CH2M HILL
2485 Natomas Park Drive
Suite 600
Sacramento, CA 95833
Tel 916-920-0300
Fax 916-920-8463

September 12, 2008
File No.: 04.02.06.02
Project No. 357891

Mr. Che McFarlin, Project Manager
California Energy Commission
Systems Assessment and Facilities Siting Division
1516 9th Street, MS 15
Sacramento, CA 95814-5504

RE: Data Response, Set 2D
Ivanpah Solar Electric Generating System (07-AFC-5)

Dear Mr. McFarlin:

On behalf of Solar Partners I, LLC, Solar Partners II, LLC, Solar Partners IV, LLC, and Solar Partners VIII, LLC (Applicant), please find attached one original and 12 hard copies of Data Response, Set 2D, which provides a response to Staff's Data Requests dated May 8, 2008.

Please call me if you have any questions.

Sincerely,

CH2M HILL

John L. Carrier, J.D.
Program Manager

Enclosure
c: POS List
Project File

Ivanpah Solar Electric Generating System (ISEGS)

(07-AFC-5)

Data Response, Set 2D

(Responses to Data Requests: Biological Resources)

Submitted to the

California Energy Commission

Submitted by

Solar Partners I, LLC; Solar Partners II, LLC; Solar Partners IV, LLC; and Solar Partners VIII, LLC

September 12, 2008

With Assistance from

CH2MHILL
2485 Natomas Park Drive
Suite 600
Sacramento, CA 95833

Introduction

Attached are Solar Partners I, LLC, Solar Partners II, LLC, Solar Partners IV, LLC, and Solar Partners VIII, LLC (Applicant) responses to the California Energy Commission (CEC) Staff's data requests for the Ivanpah Solar Electric Generating System (Ivanpah SEGS) Project (07-AFC-5). The CEC Staff served these data requests on May 8, 2008, as part of the discovery process for Ivanpah SEGS. The responses are grouped by individual discipline or topic area. Within each discipline area, the responses are presented in the same order as CEC Staff presented them and are keyed to the Data Request numbers. New graphics or tables are numbered in reference to the Data Request number. For example, the first table used in response to Data Request 15 would be numbered Table DR15-1. The first figure used in response to Data Request 15 would be Figure DR15-1, and so on. AFC figures or tables that have been revised have "R1" following the original number, indicating revision 1.

Additional tables, figures, or documents submitted in response to a data request (supporting data, stand-alone documents such as plans, folding graphics, etc.) are found at the end of a discipline-specific section and may not be sequentially page-numbered consistently with the remainder of the document, though they may have their own internal page numbering system.

The Applicant looks forward to working cooperatively with the CEC and BLM staff as the Ivanpah SEGS Project proceeds through the siting process. We trust that these responses address the Staff's questions and remain available to have any additional dialogue the Staff may require.

Biological Resources (124)

BACKGROUND:

Data request 17 stated: Provide status and progress updates on the anticipated schedule (including estimated dates) for submitting the Biological Assessment (BA) and consulting with the California Department of Fish and Game (CDFG) regarding rare plant and desert tortoise impacts. The data request response stated: A draft BA was prepared by CH2M HILL and submitted to the BLM on October 30, 2007. The BA will be submitted to the United States Fish and Wildlife Service (USFWS) by the BLM upon the completion of their review of the document. Meetings with CDFG will be scheduled within 60 days of submittal.

BLM has reviewed the draft BA submitted on October 30, 2007. In general, BLM has determined that more effects analysis is needed, and specifically, protective measures for the desert tortoise on the gas pipeline and water pipeline portions of the project are lacking incomplete, inaccurate, or confusing. Also, the desert tortoise protective measures need to be organized to reflect whether or not they apply to construction, or to operations and maintenance. Applicant will need to incorporate the protective measures into the proposed action. BLM is concerned other agencies such as the US Army Corps of Engineers and the State Water Resources Control Board (SWRCB) may require additional mitigation measures or changes to the project that will affect the project footprint therefore changing the proposed action. Changes to the project proposed action must all be made prior to submission of the BA to the USFWS.

DATA REQUEST:

124. The following requests are based on BLM review of the Draft Biological Assessment for the Ivanpah Solar Electric Generating System Project (October 2007); hereinafter referred to as the ISEGS draft BA:

    - Change use of the word “will” in this document to “would.
    - This consultation is on the *desert tortoise*. Refer to this species as such throughout the document. Please replace “covered species” with “desert tortoise” throughout the document.
    - Update the BA as outlined in attachment #1, Biological Assessment Comments. Please coordinate with Charles Sullivan (BLM Needles Field Office) concerning questions on these sections of the BA that require modification.

Response: Applicant has addressed these comments and a Draft Biological Assessment (Revision 1) is being submitted to BLM as Attachment DR124-1A.

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    - Update the BA as outlined in attachment #1, Biological Assessment Comments. Please coordinate with Charles Sullivan (BLM Needles Field Office) concerning questions on these sections of the BA that require modification.

Response: Applicant has addressed these comments and a Draft Biological Assessment (Revision 1) is being submitted to BLM as Attachment DR124-1A.

Attachment DR124-1A
Revision 1

Draft Biological Assessment for the Ivanpah Solar Electric Generating System (Ivanpah SEGS) Project

Prepared for

Bureau of Land Management

Prepared on behalf of

Solar Partners I, LLC; Solar Partners II, LLC; Solar Partners IV, LLC; and Solar Partners VIII, LLC

Prepared by

CH2MHILL
2485 Natomas Park Drive, Suite 600
Sacramento, CA 95833

September 2008

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Acronyms and Abbreviations

ACEC	Area of Critical Environmental Concern
AT&T	American Telephone and Telegraph
BA	Biological Assessment
BLM	United States Bureau of Land Management
BMP	best management practices
BRMIMP	Biological Resources Mitigation, Implementation and Monitoring Plan
CAISO	California Independent System Operator
Caltrans	California Department of Transportation
CCDOA	Clark County Department of Aviation
CDFG	California Department of Fish and Game
CEC	California Energy Commission
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
DOD	Department of Defense
DWMA	Desert Wildlife Management Area
EIS	Environmental Impact Statement
ESA	Endangered Species Act
FRA	Federal Railroad Administration
GPM	gallons per minute
GPS	global positioning system
HDPE	high density polyethylene
HMBP	Hazardous Materials Business Plan
I-15	Interstate 15
Ivanpah SEGS	Ivanpah Solar Electric Generating System
KRGT	Kern River Gas Transmission
kV	kilovolt
LADWP	Los Angeles Department of Water and Power

LLC	limited liability corporation
LORS	laws, ordinances, regulations, and standards
MW	megawatt
NEMO	Northern and Eastern Mojave Plan
NFPA	National Fire Protection Association
NOI	Notice of Intent
NOP	Notice of Preparation
MNP	Mojave National Preserve
NPS	National Park Service
POD	Plan of Development
PVC	polyvinyl chloride
RMP	Risk Management Plan
ROW	right-of-way
SCADA	Supervisory Control and Data Acquisition
SCE	Southern California Edison
SPT	solar power tower
STG	steam turbine generator
SWPPP	Stormwater Pollution Prevention Plan
TMWC	Table Mountain Wind Company
UPRR	Union Pacific Railroad
URTD	upper respiratory tract disease
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
WEAP	Worker Environmental Awareness Program
ZOI	zone of influence

Introduction

1.1 Purpose and Need

Solar Partners I, LLC; Solar Partners II, LLC; Solar Partners VIII, LLC, the owners of the three separate solar plants, and Solar Partners IV, LLC, the owner of shared facilities required by the three solar plants (the "Applicant") are proposing to develop a solar facility (together referred to as the Ivanaph Solar Electric Generating System, or Ivanaph SEGS) in the Ivanpah valley about 4.5 miles southwest of Primm, NV. The purpose of this Biological Assessment (BA) is to support formal Section 7 Consultation under the Endangered Species Act (ESA) with the U.S. Fish and Wildlife Service (USFWS). This BA has been prepared in accordance with legal requirements set forth under Section 7 of the ESA (16 U.S.C. 1536(c)), and adheres to the standards established in the ESA consultation handbook. Formal Section 7 consultation with the USFWS is required for any federal action that may adversely affect a federally listed species. The Mojave population of the desert tortoise (*Gopherus agassizii*) is a federal listed threatened species under the ESA.

The U.S. Bureau of Land Management (BLM) is requesting formal Section 7 Consultation on the desert tortoise for the construction and operation of the Ivanpah Solar Electric Generating System (Ivanpah SEGS). As the lead federal agency, BLM would oversee compliance with laws, ordinances, regulations, and standards (LORS) required for the project, as well as implementation of the avoidance and minimization measures listed in this BA and the terms and conditions of the Biological Opinion.

1.2 Consultation History with USFWS and other Agencies

May 11, 2007	CH2M HILL contacted Ray Bransfield (ESA Coordinator) of the USFWS Ventura Field Office by telephone to provide a briefing on the proposed project. The discussion included a summary of the current project description, the use of the approved USFWS desert tortoise survey methodology, and preliminary survey findings. Ray Bransfield approved CH2M HILL's requested to extend the protocol survey period (March 25 to May 31) in order to complete the ongoing 2007 survey of the action area. Based on the demonstrated presence of desert tortoises in and adjacent to the action area it was determined that formal Section 7 Consultation under the ESA would need to be initiated with the USFWS. Ray also stated that it may not be necessary to complete the zone-of-influence (ZOI) transects given that tortoise presence had already been established in the action area.
May 14, 2007	CH2M HILL contacted Charles Sullivan of the BLM by telephone to discuss the continuance of the desert tortoise surveys in the current action area. Charles stated that the entire action area should be surveyed using the USFWS protocol and the ZOI transects should extend to the 600 foot transect.

May 14, 2007	CH2M HILL contacted Marc Sazaki of the California Energy Commission (CEC) to get his opinion on the appropriate methodology for continued tortoise surveys in the action area. Marc preferred that BrightSource Energy, Inc. (BrightSource) continue and complete the 100 percent coverage of the action area according to the USFWS protocol. Marc mentioned that all ZOI transects should be completed and to add a 1-mile ZOI transect to cover the 1-mile buffer. Marc also asked that BrightSource coordinate with CDFG.
July 12, 2007	CH2M HILL contacted biologist Becky Jones of the California Department of Fish and Game (CDFG) to initiate informal consultation for the desert tortoise with the state. Consultation with the state is referenced due to its relevance to the outcome of the Section 7 consultation. Becky Jones was provided with a project description including maps and survey results. Potential permitting needs such as 2081 and 1600 approvals were discussed.
August 31, 2007	The Applicant filed an Application for Certification (AFC) with the CEC. An AFC is intended to address the requirements of CEQA and NEPA and the process is a precursor and is relevant to the development of this BA.
October 5, 2007	CH2M HILL coordinated with Charles Sullivan of the BLM regarding the outline and content of the BA by telephone.
October 31, 2007	The CEC Commission accepts the AFC as complete and "data adequate." Copies of the AFC are distributed to BLM, USFWS, and CDFG for review and comment.
October 31, 2007	CH2M HILL mailed a copy of the draft BA to Charles Sullivan of the BLM.
November 6, 2007	The BLM announces a notice of intent to prepare a joint Environmental Impact Statement (EIS) and Final Staff Assessment (FSA), and amend the California Desert Conservation Area Plan (CDCA) with the CEC for the Ivanpah SEGS project (*in* **FR** 72 (214): 62671-62672).
November 6, 2007	Charles Sullivan of the BLM provided some verbal comments to CH2M HILL regarding the BA via telephone.
December 12, 2007	Data Request 1 through 116 was issued by the CEC. The document included a request that copies of the draft BA be provided to BLM and CEC for review.
December 21, 2007	Brian Croft of USFWS and CH2M HILL informally discussed the Ivanpah SEGS project via telephone. Brian suggested a selection of recently completed consultations to use as a reference and guidance for the Ivanpah SEGS consultation.

January 4, 2008	The BLM held a scoping meeting and the CEC Staff held a public workshop at the Primm Valley Golf Club to address the CEC and BLM data requests issued to the Applicant. This joint meeting with the BLM also served as a NEPA scoping meeting for BLM.
January 25, 2008	The CEC Siting Committee for the Ivanpah SEGS project held a public Site Visit and Informational Hearing at the Primm Valley Golf Club to discuss the proposed project, and, at this joint meeting, the BLM conducted a Public Scoping Hearing.
January 31, 2008	CDFG provided written comments to the CEC regarding the AFC. Among the comments concerning the desert tortoise, CDFG stated that it believed the magnitude of habitat lost would constitute a significant impact based on the site's tortoise habitat and population characteristics and a 1:1 mitigation ratio would not fully mitigate potential impacts on the desert tortoise. CDFG also reiterated that it did not agree with the BLM's decision in the NEMO to classify desert tortoise habitat designation in the vicinity of the action area as Category III. Notwithstanding BLM's decision in the NEMO, CDFG continues to consider the desert tortoise habitat in the action area to be Category II and believes the mitigation/compensation should reflect CDFG's position. CDFG also stated that the project access roads should be fenced for tortoise exclusion given the estimated traffic levels during construction. CDFG would also require enhancement and endowment fees along with the mitigation, monthly compliance reports, an approved tortoise translocation plan, and an approved raven management plan in order to issue an Incidental Take Permit for the Ivanpah SEGS project.
March 19, 2008	Brian Croft of USFWS informed CH2M HILL via e-mail that he was drafting translocation guidance for renewable energy projects in coordination with the Desert Tortoise Recovery Office. The document would be relevant to the Ivanpah SEGS project but may not be completed prior to completion of formal consultation on Ivanpah SEGS.
April 22, 2008	The BLM informed CH2M HILL that protocol tortoise surveys should be conducted during the spring 2008 survey season for the additional action area not included in the 2007 survey effort. The guidance was a result of interagency discussion between BLM and USFWS.
April 30, 2008	CH2M HILL provided Brian Croft of the USFWS with a figure via e-mail showing the additional action area that would be surveyed in 2008.
May 5, 2008	CH2M HILL provided USFWS and BLM with resumes of proposed tortoise biologists via e-mail for approval to conduct USFWS protocol surveys of additional action area. Brian Croft of USFWS responded the same day via email that surveyor approval was not needed if the

	survey methodology did not involve capture, harassment, or other forms of "take."
May 8, 2008	Data Request 117 through 151 was issued by the CEC. The data request included comments from the BLM regarding the draft biological assessment.
May 15, 2008	Ray Bransfield of USFWS informed CH2M HILL via e-mail that Section 7 or Section 10 consultation was not initiated for the Primm Valley Golf Club. This was in response to CH2M HILL's concern that the golf club's lack of a raven management plan may adversely affect the implementation of the Ivanpah SEGS raven management plan.
May 15, 2008	Sundance Biology, Inc. began protocol desert tortoise surveys of the additional action area. The survey was completed on May 20, 2008. The survey of 726 acres resulted in the discovery of three tortoises.
June 10, 2008	CH2M HILL provided USFWS, BLM, CDFG, and CEC via e-mail with three proposed alternative approaches to tortoise translocation. The message was intended to initiate discussion on the translocation issue. The proposed alternatives included: (1) movement of tortoises to the immediate area just outside the exclusion fencing, (2) movement to a yet to be determined preserve that may or may not be habitat acquired to compensate for habitat lost due to the construction of Ivanpah SEGS, and (3) movement of tortoises to the Large Scale Translocation Site (LSTS) associated with the Clark County Multi-Species Habitat Conservation Plan (MSHCP). Brian Croft of USFWS responded the same day via e-mail and agreed that the preferred option would be to move displaced tortoises the shortest distance possible to keep them within their genetic unit and reduce the adverse affects associated with longer distance translocations. Brian also suggested that we schedule an interagency field meeting to further discuss a proposed translocation area.
June 10, 2008	Becky Jones of CDFG provided to CH2M HILL and the CEC, via e-mail, a map of the Ord Mountain grazing allotment. Jones proposed that purchase of all or a portion of the grazing allotment may provide some of the appropriate compensation/mitigation for the loss of tortoise habitat due to the construction of Ivanpah SEGS. Jones also stated that it was preferable to move tortoises the shortest distance possible, it was her understanding that it is illegal to translocate tortoises across a state line, it may be possible to translocate tortoises to an approved preserve, and that tortoises from Ivanpah SEGS cannot be translocated into designated critical habitat.
June 11, 2008	Michael Burroughs of the USFWS Las Vegas Field Office confirmed via e-mail to CH2M HILL that use of the LSTS was only for tortoises translocated under the direction of the Clark County MSHCP.

June 11, 2008	CH2M HILL discussed desert tortoise recovery actions with Debra Hughson of the Mojave National Preserve via a phone call. Debra stated that the NPS would provide additional information regarding their proposed desert tortoise recovery actions they are trying to fund within the MNP. CH2M HILL was interested in pursuing some of the recovery actions to satisfy some of the Ivanpah SEGS mitigation needs. Debra stated that their proposed juvenile tortoise headstart program will be included in the soon to be issued draft revised desert tortoise recovery plan.
June 23, 2008	The CEC held another public workshop at the Primm Valley Golf Club to address the second set of CEC and BLM data requests issued to BrightSource.
July 16, 2008	Kimberleigh Field of USFWS provided CH2M HILL with information via e-mail regarding potential cattle guard designs that could be used to discourage tortoises from entering exclusion areas through gates opened for vehicle access.
July 25, 2008	CH2M HILL had a telephone discussion with Becky Jones of CDFG regarding compensation for the project effects on the desert tortoise. Jones restated CDFG's position that CDFG did not agree with the BLM's NEMO and the 1:1 mitigation ratio in the NEMO for the project site as Class III federal public land. CDFG stated that it would be seeking greater than the BLM NEMO recommended 1:1 mitigation/compensation. Jones agreed that CDFG may be willing to accept partial mitigation in the form of funding recovery actions if sufficient habitat acquisition could not be found. Jones clarified that the CDFG cannot accept mitigation through contribution to a species fund and provided additional information regarding the possibility of acquiring the Ord Mountain grazing allotment to satisfy tortoise mitigation needs. [BrightSource is concerned about the distance to Ord Mountain grazing allotment which is about 100 miles away.]
July 31, 2008	USFWS, BLM, CDFG, CEC, National Park Service (NPS), BrightSource, and CH2M HILL met via phone conference to discuss options for Ivanpah SEGS tortoise translocation. The group reached a consensus that the preferred option was to move tortoises the least distance possible. The preferred location may be to BLM land to the immediate west, between the Mojave National Preserve (MNP) Clark Mountain unit and the Ivanpah SEGS.

1.3 Scope and Terminology

The BLM, as the lead federal agency, is requesting the initiation of formal Section 7 consultation with the USFWS in order to meet its responsibilities under the Endangered Species Act. This BA addresses the proposed action (including avoidance and mitigation measures), biological setting, environmental baseline, status of the desert tortoise and its

habitat, and the potential effects of the proposed action upon the desert tortoise. The Section 7 authorized take coverage for the activities described in this BA is requested for the project construction and operation. The life of the Ivanpah SEGS operation is expected to be 50 years.

The following includes the definition of terms and phrases used in this BA.

"Action" refers to discretionary activities or programs that are authorized, funded, or carried out, in whole or in part, by federal agencies.

"Action area" refers to all lands directly or indirectly affected by the action and not merely the immediate area involved in the action. Planned activities would be wholly contained within BLM-managed lands.

"Species" and "habitat description" refers to the desert tortoise and its habitat to be considered. The desert tortoise is the only federally listed species that is known to occur within the action area.

"Effects of the action" include direct and indirect effects of an action on the desert tortoise or critical habitat, together with the effects of other activities that would be added to the environmental baseline.

The "environmental baseline" includes the past and present impacts of all federal, state, or private actions and other human activities in the action area; the anticipated effects of all proposed projects in the action area that have already undergone Section 7 or Section 10 consultation; and the effects of state or private actions that are contemporaneous with the consultation in process.

"Direct effects" include the direct or immediate effect of the action on the desert tortoise or its habitat.

"Indirect effects" are those that are caused by the proposed action and are later in time, but are still reasonably certain to occur. For example, an action that results in subsequent changes to land use patterns would be considered an indirect effect.

"Cumulative effects" are those effects of future state or private activities that are reasonably certain to occur within the action area of the federal action subject to consultation.

"Relevant reports" include any available information on the action, action area, affected listed species, or critical habitat. The references section of this BA includes a list of relevant reports and other cited works.

Description of Proposed Action

2.1 Introduction

This BA is submitted by the BLM to the USFWS in support of a formal Section 7 consultation for the "Ivanpah Solar Electric Generating System" or "Ivanpah SEGS" project. Solar Partners I, LLC; Solar Partners II, LLC; Solar Partners VIII, LLC, the owners of the three separate solar plants, and Solar Partners IV, LLC, the owner of shared facilities required by the three solar plants, are the proponent for the project (hereafter referred to as the "Applicant"). These four companies are Delaware limited liability companies. BrightSource Energy Inc. (BrightSource), a Delaware corporation, is a technology and development company, and the parent company of the Applicant.

The Applicant would use BrightSource's solar thermal technology for this proposed project. The three plants would be separately owned and operated by Solar Partners I, LLC; Solar Partners II, LLC; and Solar Partners VIII, LLC to facilitate the construction, financing, and possible sale of the three separate plants. In addition, a fourth company, Solar Partners IV, LLC, would own the shared facilities that are required for the operation of each of the solar plants. The Applicant developed this approach to permitting the three solar plants and the common infrastructure based in part on pre-application discussions with the BLM and the California Energy Commission, the state lead agency under the California Environmental Quality Act (CEQA).

The Proposed Action is to develop three solar energy plants in the Ivanpah Valley located in San Bernardino County, California, 4.5 miles southwest of Primm, Nevada (Figure 2-1, all figures are located at the end of the section). The site is located in Township 17N, Range 14E, and Township 16N, Range 14E on land administered by the BLM. Access to the site is via the Yates Well Road interchange on I-15 and Colosseum Road. The site is located 0.5 mile to the west of the Primm Valley Golf Club.

The first 100-megawatt (MW) plant at the south end of the project, known as Ivanpah 1, would be owned by Solar Partners II, LLC. Solar Partners I, LLC would own the middle 100-MW plant known as Ivanpah 2. The northernmost 200-MW plant, known as Ivanpah 3, would be owned by Solar Partners VIII, LLC (Figure 2-2). The three solar plants and their shared infrastructure collectively are known as the "Ivanpah Solar Electric Generating System" or "Ivanpah SEGS." The Applicant is seeking a separate right-of-way (ROW) grant from the BLM for each of the three solar plants and for the shared infrastructure.

These companies have filed SF 299 ROW grant applications for use of the land with the BLM Needles Field Office. The 100-MW Ivanpah 1 solar plant would require approximately 914 acres (1.4 square miles), 100-MW Ivanpah 2 solar plant would require approximately 921 acres (1.4 square miles), and the 200-MW Ivanpah 3 site would require approximately 1,843 acres (2.9 square miles). In addition, the Administration Building/warehouse, a substation, and detention ponds would need to be located in the area between Ivanaph 1 and 2 would require approximately 66 acres, along with other permanent facilities like transmission towers, linear facilities and access roads.

The total area required for construction and operation of all three solar plants including the shared infrastructure is approximately 4,065 acres (minus the acreage for existing established dirt roads equals about 4,060 acres, net). This includes approximately 3,760 acres of permanent effects and approximately 300 acres of work area that would be subject to restoration following construction. The BLM is requesting formal consultation on the 4,060-acre project site. In addition to the project site, the action area includes the installation of a fiber optic line. This optic fiber route consist of two segments. The first segment is from Ivanpah substation to Mountain Pass substation using existing distribution line poles located in the Figure 2-3). The second segment is from Mountain Pass substation to an interface point to be designated by local Telecommunication Carrier. In both segments the fiber cable would be installed on the existing distribution line poles. Therefore, the action area includes the project site plus the route for the fiber optic line.

Concurrent with the BLM ROW filing process, the Applicant also filed an AFC with the CEC. The Applicant has been informed by both the CEC and the BLM of their intention to conduct a joint environmental review of the proposed project. It is expected that the two agencies will coordinate their analysis and issue joint environmental documents and separate decisions.

2.2 Project Features, Construction, and Operation and Maintenance

This section describes the various construction activities for the Ivanpah SEGS project.

2.2.1 Project Features

2.2.1.1 Solar Fields

The following sections describe the major components of the solar fields.

2.2.1.1.1 Heliostats and Solar Receivers

The solar fields would consist of one heliostat (mirror) array constructed within each 100-MW plant and four heliostat arrays constructed within the 200-MW plant. Each heliostat array would be arranged around a single centralized solar power tower (SPT). An artist rendering is provided as Figure 2-4. The heliostats would automatically track the sun throughout the day and reflect the solar energy to the SPT. It is estimated that the 100- and 200-MW plants would contain approximately 55,000 and 104,000 heliostats, respectively. Each heliostat consists of two mirrors. Each mirror is 7.22 feet wide by 10.5 feet high (2.20 meters by 3.20 meters) yielding a reflecting surface of 75.8 square feet (7.04 square meters).

2.2.1.1.2 Solar Tower Height

The SPT height for all three solar plants would be 459 feet (140 meters). In addition, FAA-required lighting and a lightening pole would extend above the top of the towers approximately 5 to 10 feet (1.5 to 3 meters).

2.2.1.2 Electrical System

Ivanpah 1, 2, and 3 would be interconnected to an existing Southern California Edison (SCE) grid through an upgraded SCE 115-kV line passing between Ivanpah 1 and 2 on a northeast-southwest utility corridor. A substation would be constructed between Ivanpah 1 and 2 that would be used to connect Ivanpah SEGS to the electrical grid. Two options (A and B) are being considered for the location of the substation (see Figure 2-2).

The 115-kV transmission generation tie line (gen-tie line) from Ivanpah 1 to the substation would be approximately 5,700 feet long for location A and 6,600 feet long for location B. The Ivanpah 2 and 3 gen-tie lines extend approximately 2,300 feet and 13,100 feet, respectively, before coming together. The combined gen-tie line then extends 1,200 feet to the Ivanpah Substation at location A and approximately 1,500 feet to location B.

Each circuit would be supported by single-pole structures at appropriate intervals with final heights as determined during detailed design. The shared gen-tie line for Ivanpah 2 and 3 would be carried on a double-circuit pole line. The lines would be insulated from the poles using porcelain insulators.

The proposed Ivanpah substation would also require new telecommunication infrastructure to be installed to provide protective relay circuit, Supervisory Control and Data Acquisition (SCADA) circuit, data, and telephone services. The telecommunication path from Ivanpah substation to local carrier facility interface at Mountain Pass area consists of approximately 8 miles of fiber optic cable to be installed overhead on existing poles and new underground conduits to be constructed in the substation and telecom carrier interface point. This fiber optic route consists of two segments. The first segment is from Ivanpah substation to Mountain Pass substation using the existing Nipton 33-kV distribution line poles built along the transmission line corridor that crosses between Ivanpah 1 and 2. The second segment is from Mountain Pass substation to the telecommunications facility approximately 1.5 miles away at an interface point to be designated by the local telecommunication carrier. The fiber cable would be installed on the existing 12 kV distribution line poles. Biological surveys of this area were conducted by EPG, Inc. (2008) on April 7 to 10, 2008 and April 14 to 15, 2008. These surveys were conducted on foot and from vehicles. Protocol-level desert tortoise surveys were not conducted. EPG also conducted a limited regional literature search, a queried the California Natural Diversity Database, and consulted with the CDFG, Nongame Wildlife Program, USFWS, and BLM. Based on the review, no other Federal-listed species other than the desert tortoise where identified). The entire fiber optic project area was determined to be within the range of the desert tortoise, and most of the area provides suitable habitat for tortoises. Tortoise sign was observed during the surveys (EPG, 2008).

2.2.1.3 Fuel System

Natural gas would be used as a supplementary fuel for project operation. Each phase of the project includes a small package natural gas-fired start-up boiler to provide heat for plant start-up and during temporary cloud cover. Natural gas would be obtained by the construction of a new 6-mile-long, 4- to 6-inch distribution pipeline from the existing Kern River Gas Transmission (KRGT) pipeline located approximately 0.5 mile north of the Ivanpah 3 site (see Figure 2-2). A permanent gas metering station (100 feet x 150 feet) and a temporary construction area (200 feet x 200 feet) would be located at the point of connection. From the tap station, the natural gas line would head south along the western edge of

Ivanpah 3 to a metering station (10 feet x 40 feet) near its southeast corner. Although the gas line and metering station would be within the area that was surveyed, they would be located outside the project's fenced heliostat fields and a dirt access road would follow the pipeline so that the gas company has access to it for maintenance.

From the metering station at Ivanaph 3, the gas line (and dirt access road) would continue along the eastern edge of Ivanpah 2 to another metering station (20 feet x 40 feet) on the southeast corner, below Colosseum Road that would service Ivanaph 1 and 2. Again, the gas line and metering station would be located within the project area, but outside the fenced heliostat fields. From that metering station, the gas line to Ivanaph 1 would be located within the paved access road that goes from Colosseum Road past the Administration Building to the Ivanpah 1 site.

A gas-metering station would be required at the KRGT tap point to measure and record gas volumes. In addition, facilities would be installed to regulate the gas pressure and to remove any liquids or solid particles. Construction activities related to the metering station and metering sets would include grading a pad and installing above- and below-ground gas piping, metering equipment, gas conditioning, pressure regulation, and possibly pigging facilities. A distribution power line for metering-station-operation lighting, communication equipment, and perimeter chain-link fencing for security would also be installed.

The primary method of construction includes excavation of an open trench approximately 36 inches wide and 3 to 10 feet deep, depending on the site-specific soil type. With loose soil, a trench up to 8 feet wide at the top and 3 feet wide at the bottom may be required. The pipeline would be buried to provide a minimum cover of 36 inches. During construction, a 75-foot-wide ROW may be disturbed. This temporary construction corridor would be used to store the excavated soil, provide access for equipment and vehicles, and space for fitting the pipeline prior to installation and backfill via backhoe. The cathodic protection system would be designed to control the electrochemical corrosion of designated metal piping buried in the soil. Depending upon the corrosion potential and the site soils, either passive or impressed current cathodic protection would be provided.

Construction would require temporary disturbance of the ROW (e.g., vegetation clearing, trench excavation, soil compaction, dust generation, and restoration). The temporary construction disturbance area for the natural gas pipeline would be a 200-foot by 200-foot area required for the KRGT tap point. Construction of the Ivanpah 3 metering set would use a temporary laydown area within the Ivanpah 3 site; whereas, construction of the Ivanpah 1 and 2 metering set would use a temporary 1.37-acre triangular area just south of the metering set.

2.2.1.4 Water System

Two new wells would be drilled and developed to provide raw water for the Ivanpah SEGS project. The water would be drawn from one of the two wells that would be located near the northwest corner of Ivanpah 1 (see Figure 2-2), with the other well serving as 100 percent redundant backup. To reduce impacts on the land and provide operating efficiencies, the wells would provide water to all three plants. The 400-MW capacity of the three plants would require up to 46 gallons per minute (gpm) of raw water make-up, which would be drawn from the wells and distributed to the plants via underground high density

polyethylene (HDPE) or polyvinyl chloride (PVC) pipe. Each plant would have a raw water tank with a capacity of 250,000 gallons. A portion of the raw water (100,000 gallons) is for plant use while the majority would be reserved for fire water.

There would be a dirt access road to the wells. The water supply line would go from the wells to the paved road on the northwest corner of Ivanpah 1 and run north to Administration Building, Ivanpah 2 and Ivanpah 3 along the same corridor as the gas line; and south to Ivanpah 1 along the paved access road leading to the power block. This new water distribution line would be approximately 600 feet long from the wells to the main line going to each of the plants.

The primary method of construction of the water supply line includes excavation of an open trench approximately 3 feet wide and 5 to 10 feet deep, depending on the site-specific soil type. With loose soil, a trench up to 8 feet wide at the top and 3 feet wide at the bottom may be required. The pipeline would be buried to provide a minimum cover of 36 inches. During construction, a 50-foot wide right-of-way may be disturbed. This temporary construction corridor would be used to store the excavated soil, provide access for equipment and vehicles, and space for fitting the pipeline prior to installation and backfill via backhoe.

Construction would require temporary disturbance to the corridor (e.g., vegetation clearing, trench excavation, soil compaction, dust generation, and restoration). The temporary construction disturbance area for the water supply line outside of the project footprint for three solar fields encompasses 1.2 acres, with permanent disturbance of 0.38 acres.

In addition, a monitoring well would be installed southeast of the Administration Building near a northwest corner of Ivanpah 1 (see Figure 2-2). The permanent area required for the installation of the monitoring well and access to it is 0.23 acres.

2.2.2 Construction

2.2.2.1 Schedule, Workforce, Access, and Laydown

Construction of Ivanpah SEGS, from site preparation and grading to commercial operation, is expected to begin after the Second Quarter of 2009 and be completed within 48 months. The phasing is planned so that Ivanpah 1 (southern plant) would be constructed first, followed by Ivanpah 2 (middle plant), then Ivanpah 3 (northern plant), though the order of construction may change. Construction of each plant would begin about 12 months following the start of the prior plant. Construction of the shared facilities would occur with the first solar plant.

There would be an average and peak workforce of approximately 474 and 959, respectively, of construction craft people, supervisory, support, and construction management personnel onsite during construction. The peak construction site workforce level is expected to occur in Month 32.

Typically, construction would be scheduled to occur between 5 a.m. and 7 p.m. on weekdays and Saturdays. Additional hours may be necessary to make up schedule deficiencies, or to complete critical construction activities (e.g., pouring concrete at night during hot weather and working around time-critical shutdowns and constraints). During

some construction periods and during the startup phase of the project, some activities would continue 24 hours per day, 7 days per week.

The construction laydown and parking would occupy areas of the solar plants within the heliostat fields and in the area between Ivanpah 1 and Ivanaph 2 (see Figure 2-2). The temporary construction support facilities in these areas (primarily located in Area F on Figure 2-5) would include:

- 10 single-wide full-length trailer offices or equivalent
- Chemical toilets
- Parking for 200 vehicles
- 5 tool sheds/containers
- Equipment parking for 20 pieces of construction equipment
- Construction material laydown area
- Solar field equipment laydown area
- Fabrication sheds

A construction equipment noxious weed wash station would be constructed within the project site (currently planned in Area F6) or within an alternate area approved by BLM.

Construction access would be from Colosseum Road to the plant entrance road (Figure 2-2). Colosseum Road is an existing dirt road, which is planned to be asphalted from the Primm Valley Golf Club to the project site. The project would re-route a portion of Colosseum Road around the southern end of the Ivanpah 2 plant. In addition, paved access roads would be created to access the power blocks of the three Ivanpah plants.

2.2.2.2 Clearing and Grading

Prior to clearing vegetation and site grading, each site boundary would be permanently fenced with an 8-foot-high chain-link for security purposes and permanent desert tortoise exclusionary fencing would either be attached to the base of the security fence or installed outside the security fence to allow construction of linear facilities. Cattle grating would be installed to allow equipment access to the fenced sites and exclude desert tortoises. The first step would include clearing an approximate 10-foot-wide linear swath of vegetation along the entire outer edge of each facility boundary to create an internal perimeter road and install the fencing. The perimeter road would be within the fence line or site boundary. Once the fence is installed and prior to vegetation clearing and site grading, a desert tortoise clearance survey according to USFWS protocol and a project-specific translocation plan would be performed. Upon completion of the desert tortoise clearance survey and translocation, and prior to clearing and grading, the barrel cactus and Mojave yucca that would otherwise be removed or impacted during construction would be offered up for public salvage per BLM policy. These activities would be coordinated with the BLM.

The estimated size of the area for Ivanpah 1 (Phase 1) is 914 acres; for Ivanpah 2 (Phase 2) the area is 921 acres; and for Ivanpah 3 (Phase 3) the area is 1,843 acres. To construct the heliostat array fields located within these sites, some vegetation clearing and site grading would occur. In areas where general site grading is not required for stormwater management, vegetation clearing and grading would be performed only between every other row of the heliostat arrays that radiate outward in concentric arcs from their associated receiving towers. The cleared rows would serve as access routes from which the

heliostat mirrors can be reached from both side of the road for service and cleaning, thus minimizing soil disturbance within the heliostat array fields. It should be noted that a minimum amount of cutting and filling within these access routes is anticipated. Some re-grading for maintenance would most likely be required due to soil erosion and regular use.

Although soil disturbance would be minimized to the degree possible, the entire area covered by the solar plant sites and related facilities would no longer be available to tortoises for habitat. The sites (and the related facilities such as the substation, Administration Building, and detention ponds) would be fenced and tortoises excluded during construction and operation. Inclusive of these solar plant sites and the area used for access roads, transmission poles, and the substation and administration building, the total area that would be permanently disturbed by development activities consists of approximately 3,760 acres or approximately 5.9 square miles.

Existing root systems would remain in place to anchor the soil reducing the potential for erosion. Occasional cutting of the vegetation may be required to control plant re-growth that could affect mirror movement. All cut vegetation would be handled as described in Chapter 7 of the Closure, Revegetation and Rehabilitation Plan (Attachment DR125-2A).

In regard to stormwater runoff and hydrologic connectivity, the solar field development would maintain unobstructed sheet flow to the degree possible. The finish grade of the power block and power tower areas would be about 3 feet above the surrounding grade with moderate transition slopes to protect them from floods and return the relatively small local diversions to sheet flow through the solar fields. Detention ponds would be used on the west side of the project to reduce the stormwater velocity and allow sediment to drop out. Also, a few drainage channels would be required to redirect the stormwater and minimize erosion. Access roads would be protected from floods via ditches and local fords with reinforced concrete shoulders. Overall the project would be designed to maintain, to the extent possible, the existing sheet flow patterns and ephemeral drainages.

2.2.3 Operation

Ivanpah SEGS would be designed for an operating life of 50 years.

2.2.3.1 Solar Fields

Management, engineering, administrative staff, skilled workers, and operators would serve the three Ivanpah SEGS plants. Ivanpah SEGS is expected to employ up to 90 full-time employees. The plants are expected to operate 7 days a week, 14 hours per day. Ivanpah SEGS is expected to have an annual power plant performance availability of 92 to 98 percent.

2.2.3.2 Water System

Operation requirements necessitate the washing of some portion of the project's solar heliostats on a nightly basis. Individual heliostats are thus washed about once every 2 weeks. Because of dust created during site grading, this washing cycle may be more frequent (but not likely more than double) when Ivanpah 1 is operating and Ivanpah 3 is being graded. Thus, for no more than the first 5 months of construction of Ivanpah 3,

Ivanpah 1 could use twice as much water as it would during standard operations. However, the total amount used would not exceed 100 acre-feet/year.

Best Management Practices (BMPs) for the use of wash water is outlined in a Draft Drainage, Erosion, and Sediment Control Plan (DESCP) (see Attachment DR140-1A, Data Response Set 2B). The water used for heliostat washing would be deionized water, and thus, very high quality containing only minimal iron and copper from the water piping. A pressure washer or other method would be used to wash the heliostats to minimize the amount of water used (about 2.5 gallons per heliostat), and no water is anticipated to run offsite as a result of these washing activities. Due to the high evaporation rates in the area, and the minimal amount of water used, it is likely that wash water would evaporate at or just below the ground surface. Stormwater discharge during construction would adhere to a Stormwater Pollution Prevention Plan (SWPPP) and the DESCP and to state water quality standards.

Water consumption is considered minimal (estimated at less than 100 acre-feet/year for all three solar plants) and would mainly be used to provide water for washing heliostats and to replace boiler feedwater blowdown. Groundwater would go through a treatment system for use as boiler make-up water and to wash the heliostats.

2.2.3.3 Concrete Holding Basins

Any reject streams from water treatment (for example from the reverse osmosis system, if used) would be trucked offsite for treatment or disposal. However, two concrete-lined holding basins of about 40 feet by 60 feet are included in the power block area. They can serve for boiler commissioning and emergency outfalls from any of the processes.

2.2.3.4 Waste Management

Waste management is the process whereby all operational wastes produced at Ivanpah SEGS are properly collected, treated (if necessary), and disposed of in a closed system. Wastes include process and sanitary wastewater, nonhazardous waste and hazardous waste, both liquid and solid. A sewage package treatment plant would be located at the Administration Building/Operations and Maintenance area, located between Ivanpah 1 and 2. This primary wastewater collection system would collect process wastewater from all equipment, including the boilers and water treatment equipment. Additionally, each solar plant would include a small onsite wastewater plant located in the power block that would treat wastewater from domestic waste streams such as showers and toilets. Sewage sludge would be removed from the site by a sanitary service provider. All wastewater would be recycled in the system, except for a small stream that would be treated and used for landscape irrigation. If necessary, a small filter/purification system would be used to provide potable water at the Administration Building.

2.2.3.5 Fire Protection

The fire protection system would be designed to protect personnel and limit property loss and plant downtime in the event of a fire. The primary source of fire protection water would be the raw water storage tank to be located in each power block. An electric jockey pump and electric-motor-driven main fire pump would be provided to increase the water pressure in the plant fire main to the level required to serve all fire fighting systems. In addition, a

back-up diesel engine-driven fire pump would be provided to pressurize the fire loop if the power supply to the electric-motor-driven main fire pump fails. A fire pump controller would be provided for each fire pump.

The fire pump would discharge to a dedicated underground firewater loop piping system. Normally, the jockey pump would maintain pressure in the firewater loop. Both the fire hydrants and the fixed suppression systems would be supplied from the firewater loop. Fixed fire suppression systems would be installed at determined fire risk areas such as the transformers and turbine lube oil equipment. Sprinkler systems would also be installed in the Administration/Control/Warehouse/Maintenance Building and Fire Pump enclosure as required by National Fire Protection Association (NFPA) and local code requirements. Handheld fire extinguishers of the appropriate size and rating would be located in accordance with NFPA.

2.2.4 Project Maintenance

The Ivanpah SEGS will require routine inspections and maintenance outside fenced areas to remain in operation. The security fences around each of the three solar plants would be designed to exclude desert tortoises, or separate tortoise fencing would be constructed. The potential for direct effects to tortoises due to maintenance are only expected as a result of those few actions that would be conducted outside the fenced areas. Therefore, only those maintenance activities occurring outside of the fenced area are included in this section. Those project components would include the natural gas pipeline ROW, water pipeline ROW, access roads, and perimeter fence.

Structures and machinery may be repaired, upgraded or retrofitted to ensure peak performance. The anticipated maintenance activities that could occur outside the fenced solar plant sites are grouped into the following five categories:

- Class I: Maintenance activities that do not result in new surface disturbance;
- Class II: Maintenance activities that result in minimal surface disturbance;
- Class III: Maintenance activities that result in major surface disturbance;
- Class IV: Maintenance activities that may extend outside the project ROW; and
- Class V: Emergency Repairs.

The activities associated with the maintenance classes are further discussed as follows.

2.2.4.1 Class I

Class I are those maintenance activities outside the fenced area that do not result in new surface disturbance. These activities include tasks that would be performed by hand or with the use of tools, equipment, and/or vehicles. Class I activities would take place on existing structures or would be staged from existing roads or likewise disturbed areas (excluding those areas subjected to restoration). They would not include off-road travel. Vehicles used for such tasks would likely include those primarily used for transportation or lifting purposes. Low-boy tractor and trailer, flat bed, utility trucks, forklifts, scissor lifts, cherry pickers, and mechanical hoists may be used to transport equipment and materials and to lift

heavy objects. Labor may involve several workers confined to the area in need of maintenance. These activities may need to be performed on a routine daily or as needed.

2.2.4.2 Class II

Class II activities would result in minimal surface disturbance. These activities would likely be performed with heavy earth moving equipment including motor grader, bulldozer, front-end loader, backhoe, water truck, asphalt paver, and dump truck. Labor may involve several workers confined to the area in need of maintenance. Class II activities may involve the following:

a) Underground utility (e.g.; water, gas, sewage, electrical, communication, etc.) repairs, upgrades and tie-ins to structures;

b) Motor grading and repairs of existing dirt roads, shoulders, and berms;

c) Cut or fill of soil surface to re-establish appropriate cover due to soil erosion after rainfall events;

d) Maintenance of drainages, fords and culverts for proper flow of water runoff, including the removal of debris along the outside of the security fences and remedy for areas of undercut fence;

e) Re-surfacing and other maintenance of the asphalt roads, shoulders and parking lots;

f) Major security and desert tortoise exclusionary fence repairs;

g) Pipeline segment replacement should a below grade inspection reveal severe damage, then excavation and replacement of a portion of the pipeline would be necessary;

h) Installation of anodes should routine cathodic protection surveys reveal an isolated gas pipeline segment with low pipe-to-soil electrical potentials;

i) Below grade gas pipe and coating inspections indicating low pipe-to-soil electrical potentials where a portion of the pipe would be excavated for visual inspection; and

j) Installation of anode flex for cathodic protection should a below grade inspection reveal failed gas pipeline coating where excavation and recoating of the pipeline segment could be necessary.

2.2.4.3 Class III

Class III includes maintenance activities that result in major surface disturbance. Class III activities may involve the following:

a) Installation of a new underground pipeline a distance of 1,000 feet or more; and

b) Disturbance of 1 acre or more for construction of a new stormwater detention pond or drainage feature.

2.2.4.4 Class IV

Class IV includes maintenance activities that would extend outside the action area described in this BA. This class of activities may include any of the previously mentioned actions that would extend beyond these limits including the creation of staging or laydown areas and equipment stockpile and spoil pile deposition areas. The extent of disturbance may vary with the project and depend upon the ROW width, topography, layout, and other factors. Class IV activities may require additional consultation with the USFWS prior to implementation.

2.2.4.5 Class V

Class V includes emergency situations to ensure public safety, service reliability, and to protect the environment. Emergency repairs may include temporary closure and bringing the solar plant back online, utility outages, pipeline leaks or breaks, fire control, human medical emergency, and reestablishment of access roads severely damaged by storms. These activities may involve a backhoe and/or cat-loader, motor grader, and possibly other heavy earth moving equipment. It is anticipated that most emergency situations would affect less than 0.5 acre, although the amount of habitat disturbance would vary depending upon the nature of the emergency. The Applicant may need to consult with the USFWS following the emergency action if those activities extend beyond the action area described in this BA.

2.3 Site Rehabilitation Plan

The draft Closure, Revegetation and Rehabilitation Plan (Rehabilitation Plan) is included as Appendix A (Attachment DR125-2A, to be made available in September 2008). The Rehabilitation Plan follows the TBD, the Weed Management Plan, and other component plans approved by the BLM, USFWS, CDFG and other appropriate resource agencies. The plan is to be implemented to rehabilitate habitat including accelerating revegetation following construction and closure of the facility. One of the objectives of plan implementation is the acceleration of secondary succession and consequent improvement of desert tortoise habitat characteristics over time following last disturbance. A brief description of the rehabilitation and revegetation plan is provided below. The Rehabilitation Plan for construction impacts would be incorporated into the BRMIMP and submitted to the BLM and CEC for review and approval at least 30 days prior to the start of construction. Temporarily disturbed areas such as the pipeline corridors would be treated immediately following completion of those activities. This plan includes the following sections and details:

1) Goals and objectives of rehabilitation and revegetation
2) A description of methods employed to achieve them
3) Criteria to determine the progress of revegetation
4) Operations phase procedures and guidelines for addressing occasional disturbance such as may be caused by flood waters
5) Integration of measures provided in the accepted weed control plan
6) Reporting procedures and schedule objectives

The scope of the plan would be proportionate to the magnitude of the expected impact from construction, and to the size of the area to be rehabilitated at the end of Ivanpah SEGS' operational life.

As noted in the Rehabilitation Plan, arid region soils can have accumulated substantial amounts of nutrients as well as a dormant seed bank, despite having little organic matter compared to humid zone soils. Soil mycorrhizal fungi are also usually present, and all these characteristics can aid in rehabilitation and revegetation. Therefore, the top 2 inches of topsoil in trenched areas for pipeline installation would be salvaged and stockpiled until it can be re-spread following construction. Decompacting surface areas compressed by passing vehicles, and compacting areas where the density of the soil has been affected by excavation is planned, followed by re-spreading the stockpiled topsoil area prior to seeding. The disturbed ROW would then be seeded with native species identified in the plan, emphasizing those species adapted to disturbed habitat such as cheesebush (*Hymenoclea salsola*), saltbush (*Atriplex canescens*), and black-banded rabbitbrush (*Chysothamnus paniculatus*). The Rehabilitation Plan and, in particular, the Technical Basis Document (TBD; Attachment DR125-1A; CH2M HILL, 2008a) prepared as part of that effort, detail the ecological basis for this project's approach to revegetation. Of particular importance is the conclusion based on ecological studies as well as revegetation monitoring that successful revegetation occurs in stages beginning with those species best adapted to disturbed soils. Achieving vegetation comparable in density and composition to the surrounding landscape is not a near-term goal of revegetation, since it would be physically impossible in the absence of mature soil conditions, as well as other microenvironmental factors achieved through vegetation succession. Seeding and other revegetation measures are specifically intended to accelerate that successional process. Because rainfall is not only sparse but also intermittent, seeding would be timed as far as practicable to avoid drought periods. Volunteers, weedy species that would naturally disperse to the area and become established, are also anticipated and would be used to accelerate revegetation, provided they are not a noxious weeds identified for eradication, if encountered.

Over the long-term, once the Ivanpah SEGS facilities are decommissioned (anticipated to be approximately 50 years after commencement of commercial operation) the structures would be removed and the project area would be rehabilitated to approximate preconstruction surface conditions in terms of slope and surface roughness. Because rehabilitation and revegetation of the site would not occur for more than 50 years, the Rehabilitation Plan has provisions to allow for updating to accommodate changing environmental conditions as well as provide increased specificity when needed. Completed no later than 1 year prior to closure, these updates would also reflect the current technology and regulatory requirements at the time of facility closure, and document any deviations from the original plan. The updates to the Rehabilitation Plan (as appropriate to the regulatory environment at the time) would be integrated into the Plan and submitted to the BLM, USFWS, CDFG, and CEC at least one year prior to facility closure.

2.4 Facility Closure

Facility closure can be temporary or permanent. Temporary closure would be defined as a shutdown for a period exceeding the time required for normal maintenance, including

closure for overhaul or replacement of the steam turbine. Causes for temporary closure include a disruption in the supply of natural gas or damage to the facility from earthquake, fire, storm, or other natural acts. Permanent closure would be defined as a cessation in operations with no intent to restart operations owing to facility age, damage to the facility beyond repair, economic conditions, or other reasons.

2.4.1 Temporary Closure

For a temporary facility closure, where there is no release of hazardous materials, security would be maintained on a 24-hour basis. The CEC, BLM and other responsible agencies would be notified of a temporary closure as necessary and appropriate. Depending on the length of the shutdown, a contingency plan for the temporary cessation of operations would be implemented. The contingency plan would be conducted to ensure conformance with all applicable LORS and the protection of public health, safety, and the environment. The plan, depending on the expected duration of the shutdown, may include the draining of all chemicals from storage tanks and other equipment and the safe shutdown of all equipment. All wastes would be properly disposed of according to applicable LORS.

Where the temporary closure includes damage to the facility, and there is a release or threatened release of regulated substances or other hazardous materials into the environment, procedures would be followed as set forth in a Risk Management Plan (RMP) and a Hazardous Materials Business Plan (HMBP). (The RMP and HMBP are available on request.) Procedures would include methods to control releases, notification of applicable authorities and public, emergency response, and training for facility personnel in responding to and controlling releases of hazardous materials. Once the immediate problem is solved, and the regulated substance/hazardous material release is contained and cleaned up, temporary closure would proceed as described above for a closure where there is no release of hazardous materials.

2.4.2 Permanent Closure

Because the conditions that would affect the decommissioning decision are largely unknown at this time, these conditions would be presented to the CEC and BLM when more information is available and the timing for decommissioning is imminent.

To ensure that public health, safety and the environment are protected during this period, a decommissioning plan would be submitted to the CEC and BLM for approval prior to decommissioning. The plan would include the following:

- Proposed decommissioning activities
- Conformance of the proposed decommissioning activities to all applicable LORS and local/regional plans
- Activities necessary to restore the site if the plan requires removal of all equipment and appurtenant facilities
- Decommissioning alternatives
- Associated costs of the decommissioning activities

In general, the decommissioning plan for the facility would attempt to maximize the recycling of all facility components. Unused chemicals would be sold back to the suppliers or other purchasers or users. All equipment containing chemicals would be drained and shut down to ensure public health, safety and to protect the environment. All non-hazardous wastes would be collected and disposed of in appropriate landfills or waste collection facilities. The site would be secured 24 hours per day during the decommissioning activities.

2.5 Avoidance and Minimization Measures-Construction

The following subsection describes the measures proposed by the Applicant to avoid and minimize the potential adverse effects to the desert tortoise resulting from the Ivanpah SEGS construction and operation. It is anticipated that these commitments would be adopted by the Biological Opinion, conditions of certification of the CEC, the ROW grant issued by BLM, and permits issued by other federal and state agencies, as well as specifications in the construction contracts. Site-specific measures, such as exclusionary fencing, preconstruction surveys, monitoring, etc., would be mapped and identified as environmental specifications in the construction drawings.

2.5.1 Avoidance and Minimization Measures for use during Construction

This section lists measures that would be implemented during construction of each solar plant intended to avoid and minimize adverse effects to the desert tortoise. Each solar plant would be developed independently and work would not be started until financing for that phase has been secured.

1. USFWS-approved Desert Tortoise Monitors (Monitors) would be selected to oversee all project construction activities with the potential to affect the desert tortoise. The Monitors would provide oversight to ensure proper implementation of protective measures, record and report desert tortoise and sign observations in accordance with approved protocol, report incidents of noncompliance in accordance with the biological opinion and other relevant permits, and move desert tortoises from harm's way and place these animals in "safe areas" pre-selected by Authorized Biologists or maintain the desert tortoises in their immediate possession until an Authorized Biologist assumes care of the animal.

   The Monitors would assist the Authorized Biologists during surveys and often serve as "apprentices" to acquire experience. Monitors would not be authorized to conduct desert tortoise presence/absence or clearance surveys unless directly supervised by an Authorized Biologist; "directly supervised" means the Authorized Biologist is in direct voice and sight contact with the Monitor.

   The Applicant will be seeking, from time-to-time, Desert Tortoise Monitor approval for individuals who have the qualification similar to those of Ava Rosales Edens, Sophia Chiang, Victor Leighton, Chris Green, Robert Hernandez, and Katy Oakes. The qualifications of these individuals are included in Appendix B.

2. USFWS-approved Authorized Biologists would be selected to conduct all activities described in the previous section for Desert Tortoise Monitors, and to locate desert

tortoises and their sign (i.e., conduct presence/absence and clearance surveys) and ensure that the effects of the project on the desert tortoise and its habitat are minimized in accordance with the measures stated in this BA and the terms and conditions of the biological opinion. Authorized Biologists would keep current with the latest information on USFWS protocols and guidelines. An Authorized Biologist would have thorough and current knowledge of desert tortoise behavior, natural history, and ecology, physiology, and demonstrated substantial field experience and training to safely and successfully:

- handle and temporarily hold desert tortoises
- excavate burrows to locate desert tortoise or eggs
- relocate/translocate desert tortoises
- reconstruct desert tortoise burrows
- unearth and relocate desert tortoise eggs
- locate, identify, and record all forms of desert tortoise sign

The Applicant will from time-to-time be seeking Authorized Biologist approval for individuals who have the qualification similar to those of Robert Hernandez, Gabe Valdes, Mark Cochran, John Cleckler, Gilbert Goodlett, Glenn Goodlett, Dan Hack, and Erin Whitfield. The qualifications of these individuals are found in Appendix B.

3. The Applicant would prepare and implement a Biological Resources Mitigation, Implementation and Monitoring Plan (BRMIMP). The BRMIMP would outline steps to implement the protection measures to maintain any action authorized, funded, or carried out by the state or federal lead agencies that are not likely to jeopardize the continued existence of the desert tortoise. The BRMIMP would also address other biological resource concerns and include the various plans and programs identified throughout these avoidance and minimization measures.

4. The Applicant would prepare and implement an Ivanpah SEGS-specific Worker Environmental Awareness Program (WEAP). The WEAP would be administered to all onsite personnel including surveyors, construction engineers, employees, contractors, contractor's employees, supervisors, inspectors, subcontractors, delivery personnel, and all visitors operating a vehicle in the right-of-way. The WEAP will include information regarding the sensitive biological resources, restrictions, protection measures, and individual responsibilities associated with the project. It would be incorporated into the BRMIMP and approved by the USFWS, BLM, CEC and CDFG at least 60 days prior to the start of construction. The program would be administered onsite by the Authorized Biologist. It may include an oral, video/PowerPoint, and written materials presentation. The presentation would include the types of construction activities that may affect biological resources and the protection measures listed in this BA and the terms and conditions of the biological opinion to avoid such affects. The WEAP would also include appropriate contact procedures and personnel information. The program would provide information regarding encounters with wildlife and dealing with situations involving biological resources. Special emphasis would be placed on explaining the protection measures developed for the desert tortoise and the consequences of noncompliance. At a minimum, the program would contain information on physical characteristics, distribution, behavior, ecology, sensitivity to human activities, legal

protection, penalties for violations, reporting requirements, and protection measures associated with the desert tortoise. In addition, the program would include fire prevention measures to be implemented by workers during project activities. Participants would sign an attendance sheet documenting their participation in the training and copies of the sheets would be submitted with the annual report. A pamphlet that outlines basic critical information on dealing with tortoises encountered on the project will be provided to all personnel attending the program.

5. The Applicant would designate a Field Contact Representative who would be responsible for overseeing compliance with the protection measures. The Field Contact Representative would be onsite during any activities with the potential to result in the take of tortoise. The Field Contact Representative would have the authority to halt all activities that are in violation of the measures. Work would proceed only after hazards to the desert tortoise are removed, the desert tortoise is no longer at risk, or the animal has been moved from harm's way by the Authorized Biologist. The Field Contact Representative would have a copy of the measures included in this biological assessment as well as the terms and conditions of the biological opinion when work is being conducted onsite.

6. An Authorized Biologist would be onsite during any activities with the potential to result in the take of tortoise. The Authorized Biologists would have demonstrated prior field experience using accepted resource agency techniques to survey for desert tortoises and tortoise sign, which will include a minimum of 60 days field experience. All Authorized Biologists would comply with the Service-approved handling protocol (Desert Tortoise Council 1994, revised 1999). In addition, the Authorized Biologists would have the ability to recognize all forms of tortoise sign, shall have the ability to recognize and accurately record survey results, and must be familiar with the terms and conditions of this biological opinion. All Authorized Biologists shall complete a Qualifications Form and submit it to the Service within 60 days prior to ground breaking for review and final approval as appropriate.

