exceed 4 for the life of the project; and no eggs should be taken (Table 3). In addition, take in the form of capture from O&M activities may result in the incidental take of no more than 2 subadult and adult tortoises in a single year, not to exceed 10 for the life of the project; 2 hatchling or juvenile tortoises in a single year, not to exceed 10 for the life of the project; and no eggs should be taken (Table 3).

Table 3. Desert Tortoise Incidental Take Thresholds for the MSEC project.

Type of take	**Within fenced perimeter of SPGF**	**Outside fenced perimeter during construction**[1]	**O&M activities**	**Totals for all activities**
Death or injury – subadults & adults	1	1	1 for the life of the project	3
Death or injury – hatchlings & juveniles	unknown[2]	2	1 per year; not to exceed 4 for the life of the project	6

Type of take	Within fenced perimeter of SPGF	Outside fenced perimeter during construction[1]	O&M activities	Totals for all activities
Capture – subadults & adults	10	all in harm's way; estimate = 9	all in harm's way; 2 per year not to exceed 10 for the life of the project	29
Capture – hatchling & juveniles	56	all in harm's way; estimate = unknown[2]	all in harm's way; 2 per year not to exceed 10 for the life of the project	Unknown[2]; estimate = 66
Eggs destroyed	unknown[2]	0	0	unknown

[1]Includes all ROWs.
[2]Take threshold determined by the number of subadults and adults.

The disturbance of up to 951.5 acres of habitat from construction of the proposed solar project including transmission lines, pipeline, and road construction or upgrade activities may result in harm to desert tortoises that use this area as part of their home range. If the proposed project-related activities result in impacts to desert tortoise habitat beyond this acreage, the amount or extent of take will be exceeded.

Although the release of up to 10 adult and subadult tortoises and up to 56 hatchling and juvenile tortoises may disrupt normal behaviors of resident tortoises in the relocation areas, we do not believe this level of disruption will result in incidental take of more than a small number (e.g., <5) of individuals. We do not anticipate that the collection of blood samples of those animals that will be relocated out of the SPGF will result in the death or injury of any individuals because Service-approved authorized desert tortoise biologists will perform health assessments in accordance with the most recent Service guidance (Service 2013).

Effect of Take

In the accompanying biological opinion, the Service determined that the levels of anticipated take associated with this project alone are not likely to jeopardize the continued existence or adversely affect the recovery of the Moapa dace or Mojave desert tortoise.

Reasonable and Prudent Measures (RPMs) with Terms and Conditions (T&Cs)

The BIA, BLM, Tribe, and Applicant will implement numerous conservation measures as part of the proposed action to minimize the incidental take of desert tortoises. Our evaluation of the proposed action is based on the assumption that the actions as set forth in the "Conservation Measures" section of this biological opinion will be implemented. Any proposed changes to the conservation measures or in the conditions under which project activities were evaluated may constitute a modification of the proposed action. If this modification causes an effect to desert tortoises that was not considered in the biological opinion, reinitiation of formal consultation pursuant to the implementing regulations of section 7(a)(2) of the Act (50 CFR § 402.16) may be warranted. The following RPMs supplement and clarify conservation measures included as part of the proposed action. The RPMs are necessary and appropriate to minimize the impact of take on desert tortoises.

To be exempt from the prohibitions of section 9 of the Act, the BIA, BLM, Tribe and Applicant, including all agents, consultants, and contractors, must comply with the following terms and conditions, which implement the reasonable and prudent measures described above, and are intended to minimize the impact of incidental take on the Moapa dace and desert tortoise. These terms and conditions are non-discretionary.

1. *Moapa Dace*

RPM 1: *The BIA shall ensure that measures are implemented to minimize potential impacts to Moapa dace that may result from groundwater pumping associated with construction and O&M of the proposed solar project.*

Term and Condition – The following terms and condition implements RPM 1:

The BIA and Tribe shall implement all conservation measures outlined in the Muddy River MOA that are specific to the project applicant, as well as those measures to be carried out in conjunction with other Parties to the MOA. The specific measures applicable to the Tribe are detailed in the PBO (File No. 1-5-05-FW-536).

2. *Desert Tortoise*

RPM 2: *The BIA and BLM shall ensure the level of incidental take anticipated in this biological opinion is commensurate with the analysis contained herein.*

Term and Condition – The following terms and conditions implement RPM 2:

2.a. To ensure that the conservation measures are effective and properly implemented, the Service and all applicable entities shall be informed immediately upon discovery of a desert tortoise that has been killed or injured within the Action Area of the project. At that time, and in coordination with the Service, the BIA or BLM must review the circumstances surrounding the incident to determine whether additional protective measures are required. Project activities may continue during the outcome of the review, provided the conservation measures included as part of the proposed action (see "Conservation Measures" section) and the T&Cs in this biological opinion have been and continue to be fully implemented.

