DOCKETED

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Appendix I

Condition of Certification BIO-17

Desert Tortoise Compensatory Mitigation Fencing Annual Inspection, Repairs and Maintenance

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an NRG service

NRG Ivanpah Solar Thermal Power Plant
100302 Yates Well Road, HCR1, Box 280 Nipton, CA 92364
Ph: 702-815-2012 Fax: 702-815-2030

January 6, 2017

Mr. Joseph Douglas
Compliance Project Manager
California Energy Commission, Siting, Transportation and Environmental Protection Division
1516 9th Street
Sacramento, CA 95814

Mr. Michael Ahrens
Authorized Officer
Bureau of Land Management, Needles Field Office
1303 U.S. Hwy 95 S.
Needles, CA 92363

RE: Ivanpah Solar Electric Generating System (07-AFC-5C) and BLM Right-of-Way Grant CACA-055666
Desert Tortoise Compensatory Mitigation – Fencing Annual Inspection, Repairs and Maintenance; Rehabilitated Routes, to fulfill California Energy Commission Condition of Certification, BIO-17

Dear Mr. Douglas and Mr. Ahrens,

In accordance with the requirements of Conditions of Certification BIO-17 of the Commission's approval of the Ivanpah Solar Electric Generating System, the project owner shall provide to the CPM and CDFG an annual report describing: the results of the annual inspection of fencing and rehabilitated routes; a summary of fence repairs and maintenance of reclaimed routes completed during the year; and recommendations and a cost estimate for repairs and maintenance activities needed for the upcoming year.

The construction of 50 miles of Desert Tortoise Exclusion Fencing along the northbound side of Interstate 15 (I-15) between Nipton Road and Yates Well Road (approximately 5 miles) was completed on October 30, 2015, and the tortoise exclusion fencing along the eastbound and westbound sides of Interstate 40 (I-40) between Goffs Road and US Route 95 (approximately 45 miles) was completed on March 7, 2016. BLM and Caltrans representatives inspected the completed fencing works on November 18, 2015 and March 14, 2016. Caltrans accepted the completed fencing works for I-15 on November 18, 2015; March 17, 2016 and October 11, 2016 for I-40. BLM issued the Compliance Notice under BLM Right-of-Way Grant CACA-055666 on March 28, 2016.

After construction, quarterly and after major rainfall events inspections are performed as mitigation of the ISEGS project. The quarterly inspections for I-15 were conducted on August 19, 2016, and on December 10-11, 2016. The quarterly inspections for I-40 were conducted on September 15-17, 2016,

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and December 7-9, 2016. Breaches identified during these inspections were repaired during the inspection. A copy of the annual inspection report is attached.

As reported in the 2015 annual compliance report, no further reporting is required for the Fifty-one BLM Routes with BLM's confirmation on February 26, 2015 that the requirements of this condition were satisfied.

Please feel free to contact me with any questions.

Thank you.

William Dusenbury

General Manager,
NRG Ivanpah Solar Electric Generating System
100302 Yates Well Road, Nipton, CA – 92364

CC: Doug Davis, NRG, Ivanpah
Tim Sisk, NRG
Document Control Specialist – NRG.

2016 Annual Report

For

Biological Opinion

(6843 (P), CACA048668, CAD090.01)

Solar Partners' Desert Tortoise Exclusion Fencing along Interstates 15 and 40, San Bernardino County, California

Project Description

Solar Partners' began installation of fencing to exclude desert tortoises from portions of Interstates 15 and 40 within the California Department of Transportation's (Caltrans) right-of-way in October 2015. Solar Partners installed approximately 5 miles of exclusion fence along the northbound lane of Interstate 15 between the Nipton Road and Yates Well Road interchanges in 2015. In 2015 Solar Partners also began installation of exclusion fencing along both sides of Interstate 40 between Goffs Road and the vicinity of the interchange with U.S. Highway 95. Solar Partners will not fence Interstate 40 from milepost 125.8 to 128 because the terrain is rugged and mountainous and install approximately 23 miles of fence along the east- and west-bound lanes. Construction was completed on March 7, 2016.

Construction

Interstate 15
Fence construction began on October 19, 2015. Construction lasted approximately 2 weeks. Two clearance surveys of the area between the fence and the Interstate were conducted on November1[.]. No tortoise or tortoise sign were discovered.

Interstate 40
Construction of the I-40 portion of the tortoise fence began on November 2, 2015. Construction continued through the end of the year and into 2016. No tortoises were observed within the project limits this year. Construction was completed on this portion of the project on March 7. Clearance surveys were completed on March 23. No tortoises were discovered.

Inspections and Maintenance
All inspections were conducted on foot with all 50 miles walked by an Authorized Biologist. We defined a large breach as a breach an adult tortoise could potentially fit through and a small breach as one a small tortoise could potentially fit through. Breaches that did not require additional fencing were repaired during the inspection, usually with rocks or by hand with a shovel. Those breaches that were more extensive were returned to following the inspection for repair. These repairs were completed within a week of discovery during the inspections.

Interstate 15
Inspections of the I-15 fence occurred on August 19. 2016 and December 10 - 11, 2016. No significant breaches were discovered along this fence during inspections.

Interstate 40
Inspections on the I-40 fence occurred on September 15 - 17 and 23 2016 and December 7 - 9, 2016. A total of 34 large breaches and 171 small breaches were discovered and repaired during these inspections. See the photos below for 3 examples of typical breaches that were encountered.

Example 1 before and after.

Example 2 before and after.

Example 3 before and after.

Incidental Take

No incidental take occurred under this Biological Opinion in 2015 or 2016 during construction or maintenance. This includes both I-15 and I-40 project locations. No live tortoises were observed within the project limits in either portion of the project in 2016. No known tortoise mortality or injury occurred as a result of project activities. Many instances of bone and shell remains were found along the highway and within the right-a-way during. All remains were old, generally greater than 2 years since death. Locations for these old tortoise carcasses are included in Attachment A.

Personnel and Experience

Four Authorized Biologists worked on the project in 2016: Bruce Weise, Dave Prival, Lori Rose, and Steve Jones. Each was involved in the following activities during the year:

- 24 hour pre construction/ground disturbance surveys
- Equipment monitoring during ground disturbance
- Escorting equipment through habitat
- Monitoring equipment during fence construction
- Recording data (tortoise sign or other pertinent information)
- Fence inspections
- Clearance surveys (I-15 only)
- Fence maintenance

Each biologist conducted the above activities individually or in pairs. The terrain and types of equipment varied.