7. The boundaries of all areas to be disturbed would be flagged before beginning any activities, and all disturbances shall be confined to the flagged areas. All project vehicles and equipment would be confined to the flagged areas. Survey crew vehicles would remain on existing roads. Disturbance beyond the construction zone would be prohibited except to complete a specific task within designated areas or emergency situations.

8. An Authorized Biologist would survey for and clear the area of tortoises immediately prior to any cross-country travel within the action area. Cross-country travel would be the minimum necessary to complete a specific task. Authorized Biologists and/or Monitors would be assigned to ensure that construction activities occur in designated areas.

9. Prior to the initiation of construction activities for each solar plant, the Applicant would enclose the boundary of the affected solar plant with permanent chain-link fencing for security purposes and permanent desert tortoise exclusionary fencing would be attached to the bottom of the chain link fencing. The permanent tortoise exclusionary fencing would consist of galvanized hard wire cloth l cm mesh, sunk

15 cm into the ground. The utility ROWs would be temporarily fenced on each side of the ROW. The temporary exclusionary fencing would consist of galvanized hard wire cloth or silt fencing. The fencing would be buried approximately 6 inches below ground or bent at a right angle towards the outside of the solar plants and covered with dirt, rocks or gravel to discourage the tortoise from digging under the fence. Security gates would provide minimal ground clearance to deter ingress by tortoises. The gates may be electronically activated to open and close immediately after the vehicle(s) have entered or exited. This would prevent the gates from being kept open for long periods of time, which may lead to a tortoise entering. Cattle grating would be installed at the gated entries to discourage tortoises from gaining entry. The cattle grating design used for recent Nevada Department of Transportation projects would be used.

The exclusion fencing would be installed prior to the onset of clearing and grubbing. The fence installation would be supervised and monitored under the direction of Authorized Biologists and Desert Tortoise Monitors.

Any damage to the permanent fencing would be repaired immediately. Following installation, the permanent fencing would be inspected yearly and after major rainfall events.

10. Within 24 hours prior to the initiation of construction of the tortoise-exclusion fence, an Authorized Biologist(s) would survey for desert tortoises and their burrows using techniques providing 100-percent coverage of the construction area and an additional transect along both sides of the fence line transect to provide coverage of an area approximately 90 feet wide centered on the fence alignment. Transects would be no greater than 30 feet apart. The fence alignment would be flagged prior to the biological survey. Two complete passes of complete coverage shall be conducted. All desert tortoise burrows, and burrows constructed by other species that might be used by desert tortoises, would be examined to determine occupancy of each burrow by desert tortoises and handled in accordance Service-approved protocol.
11. Following construction of the security and attached tortoise exclusion fence, the fenced area would be cleared of tortoises. Two complete passes with complete coverage shall be conducted as described above. If no tortoises are observed during the second survey, a third survey would not be conducted. Transects would be no wider than 30 feet. Each separate survey would be walked in a different direction to allow opposing angles of observation. If a desert tortoise is located on the second survey, a third survey would be conducted. The Authorized Biologists would be primarily responsible for the clearance surveys. Some Authorized Biologists may be substituted with Desert Tortoise Monitors and would be placed between Authorized Biologists during the surveys. Once the area surveyed is deemed free of desert tortoises the areas may be open to a vegetation salvage program, if BLM desires.

    All potential desert tortoise burrows located would be excavated by hand by an Authorized Biologist, tortoises removed, and collapsed or blocked to prevent occupation by desert tortoises. If excavated during May through July, the Authorized Biologist would search for desert tortoise nests/eggs, which are typically

located near the entrance to burrows. All desert tortoise handling and removal, and burrow excavations, including nests, would be conducted by an Authorized Biologist in accordance with the Service-approved protocol (Desert Tortoise Council 1994, revised 1999). If the Desert Tortoise Council releases a revised protocol for handling of desert tortoises before initiation of project activities, the revised protocol would be implemented for the project.

12. Following the tortoise clearance and translocation and vegetation salvage, heavy equipment would be allowed to enter the project site to perform earth work such as clearing, grubbing, leveling, and trenching. A Desert Tortoise Monitor would monitor initial clearing and grading activities to find and translocate tortoises missed during the initial tortoise clearance survey. Should a tortoise be discovered, an Authorized Biologist would be responsible for relocating it outside the fence. Any pre-activity tortoise surveys for other construction areas would be performed within 72 hours of work activities.

13. The Applicant would prepare and implement a desert tortoise translocation/ relocation plan. The plan would be incorporated into the BRMIMP, and submitted with the proposed action. The plan would be implemented as part of the relocation effort and would outline the following procedures.

    The Authorized Biologist would maintain a record of all desert tortoises encountered and relocated during project surveys and monitoring. This information would include for each individual: the locations (narrative, vegetation type, and maps) and dates of observations; general conditions and health; any apparent injuries and state of healing; if moved, the location from which it was captured and the location in which it was released (whether animals voided their bladders); and diagnostic markings (i.e., identification numbers).

    All potential desert tortoise burrows within the fenced area would be searched for presence. In some cases, a fiber optic scope may be used to determine presence or absence within a deep burrow. Burrows inhabited by tortoises would be excavated by Authorized Biologists or Monitors supervised by an Authorized Biologist using hand tools. To prevent reentry by a tortoise or other wildlife, all burrows would be collapsed once absence has been determined. Tortoises excavated from burrows would be relocated to unoccupied natural or artificial burrows outside the fenced area immediately following excavation.

    The animals would be transported in clean cardboard boxes. A new box would be used for each individual tortoise and would be properly discarded after a single use. The new burrow would be located at least 300 feet from the outside of the permanently fenced area and would be of similar size, shape and orientation to the original burrow. The new burrow locations would be determined by the Authorized Biologist. Relocated tortoises would not be placed in existing occupied burrows.

    The Authorized Biologist would wear disposable surgical gloves when handling desert tortoises. A new pair would be donned for each tortoise handled to avoid the transmission of upper respiratory tract disease (URTD). Shell notching would not be

performed. Any equipment used on the tortoises would be sterilized between each use.

Desert tortoises would be treated in a manner to ensure that they do not overheat, exhibit signs of overheating (e.g., gaping, foaming at the mouth, etc.), or are placed in a situation where they cannot maintain surface and core temperatures necessary to their well-being. Desert tortoises would be kept shaded at all times until it is safe to release them. No desert tortoise would be captured, moved, transported, released, or purposefully caused to leave its burrow for whatever reason when the ambient air temperature is above 95ºF (35ºC). Ambient air temperature would be measured in the shade, protected from wind, at a height of 2 inches (5 centimeters) above the ground surface. No desert tortoise would be captured if the ambient air temperature is anticipated to exceed 95ºF (35ºC) before handling and relocation can be completed. If the ambient air temperature exceeds 95ºF (35ºC) during handling or processing, desert tortoises would be kept shaded in an environment that does not exceed 95ºF (35ºC), and the animals would not be released until ambient air temperature declines to below 95ºF (35ºC).

For a period of 1 year following the relocation, the desert tortoises would be monitored for survivorship by an Authorized Biologist. All pertinent information would be recorded, such as behavior, physical characteristics, health characteristics and any visible signs of URTD, as well as any potential anomalies the individual desert tortoise might display.

Tortoise handling, artificial burrow construction, egg handling and other procedures would follow those described in the Guidelines for Handling Desert Tortoise During Construction Projects (Desert Tortoise Council, 1994).

14. Access to Ivanpah SEGS would be restricted to established access roads. Cross country vehicle and equipment use outside designated work areas would be prohibited. Personnel would be instructed during the WEAP to exercise caution when traveling to and from the site. To minimize the likelihood for vehicle strikes of desert tortoises, the posted speed limit on Colosseum Road and other access routes would be 20 miles per hour. Speed limit signs would be posted on both sides of access roads to remind drivers of the speed limit when entering and exiting.

15. All desert tortoises observed within the fenced area or on the access road would be reported immediately to the Authorized Biologist. Biologists and Monitors would briefly halt construction to avoid harm to a desert tortoise if necessary. Project activities that may endanger a desert tortoise would cease until the desert tortoise moves out of harm's way or is moved out of harm's way by an Authorized Biologist.

16. The Applicant would implement a trash abatement program. Trash receptacles would have self-locking lids to prevent entry by opportunistic predators such as common ravens, coyotes, and dogs. Trash receptacles would be emptied and removed daily.

17. The Applicant would prohibit workers from bringing pets and firearms to the project site.

18. The Applicant would implement a raven management plan prepared by BLM.

19. Any time a vehicle or construction equipment is parked in desert tortoise habitat outside the permanently fenced area, the ground under the vehicle will be inspected for the presence of desert tortoise before it is moved. If a desert tortoise is observed, it will be left to move on its own. If it does not move within 15 minutes, an Authorized Biologist may remove and relocate the animal to a safe location.

20. All activities would be restricted to pre-approved ROW locations. If unforeseen circumstances require expansion of activities, the potential expanded work areas would be approved by BLM, the CEC, and surveyed by an Authorized Biologist for desert tortoises prior to use of protection measures would be implemented within the expanded work areas based on the judgment of the BLM and an Authorized Biologist. Any work involving areas outside the action area described in this BA would require reinitiation of consultation with USFWS and CDFG.

21. At the end of each work day, the Applicant would ensure that trenches, bores and other excavations outside the permanently fenced area that constitute wildlife pitfalls would either be immediately backfilled, sloped at a 3:1 ratio at the ends to provide wildlife escape ramps, covered, or fully enclosed with fencing to prevent any entrapment. All excavations outside the permanently fenced area would be inspected periodically throughout and at the end of each workday by an Authorized Biologist, Desert Tortoise monitor, or the Field Contact Representative. Should a tortoise become entrapped, an Authorized Biologist will remove and relocate the tortoise to a safe location.

22. Any construction pipe, culvert, or similar structure with a diameter greater than 3 inches, stored less than 8 inches aboveground and within desert tortoise habitat (i.e., outside the permanently fenced area) for one or more nights, would be inspected for tortoises before the material is moved, buried or capped. As an alternative, all such structures may be capped before being stored outside the fenced area, or placed on pipe racks. These materials would not need to be inspected or capped if they are stored within the permanently fenced area after the clearance surveys have been completed.

23. All vehicles and equipment would be maintained in proper working condition to minimize the potential for fugitive emissions of motor oil, antifreeze, hydraulic fluid, grease, or other hazardous materials. An Authorized Biologist, Desert Tortoise Monitor, CEC, and BLM would be informed of any hazardous spills immediately as directed in the project Hazardous Materials Plan. Hazardous spills would be immediately cleaned up and the contaminated soil would be properly disposed of at a licensed facility.

24. All fuel, transmission or brake fluid leaks, or other hazardous waste leaks, spills or releases shall be reported immediately. The project proponent shall be responsible for spill material removal and disposal to an approved offsite landfill. Servicing of construction equipment would take place only at a designated area. All fuel or hazardous waste leaks, spills, or releases would be stopped or repaired immediately

and cleaned up at the time of occurrence. Service/maintenance vehicles would carry a bucket and pads to absorb leaks or spills.

25. Take of a desert tortoise would be prohibited. The Authorized Biologist, Monitors, BLM, and CEC would be notified of any such occurrences within 24 hours of the incident. The USFWS and CDFG would be contacted within 24 hours if a desert tortoise is collected by anyone other than the Authorized Biologist or Monitors or for any other purpose than for translocation. The USFWS and CDFG would also be contacted within 24 hours if a tortoise is harmed or killed.

    For reference, Section 9 of the ESA, and federal regulation pursuant to section 4(d) of the ESA, 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 USFWS 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 by USFWS as intentional or negligent 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. **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 intended as part of the agency action is not considered to be prohibited taking under the ESA provided that such taking is in compliance with the terms and conditions of this incidental take statement.

26. Water would be applied to the construction area, dirt roads, trenches, spoil piles and other areas where ground disturbance has taken place to minimize dust emissions and topsoil erosion. The minimal amount of water would be applied to meet safety and air quality standards in an effort to prevent the formation of puddles and thereby attracted desert tortoises and common ravens to the construction site(s) (as well as wildlife to areas outside the fenced areas). A Monitor would patrol these areas to identify areas were water is puddling and would work with the Field Contact Representative to remedy the situation.

27. The Applicant would compensate for the loss of tortoise habitat likely through an assessed financial contribution based on the final construction footprint. The Applicant proposes to compensate for this loss at 1:1 as directed by the BLM in the NEMO for desert tortoise habitat outside of a desert wildlife management area (DWMA) (BLM, 2002b). The permanent loss of desert tortoise habitat due to the installation of the three plants and the common infrastructure is estimated at 3,960 acres, minus the approximate 5 acres of existing established roads in the project site, for a total impacted area of 3,955 acres. At the date of this draft BA, the Applicant continues to discuss appropriate compensation options with CDFG, CEC, BLM, NPS, and USFWS.

28. An Authorized Biologist or Field Contact Representative would notify the BLM, USFWS, and CDFG within 24 hours upon locating a dead or injured desert tortoise. The notification would be made by telephone and in writing to the BLM Needles

Field Office, USFWS Ventura Field Office, CDFG Bishop Office and CEC. The report would include the date and time of the finding or incident (if known), location of the carcass, a photograph, cause of death (if known), and other pertinent information. Tortoises fatally injured due to project-related activities would be submitted for necropsy, at the expense of the Applicant, as outlined in Salvaging Injured, Recently Dead, Ill, and Dying Wild, Free-Roaming Desert Tortoises (*Gopherus agassizii*) (Berry 2001). Tortoises with minor injuries would be transported to a nearby qualified veterinarian for treatment at the expense of the Applicant. If an injured animal recovers, the BLM, USFWS, CDFG, and CEC would be contacted by the Applicant for final disposition of the animal.

2.5.2 Avoidance and Minimization Measures for use during Operation

The following measures would be common to all classes of maintenance activities:

1. The Authorized Biologist or Field Contact Representative would make initial notification to the BLM, USFWS, CDFG and CEC within 24 hours upon locating a dead or injured desert tortoise during the Ivanpah SEGS operation phase. The notification must be made by telephone and in writing to the BLM Needles Field Office, USFWS Ventura Field Office, CDFG Bishop Field Office and CEC Sacramento Office. The report would include the date and time of the finding or incident (if known), location of the carcass, a photograph, cause of death (if known), and other pertinent information. Tortoises fatally injured or killed from project-related activities would be submitted for necropsy, at the expense of the Applicant, as outlined in Salvaging Injured, Recently Dead, Ill, and Dying Wild, Free-Roaming Desert Tortoises (*Gopherus agassizii*) (Berry, 2001). Tortoises with minor injuries would be transported to a nearby qualified veterinarian for treatment at the expense of the Applicant. If an injured animal recovers, the BLM, USFWS, CDFG and CEC would be contacted by the Applicant for final disposition of the animal.

2. The Applicant would designate a Field Contact Representative who would be responsible for overseeing compliance with the desert tortoise protection measures during operation. The Field Contact Representative would have a copy of all measures when work is being conducted on the site. The Field Contact Representative must be onsite during any activities located outside established tortoise exclusion areas or otherwise have the potential to result in the take of tortoise. The Field Contact Representative would have the authority to halt all activities that are in violation of the measures. Work would proceed only after hazards to the desert tortoise are removed, the species is no longer at risk, or the individual has been moved from harm's way by the Authorized Biologist. The Field Contact Representative may be a project manager, the Applicant's representative, or a biologist.

3. Vehicle parking, material stockpiles, and construction-related materials would be located within the permanently fenced area.

4. WEAP training would continue for all Ivanpah SEGS personnel during the Ivanpah SEGS operation phase. All employees and their contractors involved with operation and maintenance would attend the agency approved WEAP. These employees

would participate in the education program prior to initiation of work activities. New employees would receive formal, approved training prior to working onsite. During the WEAP training, employees would be instructed to exercise caution when commuting to the project area. To minimize the likelihood for vehicle strikes of desert tortoises, the posted speed limit on the access roads would be 20 miles per hour. Speed limit signs would be posted on both sides of access roads to remind drivers of the speed limit when entering and exiting.

5. BLM would ensure activities are confined to the authorized work areas by means of project assessments. The assessments may be conducted by an Authorized Biologist. Should the assessment find that operations and maintenance activities extended beyond the approved work areas, the BLM would ensure that the Applicant uses appropriate measures to restore disturbed areas. Work areas would be clearly marked to prevent vehicles or personnel from exiting the authorized work area(s).

6. Existing routes of travel to and from the solar array fields would be used outside the cleared and fenced areas. Colosseum Road would be the only means of accessing Ivanpah SEGS. Cross-country use of vehicles and equipment outside the cleared and fenced areas would be strictly prohibited.

7. The Authorized Biologist and Monitors would be present during maintenance outside the established tortoise exclusion areas and off established roads (such as cleaning the gen-tie line conductors) to assist in the implementation of protection measures for the desert tortoise and to monitor compliance. The appropriate number of Authorized Biologist and Monitors would be dependent upon the nature and extent of the work being conducted and would be stated in the BLM's ROW grant for each particular action.

8. The movement of desert tortoises removed from harm's way would be conducted according to the *Guidelines for Handling Desert Tortoises During Construction Projects* (Desert Tortoise Council, 1999).

9. All encounters with desert tortoise would be reported to an Authorized Biologist, Biological Monitor, or Field Contact Representative. These biologists would maintain records of all desert tortoises encountered during the operation phase. This information would include for each individual: the locations (narrative, vegetation type, and maps) and dates of observations; general conditions and health; any apparent injuries and state of healing; if moved, the location from which it was captured and the location where it was released (whether animals voided their bladders); and diagnostic markings (i.e., identification numbers).

10. Only an Authorized Biologist would be permitted to handle desert tortoises during Ivanpah SEGS operation. When a desert tortoise is moved, an Authorized Biologist would be responsible for taking appropriate measures to ensure that the animal is not exposed to temperature extremes that could be harmful. When handing desert tortoises or excavating their burrows, the Authorized Biologist would follow the appropriate protocols outlined in *Guidelines for Handling Desert Tortoises During Construction Projects* (Desert Tortoise Council, 1996).

11. The Applicant would continue to implement a raven management plan during operation that would include a trash abatement program. Trash receptacles would have self-locking lids to prevent entry by opportunistic predators such as common ravens, coyotes, and dogs. Trash receptacles would be emptied and removed daily.
12. Employees would not be permitted to bring pets or firearms to the project.
13. As instructed during the environmental awareness training, employees would check under their equipment or vehicle before it is moved while working outside the cleared permanently fenced area. If desert tortoises are encountered, the vehicle would not be moved until the animal has voluntarily moved a safe distance away from the parked vehicle or the animal has been moved by the Authorized Biologist.
14. All unused material and equipment, including soil and rock piles, would be removed upon completion of any maintenance activities located outside the permanently fenced area.
15. An Authorized Biologist would perform surveys and an Authorized Biologist or Biological Monitor would perform monitoring within maintenance-need areas outside the permanently fenced area that have demonstrated the potential to affect the desert tortoise. They would be responsible for assisting crews in compliance with protection measures, performing surveys in front of the crew as needed to locate and avoid sensitive species, and compliance monitoring.
16. Pre-activity surveys of a maintenance-need area outside the permanently fenced area would be conducted by a Biological Monitor no more than 72 hours prior to the onset of activities. Desert tortoise burrows (including pallets) outside of, but near, the work area would be prominently flagged so they may be avoided during maintenance activities. Proposed actions would avoid disturbing such sites to the extent possible. In the event an occupied burrow is found within the proposed site, the Authorized Biologist would be onsite during maintenance activities.
17. Burrow excavation would be performed using hand tools either by or under the direct supervision of an Authorized Biologist. Excavation of desert tortoise burrows would occur no more than 7 days before the onset of maintenance activities. All desert tortoises removed from burrows would be placed in an unoccupied burrow of approximately the same size as the one from which it was removed. If an existing burrow is unavailable, an Authorized Biologist would construct or direct the construction of a burrow of similar shape, size, depth, and orientation as the original burrow. To ensure their safety, desert tortoises moved during least active periods would be monitored by an Authorized Biologist for 2 days after placement in the new burrows or until the end of the job. An Authorized Biologist would be allowed some judgment and discretion to ensure that survival of the desert tortoise is likely.
18. The area of disturbance from maintenance activities outside the permanently fenced areas would be confined to the smallest practical area, considering topography, placement of facilities, location of burrows, public health and safety, and other limiting factors. As needed, work area boundaries would be delineated with flagging or other marking to minimize surface disturbance associated with vehicle straying. Special habitat features, such as burrows identified outside the permanently fenced

area by an Authorized Biologist or a Monitor would be avoided to the extent possible. Also, previously disturbed areas within the permanently fenced area would, to the extent possible, be used for the stockpiling, storage, parking, and any other surface-disturbing activity.

19. All activities outside the permanently fenced area would be restricted to the described action area. If unforeseen circumstances require expansion of the corridor width, the potential expanded work areas would be surveyed by an Authorized Biologist for desert tortoise prior to use of the area. All appropriate protection measures would be implemented within the expanded work areas based on the judgment of the regulatory agencies and an Authorized Biologist. Work outside of the original ROW would proceed only after receiving written approval from the BLM, USFWS, CDFG, and CEC describing the exact location of the expansion.

20. Open trenches and other open excavations for the gas, water, and other associated utilities (as defined in the project description section) outside the permanently fenced area would be fenced with temporary desert tortoise exclusionary fencing, covered at the close of each work day, or provided with tortoise escape ramps. These excavations would be inspected periodically throughout and at the end of each work day and immediately before backfilling by an Authorized Biologist or a Desert Tortoise Monitor. Temporary tortoise exclusionary fencing may consist of silt fencing or hard wire cloth that is buried at least 6 inches and supported by wooden stakes. The fencing must be maintained to prevent entry by a desert tortoise.

21. The width of any activity corridor for any pipeline excavation or construction of any aboveground facility would be determined prior to the onset of ground-disturbing activities outside the permanently fenced area. Consistent with worker safety, work areas would be restricted to the narrowest possible corridors.

22. The Authorized Biologist or Field Contact Representative would immediately notify the BLM of an emergency situation. As a part of this response, the BLM may require additional measures to protect the desert tortoise. During any responses related to human health, fire, hazardous waste, or repairs requiring off-road vehicle and equipment use, the BLM may also require measures to recover damaged habitat.

2.6 Progress and Compliance Report

The Applicant would submit an annual report to the BLM, USFWS, CDFG and CEC documenting the completed construction activities and the effectiveness and practicality of the avoidance and minimization measures for the desert tortoise, the number of desert tortoises excavated from their burrows, the number of desert tortoises removed from the site, the number of desert tortoises killed or injured, and the specific information for each species required under protection measure 2 by January 31 of the following year or within 30 calendar days of any break in construction activity lasting more than 30 calendar days. The report would also make recommendations as appropriate for modifying the measures to enhance species protection or improve the utility of the permit. The annual report would provide information on the actual acreage disturbed by various aspects of the construction and maintenance activities. The final report would be submitted within 60 calendar days

following the completion of construction for all three solar plants and the associated utilities and facilities.

The Applicant would report to the BLM, USFWS, CDFG and CEC any direct mortality or suspected mortality of desert tortoises as a result of the proposed project. The Applicant would also report to the BLM, USFWS, CDFG and CEC immediately any information about take or suspected take of federally listed species not authorized in this biological opinion, and would notify the BLM, USFWS, CDFG and CEC within 24 hours of receiving such information. Notification would include the date, time, and location of the incident, or of the finding of a dead or injured animal. In the case of a dead animal, the individual animal should be preserved, as appropriate, and held in a secure location until instructions are received from the USFWS regarding the disposition of the specimen, or the USFWS takes custody of the specimen.

Any contractor or employee who during routine operations and maintenance activities inadvertently kills or injures a listed wildlife species would immediately report the incident to their representative. This representative must contact the CDFG immediately in the case of a dead or injured listed species.

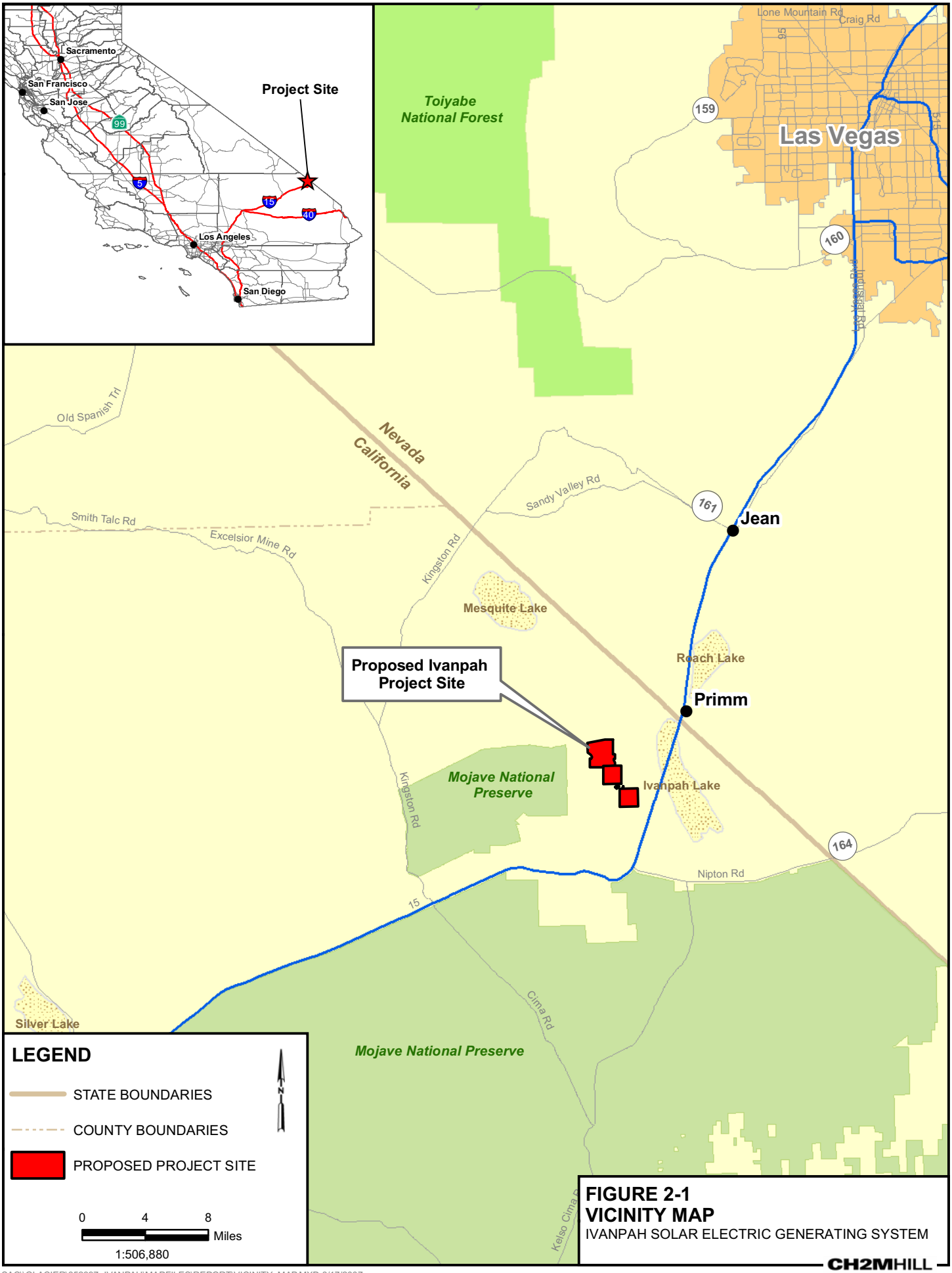

FIGURE 2-1
VICINITY MAP
IVANPAH SOLAR ELECTRIC GENERATING SYSTEM

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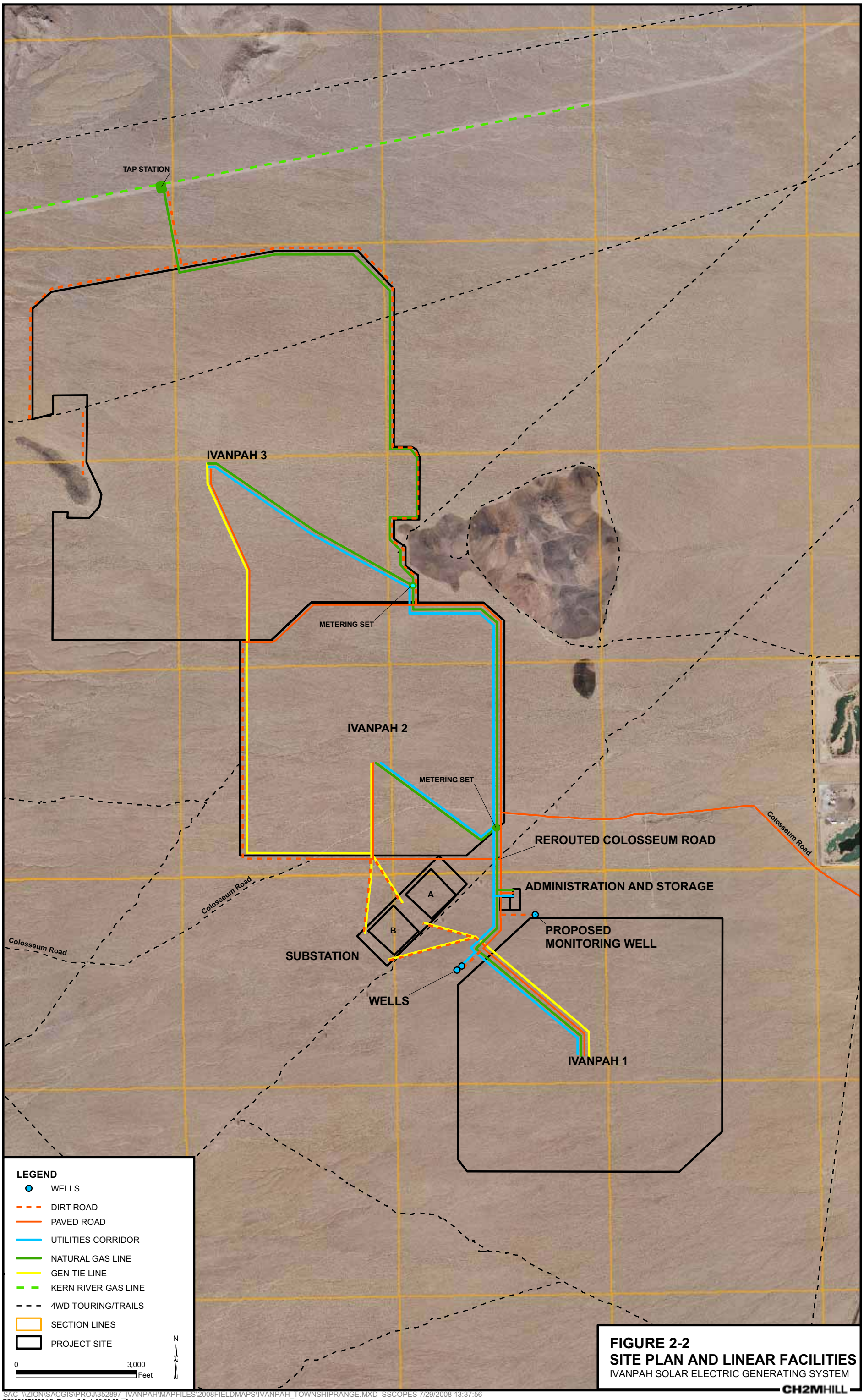

FIGURE 2-2
SITE PLAN AND LINEAR FACILITIES
IVANPAH SOLAR ELECTRIC GENERATING SYSTEM

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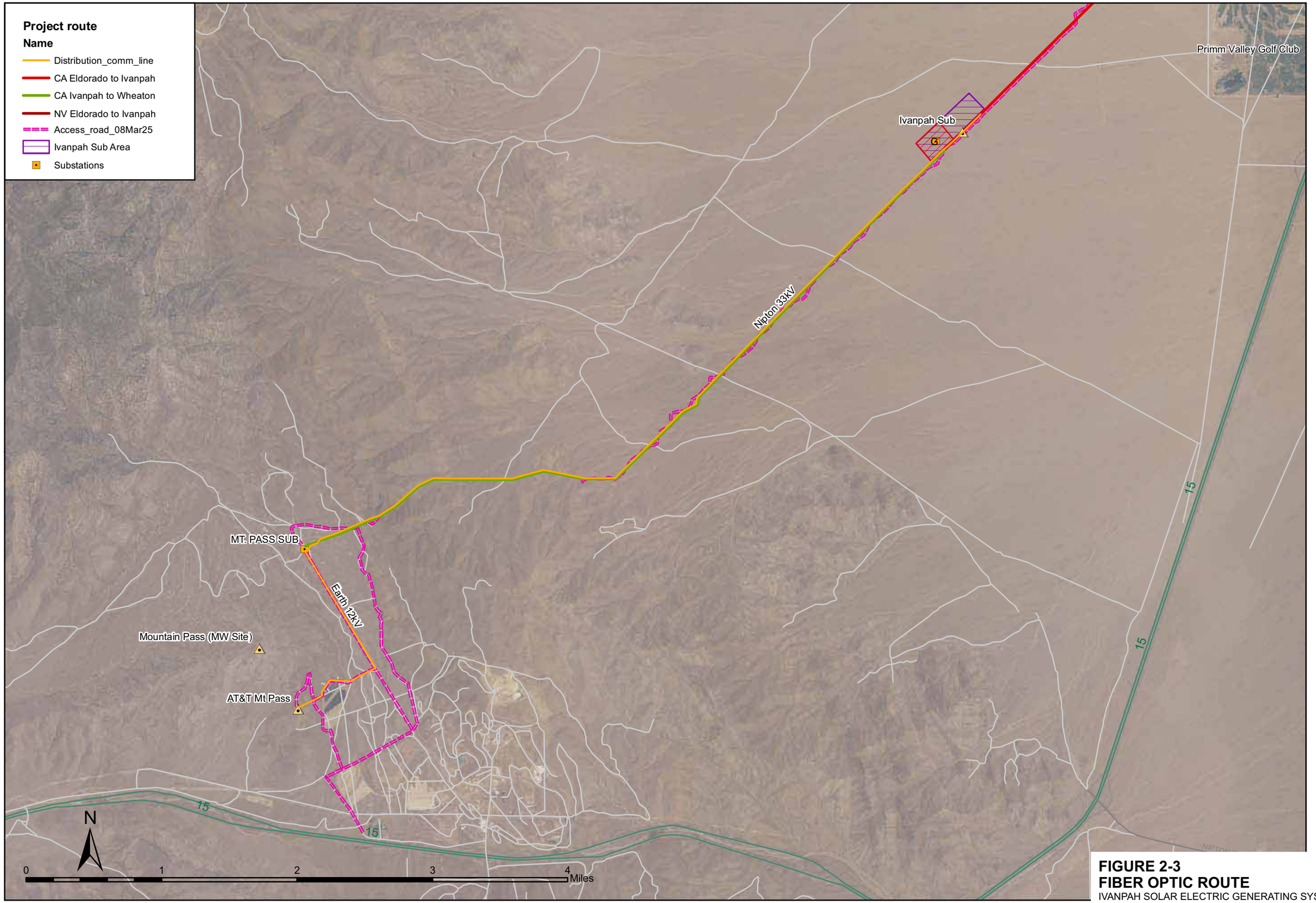

FIGURE 2-3
FIBER OPTIC ROUTE
IVANPAH SOLAR ELECTRIC GENERATING SYSTEM

Source: Southern California Edison

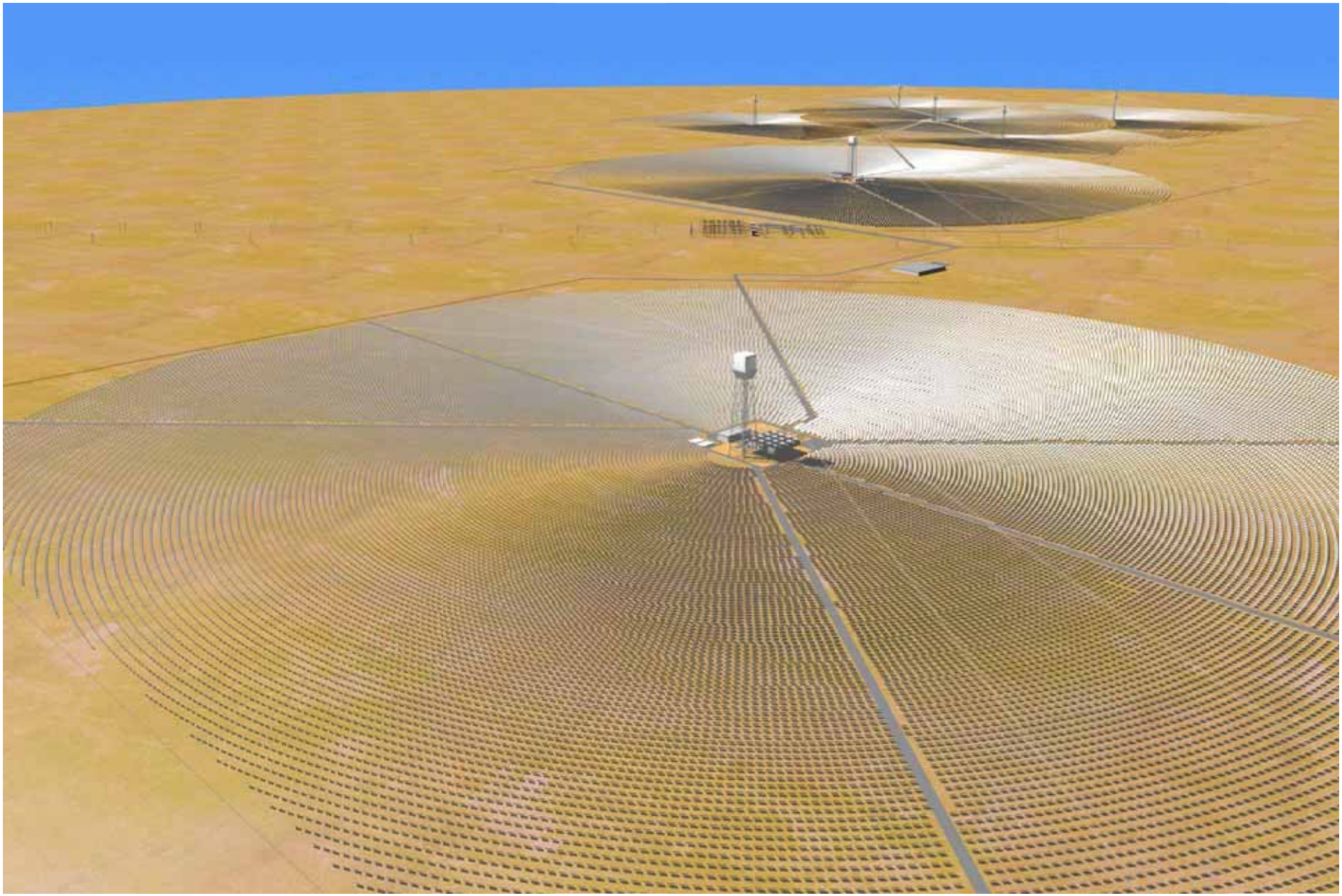

FIGURE 2-4
ARTIST RENDERING
IVANPAH SOLAR ELECTRIC GENERATING SYSTEM

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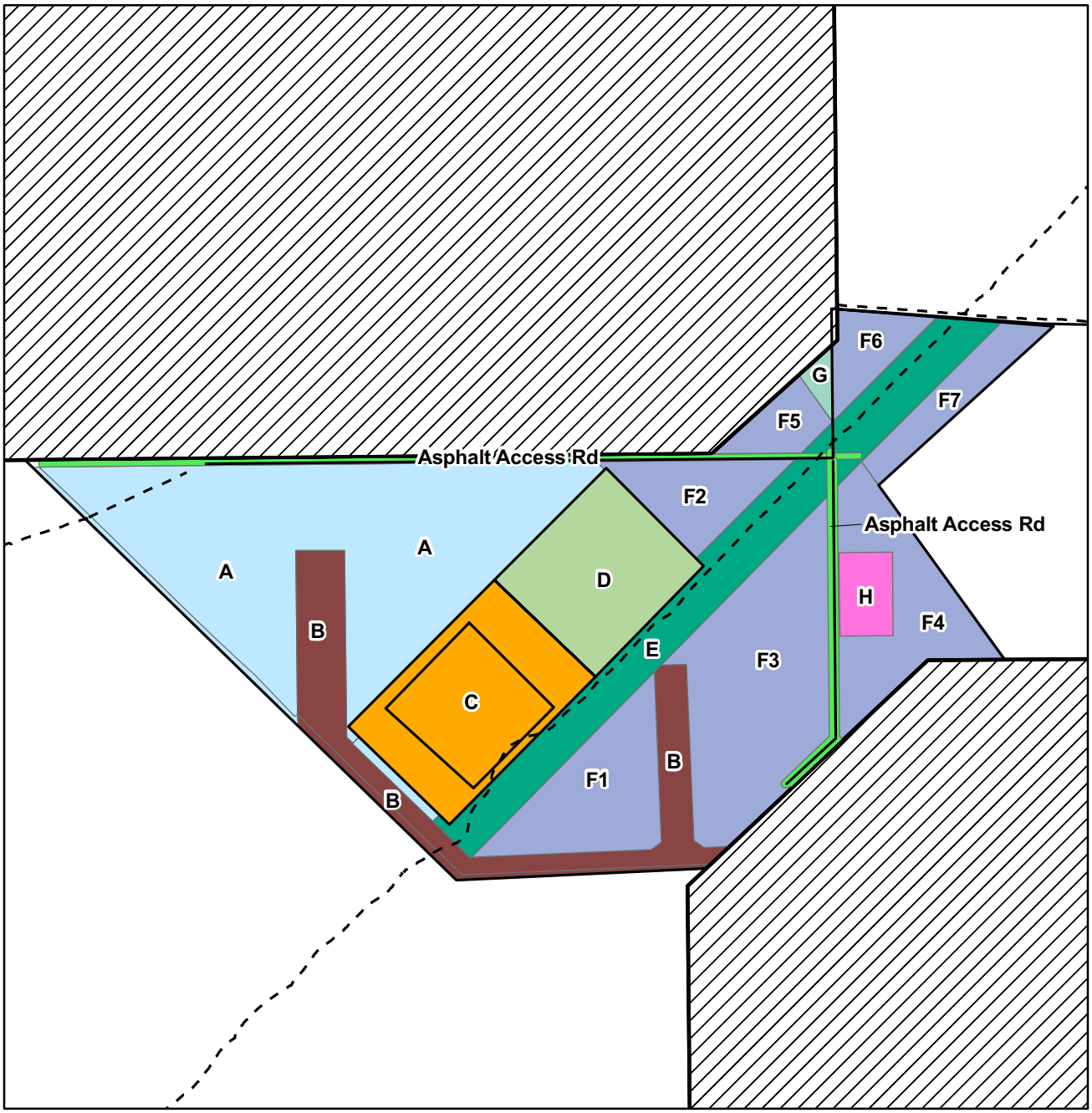
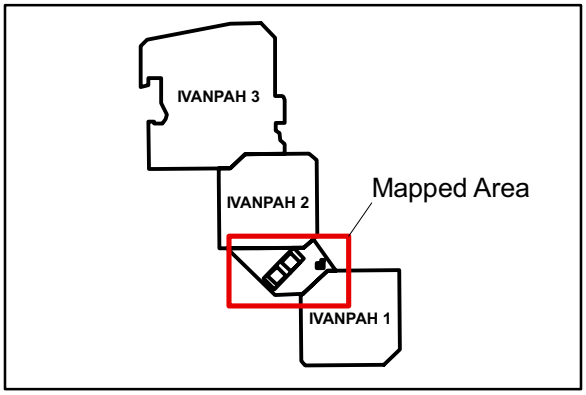


LEGEND

Construction Logistics Area

- A: 99.4 acres
- B: 29.1 acres
- C: 35.6 acres
- D: 25.7 acres
- E: 47.9 acres
- F1: 21.5 acres
- F2: 12.6 acres
- F3: 45.5 acres
- F4: 30.7 acres
- F5: 6.1 acres
- F6: 7.0 acres
- F7: 9.4 acres
- H: 5.7 acres
- G: 1.6 acres
- Asphalt Access Rd: Not included in acreage calculations
- Project Site

VICINITY MAP



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Feet

FIGURE 2-5
CONSTRUCTION LOGISTICS AREA
IVANPAH SOLAR ELECTRIC GENERATING SYSTEM

Biological Setting and Environmental Baseline

3.1 Biological Setting

3.1.1 Regional Overview

The Ivanpah Valley is bounded by the Lucy Grey Range and McCullough Mountains to the east, the New York Mountains and the Mid-Hills to the south, the Ivanpah Mountains, Mescal Range, and Clark Mountain to the west, and the Clark Mountain and southernmost Spring Range to the north. The valley-facing slopes of these mountain ranges empty into Ivanpah and Roach dry lakes. From the rugged mountains to the dry lake basins, Ivanpah Valley encompasses a diverse assemblage of landscape features and vegetation communities.

The Primm Valley Golf Club is a golf course located 0.5 mile east of the project area. There are no residential units associated with the golf course. However, the golf course has several; water features. The closest community is the town of Primm on the Nevada side of the state line. A retail and casino center along the I-15 corridor, with only a few residential facilities for casino employees, is located about 4.5 miles northeast of the project area. The town of Jean, Nevada is located approximately 15 miles north of Primm along I-15. The southern outskirts of greater Las Vegas are about 32 linear miles north-northeast of the project area.

The proposed 3,960-acre (6.2 square miles) area affected by the solar site is located on an alluvial fan, or bajada, that extends eastward from the Clark Mountains to Ivanpah Dry Lake (Figure 3-1). The alluvial fan topography slopes gradually (3 to 5 percent grade) to the east and southeast from an elevation of approximately 3,150 feet in the northwest corner to about 2,850 feet in the southeast corner. The alluvial fan is dissected by numerous ephemeral washes. Most are small (active channels 1 to 3 feet wide), but a few are larger, with bank-to-bank widths of more than 50 feet and active channels 5 to15 feet (or more) wide. In areas, the topography flattens, and many of the drainages become weakly expressed assemblages of braided erosional channels. In these areas, flows dissipate across the site into broad sheet flows. The general direction of drainage within Ivanpah SEGS flows eastward, ultimately reaching Ivanpah Dry Lake.

The site is on land administered by the BLM Needles Field Office. As an amendment to the California Desert Protection Act (CDCA) Plan, the BLM produced the Northern and Eastern Mojave (NEMO) Coordinated Management Plan (BLM, 2002). This document consists of proposed management actions and alternatives for public lands in the NEMO Planning Area. The Ivanpah SEGS site is located in the southeastern portion of the NEMO Planning Area Boundary (CH2M HILL, 2007). The Ivanpah SEGS project is not located within or adjacent to a BLM-designated Desert Wildlife Management Area (DWMA), area of critical environmental concern (ACEC) or Wildlife Habitat Management Areas (WHMAs).

3.1.2 Habitat and Vegetation

Mojave Creosote Bush Scrub is the predominant vegetation type observed within the Ivanpah SEGS site. This type corresponds to the Holland type of the same name (Holland, 1986) and may correspond to one or more of the Creosote Bush, Creosote Bush-White Bursage, or Black Bush series of *A Manual of California Vegetation* (Sawyer and Keeler-Wolf, 1995). According to Holland, Mojave Creosote Bush Scrub is composed of widely spaced evergreen and drought-deciduous shrubs, cacti and yucca, from 1 to 9 feet in height. Creosote bush (*Larrea tridentata*) is the dominant shrub species and the indicator species for this vegetation type. Burrobush or white bursage (*Ambrosia dumosa*), cheesebush (*Hymenoclea salsola*), Nevada tea (*Ephedra nevadensis*) and Mojave yucca (*Yucca schidigera*) are common associates throughout the range of this type (Holland, 1986) and are also found in the Ivanpah SEGS site.

Four subtypes of Mojave Creosote Bush Scrub were also identified in the Ivanpah SEGS site. These subtypes intergrade and transitions between these subtypes are subtle. . These Mojave Creosote Bush Scrub Subtypes are: 1) Larrea-Ambrosia Scrub; 2) Larrea mixed Scrub; 3) Larrea Scrub; and 4) Limestone-Associated Type of Larrea Scrub. The predominant subtype of Mojave Creosote Bush Scrub vegetation is the Larrea-Ambrosia subtype of Creosote Bush Scrub. Limestone features within the one-mile buffer are vegetated by the limestone-associated Larrea scrub subtype.

Two other vegetation types, Mojave Yucca – Nevada Tea Scrub and Mojave Wash Scrub also occur. The Mojave Yucca – Nevada Ephedra Scrub vegetation type is restricted to a small area of limestone pavement plain at the base of the limestone hills of the eastern extension of the Clark Mountain Range, in the north-central area of the one-mile buffer. It also extends into the very northern end of the utility corridor. Many small to medium ephemeral washes are associated with increased densities of cheesebush, and the larger ephemeral wash drainage features are vegetated with Mojave Wash Scrub. Figure 3-2 shows the general location of vegetation types present within the Ivanpah SEGS site, by project feature.

Vegetation types observed during rare plant surveys of the Ivanpah Substation to Mountain Pass Substation area are described in the Biological Survey Report prepared by EPG (EPG 2008). In general, the area at lower elevations in the vicinity of the Ivanpah substation features rolling topography draining south toward I-15. The transmission line tops out at the Mountain Pass Substation (in San Bernardino County, California) at an elevation of approximately 5,320 feet (EPG, 2008).

The dominant vegetation type at the lower elevations is a Blackbush series with Joshua trees (*Yucca brevifolia*). Blackbush is the dominant shrub, providing extensive groundcover. More conspicuous but less dominant, Joshua trees (*Yucca brevifolia*) are also present. Other plants include Mojave yucca (*Yucca schidigera*), broom snakeweed (*Gutierrezia sarothrae*), green ephedra (*Ephedra viridis*), desert almond (*Prunus fasciculata*), cheesebush (*Hymenoclea salsola*), and Utah juniper (*Juniperus osteosperma*). Near the Mountain Pass area, the plant community at this elevation is typical of mid-elevation desert mountains, and features Utah juniper, singleleaf pinyon (*Pinus monophylla*), Mormon tea (*Ephedra* sp.), and numerous shrubs, annuals, and perennial plants, including turpentine brush (*Thamnosma montana*), goldenbush (*Ericameria* sp.), bladder sage (*Salazaria mexicana*), desert lupine (*Lupinus shockleyii*), freckled milkvetch (*Astragalus lentiginosus*), and desert paintbrush (*Castilleja*

angustifolia). Additional information on the vegetation types and plant species observed in the action area is included in the Botanical Resources Report (Attachment BR3-1, Supplemental Data Response, Set 1C, GANDA, 2008; to be filed in September 2008) and the Draft Biological Survey Report prepared by EPG (EPG, 2008). A complete list of the plants observed during surveys conducted in 2007 and 2008 is included in Appendix C.

3.1.3 Threatened and Endangered Plant Species

Federally listed plant species were not identified during surveys of the action area conducted in 2007 and 2008. The following sources describe the results of the three botanical surveys conducted within the action area:

1) 2007 rare plant surveys of the Ivanpah SEGS site, including the one-mile site buffer, are included in the AFC (CH2M HILL, 2007)

2) Results of the 2008 botanical surveys of the Ivanpah SEGS site are provided in the Technical Botanical Resources Report (Attachment BR3-1, to be made available in September 2008)

3) Results of rare plant surveys conducted for the transmission corridor extending southwest from the Ivanpah substation to the Mountain Pass area are presented in the El Dorado-Ivanpah Transmission Project Biological Resources Summary Report prepared by EPG (2008)

A summary of the key findings from these three rare plant surveys is provided below. Additional details on these surveys can be found in the survey reports.

3.1.3.1 Results of Surveys Conducted for the Ivanpah SEGS Project

Eight special status plants were identified within the Ivanpah SEGS site (excluding the one-mile buffer) during 2007 and 2008. None of these eight special status species are federally or state-listed. The eight special status plant species are: small-flowered androstephium (*Androstephium breviflorum*), Mojave milkweed (*Asclepias nyctaginifolia*), desert pincushion (*Coryphantha chlorantha*), Utah vine milkweed (*Cynanchum utahense*), nine-awned pappus grass (*Enneapogon desvauxii*), Parish's club-cholla *(Grusonia (=Opuntia) parishii*), Utah mortonia (*Mortonia utahensis*) and Rusby's desert mallow (*Sphaeralcea rusbyi* var. *eremicola*). Four of these special status plants (Mojave milkweed, desert pincushion, Utah vine milkweed and Parish's club cholla) were also identified within the Ivanpah SEGS site in 2007.

In addition to the eight special-status plant species identified during protocol-level surveys, desert portulaca (*Portulaca halimoides*), an ephemeral summer annual, was observed within the Ivanpah SEGS site in October 2007 by Jim Andre during independent visits that were not a part of the protocol-level survey effort for this project. A list of plant species observed during these surveys is provided in the AFC (CH2M HILL, 2007) and in the 2008 botanical resource inventory report (Attachment BR3-1, Supplemental Data Response, Set 1C) prepared by GANDA (2008).

3.1.3.2 Results of Surveys Conducted for the Ivanpah Substation to Mountain Pass Area

Seven special status plant species, Mojave milkweed (*Asclepias nyctaginifolia*), nine-awned pappus grass (*Enneapogon desvauxii*), Parish's club-cholla *(Grusonia (=Opuntia) parishii*), Aven Nelson's phacelia (*Phacelia anelsonii*), sky-blue phacelia (*Phacelia coerulea*), black grama (*Bouteloua eriopoda*) and Utah vine milkweed (*Cynanchum utahense*) were identified within the Ivanpah Substation to Mountain Pass Area corridor of the fiber optic line. None of these special status plant species are federally listed. Additionally, one species in the Cactaceae family, in the genus *Coryphantha [Escobaria],* was identified in the Mountain Pass Area. This plant could not be positively identified to species, and it is uncertain if these plants are the desert pincushion, a special status plant. More detail on the rare plants identified during the surveys of the corridor between the Ivanpah Substation and the Mountain Pass Area are included in the biological resources summary report prepared by EPG (EPG, 2008).

3.1.4 Noxious Weeds

Noxious weeds (also sometime called invasive weeds) are defined for this document as species of non-native plants that are included on the weed lists of the California Department of Food and Agriculture (CDFA, 2007), the California Invasive Plant Council (Cal-IPC, 2006), or those weeds of special concern identified by BLM. The Mojave Weed Management Plan website (http://www.mojavewma.org/) was also consulted to assemble a list of target noxious weeds to include in surveys. A list of invasive species that occur, or potentially could occur in the action area is provided in the Table 1 of the Weed Management Plan (Attachment DR13-1A, Data Response Set 1F; CH2M HILL, 2008b).

Weeds were searched for during all phases of the biological field surveys, when special attention was given to identifying non-native invasive plant species. During protocol surveys, all surveyors noted any plant species with which they were not familiar, and took samples that were identified by the project's lead botanists, in part, to determine if these species were noxious weeds. The same procedure was used during reconnaissance surveys of the 1-mile buffer.

Several noxious weeds are known to occur in the project vicinity. The weeds of highest concern in the general area include Sahara mustard (*Brassica tournefortii*) and saltcedar (*Tamarix ramosissima*) (Pers. Comm., C. Grant and C. Sullivan, 2007). Red brome (*Bromus madritensis* ssp. *rubens*), filaree (*Erodium cicutarium*), and other ubiquitous weeds are also present; however, because of the widespread nature of these weeds, control is considered impracticable.

3.1.4.1 Species Descriptions and Management Strategy

Descriptions of the more common or troublesome noxious weeds occurring or potentially occurring at Ivanpah SEGS are provided in this section, along with the basic weed management strategy applicable to each. The Weed Management Plan (Attachment DR13-1A, Data Response Set 1F; CH2M HILL, 2008b) provides additional information on management strategy and control methods for all observed and potentially occurring noxious weed species. Management strategies must encompass not only eradication, but also identify those weed species that are widely established and ubiquitous. Certain ubiquitous exotic species (*e.g. Bromus madritensis* ssp. *rubens, Schismus* spp., *Erodium cicutarium*) would be monitored and not immediately subject to control because control of

these aggressive colonizers is impractical, and it would also likely slow site revegetation and rehabilitation by retarding the rate of secondary succession and surface stabilization. In addition, these species can play a beneficial role in accelerating surface stabilization and, therefore, reduce soil erosion caused by sheet flow or high winds. Complete eradication of large areas where infestations are already established would adversely affect other pioneer species, and is likely to be impractical because the area would likely be re-invaded from adjacent lands in the absence of physical barriers that isolate the area.

The following list provides brief descriptions of the weed species of particular concern at the Ivanpah SEGS. Additional weed species are listed in Table 1 of the Weed Management Plan:

- Sahara mustard, or African mustard, (*Brassica tournefortii*) was not observed on the project site, but is known from the area and is of high concern. Cal-IPC has declared this plant highly invasive (Cal-IPC, 2006). This species would be eradicated whenever encountered.
- Red brome (*Bromus madritensis* ssp. *rubens*) is an introduced Eurasian grass adapted to microhabitats that can be frequently found at the base of desert shrubs. It can also form carpet cover in pockets of fine-grained soils in rough terrain off the bajada. It is widespread and abundant in the Mojave Desert and has been found in the Ivanpah SEGS. Seeds from this species can disperse readily and across large distances. Cal-IPC has declared this plant highly invasive (Cal-IPC, 2006). Stands of red brome have played an important role in accelerating wildfires in desert scrub communities (Brooks, 1999); a deleterious effect partly because warm-desert plant communities are ill-adapted to fire (Brown and Minich, 1986). Because of its widespread distribution, red brome is not considered feasible for general control, and weed abatement measures for this species would not be required.
- Cheat grass (*Bromus tectorum*) is among the most widely distributed invasive plant species in the western U.S. Closely related to red brome, it is adapted to colder steppe and woodland habitats. It is known to occur in the vicinity, but has not been observed on the project site and is likely to occur only at higher elevations. Cal-IPC has declared this plant highly invasive (Cal-IPC, 2006). Because of its widespread distribution, cheat grass is not considered feasible for general control and weed abatement measures would not be required.
- Mediterranean grass (*Schismus* spp.) was observed patchily distributed throughout the project site. Cal-IPC has determined that this plant has a limited invasiveness rating in California (Cal-IPC, 2006). BLM and other agencies recognize that because of the widespread distribution of Mediterranean grass, this species is not considered feasible to control; therefore, weed abatement efforts for Mediterranean grass would not be required.
- Although all invasive plants share the trait of being adapted to disturbed habitat, Russian thistle or tumbleweed (*Salsola tragus*) particularly tends to be restricted to roadway shoulders and other sites where the soil has been recently disturbed. This species was not observed at the project site, but is a common invader on disturbed sites. After summer rains in 2008, widespread areas on the northern margin of Ivanpah Playa were covered with a thick growth of tumbleweed. Cal-IPC has determined that this

plant has a limited invasiveness rating in California (Cal-IPC, 2006). There is a high potential that Russian thistle could become established in the construction area and this species should be eradicated if observed.