2.b. Authorized desert tortoise biologists (ADTBs) will be employed to monitor project activities within desert tortoise habitat and are responsible for locating desert tortoise and their sign (i.e., conduct clearance surveys). ADTBs must ensure proper implementation of protective measures, and make certain that the effects of the project on the desert tortoise and its habitat are minimized in accordance with this biological opinion. All incidents of noncompliance in accordance with this biological opinion must be recorded and reported.

Potential authorized desert tortoise biologists must submit their statement of qualifications to the Service's Nevada Fish and Wildlife Office for approval, allowing a minimum of 30 days for Service response. The statement form is available on the internet at:
http://www.fws.gov/nevada/desert_tortoise/auth_dt_form.htm.
Within 3 days of employment or assignment, the Applicant, BLM, or BIA shall provide the Service with the names of FCRs and biological monitors who will assist the authorized desert tortoise biologist.

2.c. FCRs will be assigned to the construction phase of the solar project components; additional FCRs will be assigned for the linear project components including the transmission lines, water pipeline, and access road, as needed. The FCR will be responsible for ensuring compliance to BMPs and other mitigation and minimization measures. Authorized desert tortoise biologists and the FCRs shall be onsite during all construction activities to ensure compliance with this biological opinion, including avoidance of inadvertently harming any desert tortoises that may wander onto the construction site. The authorized desert tortoise biologist and FCRs shall be responsible for: (1) enforcing the litter-control program; (2) ensuring that desert tortoise habitat disturbance is restricted to authorized areas; (3) ensuring that all equipment and materials are stored within the boundaries of the construction zone or within the boundaries of previously-disturbed areas or designated areas; (4) ensuring that all vehicles associated with construction activities remain within the proposed construction zones; and (5) ensuring compliance with the T&Cs of this biological opinion.

2.d. All desert tortoises in harm's way may be moved out of harm's way by an authorized desert tortoise biologist (T&C 3a). Tortoises shall not be unnecessarily handled (e.g., no marking, no health assessment beyond visual) or manipulated in any way that will result in an increase in handling time.

2.e. The BIA or BLM must reinitiate consultation on the proposed action if any of the following occur: more than 10 subadult or adult desert tortoises are identified for relocation during clearance surveys of the SPGF; desert tortoise mortalities on all project components exceed thresholds in Table 3; or desert tortoise incidental take along the linear ROWs outside the SPGF in the form of capture and handling exceed the number identified in Table 3.

2.f. Desert tortoises that are determined to be sick or injured, will be transferred to an appropriate facility as directed by the Service. The Applicant is responsible for paying for care of desert tortoises taken an appropriate facility as directed by the Service.

RPM 3: *The BIA or BLM shall ensure that desert tortoises and their eggs in harm's way are located, properly handled, and moved to safety.*

Term and Condition – The following terms and conditions implement RPM 3:

3.a. A desert tortoise education program will be prepared and presented by an authorized desert tortoise biologist to all personnel onsite during construction activities. The program will contain information concerning the biology and distribution of the desert tortoise, its legal status and occurrence in the proposed project area, the definition of take and associated penalties, measures designed to minimize the effects of construction activities, the means by which employees can facilitate this process, and reporting requirements to be implemented when desert tortoises are encountered.

3.b. Tortoise-proof fencing shall be installed around the boundary of the SPGF. Fence specifications will be consistent with those approved by the Service in the Desert Tortoise Field Manual (Service 2009). Shade stations will be installed along the outside of the tortoise fence for tortoises that may travel along this area. Once exclusion fencing is installed, an authorized desert tortoise biologist will survey the SPGF area following standard protocols (Service 2009) to ensure that no tortoises or active burrows are present in the fenced area. An authorized desert tortoise biologist or monitor will be required to walk the entirety of the exterior of the SPGF fence on a daily basis during the desert tortoise active season (mid-March through May and September through mid-November) for a minimum of one year after the fence is constructed to document any desert tortoises that may be in the area or in stress. If tortoises are still being documented along the perimeter of the exterior of the fence at the end of the first year, the BIA will coordinate with the Service to extend the duration of this monitoring. Tortoises that are encountered along the perimeter of the fence that appear to be in stress may be transported to a veterinarian or wildlife rehabilitation facility with Service approval.

Fencing will be checked monthly and after precipitation that could result in erosion along the base of the fence for the life of the project. Repairs will be made in a timely manner upon discovery of potential breaches in the fencing. Monitoring and maintenance of the fencing shall include regular removal of trash and sediment accumulation and restoration of zero ground clearance between the ground and the bottom of the fence, including re-covering the bent portion of the fence if not buried.

Tortoise guards shall be placed at all road access points, where desert tortoise-proof fencing is interrupted, to exclude desert tortoises from the road and solar facility. The Applicant shall coordinate with the Service on placement and design of tortoise guards and their connection with the fencing, to ensure that the guards provide a functional barrier to desert tortoises. Tortoise guards will be inspected quarterly and maintained to ensure they continue to function as a tortoise barrier.