Attachment A
Locations of tortoise remains found along I-15 and I-40 during 50 miles of fence construction

Date	Easting	Northing	Comments
10/22/2015	641583	3929065	Part of carcass. Shell fragments. Estimated greater than 1 year since death.
11/24/2015	688836	3858974	3 pieces of carapace
12/3/2015	702510	3862204	
12/9/2015	716101	3861250	Carcass fragments on fenceline in packrat midden.
12/11/2015	676835	3855693	
12/15/2015	674921	3855368	2x3 inch section of shell, with some scute attached. Sharply pointed, appears crushed.
12/18/2015	669985	3854528	Very old. Many small pieces. 5 % or less of entire.
12/21/2015	668590	3854292	Many small carapace bones under fence and on habitat side of fence
12/21/2015	668749	3854315	Numerous carcass fragments, several years old, disarticulated.
12/21/2015	668743	3854339	Appears to be a sub-adult, estimate 2 yrs since time of death.
12/22/2015	666762	3853987	Substatial portion of carcass is present. Bone only, no scutes. Anterior portion of shell intact. Estimate animal approx 200mm at time of death, 3 to 4 years ago.
12/22/2015	668173	3854221	Hatchling carcass found along fenceline, below fence post. Part of carcass in a Ambrosia dumosa. Looks like raven depredation. Less than 2 years old. Looks pecked through on the carapace. No teeth marks.
12/22/2015	667861	3854685	Old carcass fragments
1/6/2016	669130	3854249	1 piece. Adult. Looks like bridge behind forelimb. Less than 2 years old. Likely scavenged and brought to current location.
1/8/2016	670543	3854490	
1/14/2016	671749	3854712	
1/19/2016	675999	3855401	2 4 yrs old
2/16/2016	691573	3859088	Old and broken up, but many scutes
2/22/2016	698126	3860558	Piece of carcass. Time since death > 2yrs
2/23/2016	700161	3861372	Gular and portion of anterior plastron, sub adult, more than 2 years old.
2/24/2016	702285	3962173	Carcass, old and broken up. Only 6 pieces.

Appendix J

Condition of Certification BIO-18

Special-status Plants Post-Construction Annual Report

CONDITION OF CERTIFICATION BIO-18

Year 3 (2016) Special-status Plants BIO-18 Post-construction Monitoring Annual Report

Ivanpah Solar Electric Generating System

Prepared for
Solar Partners II, LLC; Solar Partners I, LLC;
and Solar Partners VIII, LLC

January 2017

ch2m

2485 Natomas Park Drive
Suite 600
Sacramento, CA 95833

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Tables

Figures

Acronyms and Abbreviations

BIO-18	Condition of Certification BIO -18
BLM	Bureau of Land Management
CDFW	California Department of Fish and Wildlife
CEC	California Energy Commission
CH2M	CH2M Engineers Inc.
CLA	Construction Logistics Area
Revegetation Plan	*Closure, Revegetation, and Rehabilitation Plan for the Ivanpah Solar Electric Generating System.* COCs BIO-14, BIO-18 & COMP-11.
CNNDB	California Natural Diversity Database
COC	Condition of Certification
CRPR	California Rare Plant Rank
ESA	Environmentally Sensitive Area
GANDA	Garcia and Associates
gen-tie	generation tie
GIS	geographic information system
GPS	global positioning system
ID	identification
ISEGS	Ivanpah Solar Electric Generating System
kV	kilovolt
LYSF	last year's sterile fruits
MW	megawatt
NGL	Natural gas pipeline
No.	number
NRPMA	Northern Rare Plant Mitigation Area
QA	quality assurance
QC	quality control
Remedial Action Plan	*Ivanpah SEGS Special-status Plant Remedial Action Plan*
Revised Protection Plan	*Ivanpah SEGS Special-status Plant Protection and Monitoring Plan*, Revision 1
ROW	right-of-way
RPTA	Rare Plant Transplantation Area

Seed Collection Plan	*Seed Collection and Revegetation Proposed Plan,* Revision 1
Solar Partners	Solar Partners I, LLC; Solar Partners II, LLC; and Solar Partners VIII, LLC
SPT	solar power tower
SSPPA	Special-status Plant Protection Area
STG	steam turbine generator

SECTION 1

Introduction

1.1 Project Description

Solar Partners I, LLC; Solar Partners II, LLC; and Solar Partners VIII, LLC (Solar Partners) are the owners of the Ivanpah Solar Electric Generating System (ISEGS), a nominal 370-megawatt (MW) solar energy project in southern California's Mojave Desert, near the Nevada border. The project was developed by BrightSource Energy, Inc. and is operated for Solar Partners by NRG Energy Services, LLC (NRG). The project is located on a 3,471-acre site west of the Ivanpah Dry Lake, on land managed by the Bureau of Land Management (BLM). CH2M (CH2M) provides environmental compliance support during construction and operations of the solar facility.

Ivanpah 1 (the southern unit) covers approximately 913.5 acres (1.4 square miles); Ivanpah 2 (the middle unit) covers approximately 1,077 acres (1.7 square miles); and Ivanpah 3 (the northern unit) is larger and covers approximately 1,235 acres (1.9 square miles). The remaining disturbance areas include common access roads, gas lines, generation tie-lines, and construction and operations facilities. All three phases share an administration building, an operations and maintenance (O&M) building, a substation located between Ivanpah 1 and 2, and paved roads to access each site. The project ties into the existing Kern River Gas Transmission Line about 0.5-mile north of the Northern Rare Plant Mitigation Area (NRPMA) and into the Southern California Edison 230/115-kilovolt (kV) line that crosses between the Ivanpah 1 and 2 sites (Figure 1-1) (CEC, 2010).

Each unit consists of solar arrays of heliostats (or mirrors) that focus solar energy on central solar power tower receivers near the center of each of the heliostat arrays. Ivanpah 1 (nominal 120 MW) has a heliostat array consisting of approximately 53,500 heliostats. Ivanpah 2 and 3 (nominal 125 MW each) have heliostat arrays consisting of approximately 60,000 heliostats. The heliostat array of each unit is arranged around a single centralized solar power tower (SPT) that is 140 meters (459 feet) in height, including a boiler and superheater panel with an upper steam drum and protective ceramic insulation panels (20 meters [65.5 feet]) on top. Each solar power plant has a power block in the approximate center of the heliostat array. The power block includes a SPT, a receiver boiler, a steam turbine generator (STG) set, an air-cooled condenser, and other auxiliary systems. The solar field and power generation equipment are started each morning after sunrise and shut down in the evening when insolation drops below the level required to keep the turbine online (CEC, 2010).

1.2 Report Objective

The objective of this monitoring report is to present the results of the Year 3 (2016) post-construction special-status plant monitoring. This report complies with the annual reporting requirement of Condition of Certification BIO-18 (BIO-18) measures included in Section 8 of the ISEGS Special-status Plant Protection and Monitoring Plan, Revision 1 (Revised Protection Plan) (Solar Partners, 2010a), and as required by the BLM Right-of-Way (ROW) Grant.

During Year 3 monitoring, the project met percent survivorship success criterion for the five special-status plant species:

1. Mojave milkweed (Asclepias nyctaginifolia)
2. Desert pincushion (Coryphantha chlorantha)
3. Nine-awned pappus grass (Enneapogon desvauxii) [1]

[1] The 75 percent survivorship protection goal for nine-awned pappus grass was attained in 2011 (CH2M, 2012a).