- London rocket (*Sisymbrium irio*) is widespread throughout the warm deserts of North America. It was identified near the project site along Colosseum Road. Cal-IPC has declared this plant moderately invasive (Cal-IPC, 2006). London rocket would be eradicated at Ivanpah SEGS wherever it is observed.
- Mediterranean tamarisk or saltcedar (*Tamarix ramosissima*) has been observed near the project site; however, it is a riparian plant and is therefore restricted to habitats where there is perennial saturation such as springs and seeps, or runoff from poorly maintained water pipelines or well pumps. Cal-IPC has declared this plant highly invasive (Cal-IPC, 2006). This species would be eradicated wherever observed on the project site.
- Filaree or storksbill (*Erodium cicutarium*) is a widespread annual species common in disturbed habitats. It can form dense, transient populations when conditions are suitable. It has a limited overall rating by Cal-IPC, generally because the ecological impacts of the species are minor. Because of its widespread distribution, filaree is not considered feasible for general control and weed abatement measures would not be required onsite.

3.1.4.2 New Weeds

Weeds not identified in the descriptions above, or previously reported for the area or anticipated, could colonize the site or invade site facilities, both during construction as well during operation. During construction, the project environmental compliance manager (ECM) would regularly update the list of potential noxious weeds, and identify any new potential threats. This would include developing a management strategy and management methods appropriate to the plant species and the nature of any potential invasion. Similarly, the facility plant manager or appropriate designee during operations would be required to continually update the potential noxious weed list and provide monitoring and management appropriate to any new species.

3.1.5 Wildlife Species

The diversity of vegetation and landscape features in and around the proposed Ivanpah SEGS provides habitat for a rich variety of Mojave Desert and non-native wildlife. These includes the desert tortoise and other reptiles such as side-blotched lizard (*Uta stansburiana*), desert iguana (*Dipsosaurus dorsalis*), long-nosed leopard lizard (*Gambelia wislizenii*), western whiptail (*Cnemidophorus tigris*), zebra-tailed lizard (*Callisaurus draconoides*), common collared lizard (*Crotaphytus collaris*), sidewinder (*Crotalus cerastes*), and gopher snake (*Pituophis melanoleucus*). Developing knowledge of the banded Gila monster (*Heloderma suspectum cinctum*) distribution in California suggests that this large but seldom seen lizard may occur in the project vicinity.

Although human influences are primarily responsible for the year-round presence of the common raven in the Ivanpah Valley, the Ivanpah SEGS project area provides forage, cover, roosting, and nesting habitat for a variety of bird species. Resident and migratory birds use

the resources during the winter, migratory, and breeding seasons. This includes birds such as Say's phoebe (*Sayornis saya*), black-throated sparrow *(Amphispiza bilineata)*, white-crowned sparrow (*Zonotrichia leucophrys*), sage sparrow (*Amphispiza belli*), blue-gray gnatcatcher (*Polioptila caerulea*), cactus wren (*Campylorhynchus brunneicapillus*), Verdin (*Auriparus flaviceps*), western kingbird (*Tyrannus verticalis*), sage thrasher (*Oreoscoptes montanus*), house finch (*Carpodacus mexicanus*), lesser nighthawk (*Chordeiles acutipennis*), common ground-dove (*Columbina passerine*), mourning dove (*Zenaida macroura*), Gambel's quail (*Callipepla gambelii*), American kestrel (*Falco sparverius*), burrowing owl (*Athene cunicularia*), and red-tailed hawk (*Buteo jamaicensis*).

A diverse collection of landscape features, vegetation diversity, forage, and prey availability in the Ivanpah SEGS project area is likely to attract a variety of mammal species such as Audubon's cottontail (*Sylvilagus audubonii*), black-tailed jackrabbit (*Lepus californicus*), whitetail antelope squirrel (*Ammospermophilus leucurus*), desert kit fox (*Vulpes macrotis*), and coyote (*Canis latrans*). The regional mule deer (*Odocoileus hemionus hemionus*) population is considered low despite efforts in 1948 to reintroduce the species to the New York and Providence mountains, installation of guzzlers, and efforts to control the introduced feral burro (*Equus asinus*) (NPS, 2006). Given the proximity of the Clark Mountains, it is likely that deer and desert bighorn sheep (*Ovis canadensis nelsoni*) move down into the upper elevations of the valley, including the Ivanpah SEGS project area to forage. It is also likely that areas of Ivanpah Valley provide important movement corridors for mule deer and this bighorn sheep subspecies. The BLM also issues year-round cattle grazing allotments in the Ivanpah Valley, including areas within the nearby Ivanpah Valley DWMA (BLM, 2001).

A list of wildlife species observed within, or adjacent to, the action area is included in Appendix D.

3.2 Environmental Baseline

The environmental baseline includes the past and present affects of all Federal, State, or private actions and other human activities in the action area, the anticipated effects of all proposed Federal projects in the action area that have already undergone formal or early Section 7 or Section 10 consultation, and the effect of State or private actions which are contemporaneous with the consultation process (50 CFR 402.02).

The Ivanpah Valley has been affected by a variety of activities ranging from the construction and continued use of major highways such as I-15 and secondary roads, unimproved roads and trails, pipelines, Union Pacific Railroad, casinos and retail businesses, recreational opportunities (such as the Primm Golf Club and land sailing/racing on the Ivanpah Dry Lakebed), electrical transmission lines and substations, and other facilities developed around the Nevada communities of Jean and Primm as well as the California community of Nipton, and the unzoned ranchette development along Nipton Road. Development and human intrusion within the area has resulted in desert tortoise habitat loss and degradation, habitat fragmentation, harm and harassment of individual tortoises, and the introduction of non-native species. The Boulder Corridor, a utility corridor, containing such utilities as the Los Angeles Department of Water and Power (LADWP) electrical transmission line, KRGT line, and Level 3 fiber optic line is located directly north of the proposed site. Additionally,

the SCE and LADWP electrical transmission lines cross the southern extent of the project site. Several water wells also exist in the immediate area.

3.2.1 Projects That Are Reasonably Foreseeable

There are five other projects that have been studied in the Ivanpah Valley and in the vicinity of the proposed Ivanpah SEGS project including:

- Desert Xpress Rail Line
- Improvements to I-15
- Las Vegas Valley Water District Pipeline
- Southern Nevada Supplemental Airport (Ivanpah Valley Airport)
- Table Mountain Wind Generating Facility
- AT&T Fiber Optic Line
- OptiSolar

3.2.1.1 Desert Xpress Rail Line

The Desert Xpress Rail Line project is a privately funded proposed high-speed rail passenger train from Victorville, California, to Las Vegas, Nevada. The proposal was initiated to provide an alternative to automobile travel between the Los Angeles area and Las Vegas along I-15. This highway, the most direct automobile route between the Los Angeles area and Las Vegas, experiences heavy traffic congestion, especially on weekends. Currently, there is no passenger train service to Las Vegas. The city of Victorville was selected as the location for the western-most terminal since it is within a one-hour drive of 12 million people. The train would travel up to 125 miles per hour and would make the 190-mile trip from Victorville to Las Vegas in approximately 1 hour and 45 minutes, taking more than 2 hours off the typical automobile travel time.

According to the Federal Railroad Administration (FRA), the project would involve construction of a fully grade separated, dedicated double track passenger-only railroad along an approximately 200-mile corridor, from Victorville to Las Vegas. Segment 4 of the proposed route (from Mountain Pass to Primm, NV) has two alternatives. It appears that Alternatives A and B would diverge north or south of I-15 west of the I-15/Nipon Road (Highway 164) interchange. Alternative A would leave the I-15 freeway corridor in the vicinity of Holloran Springs between Kelbaker Road and Cima Road and head south for approximately 4 miles before returning to the I-15 freeway corridor south of Primm. A portion of this alignment may encroach on the MNP, approximately one half mile south of the I-15 freeway. Alternative B would leave the I-15 freeway ROW in the same vicinity and head north before returning to the I-15 freeway ROW south of Primm. A 4,000-foot long tunnel would be necessary for Alternative B (FRA, 2006). The proposed rail line would be within 1.5 miles south of the Ivanpah SEGS project.

Preparation of an environmental impact statement (EIS) for the project was initiated during FRA public scoping meetings on July 25 and 26, 2006. Effects associated with the project construction and operation have not been released. The comment period on the scope of the EIS ended on August 15, 2006. No schedule for completing the EIS or start of construction has been provided. No updates have been posted since the close of the scoping period.

3.2.1.2 Interstate 15 Improvements

I-15 is the major highway between Southern California and Las Vegas. As an international connection between the Canadian border and Montana, and the Mexican border south of San Diego, the freeway carries high volumes of interstate traffic, particularly semi-trucks. Near the California-Nevada border, traffic volumes on I-15 in San Bernardino County average 40,000 vehicles per day. These volumes include both long-distance and tourist traffic to and from the Las Vegas and Colorado River destinations. Traffic growth in the project area has been moderate (two to three percent per year), although traffic volumes have increased much faster further south.

The California Department of Transportation (Caltrans) has an ongoing plan for improvements to I-15 (DOT, 2004). Highway construction planned between Barstow and the Nevada state line includes: 1) a proposed point-of-entry inspection station near the Nevada border with construction likely to start in 2009 and continue for 2 years; 2) a 12-mile-long northbound truck descending lane and pavement rehabilitation (expected to be completed in the summer of 2010); and 3) regrading of median slopes, has been completed (Pers. Comm., Bory, 2008). The increasing traffic volumes, as well as the spot widening to the freeway, would serve to increase the highway's role in acting as a barrier to the natural movements of terrestrial wildlife species, specifically the desert tortoise, as well as to potentially increased mortality resulting from vehicle strikes. According to Caltrans, there is no permanent tortoise fencing along this stretch of I-15 (Pers. Comm., Bory, 2008).

3.2.1.3 Las Vegas Valley Water District Pipeline

The Las Vegas Valley Water District has proposed construction and operation of a water supply pipeline from the existing 2420 Zone Bermuda Reservoir (located in southern Las Vegas) to Jean, Primm, the Southern Nevada Correctional Center, and the proposed Ivanpah Valley Airport. The pipeline also would provide water to other users along the I-15 corridor and within the Ivanpah Valley in general. The project would include more than 30 miles of large-diameter pipeline, 3 pump stations, 2 reservoirs, and associated access roads, electric power distribution lines, and telemetry control structures (BLM, 2002). The availability of a reliable water source in Ivanpah Valley would likely result in increased development and a variety of direct and indirect effects as a result of the development.

3.2.1.4 Southern Nevada Supplemental Airport (Ivanpah Valley Airport)

The Clark County Department of Aviation (CCDOA) is proposing to construct a new supplemental commercial service airport in the Ivanpah Valley (Ivanpah Valley Airport). The new airport would provide additional capacity to serve residents of southern Nevada and visitors to the Las Vegas area. Ivanpah Valley Airport is the planned relief airport for McCarran International Airport. Since there is only limited space left for expansion at McCarran, a new airport is an alternative to increase capacity. Clark County, Nevada purchased 6,500 acres of land along I-15 in the Ivanpah Valley from the BLM about 30 miles southwest of McCarran International Airport. The proposed airport would be located between Jean and Primm, Nevada.

The Ivanpah Valley Airport project is planned on 9.4 square miles along I-15. The project site is bordered by I-15 on the west and the Union Pacific Rail Road (UPRR) tracks on the east. Primm, Nevada, an existing commercial development including hotel casino and

shopping plaza, is located approximately one mile south of the south end of the airport project. Jean, Nevada is located approximately 17 miles north of the Ivanpah SEGS site. The proposed airport site is located on part of the Roach Lake Playa (Clark County Department of Aviation 2004).

The analysis of the project effects has not been completed. On August 4, 2008, the FAA and BLM released a Draft Alternatives Working Paper for public comment. Comments are due by October 3, 2008. All dates for construction and availability are fluid at this time. However, the official CCDOA statements suggest a goal of starting construction in 2010 and beginning operation in 2017 (Stutz, 2007). The proposed airport project is within tortoise habitat.

3.2.1.5 Table Mountain Wind Energy Facility

The Table Mountain Wind Company (TMWC) is proposing to develop a nominal 150 to 205 MW wind-powered electric generation facility and ancillary facilities located at the south end of the Spring Mountain Range between the communities of Goodsprings, Sandy Valley, Jean, and Primm, Nevada. TMWC has applied for a 25-year term ROW grant from the BLM Las Vegas Field Office to construct, operate, and maintain a wind generating and ancillary facilities on approximately 325 acres of public land. The purpose of the proposed project is to provide wind-generated electricity to meet existing and future electricity needs and demonstrate the ability of wind energy to provide a reliable, economical, and environmentally acceptable energy resource in southern Nevada. It was concluded in the EIS that implementation of the proposed project or alternatives would result in significant impacts on visual resources and potentially significant impacts on wildlife resources. The project is located within occupied desert tortoise habitat and would therefore adversely affect the tortoise. Positive benefit to air quality and socioeconomic resources would result from the development and operation of the wind generating facility (PBS&J, 2002).

The project location is approximately 13 miles north of the Ivanpah SEGS site. Project workforce requirements and proposed construction schedules are not available. Construction workers in Las Vegas would use I-15 to Jean, NV to access the site. On July 20, 2007, Nevada Representative Dean Heller wrote a letter urging his constituents to encourage BLM to look for another location for this project.

3.2.1.6 AT&T Fiber-optic Cable Replacement Project

AT&T Corporation (AT&T) proposes to replace deteriorating portions of its approximately 190-mile fiber optic cable extending from Las Vegas, Nevada, to Victorville, California. The activities required to ensure the function and capacity of the overall system include replacement of portions of the direct bury cable, as well as replacement of portions of the cable within existing conduit. Constructed in 1988–89, this cable route contains a 0.5-inch diameter fiber optic cable that is either "directly buried" in the ground or otherwise enclosed within existing buried conduit. Segment 1, of the 3-segment project, parallels the west side of I-15 from Nipton Road to Primm, NV. The California State Lands Commission (CSLC) and the Bureau of Land Management (BLM) prepared a draft Environmental Assessment/Mitigated Negative Declaration (EA/MND) to assess the environmental impacts associated with the replacement of the three segments of AT&T's existing fiber

optic cable. The 30-day public comment period on the EA/MND concluded on August 14, 2008 (BLM and CSLC, 2008).

3.2.1.7 OptiSolar

OptiSolar, a Hayward solar manufacturer of thin film amorphous silicon solar panels and developer for wholesale applications, or its subsidiary Gen3 Solar, has submitted a ROW application to BLM for land immediately east of the Ivanpah SEGS project area (Pers. Comm., Torre, 2007). According to the BLM Needles Field Office, a plan of development (POD) has been submitted for the proposed 300 MW OptiSolar project. The POD is currently being updated by OptiSolar (Pers. Comm., Torre, 2008). The BLM's review of the potential impacts associated with the POD is not yet available for public review, and there has been no Notice of Intent (NOI) issued yet for this project. No construction schedule is available.

3.2.2 Projects That Are Not Reasonably Foreseeable

There is some information about several other projects within the Ivanpah basin; however at this time, these projects have not proceeded in the normal course to the point that there is enough publicly available information to determine their potential effects and have some comfort level that they would proceed to construction. Accordingly, these potential projects are considered speculative and thus not reasonably foreseeable. They are:

- Amtrak Rail Line
- California-Nevada Interstate Maglev
- Solar Investments I, LLC
- PPM Energy 63 MW Wind Project
- Reliant Energy 500 kV Power Line

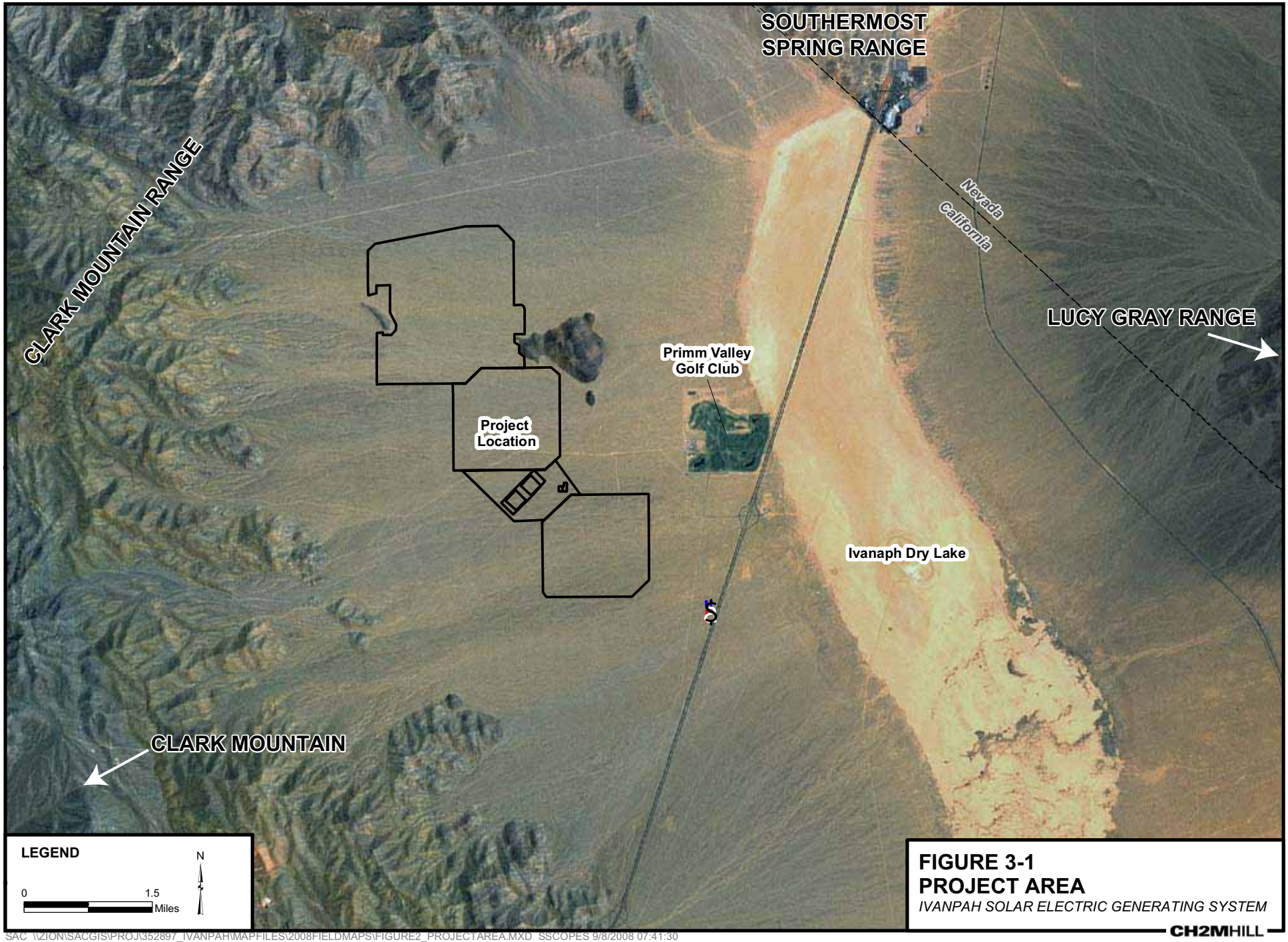

FIGURE 3-1
PROJECT AREA
IVANPAH SOLAR ELECTRIC GENERATING SYSTEM

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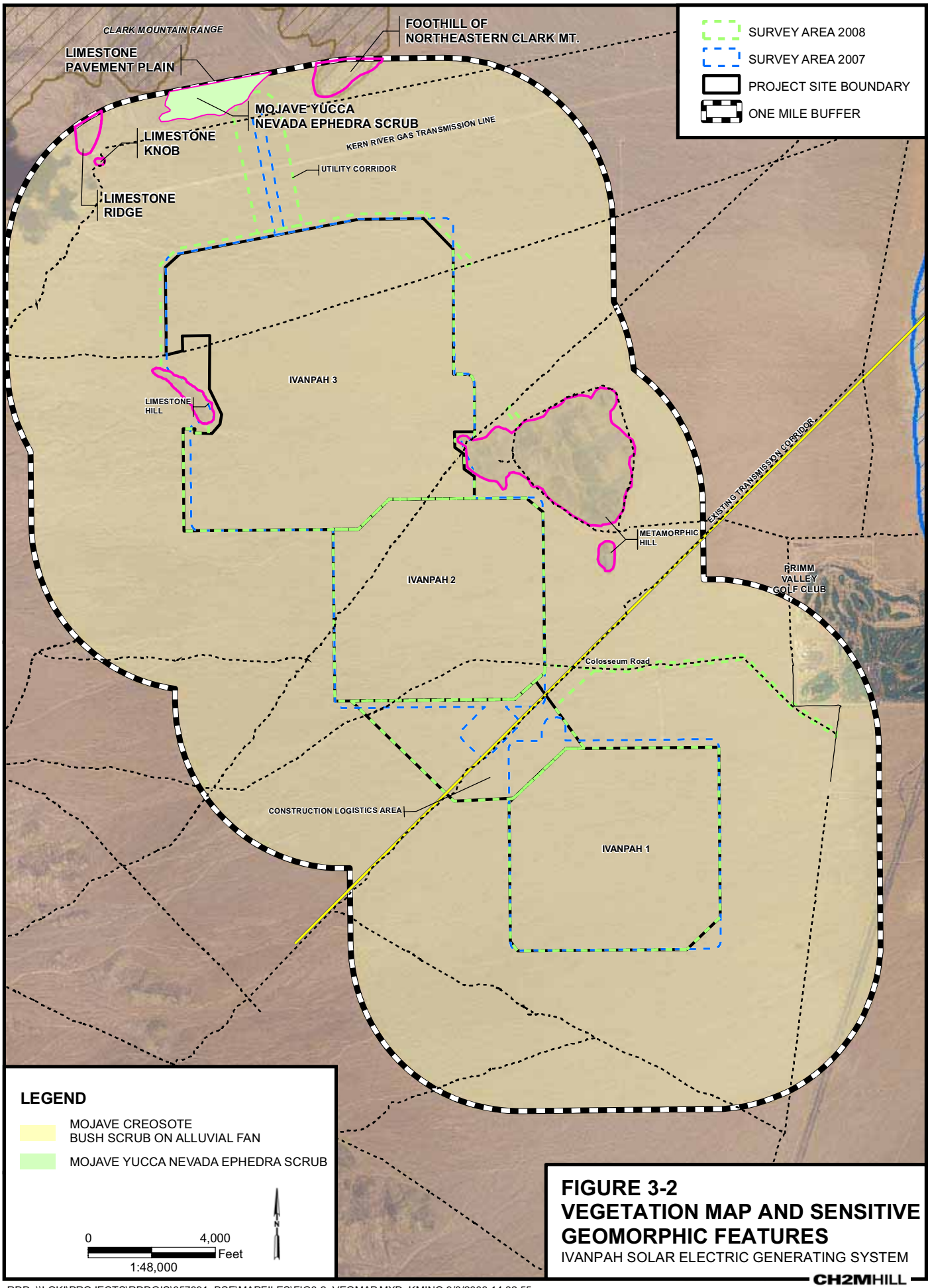

FIGURE 3-2
VEGETATION MAP AND SENSITIVE GEOMORPHIC FEATURES
IVANPAH SOLAR ELECTRIC GENERATING SYSTEM

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Status of Species and Habitat

4.1 Mojave Desert Tortoise (*Gopherus agassizii*)

This subsection describes the status, natural history, distribution, abundance and habitat of the Mojave desert tortoise relative to the proposed action area. The section includes the results of USFWS-protocol surveys conducted for the action area in 2007 and 2008.

4.1.1 Status

On August 4, 1989, the USFWS published an emergency rule listing the Mojave Desert population of the desert tortoise as endangered (USFWS, 1989). The USFWS final rule, dated April 2, 1990, determined the Mojave population of the desert tortoise to be threatened under the Federal Endangered Species Act (USFWS, 1990a). The tortoise was listed in response to loss and degradation of habitat caused by numerous human activities including urbanization, agricultural development, military training, recreational use, mining, and livestock grazing. The loss of individual desert tortoises to increased predation by common ravens, collection by humans for pets or consumption, collisions with vehicles on paved and unpaved roads, and mortality resulting from diseases also contributed to the listing. The tortoise was state-listed in California as threatened in 1989, and is classified as State Protected and Threatened by the neighboring state of Nevada. Prior to state and federal listing, BLM initiated efforts to protect the tortoise in 1988 with a range-wide management plan (BLM, 2001).

The USFWS desert tortoise recovery plan is the key strategy for recovery and delisting of this species (USFWS, 1994b). As part of the recovery strategy, the USFWS designated critical habitat for the desert tortoise in portions of California, Nevada, Arizona, and Utah (USFWS, 1994b). Further, the plan recommends implementation of reserve level protection of desert tortoise populations and habitat within DWMAs, while maintaining and protecting other sensitive species and ecosystem functions. DWMAs were developed to provide "reserve level" protection for the tortoise (USFWS, 1994b). Critical habitat was designated to identify areas containing key biological and physical attributes that are essential to the desert tortoise's survival and conservation, such as space, food, water, nutrition, cover, shelter, and reproductive sites. As part of the actions needed to accomplish the recovery of this species, land management goals within all DWMAs include restriction of human activities that adversely affect desert tortoises (USFWS, 1994b).

4.1.2 Natural History, Distribution, Abundance, and Habitat

The desert tortoise is a long-lived reptile with a high domed shell, stocky, elephant-like limbs and a short tail. *Gopherus agassizii* is one of four tortoise species found in North America. The desert tortoise's range includes the Mojave Desert region of Nevada, southern California, and the southwest corner of Utah and the Sonoran Desert region of Arizona and northern Mexico. The desert tortoise is divided into two primary populations, the Mojave and the Sonoran. The Mojave population is located north and west of the Colorado River and the Sonoran includes all tortoises south and east of the river in Arizona and Mexico (*in*

Averill-Murray and Swann 2002). The Mojave population is primarily found in creosote bush (*Larrea tridentata*) dominated valleys with adequate annual forbs for forage.

Adult desert tortoises typically weigh 10 pounds or more and reach lengths of 11 to 16 inches (*in* USFWS, 1994). Desert tortoises have been known to live up to 70 years or more but the typical adult likely lives 25 to 35 years (*in* USFWS, 1994). Like many long-lived species, the tortoise has a relatively slow rate of reproduction. Sexual maturity is primarily size dependent (≥ 180 to 208 millimeters) with tortoises typically achieving breeding status at 15 to 20 years of age. Mating generally occurs in the spring (mid-March to late-May), with nesting and egg-laying occurring from April to July (Rostral et al., 1994; USFWS, 1994b). Desert tortoises have also been known to lay eggs in the fall (*in* USFWS, 1994b). The female tortoise typically lays her eggs in an earthen chamber approximately 2.7 to 3.9 inches deep, excavated near the mouth of a burrow or under a bush (Woodbury and Hardy, 1948; USFWS, 1994b). Following egg-laying, the female covers the eggs with soil. Clutch size ranges from 2 to 14 eggs, with an average of 5 to 6 eggs (Luckenbach, 1982). Females can produce as much as three clutches in a season. Eggs are subject to predation from a variety of predators, and female tortoises have been observed apparently defending their clutches from Gila monsters (Gienger and Tracy, 2008). The eggs typically hatch 90 to 120 days later, between August and October. Hatchlings are born with a yolk sac that protrudes through the plastron. Eggs incubated above 89.3 degrees Fahrenheit (°F) develop into females and males are the result of cooler incubation (*in* USFWS, 1994b). This yolk sac typically sustains the animal for up to 6 months. Hatchling desert tortoises often go into hibernation in the late fall but often emerge for short active periods on warm sunny or rainy days (Luckenbach, 1982).

Desert tortoise activity is seasonally variable. Peak adult and juvenile desert tortoise-activity in California typically coincides with the greatest annual forage availability during the early spring and summer. However, tortoises will emerge from their burrows at any time of year when the weather is suitable. Hatchling desert tortoises typically become active earlier than adults and their greatest activity period can be expected between late winter and spring. During active periods, tortoises feed on a wide variety of herbaceous plants, including cactus, grasses, and annual flowers (USFWS, 1994b).

Annual home ranges have been estimated between 10 and 450 acres and are age, sex, seasonal, and resource density dependent (USFWS, 1994b). Although adult males can be aggressive toward each other during the breeding season, there can be a great deal of overlap in individual home ranges (USFWS, 1994b). More than 1.5 square miles of habitat may be required to meet the life history needs of a tortoise and individuals have been known to travel as much or more than 7 miles at a time (BLM, 2001). In drought years, tortoises can be expected to wander farther in search of forage.

During their active period, desert tortoises retreat to shallow burrows and aboveground shade to escape the heat of the day. They will also retire to burrows at nighttime. Desert tortoises are primarily dormant in winter in underground burrows and sometimes congregate in communal dens.

Tortoise population densities have changed over time, resulting in their federal and state listing. Estimated densities of the total desert tortoise population in the 1980s ranged from 10 to 84 individuals per 0.5 hectare (*in* Boarman, 2002). The same estimate for tortoises less

than 140 millimeters in length ranged from 2 to 63 individuals for every 0.5 hectares, with the realization that juvenile tortoises are more difficult to find and likely underrepresented in population estimates based solely on survey data. As presented in Boarman 2002, juvenile survivorship of 75 percent per year may be necessary to maintain population stability and survivorship of upwards to 97 percent may be required for the recovery of a declining population, making raven predation a major cause for concern.

The proposed Ivanpah SEGS is located in the southeastern portion of the NEMO Planning Area Boundary. The recent amendment to the NEMO addresses threatened and endangered species conservation and recovery (BLM, 2001). This includes alternatives to address mortality caused by raven predation (BLM, 2001). The NEMO defines five geographical areas of tortoise habitat in the planning area that include an Ivanpah Valley and a North Ivanpah Valley area, the Ivanpah SEGS being located with the Ivanpah Valley habitat area. The BLM has designated both Ivanpah areas as Category III desert tortoise habitat with a management goal to maintain a viable tortoise population (BLM, 2001). According to the NEMO, the non-lakebed portion of Ivanpah Valley area is excellent quality tortoise habitat with some of the highest population densities in the East Mojave while the North Ivanpah Valley area is quantified as good quality tortoise habitat (BLM, 2001).

The proposed Ivanpah SEGS project area is within the Northeastern Mohave Recovery Unit, one of six designated evolutionarily significant units within the range of the tortoise (USFWS, 1994b). When determining the size and location of DWMAs, the Service estimated that stable tortoise populations are likely to have densities of at least 10 adults per square mile (USFWS, 1994b). When the 1994 Recovery Plan was being issued some of the highest known tortoise densities were in southern Ivanpah Valley, with 200 to 250 adults per square mile (USFWS, 1994b). These 1990s densities were less than estimates for the southern Ivanpah Valley in the 1970s. That 20-year decline has been heavily attributed to raven predation (USFWS, 1994). Densities for the northern Ivanpah Valley in the 1990s were typically less than 50 adults per square mile (USFWS, 1994b). According to the 1994 recovery plan, tortoise densities in the Ivanpah Valley DWMA were estimated between 5 and 250 adult tortoises per square mile and the area was given a threat level of 3 out of 5 (5 = extremely high) (USFWS, 1994b). The Desert Tortoise Recovery Planning Assessment Committee (DTRPAC) recommended revising the threat level for the Ivanpah Valley DWMA to a 4 to reflect 2003 conditions (DTRPAC, 2004).

As a result of 2002 line distance sampling surveys in the Ivanpah Valley plots within the Mojave National Preserve, live tortoises were found on 16 percent of the transects while carcasses were found on 46 percent, but there was not enough statistical data to suggest a recent decline in the adult population (DTRPAC, 2004).

It is well established that the desert tortoise is distributed throughout Ivanpah Valley with the exception of the dry lakes and developed areas. Twenty-five live tortoises, 97 carcasses, 214 burrows, and 50 other tortoise sign were encountered during the 2007 and 2008 USFWS protocol tortoise survey of the Ivanpah SEGS

4.1.3 Survey Methodology

USFWS protocol desert tortoise surveys (USFWS, 1990b, 1992), including zone-of-influence transects (see Figure 4-1) were conducted for the project site from April 9 to June 5, 2007, and additional surveys were conducted from May 20 to May 25, 2008. The 2008 survey report and the names and qualifications of the surveyors are provided in Appendix E. As part of SCE's transmission line upgrade and fiber optic line, EPG, Inc. performed surveys of the fiber optic line. Those surveys were not protocol-level; however, their results are summarized in this section.

4.1.4 Survey Results

The action area and vicinity provides good quality desert tortoise habitat. Desert tortoises are likely to be encountered throughout the area from the edges of the Ivanpah Dry Lake north to the base of the Clark Mountains. The CNDDB contains records of the desert tortoise within the Ivanpah SEGS action area and tortoises were found during the local installation of the Kern River Gas Pipeline and the LADWP transmission line (John Cleckler, personal observation). No desert tortoises were reported within the action area during the development of the adjacent Primm Valley Golf Club (personal communication with Ray Bransfield/USFWS May 15, 2008). Tortoises were found in close proximity to the golf club perimeter fence during the 2007 Ivanpah SEGS protocol surveys.

Changes to the Ivanpah SEGS design increased the size of the action area and, therefore, additional protocol surveys were conducted for the additional areas in 2008. As a result of the 2007 and 2008 protocol surveys, a total of 386 tortoise sign including 25 live tortoises, 97 carcasses, 214 burrows, and 50 other sign were encountered. Tortoise sign and density was greatest in Ivanpah 1 at the southern boundary of the project site and was less dense as the survey moved towards the Clark Mountains and Ivanpah 3.

The desert tortoise sign discovered during the 2007 surveys and their physical relation to the action area are illustrated in Figure 4-2. The figure displays all detected 2007 desert tortoise sign that has been identified by a color coded number. These numbers are linked to the specific characteristics for each sign that are summarized in several tables included in Appendix F. Specific characteristics tortoise sign were assigned a number in the Appendix F table that can be linked to Figure 4-2.

Surveys of the fiber optic route by EPG, Inc. (2008) confirmed that the entire route is within desert tortoise habitat. Protocol level surveys were not conducted. However, in surveying the fiber optic route EPG found 3 tortoise burrows and a tortoise shell.

The 2008 desert tortoise survey report for the additional action area around the project site is included in Appendix E.

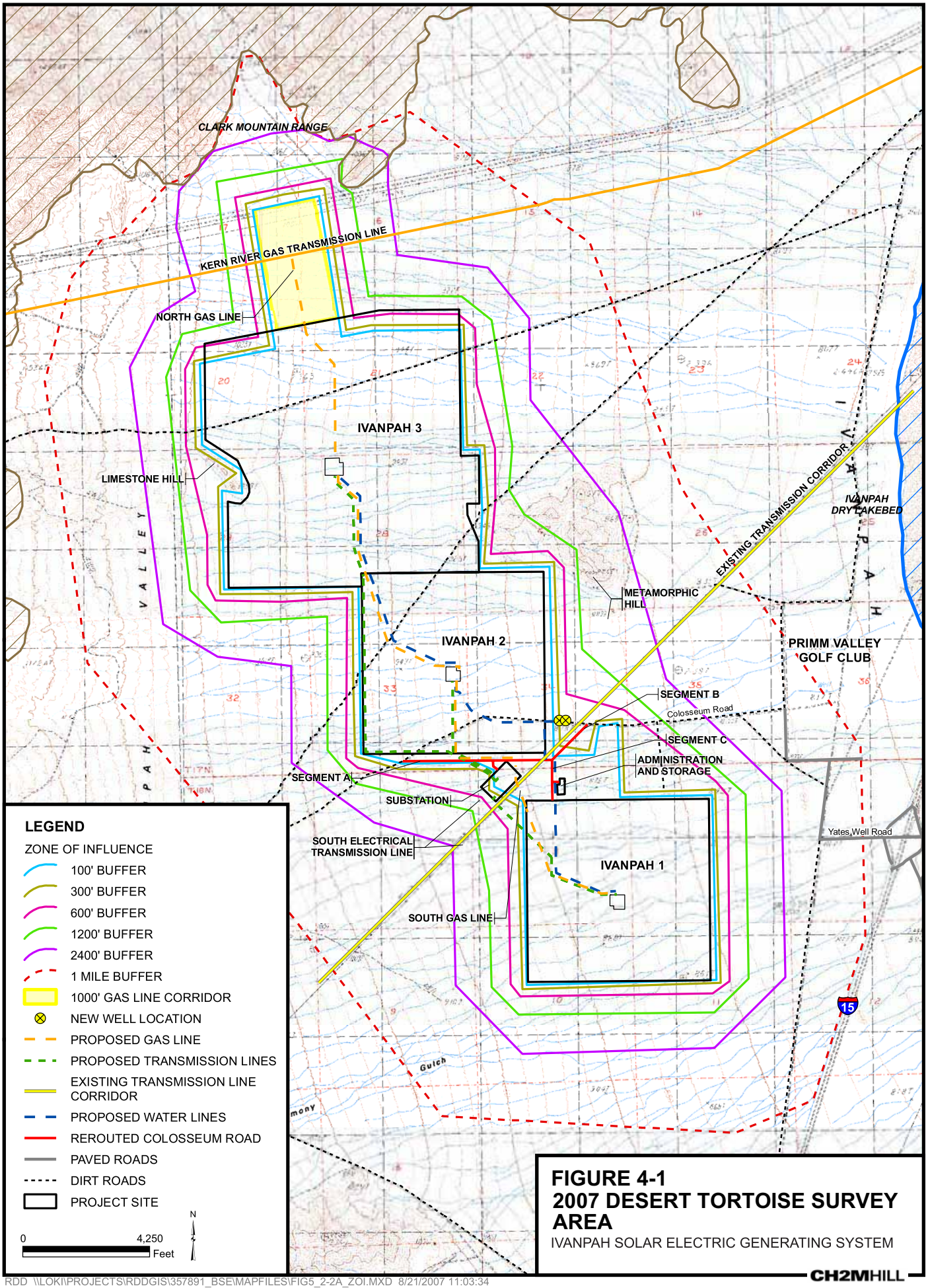

FIGURE 4-1
2007 DESERT TORTOISE SURVEY AREA

IVANPAH SOLAR ELECTRIC GENERATING SYSTEM

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CLARK MOUNTAIN RANGE

KERN RIVER GAS TRANSMISSION LINE

NORTH GAS LINE

IVANPAH 3

LIMESTONE HILL

EXISTING TRANSMISSION CORRIDOR

IVANPAH DRY LAKEBED

METAMORPHIC HILL

IVANPAH 2

PRIMM VALLEY GOLF CLUB

SEGMENT B

Colosseum Road

SEGMENT C

ADMINISTRATION AND STORAGE

SEGMENT A

SUBSTATION

SOUTH ELECTRICAL TRANSMISSION LINE

IVANPAH 1

Yates Well Road

SOUTH GAS LINE

15

77

LEGEND

- 10 TORTOISE
- 10 BURROW
- 10 CARCASS
- 10 OTHER SIGN

ZONE OF INFLUENCE

- 100' BUFFER
- 300' BUFFER
- 600' BUFFER
- 1200' BUFFER
- 2400' BUFFER
- 1 MILE BUFFER
- 1000' GAS LINE CORRIDOR
- NEW WELL LOCATION
- PROPOSED GAS LINE
- PROPOSED TRANSMISSION LINES
- EXISTING TRANSMISSION LINE CORRIDOR
- PROPOSED WATER LINES
- REROUTED COLOSSEUM ROAD
- PROPOSED PROJECT SITE

N

0 3,000 Feet

FIGURE 4-2
2007 DESERT TORTOISE SURVEY RESULTS
IVANPAH SOLAR ELECTRIC GENERATING SYSTEM

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Effects of Proposed Action

5.1 Introduction

This section includes a summary of the analysis of the potential direct, indirect and cumulative effects to the desert tortoise resulting from the proposed construction and operation of Ivanpah SEGS.

5.2 Direct Effects

Direct effects are those that are caused by the proposed action and occur at the same time and place.

As described in Section 3, no federally listed plants occur within the action area; therefore, no direct effects to federally listed plants are expected to occur as a result of project implementation.

The proposed action area is not located within designated critical habitat for the desert tortoise but is located approximately 5 miles north of the Ivanpah critical habitat unit, just north of the I-15 and Route 164 interchange. The action area is within suitable habitat for the desert tortoise and 25 live tortoises were found as a result of a combined 2007 and 2008 protocol level surveys of the action area. Based on the protocol surveys, the proposed action would likely result in the translocation of 25 tortoises and the destruction of 214 tortoise burrows. During the life of the Project, Ivanpah SEGS project would remove about 3,760 acres of desert tortoise habitat. An additional 300 acres would be used for temporary laydown and temporary work space for utility installation. It would take many years to restore to base line habitat value. However, impacts from the construction of the fiber optic line are expected to be minimal because modifications to the existing distribution lines would be done using a bucket truck that would remain in the dirt service road. Stringing the fiber optic cable would require a 40-foot by 60-foot area every 10,000 to 20,000 feet, but what could not be done from the existing dirt service road would be handled by vehicles driving over the existing vegetation.

Desert tortoises may be harmed during clearing, grubbing and trenching activities or may become entrapped within open trenches and pipes. Project actions could result in direct mortality, injury, or harassment of individuals as a result of encounters with vehicles or heavy equipment, whether in the action area or from vehicles straying from designated access or designated areas into adjacent habitat. Other direct effects could include individual tortoises being crushed or entombed in their burrows, collection or vandalism, disruption of tortoise behavior during construction or operation of facilities, disturbance by noise or vibrations from the heavy equipment, injury or mortality from encounters with workers' or visitors' pets, and trash that may attract predators such as ravens and coyotes. Desert tortoises may also be attracted to the construction area by application of water to control dust, placing them at higher risk of injury or mortality.

Increased human activity and vehicle travel would occur from the construction and improvement of access roads, which could disturb, injure, or kill individual tortoises. Also, tortoises may take shelter under parked vehicles and be killed, injured, or harassed when the vehicle is moved.

Installation of the security and exclusionary fencing could result in direct effects such as mortality, injury, or harassment of desert tortoises due to equipment operation, installation activities, removal of tortoise burrows, and tortoise translocation. The fencing would preclude desert tortoises from reentering. This would result in fragmentation of habitat and individual home ranges. Capturing, handling, and relocating desert tortoises from the proposed site after the installation of the fencing would result in harassment and may also result in death or injury. Blythe et al. (2003) found that translocated Sonoran desert tortoises moved less than 0.5 mile returned to their home ranges within a few days. Tortoises moved outside their home ranges would likely attempt to return to the area from which they were moved, therefore making it difficult to remove them from the potential adverse effects associated with project construction. Removal of habitat within a tortoise's home range or segregating individuals from their home range with a fence would likely result in displacement stress that could result in loss of health, exposure, increased risk of predation, increased intraspecific competition, and death. Tortoises may die or become injured by capture and relocation if these methods are performed improperly, particularly during extreme temperatures, or if they void their bladders. Averill-Murray (2001) determined that tortoises that voided their bladders during handling had significantly lower overall survival rates (0.81-0.88) than those that did not void (0.96). If multiple desert tortoises are handled by biologists without the use of appropriate protective measures, such as reused latex gloves, pathogens may be spread among the tortoises.

5.3 Indirect Effects

Indirect effects are those that are caused by, or result from, the proposed action and are later in time, but reasonably certain to occur. In contrast to direct effects, indirect effects are more subtle, and may affect individuals and populations and habitat quality over an extended period of time, long after construction 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.

As described in Section 3, no federally listed plants occur within the action area; therefore, no indirect effects to federally listed plants are expected to occur as a result of project implementation.

The loss of desert tortoise habitat during the project life that would occur from permanent use of about 3,760 acres and removing as much as 300 acres of shrubs and herbaceous vegetation during the construction period, would indirectly affect the species through the loss of burrowing, breeding, and foraging habitat. Habitat quality would be reduced with the potential introduction of invasive plant species and compaction of soils. Additionally, the introduction of noxious weeds may lead to increased wildfire frequency (Brooks et al., 2003). Other potential indirect effects include the permanently fenced area acting as barriers that would impede any long-term natural movements of desert tortoises attempting to return to their original home ranges and burrows.

The potential for severe long-term effects include collisions and collections along the paved access roads where vehicle frequency and speed is generally greatest. Census data indicate that desert tortoise numbers decline as vehicle use increases (Bury et al., 1977) and that tortoise sign increases with increased distance from roads (Nicholson, 1978). Additional effects that may occur from casual use of the access roads in the vicinity of the action area include unauthorized trail creation and off-highway vehicle use. The proposed Ivanpah SEGS would be the largest solar facility of its kind and could attract curiosity that would result in greater disturbance of the surrounding habitat and potential collection and other take of desert tortoise.

Human activities may provide food in the form of trash and litter or water that attracts tortoise predators such as the common raven, desert kit fox, feral dogs, and coyote (Berry, 1985; BLM, 1990). Facility infrastructure such as power poles could provide perching and nesting opportunities for ravens. Natural predation rates may be altered or increased when natural habitats are disturbed or modified. 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 current level of raven predation on juvenile desert tortoises is considered to be an unnatural occurrence (BLM, 1990). In addition to ravens, feral dogs have emerged as significant predators of the tortoise. Dogs may range several miles into the desert and have been found digging up and killing desert tortoises (USFWS, 1994a; Evans, 2001). Dogs brought to the project site with visitors may harass, injure, or kill desert tortoises, particularly if allowed off leash to roam freely in occupied desert tortoise habitat.

During construction, breaches in the desert tortoise exclusionary fencing may occur, thus allowing tortoises to pass through the barrier and be affected by project-related activities. If breaches occur, materials and equipment left behind following construction and maintenance activities may entrap or entangle tortoises, attract desert tortoise predators such as common ravens and coyotes, or provide shelter for tortoises, which when removed may result in displacement or injury of the tortoise. During operation, surface water flows could also undercut and compromise the exclusion of the security fences and, therefore, allow short-term access to desert tortoise and their predators until such time as repairs are made.

5.4 Cumulative Effects

Cumulative effects are of those future state and private activities, excluding federal activities that are reasonably foreseeable. Because the BLM, NPS, and Department of Defense (DOD) administer much of the land surrounding Ivanpah SEGS, many of the actions that are reasonably expected to occur would be subject to the requirements of Section 7.

As described in Section 3, no federally listed plants occur within the action area. Therefore, it is not expected that project implementation would contribute to cumulative effects to any federally listed plants.

Development within the Ivanpah Valley has resulted in the loss of special status plant and wildlife species and general wildlife habitat due to construction, increased human presence, introduction of non-native species, and recreational activities. Urbanization, grazing,

vandalism, illegal dumping, mining, off-road recreation, and construction of utility corridors, facilities and roads have contributed to the cumulative degradation of biological resources in the area. In general, actions on private lands within and adjacent to desert communities in Nevada including Las Vegas, Jean and Primm, and Barstow in California, are expected to continue to increase in proportion to increases in the human populations and access in these areas. Planned future actions, such as those that may occur as a result of the development of the Ivanpah Valley Airport, completion of rail lines, and others would likely continue this trend.

The Ivanpah SEGS site and associated linear features are located entirely on federal land under BLM's jurisdiction, and are therefore subject to the provisions of BLM's California Desert Conservation Area (CDCA) Plan (Revised 1999). Additionally, the Ivanpah SEGS project area, as well as much of the Ivanpah Valley, lies within the NEMO Planning Area Boundary. The NEMO Plan (July 2002) addresses threatened and endangered species conseyrvation and recovery within the Ivanpah Valley through the proposed establishment of large, well-distributed DWMAs. However, while construction of the Ivanpah SEGS would contribute to the loss of vegetation and wildlife resources within the Ivanpah Valley, this land is located outside of critical habitat, and within an area that is designated Class L Limited Use and Class M Moderate Use according to the CDCA Map 1, Land-Use Plan 1999 (BLM, 1999). Allowable uses for these land use designations include electrical generation facilities, and specifically solar electrical generation facilities. Other permitted land uses on BLM-managed land include: transmission facilities, distribution facilities, communication sites, grazing, mineral exploration and development, motorized vehicle access/ transportation, and recreation.

References

Averill-Murray, R.C. 2001. Program MARK survival analysis of tortoises voiding their bladders during handling. Proceeding of the 200 1 Desert Tortoise Council Symposium. pp. 48.

Averill-Murray, R. C. and D. E. Swann. 2002. Impacts of Urbanization on Desert Tortoises at Saguaro National Park: Tortoise Density along the Southern Park Boundary. Technical Report 199, Nongame and Endangered Wildlife Program, Arizona Game and Fish Department. Phoenix, Arizona.

Baldwin, B., S. Boyd, B. Ertter, R.W. Patterson, T.J. Rosatti and D.H. Wilken. 2002. The Jepson Desert Manual. University of California Press, Berkeley.

Benson, L. 1969. The Native Cacti of California. Stanford University Press. Stanford, California.

_____. 1982. The Cacti of the United States and Canada. Stanford University Press. Stanford, California.

Berry, K.H. 1985. Avian predation on the desert tortoise (*Gopherus agassizii*) in California.

_____. 2001. Salvaging injured, recently dead, ill, and dying wild, free-roaming desert tortoises (*Gopherus agassizii*). Protocol prepared for Fish and Wildlife permit TE006556-11. June.

Bittman, Roxanne. 2007. Botanist, California Natural Diversity Database, Sacramento, California. Personal communications via email to Ann Howald, June 29, July 2-3.

Blythe, A.K., D.E. Swann, R.J. Steidl, and E.W. Stitt. 2003. Movement patterns of translocated desert tortoises. Proceeding of the 2003 Desert Tortoise Council Symposium. p. 8 1.

Boarman, W. I. 2002. Reducing predation by common ravens on desert tortoises in the Mojave and Colorado Deserts. Unpublished report prepared for the Bureau of Land Management. July 18,2002. 33 pp.

Bory, Mally-Ann. 2008. Personal communication with Darren Cook, Caltrans Public Affairs. September 8.

Brooks, M.L., T.C. Esque, and J.R. Matchett. 2003. Current status and management of alien plants and fire in desert tortoise habitat. Proceedings of the 2003 Desert Tortoise Council Symposium. page 82.

Bury, R.B., R.A. Luckenbach, and S.D. Busak. 1977. Effects of off-road vehicles on vertebrates in the California desert. U. S. Department of the Interior, Wildlife Research Report 8, Washington, D.C.

CalFlora: Information on California plants for education, research, conservation. 2006. Berkeley, California. The CalFlora Database: http://www.calflora.org/

California Department of Fish and Game (CDFG). 2000. Guidelines for assessing the effects of proposed projects on rare, threatened and endangered plants and natural communities. May 8. Available at: http://www.dfg.ca.gov/whdab/pdfs/guideplt.pdf

_____. 2003a. State and Federally Listed Endangered, Threatened and Rare Animals of California. Habitat Conservation Division Wildlife and Habitat Data Analysis Branch. April.

_____. 2003b. CNDDB. Biogeographic Data Branch. The Vegetation Classification and Mapping Program. List of California Terrestrial Natural Communities Recognized by the California Natural Diversity Database. September 2003 Edition.

_____. 2007a. CNDDB. Biogeographic Data Branch, Department of Fish and Game. March 3, 2007 (Version 3.1.0). Species accounts, and Data Base search for the following 7.5-minute USGS quadrangles: Ivanpah Lake, State Line Pass, Mesquite Lake, Clark Mountain, Mescal Range, Mineral Hill, and Nipton.

_____. 2007b. State and federally listed endangered, threatened and rare plants of California. Accessed at: http://www.dfg.ca.gov/hcpb/species/lists.shtml

California Department of Food and Agriculture. 2007. List of noxious weeds.

California Department of Transportation. 2004. Interstate 15 Major Improvements-Summer 2002-Winter 2009 map. (http://www.dot.ca.gov/dist8/projects/15/I-15%20Brstw%20-STLN.revsd%206-2004%20copy.pdf)

California Invasive Plant Council (Cal-IPC). 2006. California Invasive Plant Inventory. Cal-IPC Publication 2006-02. California Invasive Plant Council, Berkeley. Available at: www.cal-ipc.org

California Native Plant Society (CNPS). 2001. Inventory of rare and endangered plants of California. California Native Plant Society. Special Publication #1, Sixth Edition.

_____. 2007. Inventory of rare and endangered plants of California (online edition, version 7.07c). Accessed at: http://www.cnps.org/inventory

CH2M HILL. 2007 Ivanpah Solar Electric Generating System, Application for Certification (AFC). August 31.

_____. 2008a. Attachment DR125-1A, Technical Basis Document for Revegetation and Reclamation Planning, Ivanpah Solar Electric Generating System, Eastern Mojave Desert, San Bernardino County, California. (Data Response, Set 2B, filed July 22, 2008). July.

_____. 2008b. Attachment DR13-1A, Weed Management Plan for the Ivanpah Solar Electric Generating System, Eastern Mojave Desert, San Bernardino County, California. (Data Response, Set 1F, filed August 6, 2008). August. Clark County Conservation of Public Land and Natural Resources Act of 2002, Pub. L. 107-282 § 501. 2002.

Clark County Department of Aviation. 2004. Conceptual Drainage Study for Ivanpah Valley International Airport. Prepared by G.C. Wallace, Inc. January 2004.

_____. 2006. Project Definition and Justification, Proposal to Construct and Operate a New Supplemental Commercial Service Airport in the Ivanpah Valley. August 2006

County of San Bernardino County. 2007. County General Plan.

Desert Tortoise Council. 1994 (Revised 1999). Guidelines for Handling Desert Tortoises during Construction Projects. Edward L. LaRue, Jr., editor. Wrightwood, California.

Desert Tortoise Recovery Plan Assessment Committee (DTRPAC). 2004. Desert Tortoise Recovery Plan Assessment. October 2004 Desert Tortoise Recovery Plan Assessment

EPG, Inc. 2008. Eldorado-Ivanpah Project, Biological Resources Summary Report. Prepared for Southern California Edison. July.

Evans, R. 2001. Free-roaming dog issues at the United States Marine Corps Air Ground Combat Center, Twentynine Palms, California. Proceedings of the 2001 Desert Tortoise Council Symposium. p. 6 1.

Federal Railroad Administration. 2006. Desert Xpress High Speed Train Linking Victorville, CA and Las Vegas, NV.
(http://www.fra.dot.gov/downloads/rrdev/desert_express_mailer_08_c.pdf)

_____. 2007. http://www.fra.dot.gov/us/content/1703.

Garrett, K., and J. Dunn. 1981. Birds of southern California. Los Angeles Audubon Society. 408 pp.

Garcia and Associates, 2008. Technical Report: Botanical Resources of the Ivanpah Solar Electric Generating System. Information revised by CH2M HILL.

Gienger, C., R. C. Tracy. 2008. Ecological Interactions Between Gila Monsters (*Heloderma suspectum*) and Desert Tortoises (*Gopherus agassizii*). The Southwestern Naturalist: 53(2): 265–268.

Grant, Colin. 2007. Bureau of Land Management. Weed Control Specialist. Needles District. Conversation with Amy Hiss regarding invasive weeds. August 15.

Grinnell, J., and A. H. Miller. 1944. The distribution of the birds of California. Pac. Coast Avifauna No. 27. 608 pp.

Holland, R. F. 1986. Preliminary descriptions of the terrestrial natural communities of California. California Department of Fish and Game. Unpublished report.

Illia, Tony. 2005. "New federal funds revive Maglev project." Las Vegas Business Press. August 22. On the internet at:
http://www.lvbusinesspress.com/articles/2005/08/22/news/news02.txt

Jepson Online Interchange. 2007. Consortium of California Herbaria on-line database. Accessed at: http://ucjeps.berkeley.edu/interchange.html

Jepson, W.L. 1909. A flora of California, Vol. I, page 543. Accessed at:
http://bscit.berkeley.edu/cgi-bin/display_page?page=547&elib_id=3062&format=jpeg

Keeler-Wolf, Todd. Vegetation Ecologist with the CNDDB, Sacramento, California. Personal communication with Amy Hiss 14 August 2007.

"KVBC Las Vegas Story - A new train passage to southern California proposed", KVBC Television. Las Vegas, Nevada, July 25, 2006. http://www.kvbc.com/Global/story.asp?S=5167300&nav=menu107_4.

Luckenbach, R. A. 1982. Ecology and management of the Desert Tortoise (*Gopherus agassizii*) in California. Pages 1-37 in R.B. Bury, ed., North American Tortoise and Conservation Ecology. U.S. Department of Interior, Fish and Wildlife Service, Wildlife Research Report 12.

Marcel, Fredrick. 2007. Real Estate Specialist, U.S. Bureau of Land Management, Las Vegas Field Office with Lyna Black, CH2M HILL. August 2.

Mojave Resource Conservation District. 2003. Mojave Weed Management Area – Long Range Plan. August 6.

Morefield, James, Ph.D. 2007. Botanist, Nevada Natural Heritage Program, Carson City, Nevada. Personal communication via electronic mail to Ann Howald, July 3.

Natural Resources Conservation Service (NRCS), United States Department of Agriculture. 2007. Official Soil Series Descriptions. Accessed at: http://soils.usda.gov/technical/classification/osd/index.html.

NatureServe. 2007. Natural heritage methodology. Accessed at: http://www.natureserve.org/prodServices/heritagemethodology.jsp

Nevada Power. 2007. Accessed at http://www.nevadapower.com/centennial/details/transmission.cfm.

Newsome, Suzanne. 2007. Las Vegas Valley Water District. Personal Communication, July.

Nicholson, L. 1978. The effects of roads on desert tortoise populations. Proceedings of the 1978 Desert Tortoise Council Symposium 1978:127-129.

O'Connell, Kathleen. 2007. Real Estate Specialist. Bureau of Land Management. Personal Communication with Lyna Black, CH2M HILL. August 2.

O'Conner, M.P., L.C. Zimmerman, D.E. Ruby, S.J. Bulova, and J.R. Spotila. 1994. Home range size and movements by desert tortoise, Gopherus agassizii, in eastern Mojave Desert. Herpetology Monographs. Volume 8. 60-71 pp.

Rostral, D.C., V.A. Lance, J.S. Grimbles, and A.C. Alberts. 1994. Seasonal reproductive cycle of the desert tortoise (Gopherus agassizii) in eastern Mojave Desert. Herpetology Monographs. Volume 8. 72-102 pp.

Sawyer, J. and T. Keeler-Wolf. 1995. A manual of California vegetation. California Native Plant Society, Sacramento.