3.c. Prior to surface-disturbing activities, authorized desert tortoise biologists, potentially assisted by project monitors, shall conduct a clearance survey in accordance with Service-approved protocol (Service 2009) to locate and remove all desert tortoises from areas to be disturbed or in harm's way using techniques that provide full coverage of all areas. Two passes of complete coverage will be accomplished. The authorized desert tortoise biologists shall also capture, handle, and relocate desert tortoises from harm's way in accordance with the Desert Tortoise Field Manual (Service 2009), as appropriate. Any tortoises encountered after clearance surveys in the SPGF will be handled in the same manner to those encountered during clearance surveys. Any desert tortoise eggs observed in harm's way will be relocated from harm's way by an authorized desert tortoise biologist in accordance with Service-approved protocol (Service 2009). Desert tortoise burrows that occur immediately outside work areas that can be avoided by project activities shall be clearly marked or flagged to prevent crushing. Burrows occupied by adult females will be examined thoroughly for nests and eggs during the months of May through October. For those burrows that can be avoided, no desert tortoises shall be prevented from exiting their burrows by placing rocks or other obstructions at their burrow entrances without written authorization from the Service.

3.d. All burrows detected within areas proposed for disturbance, whether occupied or vacant, shall be excavated by an authorized desert tortoise biologist and collapsed. All burrows will be excavated with hand tools to allow removal of desert tortoises or desert tortoise eggs. All desert tortoise handling and excavations, including nests, will be conducted by an authorized desert tortoise biologist in accordance with Service-approved protocol (Service 2009).

3.e. *Project areas outside the fenced solar facility:* All desert tortoises in harm's way shall be relocated to safe, secure areas with suitable shelter and habitat up to 1,000 feet from the point of capture in accordance with the Desert Tortoise Field Manual (Service 2009). If a tortoise is injured as a direct or indirect result of project activities, it shall be immediately transported to a veterinarian or wildlife rehabilitation facility and the Service will be notified by the close of the first business day subsequent to the incident.

Project areas inside the fenced solar facility: The Applicant will complete 1) health assessments, which may require temporarily holding the tortoises in a facility or temporary pen while the assessment is completed; and 2) development of a disposition plan for each tortoise encountered in the SPGF following Service-approved protocol (Service 2013). Disposition plans must be submitted to and approved by the Service's Desert Tortoise Recovery Office and Las Vegas office prior to relocating any tortoises. Tortoises encountered within 1,000 feet outside of the fence boundary also may be considered for relocation to secure areas outside the fence if approved by the Service.

3.f. All trenches and holes shall be covered, fenced or backfilled to ensure desert tortoises do not become trapped unless alternate measures are in place as agreed to by the BIA, BLM, and Service. If trenches or holes are to remain open during construction, they will be checked for tortoises at least four times a day, at the start of day, at mid-morning, early afternoon, and at the end of the work day. The trenches or holes will also be checked immediately before backfilling regardless of the season. Tortoises encountered in the trench will be reported and moved out of harm's way in accordance with handling protocols (Service 2009). In addition, wildlife escape ramps in open trench segments will be no greater than every 0.25 mile.

3.g. Any project-related activity that may endanger a desert tortoise shall cease if a desert tortoise is encountered on the project site. Project activities may resume after an authorized desert tortoise biologist removes the desert tortoise from danger or after the desert tortoise has moved to a safe area.

3.h. If a tortoise is encountered and relocated to a safe area, an authorized desert tortoise biologist, biological monitor, or FCR shall inform workers in the area to be particularly watchful for the tortoise as it may return to the work area.

No desert tortoises shall be prevented from exiting their burrows by placing rocks or other obstructions at their burrow entrances without written authorization from the Service.

3.i. Areas underneath parked project vehicles and equipment will be inspected for desert tortoises before moving them.

3.j. Vehicle speed within the project area will not exceed 25 mph. Speed limits will be clearly marked and all workers will be made aware of these limits.

3.k. Water used for fugitive dust control will not be allowed to pool on access roads or other project areas outside the fenced area, as this can attract desert tortoises. Similarly, leaks on water trucks and water tanks will be repaired to prevent pooling water.

3.l. Should any desert tortoise be injured or killed, all activities that have the potential for take will be halted, and the FCR or authorized desert tortoise biologist will be immediately contacted. The BIA, BLM, FCR or authorized desert tortoise biologist will notify the Las Vegas office of the Service by the close of the first business day subsequent to the incident.

3.m. The BIA, BLM, Tribe, and Applicant shall implement appropriate measures, which may include measures not specified in this biological opinion, to ensure that desert tortoises captured and moved, or occur in harm's way do not die or become injured as a direct or indirect (e.g., predation, maladjustment to release areas) result of the project. Measures in this biological opinion may require modification or additional measures may be necessary in response to conditions and situations that pose a threat to the well-being of desert tortoises, in consultation with the Service.