4. Parish's club-cholla (Grusonia parishii)
5. Rusby's desert mallow (Sphaeralcea rusbyi var. eremicola)

The plans and procedures prepared and implemented to date to avoid and minimize impacts to special-status plants and comply with the requirements of BIO-18 are summarized in Section 2 of this report.

1.3 Past Monitoring Summary

During construction, BIO-18 as-built monitoring was performed from 2011 through 2013. The *Condition of Certification (COC) BIO-18 Special-status Plants As-built Report for the Ivanpah Solar Electric Generating System (ISEGS)* was submitted to the CEC and BLM in 2015 (CH2M, 2015). Year 1 of post-construction monitoring commenced in fall 2014, following the transition of ISEGS from construction to operational status. Year 2 of post-construction monitoring was conducted by CH2M botanists in 2015 (CH2M, 2016b). The BIO-18 75 percent special-status plant survivorship goal for the five species was met in Year 1 (2014) and Year 2 (2015). This report documents only those procedures implemented during Year 3 post-construction monitoring, annual health assessment monitoring, and survivorship analysis.

1.4 Special-status Plant Compliance Documents

Plans prepared for ISEGS to comply with BIO-18 include the following:

- Revised Protection Plan (Solar Partners, 2010a)
- *Ivanpah SEGS Special-status Plant Remedial Action Plan* (Remedial Action Plan) (Solar Partners, 2010b)
- *Closure, Revegetation, and Rehabilitation Plan for the Ivanpah Solar Electric Generating System. COCs BIO-14, BIO-18 & COMP-11. Revision* 4. Includes the Gas Pipeline Revegetation and Monitoring Plan (BIO-18) (Revegetation Plan) (CH2M, 2010)
- *Seed Collection and Revegetation Proposed Plan, Revision 1* (Seed Collection Plan) (Solar Partners, 2010c)

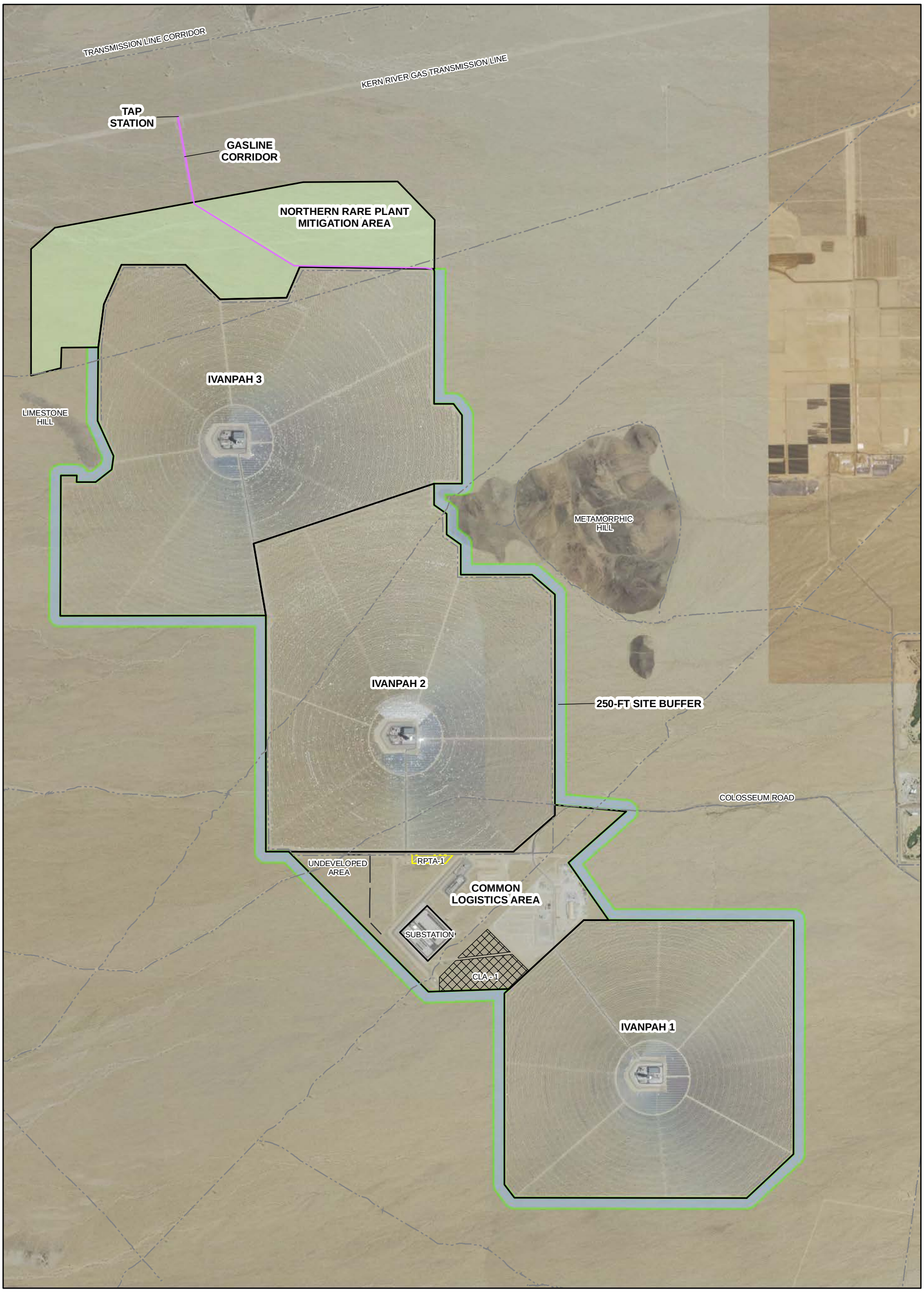
Special-status plant protection measures, plant salvage, and transplantation procedures are described in the Revised Protection Plan and the Revegetation Plan. The Remedial Action Plan describes the special-status plant seed (and other propagules [that is, live plants]) that have been collected and transplanted in the onsite nursery for use as a source of plant material should protection measures fail and special-status plants need to be re-established. The Seed Collection Plan describes seed collection procedures for special-status plants and common species. The Revised Revegetation Plan includes the Gas Pipeline Revegetation and Monitoring Plan. The implementation of these plans is described in detail in the BIO-18 natural gas line corridor revegetation and as-built reports (CH2M, 2015a,b).

1.5 Document Contents

This Monitoring Report includes the following information:

- **Section 2** includes a summary of the compliance measures required, undertaken, and in progress to comply with BIO-18 and avoid and minimize impacts to special-status plants.
- **Section 3** contains a summary of the special-status plants that are the subject of this plan.
- Post-construction monitoring methods are described in **Section 4**.
- Results of monitoring are provided in **Section 5**.
- Figures 5-1 through 5-3 show the location of Special-status Plant Protection Areas (SSPPAs) identified in 2016 within the solar field and the mitigation areas.
- References used in developing this report are included in **Section 6**.

- The BIO-18 Condition of Certification (COC) is included as **Appendix A**.
- Photographs from the 2016 compliance monitoring are included in **Appendix B**.
- **Appendix C** contains the initial 2010 protection plan figures.
- The datasheets used to collect field data are provided in **Appendix D**.