Skinner, M.W. and B.M. Pavlik (eds). 1994. Inventory of Rare and Endangered Vascular Plants of California. California Native Plant Society Special Publication No. 1 (Fifth edition). Sacramento, California. 338 pp.

Stebbins, R.C. 1985. Peterson Field Guides: Western Reptiles and Amphibians. Houghton Mifflin Company, Boston, Massachusetts.

Stutz, Howard. 2007. Nevada Landing about to sink. Las Vegas Review-Journal.

Sullivan, Charles. 2007. Bureau of Land Management. Wildlife Biologist. Needles District. Conversation with Amy Hiss regarding invasive weeds. August 15.

Thorne, R.F., B.A. Prigge and J. Henrickson. 1981. A flora of the higher ranges and the Kelso Dunes of the Eastern Mojave Desert in California. Aliso 10(1):71-186. Rancho Santa Ana Botanic Garden, Claremont, Calif. Reprint published by Southern California Botanists, December.

Torre, Alicia. 2007. Consultant to BrightSource Energy. Personal Communication (email). August 2.

Torre, Alicia. 2008. Consultant to BrightSource Energy. Personal Communication (email). August 28.

U.S. Bureau of Land Management (BLM). 1980 (Amended 1999). California Desert Conservation Area Plan. Prepared by the Bureau of Land Management Sacramento Office. August 17.

_____. 1986. Incidence of gunshot deaths in desert tortoise (Gopherus agassizii) populations in California. Wildlife Society Bulletin 14: 127-32.

_____. 1990. Draft raven management plan for the California Desert Conservation Area. Prepared by Bureau of Land Management, California Desert District, Riverside, California. April.

_____. 2001. Proposed Northern and Eastern Mojave Desert Management Plan (NEMO), Amendment to the California Desert Conservation Area Plan, Draft California Desert Conservation Area Plan Amendments for the Northern and Eastern Mojave Planning Area Final Environmental Impact Statement. January 2001. Available at: http://www.blm.gov/ca/news/pdfs/nemo2002/.

_____. 2002a. Final Environmental Impact Statement Table Mountain Wind Generating Facility. July 2002. (http://sandyvalley.us/node/143)

_____. 2002b. Northern and Eastern Mojave Desert Management Plan. Prepared by the Bureau of Land Management California Desert District Office. December 20.

_____. 2004. List of California-BLM sensitive plants. April.

U.S. Department of Transportation. 2004. Federal Register, Volume 69, Number 98. May 20, 2004. (http://www.fra.dot.gov/downloads/rrdev/vegasnoi.pdf)

U.S. Environmental Protection Agency: August 24, 2001, Federal Register. (Volume 66, Number 165), Page 44617-44620.

_____. 2002. Federal Register: January 30, 2002, Volume 67, Number 20 (http://www.epa.gov/fedrgstr/EPA-IMPACT/2002/January/Day-30/i2195.htm)

U.S. Fish and Wildlife Service (USFWS). 1970. Federal Register, Department of the Interior, Fish and Wildlife Service. United States List of Endangered Fish and Wildlife. 50 CFR Part 17. 35 FR 16047-16048. October 13.

_____. 1989. Endangered and threatened wildlife and plants; emergency determination o endangered status for the Mojave population of the desert tortoise. Federal Register 54(149):32326

_____. 1990a. Endangered and threatened wildlife and plants; determination of threatened status for the Mojave population of the desert tortoise. Federal Register 55(63):12178-1219.

_____. 1990b. Procedures for Endangered Species Act Compliance for the Mojave Desert Tortoise. U.S. Fish and Wildlife Service, Portland, Oregon.

_____. 1992. Field Survey Protocol for Any Federal Action That May Occur within the Range of the Desert Tortoise. January. http://www.fws.gov/ventura/sppinfo/protocols/deserttortoise_fedsurveyprotocol.pdf

_____. 1994a. Federal Register, Department of the Interior, Fish and Wildlife Services. Rules and Regulations. Determination of Critical Habitat for the Mojave Population of the Desert Tortoise; Final Rule. 50 CFR Part 17. 59 FR 5820-5866. February 8.

_____. 1994b. Desert Tortoise (Mojave population) Recovery Plan. Portland, Oregon. 73 pages plus appendices.

_____. 1996a. Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed, and Candidate Plants. USFWS, September 23, 1996. Available at: http://www.fws.gov/sacramento/es/documents/listed_plant_survey_guidelines.htm

_____. 1996b. Endangered and Threatened Wildlife and Plants; Review of Plant and Animal Taxa that are Candidates for Listing as Endangered or Threatened Species; Notice of Review; Proposed Rule. Federal Register 61(40): 7596-7613.

_____. 2006. List of federal candidates for listing, available at: http://ecos.fws.gov/endangered/candidates/index.html

U.S National Park Service (NPS). 2006. Mule Deer Genetics and Demographics in Mojave National Preserve. http://www.nps.gov/moja/naturescience/muledeer.htm.

Von Der Lippe, Moritz and Ingo Kowarik. 2007. Long-Distance Dispersal of Plants by Vehicles as a Driver of Plant Invasions. *Conservation Biology* Volume 21, No. 4, 986–996. Institute of Ecology, Technical University of Berlin, Rothenburgstr.12, D-12165 Berlin, Germany.

Weisenberger, M. E. 1996. Effects of simulated jet aircraft noise on heart rate and behavior of desert ungulates. Journal of Wildlife Management 60, no. (1): 52-61.

Wouldiams, Terry. 2007. Land Use Tech, San Bernardino County Planning Department. Personal communication with Lyna Black, CH2M HILL. August 2.

Woodbury, A.M. and R. Hardy. 1940. The dens and behavior of the desert tortoise. Science. December 6. 529 pp.

_____. 1948. Studies of the desert tortoise, *Gopherus agassizii*. Ecology Monographs. Volume 18, Number 2. 145-200 pp.

Zeiner, D.C, W.F. Laudenslayer, Jr., K.E. Mayer, and M. White. 1990a. California's Wildlife, Volume 2: Birds. California Department of Fish and Game, Sacramento.

_____. 1990b. California's Wildlife, Volume 3: Mammals. California Department of Fish and Game, Sacramento.

_____. 1990c. California's Wildlife, Volume 1: Amphibians. California Department of Fish and Game, Sacramento.

Zouhar, Kris 2003. Tamarix spp. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available at: http://www.fs.fed.us/database/feis/

APPENDIX A

Draft Closure, Revegetation and Rehabilitation Plan

Appendix A

Draft Closure, Revegetation and Rehabilitation Plan

The Draft Closure, Revegetation and Rehabilitation Plan will be submitted under separate cover as Attachment DR125-2A. Submission is expected in September 2008.

APPENDIX B

Resumes of Proposed Authorized Biologists and Desert Tortoise Monitors

Resumes

Proposed Authorized Biologists

John Cleckler

Mark Cochran

Gilbert Goodlett

Glenn Goodlett

Daniel Hack

Robert Hernandez

Gabriel Valdes

Erin Whitfield

Proposed Biological Monitors

Sophia Chiang

Ava Rosales Edens

Chris Green

Victor Leighton

Katy Oakes

John Cleckler

Biological Resources – CH2M HILL

Education

B.S., Wildlife Biology

Professional Certifications

California Department of Fish and Game Scientific Collector's Permit

Relevant Experience

Mr. Cleckler's more than 15 years of experience include performing general and special-status wildlife surveys using standard census techniques. His expertise includes invertebrate and vertebrate natural history, vertebrate and invertebrate collecting methods, and identification of herpetile, bird, and mammalian species. He is familiar with state and federal regulations pertaining to both wildlife and wetlands. He prepares biological assessments and develops mitigation plans for Section 7 and 10(a) compliance under the Endangered Species Act.

Representative Projects

Metcalf Energy Center (MEC), Calpine Corp., San Jose (2001 to 2005). Assisted in preparation of the Biological Resource Mitigation Implementation and Monitoring Plan, Resource Management Plan for the MEC Preserve, Fisher Creek Riparian Corridor Enhancement Plan, and Horizontal Directional Drilling Inadvertent Returns Contingency Plan. Managed monitoring efforts, provided document review, and prepared the environmental training program associated with the Metcalf Energy Center.

Roseville Energy Park (2005). Prepared the associated environmental training program.

San Francisco Electric Reliability Project AFC (2004 to 2005). Conducted site reconnaissance surveys and participated in the preparation of the AFC.

SMUD Cosumnes Power Plant AFC (2003). Conducted site reconnaissance surveys for the preparation of the AFC.

Walnut Energy Center, Turlock Irrigation District (2003 to 2005). Conducted site reconnaissance surveys and participated in the preparation of the AFC. Prepared the AFC and the Biological Resource Mitigation Implementation and Monitoring Plan. Managed monitoring efforts, provided document review, and prepared the environmental training program associated with the Walnut Energy Center as the Designated Biologist.

Inland Empire Energy Center (IEEC), Calpine Corp. (2005). Performed field surveys and assisted in preparation of the amended AFC.

MID Electric Generation Station (MEGS), Modesto Irrigation District (2004). Conducted site reconnaissance surveys and participated in the preparation of the SPPE.

Woodland Generation Station 2, Modesto Irrigation District (2003 to 2004). Provided biological monitoring to ensure compliance with conditions of site certification.

Teayawa Energy Center, Riverside County. Performed protocol desert tortoise surveys along proposed utility lines associated with the Teayawa Energy Center project. Assisted with preparation and review of the biological resources section of the EIS/EIR.

Fiber Optic Communications Cable, Level (3) Communications. Performed a full range of biological permitting services in support of a nationwide fiber optic network installation project. This linear project included extensive segments transecting the Mojave Desert and the Central Coast regions. Approximately 75 percent of the buried fiber optic cable system was within railroad rights-of-way. The remainder was within highway rights-of-way and limited private lands. Responsibilities included environmental documentation and permitting, including wetland delineations, biological resource surveys, and agency consultation.

Fiber Optic Communications Project Construction Monitoring-Level (3) Communications. Managed construction monitoring of a 96.5-mile long-haul fiber optic communications line. Special focus was placed on avoidance of desert tortoise and Mohave ground squirrel habitat. Included development and implementation of an environmental awareness program.

Bird/Wind Turbine Collision Study, California Energy Commission. Participated in a 3-year wind farm impact study near Tehachapi and Palm Springs. Conducted standard point count surveys and scavenger studies to determine the correlation between bird activity and bird mortality in and around wind farm developments. Also included coordination of the Palm Springs field station, field staff, data entry, and report writing.

Mohave Ground Squirrel Survey, California Energy Commission. Trapped, handled, and installed pit tags on Mohave ground squirrels near China Lake.

Desert Tortoise Survey, Kern River Gas Company. Surveyed for, handled, marked, and relocated desert tortoises for a pipeline construction project. Monitored construction activities and maintained client relations. Coordinated biology crews and completed daily reports. Surveys were conducted in accordance with Biological Opinion #1-1-89-F36R.

San Joaquin Sanctuary Restoration Project, Irvine Water District. Conducted breeding bird surveys with special focus on the presence of least Bell's vireo. Monitored construction activities near critical habitat.

Biological Assessment, Casmalia Resources Landfill, Casmalia. Prepared biological assessment for hazardous waste remediation activities.

Mark Cochran

Senior Biologist/Environmental Planner – CH2M HILL

Education

Graduate studies in Zoology and Wildlife Management at the University of Michigan and Humboldt State University
B.A., Biology, Grinnell College

Distinguishing Qualifications

- Expertise in NEPA/CEQA Compliance
- Biological Impact Assessments
- Natural Resources Planning
- Endangered Species Consultation
- Biological Surveys and Research

Relevant Experience

Mark Cochran has more than 25 years of experience providing a wide range of environmental services for utility companies, departments of transportation, the Department of Defense, and mining companies. Mr. Cochran also served as a Wildlife Biologist with the US Fish and Wildlife Service and Bureau of Land Management. His primary expertise is in the preparation of environmental impact statements and environmental assessments pursuant to the NEPA; environmental impact reports pursuant to CEQA; biological assessments pursuant to the federal and California endangered species acts; and natural resources management plans for the Department of Defense (Sikes Act) and Department of Interior (FLPMA). He has participated in all aspects of project management, including regulatory permitting assistance, agency liaison, report preparation and review, public presentations, budgeting, field investigations and research, supervision of field biologists, and client liaison.

Representative Projects

Task Manager for Biological Resources, Habitat Conservation Plan (HCP), Town of Marana, AZ (11/2002-10/2004). CH2M HILL assisted the Town in Phase 1 of their conservation planning process in preparation of an HCP to guide the Town in meeting Endangered Species Act compliance requirements. As Task Manager Mark developed information for identifying target species, conservation goals, a threat/needs assessment of target species, and served as project liaison with the Town. He wrote technical sections of the draft HCP.

Task Manager for Biological Resources, East Line El Paso to Phoenix Expansion Project, Kinder Morgan Energy Partners, LP, Orange, CA, 8/2005-4/2007. To further increase capacity to serve the growing demand for petroleum products in Arizona, Kinder Morgan has proposed to further expand its East Line between El Paso, TX, and Phoenix, AZ. Mr. Cochran authored

portions of the Feasibility Study; and is currently preparing portions of an Environmental Assessment; preparing a Biological Assessment; and conducting is field surveys.

Assistant Project Manager and Task Manager for Biological Resources, East Line Expansion Pipeline Project, Kinder Morgan Energy Partners, LP, Orange, CA, 9/2002-7/2006. Kinder Morgan's East Line is the only petroleum products pipeline serving the Phoenix and Tucson, Arizona areas from the East. To increase capacity to serve the growing demand for petroleum products in Arizona, Kinder Morgan proposed to expand this Line by adding 235 miles of pipe between El Paso, TX, and Phoenix, AZ. Mr. Cochran authored portions of the Feasibility Study; Environmental Assessment; conducted field Surveys, and continues to provide environment compliance support for construction. He also wrote the Biological Assessment for the project on behalf of the BLM.

Endangered Species Consultant, Tucson Replacement Project, Kinder Morgan Energy Partners, LP, Orange, CA, 8/2003-11/2003. Mark advised Kinder Morgan with regards to potential impacts to Cactus Ferruginous Pygmy Owl, and endangered species, from the emergency replacement of its East Line Pipeline (Tucson Segment). Mark's advice allowed for construction to proceed on schedule without the need to lengthy Federal consultations.

Project Biologist, Toquop Energy Project, Toquop Energy, Inc. and BLM, 8/2001-6/2002. Toquop Energy, Inc. proposed to construct a 1,100-megawatt (MW) natural gas-fired electric power generating plant located in Lincoln County in southern Nevada on lands managed by the BLM. Mark prepared the biology portions of the EIS and authored a BA.

Task Manager for Biological Resources, Albuquerque-Phoenix-Las Vegas Pipeline Routing and Feasibility Study, Confidential Client, Confidential Client, 2/2001-6/2001. Prepared biological resources and fatal flaw portions for study of a 10-inch-diameter petroleum products pipeline for a confidential client. This study defined the most feasible routes from Albuquerque, NM to Las Vegas, NV with a southern connection to Phoenix.

Task Manager for Biological Resources, Sonoran Pipeline Project Phase One, Kinder Morgan Energy Partners LP, Denver, CO, 4/2001-7/2001. Phase One of this project entailed approximately 460 miles of 36-inch, high-pressure, natural gas, interstate pipeline. Mr. Cochran organized biological investigations for the proposed line in support of preparation of a submittal to the Federal Energy Regulatory Commission (FERC) for project approval. The project is remains on hold.

Environmental Task Manager, I-10, Design Concept Report (DCR) and EA, Maricopa Rd. to Junction I-8, Arizona Department of Transportation (ADOT), Phoenix, AZ, 7/2000-4/2002. Mark prepared the administrative draft EA for this project to evaluate implementation of additional mainline travel lanes on 40 miles of I-10. The EA involved evaluation of the environmental effects as well as close coordination with the Gila River Indian Community.

Environmental Coordinator. State Route (SR) 68 Design/Build General Consultant, ADOT, Phoenix and Kingman, AZ, 7/2000—7/2001. This project entailed conversion of a 13.5 mile section of rural two-lane highway to a four-lane highway through Arizona's rugged Black

Mountains. Critical environmental issues included desert bighorn sheep, aquatic habitat, and the Sonoran desert tortoises. As general consultant, Mr. Cochran oversaw compliance with all environmental measures during final design and construction of the project.

Threatened and Endangered Species Task Manager, California High Speed Rail Project, Los Angeles to San Diego via the Inland Empire, Environmental Documentation, The California High Speed Rail Authority, Sacramento, CA, 10/2000-4/2001. This project was a component of planning and constructing a statewide high-speed rail system throughout the southern half of California. Phase One of the project entailed screening of past and current corridor alternatives and station locations to identify highly constrained conditions from a selected set of environmental category, including Threatened and Endangered Species. Phase Two would have involved detailed assessments of alternative routes.

Environmental Task Manager, Rio Salado/Scottsdale Pathway Link, City of Tempe, AZ, 7/2000-2/2002. Oversaw preparation of an Environmental Determination based on guidance from ADOT for local government projects. The project provides three-fourths of a mile of new multiuse paths constructed of decorative concrete, 50 lighting fixtures, 2 rest area ramadas including shade structures, tables, and seating, and visual enhancements to a pedestrian crossing over the 202 freeway adjacent to Tempe's Town Lake.

Senior Reviewer, Hoover Dam Bypass EIS, Federal Highway Department, Denver, CO, 11/2000-4/2001. This was a major EIS/Section 4(f) Evaluation for a 3.5 mile bypass highway and new bridge crossing of the Colorado River below Hoover Dam. Provided senior review of biological resources and cumulative effects for preparation of final EIS.

Professional Organizations/Affiliations

Wildlife Society
Desert Tortoise Council
Arizona Riparian Council

Résumé of Gilbert O. Goodlett

Owner: EnviroPlus Consulting
1660 West Franklin Avenue
Ridgecrest, California 93555
(760) 371-3592

e-Mail address:
Torthunter@aol.com
Fax: (760) 371-3592

EXECUTIVE SUMMARY

Regulatory compliance monitoring on pipeline, transmission lines, well sites, and fiber optic lines since 1991. Instructed attendees at the Desert Tortoise Council workshop on environmental compliance monitoring on construction projects in 1995-98 and 1999-05. Skills include:

• Environmental compliance	• FERC & CPUC standards	• Field surveys
• Project management	• Habitat impact studies	• Relocation projects
• Radio telemetry	• Airborne tracking	• Technical surveying
• Engineering	• Technical writing	• Communication systems
• Electronic systems	• Study design	• Navigation technology
• Macintosh & Windows computers	• Automated data acquisition	• Vegetation sampling
• Global Positioning Systems	• Environmental Training	• Photography

REGULATORY COMPLIANCE AND BIOLOGICAL MONITORING

- **Biologist for construction of the Hyundai/Kia California Proving Ground** for Bill Vanherweg. Wide range of tasks including development and implementation of accurate, 100% coverage survey technique for large areas utilizing WAAS GPS technology, participating as a team member in multiple large-scale desert tortoise surveys, radio telemetry of tortoises, managing field teams, providing environmental awareness briefings to project personnel, developing environmental awareness written materials, developing safety and environmental video, and biological monitoring of construction activities. January, 2004 to present.
- **Lead Biologist for the Defense Advanced Research Projects Agency (DARPA) Grand Challenge**, a field test of robotic vehicles. Developed strategies for pre-event surveys and during event monitoring for project. Managed a team of 20 biologists and achieved zero take of desert tortoises in spite of high tortoise activity along route from from Barstow, CA to Primm, NV. October, 2003 to May, 2004.
- **Biological Monitor for restoration of historic bridges along Route 66** in the eastern Mojave Desert for the County of San Bernardino. Surveyed impact areas for desert tortoises prior to operations and monitored construction operations. November, 2002 to February, 2003.
- **Designated Biologist on the High Desert Power Plant Project** near Adelanto, CA for URS Consultants. Project included construction of a power plant, 2 water pipelines, numerous well sites, and a 32-mile gas pipeline. Responsible for project-wide implementation of Biological Resources Mitigation and Implementation Monitoring Plan that involved numerous sensitive resources. The largest component of the project was the gas pipeline where a total of 26 biological monitors were supervised. Innovative procedures including fencing of tortoises, burrow transmitters, position monitoring of tortoises near the ROW, and others were employed to achieve zero take in high density desert tortoise habitat. July, 2001 to March, 2003.
- **Biological monitor for the expansion of Fort Irwin Road and a wash improvement** near Barstow, CA for San Bernardino County. Implemented programmatic US Fish and Wildlife Service Biological Opinion for each project. October to December, 2001.

REGULATORY COMPLIANCE AND BIOLOGICAL MONITORING (CONT.)

- **Biological Monitor on Level 3 fiber optic construction project from San Diego to Yuma** for Bio Environmental Associates. Implemented project environmental compliance and mitigation measures listed in Stormwater Pollution Prevention Plan, Spill Prevention Containment and Control Plan, Streambed Alteration Agreement, resource agency environmental compliance requirements and related documentation. Provided daily reports to project management. Primary listed species of concern included Southwestern Arroyo toad and Jacumba milk vetch. November, 2000 to February, 2001.
- **Environmental Compliance Monitor and backup lead monitor on construction of a fiber optic line from Yuma, AZ to Colton, CA** for Jones and Stokes Associates, Inc. Implemented project mitigation measures for listed species including Coachella Valley fringe-toed lizard, flat-tailed horned lizard, desert tortoise, and other species. Monitored construction activities and assisted construction companies with environmental compliance. Also fulfilled the duties of the lead monitor in her absence where scheduling monitors, additional reporting, and answering monitoring questions were additional responsibilities. October to November, 2000.
- **Environmental Compliance Monitor on a fiber optic construction route from Phoenix to Yuma, AZ** for Jones and Stokes Associates, Inc. Conducted desert tortoise clearance surveys of construction sites and monitored directional drilling operations beneath the Colorado River. Provided daily reports to environmental project management. July, 2000.
- **Desert Tortoise Monitor on water well rehabilitation project at 29 Palms Marine Corps Base** for Kiva Biological Consulting. Conducted desert tortoise surveys of affected area, designed and inspected tortoise proof fencing and gate, conducted desert tortoise awareness training, and served as a liason to the Base environmental staff for a several acre construction site. May, 2000.
- **Lead Environmental Inspector on Level 3 fiber optic construction project on the Sacramento to Merced segment (December, 1999 to January, 2000) and the Tehachapi to Cajon Pass segment (January to April, 2000)** for Ralph Osterling Consultants, Inc.. Interpreted and implemented project environmental compliance measures listed in Stormwater Pollution Prevention Plan, Spill Prevention Containment and Control Plan, Streambed Alteration Agreement, Notices to Proceed, resource agency environmental compliance requirements and related documentation. Supervised and scheduled a biological staff to fulfill project environmental requirements and provided daily reports to project management. On the Tehachapi to Cajon Pass segment, I additionally provided listed species expertise with the desert tortoise and Mohave ground squirrel.
- **Biological monitor on AT&T fiber optic installation project** in the west Mojave desert for Kiva Biological Consulting. Implemented terms and conditions of the U.S. Fish and Wildlife Service's Biological Opinion with emphasis on the desert tortoise. September to October, 1999.
- **Endangered species monitoring and surveys on various water well destruction and site remediation activities** at Edwards Air Force Base for Earth Technology Corporations. December, 1998 to present.
- **Environmental Quality Assurance Specialist on Spread 4 of The Chicago Project**, a 390 mile long, 36 in. diameter natural gas pipeline project for Enron Engineering and Construction Company via MTB Quality Consultants. Performed quality review of environmental reports and field environmental compliance measures in accordance with FERC and Company standards. March to June, 1998.
- **Development of environmental compliance education program and conduct environmental monitoring** with endangered species emphasis on expansion of expeditionary airfield at 29 Palms Marine Corps Base for Baldi Brothers Constructors, Inc. February to November, 1998.

REGULATORY COMPLIANCE AND BIOLOGICAL MONITORING (CONT.)

- **Environmental compliance inspection with desert tortoise emphasis** on a water pipeline through 29 Palms Marine Corps Air Ground Combat Center for Aspen Environmental. March, 1997.
- **Environmental compliance inspection on Los Angeles Department of Water and Power Mead to Adelanto power transmission line** for Dames and Moore. December, 1994.
- **Biological monitoring on revegetation of Morongo Basin water pipeline project** for Tom Dodson and Associates. October, 1994.
- **Biological monitoring on construction of Yucca Valley water pipeline** for Tom Dodson and Associates. August to September, 1994.
- **Environmental compliance inspection on a natural gas pipeline pr**oject for Kiva Biological Consulting. February, 1994.
- **Environmental compliance inspection on an AT&T fiber optic line route** for The Planning Center. 1993.
- **Surveys for compliance with grazing exclusion on Category 1 habitat** for the Desert Tortoise Preserve Committee, Inc. 1993.
- **Kern River Gas Transmission Company natural gas pipeline construction project** for Dames & Moore. 1991.

HABITAT IMPACT STUDIES

- **Off-highway vehicle compliance and habitat impacts in the Rand Mountains and Fremont Valley, California** for the Desert Tortoise Preserve Committee, Inc. (DTPC). 1990, 1991, February and November, 1995.
- **Assessment of potential desert tortoise mortality along a fiber optic line route** for Patrice Gould Consulting. 1995.
- **Assessment of habitat impacts from the Peacekeeper Challenger Maneuvers at Edwards Air Force Base** for Computer Sciences Corporation. 1991.

RESEARCH

- **Methods of reducing desert tortoise mortality along roadways** was a research project funded by the Clark County, Nevada, Short-term Habitat Conservation Plan for the Desert Tortoise. 1994 - 1996.
- **Effects of sheep trampling on desert tortoises and their burrows** for the Bureau of Land Management, California. 1992.

FIELD SURVEYS

- **Conducted a survey to identify desert tortoise sensitive areas** around Lake Pleasant, Arizona for the Bureau of Reclamation. Developed unique methodology to estimate desert tortoise relative density in Sonoran habitat. Utilized helicopter for habitat assessment and power boats to transport team to survey sites. Managed a team of 8 biologists and completed a final density map and report.
- **Presence/absence survey for desert tortoise** at a site in the Coachella Valley for Ecological Ventures California. Utilized technique for highly accurate walking of transects over large areas using GPS.
- **Clearance surveys prior to and during the construction of the Hyundai/Kia test track** near California City, CA. Developed methodology using GPS for high accuracy 100% coverage transects over 7 square miles of habitat. Managed a team of up to 25 biologists conducting clearance surveys. Located approximately 30 tortoises. May, 2003 to present.
- **Desert tortoise survey of proposed film studio lot** in California City, CA for the City. Followed established U.S. Fish and Wildlife Service protocols. November to December, 2001.
- **100 percent survey of several sites at the Chocolate Mountains Aerial Gunnery Range for desert tortoise habitation** for Kiva Biological Consulting. April, 1998.
- **Survey of proposed 25-mile long water pipeline** in the Indian Wells Valley for Circle Mountain Biological Consulting. December, 1997.
- **Survey of proposed airfield expansion area for desert tortoise habitation** at the Marine Corps Air Ground Combat Center for KEA Environmental. April, 1997.

FIELD SURVEYS (CONT)

- **Threatened and endangered species surveys and general habitat inventories at China Lake Naval Air Weapons Center** for Patrice Gould Consulting. 1995.
- **Assessment of environmental impacts of pipeline construction** from Kramer Junction to Trona, California for CWESA. 1992. • **Pre-construction survey, tortoise relocation, and biological monitoring for new antenna sites at the Goldstone Space Communications Complex** (Goldstone) at Fort Irwin, California for Jet Propulsion Laboratory (JPL), California Institute of Technology. 1992 - 1994.
- **Desert tortoise survey of a 134 acre explosive storage facility** near Helendale, California for W.A. Murphy. 1991.
- **Desert tortoise population and distribution in the Main Base/South Base area of Edwards Air Force Base** for Computer Sciences Corporation in 1990.
- **Various desert tortoise surveys at Edwards Air Force Base** for Computer Sciences Corporation. 1990 - 1992.
- **Desert tortoise survey at two proposed cogeneration facilities** in Clark County, Nevada, for Bonneville Pacific Corporation. 1989.
- In addition, over 25 small-scale surveys have been conducted for clients since 1989.

DESERT TORTOISE POPULATION STUDIES

- **Line-distance transects for** estimation of desert tortoise population density in the Arizona Strip District. Spring, 2003.
- **Mark-recapture study at the Virgin Slope study plot** for Kiva Biological Consulting. Spring, 2003.
- **Line-distance transects throughout the Mojave Desert** as a team member with Kiva Biological Consulting at various Desert Wildlife Management Areas. March through May, 2001.
- **Sample line-distance transects** for estimation of desert tortoise population density as team member with Kiva Biological Consulting at the Chocolate Mountains Aerial Gunnery Range and Twentynine Palms Marine Corps Air-Ground Combat Center. Project team sampled a total of 80 four kilometer long transects. Extensive use of real-time differential GPS systems. April to May, 2000.
- **Sample line-distance transects** for estimation of desert tortoise population density as team member with Kiva Biological Consulting at the Chocolate Mountains Aerial Gunnery Range. Extensive use of real-time differential GPS systems. April-May, 1999.
- **Set up line-distance transects using differential GPS for sampling desert tortoise populations** as team member with Kiva Biological Consulting at the Chocolate Mountains Aerial Gunnery Range. January, 1998.
- **Comparisons of methods of desert tortoise population censusing at eight Nevada study plots** for the National Biological Service (NBS). 1995. And for the Nevada Division of Wildlife (NDOW). 1994.
- **Population census using 60-day mark-recapture methods at 39 1.0 to 3.0 mi^2 study plots for several clients throughout desert tortoise range.** 1989 - present. Recent plots include 35-day survey of the Bonanza Wash study plot (Fall, 1997), 60-day surveys of the Virgin Slope study plot (Spring, 1997), Hualapai Foothills study plot (Fall, 1996), and Beaver Dam Exclosure study plot (Spring, 1996).

RELATIVE ABUNDANCE STUDIES

- **Conduct relative density transects within the proposed expansion area of Fort Irwin, CA** for Dr. Alice Karl. Included calibration at known population density study plots. June to July, 2001.
- **Sample line-distance transects** for estimation of desert tortoise population density as team member with Kiva Biological Consulting at the Chocolate Mountains Aerial Gunnery Range. Extensive use of real-time differential GPS systems. April-May, 1999.
- **Set up line-distance transects using differential GPS for sampling desert tortoise populations** as team member with Kiva Biological Consulting at the Chocolate Mountains Aerial Gunnery Range. January, 1998.
- **Desert tortoise density and distribution at the Marine Corps Air Ground Combat Center near 29 Palms, CA** for Kiva Biological Consulting. Walked over 500 miles of relative density transects. May to October, 1997.
- **Desert tortoise abundance at the Complex 1 Charlie site of Edwards Air Force Base** for Computer Sciences Corporation. 1991.
- **Relative desert tortoise density along California State Highway 58** for the Bureau of Land Management. 1991.

RELATIVE ABUNDANCE STUDIES (CONT)

- **Update range maps of desert tortoise density in the western Mojave desert.** Joint venture project conducted with Kiva Biological Consulting for the Bureau of Land Management (BLM). 1990.
- **An epidemiological survey of the Desert Tortoise Research Natural Area** (DTNA) for the Bureau of Land Management (BLM). 1991.
- **Disease survey of the Maricopa Mountains in Arizona** for the Arizona Game and Fish Department. 1991.

EPIDEMIOLOGY SURVEYS

- **Epidemiological study of the Desert Tortoise Research Natural Area and two areas of the Colorado desert of California** for the Bureau of Land Management. 1990.

NATURALIST INTERPRETIVE SERVICES

- **Provision of naturalist interpretive services at the Desert Tortoise Research Natural Area** (DTNA) for the Desert Tortoise Preserve Committee, Inc. (DTPC). 1993, 1994, 1995.

RELOCATION PROJECTS

- **Relocation of desert tortoises from a proposed development site in the Las Vegas Valley** for Western Technologies, Inc. as a part of a team effort. 1990.
- **Relocation of desert tortoises from a vehicle test track site for American Honda** at their West Coast Test Facility. 1989.

RADIO TELEMETRY STUDIES

- **Location and removal of radio transmitters on tortoises** for RECON. March to April, 1997.
- **Effectiveness of barrier fencing to decrease road mortality of desert tortoises** for the Bureau of Land Management and later the National Biological Service. 1991 to 1995.

SPECIES OTHER THAN DESERT TORTOISE

- **Surveys for the Delhi sands flower-loving fly (*Rhaphiomidas terminatus abdominalis*)** for commercial client according to U.S. Fish and Wildlife Service Protocols. Made 71 observations during season a premiere quality site. Prepared final reports.
- **Surveys for the Delhi sands flower-loving fly (*Rhaphiomidas terminatus abdominalis*)** for Michael Brandman Associates at various sites according to U.S. Fish and Wildlife Service Protocols. Prepared final reports for each site. July to October, 2002.
- **Consultation regarding Delhi sands flower-loving fly (*Rhaphiomidas terminatus abdominalis*) mitigation** for URS Corporation for expansion of the Mountain View Power Plant in San Bernardino, CA. November, 2001. Met with U.S. Fish and Wildlife Service and project proponents.
- **Surveys for the Delhi sands flower-loving fly (*Rhaphiomidas terminatus abdominalis*)** for Jones & Stokes Associates, Michael Brandman Associates, and Recon Environmental at various sites according to U.S. Fish and Wildlife Service Protocols. Prepared final reports for each site. August to October, 2001.
- **Surveys for the Delhi sands flower-loving fly (*Rhaphiomidas terminatus abdominalis*)** for Thomas Olsen Associates, Inc., Michael Brandman Associates, Inc. and Jones & Stokes Associates at various sites according to U.S. Fish and Wildlife Service Protocols. Prepared final reports for each site. August to October, 2000.
- **Team member on a survey for flat-tailed horned lizards (*Phrynosoma mcallii*)** surveys at a windfarm site near Palm Springs for Alice Karl Consulting. June, 2000.

SPECIES OTHER THAN DESERT TORTOISE (CONT.)

- **Habitat suitability evaluations and surveys for the Delhi sands flower-loving fly (*Rhaphiomidas terminatus abdominalis*)** according to U.S. Fish and Wildlife Service protocols at three sites in the Inland Empire area. Prepared final reports for each site. July to October, 2004.
- **Surveys for the Delhi sands flower-loving fly (*Rhaphiomidas terminatus abdominalis*)** for Thomas Olsen Associates, Inc. and Pacific Southwest Biological Services at various sites according to U.S. Fish and Wildlife Service Protocols. August to September, 1999.
- **Rare plant survey at a proposed golf course near Palm Springs, CA** for Thomas Olsen Associates. April, 1997.
- **Surveys and relocation of burrowing owls (*Speotyto cunicularia*)** for Baldi Brothers Constructors. Winter, 1996.
- **Behavioral observations and surveys for the Delhi sands flower-loving fly (*Rhaphiomidas terminatus abdominalis*)** for Thomas Olsen Associates, Inc. Summer, 1996, 1998.

GENERAL BIOLOGICAL

- **Subcontract staff biologist for Thomas Olsen Associates engaged in routine biological assessments, proposal writing, jurisdictional delineations, desert tortoise surveys, etc.** February to March, 1997; February to March, 1998, and May to July, 1999.
- **Surveyed well and field elevations using a total survey station** for Eremico in support of restoration of Cane Brake Creek Reserve in the Kern River Valley. July, 1999.

PUBLICATIONS

Boarman, W.I., Marc Sazaki, Kristin H. Berry, Gilbert O. Goodlett, W. Bryan Jennings, and A. Peter Woodman. 1992. Measuring the effectiveness of a tortoise-proof fence and culverts: status report from the first field season. Proceedings Desert Tortoise Council 1992 Symposium, pp. 126-142.

Goodlett, G.O. and Glenn C. Goodlett. 1992. Studies of unauthorized off-highway vehicle activity in the Rand Mountains and Fremont Valley, Kern County, California. Proceedings Desert Tortoise Council 1992 Symposium, pp. 163-187.

Hart, S., A.P. Woodman, S.P. Boland, S. Bailey, P. Frank, G.O. Goodlett, D. Silverman, D. Taylor, M. Walker, and P. Wood. Results of seven desert tortoise plot surveys and one mortality survey in Arizona, Fall 1991. Proceedings Desert Tortoise Council 1992 Symposium, pp. 188.

TECHNICAL REPORTS (SELECTED)

Over 50 technical reports including:

EnviroPlus Consulting, 1996. Methods of reducing desert tortoise mortality along roadways. A report presented to the Clark County Managers Office.

Hart, S., Scott Bailey, and Gilbert Goodlett. 1995. Desert tortoise population studies at two plots in southern Nevada in 1995. A report presented to the National Biological Service, Las Vegas, Nevada for work performed under contract 14-48-0006-95-019.

Goodlett, G., Peggy Wood, Dave Silverman, Karen Lange, Peter Weigel, Steve Boyle, and Dan Taylor. 1994. Desert tortoise population studies at six plots in southern Nevada. A report presented to the Nevada Division of Wildlife, Las Vegas, Nevada for work performed under contract 94-44.

PRESENTATIONS

Monitoring tortoises during construction projects. Invited lecture at the Desert Tortoise Council handling techniques workshop. 1995 and 1996.

Desert tortoise field survey techniques. Invited lecture at the Desert Tortoise Council handling techniques workshop. 1992, 1993, 1994, 1995, and 1996.

Cost and engineering of desert tortoise barriers. Presentation at the 1996 Desert Tortoise Council Annual Symposium. March 29-31, Las Vegas, Nevada.

Alternatives to Gates for Openings in Tortoise-proof Barriers. Presentation at the 1996 Desert Tortoise Council Annual Symposium. March 29-31, Las Vegas, Nevada.

Studies of unauthorized off-highway vehicle activity in the Rand Mountains and Fremont Valley, Kern County, California. Presentation at the 1992 Desert Tortoise Council Annual Symposium. March 6-8, Las Vegas, Nevada.

PERMITS

- Over 30 project-specific scientific collection permits for desert tortoise (*Gopherus agassizii)*
- U.S. Fish and Wildlife Service Permit number TE005535-1 for Delhi Sands flower-loving fly (*Rhaphiomidas terminnatus abdominalis*) and Quino checkerspot butterfly (*Euphydryas editha quino*).
- California Fish and Game Department scientific collection permit for desert tortoise (*Gopherus agassizii).*

EDUCATION

B.S., Mississippi State University. May, 1983. major: petroleum engineering.

MISCELLANEOUS

Member of the following: Desert Tortoise Council, Society of Petroleum Engineers, Society of Core Analysts.

Registered Engineer in Training, Private fixed wing and helicopter pilot.

1992 to 2003. Instructor, Desert Tortoise Handling Techniques Workshop sponsored by the Desert Tortoise Council.

1992. Instructor - Mohave Ground Squirrel cumulative human impact analysis workshop sponsored by California Fish & Game Department

REFERENCES

Becky Jones
Biologist
California Dept of Fish and Game
36431 41st Street East
Palmdale, CA 93552
(661) 285-5867
e-mail - Dfgpalm@mindspring.com
Relationship: Agency representative on several projects

Anne Knowlton
Senior Biologist, URS Corporation
130 Robin Hill Road, Suite 100
Santa Barbara, CA 93117
(805) 964-6010
Relationship: Senior technical representative for client

Peter Woodman
Owner, Kiva Biological Consulting
P.O. Box 1210
Inyokern, California 93527
(760) 377-3466
e-mail – KivaBio@aol.com
Relationship: Client manager & technical representative

Shirley Pearson
Principal Engineer
Montgomery Watson Harza (MWH)
3050 Saturn Street, Suite 205
Brea, California 92821
(714) 646-2011
e-mail - Shirley.Pearson@MWHGlobal.com
Relationship: Project Manager High Desert Power Plant

Glenn C. Goodlett
1660 West Franklin Avenue
Ridgecrest CA 93555
(760) 447-4889

Special Skills:

Extensive experience in computer systems. Apple Macintosh® "Power User"; broad ranging familiarity in working with most Apple software, including applications for text editing, image editing, drawing, mapping, graphical information systems (GIS), database, spreadsheet, communication, etc. Also proficient in using the Macintosh® system including universal script writing/editing, networking and troubleshooting.

Qualifications:

Research experience includes mark-recapture population studies, epidemiological surveys, distance sampling surveys, radio telemetry studies, use of standardized transects for population correlations, analysis of human impacts to wildlife habitats, and automated data collection using remote sensing techniques. Industry experience includes pre-construction surveys, clearance surveys, relocation projects, construction monitoring, environmental compliance inspection services, and habitat/biological assessments following U.S. Fish and Wildlife protocols. Mr. Goodlett has successfully completed many projects for clients including federal, state and county agencies; large consultancies; mining interests; private clientele and telecommunications, natural gas, and power transmission companies.

Additional research experience includes participation in small mammal studies involving; live trapping, salvage and translocation studies as well as experience in using mist nets in trapping bats for identification of digitally recorded vocal signatures.

Mr. Goodlett has an outstanding reputation for exceptional quality work and a superior work ethic. He realizes that trust is the key to enduring relationships. Commitment, excellence and quality are his goals.

Professional Experience:

Glenn Goodlett has worked extensively for the past nine years in the Mojave Desert in California, Nevada and Arizona conducting, designing and coordinating research and development related projects. He has supervised numerous projects involving pre-construction surveying, construction monitoring, handling of desert tortoises, radio telemetry, behavioral studies, mitigation assessments and disease surveys. Mr. Goodlett has been approved to handle sensitive species by the BLM, NBS, USFWS and CDFG for a broad range of clients including BLM, NBS, Los Angeles Department of Water and Power, Southern California Gas, AT&T, Kern River Gas Transmission, California Energy Commission, Desert Tortoise Preserve Inc., City of Victorville, U.S. Army, and the U.S. Air Force.

He has performed hands-on data collection activities related to various projects including locating, marking, measuring, weighing, sex identification, behavior recording, mapping of locations, collections of specimens and photography of sensitive species. Additionally Mr. Goodlett has managed and supervised multi-year multi-agency projects. This included all management responsibilities including writing of proposals, selecting locations for study, field surveys, supervising several biologists, insuring compliance with contractual obligations and writing of yearly and final reports for publication.

Relying on his strong electronics and engineering background Mr. Goodlett has helped bring advances of this nature to the biological arena. Navstar Global Positioning System (GPS) and Long Range Navigation (LORAN) have been used on many projects as an aid in determining position of natural resources in the field. He has made significant improvements to desert tortoise research with his contributions in the areas of computer-aided; data analysis, mapping, refinement of field data forms, and adaptation of laptop and palmtop computers for database maintenance and manipulation in the field. Other contributions include advancement of field communications technology, significant enhancements in wildlife transmitter design and tracking techniques, advanced applications and research of Passive Integrated Transponders (PIT tags) to study desert tortoises.

Work History: (excludes numerous small-scale projects)

March 2003 to present. Biological consultant on the Hyundai/Kia California Proving Ground, a 6.5 square mile test track facility constructed near Mojave, California. Responsibilities included surveys for desert tortoises and nesting birds, biological monitoring of all phases of construction, desert tortoise handling and radio tracking, environmental awareness training, installation and removal of tortoise-proof fencing.

March 2003. Biologist for the Defense Advanced Research Projects Agency (DARPA) Grand Challenge, a field test of robotic vehicles. Conducted pre-event surveys and during event monitoring for project as a part a team of 20 biologists. Project achieved zero take of desert tortoises in spite of high tortoise activity along route from from Barstow, CA to Primm, NV.

July, 2001 to March, 2003. Biologist on the High Desert Power Plant Project near Adelanto, CA for URS Consultants. Project included construction of a power plant, 2 water pipelines, numerous well sites, and a 32-mile gas pipeline. Responsible for implementation of Biological Resources Mitigation and Implementation Monitoring Plan that involved numerous sensitive resources.

October to December, 2001. Biological monitor for the expansion of Fort Irwin Road and a wash improvement near Barstow, CA for San Bernardino County. Implemented programmatic US Fish and Wildlife Service Biological Opinion for each project.

November, 2000 to February, 2001. Biological Monitor on Level 3 fiber optic construction project from San Diego to Yuma for Bio Environmental Associates. Implemented project environmental compliance and mitigation measures listed in Stormwater Pollution Prevention Plan, Spill Prevention Containment and Control Plan, Streambed Alteration Agreement, resource agency environmental compliance requirements and related documentation. Provided daily reports to project management. Primary listed species of concern included Southwestern Arroyo toad and Jacumba milk vetch..

July 2000 to August 2000. Golden State Fence Company. Environmental compliance inspector and biological consultant for the installation of tortoise-proof fencing on the ranges of Edwards Air Force Base, California. Responsibilities monitoring installation of the tortoise-proof fencing, and pre-construction and post-construction surveys.

July 2000. Asphalt Construction. Biological consultant for a highway improvement project on State Hwy. 58, east of Kramer Junction, CA.

March 2000 to May 2000. Granite Construction. Environmental compliance inspector and biological consultant for an asphalt concrete overlay on State Hwy. 58, near Tehachapi, CA.

March 2000 to June 2000. United States Geological Survey- Biological Resources Division. Biological consultant and project co-manager on the Goffs Desert Tortoise Permanent California Study Plot. Responsibilities included locating, marking, measuring, weighing, sex identification, behavior and data recording and photography of tortoises. Also mapping of locations, collection of specimens, reporting of results, and managing a field crew of four.

May 1999. Larry Mead, Inyokern, CA. Biological consultant. Field work consisted of locating all tortoise sign and walking standard transects to estimate surrounding area density.

September, 1998 to January, 1999. Ross G. Stephenson Associates Inc., AT&T. Managed environmental/biological compliance for a 100 mile long coaxial cable removal from Mojave California to Baker California. Primary responsibilities were to insure construction contractor compliance with U.S. Fish and Wildlife Service biological opinion and to manage a group of biologist in monitoring construction activities and conducting pre-construction surveys. Additional responsibilities included handling and relocating desert tortoises following U.S. Fish and Wildlife Service guidelines and administering Desert Tortoise Awareness Training to approximately 60 personnel.

June 1998. The Rand Mining Company. Completed a desert tortoise clearance and relocation survey for a 190 acre waste rock expansion area near Randsburg, California. Duties included handling and relocating desert tortoises following U.S. Fish and Wildlife Service guidelines, constructing artificial tortoise burrows, and completing final reports.

March 1998 to June 1998. United States Geological Survey - Biological Resources Division (USGS-BRD). Project co-manager for a contract to establish and conduct in-depth demographic and habitat surveys at 15 new desert tortoise study plots in the Goldstone Deep Space Area of Fort Irwin National Training Center (NTC), Central Mojave Desert, California. Population parameters include distribution of tortoises by habitat type, relative density, age structure, sex ratios, mortality rates, and causes of death. Duties include field surveys, collecting blood and nasal wash samples from tortoises, attaching transmitters to tortoises, radio tracking of tortoises, insuring compliance with contractual obligations, and writing of final reports.

February 1998. North State Resources. Environmental Compliance Inspector for an IXC fiber optic line from Adelanto, CA to Needles, CA. Responsibilities include performing pre-construction surveys, administering desert tortoise awareness training, end environmental compliance inspection.

July 1997 to Present. United States Geological Survey - Biological Resources Division (USGS-BRD) Project co-manager for a contract to collect data on desert tortoises at the National Training Center (NTC) at Fort Irwin, California. The primary focus of work was in the central and eastern portions of the NTC in a region known as the Tiefort Mountains, Eastgate 1, and Eastgate 2. Effort was expended on the study design and gathering of field data on selected ecological and population attributes of desert tortoises. New methods of locating tortoises in summer and fall and removing them from cover sites were tested and compared with older methods. The distribution of tortoises by type of cover sites and the use of cover sites is another subject of interest. Population parameters include distribution of tortoises by habitat type, relative density, age structure, sex ratios, mortality rates, and causes of death. Duties include project management, writing of proposals, field surveys, collecting blood from tortoises, attaching transmitters to tortoises, insuring compliance with contractual obligations and writing of final reports.

March 1996 to Present. National Biological Service and later the USGS-BRD. Project manager for a contract to conduct field work and surveys in support of the "Study of the Behavior, Movements, and Ecology of Common Ravens in the Mojave and Colorado Deserts." Tasks include surveying for ravens at attraction and control sites, trapping ravens, attaching patagial tags to ravens, attaching radio transmitters to ravens, tracking and mapping the movements of ravens equipped with transmitters and wing tags, and searching for evidence of raven predation on desert tortoises. Responsibilities include field management including writing of proposals, field surveys, supervising several biologists, insuring compliance with contractual obligations and writing of final reports.

March 1996 to 1999. Desert Tortoise Preserve Committee, Inc. Project manager for a contract to provide naturalist interpretive services. Responsibilities include the hiring, training and management of two employees to act as guides or interpreters to the public at the Desert Tortoise Natural Area during the spring.

February 1997 to June 1997. Granite Construction Company, California Department of Transportation. Managed environmental/biological compliance for a 4.2 mile long widening of state highway 14 near Cantil, California. Primary responsibilities were to insure construction contractor compliance with U.S. Fish and Wildlife Service biological opinion and to manage a group of biologist in monitoring construction activities and conducting pre-construction surveys. Additional responsibilities included ensuring proper construction of a tortoise-proof fence and administering Desert Tortoise Awareness Training to approximately 30 personnel.

November 1995 to Present. Earth Technology Corporation. Serve as an environmental compliance inspector/biological monitor on several development projects at Edwards Air Force Base. Responsibilities include conducting field surveys, monitoring construction operations, and educating construction workers about desert tortoises. Projects include: a 40 mile boundary fence encircling remote areas of the base, a tortoise exclusion fence around an experimental test area, and the drilling and development of several wells to monitor ground water contamination.

August 1995 to January 1996 and March 1996 to June 1998. Desert Tortoise Preserve Committee, Inc. Supervised and managed a desert tortoise monitoring program along a 5.7 mile long section of county road as partial fulfillment of mitigation requirements for the continued operation of the Harper Lake Solar Electric Generation Station (SEGS) in Hinkley California. Responsibilities include supervising a field team and handling desert tortoises following U.S. Fish and Wildlife Service guidelines as well as completing draft and final reports for the project.

November 1994 to July 1995. Dames and Moore Inc. Los Angeles Department of Water and Power. Mead/McCullough - Victorville/Adelanto 500 kilovolt alternating current transmission line project. Served as an environmental compliance inspector/biological monitor on the 202 mile long project from Lake Mead, Nevada to Adelanto, California. Responsibilities included knowledge of over 200 conditions and/or mitigation measures associated with the project to assist LADWP and construction contractors with their successful implementation. More specific responsibilities were to alert all on-site personnel of any action that was out of compliance with project conditions regardless of whether the action was of a general construction nature or specific to an environmental resource, including wildlife, vegetation, water resources, and paleontological, archaeological, and historic resources.

November 1994. Dames and Moore Inc. Environmental compliance inspector/Biological monitor for a desert tortoise exclusion fence at the Red Horse ordinance test site on Nellis Air Force Base, Nevada. Responsibilities included environmental compliance inspection, worker education and pre-construction surveys.

January, 1994 to March, 1994. LSA Associates Inc. Environmental compliance inspector on a 31 mile long, 24 inch diameter, Southern California Gas, natural gas pipeline #6902 in the eastern Mojave desert. Activities include: 30-day long-range tortoise surveys, 48-hour pre-construction surveys, monitoring construction operations, and educating construction workers about desert tortoises.

August, 1993 to March, 1994. David Evans & Associates, AT&T. Crew chief/Environmental compliance inspector for a 144 mile long fiber optic line from Bakersfield California to Victorville California. Primary responsibilities were to insure construction contractor compliance with U.S. Fish and Wildlife Service biological opinion and to manage a group of biologist in monitoring construction activities and conducting pre-construction surveys.

June, 1993 to July, 1993. O'Farrell Biological Consulting. Biologist assisting in conjunction with the University of Sydney in a study of comparison trapping of small mammals and marsupials in the Simpson and Tanami deserts of Australia.

March, 1993 to present. Bureau of Land Management (BLM), Kramer Junction California. Project manager and field investigator on a 3-year research contract for the National Biological Service to evaluate the effectiveness of barrier fencing to decrease highway mortality and investigate the effect of fencing on movements and home ranges of desert tortoises. This project involves the use of radio transmitters on tortoises, airborne and ground based telemetry, use of passive integrated transponders for automated animal identification and location. Also the development and use of a database for laptop and palmtop computers for data collection in the field is involved on this project. Responsibilities include all management including writing of proposals, selecting locations for study, field surveys, supervising several biologists, insuring compliance with contractual obligations and writing of yearly and final reports for publication.

November, 1992. Member of a field biological team to assess environmental impacts of pipeline construction from Kramer Junction, California to Trona, California. Contributing specialty areas included desert tortoise sign evaluation and Mohave Ground Squirrel habitat assessment.

April, 1992 to July, 1992. Bureau of Land Management (BLM). Principal investigator on study of movement and home ranges of desert tortoises along a fenced roadway; Highway 58, Kramer Junction, California. Techniques used for study include radio telemetry tracking on foot, by vehicle, and by air and airborne mapping and reconnaissance.

December, 1991 to April, 1992. United Stated Air Force (USAF). Environmental compliance inspector/Biological monitor on an 18 inch diameter water pipeline constructed at Edwards Air Force Base. Primary responsibility is to insure construction contractor compliance with U.S. Fish and Wildlife Service biological opinion.

October, 1991. Arizona Game and Fish Department. Member of field team to assess possible abnormal desert tortoise mortality rates in the Maricopa Mountains of Arizona on a contract with the Arizona Game and Fish Department.

September, 1990 to October, 1990. Bureau of Land Management (BLM). Principal investigator on a BLM project conducted to update range maps of desert tortoises and to obtain data to estimate the current distribution and relative abundance of desert tortoises in a 500 square mile area of the western Mojave desert. Additionally, data was collected on current human impacts. Conducted over 400 1.5 mile long standard relative density transects.

May, 1990 to July, 1993. Computer Sciences Corporation(CSC). Senior Member of Technical Staff - Specialist, CSC, Edwards Air Force Base. Responsible for planning and implementation of desert tortoise field work. Projects included desert tortoise surveys for the Drop Zone and Main Base/South Base.

April, 1990 to August, 1990. Bureau of Land Management (BLM). Conducted large area disease survey for desert tortoises for the BLM in the Fremont Valley, California. Field responsibilities included all hands-on data collection activities related to project including locating, marking, measuring, weighing, sex identification, behavior recording, and photography of tortoises. Additional responsibilities included mapping of locations, collection of specimens, and reporting of results.

Publications:

Berry, K., M. Weinstien, G. Goodlett, and A. Woodman. Desert Tortoise Abundance and Quantitative Measures of Human Use in the Rand Mountains, Fremont Valley, and Spangler Hills. Proceedings Desert Tortoise Council 1993 Symposium, pp. 62.

Boarman, W. I., T. Goodlett, G. C. Goodlett. In Press. Review of radio transmitter attachment techniques for chelonian research and recommendations for improvement. Herp. Review.

Boarman, W. I., M. Sazaki, G. C. Goodlett, T. Goodlett, G. O. Goodlett, and W. Brian Jennings. Tortoise Behavior: Highways, Fences, and Preserve Design. Proceedings Desert Tortoise Council 1993 Symposium, pp. 64.

Boarman, W. I., M. Sazaki, G. Goodlett, and T. Goodlett. 1992. Reduction in Mortalities of Desert Tortoises and Other Vertebrates along a Fenced Highway. Proceedings Desert Tortoise Council 1995 Symposium, pp. 108.

Goodlett, G.O. and G. C. Goodlett. 1992. Studies of unauthorized off-highway vehicle activity in the Rand Mountains and Fremont Valley, Kern County, California. Proceedings Desert Tortoise Council 1992 Symposium, pp. 163-187.

Sazaki, M., W.I. Boarman, G. Goodlett, and T. Okamoto. 1995. Risk associated with long-distance movements by desert tortoises. Proceedings Desert Tortoise Council 1994 Symposium, pp. 33-48.

Workshops:

- ◊ Invited instructor at the Desert Tortoise Council's, "Desert Tortoise Survey Techniques Workshop" in 1993 to 2000.
- ◊ Attended the "Annual Desert Tortoise Council Symposium" 1991 to 2000.
- ◊ Invited speaker at the "Annual Desert Tortoise Council Symposium" in 1996.
- ◊ Attended the sixth International Theriological Congress in Sydney, Australia in 1993.

Permits:

- ◊ Current holder of a State of California, Department of Fish and Game Scientific Collector's Permit #2895
- ◊ Currently listed on Federal Fish and Wildlife Threatened Species Permit #PRT-747907.

Education:

Completed studies in electrical engineering with emphasis on logic design, Hinds College, Mississippi State University.

References:

Dr. William I. Boarman
USGS, Biological Resources Division
6221 Box Springs Blvd.
Riverside CA 92507
(909) 697-5200
E-mail: william_boarman@usgs.gov

Marc Sazaki
California Energy Commission
1516 9th Street
Sacramento CA 95814
(916) 654-5061
E-mail: msazaki@energy.state.ca.us

Dr. Michael J. O'Farrell
O'Farrell Biological Consulting
(702) 658-5222
E-mail: mikeof@accessnv.com

Robert Hernandez

Biologist – CH2M HILL

Education

B.S., Wildlife Management, Minor in Natural Resources, Humboldt State University

Relevant Experience

Mr. Hernandez has more than 8 years experience working with California flora and fauna. He has knowledge of avian and terrestrial wildlife species, California native plants, shrubs, trees, and the role they play in the environment. He is experienced in remote sensing such as photogrammetry, topographic map interpretation, radio telemetry, photographic bait stations, sooted track-plates, GIS, and GPS. He also has extensive knowledge and experience delineating wetlands and other jurisdictional waters, as well as environmental regulations and policies that protect the environment and threatened and endangered species.

Representative Projects

- ✓ **Field Biologist, Hinkley Project, Pacific Gas and Electric, San Bernardino County, California.** Conducted focused protocol level surveys for desert tortoise and other sensitive and special-status wildlife species. Responsibilities included report writing.
- ✓ **Field Biologist, LUZ II Biological Surveys, Ivanpah Valley, California.** Conducted biological surveys for sensitive and special-status wildlife species, including desert tortoise, and burrowing owl. Responsibilities included habitat mapping, GPS/GIS mapping, and report writing.
- ✓ **Field Biologist, State Route 79, Riverside County Transportation Commission, Riverside County, California.** Conducted jurisdictional waters and wetland delineation and rare plant surveys of the proposed project site. Responsibilities included the use of GPS technology to map sensitive resources such as wetlands, vernal pools, rare plant populations, and sensitive wildlife observations.
- ✓ **Field Biologist, Fairmont Wind Project, Pacificorp Power Marketing, Fairmont, California.** Conducted field surveys of the project site for biological resources, including surveys for avian species, burrowing owl, and vegetation. Responsibilities included mapping, database management, literature review, and report writing.
- ✓ **Field Biologist, Utah Forest Highway 29 Northern Goshawk Survey, Federal Highways Administration, Beaver, Utah.** Conducted protocol level surveys for the Northern Goshawk. Responsibilities included habitat mapping, wetland delineation, and report writing.
- ✓ **Field Biologist, Multiple Jurisdictional Waters Delineations, United Engineering Group, Inc.** Conducted jurisdictional waters and wetland delineation for four large sites within the

Mojave Desert. Responsibilities include GIS/GPS mapping, literature review, and report writing.