RPM 4: *The BIA or BLM shall ensure implementation of measures to minimize predation on desert tortoises by ravens or other desert tortoise predators attracted to the action area.*

Term and Condition – The following terms and conditions implement RPM 4:

4.a. A litter control program shall be implemented to reduce the attractiveness of the area to opportunistic predators such as desert kit fox, coyotes, and common ravens. Trash and food items will be disposed properly in predator-proof containers with re-sealing lids. Trash containers will be emptied and construction waste will be removed daily from the project area and disposed of in an approved landfill.

4.b. The Applicant will monitor for the presence of ravens and other potential human-subsidized predators will be conducted and a control plan will be developed and implemented in coordination with the Service if predator densities substantially increase in the vicinity of the facility. In addition to trash management, the Applicant will implement BMPs to discourage the presence of ravens onsite including elimination of available water sources, designing structures to discourage potential nest sites, use of hazing to discourage raven presence, and active monitoring of the site for presence of ravens. Raven nesting material may be removed if no eggs or young are present in the nest.

4.c. Dogs will be prohibited in all project work areas.

RPM 5: *The BIA or BLM shall ensure implementation of measures to minimize loss and long-term degradation of desert tortoise habitat, such as soil compaction, erosion, crushed vegetation, or introduction of non-native invasive plants or weeds as a result of project activities.*

Term and Condition – The following terms and conditions implement RPM 5:

5.a. Perennial native vegetation will be flagged and avoided to the maximum extent practicable.

5.b. Cross-country travel and travel outside designated areas shall be prohibited.

5.c. The Applicant and Tribe will coordinate to salvage and relocate cacti, yuccas, and shrubs on linear ROWs and plant them back on temporarily disturbed portions of the ROWs similar to the efforts undertaken on adjacent BLM lands. If the Tribe chooses to salvage plants from the 847-acre solar facility, these plants may be held in a nursery or other temporary holding location until needed; no monitoring is required for these plants.

5.d. All work area boundaries will be conspicuously staked, flagged, or otherwise marked to minimize surface disturbance activities. All workers, equipment, vehicles, and construction materials shall remain within the ROW, existing roads, and designated areas. Staging areas will be located in previously-disturbed areas whenever possible.

5.e. The Applicant will develop a habitat restoration plan to be implemented for all temporary disturbances associated with construction of the project to be approved by the BIA, BLM (for disturbance of BLM land), Tribe, and the Service.

5.f. The proposed Weed Management Plan will be developed and implemented (Conservation Measure 15).

5.g. Final power transmission tower and associated spur road locations will be adjusted to avoid potentially active tortoise burrows to the maximum extent practicable.

5.h. In accordance with the project description, the Applicant will pay remuneration fees for the acres disturbed on Tribal and BLM lands, accordingly, prior to surface-disturbing activities associated with the MSEC. The fees on both Tribal and BLM lands would be assessed at the rate of $824 per acre of disturbance (Hastey et al. 1991). The fee rate will be indexed for inflation based on the Bureau of Labor Statistics Consumer Price Index for All Urban Consumers (CPI-U) on January 31st of each year, becoming effective March 1st. Fees assessed or collected for projects covered under this biological opinion will be adjusted based on the current CPI-U for the year they are collected. Information on the CPI-U is located on the internet at: http://www.bls.gov/news.release/cpi.toc.htm. The next adjustment will occur March 1, 2014. Fees may be paid at any time prior to surface-disturbing activities at the current fee rate of the date of payment.

BLM shall collect remuneration fees for compensation of 66.1 acres of desert tortoise habitat loss (Appendix A). At the current rate, total fees for project disturbance of desert tortoise habitat on BLM lands will be (66.1 acres x $824) $54,466.40. Remuneration fees shall be used for management actions, as identified by the BLM and Service, expected to promote recovery of the desert tortoise over time. Actions may involve habitat acquisition, population or habitat enhancement, increasing knowledge of the species' biological requirements, reducing loss of individual animals, documenting the species status and trend, and preserving distinct population attributes. This fee will be paid directly to BLM.

The payment shall be accompanied by the Section 7 Fee Payment Form (Appendix A) and completed by the payee. Payment shall be certified check or money order payable to BLM, and delivered to:

DOI/BLM
ATTN: Information Access Center
The Bureau of Land Management
1340 Financial Boulevard
Reno, Nevada 89502
Contact: (775) 861-6400

The Tribe shall collect remuneration fees for compensation of 885.4 acres of desert tortoise habitat loss. At the current rate, total fees for project disturbance of desert tortoise habitat on Tribal lands will be (885.4 acres x $824) $729,569.60. The Tribe, BIA, and Service have worked cooperatively to develop the "Management and Conservation Plan for the Moapa River Indian Reservation" (Service et al. 2014), which identifies actions the Tribe can take to promote the conservation and recovery of the desert tortoise over time across the Reservation. The remuneration fees collected by the Tribe for development of the MSEC shall be used on specific actions selected from this plan. The Tribe, BIA, and Service will coordinate on the details of selected actions prior to implementation