LEGEND

- Trails and Roads
- Project Site
- 250-ft Site Buffer
- 50-foot Corridor of Gas Line
- Rare Plant Mitigation Area
- Mitigation Area
- Rare Plant Transplantation Area (RPTA-1)

Aerial Imagery courtesy of
ESRI Basemaps (NAIP 2014 and 2015):
May 30, 2014 and May 28, 2015

N

0 1,000 2,000
Feet

Figure 1-1
Site Layout
Ivanpah Solar Electric Generating System

SECTION 2

BIO-18 Compliance Measures

This section includes a summary of the compliance measures required, or undertaken, or that are in progress to comply with BIO-18. The text of BIO-18 is included in Appendix A of this report. Table 2-1 includes requirements of BIO-18 and compliance actions undertaken by BrightSource Energy, Inc. from 2010 to 2013 and NRG between 2013 and 2016. Appendix B provides photographs documenting the compliance actions and the SSPPAs. Locations of the SSPPAs, established in 2010 and 2011 as required by BIO-18, are provided in the Revised Protection Plan (Solar Partners, 2010a). For convenience, the 2010 Revised Protection Plan figures are provided in Appendix C.

2.1 Summary

The California Energy Commission (CEC) included special-status plant avoidance, minimization, and protection goals in COC BIO-18 (Measures 1 through 11) (CEC, 2010). The steps and procedures completed or planned include the following:

- Removal of 476 acres of habitat supporting special-status plants from the project footprint, and establishment of three special-status plant mitigation areas
- Preparation of the Revised Protection Plan (Solar Partners, 2010a)
- Preparation of the Remedial Action Plan (Solar Partners, 2010b)
- Development of a Seed Collection Plan for special-status plants; Appendix B of the Remedial Action Plan describes seed collection procedures for common species, as well as special-status plants
- Preparation of the Closure, Revegetation, and Rehabilitation Plan (Revision 4) (CH2M, 2010); this plan includes the Gas Pipeline Revegetation and Monitoring Plan required by BIO-18
- Implementation of special-status plant protection goals of 75 percent, as described in Section 5.2.1.4 of the Revised Protection Plan (Solar Partners, 2010a)
- Identification and establishment of SSPPAs within the solar field and within the three mitigation areas; Revised Protection Plan Figures 5-1 through 5-3 (provided in Appendix C of this report) show the location of the SSPPAs that were established in 2010 and 2011
- Salvage and relocation of the special-status plant localities listed in Table 5-1 in the Revised Protection Plan; Figures 5-1 through 5-3 of the Revised Protection Plan (provided in Appendix C of this report) show the location of plants that were salvaged
- Maintenance, including irrigation, of salvaged special-status plants within the Rare Plant Transplantation Area (RPTA-1)
- Designation of special-status plant localities within the 250-foot buffer as Environmentally Sensitive Areas (ESAs)
- Completion of focused surveys for Mojave milkweed and Rusby's desert mallow on public lands
- Provision of security for the implementation of plans
- Acquisition of offsite Mojave milkweed lands

2.2 BIO-18 Compliance

The project complies with all of the BIO-18 measures, and 8 of the 11 measures are complete. Table 2-1 lists the compliance measures and the current compliance status of each measure. The eight completed measures are 1, 3, 5, 6, 7, 9, 10, and 11. No additional work on these measures is required.

The project complies with BIO-18 measures 2, 4, and 8, but they are not considered complete because these measures have long-term monitoring components. These longer-term elements of BIO-18, such as plant survivorship monitoring within the SSPPAs (including the three mitigation areas), are to be conducted over a 10-year post-construction timeframe, as described in the Revised Protection Plan (Solar Partners, 2010a). Information on health and vigor, reproduction, seed production, and recruitment will be monitored over time, but have no fixed success criteria. Survivorship data will be used to evaluate the short- and longer-term success against the 75 percent protection goal, and determine whether implementation of remedial measures is necessary.

This report provides results of 2016 (Year 3) monitoring, and these data represent the third year of post-construction monitoring, as described in Section 8 of the Revised Protection Plan (Solar Partners, 2010a). Results of monitoring performed during construction between 2011 through 2013 are included in the *2011, 2012*, and *2013 BIO-18 Annual Compliance Reports* (CH2M, 2012a, 2013, 2014). Results of the Year 1 (2014) Post-construction monitoring are included in the *Year 1 (2014) Special-status Plants Post-Construction Monitoring Annual Report* (CH2M, 2015c). Special-status plant impact avoidance and protection measures that are listed as complete in Table 2-1 are described in more detail in the *BIO-18 Special-status Plant As-built Report* (CH2M, 2015b).

Table 2-1. Summary of Condition of Certification BIO-18 Compliance Measures Completed and in Progress

No.	COC BIO-18 Measure	In Compliance?	Task Complete?
1	Onsite Plant Avoidance and Minimization Areas	Yes. SSPPAs were established (Figures 5-1 through 5-3 in Section 5 and Appendix C of this report).	Yes.
2	Protection Goals	Yes. Project is in compliance. SSPPAs have been created. The 75 percent protection goals set forth in Measure 2 were met during construction.	Continuing. Per the Verification section, for the life of the project, record summaries need to be submitted for the Revised Protection Plan and Remedial Action Plan.
9	Surveys on Acquired and Public Lands	Yes. Project is in compliance. Focused surveys were performed in 2011 for Mojave milkweed and Rusby's desert mallow on public lands. The requirement to identify at least the same number of Mojave milkweed and Rusby's desert mallow localities outside of the SSPPAs was met in 2011. Results of the surveys were provided to the CNDDB, and no further steps are necessary to comply with this BIO-18measure.	Yes.
10	Security for Implementation of Plans	Yes. Funding has been provided.	Yes.

Table 2-1. Summary of Condition of Certification BIO-18 Compliance Measures Completed and in Progress

No.	COC BIO-18 Measure	In Compliance?	Task Complete?
11	Acquire Offsite Occurrence of Mojave Milkweed or Adjacent Land	Yes. Security was provided. Twenty-nine privately or state-owned parcels were evaluated in 2012 for the presence of known Mojave milkweed locations or its suitable habitat (CH2M, 2012b). Parcels reviewed were located in Shadow Valley, Lanfair Valley, and the Barnwell area of the New York Mountains, within the known range of Mojave milkweed. Mojave milkweed was identified on one privately owned, 37-acre parcel in the New York Mountains in the northern Lanfair Valley. The parcel has been purchased, and the easement is in place.	Yes. Security was provided, and the acquisition and easement have occurred.

Source: COC BIO-18 (Appendix A)

Notes:
The locations of the exclusionary fencing "halos" and mitigation areas (SSPPAs) established in 2010 and referred to in BIO-18 are shown in Figures 5-1 through 5-3 in Appendix C of this report. Figures showing the location of SSPPAs, as adjusted for mortality in 2016, are provided in Section 5 of this report.