- ✓ **Field Biologist, State Route 39 Bighorn Sheep Study, Caltrans, Los Angeles County, California.** Conducted field surveys for bighorn sheep along the closed portion of State Route 39 during preconstruction. Responsibilities included data management and reporting.
- ✓ **Field Biologist, Topock IM3 Project, Pacific Gas and Electric, San Bernardino County, California**. Conducted preconstruction surveys for sensitive and special-status wildlife species. Responsibilities included jurisdictional waters and wetland delineation, environmental construction monitoring, biological sensitivity training, and report writing.
- ✓ **Field Biologist, On-Call Biological Support, County of San Diego Department of Public Works, California.** Conducted preconstruction surveys for sensitive and special-status wildlife species on an on-call basis. Responsibilities included jurisdictional waters and wetland delineation, habitat mapping, GPS/GIS mapping, and report writing.
- ✓ **Field Biologist, U.S. Air Force Plant 42 Biological Surveys, Palmdale, California.** Conducted biological surveys for sensitive and special-status wildlife species, including the desert tortoise, Mojave ground squirrel, and burrowing owl. Responsibilities included habitat mapping, GPS/GIS mapping, and report writing.
- ✓ **Field Biologist, Trunk Line, City of Burbank, California.** Conducted preconstruction surveys for sensitive and special-status wildlife species on a proposed pipeline replacement route in Los Angeles County for the Los Angeles Department of Water and Power (LADWP). Responsibilities included breeding bird surveys, seine-netting for sensitive fish, night eye-shine surveys for special-status amphibians, and environmental monitoring during construction.
- ✓ **Field Biologist, Whittier Narrows Operable Unit Remedial Action, U.S. Environmental Protection Agency, Los Angeles County, California.** Conducted preconstruction surveys for least Bell's vireo and other sensitive species in South El Monte for a groundwater remediation project. Tasks included environmental oversight of construction activities in environmentally sensitive habitats, environmental mitigation monitoring of construction practices, and preparation of revegetation and exotic plant species eradication plans.
- ✓ **Field Biologist, West Mojave Plan, U.S. Department of Interior, Bureau of Land Management (BLM).** Conducted GIS analyses on potential route closure designation as they pertain to environmentally sensitive habitats.
- ✓ **Field Biologist, Headwaters Forest Reserve, California.** Conducted pre-land acquisition and preconstruction surveys for sensitive and special-status species for the BLM, Arcata field office. Surveys of the 7,400-acre Headwaters Forest Reserve included northern spotted owl nest searches, terrestrial mollusk surveys, corvid monitoring, small forest carnivore surveys, herpetological surveys, and survey route designation.

Gabriel Valdes

Wildlife Biologist – CH2M HILL

Education

M.S., Biology, Northern Arizona University, Flagstaff, Arizona (2000)
B.S., Zoology/Terrestrial Biology, California State University, Long Beach, California (1994)

Professional Registrations

Federal Endangered Species Permit No. TE092622-0

Distinguishing Qualifications

- Extensive experience in environmental permitting of pipeline and linear utility projects.
- Manages projects and tasks for numerous government and private clients needing help with the following: NEPA process/documents, 404 permitting, Section 7 Endangered Species Consultation, mitigation planning, NPDES permits, and FERC compliance.
- Currently holds federal permits to survey and/or nest monitor for the California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, and cactus ferruginous pygmy-owl.

Relevant Experience

Mr. Valdes is a biologist with more than 12 years of experience. He manages projects and tasks of all types, including pipeline environmental compliance and endangered species surveys. Mr. Valdes manages tasks for large-scale projects, including 400-mile pipeline projects and southwestern willow flycatcher surveys along the lower Colorado River. He has also conducted FERC pipeline compliance monitoring for projects throughout the country.

Mr. Valdes also helps build relationships with clients. He performs marketing tasks to target new clients and has been instrumental in proposal and budget development.

Representative Projects

Environmental Permitting Task Manager, Utah to Las Vegas, Nevada Pipeline, Holly Energy Salt Lake City, 2006-present. Managing environmental permitting/NEPA process for 430-mile pipeline. Coordinating and managing field crews, data collection, and technical report writing for the EIS. Conducting waters delineations for 404 permit and habitat surveys.

Biologist/Task Manager, Kinder Morgan El Paso to Phoenix Expansion Project, 2006-present. Managing environmental permitting and developing the Environmental Assessment. Maintains agency relationships to acquire NPDES permits, 404 permit, and International Boundary and Water Commission License medication for crossing the Rio Grande.

Project Manager, Cultural Resource Inventory for Falcon Reservoir Project, International Boundary and Water Commission (IBWC), Zapata County, Texas, 2006-present. Managing

subcontractor and coordinating with agencies to conduct archeological field surveys for the IBWC's Falcon Reservoir Project.

Project Manager, Hidalgo Protective Levee System Rehabilitation Project, International Boundary and Water Commission (IBWC), 2006-present. Coordinating with agency and subcontractor to assist the IBWC in meeting its requirements for Sections 106 and 110 of the National Historic Preservation Act and development of a Memorandum of Agreement between the Texas Historical Commission and IBWC.

Project Manager, New Mexico/Arizona Projects, El Paso Natural Gas (EPNG), 2006. Managed three projects for EPNG in New Mexico and Arizona, which needed environmental and archeological survey reports. Developed new relationship with this client to win these projects. Conducted environmental surveys and contracted an archeological consultant to conduct the cultural resource surveys. The project involved EPNG replacing sections of pipe on the San Carlos Indian Reservation, Tonto National Forest, and crossing the Pecos River in New Mexico.

Biologist/NEPA Specialist, Kinder Morgan East Line Expansion Project, Kinder Morgan, El Paso, Texas to Phoenix, Arizona, 2004 to 2006. Prepared various sections of the Environmental Assessment and technical reports as required by NEPA. Maintained agency contacts and prepare consultation documents. Conduct biological surveys of the proposed right-of-way and laydown areas. Consulted with the Bureau of Land Management (BLM) on potential endangered species issues.

Publications and Presentations

Publications

Valdes, G. Thesis: Magnetic Field Use by Seed Caching Corvids, Northern Arizona University, 2000.

Workshops

Valdes, G. Southwestern Willow Flycatcher Training Workshop, Arizona Game and Fish Department, Lake Roosevelt, Arizona. 2003.

Valdes, G. Natural Gas Pipeline, Environmental Compliance Workshop, Federal Energy Regulatory Commission, Las Vegas, Nevada. 2002.

Valdes, G. Cactus Ferruginous Pygmy-Owl Workshop, Arizona Game and Fish Department, Tucson, Arizona. 2001.

Valdes, G. Southwestern Willow Flycatcher Workshop (1995), National Park Service and U.S. Geological Survey, Colorado Plateau Research Station, San Diego, California. 1995.

Valdes, G. Desert Tortoise Workshop, Bureau of Land Management, Department of Parks and Recreation, Riverside, California. 1995.

Erin Whitfield
P O Box 236
Keene, Ca 93531
661/823-0123 home
661/330-1066 cell
erinflinn@juno.com

Education

Bachelor, Biological Sciences, Humboldt State University 1989

Work Experience

Consulting Biologist 1990-92 & 1999 to present.
Conduct, supervise, and manage biological surveys for wildlife: animal and plant species, using established protocols. Projects include research, urban, industrial, public works, oilfield and petroleum development. Monitor and inspect for CEQA, and NEPA compliance. Implement project activities according to permit mitigation requirements and best management practices. Prepare written and oral proposals & reports. Attend daily, weekly or monthly staff & contractor meetings.

Supervisor DCCA/Land O Lakes, Tulare, 1996 to 99.
Provide direction to plant operators in cooperation with the Plant Manager. Responsibilities include: planning, organizing and leading employees in the day to day activities of the plant. This includes the areas of productivity, maintenance, safety, customer service, regulatory compliance, and housekeeping so as to assure that personal, plant 4, and company goals and objectives are met. Directed implementation & certification as an ISO 9000 production facility. Assist in oversight of budget.

Associate Scientist Sandoz Agro, Wasco, 1994 to 96.
Responsible for operation of pilot plant at biological pesticide production facility, from raw material inventory to quality finished product. Create and utilize annual budget while cutting costs. Implemented operational changes to fully comply with ISO 9000. Design and conduct process development experimentation including fermentation and recovery. Provide written and oral reports with the completion of each experiment. Responsible for SOP writing and documentation control within entire facility.

Chemist Sanifill, Inc., McKittrick, 1992 to 94.
Manage all phases of waste approval including customer and technical service. Determine waste acceptance compliance with local, state, and federal permits, including CCR Title 22 and CFR Title 40. Responsible for regulatory compliance during operation and construction of new landfill. Liaison for Water Quality Control Board, San Joaquin Valley APCD, BLM, and Department of Fish and Game during permitting process. Responsible for on site laboratory including: analytical testing, inventory control, and budgetary oversight.

Senior Biochemical Operator - Genentech, Inc., South S. F., 1986 to 90.
Protein purification using HPLC, column chromatography, filtration, and centrifugation. Coordinated scale-up efforts for department, facilitated smooth product transition from research and development to manufacturing. Implemented automation techniques. Documented all procedures using GMP & GLP. Prepared written and oral reports. Communicated deadlines, schedules and forecasts to other departments.

Sophia Chiang

Biologist – CH2M HILL

Education

M.S., Environmental Science, California State University
B.S., Environmental Analysis and Design, University of California

Professional Registrations

Endangered Species Act 10(a)(1)(A) recovery permit (TE-064359-1) for vernal pool branchiopods, Quino checkerspot butterfly, and coastal California gnatcatcher
California Department of Fish and Game Scientific Collecting Permit (SC-004717)
Federal Bird Marking and Salvage Permit (20431-BF), subpermittee
Endangered Species Act 10(a)(1)(A) recovery permit (TE-787376-9) subpermittee for southwestern willow flycatcher

Relevant Experience

Ms. Chiang has more than 8 years of experience conducting a variety of wildlife surveys throughout Southern California. She has conducted focused surveys for coastal California gnatcatcher, least Bell's vireo, Quino checkerspot butterfly, Western burrowing owl, and is a subpermittee for Southwestern willow flycatcher. Ms. Chiang has also managed brown-headed cowbird trapping and removal programs and conducted biological monitoring for various natural resources. Field technique experience includes radio telemetry, nest monitoring, mist netting, bird banding, raptor trapping and handling, mammal scent stations, mammal track identification, aerial surveys, and wetland delineations. Ms. Chiang has experience in preparation of biological resources reports and other environmental documents pursuant to California Environmental Quality Act (CEQA), National Environmental Policy Act (NEPA), Endangered Species Act (ESA), and Migratory Bird Treaty Act (MBTA).

Representative Projects

- ✓ **Task Lead and Project Team Member, State Route 79 Realignment, Riverside County, California.** Conducted focused surveys for the Western burrowing owl and least Bell's vireo. Provided support for vernal pool branchiopod surveys, sensitive amphibian surveys, sensitive plant surveys, wetland delineations, and Southwestern willow flycatcher surveys. Responsibilities included vegetation mapping and general wildlife assessments for the approximately 15,000-acre project study area. Reporting requirements included focused survey reports, Natural Environment Study, and Multiple Species Habitat Conservation Plan (MSHCP) Equivalency Analysis.
- ✓ **Project Team Member, Chiquita Canyon Landfill Master Plan Revision, Los Angeles County, California.** Conducted vegetation monitoring in compliance with the revegetation and erosion control program. Success monitoring included quantitative data collection via the line-intersect method and qualitative data collection via visual inspection. Photo locations were established to photodocument revegetation progress and site changes.

Sophia Chiang

Experience Prior to CH2M HILL

- ✓ **Principal Wildlife Biologist, Chambers Group, Inc., Irvine, California.** Responsibilities included conducting various threatened and endangered species surveys in addition to general biological and botanical surveys. Management experience included supervising junior-level staff, project and budget management, and proposal submittals. Technical reports included biological technical reports, biological assessments, biological constraints analyses, mitigation and monitoring plans, long-term management plans, environmental impact reports, environmental impact statements, environmental assessments, mitigated negative declarations, initial studies, habitat conservation plans, Section 404 and 401 certifications under the Clean Water Act, and 1603 Streambed Alteration Agreement applications.
- ✓ **Task Manager and Principal Biologist, Final Mitigation Monitoring Plan for the Big Tujunga Wash Mitigation Bank, Los Angeles County, California.** Assisted in the preparation of the Final Mitigation Monitoring Plan (MMP), a comprehensive document that included the development and implementation of enhancement strategies for the 207-acre Big Tujunga Wash Mitigation Bank. Responsible for public outreach implementation, brown-headed cowbird trapping and removal programs, formal trails establishment, wildlife success monitoring, and upland and riparian habitat restoration and revegetation monitoring. Other programs addressed by the MMP included exotic plant eradication, exotic aquatic wildlife eradication, water quality monitoring, and functional analysis. The mitigation bank provides suitable habitat for sensitive species including: Santa Ana sucker, Santa Ana speckled dace, arroyo chub, Cooper's hawk, and loggerhead shrike.
- ✓ **Principal Biologist, Restoration of Existing Least Bell's Vireo Habitat and Riparian Vegetation at Camp Pendleton, San Diego County, California.** Coordinated and conducted bird surveys, construction monitoring, and success monitoring for the functional analysis. Restoration of 55 acres took place in a fragmented river floodplain adjacent to the Santa Margarita River in existing least Bell's vireo, southwestern willow flycatcher, and arroyo toad habitat. Success criteria were based on habitat functionality for the vireo and flycatcher. The project team worked alongside the engineering staff to incorporate a new drainage system into the restoration area.
- ✓ **Project Biologist, Quino Checkerspot Butterfly Adult-Focused Surveys in Marron Valley, San Diego County, California.** Conducted adult focused surveys as part of a postfire monitoring effort funded by the Burned Area Emergency Stabilization and Rehabilitation Plan. The goal of the postfire monitoring, conducted for the U.S. Fish and Wildlife Service (USFWS) was to determine local extirpation and possible loss of population resiliency due to the 2003 Otay fire.
- ✓ **Project Biologist, Quino Checkerspot Butterfly Adult-Focused Surveys in the Cleveland National Forest, Riverside and San Diego Counties, California.** Conducted adult-focused surveys on approximately 1,146 acres of the Cleveland National Forest, along the High Point Fuel Break within the Palomar and Descanso Ranger districts, located in Riverside and San Diego counties. Prepared a technical report of findings after the surveys were completed.

Ava Rosales Edens

Biologist – CH2M HILL

Education

B.A., Biology, University of California, Santa Barbara

Professional Certifications

- U.S. Fish and Wildlife Service Endangered Species Act Section 10 Scientific Take Permit for Endangered and Threatened Vernal Pool Crustaceans
- California Department of Fish and Game Scientific Collector's Permit
- Wetland Training Institute Certified Wetland Delineator

Distinguishing Qualifications

- Currently holds federal permits to survey Endangered and Threatened Vernal Pool Crustaceans
- Trimble-certified Global Positioning System (GPS) trained in TerraSync and ArcPad
- HAZWOPER Certified: OSHA-40 hour Hazardous Waste Operations and Emergency Response

Relevant Experience

Ava Edens is a biologist specializing in wildlife biology, aquatic ecology and invertebrate zoology. She has over 6 years of experience conducting a variety of wildlife and resource surveys in California and throughout the west coast, including focused species surveys, biological monitoring and wetland delineations. She has conducted focused surveys for endangered and threatened fairy shrimp, Los Angeles pocket mice, burrowing owls, raptors, riparian birds and others. She also has experience conducting wetland delineations including vernal pool, stream and estuarine habitats. Ava also has experience in preparation of biological resource reports and other environmental documents pursuant to the National Environmental Policy Act (NEPA), the California Environmental Quality Act (CEQA) and the Endangered Species Act (ESA).

Representative Projects

Biologist and Task Manager, State Route 79 Realignment Project, Riverside County Transportation Commission, Riverside County, California. Biologist responsible for performing rare plant surveys, riparian bird surveys, burrowing owl surveys, amphibian surveys and wetland delineations. Task manager and lead biologist for vernal pool branchiopod surveys on approximately 200 ponded areas, small mammal trapping for Stephens' Kangaroo Rant and Los Angeles pocket mouse, and wildlife corridor analysis. Surveys conducted over a 3-

year period covered approximately 15,000 acres in western Riverside County and included agricultural areas, rural residential and grassland and playa habitats. Field work encompassed habitat assessments and presence/absence surveys.

Biologist, Urban and Treatment Wetland Baseline Biological Survey, Southern California Coastal Water Research Project, Southern California. Performed surveys from Santa Barbara to San Diego to evaluate the effectiveness of wetlands for use as urban runoff BMPs, and their compatibility with wildlife beneficial uses. Project fieldwork included benthic macroinvertebrate community composition sampling, fish censuses, sediment collection and water quality monitoring. Tissue specimens collected for analysis of trace metals and synthetic organic compounds.

Biologist and Task Manager, Chiquita Canyon Landfill Master Plan Revision, Waste Management, Los Angeles County. Conducted vegetation monitoring in compliance with the revegetation and erosion control programs. Successful monitoring included quantitative data collection via the line-transect method and qualitative data collection via visual inspection. Photo locations were established to document revegetation progress and site changes.

Biologist, Red Beach Training Area Vernal Pool Fairy Shrimp Wet Season Survey, Marine Corps Base Camp Pendleton, California. Delineated approximately one-hundred ponded areas and conducted protocol wet season surveys for listed vernal pool crustaceans within these area. Also acted as the Range Safety contact for Camp Pendleton Range Operations since the study area was within an active Marine Corps training area.

Biologist, Interstate 5 Santa Clara River Bridge Replacement, Caltrans, Valencia, California. Biological monitor and site safety coordinator for Interstate 5 bridge replacement over the Santa Clara River, located northwest of the City of Santa Clarita in the County of Los Angeles. Biological concerns included bats, nesting birds, invasive plant species (Giant Reed and Tamarisk), water quality/sedimentation issues and impacts to sensitive resources. Sensitive biological species included the federally endangered species such as the least Bell's vireo (state endangered), unarmored threespine stickleback and the arroyo toad (state species of special concern).

Biologist and Environmental Planner, Owens Lake Dust Mitigation Program, Inyo County, California. Responsible for a range of biological, permitting, and CEQA compliance tasks for the Owens Lake Dust Mitigation Program. This multimillion dollar, multiyear program involves the planning, design, and construction management of a variety of dust control measures on the dry Owens Lake bed in Inyo County, California. Evaluated shorebird monitoring data, water quality and salinity data, and the potential effects of management actions on these parameters as part of the habitat management plan for snowy plover and shorebird nesting on Owens Dry Lakebed. Also responsible for water quality data analysis for the Annual Monitoring Report for North Sand Sheet Shallow Flooding Project for the Owen Lake North Sand Sheet Water and Ecological Monitoring Program. In addition habitat evaluation, prepared project-specific permit, certification, notification, and lease applications. These applications included ones for the

California State Lands Commission Application for a Lease of State Lands and Bureau of Land Management.

Undergraduate Researcher, Ecology, University of California, Santa Barbara. Studied the effects of water chemistry on salt tolerant organisms from lake and estuarine systems as an undergraduate researcher. Designed and conducted controlled lab experiments that closely mimicked the conditions of Mono Lake, California to examine the effects of salt and pH on brine shrimp (*Artemia*). Also performed a controlled experiment on the salt tolerance of a native estuarine plant, *Cakile maritima*. She received an Award for Excellence in Water Research from the National Water Research Institute for her work on this topic.

Tanzania Fisheries Research Institute, East Africa. Researched ecological interactions of aquatic invertebrates in Tanzania as part of an ongoing program sponsored by the National Science Foundation and the World Wildlife Fund in collaboration with International Decade of East African Lakes and the University of Arizona. Designed laboratory experiments, collected data and specimens from the lake, conducted trials, and summarized findings in a formal peer reviewed report. The project, "Snail susceptibility to crab predation: a case study of co-evolution from Lake Tanganyika, East Africa," was presented at the Society for Integrative and Comparative Biology Conference in Toronto, Ontario.

National Center for Ecological Analysis and Synthesis (NCEAS), University of California, Santa Barbara, CA. Assisted a group of national and international authors with the production of the textbook, "Riparian Ecology of Rivers and Streams," due for publication in June 2003. Duties included: performing literature research, imaging of figures and tables, updating project web page, managing book related correspondence, editing text, compiling and analyzing data, producing presentations for scientific meetings, and creating an electronic reference library.

California Alliance for Minority Participation Advanced Research Program, University of California, Santa Barbara, CA. Investigated the impacts of stream predators on local prey densities under different environmental conditions in the project, "The effects of odonate predation on ephemeropteran prey along a hydraulic gradient." Identified and determined population densities of benthic invertebrates in Mission Creek, Santa Barbara County. Reviewed extensive scientific literature and conducted fieldwork for project. Formally presented findings in a research paper and at a colloquium at UCSB.

National Science Foundation Research Internship, University of Alaska Southeast, Juneau, AK. Performed independent and collaborative laboratory and field work on marine invertebrates. Creatively designed and constructed light traps to collect crab larvae. Installed, maintained and sampled these traps in Glacier Bay National Park. Data from this experiment are being used to determine the population dynamics of crabs in an area that has recently been closed to commercial fishing. This project is continuing in the park with variations based on my successful trap prototype and initial study. Also assisted the US Geological Survey in a Dungeness crab population analysis using tagging and recapturing techniques. Presented the results of a project on marine invertebrate interactions in southeast Alaska at a public symposium.

UC White Mountain Research Station, Bishop, CA. Carried out the duties of a Fisheries Technician for the US Forest Service. Conducted remote stream surveys to assess spawning habitat conditions for the threatened Volcano Creek golden trout in Inyo National Forest. Collaborated with the California Department of Fish & Game in the removal of hybrid trout in high altitude lakes to preserve native species. Applied creative problem solving, planning and leadership skills in addition to exercising conflict-resolution methods.

Intertidal Sampling Project, University of California, Santa Barbara, CA. Assisted in intertidal sampling project. Duties included collecting and analyzing data for coastal surfgrass restoration, both in the lab and in the field. Designed and conducted an independent experiment on the larval development and settlement cues of a limpet species found exclusively on surfgrass.

Presentations

"Snail susceptibility to crab predation: a case study of co-evolution from Lake Tanganyika, East Africa" an oral and poster presentation at the Society for Integrative and Comparative Biology 2003 Conference in Toronto, Ontario.

"The effects of odonate predation on ephemeropteran prey along a hydraulic gradient" a research paper and poster presentation in UCSB's Summer Research Colloquium 2001.

"The effects of water salinity and pH on Artemia" a research paper and oral presentation earning the highest rank in Field Ecology at UCSB, 2000.

"Effect of water salinity on the viability of Sea Rocket, *Cakile maritima*, in a controlled environment" a research paper in College of Creative Studies' Natural History of Coal Oil Point course, 2000.

Chris Green

Environmental Technician – CH2M HILL

Education

B.S., Photography, Brooks Institute of Photographic Arts and Sciences

Relevant Experience

Mr. Green has more than 14 years of experience collecting field samples and conducting surveys for a variety of environmental projects.

Representative Projects

- ✓ **Biological Monitor, Calpine Delta Energy Center, California**. Conducted preliminary fairy shrimp surveys and biological monitoring during construction of the 1,100-MW power plant in Antioch and associated gas pipelines and electric lines.
- ✓ **Biological Monitoring, CalPine Sutter Power Plant, California. I**nvolved in avian collision studies.
- ✓ **Biological Surveys, Owen's Lake, Los Angeles Department of Power and Water (LADWP), California.** Tasks included absence/presence surveys for the Mojave ground squirrel, and rare plant surveys in construction zones.
- ✓ **Biological Monitor, Kesterson Reservoir, Merced County, California.** Responsible for collecting plants, aquatic and terrestrial invertebrates, and small mammals for the monitoring required by the USBR. Performed monthly and quarterly bird surveys, annual nest monitoring, nest box surveys, soil surveys, and water quality monitoring.
- ✓ **Water Quality Monitor and Water Treatment Plant Maintenance, Austin Road Landfill, City of Stockton, California.** Tasks involved sampling surface water, stormwater, groundwater, influent and effluent waters, and overseeing construction and maintenance at onsite water treatment plant.
- ✓ **Field Crew Leader, Macroinvertebrate Monitoring, Klamath Hydroelectric Project FERC Relicensing, PacifiCorp, Portland, Oregon.** Field crew leader for the monitoring of benthic macroinvertebrates and associated water quality and habitat features, in support of PacifiCorp's FERC relicensing for this complex of dams and hydroelectric generating facilities on the Klamath River.
- ✓ **Eco-Risk Assessment and Habitat Characterization, Lava Cap Mine, California.** Tasks included plant and soil collection, aquatic and terrestrial invertebrate sampling, electro-fishing the streams and lake onsite for fish tissue samples, small mammal trapping for tissue samples, and rapid bioasssessment sampling.

Daniel Hack

201 West 70th Street, Apt. 36H
New York, New York 10023
212-877-2768
danohack@hotmail.com

EDUCATION

Fall 1993 - Spring 1997

B. Sc. Biology
University of Colorado, Boulder, and the George Washington University, Washington D.C

- Coursework included: Ecology**,** Advanced Ecology, Plant Systematics, Marine Biology, Coral Reef Ecology, Advanced Animal Physiology, Organic Chemistry, Principles of Evolution, Field Biology.

BIOLOGY EXPERIENCE

Fall 2002

Biologist, Grizzly Island Wetlands Preserve, California
Robert Booher Consultants, San Francisco, California

- Conducted multi-species surveys on and around natural gas well-pad.
- Involved in all aspects of endangered species avoidance and management.
- Trained and advised work crews regarding environmental considerations.
- Acted as liaison between work crews and state/local agencies.

Summer 2002

Biologist, Owens Lake, California
BioEnvironmental Associates, Fort Collins, Colorado

- Conducted surveys for snowy plovers and suitable habitat on behalf of Great Basin Unified Air Pollution Control District (2003 SIP-EIR).
- Designed GIS data maps using ArcView.

Spring 2002

Biologist, Owens Lake, California
BioEnvironmental Associates, Fort Collins, Colorado

- Conducted snowy plover surveys and monitoring for LADWP, in conjunction with biologists from Point Reyes Bird Observatory.
- Involved in all aspects of threatened species management, including nest and brood observations.

Winter 2001 - 2002

Wildlife Biologist, Lynx and Forest Predator Surveys, Montana/Wyoming
USGS Rocky Mountain Research Station, Missoula, Montana.

- Conducted surveys in extremely remote areas accessed via snowmobile/snowshoes.
- Identified various mammals utilizing sightings and track features.
- Collected and entered data daily on dozens of relevant data/GPS variables.
- Proficient uses of map, compass, and GPS to navigate over hundreds miles of untracked, mountainous terrain.

Spring - Fall 1999, 2000, 2001

Crew Leader and Field Biologist, WA and OR
Hamer Environmental, Mount Vernon, Washington
Worked on various research projects, including mammal, bird, and mollusk surveys.

Crew Leader, Marbled Murrelet Surveys, Olympic Peninsula, WA
Crew leader for eight field biologists.

- Trained crews in use of map and compass for navigating over densely forested terrain.
- Scheduled weekly surveys of field biologists, and ensured all surveys were completed according to Federal and State protocol.
- Reviewed all survey forms and data to ensure accuracy.
- Assisted in mapping and documentation of survey sites.
- Located and marked survey stations using ortho- and topo-graphic maps and compass.
- Worked long hours and camped solo in remote areas.
- Lived with a work team for 3+ months in a remote outdoor environment.

Field Biologist, Mollusk Surveys, Hood River, OR

- Identified various terrestrial snails and slugs, including habitat assessment.
- Recorded data about vegetation and environmental conditions.
- Located and marked survey stations using topographic maps, aerial photos and a GPS unit/compass.

Crew Leader, Red Tree Vole Surveys, Grants Pass, OR

- Conducted transect searches for Red Tree Vole nests.
- Hiked on steep terrain in adverse weather conditions.
- Recorded data regarding vegetation, and habitat assessment.
- Mapped transects and nests according to Federal and State protocol.

December 2000-
March 2001

Biological Monitor, San Diego, CA to Yuma, AZ
Blanton & Associates, Houston, TX

- Monitored work of construction crews on fiber optic project.
- Trained for the identification, avoidance, and/or relocation of numerous animal and plant species of concern, including: Burrowing Owl, Desert tortoise, Flat-Tailed Horned Lizard, Yuma Clapper Rail, and Arroyo Toad.
- Ensured all employees followed environmental regulations concerning species of concern, water protection act, and spill procedures.
- Ensured all permits were accurate and valid.
- Aided in minimizing impact of construction work.
- Environmental education of crews.

RELEVANT SKILLS
Other courses, and experiences

- Wilderness First Responder with NOLS/WMI/Outward Bound.
- PADI SCUBA rescue/medic diver.
- Strong navigation skills using GPS unit, map, and compass.
- Proficient in Microsoft Word, Excel, PowerPoint, and ArcView.

REFERENCES

- **Robert Booher Consultants**
  Robert Booher, ***Senior Wildlife Biologist***
  bbooher@pacbell.net

- **BioEnvironmental Associates**
  Rex Thomas and Steve Tabor, ***Senior Wildlife Biologists***
  (970)-227-0771
  BEAbios@aol.com

- **Hamer Environmental**
  Tom Hamer, ***Senior Wildlife Biologist***
  (360)-422-6510
  hamert@aol.com

- **Blanton & Associates**
  Don Blanton, ***Senior Wildlife Biologist***
  (512)-264-1095
  admin@blantonassociates.com

- **Washington Department of Natural Resources**
  Peter Harrison and Steve Crow, ***Wildlife Biologists***
  (marbled murrelet surveys)
  (360)-374-6131
  peter.harrison@wadnr.gov
  steve.crow@wadnr.gov

Victor Leighton

Biologist – CH2M HILL

Education

A.S., Forestry/ Wildlife Biology, American River College

Relevant Experience

Mr. Leighton has over 12 years experience with a variety of environmental studies including general wildlife and plant surveys, wetland delineations, threatened and endangered species surveys, mammal surveys and trapping, native plant propagation, and restoration of native ecosystems, including native grasslands, wetlands, and riparian habitats. He is knowledgeable of the flora and fauna of the Sacramento and San Joaquin valleys, foothills, and the Sierra Nevada Mountain region. Mr. Leighton is familiar with the biology, distribution, listing status, and survey techniques of rare and sensitive species occurring in California. He has extensive experience in conducting protocol, preconstruction surveys and construction monitoring. The focus of these activities is compliance with endangered species' laws and mitigation requirements. He has extensive monitoring experience with Horizontal Directional Drilling (HDD) and other construction-related projects, including construction crews working within or in proximity to habitats of sensitive species. He is knowledgeable with current environmental laws, policies, and regulation and familiar with environmental information resources and tools including scientific literature, computerized database, academic and agency specialist, maps, and aerial photographs.

Representative Projects

- ✓ **Biological Monitor, Calpine Corporation, Delta Energy Center, Contra Costa County, California.** Biological monitor of the 880-MW power plant. Conducted all forms of biological monitoring and surveys on the power plant and associated linear facilities and HDD, including ongoing annual avian collision studies and scavenger removal study along transmission lines associated with the power plant as part of their Condition of Certification.
- ✓ **Biological Monitor, Calpine Corporation, Sutter Energy Center, Sutter County, California**. Biological monitor of the 500-MW power plant. Conducted all forms of biological monitoring and surveys on power plant and associated linear facilities and HDD, including ongoing annual avian collision studies and scavenger removal study along transmission lines associated with the power plant as part of their Condition of Certification.
- ✓ **Biological Monitor, Calpine Natural Gas, Sevenmile Slough HDD, Twitchell Island, Sacramento County, California.** Biological monitor onsite during all construction and drilling operations. Throughout construction activities, shared knowledge with various onsite agency personnel to observe directional drilling operations, procedures, equipment, and steps that would be taken in the event of a "frac-out".

Victor Leighton

- ✓ **Pacific Gas and Electric Company, Line 401 Capacity Loops, Burney and Modoc, California.** Focused biological surveys for rare plants, wetlands, special-status wildlife species, and noxious weeds along the two loops of the 401 Expansion project. Conducted electronic database searches for existing literature and consulted with resource agencies and/or other experts to develop a target list of potentially occurring special-status wildlife species. Part of a four-person team, that surveyed the study area using accepted protocols and identified locations of special-status plants and wildlife species, including amphibians and reptiles. Assisted in producing a biological resource report.
- ✓ **East Bay Municipal Utilities District (EBMUD), Mokelumne Aqueduct Maintenance and Seismic Upgrade, San Joaquin, California.** Conducted burrowing owls and Swainson's hawk surveys along Jones and Lower Roberts Tract. Prepared weekly reports and interactions with EBMUD's biologist. Burrowing owl surveys were conducted during the early part of the breeding season and into the breeding season while upgrades were being performed as part of work extensions permitted by the CDFG.
- ✓ **Pacific Gas and Electric, Geothermal, Inc. Facility Closure Project, Middletown, California.** Conducted preconstruction survey, nesting bird surveys, photographic documentation, daily logs, reports, agency interaction, and monitored construction activities for CEQA/NEPA compliance for 12 months as part of the 3-year site closure procedures. Responsible for cultural monitors, permit requirements, removal of wetland donor soil, installation of wetland mitigation enhancement/creation, native seed collection, and planting of created pools and swales. Coordinated with USFWS and CDFG for the removal/relocation of several nesting birds within the project closure area during the breeding season. Prepared methodology procedures for the relocation of nesting avian species that were approved by the state and federal agencies. These removal/relocations allowed well-documented data of species when eggs were laid, duration of incubation, and potential for addled eggs.
- ✓ **Field Team Leader, U.S. Marine Corps Base, Camp Pendelton, San Diego County, California.** Field team leader for wetland and waters of the U.S. delineation for over 16 miles of stream corridors on one of four watersheds existing on the Base. Theses surveys were conducted using approved methodology by the Army Corp of Engineers' (USACE) Wetland Delineation Manual. Instructed and responsible for use of GeoXTt GPS units capable of submeter accuracy for recording various stream morphology data and stream channel locations along the 16 miles of waters and wetlands found within the study area. Completed an USACE-approved wetland delineation report from fieldwork conducted that was approved by a Base biologist as part of their Integrated Natural Resource Management Plan requirements.
- ✓ **On-Call Permitting Coordinator, Kinder Morgan Energy Partners, Northern California System.** Conducted permitting needs field surveys and monitoring. Developed field reports, permit applications, negotiated with agencies to obtain all required approvals.

Katy Oakes

Wildlife Biologist – CH2M HILL

Education

M.S., Resource Management, Central Washington University, 2002
B.S., Wildlife Biology, Colorado State University, 1998

Distinguishing Qualifications

- Experience in surveying for sensitive wildlife species: migratory birds, raptors, amphibians, reptiles, and mammalian species:
  - Expertise in prairie dog surveys (Utah, black-tailed, and white-tailed)
  - Expertise in using anabat equipment for bat surveys
- Experience in NEPA and environmental report writing
- Experience in using GPS to map various biological resources

Relevant Experience

Experience in preparation of biological resources reports and other environmental documents in accordance with National Environmental Policy Act (NEPA), Endangered Species Act (ESA), and Migratory Bird Treaty Act (MBTA). Experience in various survey techniques for analyzing and monitoring natural resources including sensitive wildlife species.

Representative Projects and Dates of Involvement

Project Manager, Momentum Energy Group Permit Compliance, June to December 2007. Managed financials and staff for $30,000 project. Conducted and oversaw monthly stormwater inspections for 12-mile natural gas pipeline. Coordinated and completed Compliance Certificate for USACE Nationwide Permits for pipeline.

Task Lead, Air National Guard Pest Management Plan, Pennsylvania, New Jersey, and Delaware Bases, August 2007 to April 2008. Led field visit and, using the previously developed guidebook and template, prepared pest management plan for New Castle Airport ANGB.

Team Member/Wildlife Biologist, Blundell 3 Geothermal Facility, Beaver County, Utah, August to October 2007. Conducted wildlife and habitat assessment of expansion site. Coordinated with BLM and prepared biological resources section of EA for project.

Wildlife Biologist, UNEV Pipeline, Washington, Iron, Beaver, and Millard Counties, Utah, July to September 2007. Conducted prairie dog surveys and waters of the U.S. surveys for pipeline right-of-way.

Team Member/Wildlife Biologist, Akron Wind Project, Washington, County, Colorado, May 2007 to May 2008. Conducted avian surveys for area.

Katy Oakes

Task Lead/Team Member/Wildlife Biologist, UPC Milford Wind Project, Beaver and Millard Counties, Utah, April 2007 to June 2008. Field survey manager for wildlife surveys. Developed survey protocols for project area, managed subcontractors, performed mammalian surveys including bats, Utah prairie dog, dark kangaroo mouse, kit fox, and pygmy rabbit. Assisted in compilation of Plan of Development for 300-MW wind farm and 90-mile, 345-kV transmission line. Prepared EA for project.

Team Member, Seven Mile Hill Wind Project, Wyoming, March 2007. Conducted initial field survey of area and assisted in Feasibility Report of project.

Task Lead/Team Member, Smoky Hill Air National Guard Base Environmental Assessment, Saline County, Kansas, November 2006 to November 2007. Prepared and managed EA for increased training efforts and construction projects on base.

Task Lead, U.S. Air Force Academy Association of Graduates Admissions Welcome Center Environmental Assessment, October 2006 to December 2007. Prepared and managed EA for construction of new Admissions Welcome Center.

Team Member, DKRW Coal to Liquids Facility, Carbon County, Wyoming, April to August 2007. Completed Carbon County Conditional Use Permit application.

Wildlife Biologist, CCA Prison Expansion, California City, California, January to March 2007. Conducted burrowing owl surveys following specified protocol.

Team Member, NASA Space Shuttle Transition Environmental Assessment, November 2006 to November 2007. Wrote biological resources section of EA for several facilities ending participation in the Space Shuttle Program. Facilities are across the country including the West and Southeast.

Task Lead/Team Member, Air National Guard Pest Management Plan, August 2006 to April 2007. Prepared pest management plan for Rickenbacker/Zanesville ANGS, McEntire ANGB, and Fresno ANGB; prepared toolbox and sample outline for other installations to follow. Prepared pest management strategies for various pests found on ANG bases across the country.

Team Member/Wildlife Biologist, Fort Carson Transformation Environmental Impact Statement, Colorado, February 2006 to July 2007. Wrote biological resources section of document, facilitated public meetings, attended site visit, prepared administrative record, responded to comments, and assisted in other tasks as needed to complete EIS.

Team Member/Wildlife Biologist, Pinon Canyon Maneuver Site Transformation Environmental Impact Statement, Las Animas County, Colorado, February 2006 to July 2007. Wrote biological resources section of document, facilitated public meetings, attended site visit, responded to comments, and assisted in other tasks as needed to complete EIS.

Wildlife Biologist, Hobbs Generating Station, Lea County, New Mexico, October to May 2007. Led permitting efforts including USACE clearance, New Mexico Department of Game and Fish

consultation, State Land right-of-way, and road crossing permits. Conducted burrowing owl and sensitive wildlife species surveys for site.

Wildlife Biologist, Union Pacific Railroad Moffat Tunnel Biological Assessment, Colorado, October 2006. Conducted site visit and wrote report on biological condition of water release sites.

Wildlife Biologist, CTV-Casper Wind Project, Natrona County, Wyoming, April to July 2006. Conducted weekly site visits documenting bird use of area. Point count bird surveys and incidental wildlife observations noted.

Team Member, Sand Hills Wind Project, Laramie, Wyoming, August 2006. Conducted site visit for biological assessment of site for wind turbines.

Wildlife Biologist, RTD Light Rail Expansion - Longmont to Boulder, June 2006. Sensitive species surveys for raptors, black-tailed prairie dogs, and habitats on proposed route.

Wildlife Biologist, Twin Basin Gathering System, Rio Blanco County, Colorado, and Uintah County, Utah, June 2005 to July 2006. Served as lead wildlife biologist on 93-mile natural gas pipeline. Conducted field surveys including. threatened and endangered wildlife; raptors; Birds of Conservation Concern; and characterization of vegetation communities and habitats along pipeline corridor. Participated in interagency meetings and collaboration. Wrote Plan of Development and Environmental Assessment for project. Managed threatened, endangered, and sensitive plant survey work. Managed access permission for Tribal lands for all sub-contractors. Compiled data from private, state, federal, and tribal agencies, and produced GIS maps and analysis for all aspects of the project.

Wildlife Biologist, Confidential Pipeline, Mesa County, Colorado, August 2005 to September 2006. Served as lead wildlife biologist on 12-mile portion of a natural gas pipeline. Conducted appropriate wildlife surveys for ESA, MBTA, and Nationwide 404 Permit compliance. Participated in interagency meetings and collaboration.

GIS Analyst/ Wildlife Biologist, Confidential Power Project, Limon, Colorado, June to December 2005. Completed threatened, endangered, and sensitive species surveys for coal mining and power plant area more than 7,300 acres in size. Produced GIS maps for all aspects of the project.

Wildlife Biologist, Denver Federal Center Southern RTD Expansion, November 2005 to February 2006. Served as lead biologist on black-tailed prairie dog mitigation site. Developed study design, collected data, and made recommendations for timing of remediation activities.

Task Lead, Association of Graduates Heritage Trail, U.S. Air Force Academy, Colorado Springs, Colorado, July 2005 to February 2006. Conducted site visit to determine environmental issues. Prepared AF 813 and provided justification for CATEX applicability.

Team Member, Vehicle Maintenance Facility Project, Buckley Air Force Base, Aurora, Colorado, September 2005 to February 2006; December 2006. Conducted site visit to determine

environmental issues. Wrote EA for vehicle maintenance facility. Produced GIS figures for document.

Field Data Collector, White Pine Project, Ely, Nevada, August 2005. Conducted field studies on aquatic communities. Documented spring and wetland sites including discharge, local geomorphology, associated surface water features, general vegetation characteristics, and nature of potential water-collection/diversion infrastructure. Took GPS points and produced maps based on field observations.

Professional Organizations/Affiliations

- Member, The Wildlife Society- Colorado Chapter, 2003 - present
  - 2007 Board Member, Representative-At-Large
- Member, The Wildlife Society, 2002- present
- Member, Society for Conservation Biology, 2007
- Member, Society for the Study of Amphibians and Reptiles, 2005- 2006

Publications and Presentations

Public Lecture: "Assessment of Old Growth Ponderosa Pine Habitats in Naneum Creek Watershed." Yakima County Audubon Society. September 26, 2002.

Poster Presentation: "Assessment of White-headed Woodpecker Habitat in Central Washington." Pacific Ecology Conference. February 2002.

Reagan, K.J., 2002. "Assessment of Old Growth Ponderosa Pine Habitats in Naneum Creek Watershed, Washington." M.S. Thesis. Central Washington University, Ellensburg, WA.

Reagan, K. J., 2000. Researcher, "Cruelty Statutes United States. Campaign Against Violence." American Humane Association, Englewood, CO.

APPENDIX C

Plants Observed Within the Action Area

APPENDIX C

Plant Species Observed within the Ivanpah SEGS Project Area during the 2007 and 2008 Botanical Surveys (1-mile buffer not included).
Nomenclature from Baldwin et al., Editors, 2002, The Jepson Desert Manual, UC Press.

Plant Group / Family / Species [1]	Common Name	Solar Array Sites [2]		Other Project Areas [3]					Rocky Hills [4]		
		MCBS	MWS	Main Access Road	Utility Corridor	CLA	North BLM Acc Rd	Mining Claim Acc Rd	Lime-stone	Meta-morphic	Habit
Ferns											
Pteridaceae	Brake Family										
Cheilanthes parryi	Parry's cloak fern								o		fern
Gymnosperms (Conifers)											
Ephedraceae	Ephedra Family										
Ephedra nevadensis	Nevada ephedra	1,2,3	3		x	x	x	x	x o	x	shrub
Ephedra funerea	Death Valley ephedra	1,2,3			x				x o		shrub
Dicot Angiosperms (Flowering Plants)											
Amaranthaceae	Amaranth Family										
d Amaranthus fimbriatus	fringed amaranth	1,2,3	3	x	x	x	x				annual
Apocynaceae	Dogbane Family										
Amsonia tomentosa	woolly amsonia	1, 3	3		x	x	x				per
Asclepiadaceae	Milkweed Family										
Asclepias nyctaginifolia	Mojave milkweed	1,2,3	3		x	x					per
Cynanchum utahense	Utah vine milkweed	1,2,3	3								per
Asteraceae	Sunflower Family										
Acamptopappus sphaerocephalus	goldenhead	1,2,3			x	x	x				shrub
Adenophyllum cooperi	Cooper's dyssodia	1,2,3			x	x	x				per
Ambrosia dumosa	burrobush	1,2,3	3	x	x	x	x	x	x o	xo	shrub
Ambrosia eriocentra	woolly bursage	3	3		x		x				shrub
Amphipappus fremontii var. *spinosus*	Fremont's chaff-bush	1									shrub
Anisocoma acaulis	scale bud	2									annual
Baccharis brachyphylla	short-leaved baccharis	3									shrub
Baileya multiradiata var. *m.*	desert marigold	1, 3			x		x				annual
Bailey pleniradiata	woolly marigold	1,2,3		x		x					annual
Bebbia juncea var. *aspera*	sweetbush	1,2	3								shrub
Brickellia arguta var. *a.*	spearleaf brickellbush	3							o	o	shrub
Brickellia cf. *californica*	California brickellbush	3							o	o	shrub
Brickellia incana	woolly brickellbush	1, 2		x			x				shrub
Calycoseris parryi	yellow tack-stem	2									annual
Chaenactis carphoclinia	pebble pincushion	1,2,3			x	x	x				annual
Chaenactis fremontii	desert pincushion	1,2,3		x	x	x	x				annual
Chaenactis macrantha	Mojave pincushion	3									annual
Chaenactis stevioides	gray-leaved pincushion	2,3			x	x	x				annual

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Nomenclature from Baldwin et al., Editors, 2002, The Jepson Desert Manual, UC Press.

	Chrysothamnus paniculatus	black-banded rabbitbrush	1,2,3	3	x	x		x				shrub
	Cirsium cf. mohavense	Mojave thistle	1,2									annual
	Coleogyne ramosissima	blackbush	3			x		x				shrub
#	*Encelia farinosa*	brittlebush	3			x						shrub
	Encelia frutescens	rayless encelia	2									shrub
	Encelia virginensis	Virgin River brittlebush	1,2,3	3		x	x	x		x o		shrub
	Ericameria cooperi var. *c.*	Cooper's goldenbush	1,2,3		x	x				x		shrub
	Eriophyllum wallacei	Wallace's woolly daisy	1,2,3		x	x	x	x	x			annual
	Filago depressa	spreading filago	1,2,3					x				annual
	Glyptopleura marginata	holly dandelion	2									annual
	Gutierrezia microcephala	sticky snakeweed	2,3							x o		shrub
	Hymenoclea salsola	cheesebush	1,2,3	3	x	x	x	x	x	x		shrub
	Layia glandulosa	white tidy-tips	2,3			x						annual
	Malacothrix glabrata	desert dandelion	1,2,3		x	x	x					annual
	Monoptilon bellidiforme	small desert star	1,2,3									annual
	Monoptilon bellioides	desert star	1,2,3			x		x				annual
d	*Pectis papposa*	chinch-weed	1,2,3				x					annual
	Porophyllum gracile	slender poreleaf	1,2,3	3		x	x	x	x	x	x	per
	Psilostrophe cooperi	paper-daisy	1,3	3		x		x				sub-shrub
	Rafinesquia neomexicana	desert chicory	1,2,3			x	x	x				annual
	Senecio flaccidus var. *monoensis*	sand-wash groundsel	1,2,3	3		x	x	x				sub-shrub
	Sonchus sp.	sow thistle	2									
	Stephanomeria exigua	small wirelettuce	1,2,3									annual
	Stephanomeria pauciflora var. *p.*	wire-lettuce	1,2,3	3	x	x	x	x		o	x	per
	Stylocline micropoides	desert nest-straw	1,2,3			x		x				annual
	Thymophylla pentachaeta	thymophylla	1,2,3	3		x	x	x				per
	Uropappus lindleyi	silver puffs	3			x						annual
	Viguiera parishii	Parish's golden-eye	1,2,3			x						shrub
	Xylorhiza tortifolia	Mojave aster	3			x		x			x	per
Bignoniaceae		Bignonia Family										
	Chilopsis linearis	desert-willow		3		x		x				shrub/ tree
Boraginaceae		Borage Family										
	Amsinckia tessellata	checker fiddleneck	1,2,3			x	x	x				annual
	Cryptantha angustifolia	narrow-leaved cryptantha	1,2,3		x	x	x	x				annual
d	*Cryptantha* sp.	cryptantha	1,2,3							o	o	annual
	Cryptantha sp. 1	cryptantha									o	annual
	Cryptantha barbigera	fuzzy cryptantha	2,3									annual
	Cryptantha circumscissa	capped cryptantha	1,2,3					x				annual
	Cryptantha decipiens	gravel cryptantha	1									annual

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Nomenclature from Baldwin et al., Editors, 2002, The Jepson Desert Manual, UC Press.

	Cryptantha dumetorum	flexuous cryptantha	1,2,3	2		x	x					annual
	Cryptantha micrantha ssp. *m.*	purple-rooted cryptantha	1,2,3		x		x					annual
	Cryptantha nevadensis	Nevada cryptantha	1,2,3		x	x	x	x				annual
	Cryptantha pterocarya	wing-nut cryptantha	1,2,3			x	x	x				annual
	Cryptantha recurvata	curved cryptantha	1,3									annual
	Cryptantha utahensis	Utah cryptantha	1,2,3			x		x				annual
	Pectocarya heterocarpa	wing-nutted combseed	1,2,3		x	x	x	x				annual
	Pectocarya platycarpa	broad-fruited combseed	1,2,3		x		x	x				annual
	Pectocarya recurvata	curved combseed	3									annual
	Pectocarya setosa	round combseed	1,3									annual
	Plagiobothrys arizonicus	Arizona popcorn-flower	3									annual
	Plagiobothrys jonesii	Jones's popcorn-flower	2		x							annual
	Tiquilia canescens var. *c.*	gray coldenia	3			x	x	x				sub-shrub
Brassicaceae		Mustard Family										
*	*Brassica tournefortii*	Saharan mustard	3			x						annual
	Caulanthus cooperi	Cooper's jewelflower	1,2,3			x	x	x				annual
	Descurainia pinnata ssp. *glabra*	tansy mustard	1,2,3		x	x	x	x				annual
	Dithyrea californica	spectacle-pod	1,2,3		x		x					annual
	Draba cuneifolia	desert draba	1,2									annual
	Guillenia lasiophylla	California mustard	1,2,3		x		x					annual
	Lepidium fremontii	desert alyssum	1,2,3	3	x	x	x	x				sub-shrub
	Lepidium lasiocarpum var. *l.*	modest peppergrass	1,2,3		x	x	x	x				annual
*	*Sisymbrium irio*	London rocket	2		x							annual
	Streptanthella longirostris	long-beaked twist flower	1,2,3		x		x					annual
	Thysanocarpus curvipes	fringe-pod	3				x					annual
Buddlejaceae		Buddleja Family										
	Buddleja utahensis	Panamint butterfly bush								o		shrub
Cactaceae		Cactus Family										
	Coryphantha chlorantha	desert pincushion	1, 2, 3			x	x	x	x			shrub
	Echinocactus polycephalus var. *p.*	clustered barrel cactus	1, 2, 3			x	x	x		x o	o	shrub
	Echinocereus engelmannii	hedgehog cactus	1, 2, 3			x	x	x		x o	xo	shrub
	Ferocactus cylindraceus var. *lecontei*	California barrel cactus	1, 2, 3	3		x	x	x		o	xo	shrub
	Grusonia (=Opuntia) parishii	Parish's club cholla	1, 3				x					shrub
	Mammillaria tetrancistra	fish-hook cactus	1, 2, 3			x	x	x				shrub
	Opuntia acanthocarpa var. *coloradensis*	buckhorn cholla	1, 2, 3	3	x	x	x	x		x o	xo	shrub
	Opuntia basilaris var. *b.*	beavertail cactus	1, 2, 3		x	x	x	x		x		shrub

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Opuntia chlorotica	pancake prickly-pear	3					x			shrub
Opuntia echinocarpa	silver cholla	1, 2, 3		x	x	x	x	x	xo	shrub
Opuntia echinocarpa X *O. ramosissima*	hybrid silver X pencil cholla	3								shrub
Opuntia erinacea	Mojave prickly-pear	2, 3			x					shrub
Opuntia ramosissima	pencil cholla	1, 2, 3	3	x	x	x	x	x o		shrub
Campanulaceae	Bellflower Family									
Nemacladus glanduliferus	glandular thread-plant	1,2,3								annual
Nemacladus cf. gracilis	slender thread-plant	3								annual
Nemacladus cf. rubescens	yellow-flowered thread-plant	2								annual
Nemacladus sp. nov.	thread-plant	3								annual
Nemacladus sp.	thread-plant				x					annual
Celastraceae	Staff-tree Family									
Mortonia utahensis	Utah mortonia				x					shrub
Chenopodiaceae	Goosefoot Family									
Atriplex canescens ssp. *c.*	fourwing saltbush	3								shrub
Atriplex polycarpa	cattle spinach	2								shrub
Grayia spinosa	hop-sage	1,2								shrub
Krascheninnikovia lanata	winterfat	3								shrub
* *Salsola* sp.	Russian thistle			x						annual
Cuscutaceae	Dodder Family									
Cuscuta cf. californica	California dodder	1,2				x				parasitic
Euphorbiaceae	Spurge Family									
Chamaesyce albomarginata	rattlesnake weed	1,2,3	3	x	x	x	x			per
Chamaesyce micromera	Sonoran sand-mat	1,2				x				annual
d *Chamaesyce polycarpa*	golondrina	1,2								annual
Chamaesyce setiloba	Yuma spurge	1,2			x		x			annual
Fabaceae	Legume Family									
Acacia greggii	catclaw acacia	1,2,3	3		x	x	x	o		shrub
Astragalus acutirostris	keel-beak milk-vetch	3								annual
Astragalus lentiginosus var. *fremontii*	freckled milk-vetch	1,2,3				x				per
Astragalus nuttallianus var. *imperfectus*	Nuttall's milk-vetch	1,2,3								annual
Dalea mollisima	silk dalea	1,2,3		x	x	x	x			annual
Lotus strigosus var. *tomentellus*	stiff-haired lotus	1,2,3				x				annual
Lupinus brevicaulis	short-stemmed blue lupine	3					x			annual
Lupinus concinnus	bajada lupine	1,2,3				x				annual
Lupinus flavoculatus	yellow-eyed lupine	2								annual
Lupinus odoratus	royal desert lupine	3								annual
Geraniaceae	Geranium Family									

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Plant Species Observed within the Ivanpah SEGS Project Area during the 2007 and 2008 Botanical Surveys (1-mile buffer not included).
Nomenclature from Baldwin et al., Editors, 2002, The Jepson Desert Manual, UC Press.

* *Erodium cicutarium*	red-stemmed filaree	1,2,3		x	x	x	x			annual
Hydrophyllaceae	Waterleaf Family									
Eucrypta micrantha	desert eucrypta	1,2,3				x				annual
Nama demissum	purple mat	1,2,3								annual
Phacelia crenulata var. *ambigua*	purple phacelia	1,2,3		x	x	x	x			annual
Phacelia distans	common phacelia	2,3								annual
Phacelia fremontii	yellow-throats	1,2,3		x	x	x	x			annual
Phacelia perityloides	cliff phacelia							o		per
Phacelia rotundifolia	round-leaved phacelia							o		annual
Phacelia vallis-mortae	Death Valley phacelia	3			x		x			annual
Krameriaceae	Rhatany Family									
Krameria erecta	pima ratany	1,2,3		x	x	x	x	x o	xo	shrub
Lamiaceae	Mint Family									
Salvia columbariae	chia	1,2,3	3		x	x	x			annual
Salazaria mexicana	Mexican bladder sage	1,2,3	3		x	x	x	x o		shrub
Salvia dorrii	blue sage	1,2,3	3		x	x	x	x o		shrub
Loasaceae	Sandpaper-plant Family									
Eucnide urens	rock nettle							o		shrub
Mentzelia cf albicaulis	little blazing star	1,2,3		x	x	x	x			annual
Petalonyx thurberi ssp. *t.*	Thurber's sandpaper plant	2, 3	3				x			shrub
Malvaceae	Mallow Family									
Sphaeralcea ambigua	apricot mallow	1,2,3		x	x		x			per
Sphaeralcea rusbyi var. *eremicola*	Rusby's desert mallow	1,2,3			x					per
Molluginaceae	Carpet-weed Family									
d *Mollugo cerviana*	carpet-weed	1,2								annual
Nyctaginaceae	Four O'clock Family									
Allionia incarnata	windmills	1,2,3			x	x	x			per
d *Boerhavia triquetra*	slender spiderling	2								annual
d *Boerhavia wrightii*	Wright's spiderling	2,3		x	x	x	x			annual
Mirabilis bigelovii	wishbone bush	1,2,3					x			per
Mirabilis multiflora	giant four-o'clock	1,2,3				x	x			per
Oleaceae	Olive Family									
Menodora spinescens	spiny menodora	1,2,3			x		x	x o		shrub
Onagraceae	Evening Primrose Family									
Camissonia boothii ssp. *condensata*	woody bottle-washer	1,2,3		x	x	x	x		x	annual
Camissonia brevipes	yellow cups	2,3			x		x			annual
Camissonia cf. campestris	Inyo suncups				x					annual
Camissonia chamaenerioides	modest primrose	1,2,3								annual

APPENDIX C

Plant Species Observed within the Ivanpah SEGS Project Area during the 2007 and 2008 Botanical Surveys (1-mile buffer not included).
Nomenclature from Baldwin et al., Editors, 2002, The Jepson Desert Manual, UC Press.