RPM 6: *The* BIA or *BLM shall ensure implementation of measures to ensure compliance with the RPMs, Terms and Conditions, reporting requirements, and reinitiation requirements contained in this biological opinion.*

Term and Condition – The following terms and conditions implement RPM 6:

6.a. **Construction and O&M Reporting Requirements:** The BIA and BLM will be responsible for providing quarterly reports during construction and annual reports during O&M activities for actions on lands managed by the respective agency. The BIA and BLM may delegate this responsibility to the Tribe or Applicant. In addition, a final construction report will be submitted to the Service within 60 days of completion of construction of the project. All quarterly reports are due by the 10th of each of the following months (January, April, July, October), and annual reports are due February 1 of each year. The Service anticipates the first annual report by February 1, 2015, if construction or project activities occur in 2014. Annual status updates shall be provided to the Service during O&M activities for the life of the facility.

Tortoise monitoring reports are required quarterly during the duration of construction and annually during O&M for the life of the facility. Specifically, all reports must include Table 4 (see below) information on any instances when desert tortoises were killed, injured, or handled; the circumstances of such incidents; and any actions undertaken to prevent similar incidents from reoccurring. Additionally, the reports should provide detailed information regarding each desert tortoise handled or observed. Information will include the following: location (GPS), date and time of observation, whether desert tortoise was handled, general health and whether it voided its bladder, location desert tortoise was moved from and location moved to, unique physical characteristics of each tortoise, and effectiveness and compliance with the desert tortoise protection measures.

Table 4. Desert Tortoise Actual Incidental Take for the Moapa Solar Energy Center Project, Clark County, Nevada.

<table>
<tr><th rowspan="2">Activity</th><th colspan="2">Actual Mortality, Injury, and Destruction</th><th colspan="2">Actual Harassment: Capture and Removal</th><th>Actual Habitat Loss (ac)</th></tr>
<tr><td>Adults / Subadults</td><td>Juveniles / Hatchlings</td><td>Adults / Subadults</td><td>Juveniles / Hatchlings</td><td>Non-critical</td></tr>
<tr><td>Construction</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Operation and Maintenance</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Predation</td><td></td><td></td><td></td><td></td><td>None</td></tr>
<tr><th colspan="2">Minimization Measure Implemented</th><th colspan="4">Effectiveness and Recommendations</th></tr>
<tr><td colspan="2"></td><td colspan="4"></td></tr>
</table>

6.b. Any incident occurring during project activities that was considered by the FCR, authorized desert tortoise biologist or biological monitor to be in non-compliance with this biological opinion will be documented immediately by the authorized desert tortoise biologist and included in the monitoring report.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

1. We recommend the BIA and Tribe continuously monitors the recorded groundwater level in the reservation production well that will be pumped for this project in order to validate the anticipated impacts from pumping.
2. We recommend the Tribe develops a Reservation-wide desert tortoise assessment based on desert tortoise and vegetation surveys that use methodologies approved by the FWS. This information can be used to 1) identify areas on the Reservation that will least impact tortoise and are therefore the most appropriate for development, and 2) develop a reserve design for desert tortoise habitat on the Reservation in consideration of the existing

6,000-ac conservation area associated with the K Road Solar Energy Project, contiguous and adjacent BLM land, and potential development areas.

3. We recommend that the Tribe and Applicant consider retrofitting the existing irrigation diversion of the Muddy River on the Reservation to function as a barrier to non-native fish which are a threat to the Moapa dace, as well as a diversion structure in consultation with the Service.

4. Desert tortoise fencing installed for the previously proposed Ash Grove Cement Project should be removed or breaches established to reduce fragmentation of the habitat and reduce the threat to tortoises and other wildlife.

REINITIATION NOTICE

This concludes formal consultation on BIA's proposal to approve the lease for development of a solar energy project and associated linear components and BLM's proposal to issue ROW grants to Moapa Solar LLC for construction of linear components on BLM-administered lands. Consistent with 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal involvement or control over the action has been retained (or is authorized by law) and if: 1) the amount or extent of take specified in the incidental take statement is exceeded; 2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; 3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this biological opinion; and 4) a new species is listed or critical habitat designated that may be affected by the action. In addition, if any of the stated assumptions used in our analysis are invalidated, BIA or BLM must reinitiate consultation.

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<u>Personal Communications</u>

Harper, Don. 2011. Cartographer, Fish and Wildlife Service, Las Vegas, Nevada.

Mellison, Chad. 2011. Fish and Wildlife Biologist, Fish and Wildlife Service, Reno, Nevada.