CNDDB = California Natural Diversity Database

No. = number

SECTION 3

Special-status Plant Descriptions

This section provides a brief description of the five special-status plants included in the Revised Protection Plan (Solar Partners, 2010a). More detailed information on the basic distributional and ecological information known for each of these special-status plants can be found in the *Special-status Plant Survey Report* (GANDA, 2008), the Revised Protection Plan (Solar Partners, 2010a), and the Remedial Action Plan (Solar Partners, 2010b). Photographs of the special-status plants are included in this section and in Appendix B. Photographs of nine-awned pappus grass obtained during the focused 2011 surveys for this species were included in the *2011 BIO-18 Annual Compliance Report* (CH2M, 2012a). Additional photographs are provided in the annual compliance reports (CH2M, 2013, 2014, 2015c, 2016b) and *BIO-18, Special-status Plant As-built Report* (CH2M, 2015b).

3.1 Mojave Milkweed (Asclepias nyctaginifolia)

Mojave milkweed is a perennial herb with stems and leaves that die back completely at the end of the growing season (Photographs 3-1 through 3-4). In California, it produces showy, cream-colored flowers from May to June and again in late summer to fall, if summer rainfall is adequate. The habitat of this species in California includes washes and dry slopes in Mojave Desert scrub and pinyon-juniper woodland, from about 3,000 to 5,100 feet in elevation (Solar Partners, 2010a). The distribution of Mojave milkweed in California is limited to a few locations in the eastern Mojave Desert. Mojave milkweed is not federally or state-listed, nor is it considered a BLM-sensitive species, but it has a California Rare Plant Rank (CRPR) of 2B.1 and a Heritage Program Rank of G4G5/S2 (CNDDB, 2017).

PHOTOGRAPH 3-1
Mojave milkweed (by white board) and dry wash habitat

PHOTOGRAPH 3-2
Mojave milkweed in flower

PHOTOGRAPH 3-3
Mojave milkweed seeds (silky hairs aid in seed dispersal)

PHOTOGRAPH 3-4
Mojave milkweed seed pods

3.2 Desert Pincushion (Coryphantha chlorantha)

Desert pincushion is a small, leafless, stem succulent that produces yellow-green to pale pink flowers (Photographs 3-5 and 3-6). At the ISEGS site, this species was observed in flower between April and May (GANDA, 2008). The habitat of desert pincushion in California is described as Mojave Desert scrub, Joshua tree woodland, and pinyon-juniper woodland, on gravelly or rocky carbonate (limestone) substrates, from about 3,000 to 7,000 feet in elevation (GANDA 2008). The distribution of desert pincushion in California is restricted to the eastern Mojave Desert in Inyo and San Bernardino counties. Desert pincushion is not federally or state-listed, nor is it a BLM-sensitive species. Desert pincushion is a CRPR List 2B.1 species and has a Heritage Program Rank of G4/S3 (CNDDB, 2017).

PHOTOGRAPH 3-5
Desert pincushion (in front of the white stake)

PHOTOGRAPH 3-6
Desert pincushion in full bloom

3.3 Parish's Club-cholla (*Grusonia parishii*)

Parish's club-cholla is a clonal stem succulent that forms large, spreading mats of prostrate stems (Photographs 3-7 and 3-8). The flowers are yellow to red, and appear from May to July in California. The habitat of this species in California is described as Sonoran Desert scrub, Mojave Desert scrub, and Joshua tree woodland, in sandy flats, from about 2,950 to 5,000 feet in elevation (Solar Partners, 2010a).

The distribution of Parish's club-cholla in California includes the Mojave and Colorado deserts in San Bernardino, Riverside, and Imperial counties. Parish's club-cholla is not federally or state-listed, nor is it a BLM-sensitive species. Parish's club-cholla has a CRPR of 2B.2 and a Heritage Program Rank of G3G4/S2 (CNDDB, 2017).

PHOTOGRAPH 3-7
Clonal mat of Parish's club-cholla

PHOTOGRAPH 3-8
Parish's club-cholla in fruit

3.4 Nine-awned Pappus Grass (*Enneapogon desvauxii*)

Nine-awned pappus grass is a summer annual in California, meaning that it germinates and grows after summer rain (Photographs 3-9 and 3-10). It flowers in California from August to September. The habitat of nine-awned pappus grass in California is described as rocky calcareous (limestone) soils in pinyon-juniper woodland from 3,825 to 5,475 feet in elevation (Solar Partners, 2010a). The ISEGS surveys and other collections show that this species also occurs in Mojave Desert scrub down to elevations of 2,900 feet (GANDA, 2008). The distribution of nine-awned pappus grass in California is limited to the eastern Mojave Desert in San Bernardino County. Photographs of nine-awned pappus grass obtained during the focused 2011 surveys for this species were included in the *2011 Annual Compliance Report* (CH2M, 2012a).

Nine-awned pappus grass has a CRPR of 2B.2 and a Heritage Program Rank of G5/S3 (CNDDB, 2017). It is not federally or state-listed, nor is it a BLM-sensitive species. As described in the Revised Protection Plan, this species germinates and grows from an existing seed bank in years with adequate summer rainfall. No special avoidance or salvage procedures were proposed other than seed collection from onsite localities in case species-specific remedial measures are needed (Solar Partners, 2010a). Several localities of nine-awned pappus grass were identified during focused surveys in 2011 (CH2M, 2012a).

PHOTOGRAPH 3-9
Nine-awned pappus grass

PHOTOGRAPH 3-10
Nine-awned pappus grass inflorescence

3.5 Rusby's Desert Mallow (*Sphaeralcea rusbyi* var. *eremicola*)

Rusby's desert mallow is a small (up to 18 inches), soft-woody subshrub with showy, dark apricot-colored flowers and drought deciduous leaves (Photographs 3-11 and 3-12). Information on how to identify Rusby's desert mallow and additional photographs of this species are provided in the *Rusby's Desert Mallow and Mojave Milkweed Surveys on Public Lands Report* (CH2M, 2012a). The palmately compound leaves distinguish this species from the much more common species, desert mallow (*Sphaeralcea ambigua*). The habitat of Rusby's desert mallow includes Mojave Desert scrub and Joshua tree woodland at elevations of 2,925 to 4,500 feet (Solar Partners, 2010a).

Rusby's desert mallow is endemic to California, where it is restricted to the eastern Mojave Desert. Rusby's desert mallow is not federally or state-listed. It has a CRPR of 1B.2 and a Heritage Program Rank of G4T2/S2 (CNDDB, 2017). Species with a CRPR of 1B are considered a sensitive species by BLM.

PHOTOGRAPH 3-11
Close view of Rusby's desert mallow flower

PHOTOGRAPH 3-12
Rusby's desert mallow; these leaves are an important characteristic for identifying this species

SECTION 4

Monitoring Methods

This section describes the methods used to establish the SSPPAs, and assess plant survivorship and health and vigor during construction and operations. During construction, monitoring was performed from 2011 through 2013. Year 1 of post-construction monitoring commenced in fall 2014, following the transition of ISEGS from construction to operational status. Year 2 of post-construction monitoring was conducted in 2015 (CH2M, 2016b). Year 3 of post-construction monitoring was conducted in 2016 and is the subject of this report.