Camissonia claviformis ssp. *aurantiaca*	brown-eyed primrose	1,2,3		x		x	x				annual
Camissonia refracta	narrow-leaved primrose	1,2									annual
Oenothera deltoides	birdcage	1									per
Oenothera primiveris ssp. *bufonis*	large yellow evening-primrose	1,2,3									per
Orobanchaceae	Broom-rape Family										
Orobanche cooperi	Cooper's broom-rape	1,2,3				x	x				parasitic
Papaveraceae	Poppy Family										
Eschscholzia glyptosperma	desert gold-poppy	1,2,3			x	x	x				annual
Eschscholzia minutiflora	little gold-poppy	1,2,3									annual
Plantaginaceae	Plantain Family										
Plantago ovata	woolly plantain	1,2,3			x		x				annual
Plantago patagonica	Patagonia plantain	1,2,3									annual
Polemoniaceae	Phlox Family										
Eriastrum diffusum	diffuse woolly star	2									annual
Eriastrum eremicum ssp. *e.*	desert woolly star	1,2,3		x		x	x				annual
Eriastrum sparsiflorum	few-flowered woolly star	3			x	x					annual
Gilia cana ssp. *speciformis*	showy gilia	2,3			x		x				annual
Gilia ophthalmoides	pinyon gilia	3									annual
Gilia sinuata	cinder gilia	1,2,3			x	x					annual
Gilia stellata	dotted-throat gilia	1,2,3									annual
Gilia transmontana	star gilia	1,2,3									annual
Gilia sp.	gilia				x						annual
Ipomopsis polycladon	spreading gilia	2,3									annual
Langloisia setosissima ssp. *punctata*	lilac sunbonnet	1,2,3			x		x				annual
Linanthus aureus	golden linanthus	1									annual
Linanthus bigelovii	Bigelow's linanthus	2									annual
Linanthus demissus	desert snow	1,2,3					x				annual
Linanthus jonesii	Jones's linanthus	1,2,3			x	x					annual
Loeseliastrum matthewsii	desert calico	2									annual
Loeseliastrum schottii	little sunbonnets	1,2,3			x						annual
Phlox stansburyi	cold-desert phlox	1									
Polygonaceae	Buckwheat Family										annual
Chorizanthe brevicornu	brittle spineflower	1,2,3		x	x	x	x				annual
Chorizanthe rigida	rigid spiny-herb	1,2,3		x	x	x	x		x	x	annual
Eriogonum brachypodium	glandular skeleton-weed	2,3			x		x				annual
Eriogonum deflexum	flat-topped buckwheat	3									annual
Eriogonum fasciculatum ssp. *polifolium*	Mojave Desert California buckwheat	1,2,3	3		x	x	x		x o	xo	shrub

APPENDIX C

Plant Species Observed within the Ivanpah SEGS Project Area during the 2007 and 2008 Botanical Surveys (1-mile buffer not included).
Nomenclature from Baldwin et al., Editors, 2002, The Jepson Desert Manual, UC Press.

Eriogonum inflatum var. *i.*	desert trumpet	1,2,3			x	x	x		x o	xo	per
Eriogonum maculatum	spotted buckwheat	1,2,3									annual
Eriogonum nidularium	birdnest buckwheat	2,3				x	x				annual
Eriogonum palmerianum	Palmer's buckwheat	2									annual
Eriogonum pusillum	yellow turbans	1,2,3				x					annual
Eriogonum thomasii	Thomas's buckwheat	1									annual
d *Eriogonum* sp.	annual buckwheat	3		x							annual
Eriogonum trichopes	little desert trumpet	1,2,3			x						annual
Portulacaceae	Portulaca Family										
Calyptridium monandrum	sand cress	2									annual
Rosaceae	Rose Family										
Coleogyne ramosissima	blackbush	1, 3			x		x		o		shrub
Prunus fasciculata	desert almond	1,2,3	3				x		x o		shrub
Rutaceae	Rue Family										
Thamnosma montana	turpentine-broom	3							o		shrub
Scrophulariaceae	Figwort Family										
Antirrhinum filipes	twining snapdragon	1,2,3					x				annual
Castilleja angustifolia	desert paintbrush	3			x						per
Mimulus bigelovii	Bigelow's monkeyflower	2,3			x		x				annual
Penstemon palmeri	Palmer's penstemon	1,3	3		x	x					per
Solanaceae	Nightshade Family										
Lycium andersonii	Anderson's box-thorn	1,2,3	3	x	x	x	x		x o	xo	shrub
Lycium cooperi	Cooper's box-thorn	1,2,3		x	x	x			x o		shrub
Nicotiana obtusifolia	desert tobacco	1,2,3					x		o	o	per
Physalis crassifolia	thickleaf ground-cherry	3					x			o	per
Viscaceae	Mistletoe Family										
Phoradendron californicum	desert mistletoe	1,2,3	3		x	x	x				parasitic
Zygophyllaceae	Caltrop Family										
d *Kallstroemia californica*	California caltrop	1,2				x					annual
* *Kallstroemia cf. parviflora*	few-flowered caltrop	1,2									annual
Larrea tridentata	creosote bush	1,2,3	3	x	x	x	x	x	x o	xo	shrub
Monocot Angiosperms (Flowering Plants)											
Liliaceae	Lily Family										
Androstephium breviflorum	small-flowered androstephium	1,2									per
Yucca schidigera	Mojave yucca	1,2,3	3	x	x	x	x	x	x o		shrub
Poaceae	Grass Family										
Achnatherum speciosum	desert needlegrass	1,2,3			x	x	x				per
Aristida adscensionis	six-weeks three-awn	1,2,3			x	x	x		o	o	annual
Aristida purpurea	purple three-awn	1,2,3			x	x	x		o		per
d *Bouteloua aristidoides* var. *a.*	needle grama	2									annual

APPENDIX C

Plant Species Observed within the Ivanpah SEGS Project Area during the 2007 and 2008 Botanical Surveys (1-mile buffer not included).
Nomenclature from Baldwin et al., Editors, 2002, The Jepson Desert Manual, UC Press.

d	*Bouteloua barbata*	six-weeks grama	1,2,3		x	x	x	x				annual
*	*Bromus madritensis* ssp. *rubens*	red brome	1,2,3	x	x	x	x	x	x	x o	xo	annual
*	*Bromus tectorum*	cheat grass	1,2,3				x					annual
d	*Enneapogon desvauxii*	nine-awned pappus grass	1,2,3			x	x	x				annual
	Erioneuron pulchellum	fluff grass	1,2,3		x	x	x	x		x o	o	per
	Muhlenbergia microsperma	little-seed muhly	2			x						per
	Muhlenbergia porteri	Porter's muhly	1,2,3			x	x	x				per
	Pleuraphis rigida	big galleta	1,2,3		x	x	x	x		x	xo	per
*	*Schismus* sp.	Mediterranean grass	1,2,3	x	x	x	x	x	x	x	xo	annual
	Vulpia octoflora var. *hirtella*	six-weeks fescue	1,2,3			x	x	x				annual

Footnotes:

[1] * = introduced species (not native to California)

\# = California native species not native to area; probably planted during restoration work on Kern River Pipeline

d = annual species observed only as dead plants from previous year (noted for annual species only)

[2] Species observed in proposed solar array sites were recorded by plant community and by site:

MCBS = Mojave creosote bush scrub plant community
MWS = Mojave wash scrub plant community
1 = species present in the southern site, Ivanpah 1
2 = species present in the middle site, Ivanpah 2
3 = species present in the northern site, Ivanpah 3

[3] Other proposed project areas surveyed outside of the solar array sites include:

Access Road = unpaved access road, along Colosseum Road west from the paved golf course road to the junction with the electrical transmission line access road east of the middle site
Utility Corridor = proposed utility corridor extending north from Ivanpah 3
CLA (Construction Logistics Area) = This area will include up to 10 single-wide full-length trailer offices or equivalent, chemical toilets, and parking for 200 vehicles. Additionally, it will be used during construction as a laydown area, equipment storage, and materials fabrication.
x = species present in the survey area

[4] Two rocky hills occur near the middle and northern solar array sites:

Limestone hill = hill of gray limestone located on the west edge of the northern site; an intensive survey was conducted over most of the limestone hill outside of the buffer zone in 2007
Metamorphic hill = large hills of red and black metamorphic rock located at the southeastern edge of the northern site and just north and northeast of the middle site; no intensive survey was conducted of the metamorphic hill outside the buffer zone
x = species present on hill within the northern site 250-foot buffer zone (2007)
o = species present on hill outside of the northern site 250-foot buffer zone, and out of the project area (2007)

APPENDIX D

Wildlife Species Observed in the Action Area during 2007 and 2008 Biological Surveys

Appendix D
Wildlife Species Observed in the Action Area during 2007 and 2008 Biological Surveys

Scientific Name	Common Name
BIRDS	
ORDER:CICONIIFORMES	**FLAMINGOS, HERONS AND STORKS**
Ardeidae	**Herons**
Ardea herodias	Great Blue Heron
ORDER: FALCONIFORMES	**HAWKS AND VULTURES**
Accipitiridae	**Hawks**
Aquila chrysaetos	Golden Eagle
Buteo jamaicensis	Red-tailed Hawk
Falconidae	**Falcons**
Falco sparverius	American Kestrel
ORDER: STRIGIFORMES	**OWLS**
Strigidae	**Typical Owls**
Athene cunicularia hypugaea	Western burrowing owl
ORDER: COLUMBIFORMES	**DOVES AND PIGEONS**
Columbidae	**Pigeons and Doves**
Zenaida macroura	Mourning Dove
ORDER: CAPRIMULGIFORMES	**NIGHTJARS**
Caprimulgidae	**Goatsuckers**
Chordeiles acutipennis	Lesser Nighthawk
ORDER: APODIFORMES	**HUMMINGBIRDS AND SWIFTS**
Apodidae	**Swifts**
Aeronautes saxatalis	White-throated Swift
Chaetura vauxi	Vaux's Swift
ORDER: PASSERIIFORMES	**PASSERINES AND PERCHING BIRDS**
Tyranidae	**Flycatchers**
Sayornis saya	Say's Phoebe
Tyrannus verticalis	Western Kingbird
Myiarchus crinitus	Ash-throated flycatcher
Hirundinidae	**Swallows**
Hirundo rustica	Barn Swallow
Tachycineta thalassina	Violet-green Swallow
Corvidae	**Jays, Magpies, and Crows**
Corvus corax	Common Raven
Alaudidae	**Larks**
Eremophila alpestris	Horned lark
Paridae	**Chicadees, Titmice**
Auriparus flaviceps	Verdin
Troglotytidae	**Wrens**
Campylorhynchus brunneicapillus	Cactus Wren
Muscicapidae	**Kinglets, gnatcatchers, thrushes**
Polioptila caerulea	Blue-gray gnatcatcher
Polioptila melanura	Black tailed gnatcatcher
Mimidae	**Mimic Thrashers**
Oreoscoptes montanus	Sage Thrasher
Toxostoma crissale	Crissal Thrasher
Toxostoma lecontei	LeConte's Thrasher
Laniidae	**Shrikes**
Lanius ludovicianus	Loggerhead Shrike
Emberizidae	**Emberizids**
Amphispiza bilineata	Black-throated Sparrow
Amphispiza belli	Sage sparrow
Icterus parisorum	Scott’s oriole
Icterus galbula bullockii	Northern Oriole

Appendix D
Wildlife Species Observed in the Action Area during 2007 and 2008 Biological Surveys

Scientific Name	Common Name
Spizella breweri	Brewer's Sparrow
Dendroica caerulescens	Black-throated Gray Warbler
Dendroica coronata	Yellow-rumped warbler
Dendroica townsendi	Townsend's warbler
Vermivora celata	Orange-crowned Warbler
Wilsonia pusilla	Wilson's Warbler
Fringillidae	**Finches**
Carduelis psaltria	Lesser Goldfinch
Carpodacus mexicanus	House Finch
MAMMALS	
ORDER: CARNIVORA	**FLESH-EATERS**
Mustelidae	**Weasels, Skunks, etc.**
Taxidea taxus	American Badger
Canidae	**Dogs, wolves, and foxes**
Canis latrans	Coyote
Vulpes macrotis	Kit Fox
ORDER: RODENTIA	**GNAWING MAMMALS**
Sciuridae	**Squirrels**
Ammospermophilus leucurus	Whitetail antelope squirrel
Heteromyidae	Kangaroo Rats, Kangaroo Mice, and Rock Pocket Mice
Dipodomys merriami	Merriam's kangaroo rat
Cricetidae	**New World Rodents**
Neotoma lepida	Desert woodrat
ORDER: LAGOMORPHA	**PIKAS, HARES, AND RABBITS**
Leporidae	**Hares and Rabbits**
Lepus californicus	Black-tailed Jackrabbit
Sylvilagus audubonii	Audubon's Cottontail
ORDER: ARTIODACTYLA	**EVEN-TOED HOOFED MAMMALS**
Bovidae	**Bison, goats, muskox, and sheep**
Bos Taurus	Domestic Cow
ORDER: PERISSODACTYLA	**ODD-TOED UNGULATES**
Equidae	**Horse-like animals**
Equus asinus	Feral Burro
REPTILES	
ORDER: TESTUDINES	**TURTLES**
Testudinidae	**Land Tortoises**
Gopherus agassizii	Desert Tortoise
ORDER:SQUAMATA	**LIZARDS AND SNAKES**
Iguanidae	**Iguanids**
Callisaurus draconoides	Zebra-tailed Lizard
Crotaphytus collaris	Common Collared Lizard
Dipsosaurus dorsalis	Desert Iguana
Uta stansburiana	Side-blotched Lizard
Sceloporus grasiosus	Sagebrush lizard
Teiidae	**Whiptails**
Cnemidophorus tigris	Western Whiptail
Phrynosoma platyrhinos	Desert horned lizard
Viperidae	**Pit Vipers**
Crotalus cerastes	Sidewinder

APPENDIX E

2008 Desert Tortoise Survey Report for Additional Ivanpah SEGS Action Area

PRESENCE/ABSENCE SURVEY FOR THE DESERT TORTOISE *(Gopherus agassizii),* on the proposed IVANPAH SOLAR ELECTRIC GENERATING SYSTEM in Ivanpah Valley, San Bernardino County, California

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Prepared for:

CH2MHill, Inc.
West Region, Environmental Services
2485 Natomas Park Drive, Suite 600
Sacramento, California 95833

Prepared by:

Sundance Biology, Inc.
179 Niblick Rd. PMB 272
Paso Robles, CA 93446

Mercy Vaughn • (928) 380-5507 • manydogs10@aol.com Stephen Boland • (928) 380-8850 • spboland@aol.com

EXECUTIVE SUMMARY

As recommended in the US Fish and Wildlife Service (USFWS) *Survey Protocol for any Non-Federal Action that may Occur within the Range of the Desert Tortoise, January 1992,* a desert tortoise *(Gopherus agassizii)* presence or absence survey was conducted on 1.6 miles of access road and 13 non-contiguous areas immediately adjacent to the proposed Ivanpah Solar Electric Generating System project site in Ivanpah Valley, San Bernardino County, California. These areas comprise a total of 726 acres all of which could support desert tortoise activity. The access road and 13 areas are additional acreage to the original 3,870 acres surveyed in 2007.

The delineated area was surveyed for desert tortoises and tortoise sign. No Zone of influence (ZOI) transects were conducted, as requested by the proponent, since they were done in 2007 during the survey of the initial 3,870 acres. Three individual tortoises were found onsite, one each in Areas 1, 2, and 13.

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INTRODUCTION

This report addresses the results of a presence/absence survey for the desert tortoise on the additional areas of the proposed Ivanpah Solar Electric Generating System in San Bernardino County, California.

The proposed project is located west of Ivanpah Lake bed and U.S. Interstate 15 in Ivanpah Valley, CA approximately 4.5 miles southwest of Primm, NV on the California-Nevada State line where it intersects U.S. Interstate 15. The site includes portions of Sections 20-22, 27-29, 33-34, T17N, R14E and portions of Sections 2, 3, 4, 10, and 11, T16N, R14E, (Ivanpah Lake, CA quadrangle, 7.5 minute series). The elevation of the proposed project site is between 2,750 ft to 3,450 ft above mean sea level (Figure 1).

A total of 726 acres were surveyed for desert tortoises and tortoise sign between May 15 and May 20, 2008. No Zone of influence (ZOI) transects were conducted, as requested by the proponent, since they were done in 2007 during the survey of the initial 3,870 acres. Additionally, all wildlife species and their sign were noted.

METHODOLOGY

Survey Methodology

The following methodology was used to increase efficiency in determining presence or absence of desert tortoises through systematic search and location of tortoises, their burrows and other sign. This methodology has proven accurate on other large-scale presence/absence surveys.

Teams consisting of two or three experienced desert tortoise biologists conducted the survey between May 20 and May 25, 2008 by walking a set of transects that covered each of the 13 survey areas plus the access road. Transect spacing was at 30 feet between transect centerlines, the standard width for desert tortoise presence/absence surveys.

A set of UTM coordinates for transect endpoints for virtual north-south or east-west transects were calculated. This resulted in 390 transects ranging from 1,000-6,800 feet in length. Lowrance iFinder handheld global positioning system (GPS) units were used to navigate transects.

One member of the team was responsible for navigating the selected transects. The other members surveyed 30 feet to either side of the navigator. When the end of each transect was reached, the team shifted to the adjacent transects and the navigator programmed the beginning and ending point of the team center transect for the next trip.

Team members focused on a search area that included 15 feet on either side of them. The members of the team remained close to one another without leading or lagging in order to increase the precision of searching. Team members were instructed to search beneath every shrub.

ZOI Transects

ZOI transects are typically conducted in suitable tortoise habitat to the east, west, north, and south of the survey area at 100, 300, 600, 1,200, and 2,400 feet from the survey area perimeter. Since these were done in 2007 around the original 3,870 acres the proponent requested that they not be repeated for this survey (Figure 2).

Data Recorded

Any tortoise or large mammal burrows encountered that could potentially be used by tortoises were visually inspected. Very small burrows that could be potentially used by juvenile tortoises but are much more often rodent burrows were also visually checked when encountered. Only definitive tortoise sign was recorded. All other wildlife species encountered were noted.

Biological Field Team

The biological team for the survey included Christine Halley, Colin Spake, Ashley Spenceley, Debbie Vaughn, and Jenny Weidensee. The survey was managed by Mercy Vaughn.

RESULTS

Survey Area

The survey area ranged in elevation from 2,750 ft to 3,450 ft and is characterized by creosote-bursage desert scrub. Acreages of the areas surveyed are as follows:

Area 1	52.63 acres
Area 2	32.03 acres
Area 3	218.25 acres
Area 4	35.43 acres
Area 5	55.14 acres
Area 6	32.62 acres
Area 7	31.56 acres
Area 8	56.02 acres
Area 9	98.57 acres
Area 10	24.61 acres
Area 11	20.52 acres
Area 12	7.72 acres
Area 13	40.61 acres
Access road	20 acres

The geomorphology of the survey area ranges from lower bajada at the southeast end of the site with predominantly sandy loam soils to upper bajada at the northwest end with predominantly sandy loam to gravel-cobble soil. Human impacts within the survey area include dirt roads, trash dump sites, and OHV trails.

The condition of the desert scrub is generally good. Plants seen on the site are shown in Table 1. Dominant perennials include creosote bush, bursage, and Mohave yucca. Annual vegetation production appeared to be higher than last year, a low production year.

Desert tortoise sign found are listed in Table 2 and shown in Figure 2. All other wildlife sightings are listed in Tables 3 to 5.

Desert Tortoise

Three live, adult desert tortoises were found onsite, one each in Areas 1, 2, and 13. All three tortoises were adults, two males and one female. The male found in Area 13 was found at the base of a Mojave yucca and appeared healthy. The male found in area 2 was face down in a burrow. Its health could not be determined. The female found in Area 1 was face out in a burrow and appeared healthy. Two sets of tortoise tracks were found one in Area 2 and one in Area 10. The tracks in Area 2 were of an adult tortoise. The tracks in Area 10 were from an immature sized tortoise.

Twenty shell-skeletal remains were found onsite, two of which were juveniles. One juvenile was depredated this year, evidence that reproduction may be occurring on the site. Time since death for 16 of the remains is greater than 4 years, 2 to 4 years for two others and less than 1 year for an adult and the juvenile mentioned above. Remains were found in Areas 1 to 6, 8, 9, and 12.

Thirty tortoise burrows and one pallet were identified onsite. Five of the burrows had tortoise scat in or adjacent to the burrow. Burrows were found in Areas 1, 2, 4, 8, 9, 10, 13, and the access road. The pallet was found in Area 5. Twenty-two of the burrows appeared to be in good condition of which seven have been recently used.

Twenty-four scat events were identified not including those associated with burrows. Twenty-one of these were laid down this year. The scat was found in Areas 1, 2, 3, 5, 6, 8, 9, 10, and 12.

DISCUSSION

Desert Tortoise

The proposed Ivanpah Solar Electric Generating System project site lies well within the desert tortoise's geographic range. Recent tortoise sign was found in all survey areas except Area 7. All size classes were represented in the recent tortoise sign found including two juvenile shell remains with time since death within the last 2 years. Based on the number of good burrows found, tracks, and recent scat it is likely that more tortoises are using this area than the three found. It is not surprising that more tortoises were not found due to the long narrow shape of the areas surveyed. More tortoises are likely nearby outside the survey area boundaries. Indications are that tortoises are active throughout this valley and have been reproducing suggesting a viable population within the project area.

The proposed Ivanpah Solar Electric Generating System project would have both direct and indirect impacts on desert tortoises on the site and tortoises in the area. Since tortoises use the site indirect impacts would occur through loss of habitat. Direct impacts could occur during construction if a tortoise wanders onto the site and is either injured or killed.

In addition to loss of habitat, the tortoises located onsite would have to be translocated to an appropriate area offsite. The effectiveness of translocation of tortoises is still being researched. Both the translocated tortoises as well as the tortoises located on the recipient site could be affected. This effect could be minimized by translocation within the current home range of tortoises cleared from the site. The long-term use of the site may pose a risk to any tortoises wandering into the area if permanent tortoise proof fencing is not installed and maintained.

MITIGATION RECOMMENDATIONS

Desert Tortoise

In order to mitigate potential direct impacts, the following recommendations will help minimize the potential for "take" of tortoises during and after construction.

1). Develop a translocation plan for the desert tortoises onsite.

2). Develop a biological monitoring plan in consultation with the CEC, USFWS and the CDFG. This plan would delineate all measures to be implemented prior to, during and post-construction which would include but are not limited to the following measures:

a). Permanent and or temporary tortoise-proof fencing (1"x 2" mesh hardware cloth) may need to be erected and maintained between the interface of the project area and any remaining desert tortoise habitat prior to initiating construction and clearance surveys for desert tortoises onsite. The fence will prevent tortoises from wandering onto the site both during construction as well as during use of the facility. Ongoing maintenance of the fencing would be recommended with oversight by an authorized biologist. Fence installation should be monitored by a qualified tortoise biologist.

b). If tortoises are to be cleared from the site it is recommended tortoise clearance surveys be conducted at 15-foot intervals. It is recommended that two coverages without finding any tortoises or new tortoise sign be conducted prior to declaring the site clear of tortoises. All burrows that could provide shelter for a desert tortoise should be excavated during the first clearance survey.

c). All construction personnel should undergo desert tortoise awareness training

d). After the tortoise proof-fence is erected a qualified biologist(s) should remain onsite until all vegetation is cleared and, at a minimum, conduct site and fence inspections on a bi-weekly basis throughout construction in order to maintain compliance with mitigation measures.

e). A qualified biologist(s) should be onsite to survey for tortoises immediately in front of vegetation clearance activities in the event a tortoise was inadvertently missed during clearance surveys.

f). A biologist should remain on-call throughout construction in the event a tortoise wanders onto the site.

g). A raven management plan should be developed for the project site.

Table 1. Dominant Plant Species

Latin Name	Common name
ASTERACEAE	**Composite Family**
Ambrosia dumosa	Burrobush
Chaenactis fremontii	Desert pincushion
Encelia virginensis	
Ericameria cooperi var. c.	Cooper's goldenbush
Hymenoclea salsola	Cheesebush
Psilostrophe cooperi	Paper-flower
Stephanomeria pauciflora	Wire-lettuce
ASCLEPIADACEAE	**Milkweed Family**
Asclepias nyctaginifolia	Mojave milkweed
Cynanchum utahense	Utah cynanchum
APOCYNACEAE	**Dogbane Family**
Amsonia tomentosa	Small-leaved amsonia
Cryptantha sp.	
BORAGINACEAE	**Borage Family**
Amsinckia tessellata	Devil's lettuce
BRASSICACEAE	**Mustard Family**
Descurainia pinnata ssp. Glabra	Yellow tansy mustard
Dithyrea californica	Spectacle-pod
Lepidium fremontii	Desert alyssum
Lepidium lasiocarpum var. l.	
CACTACEAE	**Cactus Family**
Echinocactus polycephalus	Cottontop cactus
Echinocerus engelmannii	Hedgehog cactus
Escobaria vivipara	Beehive cactus
Ferocactus cylindraceus	California barrel cactus
Mammillaria tetrancistra	Corkseed cactus
Opuntia acanthocarpa	Buckhorn cholla
Opuntia basilaris	Beavertail cactus
Opuntia echinocarpa	Golden cholla
Opuntia parishii	Mat cholla
Opuntia ramosissima	Diamond cholla
EPHEDRACEAE	**Ephedra Family**
Ephedra nevadensis	Nevada joint-fir
EUPHORBIACEAE	**Spurge Family**
Chamaesyce albomarginata	Spurge
FABACEAE	**Legume Family**
Acacia greggii	Catclaw
GENTIANACEAE	**Gentian Family**
Erodium cicutarium	Filaree

Table 1. Dominant Plant Species	
HYDROPHYLLACEAE	**Waterleaf Family**
Phacelia sp.	
LAMIACEAE	**Mint Family**
Salazaria mexicana	Bladder sage
Salvia dorrii	
LILIACEAE	**Lily Family**
Yucca schidigera	Mohave yucca
LOASACEAE	**Loasa Family**
Mentzelia sp.	
ONAGRACEAE	**Primrose Family**
Camissonia sp.	Sun cup
POACEAE	**Grass Family**
Achnatherum hymenoides	Indian rice grass
Achnatherum speciosum	Needle grass
Erioneuron pulchellum	Split grass
Enneapogon desvauxii	Pappus grass
POLEMONIACEAE	**Phlox Family**
Eriastrum sp.	
Gilia sp.	
POLYGONACEAE	**Buckwheat Family**
Chorizanthe rigida	Spiny-herb
Chorizanthe brevicornu	Brittle spineflower
Eriogunum fasciiculatum ssp. polifolium	California buckwheat
Eriogonum inflatum var. inflatum	Desert trumpet
SOLANACEAE	**Nightshade Family**
Lycium andersonii	Anderson thornbush
Lycium cooperi	Peach-thorn
ZYGOPHYLLACEAE	**Caltrop Family**
Larrea tridentata	Creosote

Table 2. Desert Tortoise and Sign Locations (Datum NAD 27 CONUS)

Sign	Area	Easting	Northing	Notes
burrow	1	641268	3932429	fresh tracks
burrows	1	641149	3932434	
burrow	1	641466	3932454	
burrow	1	640855	3932455	
burrow with scat	1	641148	3932445	
scat	1	641128	3932416	
scat	1	641249	3932431	
scat	1	641381	3932460	
scat	1	641434	3932463	

Table 2. Desert Tortoise and Sign Locations (Datum NAD 27 CONUS)				
scat	1	641436	3932463	within 10' of previous scat
scat	1	641452	3932467	
tortoise in burrow	1	641465	3932496	adult female, MCL ~190, in burrow but looks healthy
shell-skeletal remains	2	639438	3932604	fragments
shell-skeletal remains	2	639381	3932970	fragments
shell-skeletal remains	2	639426	3933879	fragments
shell-skeletal remains	2	639111	3937972	juvenile
scat	2	639371	3933602	
tortoise in burrow	2	639421	3933349	adult male, ~240 MCL, facing into burrow health unknown.
tracks	2	639444	3933915	
shell-skeletal remains	3	639177	3933969	female, ~230 MCL
shell-skeletal remains	3	639287	3934312	sub-adult
scat	3	639305	3934105	
burrow	4	640104	3934948	
shell-skeletal remains	4	639990	3934925	female
shell-skeletal remains	4	640048	3934942	female
shell-skeletal remains	5	637757	3934829	
shell-skeletal remains	5	637841	3936387	
pallet	5	637766	3936089	adult
Shell-skeletal remains	6	637206	3456579	
Scat	6	638193	3936544	
Burrow	8	636846	3939045	Adult, w/ scat
Burrow	8	636852	3939049	Adult
Burrow	8	636411	3939011	under yucca, much scat inside
Burrow	8	636858	3939047	caliche cave
Burrow	8	636818	3939069	Adult, series of caves w/scat
Burrow	8	636584	3938990	
Burrow	8	636845	3939046	Adult, caliche cave
Burrow	8	636837	3939052	
Burrow	8	636494	3938954	Adult
Burrow	8	636128	3938969	Adult
Burrow	8	636797	3939073	1 pc bone on apron
Burrow	8	636273	3939120	Adult
Burrow	8	636290	3939116	Adult
Burrow	8	636929	3939222	Adult
Shell-skeletal remains	8	636797	3939073	1 piece only
Shell-skeletal remains	8	636393	3939082	1 piece only, assoc. w/ packrat midden
Shell-skeletal remains	8	636954	3939040	Male est MCL 240
Shell-skeletal remains	8	636229	3939147	Adult,est MCL 255 mm, Some tissue remains (tail, legs), ants

Table 2. Desert Tortoise and Sign Locations (Datum NAD 27 CONUS)				
				scavenging
Shell-skeletal remains	8	636396	3939218	Adult
Scat	8	636606	3939005	Adult
Scat	8	636649	3939023	Adult
Scat	8	636761	3939034	Adult
Scat	8	636341	3939111	in wash bottom
Scat	8	636634	3939008	3 pieces adult, 2 pieces sub-adult
Scat	8	636086	3938595	0.18mi S of area 8
Scat	8	636411	3939018	
Scat	8	636904	3939250	3 pieces
burrow	9	638618	3939471	
shell-skeletal remains	9	638638	3939277	
shell-skeletal remains	9	638501	3939501	scutes attached
scat	9	638101	3939327	
scat	9	637865	3939378	
scat	9	637706	3939385	2 pieces
scat	9	637818	3939400	
burrow	10	639040	3936967	
scat	10	638866	3937963	
scat	10	638891	3938976	
tracks	10	638861	3937962	immature size
burrow	11	639135	3937503	
burrow	11	639115	3937649	
burrow	11	639123	3937592	
burrow with scat	11	639054	3937472	
shell-skeletal remains	11	639153	3937318	whole juvenile carcass
shell-skeletal remains	12	639056	3936914	with scutes
scat	12	639102	3936998	6 pieces
Burrow	13	636781	3940531	
Burrows and scat	13	636847	3940654	burrows in wash w/ scat
Tortoise	13	636707	3940608	Male, est MCL 250 mm, sinking scutes vertebral & costal, @ base of yucca
burrow	Access road	640575	3935115	old, unoccupied, in need of repair
burrow	Access road	640541	3935110	sub-adult size

Table 3. Mammal Species

Scientific Name	Common name
Dipodomys merriami	Merriam's kangaroo rat
Desert woodrat	Wood rat
Amnospermophilus leucurus	White-tailed antelope ground squirrel
Lepus californicus	Black-tailed jackrabbit
Sylvilagus audubonii	Desert cottontail
Canis latrans	Coyote
Vulpes macrotis	Kit fox
Homo sapiens	Human
Equus asinus	Wild Burro

Table 4. Reptile Species

Scientific Name	Common Name
Gopherus agassizii	Desert tortoise
Phrynosoma platyrhinos	Desert horned lizard
Gambelia wislizenii	Longnose leopard lizard
Sceloporus grasiosus	Sagebrush lizard
Callisaurus draconoides	Zebratail lizard
Cnemidophorus tigris	Western whiptail lizard

Table 5. Bird Species

Scientific Name	Common Name
Buteo jamaicensis	Red-tailed hawk
Zenaida macroura	Mourning dove
Myiarchus crinitus	Ash-throated flycatcher
Lanius ludovicianus	Loggerhead shrike
Corvus corax	Common raven
Eremophila alpestris	Horned lark
Campylorhynchus brunneicapilus	Cactus wren
Polioptila melanura	Black tailed gnatcatcher
Amphispiza bilineata	Black-throated sparrow
Amphispiza belli	Sage sparrow
Icterus parisorum	Scott's oriole

Figure 1. Ivanpah Solar Electric Generating System project site in Ivanpah Valley, CA.

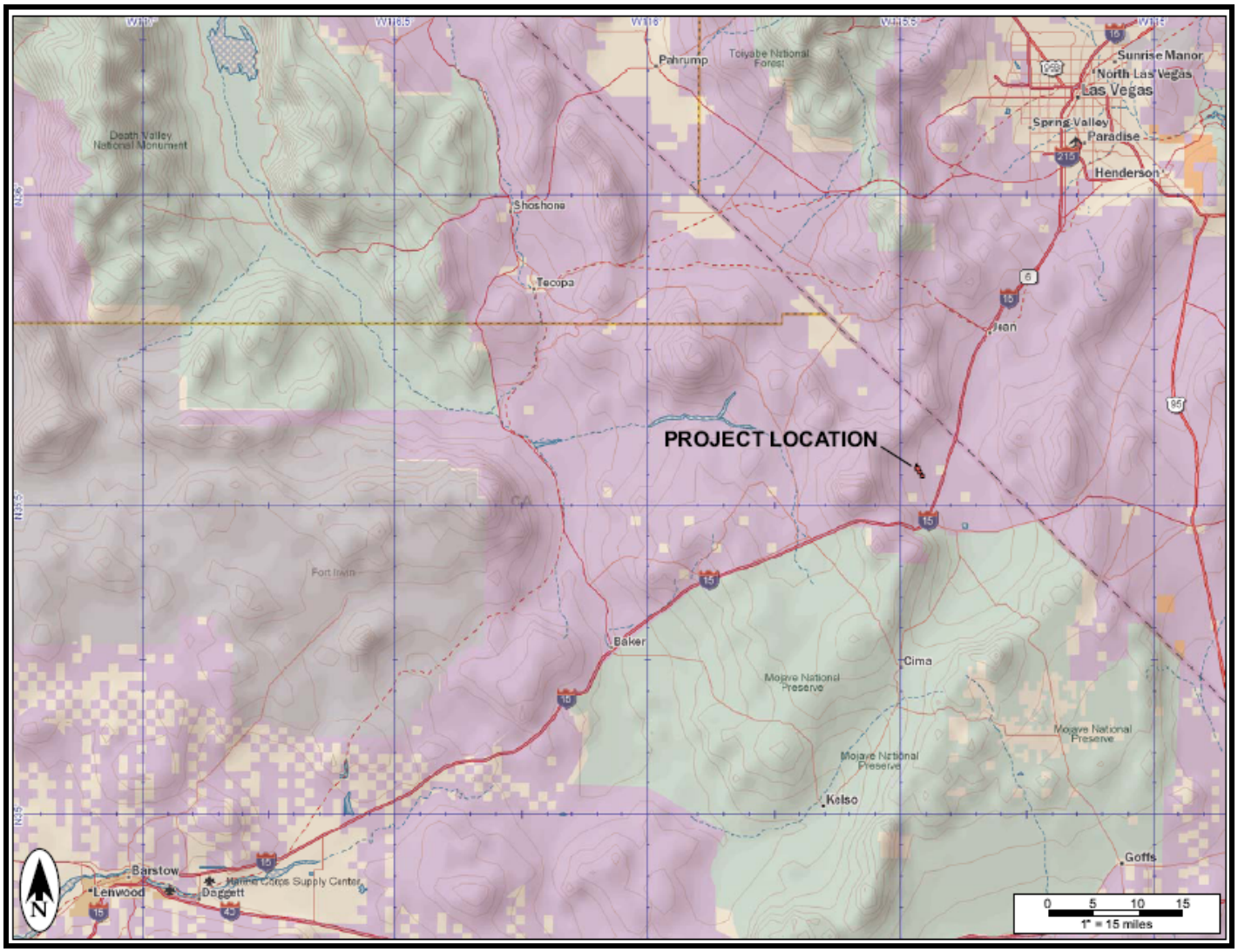

Figure 2. Desert tortoise survey area and sign encountered on the Ivanpah Solar Electric Generating System project site in Ivanpah Valley, CA.

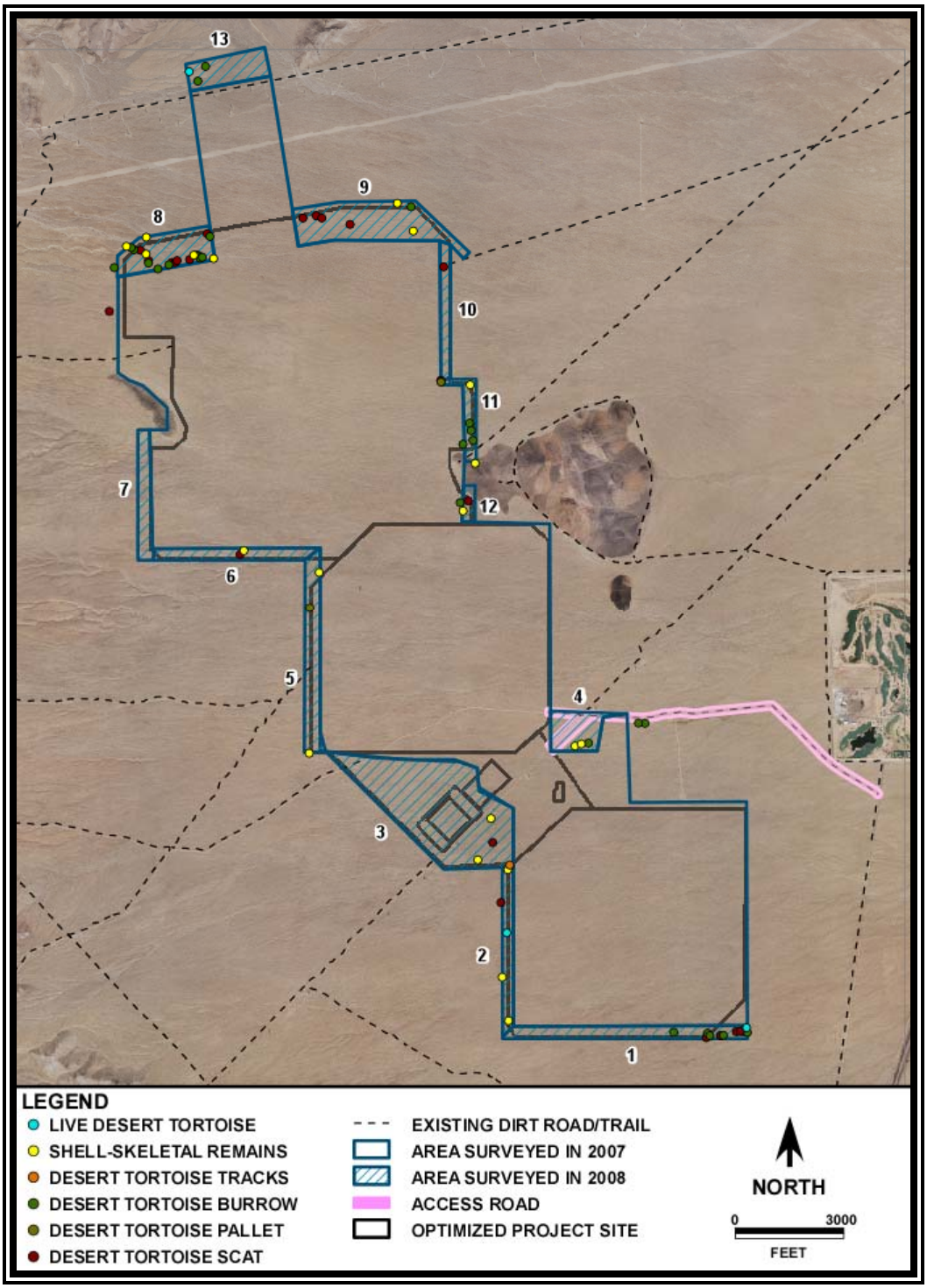

Figure 3. Area photos and tortoise photos on the Ivanpah Solar Electric Generating System project site in Ivanpah Valley, CA.

Area 1 and 2 -View to the north

Area 3- View to the north

Area 4 and access road -View to the east

Area 5- View to the north

Area 6 -View to the north

Area 7- View to the north

Area 8 -View to the north

Area 9- View to the north

Area 10 -View to the east

Area 11- View to the north

Area 12 -View to the north

Area 13- View to the north

Area 13 –Active adult male tortoise

Area 1- Adult male tortoise in burrow

Area 2 – Adult female tortoise in burrow

Area 11- Juvenile tortoise died within the last year

APPENDIX F

List of Observed Desert Tortoise Sign at Ivanpah SEGS in 2007

Desert Tortoise Data Tables

Row #	Field Personnel Initials	Collection Date	Estimated MCL	Sex	Age Class	Location Coversite Type	Location At Coversite	Location Not At Coversite	Location Comment	Activity	Activity Comment	Temperature	Cloud Cover %	Wind Direction	Wind Speed	General Comment	Maximum PDOP
1	dhh	4/14/2007	210	Unknown	Subadult	Pallet	Inside coversite.	Not applicable.		Resting		0	50-60%	South	15		5.8
2	rsf	4/15/2007	270	Unknown		Shrub	Inside coversite.	Not applicable.		Resting		0	10-20%	South	5		2
3	gg	4/15/2007	200	Unknown	Subadult	Burrow	Inside coversite.			Resting		52.200001	80-90%	Southwest	13.3	colosseum rd 2400 ft south zoi transect	4.2
4	rsf	4/21/2007	190	Female	Subadult	Shrub		Other	no sign of urtd	Resting		69	10-20%	Northwest	7		3.1
5	ew	4/27/2007	250	Unknown	Adult	Other	Not applicable.	In the open.		Walking		86	0-10%	North	5	found by veg crew, then point located by tortoise biologist. tort not found.	3.8
6	rsf	4/28/2007	250	Female	Adult	Burrow	Inside coversite.			Resting		82	0-10%	North	3	sex iis uncertain	4.9
7	ew	5/7/2007	235	Female	Adult	Burrow	Inside coversite.		facing outside	Resting		78	0-10%	North	10	no sign of urtd	4.4
8	ew	5/8/2007	230	Female	Adult	Burrow	On coversite mound.	In the open.	facing outward from burrow opening.	Resting		85	0-10%	North	5		2.8
9	dh	5/12/2007	140	Unknown	Immature	Burrow	Inside coversite.			Resting		92	20-30%	South	3		2.7
10	gg	5/13/2007	150	Unknown	Immature	Burrow	Inside coversite.			Resting		89	10-20%		0		3.8
11	dhh	5/13/2007	190	Unknown	Subadult	Burrow	Inside coversite.	Not applicable.		Resting		91	30-40%	Southwest	3		3
12	gg	5/18/2007	250	Unknown	Adult	Burrow	Entering coversite.	Not applicable.		Resting		89		Northeast	1	1 turd	2.2
13	dhh	5/19/2007	220	Unknown	Adult	Burrow	Inside coversite.			Resting		0	0-10%	Northwest	10		3.6
14	dhh	5/20/2007	230	Unknown	Adult	Burrow	Inside coversite.			Resting		76	0-10%		0	clear nares	2.5
15	ew	5/22/2007	200	Unknown	Adult	Burrow	Entering coversite.	Not applicable.		Resting		79	10-20%	North	2		4.8

Desert Tortoise Data Tables

Row #	Field Personnel Initials	Collection Date	Estimated MCL	Sex	Age Class	Location Coversite Type	Location At Coversite	Location Not At Coversite	Location Comment	Activity	Activity Comment	Temperature	Cloud Cover %	Wind Direction	Wind Speed	General Comment	Maximum PDOP
16	gcg	5/22/2007	240	Female	Adult			In the open.	walking	Walking		68	10-20%	Southeast	2	in open walking apparently healthy	2.8
17	ew	5/24/2007	240	Unknown	Adult	Burrow	Inside coversite.	Not applicable.		Resting		85	20-30%	Northeast	3	no sign of urtd	3.6
18	gcg	5/29/2007	240	Female	Adult		Other	In the open.	in open walking	Walking	walking	88	0-10%	North	2		3.3
19	gcg	6/4/2007	0	Unknown	Adult	Burrow	Inside coversite.	Not applicable.		Resting		92	60-70%	South	8		1.8
20	gcg	6/5/2007	0	Unknown	Adult	Burrow	Inside coversite.			Resting		87	70-80%	Northwest	10		1.7
21	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>
22	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>

Desert Tortoise Data Tables

Row #	Field Personnel Initials	Collection Date	Maximum HDOP	Correction Type	Receiver Type	GPS Date	GPS Time	Update Status	Feature Name	Datafile Name	Unfiltered Positions	Filtered Positions	Data Dictionary Name	GPS Week	GPS Second	GPS Height	Vertical Precision
1	dhh	4/14/2007	2.5	Postprocessed Code	GeoXH 2005	4/14/2007	02:06:47pm	New	Tortoise	BSE14APR07UNIT1.cor	236	235	BSE_Tortoise_v1	1422	594421	2923.074	1.4
2	rsf	4/15/2007	1.2	Postprocessed Carrier Float	GeoXH 2005	4/15/2007	09:49:19am	New	Tortoise	BSE15APR07UNIT1.cor	319	319	BSE_Tortoise_v1	1423	60573	2932.548	0.7
3	gg	4/15/2007	1.7	Postprocessed Code	GeoXH 2005	4/15/2007	05:07:12pm	New	Tortoise	BSE15APR07UNIT1.cor	238	238	BSE_Tortoise_v1	1423	86846	2733.809	6.5
4	rsf	4/21/2007	2.3	Postprocessed Code	GeoXH 2005	4/21/2007	11:16:44am	New	Tortoise	BSE21APR07UNIT1.cor	373	373	BSE_Tortoise_v1	1423	584218	3024.444	3.4
5	ew	4/27/2007	3	Postprocessed Code	GeoXH 2005	4/27/2007	01:18:09pm	New	Tortoise	BSE27APR07UNIT2.cor	260	260	BSE_Tortoise_v1	1424	505103	2821.394	4.3
6	rsf	4/28/2007	2.3	Postprocessed Code	GeoXH 2005	4/28/2007	10:01:18am	New	Tortoise	BSE28APR07UNIT1.cor	394	394	BSE_Tortoise_v1	1424	579692	2824.094	5
7	ew	5/7/2007	2.4	Postprocessed Code	GeoXH 2005	5/7/2007	02:34:38pm	New	Tortoise	BSE7MAY07UNIT1.cor	207	206	BSE_Tortoise_v1	1426	164092	2905.317	3.9
8	ew	5/8/2007	1.6	Postprocessed Code	GeoXH 2005	5/8/2007	12:05:35pm	New	Tortoise	BSE8MAY07UNIT2.cor	134	134	BSE_Tortoise_v1	1426	241549	2950.021	3.5
9	dh	5/12/2007	1.5	Postprocessed Carrier Float	GeoXH 2005	5/12/2007	12:31:04pm	New	Tortoise	BSE12MAY07UNIT1.cor	109	109	BSE_Tortoise_v1	1426	588678	3021.449	1.1
10	gg	5/13/2007	3	Postprocessed Code	GeoXH 2005	5/13/2007	10:07:30am	New	Tortoise	BSE13MAY07UNIT1.cor	166	165	BSE_Tortoise_v1	1427	61664	3045.795	0.9
11	dhh	5/13/2007	1.5	Postprocessed Code	GeoXH 2005	5/13/2007	11:36:30am	New	Tortoise	BSE13MAY07UNIT1.cor	84	84	BSE_Tortoise_v1	1427	67004	3041.556	1.1
12	gg	5/18/2007	1.1	Postprocessed Code	GeoXH 2005	5/18/2007	09:15:09am	New	Tortoise	BSE18MAY07UNIT1.cor	16	16	BSE_Tortoise_v1	1427	490523	3155.298	3.5
13	dhh	5/19/2007	1.9	Postprocessed Code	GeoXH 2005	5/19/2007	04:32:39pm	New	Tortoise	BSE19MAY07UNIT1.cor	142	141	BSE_Tortoise_v1	1427	603173	3191.703	5.7
14	dhh	5/20/2007	1.4	Postprocessed Code	GeoXH 2005	5/20/2007	07:17:48am	New	Tortoise	BSE20MAY07UNIT1.cor	132	131	BSE_Tortoise_v1	1428	51482	3193.166	3.1
15	ew	5/22/2007	3.3	Postprocessed Code	GeoXH 2005	5/22/2007	07:10:48am	New	Tortoise	BSE22MAY07UNIT1.cor	187	187	BSE_Tortoise_v1	1428	223862	2958.114	3.1

Desert Tortoise Data Tables

Row #	Field Personnel Initials	Collection Date	Maximum HDOP	Correction Type	Receiver Type	GPS Date	GPS Time	Update Status	Feature Name	Datafile Name	Unfiltered Positions	Filtered Positions	Data Dictionary Name	GPS Week	GPS Second	GPS Height	Vertical Precision
16	gcg	5/22/2007	1.5	Postprocessed Code	GeoXH 2005	5/22/2007	07:56:56am	New	Tortoise	BSE22MAY2007UNIT2.co	202	202	BSE_Tortoise_v1	1428	226630	3517.189	3.7
17	ew	5/24/2007	2	Real-time SBAS Corrected	GeoXH 2005	5/24/2007	12:33:27pm	New	Tortoise	BSE24MAY07UNIT1.cor	156	108	BSE_Tortoise_v1	1428	416021	3263.746	4.9
18	gcg	5/29/2007	1.8	Postprocessed Code	GeoXH 2005	5/29/2007	08:49:28am	New	Tortoise	BSE29MAY2007UNIT2.co	139	138	BSE_Tortoise_v1	1429	229782	3326.763	4
19	gcg	6/4/2007	1	Postprocessed Carrier Float	GeoXH 2005	6/4/2007	11:20:48am	New	Tortoise	BSE4JUNE07UNIT1.cor	91	91	BSE_Tortoise_v1	1430	152462	3274.956	1
20	gcg	6/5/2007	0.9	Postprocessed Carrier Float	GeoXH 2005	6/5/2007	08:26:17am	New	Tortoise	BSE5JUNE07UNIT1.cor	99	99	BSE_Tortoise_v1	1430	228391	3314.414	0.8
21	<Null>	<Null>	<Null>	<Null>	<Null>	5/30/2007	09:35:11am	<Null>	<Null>	MK053007.cor	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>
22	<Null>	<Null>	<Null>	<Null>	<Null>	4/29/2007	08:56:36am	<Null>	<Null>	RH04292007.cor	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>

Desert Tortoise Data Tables

Row #	Field Personnel Initials	Collection Date	Horizontal Precision	Standard Deviation	Latitude	Longitude	Point ID	X Coordinate	Y Coordinate	GPS Processing Notes	Survey ID	SITE	LOCID
1	dhh	4/14/2007	0.9	1.312661	35.55976845	-115.461984	4	7316532.5	2399584	<Null>	<Null>	IVANPAH 2	16
2	rsf	4/15/2007	0.5	0.396565	35.56172397	-115.462709	1	7316298.5	2400290.8	<Null>	<Null>	IVANPAH 2	15
3	gg	4/15/2007	3.1	1.155647	35.54276802	-115.437511	8	7323967	2393582.5	<Null>	<Null>	WITHIN 1-MILE BUFFER	19
4	rsf	4/21/2007	2.4	1.453962	35.56300937	-115.470261	2	7314041.5	2400701.8	<Null>	<Null>	IVANPAH 2	14
5	ew	4/27/2007	3	0.830541	35.53041526	-115.445201	5	7321794	2389029.5	<Null>	<Null>	IVANPAH 3	22
6	rsf	4/28/2007	3.2	2.623661	35.53220285	-115.446003	4	7321539.5	2389674	<Null>	<Null>	IVANPAH 3	21
7	ew	5/7/2007	3.2	1.229448	35.54342791	-115.456991	4	7318168	2393675.5	<Null>	<Null>	IVANPAH 3	18
8	ew	5/8/2007	2.3	1.214191	35.54408088	-115.461216	1	7316905.5	2393881.5	<Null>	<Null>	IVANPAH 3	17
9	dh	5/12/2007	1	0.459985	35.57305077	-115.470445	10	7313895	2404354.8	<Null>	<Null>	IVANPAH 1	12
10	gg	5/13/2007	0.6	2.076773	35.58152242	-115.472113	4	7313321.5	2407424.8	<Null>	<Null>	IVANPAH 1	9
11	dhh	5/13/2007	0.8	1.683126	35.57225791	-115.472219	6	7313374	2404052.8	<Null>	<Null>	IVANPAH 1	11
12	gg	5/18/2007	2.2	0.693083	35.58238259	-115.479912	2	7310995	2407679.3	<Null>	<Null>	IVANPAH 1	8
13	dhh	5/19/2007	3.6	0.777587	35.58542943	-115.482003	9	7310346	2408773	<Null>	<Null>	IVANPAH 1	5
14	dhh	5/20/2007	2.4	1.18383	35.58455923	-115.482693	2	7310149	2408451.3	<Null>	<Null>	IVANPAH 1	6
15	ew	5/22/2007	2.7	60.253356	35.57466032	-115.444293	1	7321655.5	2405136.8	<Null>	<Null>	OUT 1-MILE BUFFER	13

Desert Tortoise Data Tables

Row #	Field Personnel Initials	Collection Date	Horizontal Precision	Standard Deviation	Latitude	Longitude	Point ID	X Coordinate	Y Coordinate	GPS Processing Notes	Survey ID	SITE	LOCID
16	gcg	5/22/2007	2.6	49.791174	35.58708014	-115.48489	5	7309472.5	2409352.3	<Null>	<Null>	IVANPAH 1	4
17	ew	5/24/2007	3	2.883802	35.58624957	-115.487029	5	7308844	2409033.5	<Null>	<Null>	IVANPAH 1	3
18	gcg	5/29/2007	2.5	1.463365	35.56820163	-115.491595	1	7307651	2402432.3	<Null>	<Null>	IVANPAH 1	10
19	gcg	6/4/2007	0.7	0	35.590213	-115.486746	8	7308892.5	2410478	<Null>	<Null>	1000' GAS LINE CORRIDOR	2
20	gcg	6/5/2007	0.5	0.260513	35.59444181	-115.488766	5	7308253	2412002.5	<Null>	<Null>	1000' GAS LINE CORRIDOR	1
21	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	7308601.5	2406543.8	Added from generic_point (BRD)	<Null>	IVANPAH 1	7
22	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	7318627	2391045.3	Added from generic_point (BRD)	<Null>	IVANPAH 3	20

Tortoise by Site

SITE	GPS_POINTS
1000' GAS LINE CORRIDOR	2
IVANPAH 1	10
IVANPAH 2	3
IVANPAH 3	5
OUT 1-MILE BUFFER	1
WITHIN 1-MILE BUFFER	1

Desert Tortoise Carcass Data

Row #	Field Personnel Initials	Collection Date	Estimated MCL	Sex	Age Class	Location Coversite Type	Location At Coversite	Location Not At Coversite	Location Comment	Sun Exposure Percentage	Carcass Position	Time Since Death	Cause Of Death	Death Comment	Cloud Cover %	Wind Direction
1	ew	4/10/2007	250	Unknown	Adult	Other	Not applica	In the oper		80-100%	Disarticulat	Greater tha	Unknown			
2	ew	4/12/2007	0	Unknown	Adult	Other	Not applica	Other	under creo	80-100%	Disarticulat	Greater tha	Unknown			
3	gg	4/13/2007	270	Unknown	Adult			In the oper		80-100%	Disarticulat	Greater tha	Unknown			
4	rsf	4/14/2007	220	Unknown	Adult					80-100%	Disarticulat	Greater tha	Unknown			
5	jg	4/15/2007	200	Unknown	Subadult	Other	Other	In the oper		80-100%	Disarticulat		Unknown		30-40%	
6	gg	4/15/2007	200	Unknown	Subadult			In the oper		80-100%	Disarticulat		Unknown			
7	gg	4/16/2007	250	Unknown	Adult			In the oper		80-100%	Disarticulat	Greater tha	Unknown			
8	ew	4/17/2007	140	Unknown	Subadult	Other	Not applica	In the oper		80-100%	Disarticulat	2-4 years.	Unknown			
9	ew	4/17/2007	230	Female	Adult	Other	Not applica	In the oper		80-100%	Inverted	1-2 years.	Unknown			
10	ew	4/19/2007	250	Unknown	Adult			Other	middle of la	60-80%	Disarticulat	Greater tha	Unknown			
11	ew	4/19/2007	250	Unknown	Adult			In the oper		80-100%	Disarticulat		Unknown			
12	ew	4/19/2007	250	Unknown	Adult			In the oper		80-100%	Disarticulat	Greater tha	Unknown			
13	gg	4/19/2007	250	Unknown	Adult			In the oper		80-100%	Disarticulat	Greater tha	Unknown			
14	ew	4/20/2007	250	Male	Adult			In the oper		80-100%	Upright	Greater tha	Unknown			
15	jg	4/21/2007	260	Male	Adult							Greater tha	Unknown			
16	jg	4/21/2007	200	Unknown	Subadult		Other		under smal	60-80%	Upright	Greater tha	Unknown			
17	jg	4/22/2007	180	Unknown	Subadult	Other	Other	In the oper		80-100%	Disarticulat	Greater tha	Unknown			
18	dh	4/22/2007	180	Unknown		Shrub	Other			80-100%		Greater tha	Unknown			
19	jg	4/22/2007	250	Unknown	Adult					80-100%	Disarticulat	Greater tha	Other			
20	ew	4/25/2007	0	Unknown	Adult	Other	Other	In the oper		80-100%	Disarticulat	Greater tha	Unknown			
21	ew	4/25/2007	190	Female	Subadult	Other	Not applica	In the oper		80-100%	Upright	1-2 years.	Unknown			
22	ew	4/26/2007	0	Unknown	Adult	Other	Not applica	In the oper		80-100%	Disarticulat	Greater tha				
23	gg	4/27/2007	0	Unknown	Adult					80-100%	Disarticulat	Greater tha	Unknown			
24	ew	4/27/2007	0	Unknown	Adult	Other	Not applica	In the oper		80-100%	Disarticulat	Greater tha	Unknown			
25	gg	4/28/2007	0	Unknown	Adult	Other				80-100%		Greater tha	Unknown			
26	rsf	4/28/2007	0	Unknown	Adult	Other				80-100%	Disarticulat	Greater tha	Unknown			
27	gg	4/28/2007	250	Male	Adult	Other	Other	In the oper		80-100%	Upright	2-4 years.	Unknown			
28	rsf	4/28/2007	0	Unknown	Adult							Greater tha	Unknown			
29	ew	4/30/2007	200	Female	Adult	Other	Not applica	In the oper		80-100%	Inverted	Greater tha	Unknown			
30	ew	4/30/2007	0	Unknown	Adult		Not applica	In the oper		80-100%	Disarticulat	Greater tha	Unknown			
31	ew	5/1/2007	250	Female	Adult			In the oper		80-100%	Disarticulat	Greater tha	Unknown		80-90%	South
32	gg	5/4/2007	0	Unknown	Adult					80-100%	Disarticulat	Greater tha	Unknown			
33	gg	5/4/2007	240	Female	Adult			In the oper		80-100%	Inverted	2-4 years.	Unknown			
34	gg	5/7/2007	0	Unknown	Adult			In the oper		80-100%	Disarticulat	Greater tha	Unknown			
35	ew	5/8/2007	0	Unknown	Adult			In the oper		80-100%	Disarticulat	Greater tha	Unknown			
36	ew	5/9/2007	260	Male	Adult		Not applica	In the oper		80-100%	Upright	2-4 years.	Unknown			
37	gcg	5/9/2007	0	Unknown	Adult		Not applica	In the oper	scattered	80-100%	Disarticulat	Greater tha	Unknown			
38	gcg	5/9/2007	0	Unknown	Adult			Not applica	disarticulat	80-100%	Disarticulat	Greater tha	Unknown			
39	gcg	5/9/2007	0	Unknown	Adult			Not applica		80-100%	Disarticulat	Greater tha	Unknown			
40	ew	5/10/2007	0	Unknown	Adult			In the oper		80-100%	Disarticulat	Greater tha	Unknown			
41	ew	5/11/2007	220	Female	Adult		Not applica	In the oper		80-100%	Upright	2-4 years.	Unknown			
42	sf	5/12/2007	245	Male	Adult					80-100%	Upright	Greater tha	Unknown			