APPENDIX A. BLM REMUNERATION FEE PAYMENT FORM

Biological Opinion File Number: 84320-2013-F-0301

Biological Opinion Issued By: Nevada Fish and Wildlife Office, Las Vegas, Nevada

Species: Mojave Desert Tortoise (*Gopherus agassizii*)

Project Name: Moapa Solar Energy Center Project

Project Proponent: Moapa Solar LLC

Phone Number: ____________________

Payment Calculations:	Clark County		Lincoln County		________ County	
	Critical habitat	Non-critical habitat	Critical habitat	Non-critical habitat	Critical habitat	Non-critical habitat
# acres anticipated to be disturbed on federal land	0	66.1	0	0		
Fee rate (per acre)	0	0	0	0		
Total cost per county	$ 0		$ 0		$ -	

Total payment required (all counties): $

Amount paid: __________ Date: __________ Check/Money Order #: __________

Authorizing agencies: Bureau of Land Management, Las Vegas, Nevada

Make check payable to: Bureau of Land Management

Deliver check to:

Physical Address
Bureau of Land Management
Attn: Information Access Ctr
1340 Financial Blvd.
Reno, NV 89502

PO Box
Bureau of Land Management
Attn: Information Access Ctr
PO Box 12000
Reno, NV 89520-0006

For BLM Public Room
Process check to:
Contributed Funds-All Other
WBS: LVTFF1000800
7122 FLPMA
All other Res. Dev. Project and Management
Remarks: LLNV9300000 L71220000.JP0000 LVTFF1000800 Desert Tortoise Conservation Program

Please provide a copy of this completed payment form and the payment receipt to NV-930, Attn: T&E Program Lead

***T&E Program Lead will provide a copy to the appropriate District Office(s)*

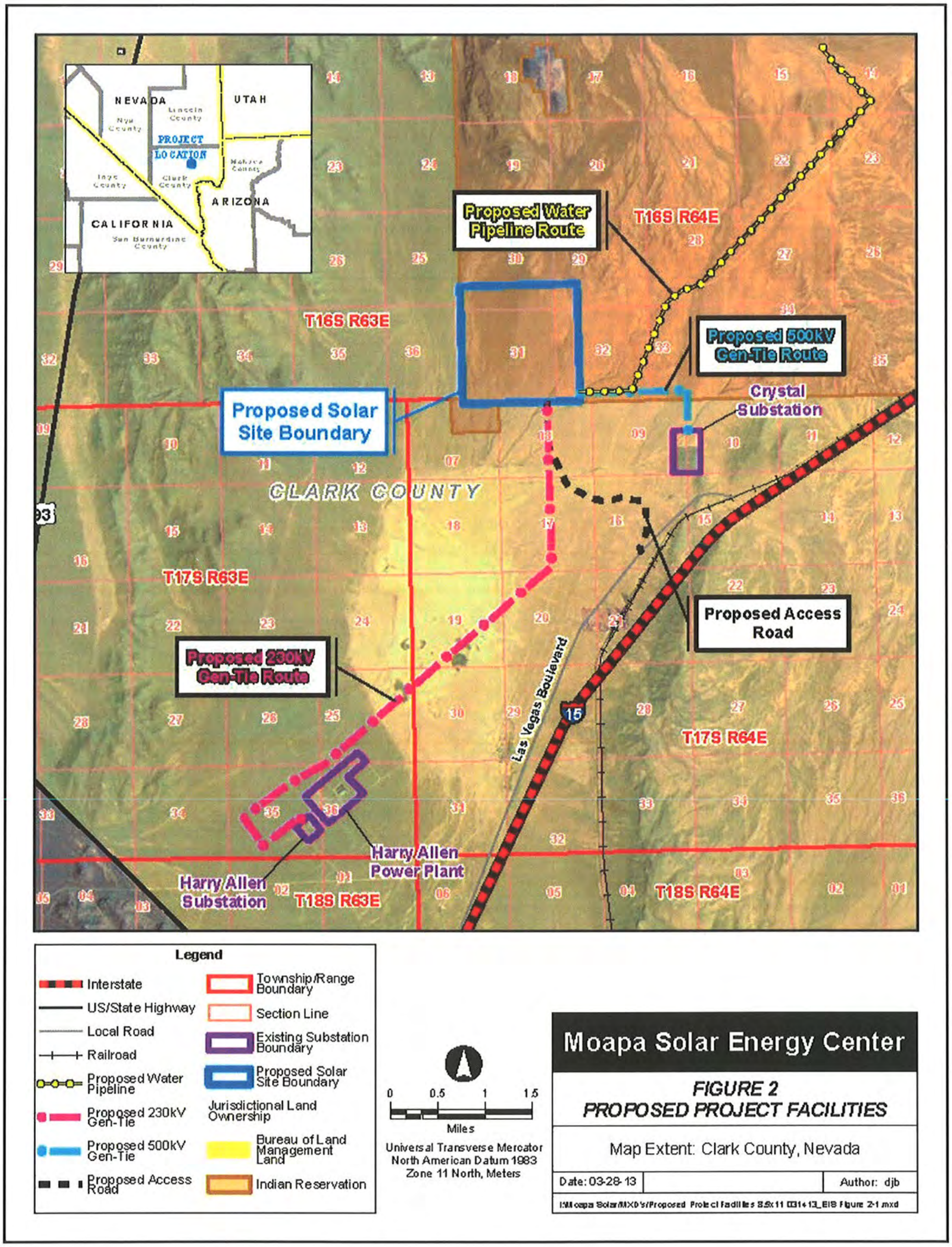


Figure 1. Approximate location of project features for the Moapa Solar Energy Center, Clark County, Nevada.