4.1 Special-status Plant Protection Areas

Pre-construction surveys were performed in spring 2010, as outlined in the Revised Protection Plan (Solar Partners, 2010a), to relocate, map, and stake in the field all special-status plant localities and individual plants that were to be avoided or salvaged. Data collected during these surveys, combined with the final engineering layout, were used to create the SSPPAs. The SSPPAs are defined as exclusionary fences in the solar field installed around special-status plants and associated habitat (BIO-18 refers to them as "halos"). BIO-18's purpose of establishing SSPPAs is to facilitate achieving the 75 percent protection goal. Collectively, the three mitigation areas, NRPMA, Construction Logistics Area (CLA) CLA-1 and CLA-2, and the SSPPAs, are referred to as protection areas. Except for minor adjustments (for example, a few plants noted as present in 2010 were missing or dead by the time fencing was placed), exclusionary fencing was installed in 2010 and 2011 at all of the areas in the solar fields shown on Figures 5-1 through 5-3 of the Revised Protection Plan (Solar Partners, 2010a) (Appendix C of this report). The location of the three mitigation areas is also shown on Figures 5-1 through 5-3.

4.2 Plant Protection Goals

The objective in establishing the SSPPAs was to facilitate achieving the 75 percent special-status plant protection goal required by BIO-18. The number of SSPPAs established in 2010 and the number of plants within them forms the pre-project baseline, as required by BIO-18. Table 4-1 lists the target number of localities and plants to be protected to facilitate achieving the 75 percent protection goal. Results of the 2016 post-construction monitoring, as measured against these target protection goals, are presented in Section 5, Results.

TABLE 4-1. Special-status Plant Localities and Individuals Proposed for Protection or Salvage, or Included in Mitigation Area

Special-status Plant Scientific Name a	Special-status Plant Common Name	Total No. of Localities to be Avoided b	Total No. of Plants to be Avoided b
Asclepias nyctaginifolia	Mojave milkweed	40	85
Coryphantha chlorantha	Desert pincushion	127	135
Enneapogon desvauxii a	Nine-awned pappus grass	76	668

TABLE 4-1. Special-status Plant Localities and Individuals Proposed for Protection or Salvage, or Included in Mitigation Area

Special-status Plant Scientific Name a	Special-status Plant Common Name	Total No. of Localities to be Avoided b	Total No. of Plants to be Avoided b
Grusonia (Opuntia) parishii	Parish's club-cholla c	10	16
Sphaeralcea rusbyi var. eremicola	Rusby's desert mallow	3	3

Source: (Solar Partners, 2010a; CH2M, 2012a, 2013, 2014, 2015c)

[a] Nine-awned pappus grass is a summer annual in California, meaning it germinates and grows after adequate summer rainfall. Because of the ecology of this species, special protection procedures for nine-awned pappus grass outside the three mitigation areas have not been established. Surveys for this species were performed in 2011, and the protection goal was attained for this species. See the *2011 BIO-18 Annual Compliance Report* (CH2M, 2012a) for more information.

[b] Minor adjustments (for example, plants missing or dead) were made to correct the total numbers of localities and plants to be avoided from those originally presented in the Revised Protection Plan (Solar Partners, 2010a).

[c] As described in the Revised Protection Plan, Parish's club-cholla individuals not included in the mitigation areas were salvaged and replanted in the RPTA-1 (Solar Partners, 2010a).

As required by BIO-18, the number of special-status plants identified post-construction is compared to the number of plants identified in the pre-project baseline. Percent survival (as a measure of plant protection) is the quantitative performance benchmark. Plant protection will be determined successful if the 75 percent protection goal is attained, as required by BIO-18. Characteristics, such as health and vigor, reproduction, seed production, and recruitment, are site characteristics that will be monitored over time but have no fixed success criteria. In addition to determining if the protection goal is met, results of monitoring will be used to help determine management or remedial actions, and to document a trend of long-term persistence and reproduction onsite.

Little is known about the life history, longevity, recruitment, rate of variation across a site, and numerous other ecological variables for these special-status plants. The 75 percent protection target may be biologically unattainable, even in sites that are completely undisturbed. The practicability and attainability of these protection goals have never been demonstrated.

4.3 Special-status Plant Monitoring

As described in BIO-18 (Appendix A), special-status plant monitoring will be performed for 10 years following construction, or until success criterion are met, to determine whether the special-status plants that have been protected persist over time. The monitoring schedule from the Revised Protection Plan is provided in Table 4-2 (Solar Partners, 2010a).

Monitoring during construction was performed from 2011 through 2013. The first year of post-construction monitoring was conducted in 2014. Year 2 of post-construction monitoring was performed in 2015. Results of Year 3 monitoring are the subject of this report. The final BIO-18 Special-status Plant As-built Report (CH2M, 2015b) documents the size and shape of the SSPPAs and the amount of area protected.

Table 4-2. Ivanpah Solar Electric Generating System Special-status Plant Mitigation Monitoring Schedule

	As-built Data Collection[a]			Success Criterion and Long-term Persistence Trend Monitoring										
	Year			Year										
	1	2	3	1	2	3	4	5	6	7	8	9	10	11
Location	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**
As-built Monitoring[a]														
Ivanpah 1 and CLA	X													
Ivanpah 2		X												
Ivanpah 3		X	X											
Success Criterion Monitoring[b]														
Percent survivorship			X	X	X	X	X	X	X	X	X	X	X	
Long-term Persistence Trend Monitoring[c]														
Health and vigor data	X	X	X	X	X	X	X	X	X	X	X	X	X	
Annual reporting	X	X	X	X	X	X	X	X	X	X	X	X	X	
Final evaluation of success criterion and reporting														X

Source: Table 8-1 (Solar Partners, 2010a)

[a] At the time Table 8-1 of the Revised Protection Plan was prepared (Solar Partners, 2010a), it was assumed that each solar field would be constructed independently, but construction of the project was performed concurrently. The annual monitoring reports functioned as interim As-built reports. Final As-built conditions were documented in the *BIO-18 As-built Report* (CH2M, 2015b).

[b] The percent survivorship goal of BIO-18 is 75 percent.

[c] Health and vigor data are collected during the percent survivorship assessment, but trend data are not tied to the 75 percent survivorship success criterion (see Revised Protection Plan [Solar Partners, 2010a] for more details).

4.3.1 During-construction Monitoring (2011 through 2013)

Every plant with protective exclusionary fencing or in a mitigation area that was mapped previously as an SSPPA was revisited from 2011 through 2013 to assess survivorship and plant health and vigor. Table 4-3 lists information collected in the global positioning system (GPS) unit and on hard copy data sheets. Appendix D provides the datasheet used to collect additional field data. Each locality and individual plant was assigned a unique identification number so it could be tracked over time. An aluminum tag with the unique identification number was placed near the base of each plant. A heavy-duty, plastic stake was also installed near each plant. Results of 2011 through 2013 special-status plant construction monitoring are included in the *2011, 2012*, and *2013 BIO-18 Annual Compliance Reports* (CH2M, 2012a, 2013, 2014). A 75 percent survivorship rate was recorded in all three construction monitoring years.