Desert Tortoise Carcass Data

Row #	Field Personnel Initials	Collection Date	Estimated MCL	Sex	Age Class	Location Coversite Type	Location At Coversite	Location Not At Coversite	Location Comment	Sun Exposure Percentage	Carcass Position	Time Since Death	Cause Of Death	Death Comment	Cloud Cover %	Wind Direction
43	sf	5/12/2007	220	Female	Adult					80-100%	Upright	Greater tha	Unknown			
44	gg	5/12/2007	275	Male	Adult		Other	In the oper		80-100%	Inverted		Unknown			
45	gg	5/13/2007	250	Female	Adult					80-100%	Inverted		Unknown			
46	dhh	5/13/2007	260	Unknown	Adult					80-100%	Disarticulat	Greater tha	Unknown			
47	dhh	5/13/2007	0	Unknown	Adult					80-100%	Disarticulat	Greater tha	Unknown			
48	dhh	5/13/2007	230	Unknown	Adult					80-100%	Disarticulat	Greater tha	Unknown			
49	dhh	5/13/2007	0	Unknown	Adult					80-100%	Disarticulat	Greater tha	Unknown			
50	gg	5/14/2007	270	Unknown	Adult	Other	Not applica	In the oper		80-100%	Disarticulat	Greater tha	Unknown			
51	gcg	5/14/2007	80	Unknown	Junvenile			In the oper		80-100%	Inverted	<1 YR	Common F	peck hole in plastron		
52	gg	5/14/2007	120	Unknown	Immature	Other	Not applica		found at be	80-100%	Disarticulat	<1 YR	Unknown			
53	gg	5/14/2007	140	Unknown	Immature	Other	Not applica	In the oper		80-100%	Disarticulat	<1 YR	Unknown			
54	gcg	5/16/2007	70	Unknown	Junvenile			In the oper		80-100%	Upright	<1 YR	Unknown	possibly crushed		
55	gcg	5/17/2007	180	Female	Adult			In the oper		80-100%	Disarticulat	1-2 years.				
56	rr	5/17/2007	0	Unknown	Adult	Other	Not applica	In the oper		80-100%	Disarticulat	Greater tha	Unknown			
57	gg	5/18/2007	260	Female	Adult	Other	Not applica	Other		80-100%	Disarticulat	Greater tha	Unknown			
58	gg	5/18/2007	0	Unknown	Adult					80-100%	Disarticulat	Greater tha	Unknown			
59	dhh	5/19/2007	140	Unknown	Immature	Other	Other			80-100%	Disarticulat	Greater tha	Unknown			
60	dhh	5/19/2007	0	Unknown						80-100%	Disarticulat	Greater tha	Unknown			
61	gg	5/19/2007	0	Unknown	Adult					80-100%	Disarticulat	Greater tha	Unknown			
62	ew	5/21/2007	250	Female	Adult	Other	Not applica	In the oper		80-100%	Upright	Greater tha	Unknown			
63	ew	5/21/2007	300	Unknown	Adult			In the oper		80-100%	Disarticulat	2-4 years.	Unknown			
64	gcg	5/21/2007	260	Male	Adult					60-80%	Disarticulat	Greater tha	Unknown			
65	gcg	5/21/2007	0	Unknown	Adult					80-100%	Disarticulat	Greater tha	Unknown			
66	gcg	5/22/2007	240	Female	Adult			In the oper		80-100%	Disarticulat	2-4 years.	Unknown			
67	gcg	5/24/2007	140	Unknown	Immature			Other	on i15 sb s	80-100%	Disarticulat	1-2 years.	Vehicle	likely vehicle impact		
68	ew	5/28/2007	225	Female	Adult			In the oper		80-100%	Inverted	Greater tha	Unknown			
69	gcg	5/28/2007	260	Male	Adult					80-100%	Disarticulat	Greater tha	Unknown			
70	gg	6/1/2007	265	Male	Adult					80-100%	Upright	2-4 years.	Unknown			
71	dhh	6/2/2007	0	Unknown	Adult					80-100%	Disarticulat	2-4 years.	Unknown			
72	gg	6/2/2007	270	Unknown	Adult					80-100%	Disarticulat		Unknown			
73	gg	6/5/2007	265	Male	Adult			In the oper		80-100%	Inverted	Greater tha	Unknown			
74	gog	6/5/2007	250	Unknown	Adult			In the oper		80-100%	Disarticulat	Greater tha	Unknown			
75	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>
76	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>
77	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>

Desert Tortoise Carcass Data

Row #	Field Personnel Initials	Collection Date	General Comment	Maximum PDOP	Maximum HDOP	Correction Type	Receiver Type	GPS Date	GPS Time	Update Status	Feature Name	Datafile Name	Unfiltered Positions	Filtered Positions	Data Dictionary Name	GPS Week
1	ew	4/10/2007	just a few bone	5.4	2.2	Postproces	GeoXH 20(	4/10/2007	01:10:26pr	New	Carcass	BSE10APF	201	201	BSE_Torto	1422
2	ew	4/12/2007	fragments	2.9	1.3	Postproces	GeoXH 20(	4/12/2007	03:19:00pr	New	Carcass	BSE12APF	264	264	BSE_Torto	1422
3	gg	4/13/2007		2.4	1.5	Postproces	GeoXH 20(	4/13/2007	04:33:55pr	New	Carcass	BSE1APR(	106	106	BSE_Torto	1422
4	rsf	4/14/2007		1.8	0.9	Postproces	GeoXH 20(	4/14/2007	11:13:06ar	New	Carcass	BSE14APF	221	221	BSE_Torto	1422
5	jg	4/15/2007		1.7	0.9	Postproces	GeoXH 20(	4/15/2007	11:30:19ar	New	Carcass	BSE15APF	125	125	BSE_Torto	1423
6	gg	4/15/2007		2.2	1.2	Postproces	GeoXH 20(	4/15/2007	11:39:42ar	New	Carcass	BSE15APF	58	58	BSE_Torto	1423
7	gg	4/16/2007		1.8	1	Postproces	GeoXH 20(	4/16/2007	09:38:33ar	New	Carcass	BSE16APF	62	62	BSE_Torto	1423
8	ew	4/17/2007		2	1.1	Postproces	GeoXH 20(	4/17/2007	02:40:38pr	New	Carcass	BSE17APF	17	17		1423
9	ew	4/17/2007		2.9	1.3	Postproces	GeoXH 20(	4/17/2007	03:05:09pr	New	Carcass	BSE17APF	21	21		1423
10	ew	4/19/2007		1.9	1	Postproces	GeoXH 20(	4/19/2007	11:15:27ar	New	Carcass	BSE19APF	29	29		1423
11	ew	4/19/2007		1.9	1.1	Postproces	GeoXH 20(	4/19/2007	11:25:48ar	New	Carcass	BSE19APF	29	29		1423
12	ew	4/19/2007		1.7	0.9	Postproces	GeoXH 20(	4/19/2007	11:34:22ar	New	Carcass	BSE19APF	66	66		1423
13	gg	4/19/2007		1.8	0.9	Postproces	GeoXH 20(	4/19/2007	11:40:18ar	New	Carcass	BSE19APF	40	40		1423
14	ew	4/20/2007		3.7	2.1	Postproces	GeoXH 20(	4/20/2007	02:24:58pr	New	Carcass	BSE20APF	65	65		1423
15	jg	4/21/2007		5.4	2.1	Postproces	GeoXH 20(	4/21/2007	11:55:42ar	New	Carcass	BSE21APF	60	59	BSE_Torto	1423
16	jg	4/21/2007		1.9	1	Postproces	GeoXH 20(	4/21/2007	02:20:03pr	New	Carcass	BSE21APF	166	166	BSE_Torto	1423
17	jg	4/22/2007		4.7	2.5	Real-time S	GeoXH 20(	4/22/2007	08:12:09ar	New	Carcass	BSE22APF	72	51	BSE_Torto	1424
18	dh	4/22/2007		4.5	1.9	Postproces	GeoXH 20(	4/22/2007	12:25:54pr	New	Carcass	BSE22APF	59	58	BSE_Torto	1424
19	jg	4/22/2007		2.3	1.4	Postproces	GeoXH 20(	4/22/2007	10:36:05ar	New	Carcass	BSE22APF	73	73	BSE_Torto	1424
20	ew	4/25/2007		2.3	1.1	Postproces	GeoXH 20(	4/25/2007	10:17:16ar	New	Carcass	BSE25APF	43	43	BSE_Torto	1424
21	ew	4/25/2007		2	1	Postproces	GeoXH 20(	4/25/2007	10:22:06ar	New	Carcass	BSE25APF	39	39	BSE_Torto	1424
22	ew	4/26/2007		3	1.7	Postproces	GeoXH 20(	4/26/2007	10:19:32ar	New	Carcass	BSE26APF	48	48	BSE_Torto	1424
23	gg	4/27/2007		3.7	1.3	Postproces	GeoXH 20(	4/27/2007	05:01:24pr	New	Carcass	BSE27APF	37	37	BSE_Torto	1424
24	ew	4/27/2007		4.4	2.9	Postproces	GeoXH 20(	4/27/2007	10:32:11ar	New	Carcass	BSE27APF	58	58	BSE_Torto	1424
25	gg	4/28/2007		3.2	1.6	Postproces	GeoXH 20(	4/28/2007	09:41:42ar	New	Carcass	BSE28APF	70	70	BSE_Torto	1424
26	rsf	4/28/2007		2.9	1.4	Postproces	GeoXH 20(	4/28/2007	09:51:19ar	New	Carcass	BSE28APF	73	72	BSE_Torto	1424
27	gg	4/28/2007		6	4.8	Postproces	GeoXH 20(	4/28/2007	11:12:53ar	New	Carcass	BSE28APF	154	154	BSE_Torto	1424
28	rsf	4/28/2007		2.5	1.8	Postproces	GeoXH 20(	4/28/2007	01:13:18pr	New	Carcass	BSE28APF	18	17	BSE_Torto	1424
29	ew	4/30/2007		2.4	1.1	Postproces	GeoXH 20(	4/30/2007	07:21:26ar	New	Carcass	BSE30APF	54	54		1425
30	ew	4/30/2007		3.4	2	Postproces	GeoXH 20(	4/30/2007	07:54:49ar	New	Carcass	BSE30APF	40	40		1425
31	ew	5/1/2007		2.3	1.3	Real-time S	GeoXH 20(	5/1/2007	08:51:41ar	New	Carcass	BSE1MAY(	88	88		1425
32	gg	5/4/2007		3.1	1.4	Postproces	GeoXH 20(	5/4/2007	11:16:22ar	New	Carcass	BSE4MAY(	20	20		1425
33	gg	5/4/2007		3.6	1.8	Postproces	GeoXH 20(	5/4/2007	02:34:54pr	New	Carcass	BSE4MAY(	57	56		1425
34	gg	5/7/2007	single bone	4.2	2.1	Postproces	GeoXH 20(	5/7/2007	11:36:47ar	New	Carcass	BSE7MAY(	54	54	BSE_Torto	1426
35	ew	5/8/2007		2.7	1.7	Postproces	GeoXH 20(	5/8/2007	02:18:09pr	New	Carcass	BSE8MAY(	49	48	BSE_Torto	1426
36	ew	5/9/2007		5.2	2.3	Postproces	GeoXH 20(	5/9/2007	09:12:41ar	New	Carcass	BSE9MAY(	91	91	BSE_Torto	1426
37	gcg	5/9/2007		2.7	1.6	Postproces	GeoXH 20(	5/9/2007	10:16:42ar	New	Carcass	BSE9MAY(	26	26	BSE_Torto	1426
38	gcg	5/9/2007		2.8	1.3	Postproces	GeoXH 20(	5/9/2007	01:40:14pr	New	Carcass	BSE9MAY(	105	105	BSE_Torto	1426
39	gcg	5/9/2007		2.4	1.5	Postproces	GeoXH 20(	5/9/2007	02:49:27pr	New	Carcass	BSE9MAY(	71	71	BSE_Torto	1426
40	ew	5/10/2007		1.7	0.9	Postproces	GeoXH 20(	5/10/2007	10:05:43ar	New	Carcass	BSE10MA\	30	30	BSE_Torto	1426
41	ew	5/11/2007		4.1	3.2	Postproces	GeoXH 20(	5/11/2007	10:23:24ar	New	Carcass	BSE11MA\	81	81	BSE_Torto	1426
42	sf	5/12/2007		1.9	1.1	Postproces	GeoXH 20(	5/12/2007	07:48:08ar	New	Carcass	BSE12MA\	79	79	BSE_Torto	1426

Desert Tortoise Carcass Data

Row #	Field Personnel Initials	Collection Date	General Comment	Maximum PDOP	Maximum HDOP	Correction Type	Receiver Type	GPS Date	GPS Time	Update Status	Feature Name	Datafile Name	Unfiltered Positions	Filtered Positions	Data Dictionary Name	GPS Week
43	sf	5/12/2007		2.4	1.3	Postproces	GeoXH 20(	5/12/2007	08:12:22ar	New	Carcass	BSE12MA\	29	29	BSE_Torto	1426
44	gg	5/12/2007		4.4	2	Postproces	GeoXH 20(	5/12/2007	11:22:12ar	New	Carcass	BSE12MA\	88	88	BSE_Torto	1426
45	gg	5/13/2007		2.5	1.3	Postproces	GeoXH 20(	5/13/2007	09:22:10ar	New	Carcass	BSE13MA\	47	47	BSE_Torto	1427
46	dhh	5/13/2007		3	2.8	Postproces	GeoXH 20(	5/13/2007	12:01:24pr	New	Carcass	BSE13MA\	54	54	BSE_Torto	1427
47	dhh	5/13/2007		5.9	4.2	Postproces	GeoXH 20(	5/13/2007	12:04:48pr	New	Carcass	BSE13MA\	36	36	BSE_Torto	1427
48	dhh	5/13/2007		2.4	1	Postproces	GeoXH 20(	5/13/2007	06:02:47ar	New	Carcass	BSE13MA\	34	34	BSE_Torto	1427
49	dhh	5/13/2007		1.7	0.9	Postproces	GeoXH 20(	5/13/2007	09:53:07ar	New	Carcass	BSE13MA\	53	53	BSE_Torto	1427
50	gg	5/14/2007		2.5	1.2	Postproces	GeoXH 20(	5/14/2007	07:14:53ar	New	Carcass	BSE14MA\	80	80	BSE_Torto	1427
51	gcg	5/14/2007		1.9	1.1	Postproces	GeoXH 20(	5/14/2007	08:17:18ar	New	Carcass	BSE14MA\	157	156	BSE_Torto	1427
52	gg	5/14/2007		2.4	1.2	Postproces	GeoXH 20(	5/14/2007	10:46:31ar	New	Carcass	BSE14MA\	88	88	BSE_Torto	1427
53	gg	5/14/2007		5.6	4.3	Postproces	GeoXH 20(	5/14/2007	11:39:58ar	New	Carcass	BSE14MA\	108	108	BSE_Torto	1427
54	gcg	5/16/2007		3.2	2	Postproces	GeoXH 20(	5/16/2007	07:24:07ar	New	Carcass	BSE16MA\	176	176	BSE_Torto	1427
55	gcg	5/17/2007		2.5	1.2	Postproces	GeoXH 20(	5/17/2007	06:23:46ar	New	Carcass	BSE 17 MA	52	52	BSE_Torto	1427
56	rr	5/17/2007		3.7	1.8	Postproces	GeoXH 20(	5/17/2007	06:41:22ar	New	Carcass	BSET17MA	18	18	BSE_Torto	1427
57	gg	5/18/2007		2.4	1.3	Postproces	GeoXH 20(	5/18/2007	07:03:56ar	New	Carcass	BSE18MA\	52	52	BSE_Torto	1427
58	gg	5/18/2007		2.3	1.2	Postproces	GeoXH 20(	5/18/2007	11:15:03ar	New	Carcass	BSE18MA\	220	220	BSE_Torto	1427
59	dhh	5/19/2007		3.9	2.8	Postproces	GeoXH 20(	5/19/2007	11:35:26ar	New	Carcass	BSE19MA\	121	120	BSE_Torto	1427
60	dhh	5/19/2007		3.2	2	Postproces	GeoXH 20(	5/19/2007	12:12:05pr	New	Carcass	BSE19MA\	39	39	BSE_Torto	1427
61	gg	5/19/2007		3.1	1.4	Postproces	GeoXH 20(	5/19/2007	12:56:22pr	New	Carcass	BSE19MA\	21	21	BSE_Torto	1427
62	ew	5/21/2007		5.4	2.5	Real-time S	GeoXH 20(	5/21/2007	07:54:10ar	New	Carcass	BSE21MA\	265	238	BSE_Torto	1428
63	ew	5/21/2007		3.9	2.8	Real-time S	GeoXH 20(	5/21/2007	10:16:01ar	New	Carcass	BSE21MA\	60	47	BSE_Torto	1428
64	gcg	5/21/2007		2.9	1.5	Real-time S	GeoXH 20(	5/21/2007	09:13:17ar	New	Carcass	BSE21MA\	32	31	BSE_Torto	1428
65	gcg	5/21/2007		3.1	1.5	Real-time S	GeoXH 20(	5/21/2007	11:15:29ar	New	Carcass	BSE21MA\	20	10	BSE_Torto	1428
66	gcg	5/22/2007		3.1	2.1	Postproces	GeoXH 20(	5/22/2007	09:21:07ar	New	Carcass	BSE22MA\	73	71	BSE_Torto	1428
67	gcg	5/24/2007		2.8	1.5	Real-time S	GeoXH 20(	5/24/2007	07:52:31ar	New	Carcass	BSE24MA\	129	54	BSE_Torto	1428
68	ew	5/28/2007		4.1	1.6	Postproces	GeoXH 20(	5/28/2007	10:13:17ar	New	Carcass	BSE28MA\	174	174	BSE_Torto	1429
69	gcg	5/28/2007		3.8	2.9	Postproces	GeoXH 20(	5/28/2007	11:09:44ar	New	Carcass	BSE28MA\	31	31	BSE_Torto	1429
70	gg	6/1/2007		2.1	1.1	Postproces	GeoXH 20(	6/1/2007	10:13:42ar	New	Carcass	BSE01JUN	30	30	BSE_Torto	1429
71	dhh	6/2/2007		5.4	3.5	Postproces	GeoXH 20(	6/2/2007	12:29:06pr	New	Carcass	BSE02JUN	104	103	BSE_Torto	1429
72	gg	6/2/2007		3.6	3	Postproces	GeoXH 20(	6/2/2007	12:52:36pr	New	Carcass	BSE02JUN	17	16	BSE_Torto	1429
73	gg	6/5/2007		1.9	1.1	Postproces	GeoXH 20(	6/5/2007	06:34:33ar	New	Carcass	BSE5JUNE	66	66	BSE_Torto	1430
74	gog	6/5/2007		1.8	0.9	Postproces	GeoXH 20(	6/5/2007	07:56:54ar	New	Carcass	BSE5JUNE	25	25	BSE_Torto	1430
75	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	4/17/2007	11:42:16ar	<Null>	<Null>	JB041708A	<Null>	<Null>	<Null>	<Null>
76	<Null>	<Null>	tortoise she	<Null>	<Null>	<Null>	<Null>	4/20/2007	09:28:41ar	<Null>	<Null>	R042007A:	<Null>	<Null>	<Null>	<Null>
77	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	4/18/2007	12:21:41pr	<Null>	<Null>	JB041809A	<Null>	<Null>	<Null>	<Null>

Desert Tortoise Carcass Data

Row #	Field Personnel Initials	Collection Date	GPS Second	GPS Height	Vertical Precision	Horizontal Precision	Standard Deviation	Latitude	Longitude	Point ID	X Coord	Y Coord	SITE	LOCID
1	ew	4/10/2007	245440	2893.48	5	2.7	0.928607	35.5547	-115.458	2	7317725	2397768	WITHIN 1-	52
2	ew	4/12/2007	425954	2902.807	0.8	0.4	0	35.55491	-115.459	1	7317430	2397838	WITHIN 1-	51
3	gg	4/13/2007	516849	2906.279	1.4	1.2	0	35.55976	-115.46	2	7317103	2399595	IVANPAH 2	45
4	rsf	4/14/2007	584000	2915.134	0.6	0.4	0	35.5635	-115.461	1	7316750	2400947	IVANPAH 2	40
5	jg	4/15/2007	66633	2939.84	0.9	0.7	0.220467	35.56006	-115.463	4	7316209	2399684	IVANPAH 2	44
6	gg	4/15/2007	67196	2936.376	1.1	0.8	0	35.56157	-115.463	5	7316213	2400232	IVANPAH 2	42
7	gg	4/16/2007	146327	2828.177	2.9	2.1	0.37342	35.55216	-115.452	1	7319646	2396894	WITHIN 1-	54
8	ew	4/17/2007	250852	2959.038	2	1.3	0	35.55753	-115.465	316	7315757	2398748	IVANPAH 2	46
9	ew	4/17/2007	252323	2951.714	1.5	0.7	0	35.56459	-115.465	317	7315648	2401319	IVANPAH 2	38
10	ew	4/19/2007	411341	2965.24	1.1	0.8	0	35.55987	-115.465	182	7315561	2399595	IVANPAH 2	43
11	ew	4/19/2007	411962	2971.426	1.4	1	0	35.56153	-115.466	183	7315282	2400193	IVANPAH 2	41
12	ew	4/19/2007	412476	2966.958	1.1	0.8	0	35.56378	-115.466	184	7315374	2401016	IVANPAH 2	37
13	gg	4/19/2007	412832	2970.756	1	0.7	0	35.56434	-115.466	186	7315235	2401217	IVANPAH 2	36
14	ew	4/20/2007	509112	3001.478	3.6	3	0.630873	35.56632	-115.469	103	7314399	2401916	IVANPAH 1	32
15	jg	4/21/2007	586556	3029.735	3.6	2.6	1.109737	35.56254	-115.471	5	7313910	2400528	IVANPAH 2	35
16	jg	4/21/2007	595217	3042.572	1.4	0.9	0	35.55594	-115.471	6	7313762	2398122	IVANPAH 2	48
17	jg	4/22/2007	54743	3065.671	6.5	3.9	0.846664	35.56311	-115.473	3	7313108	2400714	IVANPAH 2	34
18	dh	4/22/2007	69968	3093.4	1.4	0.7	0.610201	35.55447	-115.475	6	7312613	2397558	IVANPAH 2	49
19	jg	4/22/2007	63379	3082.04	3.6	3.4	1.018079	35.55391	-115.474	7	7312887	2397360	IVANPAH 2	50
20	ew	4/25/2007	321450	2766.395	1.2	0.7	0.254143	35.54104	-115.442	3	7322730	2392921	IVANPAH 3	65
21	ew	4/25/2007	321740	2766.872	1.1	0.6	0.211082	35.5407	-115.442	4	7322716	2392797	IVANPAH 3	67
22	ew	4/26/2007	407986	2780.58	0.9	0.5	0.142445	35.53723	-115.442	2	7322539	2391530	IVANPAH 3	69
23	gg	4/27/2007	518498	2814.771	6.5	2.6	0.251553	35.53322	-115.445	1	7321771	2390048	IVANPAH 3	75
24	ew	4/27/2007	495145	2796.42	3.7	2.9	1.082164	35.53622	-115.444	3	7322074	2391149	IVANPAH 3	73
25	gg	4/28/2007	578516	2810.308	4.1	3.1	2.375886	35.53828	-115.446	2	7321457	2391885	IVANPAH 3	68
26	rsf	4/28/2007	579093	2818.264	3.9	2.4	0.49052	35.53514	-115.446	3	7321507	2390741	IVANPAH 3	74
27	gg	4/28/2007	583987	2805.425	4	3.1	2.736622	35.54441	-115.446	8	7321281	2394112	IVANPAH 3	59
28	rsf	4/28/2007	591212	2820.386	3.4	3.5	1.043593	35.53601	-115.447	10	7321325	2391053	IVANPAH 3	72
29	ew	4/30/2007	138100	2846.002	1.3	0.7	0	35.5407	-115.45	218	7320153	2392733	IVANPAH 3	64
30	ew	4/30/2007	140103	2885.724	1.4	0.9	0.369219	35.52863	-115.451	219	7320229	2388339	IVANPAH 3	76
31	ew	5/1/2007	229915	2861.308	3.4	2.3	0.155753	35.53824	-115.452	377	7319681	2391826	IVANPAH 3	66
32	gg	5/4/2007	497796	2917.607	3	1.4	0	35.53723	-115.456	132	7318444	2391427	IVANPAH 3	70
33	gg	5/4/2007	509708	2931.144	2	1.3	0.363388	35.53611	-115.457	136	7318182	2391012	IVANPAH 3	71
34	gg	5/7/2007	153421	2826.628	5.2	2.6	1.564242	35.54255	-115.448	3	7320772	2393421	IVANPAH 3	63
35	ew	5/8/2007	249503	2954.026	4.6	3.8	1.240025	35.54412	-115.462	4	7316732	2393890	IVANPAH 3	57
36	ew	5/9/2007	317575	2799.707	4.4	2.8	0.935369	35.54442	-115.446	6	7321281	2394116	IVANPAH 3	60
37	gcg	5/9/2007	321416	2794.873	3.4	2.6	0.700406	35.54477	-115.446	8	7321526	2394249	IVANPAH 3	61
38	gcg	5/9/2007	333628	2780.578	1.3	0.6	0	35.54487	-115.444	9	7321976	2394299	IVANPAH 3	62
39	gcg	5/9/2007	337781	2843.824	1.5	1.2	0	35.54504	-115.451	10	7319880	2394305	WITHIN 1-	58
40	ew	5/10/2007	407157	3063.664	1.6	1.2	0	35.55084	-115.472	2	7313569	2396261	IVANPAH 2	53
41	ew	5/11/2007	494618	2981.236	1	0.8	0.507069	35.57205	-115.467	4	7315074	2404018	WITHIN 1-	27
42	sf	5/12/2007	571702	3005.446	1.1	0.9	0.551771	35.56632	-115.469	1	7314398	2401916	IVANPAH 1	33

Desert Tortoise Carcass Data

Row #	Field Personnel Initials	Collection Date	GPS Second	GPS Height	Vertical Precision	Horizontal Precision	Standard Deviation	Latitude	Longitude	Point ID	X Coord	Y Coord	SITE	LOCID
43	sf	5/12/2007	573156	3003.564	2	1.1	0	35.57333	-115.469	2	7314344	2404469	IVANPAH :	26
44	gg	5/12/2007	584546	3024.134	1.6	0.8	0.423279	35.58422	-115.47	7	7313909	2408422	IVANPAH :	12
45	gg	5/13/2007	58944	3039.104	1.5	0.9	0	35.56699	-115.472	2	7313550	2402140	IVANPAH :	30
46	dhh	5/13/2007	68498	3046.674	1.3	1.2	0.55087	35.581	-115.472	9	7313271	2407234	IVANPAH :	15
47	dhh	5/13/2007	68702	3047.744	1.5	1.6	0.809992	35.58163	-115.472	10	7313260	2407460	IVANPAH :	14
48	dhh	5/13/2007	46981	3035.205	1.5	0.6	0	35.58746	-115.471	11	7313675	2409598	IVANPAH :	9
49	dhh	5/13/2007	60801	3040.725	1.6	1.3	0	35.57606	-115.472	14	7313442	2405438	IVANPAH :	23
50	gg	5/14/2007	137707	3063.252	1.1	0.8	0	35.58358	-115.473	1	7313060	2408167	IVANPAH :	13
51	gcg	5/14/2007	141452	3050.168	0.9	0.6	0.180904	35.57852	-115.473	3	7313200	2406329	IVANPAH :	19
52	gg	5/14/2007	150405	3081.337	1.1	0.6	0	35.58494	-115.474	6	7312714	2408655	IVANPAH :	10
53	gg	5/14/2007	153612	3067.469	1.1	0.9	0.88522	35.57637	-115.474	7	7312865	2405537	IVANPAH :	22
54	gcg	5/16/2007	311061	3080.938	3.6	3.1	1.651307	35.57573	-115.475	2	7312404	2405294	IVANPAH :	21
55	gcg	5/17/2007	393840	3097.68	1.5	0.8	0	35.56878	-115.476	1	7312187	2402758	IVANPAH :	28
56	rr	5/17/2007	394896	3113.284	1.1	0.7	0	35.58377	-115.477	2	7311971	2408209	IVANPAH :	11
57	gg	5/18/2007	482650	3135.947	3.7	2.7	1.013694	35.57281	-115.479	1	7311403	2404204	IVANPAH :	25
58	gg	5/18/2007	497717	2888.791	0.8	0.5	0.314071	35.54794	-115.457	4	7318191	2395321	WITHIN 1-	56
59	dhh	5/19/2007	585340	3165.716	4.3	4.5	0.906	35.57876	-115.482	4	7310509	2406348	IVANPAH :	18
60	dhh	5/19/2007	587539	3165.147	3.8	2.7	2.620116	35.58532	-115.481	6	7310631	2408741	IVANPAH :	8
61	gg	5/19/2007	590196	2958.896	5.2	3.2	0.654194	35.57814	-115.465	13	7315547	2406249	WITHIN 1-	20
62	ew	5/21/2007	140064	2971.645	3.1	2.1	0.862607	35.56797	-115.466	1	7315150	2402535	WITHIN 1-	31
63	ew	5/21/2007	148575	2839.677	4.6	3.3	2.038775	35.5578	-115.454	4	7319008	2398931	WITHIN 1-	47
64	gcg	5/21/2007	144811	3207.69	3.6	2.5	0.59069	35.58469	-115.484	8	7309891	2408492	IVANPAH :	7
65	gcg	5/21/2007	152143	3223.425	4.6	2.6	0.141203	35.58724	-115.484	12	7309779	2409417	IVANPAH :	4
66	gcg	5/22/2007	231681	3305.436	4.1	3.9	61.05252	35.57254	-115.485	6	7309623	2404062	IVANPAH :	24
67	gcg	5/24/2007	399165	2708.238	3.3	2.1	0.382531	35.52371	-115.428	8	7327082	2386724	WITHIN 1-	77
68	ew	5/28/2007	148411	3506.702	5	2.7	0.817428	35.56307	-115.502	1	7304479	2400486	WITHIN 1-	29
69	gcg	5/28/2007	151798	3280.816	5.2	4.8	2.365424	35.57706	-115.49	7	7307937	2405667	IVANPAH :	17
70	gg	6/1/2007	494036	3326.147	2.4	1.6	0	35.57628	-115.494	1	7306933	2405357	WITHIN 1-	16
71	dhh	6/2/2007	588560	3398.799	6.7	4.4	1.951788	35.58135	-115.497	6	7305970	2407178	IVANPAH :	5
72	gg	6/2/2007	589970	3364.717	4.7	5.6	0.89821	35.58208	-115.494	7	7306773	2407464	IVANPAH :	6
73	gg	6/5/2007	221687	3304.759	1	0.6	0	35.59759	-115.488	1	7308357	2413150	1000' GAS	2
74	gog	6/5/2007	226628	3298.32	1.6	1.1	0	35.59155	-115.488	3	7308511	2410957	1000' GAS	3
75	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	7294553	2410733	OUT 1-MIL	1
76	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	7323286	2397034	WITHIN 1-	55
77	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	7318409	2401777	WITHIN 1-	39

Carcass by Site

SITE	GPS_POINTS
1000' GAS LINE CORRIDOR	2
IVANPAH 1	25
IVANPAH 2	16
IVANPAH 3	19
OUT 1-MILE BUFFER	1
WITHIN 1-MILE BUFFER	14

Other Tortoise Sign

Row #	Field Personnel Initials	Collection Date	Scat Presence	Number Of Scat	Scat Condition	Courtship Ring	Eggshell Fragments	General Comment	Maximum PDOP	Maximum HDOP	GPS Date	GPS Time
1	ew	4/10/2007		0			Eggshell fragments present.	intact nonviable tort egg near neotoma midden, in opening of small mammal burrow.	3.4	1.5	4/10/2007	01:23:29pm
2	ew	4/19/2007		0			Eggshell fragments present.	fragment.	2.4	1.5	4/19/2007	04:06:49pm
3		4/19/2007		0			Eggshell fragments present.	more probably same egg.	2.4	1.5	4/19/2007	04:08:57pm
4	ew	4/26/2007	Scat present.	1	Scat from this year.	Courtship ring not present.		found off site, on walk back to truck	2.6	1.2	4/26/2007	12:37:30pm
5	ew	5/1/2007	Scat present.	1	Scat from this year.			one scat, not at a burrow.	3.6	1.8	5/1/2007	02:46:37pm
6	ew	5/1/2007	Scat present.	1	Scat from this year.			one scat, not at a burrow.	3.5	1.8	5/1/2007	02:51:00pm
7	gcg	5/9/2007		1	Scat from this year.				3	1.7	5/9/2007	08:34:42am
8	gg	5/13/2007	Scat present.	1	Scat from this year.				3.2	2	5/13/2007	09:46:00am
9	dhh	5/19/2007	Scat present.	1	Scat from this year.			not associated with burrow.	2.8	1.5	5/19/2007	12:14:24pm
10	gcg	5/21/2007	Scat present.	2	Scat from this year.				2.9	1.8	5/21/2007	11:07:49am
11	gcg	5/22/2007	Scat present.	1	Scat from this year.				3.8	3	5/22/2007	11:34:26am
12	gcg	5/22/2007	Scat present.	2	Scat from this year.				3.4	1.4	5/22/2007	12:09:18pm
13	gcg	5/23/2007	Scat present.	1	Scat from this year.			scat 1ad ty	2.7	1.2	5/23/2007	03:37:06pm
14	gg	5/24/2007	Scat present.	1	Scat from this year.				3.9	2	5/24/2007	09:36:06am
15	gcg	5/25/2007	Scat present.	1	Scat from this year.			1 ad ty	2.6	1.4	5/25/2007	07:52:39am
16	gcg	5/25/2007	Scat present.	1	Scat from this year.			1 ad ty	1.7	0.9	5/25/2007	09:08:10am
17	gcg	5/28/2007	Scat present.	1	Scat not from this year.				2.1	1.2	5/28/2007	10:52:09am
18	gcg	5/28/2007	Scat present.	1	Scat not from this year.			1 ad nty	3	1.3	5/28/2007	03:07:06pm
19	gcg	5/30/2007	Scat present.	1	Scat not from this year.			1 ad nty	2.9	1.9	5/30/2007	09:41:19am
20	ew	5/31/2007	Scat present.	1	Scat from this year.				3.1	1.5	5/31/2007	10:19:15am
21	gcg	5/31/2007	Scat present.	1	Scat from this year.				4.3	2.6	5/31/2007	09:27:02am
22	gg	6/2/2007	Scat present.	1	Scat from this year.				2.6	1.3	6/2/2007	07:29:57am
23	gg	6/3/2007	Scat present.	2					2	1.1	6/3/2007	10:38:42am
24	dhh	6/3/2007	Scat present.	1	Scat not from this year.				2.7	1.5	6/3/2007	11:26:18am
25	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	adult tortoise tracks in wash	<Null>	<Null>	5/4/2007	03:04:31pm

Other Tortoise Sign

Row #	Datafile Name	Unfiltered Positions	Filtered Positions	GPS Week	GPS Second	GPS Height	Vertical Precision	Horizontal Precision	Standard Deviation	Latitude	Longitude	Point ID	X Coordinate	Y Coordinate	SITE	LOCID
1	BSE10APR07UNI	119	119	1422	246223	2896.189	6.3	3.2	1.035722	35.55513828	-115.458255	3	7317683.5	2397927.8	WITHIN 1-MILE BUFFER	19
2	BSE19APR07UNI	58	58	1423	428823	2988.252	1.2	1	0	35.55729982	-115.4673	190	7314974	2398646.5	IVANPAH 2	17
3	BSE19APR07UNI	57	57	1423	428951	2991.613	1.1	0.9	0	35.55729705	-115.467375	191	7314952.5	2398644.5	IVANPAH 2	18
4	BSE26APR07UNI	96	95	1424	416264	2788.079	0.9	0.6	0.337776	35.543838	-115.444427	6	7321901	2393919.3	IVANPAH 3	22
5	BSE1MAY07UNIT	53	52	1425	251211	2905.673	1.9	1.2	0.428282	35.52902198	-115.452729	381	7319567.5	2388465.3	IVANPAH 3	24
6	BSE1MAY07UNIT	33	33	1425	251474	2906.766	1.9	1.1	0.670134	35.52812135	-115.452659	382	7319597.5	2388138.5	WITHIN 1-MILE BUFFER	25
7	BSE9MAY07UNIT	29	29	1426	315296	2942.476	4.4	3.5	0.942967	35.54433594	-115.461012	4	7316963	2393975.5	IVANPAH 3	20
8	BSE13MAY07UN	33	32	1427	60374	3043.96	1.9	1.9	0.932711	35.57493837	-115.472118	3	7313380	2405029	IVANPAH 1	10
9	BSE19MAY07UN	46	46	1427	587678	3175.747	4.7	3	0.744857	35.58531572	-115.481114	7	7310611	2408738.5	IVANPAH 1	6
10	BSE21MAY07UN	21	16	1428	151683	3216.397	3.7	2.2	1.123503	35.58573207	-115.483948	10	7309764.5	2408868.3	IVANPAH 1	5
11	BSE22MAY2007U	48	16	1428	239680	3221.536	2.9	5.1	0.786806	35.56939765	-115.485342	7	7309499.5	2402914.3	IVANPAH 1	16
12	BSE22MAY2007U	85	39	1428	241772	3204.2	3.1	2	1.302605	35.57895246	-115.485137	8	7309472.5	2406392.3	IVANPAH 1	7
13	BSE23MAY2007U	60	60	1428	340640	2729.005	0.9	0.6	0	35.54127199	-115.436827	1	7324185	2393043	WITHIN 1-MILE BUFFER	23
14	BSE24MAY07UN	19	19	1428	405380	3241.254	5.9	4	1.726328	35.57080686	-115.486205	1	7309229	2403420.3	IVANPAH 1	12
15	BSE25MAY2007U	53	53	1428	485573	3267.351	1.5	0.8	0	35.58636448	-115.487266	2	7308772.5	2409074	IVANPAH 1	4
16	BSE25MAY2007U	73	73	1428	490104	3252.112	1.3	0.9	0	35.57818378	-115.487863	3	7308669.5	2406092.3	IVANPAH 1	8
17	BSE28MAY07UN	15	15	1429	150743	3304.119	3.7	2.8	0.742771	35.56891764	-115.490421	6	7307993.5	2402701.5	IVANPAH 1	14
18	BSE28MAY07UN	35	35	1429	166040	3307.521	1.7	1	0	35.56844443	-115.490687	10	7307918.5	2402527.3	IVANPAH 1	15
19	BSE30MAY2007U	28	27	1429	319293	3332.673	2.5	1.4	4.728563	35.56926858	-115.492142	2	7307479	2402816.3	IVANPAH 1	13
20	BSE31MAY07UN	57	57	1429	407969	3318.728	3.7	2.4	0.389108	35.57720529	-115.492692	1	7307243	2405700.3	IVANPAH 1	9
21	BSE31MAY2007U	61	60	1429	404836	3220.164	4.2	3.2	0.802714	35.60156075	-115.483333	4	7309803.5	2414633	WITHIN 1-MILE BUFFER	1
22	BSE02JUNE07UN	21	21	1429	570611	3357.001	3.9	2.3	0.453205	35.57351344	-115.494207	2	7306825.5	2404345.8	WITHIN 1-MILE BUFFER	11
23	BSE03JUNE07UN	21	21	1430	63536	3261.146	2.1	2	0	35.59687359	-115.484579	2	7309475.5	2412918.3	1000' GAS LINE CORRIDOR	2
24	BSE03JUNE07UN	25	24	1430	66392	3233.745	2.5	1.7	1.651795	35.59202199	-115.483972	3	7309700.5	2411157	1000' GAS LINE CORRIDOR	3
25	BSE4MAY07U1.c	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	7318116.5	2393166.8	IVANPAH 3	21

Other Sign By Site

SITE	GPS_POINTS
1000' GAS LINE CORRIDOR	2
IVANPAH 1	12
IVANPAH 2	2
IVANPAH 3	4
WITHIN 1-MILE BUFFER	5

Tortoise Burrows

Row #	Field Personnel Initials	Collection Date	Burrow Length	Burrow Width	Burrow Height	Burrow Entry Soil	Burrow Aspect	Burrow Condition	Scat Presence	Number Of Scat	Scat Condition	Courtship Ring	Eggshell Fragments	Drinking Depression	General Comment	Maximum PDOP	Maximum HDOP	Correction Type	GPS Date
1	DHH	5/12/2007	1000	340	190	180	SE	Fair		0						2	1	Postproces	5/12/2007
2	gg	5/14/2007	600	200	80	70	s	Excellent	Scat not present.	0						4	2.1	Postproces	5/14/2007
3	gcg	5/16/2007	1000	240	120	20	se	Fair	Scat not present.	0						4.1	2.2	Postproces	5/16/2007
4		5/17/2007	800	275	100	225	ne	Fair		0						2.1	1.2	Postproces	5/17/2007
5	gg	5/18/2007	500	260	200	75	s	Excellent	Scat present.	1	Scat from this year.		Eggshell fragments not present.		dt in burrow	5.2	2.3	Postproces	5/18/2007
6		5/19/2007	1000	300	130	50	se	Excellent	Scat present.	0	Scat from this year.	Courtship ring not present.	Eggshell fragments not present.	Drinking depression not present.		2.5	1.3	Postproces	5/19/2007
7	dhh	5/19/2007	1000	280	130	120	southeast	Excellent	Scat not present.	0		Courtship ring not present.			tortoise inside	4.3	2	Postproces	5/19/2007
8	gg	5/19/2007	500	325	100	125	sw	Fair	Scat not present.	0						2.6	1.5	Postproces	5/19/2007
9	dhh	5/20/2007	800	230	110	60	south	Excellent		0					tortoise inside	3.2	1.6	Postproces	5/20/2007
10	gg	5/20/2007	900	225	175	90	e	Fair	Scat not present.	0						5.9	4	Postproces	5/20/2007
11	gg	5/21/2007	800	250	125	300	ne	Fair	Scat not present.	0						5.7	2	Real-time S	5/21/2007
12	ew	5/22/2007	400	300	200	30	ne	Fair	Scat not present.	0						2.8	1.5	Postproces	5/22/2007
13	ew	5/24/2007	700	300	175	70	w	Excellent	Scat present.	2	Scat from this year.				tort in burrow	3.4	1.7	Real-time S	5/24/2007
14	ew	5/24/2007	700	275	175	225	nw	Good	Scat not present.	0						3.7	1.7	Real-time S	5/24/2007
15	dh	5/26/2007	460	290	110	180	ne	Fair		0						3.1	2.6	Postproces	5/26/2007
16	dh	5/26/2007	660	290	110	100	ese	Excellent	Scat present.	3	Scat from this year.	Courtship ring not present.	Eggshell fragments not present.	Drinking depression not present.		2.4	1.3	Postproces	5/26/2007
17	gg	5/28/2007	700	175	50	75	s	Good	Scat not present.	0						5.9	2.3	Postproces	5/28/2007
18	gcg	5/28/2007	1000	275	150	200	sw	Good	Scat present.	2	Scat not from this year.					5	2.6	Postproces	5/28/2007
19	gcg	5/29/2007	1000	350	180	100	se	Excellent	Scat present.	1	Scat from this year.				tracks in burrow	3.5	1.4	Postproces	5/29/2007
20	gcg	5/29/2007	1000	250	300	60	se	Good	Scat present.	1	Scat from this year.					3.8	1.9	Postproces	5/29/2007
21	gcg	5/30/2007	1000	280	120	60	east	Good	Scat not present.	0						1.6	0.9	Postproces	5/30/2007
22	gcg	5/31/2007	1000	400	200	300	south	Good	Scat present.	1	Scat not from this year.				caliche cave	5.1	2.2	Postproces	5/31/2007
23	gcg	6/1/2007	1000	250	120	60	east	Good	Scat present.	1	Scat not from this year.					3.9	2	Postproces	6/1/2007
24	gcg	6/1/2007	500	250	120	40	north	Excellent	Scat not present.	0					tracks in burrow	4	2.2	Postproces	6/1/2007
25	dh	6/2/2007	500	240	160	80	se	Fair		0						2	1.2	Postproces	6/2/2007
26	dh	6/2/2007	1000	400	200	150	sw	Excellent	Scat not present.	0						3.3	3.3	Postproces	6/2/2007
27	gg	6/3/2007	1000	275	225	150	n	Fair	Scat not present.	0						3.2	1.7	Postproces	6/3/2007
28	dh	6/3/2007	1000	375	130	90	ne	Good	Scat not present.	0						2.8	1.3	Postproces	6/3/2007
29	gcg	6/5/2007	1000	275	90	150	s	Fair	Scat not present.	0						2.7	1.5	Postproces	6/5/2007
30	gcg	6/5/2007	1000	425	225	300	ne	Good		0						1.9	1.1	Postproces	6/5/2007

Tortoise Burrows

Row #	Field Personnel Initials	Collection Date	Burrow Length	Burrow Width	Burrow Height	Burrow Entry Soil	Burrow Aspect	Burrow Condition	Scat Presence	Number Of Scat	Scat Condition	Courtship Ring	Eggshell Fragments	Drinking Depression	General Comment	Maximum PDOP	Maximum HDOP	Correction Type	GPS Date
31	gg	6/5/2007	1000	300	175	90	ne	Excellent	Scat not present.	0					tort in burrow.	2.4	1.2	Postproces	6/5/2007
32	gog	6/5/2007	800	375	150	40	ne	Good	Scat not present.	0						2.6	1.2	Postproces	6/5/2007
33	ew	6/4/2007	600	325	200	50	sw	Good	Scat not present.	0						1.9	1.1	Postproces	6/4/2007
34	gg	6/4/2007	100	350	175	70	se	Excellent	Scat present.	10	Scat from this year.					1.9	1.1	Postproces	6/4/2007
35	gg	6/4/2007	600	375	175	50	se	Fair	Scat not present.	0						1.4	0.8	Postproces	6/4/2007
36	ew	6/4/2007	1000	325	200	350	ne	Fair	Scat not present.	0						4.1	3.3	Postproces	6/4/2007
37	gcg	6/4/2007	600	350	150	30	south	Good	Scat present.	1	Scat from this year.					2.1	1	Postproces	6/4/2007
38	gg	6/4/2007	800	350	150	75	ne	Good	Scat not present.	0						3.5	2.9	Postproces	6/4/2007
39	gcg	6/4/2007	1000	375	150	30	nne	Good	Scat not present.	0						3.1	1.9	Postproces	6/4/2007
40	gcg	6/4/2007	1000	350	175	250	n	Excellent	Scat not present.	0					tortoise in burrow.	2	1.1	Postproces	6/4/2007
41	jg	5/6/2007	900	330	110	120	east	Fair	Scat not present.	0		Courtship ring not present.	Eggshell fragments not present.			2.5	1.2	Postproces	5/6/2007
42	jg	5/5/2007	700	310	120	110	east	Good	Scat not present.	0		Courtship ring not present.	Eggshell fragments not present.	Drinking depression not present.		2	1.1	Postproces	5/5/2007
43	gg	5/5/2007	800	550	350	400	nnw	Good	Scat not present.	0						2.1	1.2	Postproces	5/5/2007
44	ew	5/4/2007	1000	400	175	275	s	Good	Scat not present.	0						2.6	1.2	Postproces	5/4/2007
45	ew	5/4/2007	800	275	175	30	ne	Good	Scat not present.	0			Eggshell fragments present.		egg shell fragments outside burrow.	2	1.1	Postproces	5/4/2007
46	gg	5/4/2007	500	325	90	125	ene	Good	Scat not present.	0						3.6	2	Postproces	5/4/2007
47	ew	5/1/2007	1000	375	250	200	e	Excellent	Scat present.	2	Scat from this year.					2.2	1.2	Postproces	5/1/2007
48	jg	4/28/2007	740	190	85	70	south east	Poor	Scat not present.	0		Courtship ring not present.	Eggshell fragments not present.	Drinking depression not present.		3	1.8	Postproces	4/28/2007
49	ew	4/27/2007	1000	350	275	50	n	Good	Scat not present.	0						3.1	1.5	Postproces	4/27/2007
50	gg	4/26/2007	1000	325	175	90	se	Good	Scat not present.	0						2.4	1.1	Postproces	4/26/2007
51	ew	4/25/2007	500	400	300	100	n	Fair	Scat not present.	0						2.6	1.2	Postproces	4/25/2007
52	ew	5/4/2007	900	350	225	200	n	Fair	Scat not present.	0						3.7	1.8	Postproces	5/4/2007
53	gg	4/26/2007	1000	275	175	200	se	Fair	Scat not present.	0						2.6	1.2	Postproces	4/26/2007
54	gg	5/25/2007	1000	325	325	150	ne	Good	Scat not present.	0						2.4	1.2	Postproces	5/25/2007
55	jg	5/6/2007	1000	190	140	100	east	Good	Scat not present.	0		Courtship ring not present.	Eggshell fragments not present.	Drinking depression not present.		3	2.2	Postproces	5/6/2007
56	gg	5/3/2007	800	325	250	125	e	Fair	Scat not present.	0						2.9	1.5	Real-time S	5/3/2007
57	gg	4/28/2007	900	230	140	110	ne	Good		0						4.6	2.8	Postproces	4/28/2007
58	jg	4/28/2007	630	260	135	160	south	Good	Scat not present.	0		Courtship ring not present.	Eggshell fragments not present.	Drinking depression not present.		5.2	2.3	Postproces	4/28/2007
59	gg	4/27/2007	800	400	200	250	ne	Fair	Scat not present.	0						5.6	4.5	Postproces	4/27/2007
60	gg	4/26/2007	900	325	200	200	sw	Good	Scat not present.	0						2.6	1.4	Postproces	4/26/2007
61	gg	5/4/2007	800	350	200	50	ne	Fair	Scat not present.	0						1.3	0.7	Postproces	5/4/2007

Tortoise Burrows

Row #	Field Personnel Initials	Collection Date	Burrow Length	Burrow Width	Burrow Height	Burrow Entry Soil	Burrow Aspect	Burrow Condition	Scat Presence	Number Of Scat	Scat Condition	Courtship Ring	Eggshell Fragments	Drinking Depression	General Comment	Maximum PDOP	Maximum HDOP	Correction Type	GPS Date
62	jg	4/29/2007	850	310	140	145	south east	Fair	Scat not present.	0		Courtship ring not present.	Eggshell fragments not present.	Drinking depression not present.		1.7	0.9	Postproces	4/29/2007
63	rsf	4/28/2007	800	350	150	80	south ea t	Fair	Scat not present.	0		Courtship ring not present.	Eggshell fragments not present.			5.8	3.2	Postproces	4/28/2007
64	ew	5/4/2007	1000	350	250	50	e	Excellent	Scat present.	4	Scat not from this year.					2.2	1.1	Postproces	5/4/2007
65	ew	5/3/2007	500	275	200	100	ne	Fair	Scat not present.	0						3.5	2	Postproces	5/3/2007
66	ew	5/1/2007	1000	350	200	100	n	Good	Scat not present.	0						4.6	2.3	Postproces	5/1/2007
67	jg	4/28/2007	190	250	155	150	south west	Fair	Scat not present.	0		Courtship ring not present.	Eggshell fragments not present.	Drinking depression not present.		5.9	2	Postproces	4/28/2007
68	jg	4/28/2007	480	220	160	40	north	Good	Scat not present.	0		Courtship ring not present.	Eggshell fragments not present.	Drinking depression not present.		2.8	1.5	Postproces	4/28/2007
69	ew	4/27/2007	1000	350	250	200	e	Good	Scat not present.	0						2.5	1.6	Postproces	4/27/2007
70	gg	4/26/2007	1000	200	90	30	n	Good	Scat not present.	0						2.9	1.7	Postproces	4/26/2007
71	gcg	5/24/2007	1000	280	160	40	south	Good	Scat not present.	0						5.5	3.8	Real-time S	5/24/2007
72	gcg	5/24/2007	1000	260	140	30	se	Good	Scat present.	1	Scat not from this year.					2.5	1.5	Postproces	5/24/2007
73	gg	5/3/2007	500	275	90	30	e	Good	Scat not present.	0						5.8	2.2	Postproces	5/3/2007
74	gg	5/4/2007	800	250	125	200	w	Fair	Scat not present.	0						4.5	1.5	Postproces	5/4/2007
75	gg	4/13/2007	400	250	70	250	sw	Poor	Scat not present.	0						2.5	1.6	Postproces	4/13/2007
76	gg	5/24/2007	1000	325	175	150	se	Fair	Scat not present.	0						5.5	2.1	Postproces	5/24/2007
77	rh	5/15/2007	600	450	375	100	nw	Poor		0						4.6	3.5	Postproces	5/15/2007
78	dhh	5/20/2007	580	260	120	50	south	Excellent	Scat not present.	0						3.7	3	Postproces	5/20/2007
79	gg	5/13/2007	700	175	80	30	east	Excellent	Scat not present.	0						2.2	1.1	Postproces	5/13/2007
80	dhh	6/2/2007	700	275	150	30	SE	Good		0						2.8	1.3	Postproces	6/2/2007
81	gg	5/21/2007	1000	425	175	75	ne	Poor	Scat not present.	0						3.5	1.6	Real-time S	5/21/2007
82	dhh	5/19/2007	1000	270	110	90	N	Good	Scat not present.	0						3.5	3	Postproces	5/19/2007
83	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	burrow	<Null>	<Null>	<Null>	6/5/2007
84	dhh	5/13/2007	900	350	200	125	N	Fair		0						2.3	1.3	Postproces	5/13/2007
85	gg	6/2/2007	800	325	200	350	east	Fair		0						2.9	2.9	Postproces	6/2/2007
86	dhh	6/3/2007	420	230	190	150	north	Fair		0					other similar burrow nearby	5.7	2.3	Postproces	6/3/2007
87	gg	4/9/2007	1000	350	200	90	nw	Fair	Scat not present.	0						5.7	2.2	Postproces	4/9/2007
88	ew	4/9/2007	700	250	250	40	se	Poor	Scat not present.	0						3.4	1.3	Postproces	4/9/2007
89	ew	4/10/2007	700	350	250	40	nw	Fair	Scat not present.	0						3.1	1.4	Postproces	4/10/2007
90	ew	4/10/2007	700	375	175	40	ene	Fair	Scat not present.	0						2.7	1.7	Postproces	4/10/2007
91	jg	4/14/2007	800	260	150	50	east	Fair	Scat not present.	0			Eggshell fragments not present.	Drinking depression not present.	3 burros near by in wash probably not tortoie	5.5	2.4	Postproces	4/14/2007