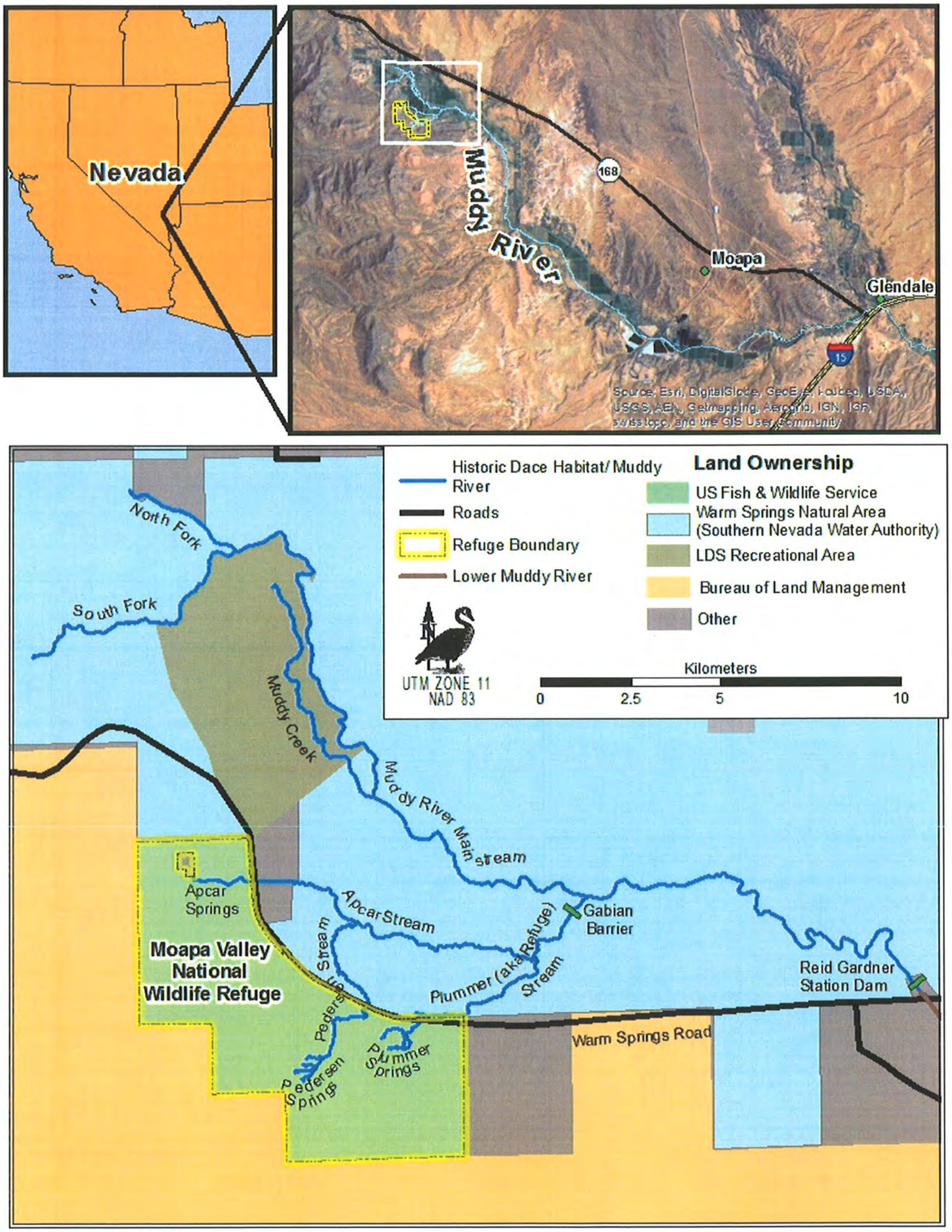
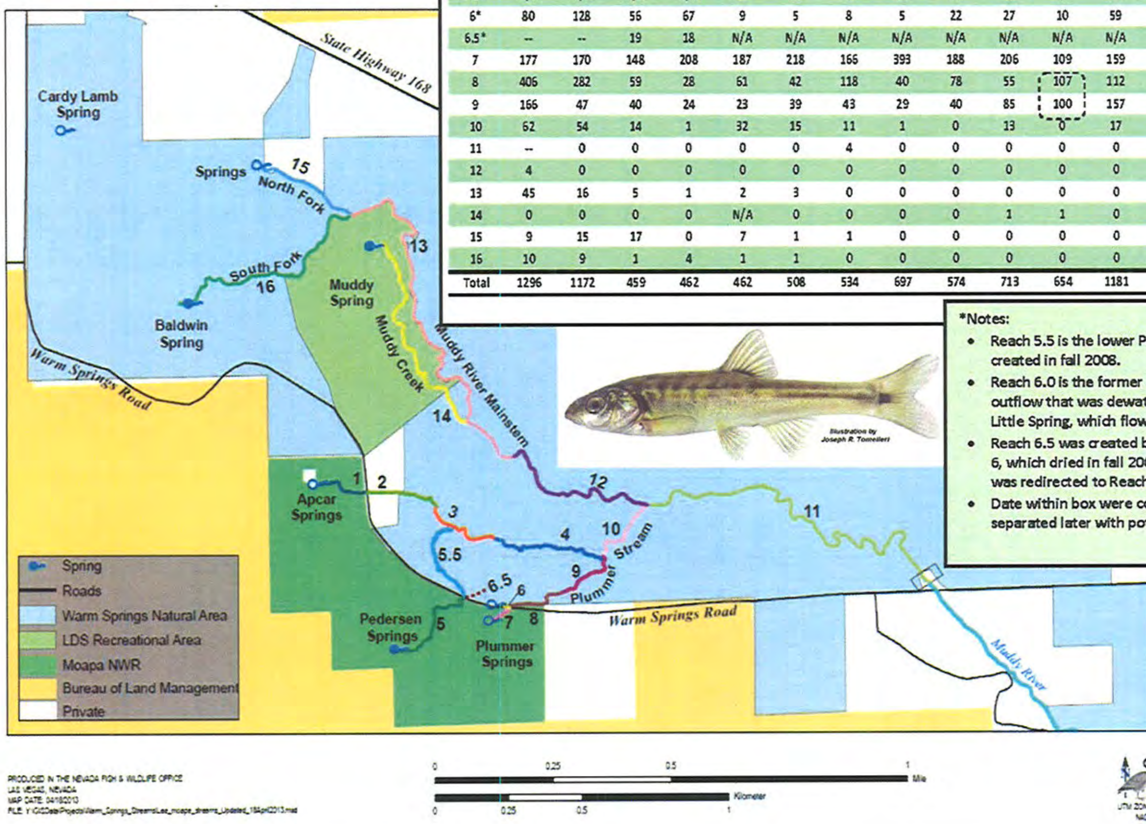