Table 4-3. Ivanpah Solar Electric Generating System Year 3 (2016) Post-construction Data Collected[a] in Special-status Plant Protection Areas

Mojave Milkweed	Desert Pincushion	Parish's Club-cholla	Rusby's Desert Mallow
Plant ID No.	Plant ID No.	Plant ID No.	Plant ID No.
New Plant	New Plant	New Plant	New Plant
Plant Absent	Plant Absent	Plant Absent	Plant Absent
Seedling Count	Plant Dead	Plant Dead	Plant Dead
Vigor Score	Vigor Score	Vigor Score	Vigor Score
Phenology	Phenology	New Growth	Phenology
Grazing Damage	Head No.	% Dead	Grazing Damage
Dig-down Depressions	Grazing Damage	Phenology	No. Stems
No. Flower Clusters	No. Flowers	No. Clumps	No. Flowers
No. Fruits	No. Fruits	No. Flowers	No. Fruits
Seeds Present	Pollinators Observed	No. Fruits	Seeds Present
Pollinators Observed	Size (Height/Width)	LYSF	Pollinators Observed
Size (Height/Width)		Pollinators Observed	Size (Height/Width)

[a] Ecological data was collected in accordance with Revised Protection Plan (Solar Partners, 2010a)

% = percent

ID = identification

LYSF = last year's sterile fruits

4.3.2 Post-construction Monitoring (2014 through 2023)

Objectives of the post-construction monitoring are to collect survivorship data needed to determine if the 75 percent survivorship success criterion has been achieved, and to assess special-status plant health and vigor. Year 3 monitoring followed the recommendations outlined in the Revised Protection Plan (Solar Partners, 2010a), with slight revisions to accommodate for new special-status plant recruits found outside of protection areas but still within the facility boundaries (see Section 4.3.2.4 for further details).

The first year of post-construction monitoring was completed in 2014. Results of post-construction monitoring were included in the *Year 1 (2014) BIO-18 Annual Compliance Report* (CH2M, 2015c) and *Year 2 (2015) BIO-18 Annual Compliance Report* (CH2M, 2016b). The 75 percent survivorship goal was met in both

2014 and 2015. Year 3 of the post-construction monitoring was performed in 2016 and is the subject of this report.

Field work was conducted by botanists familiar with the flora of the Mojave Desert and several years of experience with the special-status plants at ISEGS. Two-person teams navigated to known special-status plant localities using existing GPS coordinates from the previous surveys to verify if they were still extant. Mobile devices with iOS or Android platforms were used to collect plant survivorship, vigor data, and photographs for individual special-status plants at each locality. During fieldwork, special-status plant data was synced real-time to an ArcGIS Online platform. Ecological data recorded on health, vigor, size, reproduction, seed production, predation, pollination, and recruitment, as well as other data collected during the surveys, are summarized in Table 4-3. Photographs of each special-status plant were taken to document field conditions and the status of the special-status plant at the time monitoring was performed. Data and photographs were synced to ArcGIS Online. Appendix D provides the hard copy datasheet used to collect additional field data. Data sheets were scanned and filed electronically.

Due to differences between the four species surveyed during Year 3, individual species' health assessment data was often collected in a unique manner to account for ecological differences. For instance, flowers for desert pincushion are recorded individually, but for Mojave milkweed, clusters of flowers are counted. For status of the plant, "dead – detached" is a category used for desert pincushion, but not used for the other plants. Desert pincushion are round cactus with shallow roots that can get knocked over, for instance, by wild burros. Status on Mojave milkweed is frequently recorded as "absent," which does not necessarily indicate that the plant is dead. Mojave milkweed is a perennial herb, so stems and leaves die back each year, but the plant persists through deep roots. The plant may be not visible on a particular monitoring year without sufficient precipitation, but may be visible in other years. Vigor data are collected in a similar manner for the four species, on a scale of 1 to 5, where 1 is "robust" and 5 is "poor or damaged."

4.3.2.1 Nine-awned Pappus Grass

Nine-awned pappus grass is a summer annual in California, meaning that it germinates and grows after adequate summer rainfall. Because of the ecology of this species, special protection procedures for nine-awned pappus grass outside the three mitigation areas were not established in the Revised Protection Plan. Surveys for this species were performed in 2011. Documenting persistence for 4 out of 10 years for this species is not necessary to meet success criterion, and the protection goal for this species was attained in 2011. For more information, refer to the *2011 BIO-18 Annual Compliance Report* (CH2M, 2012a). During Year 3 monitoring, botanists performed only limited surveys to confirm presence of this species.

4.3.2.2 Parish's Club-cholla

Monitoring methods for the Parish's club-cholla are slightly different from the monitoring methods for the other species. Parish's club-cholla is well-adapted to vegetative propagation. For this reason, calculations of plant protection for this species include the plants salvaged from the construction footprint and replanted into the RPTA-1 (Figure 1-1). As outlined in the Revised Protection Plan (Solar Partners, 2010a), a total of 8 localities and 15 individuals (clonal mats) were also protected in place, predominantly in the CLA-1 mitigation area. No SSPPAs were established for this species. Percent survivorship calculations for Parish's club-cholla include those individuals located in the mitigation areas, as well as those individuals in the RPTA-1.

4.3.2.3 Rusby's Desert Mallow

In the Revised Protection Plan, Rusby's desert mallow is identified as being short-lived (Table 4-3, Solar Partners, 2010a). One of the four original Rusby's desert mallow identified pre-construction continues to persist in RPTA-1 (Figure 1-1). Similar to methods for Parish's club cholla, percent survivorship calculations for Rusby's desert mallow include those individuals located in the mitigation areas, as well as the individual located in the RPTA-1.

4.3.2.4 New Special-Status Plant Recruits

In addition, botanists surveyed for new special-status plant recruits in the protection areas. For Mojave milkweed, for instance, new recruits are often located downstream in an ephemeral wash from the original plant. When a new individual was located, it was assigned a unique ID number. An aluminum tag with the unique ID number was placed near the base of each plant. A heavy-duty, plastic or wooden stake was also installed near each plant. Botanists recorded survivorship and health assessment data on these individuals (Table 4-3).

Botanists also identified new recruits of individual special-status plants that were outside of SSPPAs and mitigation areas, but still within the facility boundaries. In Year 3, new recruits were located in the solar fields or in the 250-foot facility buffer. No individual special-status plants were salvaged or transplanted during Year 3. For Mojave milkweed and desert pincushion, three to four stakes were placed around the perimeter of the plant to provide protection from operations tasks. For Rusby's desert mallow, a small, low, exclusionary fence was erected from t-posts and chicken-wire fence (Appendix D). These individuals were also assigned a unique ID number and GPS coordinates. A limited amount of ecological health assessment data was collected to document the baseline conditions, and the individual was photographed.