Tortoise Burrows

Row #	Field Personnel Initials	Collection Date	Burrow Length	Burrow Width	Burrow Height	Burrow Entry Soil	Burrow Aspect	Burrow Condition	Scat Presence	Number Of Scat	Scat Condition	Courtship Ring	Eggshell Fragments	Drinking Depression	General Comment	Maximum PDOP	Maximum HDOP	Correction Type	GPS Date
92	rsf	4/14/2007	1000	280	150	120	sse		Scat not present.	0		Courtship ring not present.				3.8	2.8	Postproces	4/14/2007
93	dhh	4/15/2007	740	300	145	80	east	Fair	Scat not present.	0		Courtship ring not present.	Eggshell fragments not present.	Drinking depression not present.	fair condition does not look recently used	2.5	1.5	Postproces	4/15/2007
94	gg	4/15/2007	800	250	100	100	ne	Fair	Scat not present.	0						1.7	0.8	Postproces	4/15/2007
95	dhh	4/15/2007	550	220	85	150	eastern	Fair	Scat not present.	0		Courtship ring not present.	Eggshell fragments not present.	Drinking depression not present.	poor burrow approx. 5 feet away	1.8	1	Postproces	4/15/2007
96	rsr	4/15/2007	900	300	140	70	north	Good	Scat not present.	0		Courtship ring not present.	Eggshell fragments not present.	Drinking depression not present.		2.7	2.2	Postproces	4/15/2007
97	gg	4/16/2007	700	275	175	30	ssw	Fair	Scat not present.	0						1.9	1	Postproces	4/16/2007
98	gg	4/19/2007	800	275	175	150	se	Fair	Scat not present.	0						1.9	1.1	Postproces	4/19/2007
99	gg	4/19/2007	1000	350	175	200	n	Fair	Scat not present.	0						1.8	1.1	Postproces	4/19/2007
100	gg	4/19/2007	700	300	175	60	nne	Fair	Scat not present.	0						1.6	1	Postproces	4/19/2007
101	ew	4/19/2007	800	350	175	225	e	Fair	Scat not present.	0						1.9	1	Postproces	4/19/2007
102	gg	4/20/2007	750	275	175	200	ne	Poor	Scat not present.	0						3.1	1.9	Postproces	4/20/2007
103	gg	4/20/2007	1000	350	150	60	ene	Good	Scat not present.	0						2.4	1.4	Postproces	4/20/2007
104	gg	4/20/2007	800	400	250	8	e	Good	Scat not present.	0						3.8	1.6	Postproces	4/20/2007
105	gg	4/20/2007	1000	300	200	150	se	Fair	Scat not present.	0						5.9	2	Postproces	4/20/2007
106	ew	4/20/2007	1000	350	150	60	e	Good	Scat present.	0	Scat not from this year.					2.6	1.3	Postproces	4/20/2007
107	gg	4/20/2007	900	350	175	175	n	Fair	Scat not present.	0						5.4	3.4	Postproces	4/20/2007
108	gg	4/20/2007	1000	325	225	250	se	Fair	Scat not present.	0						2	1.1	Postproces	4/20/2007
109	ew	4/20/2007	1000	375	200	300	nne	Fair	Scat not present.	0						2.6	1.6	Postproces	4/20/2007
110	gg	4/20/2007	600	400	175	40	ne	Fair	Scat not present.	0						3.1	1.7	Postproces	4/20/2007
111	gg	4/20/2007	1000	325	150	100	n	Fair		0					another bur in similar condition 5 m nw no other sign	2.5	1.6	Postproces	4/20/2007
112	jg	4/21/2007	1000	240	165	100	east	Good		0						2.6	1.6	Postproces	4/21/2007
113	jg	4/21/2007	450	340	160	160	north	Fair		0						2.7	1.6	Postproces	4/21/2007
114	jg	4/21/2007	1000	210	110	70	east	Fair		0						3.8	1.9	Postproces	4/21/2007
115	gg	4/21/2007	530	225	175	175	nne	Fair		0						2.5	1.6	Postproces	4/21/2007
116	gg	4/21/2007	430	300	140	120	se	Good	Scat not present.	0						2.8	1.6	Postproces	4/21/2007
117	jg	4/22/2007	500	250	80	110	east	Poor	Scat not present.	0		Courtship ring not present.	Eggshell fragments not present.	Drinking depression not present.	small burrow near by also poor condition	3.7	1.6	Real-time S	4/22/2007
118	dhh	4/22/2007	1000	190	110	80	SE	Good		0						5.6	2.9	Real-time S	4/22/2007
119	jg	4/22/2007	900	210	120	60	east	Good	Scat not present.	0		Courtship ring not present.	Eggshell fragments not present.	Drinking depression not present.	older larger burrow near by in poor	5.6	2.9	Postproces	4/22/2007
120	dhh	4/22/2007	780	245	110	75	NORTH	Fair		0					no other sign	2.4	1.1	Postproces	4/22/2007
121	jg	4/22/2007	1000	300	250	350	se	Fair	Scat present.	3						2	1.1	Postproces	4/22/2007
122	gg	4/22/2007	700	250	90	200	ene	Fair	Scat not present.	0						4.3	3.1	Postproces	4/22/2007
123	gg	4/22/2007	600	300	125	30	ene	Fair	Scat not present.	0						3	1.4	Postproces	4/22/2007

Tortoise Burrows

Row #	Field Personnel Initials	Collection Date	Burrow Length	Burrow Width	Burrow Height	Burrow Entry Soil	Burrow Aspect	Burrow Condition	Scat Presence	Number Of Scat	Scat Condition	Courtship Ring	Eggshell Fragments	Drinking Depression	General Comment	Maximum PDOP	Maximum HDOP	Correction Type	GPS Date
124	ew	4/23/2007	600	325	175	30	se	Fair	Scat not present.	0						2	1.1	Postproces	4/23/2007
125	ew	4/24/2007	1000	350	250	300	w	Good	Scat not present.	0						1.9	1.1	Postproces	4/24/2007
126	ew	4/24/2007	750	300	250	50	se	Fair	Scat not present.	0						2.6	1.2	Postproces	4/24/2007
127	ew	4/24/2007	750	350	300	100	e	Fair	Scat not present.	0						2.7	1.5	Postproces	4/24/2007
128	ew	4/25/2007	300	250	200	100	n	Good	Scat not present.	0						2.2	1.1	Postproces	4/25/2007
129	ew	4/26/2007	1000	400	350	200	nw	Fair	Scat not present.	0						2.2	1.1	Postproces	4/26/2007
130	rsf	4/28/2007	1000	210	170	60	nne	Fair	Scat not present.	0		Courtship ring not present.	Eggshell fragments not present.			4	2.4	Postproces	4/28/2007
131	ew	5/2/2007	500	300	300	400	n	Good	Scat not present.	0					in the bank of a small wash.	2.3	1.5	Postproces	5/2/2007
132	gg	5/3/2007	800	325	175	350	sw	Good	Scat not present.	0						3	2	Postproces	5/3/2007
133	gg	5/6/2007	700	450	275	400	n	Good	Scat not present.	0						2.5	1.8	Postproces	5/6/2007
134	ew	5/7/2007	800	350	175	150	e	Fair	Scat not present.	0						4	2.1	Postproces	5/7/2007
135	ew	5/7/2007	600	300	150	40	se	Excellent	Scat not present.	0					tortoise inside	2.6	1.7	Postproces	5/7/2007
136	ew	5/8/2007	1000	300	250	100	ne	Excellent	Scat not present.	0					tortoise on mound.	4.2	2.8	Postproces	5/8/2007
137	ew	5/8/2007	1000	375	200	125	e	Good	Scat not present.	0						3.3	2.8	Postproces	5/8/2007
138	gcg	5/9/2007	450	350	140	15	s	Good	Scat not present.	0					tracks in burrow	2.3	1.3	Postproces	5/9/2007
139	ew	5/9/2007	1000	400	160	25	e	Good	Scat not present.	0					tracks in burrow	3.1	2	Postproces	5/9/2007
140	gcg	5/9/2007	1000	550	140	100	ne	Fair	Scat not present.	0						2.4	1.3	Postproces	5/9/2007
141	ew	5/9/2007	1000	450	220	100	s	Fair	Scat present.	4	Scat not from this year.					2.2	1.1	Postproces	5/9/2007
142	gcg	5/9/2007	1000	400	200	60	ne	Good	Scat not present.	0						2.6	1.3	Postproces	5/9/2007
143	gg	5/10/2007	700	325	125	70	s	Fair	Scat not present.	0						2.2	1.1	Postproces	5/10/2007
144	gg	5/10/2007	800	275	250	175	sw	Fair	Scat not present.	0						2.6	1.3	Postproces	5/10/2007
145	gg	5/11/2007	700	250	200	100	n	Fair	Scat not present.	0						1.9	1	Postproces	5/11/2007
146	gcg	5/11/2007	1000	325	200	70	northeast	Fair	Scat not present.	0						2.5	1.2	Postproces	5/11/2007
147	gcg	5/11/2007	1000	425	175	50	ne	Good		0						2.5	1.2	Postproces	5/11/2007
148	dhh	5/12/2007	800	425	200	150	NE	Fair		0						1.9	1.1	Postproces	5/12/2007
149	DHH	5/12/2007	1000	330	155	80	NE	Excellent		0						1.9	1.1	Postproces	5/12/2007
150	GG	5/12/2007	770	180	75	40	se	Fair	Scat not present.	0						2.2	1.1	Postproces	5/12/2007
151	gg	5/12/2007	570	310	140	120	ne	Fair	Scat not present.	0						2.1	1.1	Postproces	5/12/2007
152	gg	5/12/2007	540	240	130	35	se	Fair		0						2.3	1.3	Postproces	5/12/2007
153	dh	5/12/2007	300	180	60	20	se	Excellent	Scat not present.	0						2.7	1.5	Postproces	5/12/2007
154	gg	5/12/2007	840	290	180	70	ne	Fair	Scat not present.	0						4.3	3.3	Postproces	5/12/2007
155	dhh	5/12/2007	300	210	90	60	SE	Fair		0						3.4	2	Postproces	5/12/2007
156	gg	5/13/2007	900	325	175	30	se	Good	Scat not present.	0						1.6	0.9	Postproces	5/13/2007
157	dhh	5/13/2007	700	250	175	30	NE	Excellent		0					tortoise inside	2.3	1.3	Postproces	5/13/2007
158	dhh	5/13/2007	340	180	90	100	N	Fair		0						2.8	1.3	Postproces	5/13/2007
159	dhh	5/13/2007	1000	210	90	100	S	Good		0						1.4	0.8	Postproces	5/13/2007
160	gcg	5/14/2007	800	400	175	30	east	Good	Scat present.	1	Scat not from this year.					1.9	1.1	Postproces	5/14/2007
161	gcg	5/14/2007	1000	375	225	350	north	Good	Scat present.	3	Scat not from this year.					2.1	1.1	Postproces	5/14/2007
162	rh	5/15/2007	1000	700	350	100	e	Poor	Scat present.	1	Scat not from this year.					2.3	1.4	Postproces	5/15/2007

Tortoise Burrows

Row #	Field Personnel Initials	Collection Date	Burrow Length	Burrow Width	Burrow Height	Burrow Entry Soil	Burrow Aspect	Burrow Condition	Scat Presence	Number Of Scat	Scat Condition	Courtship Ring	Eggshell Fragments	Drinking Depression	General Comment	Maximum PDOP	Maximum HDOP	Correction Type	GPS Date
163	gcg	5/15/2007	1000	260	140	200	north	Good	Scat not present.	0						3	1.6	Postproces	5/15/2007
164	gcg	5/15/2007	1000	270	140	40	east	Excellent	Scat present.	8	Scat from this year.				tracks on mound	3.6	1.5	Postproces	5/15/2007
165	gcg	5/15/2007	1000	180	110	20	north	Good	Scat not present.	0						1.8	0.9	Postproces	5/15/2007
166	gcg	5/16/2007	1000	200	160	20	east	Fair	Scat not present.	0						5.9	1.8	Postproces	5/16/2007
167	dhh	5/19/2007	380	340	150	180	S	Fair		0						3.9	2	Postproces	5/19/2007
168	dhh	5/19/2007	600	300	180	210	ne	Fair	Scat present.	0						5.8	2.3	Postproces	5/19/2007
169	dhh	5/19/2007	680	260	180	160	NE	Fair	Scat not present.	0						3.1	1.2	Postproces	5/19/2007
170	gg	5/19/2007	700	200	90	30	ne	Fair	Scat not present.	0						2.7	1.7	Postproces	5/19/2007
171	ew	5/21/2007	500	300	225	300	e	Fair	Scat not present.	0						4.3	2.3	Real-time S	5/21/2007
172	gcg	5/21/2007	350	200	90	20	se	Excellent	Scat not present.	0					tracks in burrow	4.4	3.4	Real-time S	5/21/2007
173	gg	5/21/2007	1000	250	175	100	se	Fair	Scat not present.	0						3.6	2.5	Real-time S	5/21/2007
174	ew	5/22/2007	500	250	250	50	s	Excellent	Scat present.	0	Scat not from this year.					2.7	1.8	Postproces	5/22/2007
175	ew	5/22/2007	450	200	175	75	nw	Excellent	Scat not present.	0						5.8	2	Postproces	5/22/2007
176	gg	5/24/2007	800	375	175	80	ne	Fair	Scat not present.	0						4.5	3.2	Postproces	5/24/2007
177	gg	5/24/2007	1000	300	200	100	ne	Fair	Scat not present.	0						2.3	1.7	Postproces	5/24/2007
178	gg	5/26/2007	700	325	225	150	n	Fair	Scat not present.	0						2.1	1	Postproces	5/26/2007
179	gg	5/26/2007	1000	425	200	450	sw	Good	Scat not present.	0						2.6	1.3	Postproces	5/26/2007
180	gg	5/28/2007	800	225	150	50	ne	Fair	Scat not present.	0						4.9	4.5	Postproces	5/28/2007
181	gg	5/28/2007	1000	325	300	75	se	Good	Scat not present.	0						2.7	1.7	Real-time S	5/28/2007
182	gcg	5/28/2007	1000	325	175	150	south	Good	Scat present.	1	Scat from this year.					3.3	1.9	Postproces	5/28/2007
183	gcg	5/28/2007	700	325	175	150	south	Excellent	Scat present.	4	Scat from this year.					4.4	2.3	Postproces	5/28/2007
184	gcg	5/29/2007	1000	225	75	350	sw	Fair	Scat not present.	0						5.6	3	Postproces	5/29/2007

Tortoise Burrows

Row #	GPS Time	Datafile Name	Unfiltered Positions	Filtered Positions	Data Dictionary Name	GPS Week	GPS Second	GPS Height	Vertical Precision	Horizontal Precision	Standard Deviation	Latitude	Longitude	Point ID	X Coordinate	Y Coordinate	SITE	LOCID	BURROW
1	09:12:49ar	BSE12MA`	66	66	BSE_Torto	1426	576783	3015.28	1.5	0.9	0	35.58421	-115.4691	5	7314191	2408424.8	IVANPAH 1	27	BURROW
2	10:12:13ar	BSE14MA`	16	16	BSE_Torto	1427	148347	3076.213	4.1	2.4	1.000191	35.58367	-115.4732	5	7312967.5	2408199	IVANPAH 1	26	BURROW
3	06:36:46ar	BSE16MA`	19	19	BSE_Torto	1427	308220	3089.788	5.6	3.5	0.94962	35.58443	-115.475	1	7312436.5	2408463.3	IVANPAH 1	25	BURROW
4	08:12:39ar	BSET17M/	16	16	BSE_Torto	1427	400373	3118.936	2.4	1.4	0	35.58168	-115.4773	3	7311766.5	2407443.5	IVANPAH 1	41	BURROW
5	09:18:54ar	BSE18MA`	79	78	BSE_Torto	1427	490748	3156.064	3.9	2.5	0.867458	35.58239	-115.4799	3	7310995	2407681.3	IVANPAH 1	39	BURROW
6	06:00:31ar	BSE19MA`	95	95	BSE_Torto	1427	565245	3156.629	3.9	2.3	0.404439	35.58277	-115.4801	1	7310938	2407818.8	IVANPAH 1	38	BURROW
7	04:36:51pr	BSE19MA`	219	219	BSE_Torto	1427	603425	3191.099	6.8	3.9	0.4958	35.58543	-115.482	10	7310345	2408773	IVANPAH 1	24	BURROW
8	12:21:12pr	BSE19MA`	53	53	BSE_Torto	1427	588086	2939.72	4.4	3.2	0.943937	35.58187	-115.4633	11	7315943.5	2407618.8	WITHIN 1-MILE BUFFER	28	BURROW
9	07:22:28ar	BSE20MA`	79	79	BSE_Torto	1428	51762	3193.455	4	2.9	0.68731	35.58456	-115.4827	3	7310149	2408451.3	IVANPAH 1	33	BURROW
10	07:03:30ar	BSE20MA`	77	77	BSE_Torto	1428	50624	3108.284	4.5	3.2	0.645928	35.59179	-115.475	4	7312366.5	2411138.3	WITHIN 1-MILE BUFFER	10	BURROW
11	01:10:54pr	BSE21MA`	65	44	BSE_Torto	1428	159068	3212.581	8.9	3.4	0.860229	35.58453	-115.4844	13	7309627	2408426.5	IVANPAH 1	32	BURROW
12	07:41:06ar	BSE22MA`	65	64	BSE_Torto	1428	225680	3000.063	3.7	2.5	120.6912	35.58363	-115.4479	3	7320506	2408373.3	OUT 1-MILE BUFFER	29	BURROW
13	12:36:07pr	BSE24MA`	76	76	BSE_Torto	1428	416181	3264.921	4.7	2.9	0.099325	35.58625	-115.487	6	7308842	2409034.5	IVANPAH 1	22	BURROW
14	12:37:38pr	BSE24MA`	56	56	BSE_Torto	1428	416272	3261.74	5.2	2.6	0.74024	35.58623	-115.487	7	7308856	2409028.5	IVANPAH 1	23	BURROW
15	07:22:12ar	BSE26MA`	93	93	BSE_Torto	1428	570146	3274.326	3.8	3	0.86315	35.58441	-115.4878	3	7308637	2408359.3	IVANPAH 1	31	BURROW
16	10:46:06ar	BSE26MA`	198	198	BSE_Torto	1428	582380	3295.619	0.7	0.5	0.530137	35.58623	-115.4888	4	7308321.5	2409013.8	IVANPAH 1	21	BURROW
17	07:41:18ar	BSE28MA`	32	32	BSE_Torto	1429	139292	3296.439	5.1	2.9	1.144152	35.58316	-115.4896	3	7308103.5	2407891	IVANPAH 1	37	BURROW
18	11:44:24ar	BSE28MA`	91	90	BSE_Torto	1429	153878	3306.294	4.6	3.3	0.740611	35.58402	-115.4901	9	7307943	2408201	IVANPAH 1	30	BURROW
19	12:13:07pr	BSE29MA`	44	44	BSE_Torto	1429	242001	3330.219	6.6	2.9	0.792835	35.58322	-115.4915	3	7307557	2407900	IVANPAH 1	35	BURROW
20	12:15:52pr	BSE29MA`	49	49	BSE_Torto	1429	242166	3328.275	5.2	3.1	0.907272	35.58319	-115.4914	4	7307567	2407889	IVANPAH 1	36	BURROW
21	09:03:08ar	BSE30MA`	26	26	BSE_Torto	1429	317002	3339.741	2.7	1.8	0	35.58653	-115.4919	1	7307405.5	2409099.8	IVANPAH 1	20	BURROW
22	07:08:36ar	BSE31MA`	67	67	BSE_Torto	1429	396530	3338.672	4.4	3.2	1.993422	35.60086	-115.4909	3	7307568	2414322	1000' GAS LINE CORRIDOR	1	BURROW
23	07:50:33ar	BSE01JUN	33	33	BSE_Torto	1429	485447	2833.693	5.9	3.7	2.197591	35.5929	-115.4517	2	7319279.5	2411716.5	WITHIN 1-MILE BUFFER	11	BURROW
24	07:54:18ar	BSE01JUN	36	35	BSE_Torto	1429	485672	2835.675	3.9	2.6	2.671558	35.5931	-115.4517	3	7319280.5	2411791.5	WITHIN 1-MILE BUFFER	12	BURROW
25	11:22:27ar	BSE02JUN	46	46	BSE_Torto	1429	584561	3399.91	3.2	2.2	0.480577	35.58207	-115.4965	4	7306066	2407442.5	IVANPAH 1	40	BURROW
26	12:57:44pr	BSE02JUN	55	55	BSE_Torto	1429	590278	3372.515	4.6	3.6	0.788733	35.58328	-115.4942	8	7306724.5	2407899	IVANPAH 1	34	BURROW
27	11:58:18ar	BSE03JUN	42	41	BSE_Torto	1430	68312	3257.738	1.3	0.6	0.525668	35.59701	-115.485	4	7309338	2412964.8	1000' GAS LINE CORRIDOR	3	BURROW
28	11:59:59ar	BSE03JUN	85	85	BSE_Torto	1430	68413	3252.795	1.3	0.6	1.944752	35.59704	-115.4848	5	7309397.5	2412977.8	1000' GAS LINE CORRIDOR	5	BURROW
29	06:40:48ar	BSE5JUNE	25	25	BSE_Torto	1430	222062	3304.957	1.7	1	0.469492	35.5965	-115.4881	2	7308425	2412755	1000' GAS LINE CORRIDOR	4	BURROW
30	08:08:00ar	BSE5JUNE	34	34	BSE_Torto	1430	227294	3273.92	1.7	1.2	0.442283	35.5873	-115.4871	4	7308814.5	2409415.5	IVANPAH 1	19	BURROW

Tortoise Burrows

Row #	GPS Time	Datafile Name	Unfiltered Positions	Filtered Positions	Data Dictionary Name	GPS Week	GPS Second	GPS Height	Vertical Precision	Horizontal Precision	Standard Deviation	Latitude	Longitude	Point ID	X Coordinate	Y Coordinate	SITE	LOCID	BURROW
31	08:28:02ar	BSE5JUNE	102	102	BSE_Torto	1430	228496	3314.152	0.8	0.6	0	35.59444	-115.4888	6	7308253	2412002.5	1000' GAS LINE CORRIDOR	6	BURROW
32	09:33:30ar	BSE5JUNE	35	35	BSE_Torto	1430	232424	3309.828	1.8	0.9	0	35.59187	-115.489	7	7308222.5	2411067	1000' GAS LINE CORRIDOR	8	BURROW
33	06:37:58ar	BSE4JUNE	47	47	BSE_Torto	1430	135492	3247.189	1.5	0.9	0	35.59207	-115.4848	1	7309466.5	2411169	1000' GAS LINE CORRIDOR	9	BURROW
34	07:24:43ar	BSE4JUNE	33	33	BSE_Torto	1430	138297	3239.938	1.5	0.9	0	35.58946	-115.4846	2	7309533	2410218.5	IVANPAH 1	17	BURROW
35	08:28:24ar	BSE4JUNE	25	25	BSE_Torto	1430	142118	3267.514	1.7	1.3	0	35.59338	-115.4858	3	7309135	2411638.3	1000' GAS LINE CORRIDOR	7	BURROW
36	08:48:42ar	BSE4JUNE	33	33	BSE_Torto	1430	143336	3256.649	1.9	1.2	0.320509	35.58947	-115.4856	4	7309248	2410217.5	1000' GAS LINE CORRIDOR	16	BURROW
37	09:57:30ar	BSE4JUNE	45	45	BSE_Torto	1430	147464	3262.606	1.7	1	0	35.5894	-115.4861	5	7309093.5	2410185.8	1000' GAS LINE CORRIDOR	15	BURROW
38	10:42:18ar	BSE4JUNE	18	18	BSE_Torto	1430	150152	3300.601	1.5	1.6	0.985718	35.59861	-115.488	6	7308456	2413523.3	1000' GAS LINE CORRIDOR	2	BURROW
39	11:05:42ar	BSE4JUNE	24	24	BSE_Torto	1430	151556	3266.918	2.8	2.4	0.601801	35.58951	-115.4864	7	7309009.5	2410226.5	1000' GAS LINE CORRIDOR	14	BURROW
40	11:22:30ar	BSE4JUNE	84	84	BSE_Torto	1430	152564	3276.962	1	0.7	0	35.59021	-115.4867	9	7308891.5	2410478	1000' GAS LINE CORRIDOR	13	BURROW
41	11:25:23ar	BSE6MAY	26	26	BSE_Torto	1426	66337	2959.61	4.7	2.4	0.214219	35.53726	-115.4601	2	7317302.5	2391406.5	IVANPAH 3	151	BURROW
42	01:28:39pr	BSE5MAY	19	19	BSE_Torto	1425	592133	2951.05	2	1.3	0	35.53687	-115.4589	2	7317661	2391276.8	IVANPAH 3	152	BURROW
43	10:24:24ar	BSE05MA	35	35	BSE_Torto	1425	581078	2935.847	3.8	2.5	0.268683	35.53716	-115.458	1	7317937	2391386.8	IVANPAH 3	153	BURROW
44	11:51:54ar	BSE4MAY	47	47		1425	499928	2917.503	2.5	1.3	0	35.53704	-115.4565	133	7318383.5	2391355	IVANPAH 3	154	BURROW
45	12:38:21pr	BSE4MAY	97	97		1425	502715	2919.068	1	0.9	0	35.53769	-115.4567	134	7318307.5	2391590.8	IVANPAH 3	155	BURROW
46	09:55:30ar	BSE4MAY	51	50		1425	492944	2912.324	1	0.7	0.249764	35.53743	-115.456	130	7318529	2391500.5	IVANPAH 3	156	BURROW
47	12:37:22pr	BSE1MAY	54	54		1425	243456	2875.817	1.1	0.9	1.078373	35.53698	-115.4523	378	7319612	2391365	IVANPAH 3	157	BURROW
48	10:55:42ar	BSE28APF	63	63	BSE_Torto	1424	582956	2812.32	3.7	3	1.783027	35.53858	-115.4465	7	7321337	2391989.8	IVANPAH 3	158	BURROW
49	10:40:42ar	BSE27APF	47	46	BSE_Torto	1424	495656	2792.345	4	2.3	0.651765	35.53893	-115.4442	4	7322029	2392134.3	IVANPAH 3	159	BURROW
50	04:28:35pr	BSE26APF	11	11	BSE_Torto	1424	430129	2783.529	4.1	2.4	0	35.53848	-115.4439	8	7322110	2391972.8	IVANPAH 3	161	BURROW
51	08:23:20ar	BSE25APF	25	25	BSE_Torto	1424	314614	2771.555	0.9	0.7	0	35.53796	-115.4416	1	7322796	2391800.5	IVANPAH 3	163	BURROW
52	02:31:03pr	BSE4MAY	58	58		1425	509477	2932.828	2.1	1.2	0.633934	35.53534	-115.457	135	7318227	2390733.3	IVANPAH 3	164	BURROW
53	12:17:06pr	BSE26APF	32	32	BSE_Torto	1424	415040	2784.632	1.8	0.9	0	35.5369	-115.4431	5	7322373.5	2391406.5	IVANPAH 3	165	BURROW
54	07:50:24ar	BSE25MA	33	33	BSE_Torto	1428	485438	3111.382	1.7	0.9	1.667771	35.53368	-115.4704	1	7314278	2390027.5	WITHIN 1-MILE BUFFER	166	BURROW
55	11:10:22ar	BSE6MAY	31	31	BSE_Torto	1426	65436	2995.722	3.8	2.7	1.042372	35.53187	-115.4607	1	7317172	2389442.3	IVANPAH 3	167	BURROW
56	09:57:38ar	BSE3MAY	24	24		1425	406672	2909.185	4.7	2.9	0.261341	35.53351	-115.4543	424	7319059	2390085.8	IVANPAH 3	168	BURROW
57	01:22:07pr	BSE28APF	89	89	BSE_Torto	1424	591741	2827.572	6.4	4.2	1.459704	35.53313	-115.4467	11	7321338	2390004.8	IVANPAH 3	169	BURROW
58	10:38:06ar	BSE28APF	64	63	BSE_Torto	1424	581900	2829.817	4.5	2.7	1.949615	35.53302	-115.4465	6	7321398	2389967	IVANPAH 3	170	BURROW
59	05:25:06pr	BSE27APF	45	45	BSE_Torto	1424	519920	2814.53	4.8	4.1	1.63122	35.53268	-115.4454	2	7321727	2389851.3	IVANPAH 3	171	BURROW
60	10:32:18ar	BSE26APF	36	35	BSE_Torto	1424	408752	2789.36	1.2	0.9	0.592527	35.53298	-115.4425	3	7322586	2389985	IVANPAH 3	172	BURROW
61	10:40:18ar	BSE4MAY	45	45		1425	495632	2937.281	2.6	1.8	0	35.53167	-115.4561	131	7318548	2389404.8	IVANPAH 3	173	BURROW

Tortoise Burrows

Row #	GPS Time	Datafile Name	Unfiltered Positions	Filtered Positions	Data Dictionary Name	GPS Week	GPS Second	GPS Height	Vertical Precision	Horizontal Precision	Standard Deviation	Latitude	Longitude	Point ID	X Coordinate	Y Coordinate	SITE	LOCID	BURROW
62	10:31:53ar	BSE29APF	75	75	BSE_Torto	1425	63127	2866.859	1.3	0.9	0	35.53131	-115.4496	2	7320473.5	2389322.5	IVANPAH 3	174	BURROW
63	10:09:48ar	BSE28APF	111	111	BSE_Torto	1424	580202	2817.628	6.5	4.2	4.111653	35.53221	-115.446	5	7321537	2389676	IVANPAH 3	175	BURROW
64	09:33:19ar	BSE4MAY(	183	183		1425	491613	2942.065	0.9	0.5	0.692693	35.52953	-115.4557	129	7318667	2388627.5	IVANPAH 3	176	BURROW
65	08:17:39ar	BSE3MAY(	55	55		1425	400673	2920.498	4.9	3.2	0.515631	35.52918	-115.4537	427	7319273.5	2388516.8	IVANPAH 3	177	BURROW
66	01:03:30pr	BSE1MAY(	43	43		1425	245024	2904.415	1.4	1.4	0.448582	35.52948	-115.4525	379	7319618	2388634.5	IVANPAH 3	178	BURROW
67	02:48:09pr	BSE28APF	105	105	BSE_Torto	1424	596903	2836.41	9.3	4	0.653149	35.53069	-115.4473	13	7321180.5	2389111.8	IVANPAH 3	179	BURROW
68	08:45:25ar	BSE28APF	84	84	BSE_Torto	1424	575139	2825.571	3.2	2.6	1.176184	35.52941	-115.4454	1	7321739.5	2388661.3	IVANPAH 3	180	BURROW
69	01:41:40pr	BSE27APF	53	53	BSE_Torto	1424	506514	2816.502	4	2.7	0.374585	35.52855	-115.4445	6	7322024	2388354.3	IVANPAH 3	181	BURROW
70	02:45:09pr	BSE26APF	23	22	BSE_Torto	1424	423923	2804.894	2.7	1.3	1.491499	35.52813	-115.4433	7	7322367.5	2388211.8	WITHIN 1-MILE BUFFER	182	BURROW
71	01:09:18pr	BSE24MA`	55	25	BSE_Torto	1428	418172	2765.648	6.7	6.6	0.282544	35.52783	-115.4396	12	7323498	2388132.5	WITHIN 1-MILE BUFFER	183	BURROW
72	09:09:25ar	BSE24MA`	55	55	BSE_Torto	1428	403779	2915.51	3.7	2.6	1.22518	35.52248	-115.4516	9	7319961.5	2386092.3	WITHIN 1-MILE BUFFER	184	BURROW
73	02:07:03pr	BSE3MAY(	27	26		1425	421637	2895.257	6.4	3.1	0.282071	35.53626	-115.4552	425	7318763	2391081.8	IVANPAH 3	160	BURROW
74	04:23:01pr	BSE4MAY(	21	21		1425	516195	2922.331	5.4	2.5	0	35.53653	-115.4572	138	7318166	2391166	IVANPAH 3	162	BURROW
75	04:26:27pr	BSE1APR(	128	128	BSE_Torto	1422	516401	2908.965	1.1	0.9	0	35.55984	-115.4603	1	7317037	2399624.5	IVANPAH 2	111	BURROW
76	10:27:19ar	BSE24MA`	45	44	BSE_Torto	1428	408453	3244.288	4.4	2.6	0.801813	35.58131	-115.4863	4	7309115	2407240.5	IVANPAH 1	42	BURROW
77	08:07:51ar	BSE15MA`	89	89	BSE_Torto	1427	227285	3075.547	3.8	3.1	4.928001	35.58158	-115.4742	1	7312691	2407428.8	IVANPAH 1	43	BURROW
78	07:06:34ar	BSE20MA`	50	50	BSE_Torto	1428	50808	3188.984	3.6	2.9	1.83804	35.58226	-115.4827	1	7310178.5	2407615.8	IVANPAH 1	44	BURROW
79	10:10:24ar	BSE13MA`	77	77	BSE_Torto	1427	61838	3045.742	0.9	0.7	0	35.58152	-115.4721	5	7313321	2407425.8	IVANPAH 1	45	BURROW
80	12:08:06pr	BSE02JUN	29	29	BSE_Torto	1429	587300	3403.457	4.3	2.6	1.84106	35.58051	-115.497	5	7305934.5	2406871.3	IVANPAH 1	46	BURROW
81	06:49:58ar	BSE21MA`	63	61	BSE_Torto	1428	136212	3201.921	2.8	1.8	0.25476	35.58069	-115.4838	5	7309849	2407034.8	IVANPAH 1	47	BURROW
82	11:46:24ar	BSE19MA`	36	35	BSE_Torto	1427	585998	3178.906	3.5	5.3	1.168774	35.58073	-115.4818	5	7310458.5	2407065.3	IVANPAH 1	48	BURROW
83	06:22:41ar	VL060507.	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	7312041.5	2406971.3	IVANPAH 1	49	BURROW
84	11:57:36ar	BSE13MA`	62	61	BSE_Torto	1427	68270	3046.23	1.3	1.1	0.703395	35.58021	-115.4723	8	7313271.5	2406944.5	IVANPAH 1	50	BURROW
85	11:03:39ar	BSE02JUN	53	53	BSE_Torto	1429	583433	3394.835	3.8	3.5	2.655894	35.57845	-115.4965	3	7306099.5	2406124.8	WITHIN 1-MILE BUFFER	51	BURROW
86	07:23:54ar	BSE03JUN	246	246	BSE_Torto	1430	51848	3203.58	4.5	2.7	1.288757	35.58898	-115.4822	1	7310242	2410062	IVANPAH 1	18	BURROW
87	11:05:07ar	BSE9APR(	144	144	BSE_Torto	1422	151521	2864.141	4.5	2.6	1.498023	35.55803	-115.4561	1	7318308.5	2398995	WITHIN 1-MILE BUFFER	118	BURROW
88	01:26:28pr	BSE9APR(	174	174	BSE_Torto	1422	160002	2872.611	0.8	0.4	0.39227	35.55683	-115.4564	2	7318228	2398558.3	WITHIN 1-MILE BUFFER	127	BURROW
89	08:59:07ar	BSE10APF	74	74	BSE_Torto	1422	230361	2877.104	4.9	2.6	0.535292	35.55964	-115.4575	1	7317880.5	2399571	WITHIN 1-MILE BUFFER	112	BURROW
90	04:07:58pr	BSE10APF	109	109	BSE_Torto	1422	256092	2892.913	2.5	1.4	0	35.56651	-115.4589	4	7317377	2402059	WITHIN 1-MILE BUFFER	87	BURROW
91	11:37:30ar	BSE14APF	406	406	BSE_Torto	1422	585464	2918.747	0.7	0.5	0.696991	35.55874	-115.4612	2	7316781	2399214.8	IVANPAH 2	117	BURROW

Tortoise Burrows

Row #	GPS Time	Datafile Name	Unfiltered Positions	Filtered Positions	Data Dictionary Name	GPS Week	GPS Second	GPS Height	Vertical Precision	Horizontal Precision	Standard Deviation	Latitude	Longitude	Point ID	X Coordinate	Y Coordinate	SITE	LOCID	BURROW
92	01:18:45pr	BSE14APF	213	213	BSE_Torto	1422	591539	2921.201	0.9	1.1	0.607614	35.5587	-115.4614	3	7316717.5	2399200.8	IVANPAH 2	116	BURROW
93	10:28:54ar	BSE15APF	247	246	BSE_Torto	1423	62948	2932.681	0.8	0.4	1.07303	35.55846	-115.4626	2	7316369	2399104.8	IVANPAH 2	115	BURROW
94	11:16:53ar	BSE15APF	50	50	BSE_Torto	1423	65827	2942.538	1	0.7	0.808228	35.5563	-115.463	3	7316262	2398315.8	IVANPAH 2	126	BURROW
95	11:49:27ar	BSE15APF	148	148	BSE_Torto	1423	67781	2935.809	1	0.7	0	35.56383	-115.4632	6	7316125.5	2401053	IVANPAH 2	94	BURROW
96	12:22:43pr	BSE15APF	127	127	BSE_Torto	1423	69777	2945.713	1.2	1.3	0	35.5604	-115.4637	7	7316028.5	2399802.8	IVANPAH 2	110	BURROW
97	02:38:39pr	BSE16APF	54	54	BSE_Torto	1423	164333	2952.055	1.3	1	0	35.55735	-115.464	2	7315954	2398690	IVANPAH 2	125	BURROW
98	11:37:10ar	BSE19APF	46	46		1423	412644	2972.669	0.8	0.6	0	35.56402	-115.4663	185	7315217.5	2401097.8	IVANPAH 2	93	BURROW
99	12:06:45pr	BSE19APF	21	21		1423	414419	2977.392	1.1	0.7	0	35.56127	-115.4666	187	7315141.5	2400095.8	IVANPAH 2	108	BURROW
100	01:51:54pr	BSE19APF	55	55		1423	420728	2986.107	1.2	1.2	0	35.55735	-115.4667	188	7315158	2398669.3	IVANPAH 2	124	BURROW
101	02:34:00pr	BSE19APF	44	44		1423	423254	2981.481	1.5	1	0	35.56164	-115.467	189	7315015.5	2400228.5	IVANPAH 2	107	BURROW
102	09:05:44ar	BSE20APF	25	25		1423	489958	2996.788	5.5	5.5	0.764824	35.55638	-115.4677	97	7314865	2398306.8	IVANPAH 2	123	BURROW
103	09:28:19ar	BSE20APF	45	45		1423	491313	2981.518	3.9	2.9	0.522113	35.56284	-115.4674	98	7314889	2400663	IVANPAH 2	106	BURROW
104	09:31:36ar	BSE20APF	67	67		1423	491510	2992.929	4.2	2.7	0.72818	35.56298	-115.4678	99	7314777	2400708.5	IVANPAH 2	105	BURROW
105	09:59:11ar	BSE20APF	45	45		1423	493165	2997.61	4	2.5	0.881297	35.55883	-115.4678	100	7314799	2399197.8	IVANPAH 2	114	BURROW
106	10:42:31ar	BSE20APF	120	119		1423	495765	2995.229	3.8	2.2	1.211611	35.56255	-115.4681	101	7314683	2400551.3	IVANPAH 2	104	BURROW
107	12:14:09pr	BSE20APF	34	33		1423	501263	3003.936	5.9	3.4	2.303942	35.56222	-115.4684	102	7314595	2400428.5	IVANPAH 2	103	BURROW
108	02:35:48pr	BSE20APF	47	47		1423	509762	3008.544	3.5	2.5	0.275527	35.56548	-115.4691	104	7314372	2401608.5	IVANPAH 2	90	BURROW
109	02:40:22pr	BSE20APF	22	22		1423	510036	3004.591	4.2	3	0.885133	35.56498	-115.4691	105	7314373	2401428.3	IVANPAH 2	92	BURROW
110	02:53:18pr	BSE20APF	74	73		1423	510812	3008.45	4.1	2.7	0.672695	35.5605	-115.469	106	7314440.5	2399797.8	IVANPAH 2	109	BURROW
111	03:56:45pr	BSE20APF	26	26		1423	514619	3015.081	3.9	3.3	0.532349	35.55613	-115.4691	107	7314455.5	2398208.8	IVANPAH 2	122	BURROW
112	11:07:19ar	BSE21APF	34	34	BSE_Torto	1423	583653	3014.315	3.9	2.4	0.388873	35.56202	-115.4694	1	7314292	2400347.3	IVANPAH 2	102	BURROW
113	11:29:07ar	BSE21APF	107	107	BSE_Torto	1423	584961	3011.549	3.9	2.9	0.595612	35.56372	-115.4697	3	7314196	2400965	IVANPAH 2	95	BURROW
114	11:37:18ar	BSE21APF	77	77	BSE_Torto	1423	585452	3016.336	3.6	2.5	2.186208	35.56482	-115.4698	4	7314152.5	2401366	IVANPAH 2	91	BURROW
115	03:50:45pr	BSE21APF	129	129	BSE_Torto	1423	600659	3056.25	1.2	0.9	0	35.55591	-115.4724	7	7313479	2398103	IVANPAH 2	121	BURROW
116	06:02:32pr	BSE21APF	59	59	BSE_Torto	1424	3766	3069.252	1.4	0.9	0.337203	35.55229	-115.4732	8	7313261.5	2396777.3	IVANPAH 2	132	BURROW
117	07:58:54ar	BSE22APF	149	149	BSE_Torto	1424	53948	3064.186	3.9	2.1	3.176764	35.56195	-115.4734	1	7313117	2400292.8	IVANPAH 2	101	BURROW
118	08:06:00ar	BSE22APF	48	15	BSE_Torto	1424	54374	3065.378	8	5	0.933076	35.56227	-115.4735	2	7313089	2400408.5	IVANPAH 2	100	BURROW
119	09:59:26ar	BSE22APF	162	162	BSE_Torto	1424	61180	3080.114	5.4	3.4	1.753394	35.56534	-115.4746	4	7312730.5	2401516.5	IVANPAH 2	89	BURROW
120	12:14:24pr	BSE22APF	17	17	BSE_Torto	1424	69278	3094.936	2.4	1.2	0	35.55704	-115.4754	5	7312567.5	2398491	IVANPAH 2	120	BURROW
121	10:41:51ar	BSE22APF	52	52	BSE_Torto	1424	63725	3083.148	3.2	2.2	1.059917	35.5539	-115.4745	8	7312879	2397357.5	IVANPAH 2	129	BURROW
122	11:03:45ar	BSE22APF	70	70	BSE_Torto	1424	65039	3083.772	3.3	2.3	0.635008	35.56168	-115.4749	9	7312663.5	2400181	IVANPAH 2	99	BURROW
123	12:02:28pr	BSE22APF	51	51	BSE_Torto	1424	68562	3098.392	2.6	1.3	0	35.55461	-115.4756	10	7312518	2397604	IVANPAH 2	128	BURROW

Tortoise Burrows

Row #	GPS Time	Datafile Name	Unfiltered Positions	Filtered Positions	Data Dictionary Name	GPS Week	GPS Second	GPS Height	Vertical Precision	Horizontal Precision	Standard Deviation	Latitude	Longitude	Point ID	X Coordinate	Y Coordinate	SITE	LOCID	BURROW
124	09:36:11ar	BSE23APF	37	37	BSE_Torto	1424	146185	3103.688	1.7	1	0	35.56195	-115.4764	1	7312236.5	2400272	IVANPAH 2	98	BURROW
125	11:52:23ar	BSE24APF	62	62	BSE_Torto	1424	240757	3133.97	1.6	0.9	0	35.56087	-115.4786	1	7311593	2399861.3	IVANPAH 2	96	BURROW
126	12:19:23pr	BSE24APF	62	62	BSE_Torto	1424	242377	3135.805	2.1	1	0	35.5613	-115.4785	2	7311622	2400018.5	IVANPAH 2	97	BURROW
127	01:36:04pr	BSE24APF	61	61	BSE_Torto	1424	246978	3136.364	1.4	1.3	0.464616	35.55233	-115.4783	3	7311755.5	2396756.5	IVANPAH 2	131	BURROW
128	10:04:47ar	BSE25APF	48	48	BSE_Torto	1424	320701	2762.68	1.1	0.6	0.391792	35.54196	-115.4416	2	7322749.5	2393255.8	IVANPAH 3	148	BURROW
129	09:58:56ar	BSE26APF	56	56	BSE_Torto	1424	406750	2775.377	1.2	0.7	0	35.54097	-115.4425	1	7322514	2392890.5	IVANPAH 3	150	BURROW
130	01:00:48pr	BSE28APF	101	101	BSE_Torto	1424	590462	2811.506	5.4	3.9	1.049971	35.54016	-115.4467	9	7321269.5	2392564.8	IVANPAH 3	149	BURROW
131	08:54:58ar	BSE2MAY(	107	107		1425	316512	2867.787	0.9	0.6	0	35.54185	-115.4533	489	7319294.5	2393129.3	IVANPAH 3	147	BURROW
132	03:05:48pr	BSE3MAY(	66	65		1425	425162	2892.172	4.7	3.6	1.397648	35.5417	-115.4553	426	7318701.5	2393059.8	IVANPAH 3	146	BURROW
133	12:38:27pr	BSE06MA`	56	56	BSE_Torto	1426	70721	2955.051	1.2	1.4	0	35.54217	-115.4615	3	7316836	2393182.5	IVANPAH 3	145	BURROW
134	10:37:59ar	BSE7MAY(	24	24	BSE_Torto	1426	149893	2961.293	6.1	4	0.4896	35.54286	-115.4611	1	7316951	2393438	IVANPAH 3	143	BURROW
135	02:38:30pr	BSE7MAY(	70	70	BSE_Torto	1426	164324	2906.058	3.7	3.1	0.274833	35.54343	-115.457	5	7318167	2393675.5	IVANPAH 3	144	BURROW
136	12:09:33pr	BSE8MAY(	40	40	BSE_Torto	1426	241787	2946.171	4.5	3.3	2.163164	35.54409	-115.4612	2	7316904.5	2393884.5	IVANPAH 3	136	BURROW
137	12:22:24pr	BSE8MAY(	53	52	BSE_Torto	1426	242558	2893.673	3.6	3.1	1.54683	35.54405	-115.4561	3	7318413.5	2393908.3	IVANPAH 3	138	BURROW
138	08:11:57ar	BSE9MAY(	139	139	BSE_Torto	1426	313931	2886.114	3.5	2.5	0.787737	35.54435	-115.4553	1	7318653	2394022	IVANPAH 3	140	BURROW
139	08:18:07ar	BSE9MAY(	91	91	BSE_Torto	1426	314301	2889.573	3.8	2.7	1.221975	35.54433	-115.4557	2	7318552	2394013.3	IVANPAH 3	139	BURROW
140	08:23:33ar	BSE9MAY(	49	49	BSE_Torto	1426	314627	2896.572	3.1	2.2	1.101072	35.54435	-115.4564	3	7318335	2394015.3	IVANPAH 3	137	BURROW
141	09:09:21ar	BSE9MAY(	30	30	BSE_Torto	1426	317375	2801.487	3.7	2.3	0.708164	35.54445	-115.4466	5	7321244.5	2394124	IVANPAH 3	141	BURROW
142	09:26:30ar	BSE9MAY(	36	35	BSE_Torto	1426	318404	2765.571	4.2	2.5	0.629854	35.54437	-115.442	7	7322607	2394132	IVANPAH 3	142	BURROW
143	09:09:14ar	BSE10MA`	78	78	BSE_Torto	1426	403768	3069.985	1.1	0.7	1.01074	35.55095	-115.4726	1	7313454.5	2396295.3	IVANPAH 2	135	BURROW
144	10:24:12ar	BSE10MA`	38	37	BSE_Torto	1426	408266	3116.179	2.1	1.4	0.900609	35.55068	-115.4762	3	7312375.5	2396169.5	IVANPAH 2	134	BURROW
145	09:48:11ar	BSE11MA`	70	70	BSE_Torto	1426	492505	3153.178	1.2	0.8	0.433566	35.55637	-115.4797	1	7311304	2398215.8	IVANPAH 2	119	BURROW
146	11:32:55ar	BSE11MA`	96	96	BSE_Torto	1426	498789	2985.559	1.1	0.6	0	35.56783	-115.4672	2	7314895	2402479.8	IVANPAH 1	84	BURROW
147	11:39:24ar	BSE11MA`	47	46	BSE_Torto	1426	499178	2985.683	1.2	0.8	0.429722	35.56668	-115.4672	3	7314928.5	2402062	IVANPAH 1	86	BURROW
148	08:14:00ar	BSE12MA`	51	51	BSE_Torto	1426	573254	3003.069	1.6	1	0	35.57339	-115.469	3	7314335.5	2404488.5	IVANPAH 1	73	BURROW
149	08:17:11ar	BSE12MA`	61	61	BSE_Torto	1426	573445	2999.096	1.6	1	0.554118	35.57386	-115.4687	4	7314402	2404660.8	IVANPAH 1	68	BURROW
150	10:11:29ar	BSE12MA`	79	79	BSE_Torto	1426	580303	3013.333	1.2	0.9	0.361935	35.57214	-115.4699	6	7314074	2404029	IVANPAH 1	74	BURROW
151	11:45:26ar	BSE12MA`	25	25	BSE_Torto	1426	585940	3020.011	1.4	1	0	35.57512	-115.4702	8	7313938.5	2405108.3	IVANPAH 1	66	BURROW
152	12:01:24pr	BSE12MA`	40	39	BSE_Torto	1426	586898	3021.941	1.4	1.2	0.348014	35.56913	-115.4702	9	7313992	2402930.3	IVANPAH 1	78	BURROW
153	12:33:07pr	BSE12MA`	41	41	BSE_Torto	1426	588801	3020.77	1.2	1.1	0	35.57306	-115.4704	11	7313898	2404356.8	IVANPAH 1	72	BURROW
154	12:46:07pr	BSE12MA`	62	62	BSE_Torto	1426	589581	3024.076	1.7	1.6	0.816769	35.57638	-115.4706	12	7313814	2405564.5	IVANPAH 1	63	BURROW
155	12:49:18pr	BSE12MA`	60	60	BSE_Torto	1426	589772	3020.935	1.4	1.1	0	35.57645	-115.4706	13	7313821.5	2405589.3	IVANPAH 1	64	BURROW
156	07:39:03ar	BSE13MA`	37	37	BSE_Torto	1427	52757	3031.778	1.9	1.5	0	35.57652	-115.4713	1	7313607	2405609	IVANPAH 1	61	BURROW
157	11:38:11ar	BSE13MA`	80	80	BSE_Torto	1427	67105	3041.894	1	0.7	0	35.57226	-115.4722	7	7313375	2404052.8	IVANPAH 1	71	BURROW
158	07:03:20ar	BSE13MA`	42	42	BSE_Torto	1427	50614	3028.782	2.4	1.6	0	35.57035	-115.471	12	7313751.5	2403365.8	IVANPAH 1	75	BURROW
159	07:44:54ar	BSE13MA`	21	21	BSE_Torto	1427	53108	3024.864	1.8	1.4	0	35.57635	-115.4708	13	7313763.5	2405553.8	IVANPAH 1	62	BURROW
160	08:03:09ar	BSE14MA`	89	89	BSE_Torto	1427	140603	3052.744	0.8	0.6	0	35.5724	-115.4728	2	7313208	2404100.3	IVANPAH 1	70	BURROW
161	10:00:07ar	BSE14MA`	62	62	BSE_Torto	1427	147621	3057.809	2.4	1.5	0	35.57894	-115.4732	4	7313018	2406477.3	IVANPAH 1	57	BURROW
162	08:58:12ar	BSE15MA`	54	53	BSE_Torto	1427	230306	3079.668	3.6	2.9	1.057255	35.57968	-115.4747	2	7312559.5	2406733.8	IVANPAH 1	54	BURROW

Tortoise Burrows

Row #	GPS Time	Datafile Name	Unfiltered Positions	Filtered Positions	Data Dictionary Name	GPS Week	GPS Second	GPS Height	Vertical Precision	Horizontal Precision	Standard Deviation	Latitude	Longitude	Point ID	X Coordinate	Y Coordinate	SITE	LOCID	BURROW
163	07:25:43ar	BSE 15 M/	59	59	BSE_Torto	1427	224757	2991.163	4.4	2.8	0.281689	35.56917	-115.4676	3	7314776	2402961.8	IVANPAH 1	80	BURROW
164	07:34:15ar	BSE 15 M/	105	105	BSE_Torto	1427	225269	2988.005	3.4	2.4	1.400789	35.56738	-115.4676	4	7314797	2402312.3	IVANPAH 1	85	BURROW
165	09:53:13ar	BSE 15 M/	25	25	BSE_Torto	1427	233607	2997.197	1	0.7	0	35.56864	-115.4681	5	7314641.5	2402768.8	IVANPAH 1	79	BURROW
166	10:31:38ar	BSE16MA`	40	39	BSE_Torto	1427	322312	3095.06	5.3	2.9	0.370352	35.57253	-115.4761	3	7312213	2404123	IVANPAH 1	69	BURROW
167	06:51:31ar	BSE19MA`	44	43	BSE_Torto	1427	568305	3157.231	5.1	3.4	0.799439	35.56665	-115.4806	2	7310926	2401951	IVANPAH 1	83	BURROW
168	08:21:25ar	BSE19MA`	26	26	BSE_Torto	1427	573699	3156.481	5.4	3	1.39387	35.58005	-115.4808	3	7310751.5	2406825.8	IVANPAH 1	53	BURROW
169	12:39:27pr	BSE19MA`	42	42	BSE_Torto	1427	589181	3166.311	4.8	2.6	0.161686	35.57876	-115.4817	8	7310483.5	2406349.5	IVANPAH 1	56	BURROW
170	12:30:33pr	BSE19MA`	38	38	BSE_Torto	1427	588647	2932.689	4.2	2.5	1.244558	35.57831	-115.4627	12	7316154	2406325.8	WITHIN 1-MILE BUFFER	58	BURROW
171	08:09:24ar	BSE21MA`	225	182	BSE_Torto	1428	140978	2975.098	3.3	2.1	1.948592	35.56961	-115.4665	2	7315113.5	2403131	WITHIN 1-MILE BUFFER	81	BURROW
172	06:53:01ar	BSE21MA`	142	123	BSE_Torto	1428	136395	3198.578	2.6	2.1	0.897804	35.58011	-115.4837	6	7309900.5	2406823.8	IVANPAH 1	52	BURROW
173	07:19:24ar	BSE21MA`	62	34	BSE_Torto	1428	137978	3197.581	4.5	4.3	1.048566	35.57458	-115.4838	7	7309897.5	2404811.3	IVANPAH 1	65	BURROW
174	07:14:07ar	BSE22MA`	74	74	BSE_Torto	1428	224061	3024.464	3.4	3.2	81.65085	35.57478	-115.4442	2	7321670.5	2405180.5	OUT 1-MILE BUFFER	67	BURROW
175	10:00:10ar	BSE22MA`	146	145	BSE_Torto	1428	234024	3039.822	5.9	3.1	87.05085	35.56184	-115.4339	4	7324860	2400552.3	OUT 1-MILE BUFFER	113	BURROW
176	09:46:12ar	BSE24MA`	48	47	BSE_Torto	1428	405986	3246.018	4.5	2.8	1.045949	35.56692	-115.4866	2	7309139	2402001.5	IVANPAH 1	82	BURROW
177	09:59:24ar	BSE24MA`	21	21	BSE_Torto	1428	406778	3262.831	2.6	2.3	2.925731	35.56866	-115.4867	3	7309113.5	2402636	IVANPAH 1	77	BURROW
178	10:36:16ar	BSE26MA`	42	42	BSE_Torto	1428	581790	3193.921	1.6	1	0	35.55186	-115.4819	1	7310686.5	2396557.5	WITHIN 1-MILE BUFFER	130	BURROW
179	10:41:08ar	BSE26MA`	54	54	BSE_Torto	1428	582082	3193.142	1.5	1	0.997685	35.55063	-115.482	2	7310666.5	2396110	WITHIN 1-MILE BUFFER	133	BURROW
180	07:11:05ar	BSE28MA`	45	45	BSE_Torto	1429	137479	3273.549	3.8	3.4	1.577697	35.57731	-115.4897	2	7308121.5	2405761.5	IVANPAH 1	60	BURROW
181	08:41:32ar	BSE28MA`	58	58	BSE_Torto	1429	142906	3297.319	3.5	2.5	1.616059	35.56892	-115.4899	4	7308139	2402705.5	IVANPAH 1	76	BURROW
182	10:16:09ar	BSE28MA`	74	74	BSE_Torto	1429	148583	3283.719	4.8	3.1	1.028874	35.57804	-115.4901	5	7308010.5	2406025.8	IVANPAH 1	55	BURROW
183	11:13:54ar	BSE28MA`	71	70	BSE_Torto	1429	152048	3286.23	4.7	4.1	0.443197	35.57775	-115.4904	8	7307926	2405916	IVANPAH 1	59	BURROW
184	11:28:16ar	BSE29MA`	70	70	BSE_Torto	1429	239310	3324.765	6.4	4.5	4.139342	35.56562	-115.4914	2	7307727.5	2401492.8	IVANPAH 1	88	BURROW

Burrows by Site

SITE	GPS_POINTS
1000' GAS LINE CORRIDOR	13
IVANPAH 1	65
IVANPAH 2	41
IVANPAH 3	45
OUT 1-MILE BUFFER	3
WITHIN 1-MILE BUFFER	17

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA

APPLICATION FOR CERTIFICATION FOR THE *IVANPAH SOLAR ELECTRIC GENERATING SYSTEM*	DOCKET NO. 07-AFC-5 **PROOF OF SERVICE (Revised 7/14/08)**

INSTRUCTIONS: All parties shall 1) send an original signed document plus 12 copies OR 2) mail one original signed copy AND e-mail the document to the web address below, AND 3) all parties shall also send a printed OR electronic copy of the documents that shall include a proof of service declaration to each of the individuals on the proof of service:

CALIFORNIA ENERGY COMMISSION
Attn: Docket No. 07-AFC-5
1516 Ninth Street, MS-14
Sacramento, CA 95814-5512
docket@energy.state.ca.us

APPLICANT

Solar Partners, LLC
John Woolard, Chief Executive Officer
AliciaTorre, Project Manager
1999 Harrison Street, Suite #500
Oakland, CA 94612
ATorre@BrightSourceEnergy.com

Steve De Young
Ivanpah Solar Electric Generating System
Director, Environmental, Safety and Health
1999 Harrison Street, Ste. 2150
Oakland, CA 94612
sdeyoung@brightsourceenergy.com

APPLICANT'S CONSULTANTS

John L. Carrier, J. D
2485 Natomas Park Dr. #600
Sacramento, CA 95833-2937
jcarrier@ch2m.com

COUNSEL FOR APPLICANT

Jeffrey Harris
Ellison, Schneider & Harris L.L.P.
Attorney's at Law
2015 H Street
Sacramento, CA 95814-3109
jdh@eslawfirm.com

INTERESTED AGENCIES

California ISO
P.O. Box 639014
Folsom, CA 95763-9014
e-recipient@casio.com

Tom Hurshman, Project Manager
Bureau of Land Management
2465 South Townsend Ave.
Montrose, CO 81401
tom_hurshman@blm.gov

Sterling White, Field Manager
Bureau of Land Management
Needles Field Office
1303 South Highway 95
Needles, CA 92363
Sterling_White@blm.gov

Becky Jones
California Department of Fish & Game
36431 41st Street East
Palmdale, CA 93552
dfgpalm@adelphia.net

INTERVENORS

*** California Unions for Reliable Energy ("CURE")**
Tanya A. Gulesserian
Marc D. Joseph
Adams Broadwell Joseph & Cardozo
601 Gateway Boulevard, Suite 1000
South San Francisco, CA 94080
tgulesserian@adamsbroadwell.com

ENERGY COMMISSION

JEFFERY D. BYRON
Commissioner and Presiding Member
jbyron@energy.state.ca.us

JAMES D. BOYD
Commissioner and Associate Member
jboyd@energy.state.ca.us

Paul Kramer
Hearing Officer
pkramer@energy.state.ca.us

Che McFarlin
Project Manager
Cmcfarli@energy.state.ca.us

Dick Ratliff
Staff Counsel
dratliff@energy.state.ca.us

Public Advisor
pao@energy.state.ca.us

DECLARATION OF SERVICE

I, Mary Finn, declare that on September 15, 2008 I deposited copies of the attached Data Response, Set 2D in the United States mail at Sacramento, California with first-class postage thereon fully prepaid and addressed to those identified on the Proof of Service list above.

Transmission via electronic mail was consistent with the requirements of California Code of Regulations, title 20, sections 1209, 1209.5, 1210. All electronic pages were sent to all those identified on the Proof of Service list above.

I declare under penalty of perjury that the foregoing is true and correct.

Mary Finn