Figure 2. General and specific locations where the Moapa dace occurs.



Reach	Feb. 2005	Feb. 2007	Feb. 2008	Aug. 2008	Feb. 2009	Aug. 2009	Feb. 2010	Aug. 2010	Feb. 2011	Aug. 2011	Feb. 2012	Aug. 2012	Feb. 2013	Aug. 2013	Feb. 2014
1	6	0	0	N/A	N/A	1	7	20	28	67	74	84	69	72	
2	87	42	50	22	29	34	13	35	20	54	78	79	139	310	
3	52	14	0	4	2	4	3	0	1	8	10	31	127	248	
4	18	0	0	3	0	10	7	0	2	1	0	13	62	156	
5	174	395	50	82	80	84	82	90	99	108	66	94	128	85	
5.5*	N/A	N/A	N/A	N/A	29	51	71	84	96	88	99	376	244	318	
6*	80	128	56	67	9	5	8	5	22	27	10	59	36	48	
6.5*	--	--	19	18	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
7	177	170	148	208	187	218	166	393	188	206	109	159	113	144	
8	406	282	59	28	61	42	118	40	78	55	107	112	141	161	
9	166	47	40	24	23	39	43	29	40	85	100	157	153	185	
10	62	54	14	1	32	15	11	1	0	13	0	17	14	0	
11	--	0	0	0	0	0	4	0	0	0	0	0	0	0	
12	4	0	0	0	0	0	0	0	0	0	0	0	0	0	
13	45	16	5	1	2	3	0	0	0	0	0	0	0	0	
14	0	0	0	0	N/A	0	0	0	0	1	1	0	0	0	
15	9	15	17	0	7	1	1	0	0	0	0	0	0	0	
16	10	9	1	4	1	1	0	0	0	0	0	0	0	0	
Total	1296	1172	459	462	462	508	534	697	574	713	654	1181	1226	1727	

*Notes:

- Reach 5.5 is the lower Pedersen outflow created in fall 2008.
- Reach 6.0 is the former lower Pedersen outflow that was dewatered in 2008 exposing Little Spring, which flows into reach #8.
- Reach 6.5 was created by leakage from Reach 6, which dried in fall 2008 when Pedersen flow was redirected to Reach 5.5.
- Date within box were comingled and separated later with potential error.

Figure 3. Overall trend in Moapa dace numbers since 2005.