4.3.2.5 Control Sites - Environmentally Sensitive Areas

ESAs were established to protect special-status plants located in the 250-foot facility buffer (BIO-18, Measure 4). These individuals are monitored annually as a control population for comparison against those individuals in the SSPPAs and mitigation areas. For example, if monitoring determines that protected special-status plants are not producing leaves, and are not flowering or fruiting, or if large numbers of them have died, comparisons with conditions in onsite or offsite locations could suggest reasons for these responses. If onsite or offsite control areas are responding similarly, then widespread environmental conditions could likely to be the cause, and onsite management changes may not be recommended. However, if substantial differences are found between survivorship or reproduction in the onsite protected localities compared to the onsite or offsite control areas, management changes to improve onsite protected special-status plant response could be considered.

Annual monitoring of ESAs during operations includes repairs or upkeep of the sensitive resource signs, as well as collecting special-status plant data on survivorship and ecology in accordance with Table 4-3. Appendix B provides the Protection Plan figures (5-1 through 5-3) that show the 2010 and 2011 locations of the special-status plants designated as ESAs.

4.3.2.6 Post Fieldwork Comparison and Analysis

Once fieldwork was completed, the geographic information system (GIS) analyst and botanists went through a series of quality assurance (QA) and quality control (QC) checks against hard copy datasheets. This included checking health assessment, location data, maps, and Microsoft Excel exported data tables against field maps, datasheets, and notes to confirm that the information collected was correct. Changes were made to the exported Excel tables as needed, and then the Excel data tables were re-imported into GIS to create the final 2016 special-status plant monitoring database. Final maps were prepared by GIS based on the corrected Excel data tables.

As required by BIO-18, the number of special-status plant localities and individuals identified post-construction were compared to the number of plant localities and individuals identified during the preproject baseline. "Locality" is defined as a location where one or more special-status plant was identified during pre-construction surveys. Percent survival (as a measure of plant protection) is the quantitative performance benchmark. Plant protection is determined successful if the 75 percent protection goal is attained as described in BIO-18. Characteristics, such as health and vigor, reproduction, seed production, and recruitment, are site characteristics that will be monitored over time but have no fixed success criteria.

In addition to determining if the protection goal is met, results of monitoring will be used to help determine management or remedial actions, and to document a trend of long-term persistence and reproduction onsite.

Little is known about the life history, longevity, recruitment, rate of variation across a site, and numerous other ecological variables for these special-status plants. The 75 percent protection target may be biologically unattainable, even in sites that are completely undisturbed. The practicability and attainability of these protection goals have never been demonstrated.

4.4 Schedule and Reporting

Special-status plant persistence monitoring will be conducted for a period of 10 years from the date of operations. If the percent protection (plant survivorship) is 75 percent for 4 of the 10 monitoring years, the 75 percent protection threshold will be considered attained, and protection will be determined successful. As required by BIO-18, Verification, record summaries of the annual monitoring will continue for the life of the project for the Revised Protection Plan, regardless of the success criterion being met earlier in the 10-year monitoring period (Solar Partners, 2010a). If success criterion are not met in 10 years, remedial actions will be implemented in accordance with Remedial Action Plan (Solar Partners, 2010b) until success criterion are met. The monitoring and reporting schedule is provided in Table 4-2.

SECTION 5

Monitoring Results

5.1 Survey Results

This section provides the Year 3 post-construction special-status plant monitoring results. Special-status plants from the pre- and post-construction occurrences were evaluated for comparison and are also summarized in this section.

5.1.1 Dates and Staff

Annual assessment of special-status plant survivorship and health assessment monitoring was conducted on April 12-16 and 18-21; May 24-28; and July 10-15, 18-20, 22, 25, and 26, 2016 by CH2M botanists Morgan King and Jason Brooks.

5.1.2 Percent Survivorship

This section includes results of Year 3 (2016) post-construction special-status plant monitoring. Tables 5-1 and 5-2 list the number of avoided special-status localities and individuals identified in 2016, by species, for each project component, compared to the protection goals established in the Revised Protection Plan (Solar Partners, 2010a). The 75 percent protection goal for special-status plants was attained again in 2016 (Tables 5-1 and 5-2). Figures 5-1 through 5-3 show the location of SSPPAs. Tables 5-1 and 5-2 only include those Parish's club-cholla protected in the mitigation areas, but success criterion includes those individuals (135) located in the RPTA; therefore, the total numbers for this species exceed the 75 percent protection goal for this species. The calculations of numbers of plants protected have excluded plants recorded as "Absent" (plants not present at the time of data collection) and "Dead." Figures 5-1 through 5-3 show the location of special-status plants visited during Year 3 monitoring, including those individuals that were "Absent" or "Dead" (denoted by having a strikethrough on the text).

Table 5-3 provides a comparison of 2014 through 2016 post-construction monitoring results for each species. This summary shows the persistence of each species localities and individuals through time. In 2015, a total of 243 localities with 313 plants were identified in the solar field and mitigation areas. This corresponds to an increase of 9 localities and 85 plants between 2015 and 2016 (Table 5-3).

Results of monitoring during construction are presented in the *2011, 2012*, and *2013 BIO-18 Annual Compliance Reports* (CH2M, 2012a, 2013, 2014). Results of monitoring during post-construction are presented in the *2014* and *2015 Annual Compliance Reports* (CH2M, 2015c; CH2M, 2016b).

5.1.3 New Recruits Located Outside Protection Areas

Previously, during annual monitoring, special-status species found outside of the protection areas were salvaged, exceeding the Revised Protection Plan's salvage goals (Solar Partners, 2010a). To date, 442 Mojave milkweed, desert pincushion, Parish's club-cholla, and Rusby's desert mallow have been salvaged from the solar field or impacted areas and transplanted. During Year 3 monitoring, individuals were not salvaged; instead, they were protected in place in the solar field (Mojave milkweed [19 individuals], desert pincushion [2 individuals], and Rusby's desert mallow [4 individuals]) (Figures 5-1 through 5-3). For Rusby's desert mallow, botanists erected small, exclusionary fences with t-posts and chicken wire to protect those individuals within the solar field (see Appendix D for representative photographs).

5.1.4 Photographic Documentation

Representative photographs of each of the five special-status species observed during Year 3 post-construction monitoring are provided in Appendix B.

TABLE 5-1. Ivanpah Solar Electric Generating System Special-status Plants by Location, Year 3 (2016) Post-construction Monitoring

Special-status Plant Common Name	No. of Localities Avoided in Solar Field	No. of Plants Avoided in Solar Field	No. of Localities Avoided in Mitigation Areas	No. of Plants Avoided in Mitigation Areas	Total No. of Localities Avoided Onsite	Total No. of Plants Avoided Onsite	Protection Goal Attained in 2016
Mojave milkweed	28	113	22	66	50	179	Yes
Desert pincushion	39	39	149	156	188	195	Yes
Parish's club-cholla a	0	0	15	23	15	23	Yes[a]
Rusby's desert mallow b	2	2	0	0	3	3	Yes[b]
Total	**69**	**154**	**186**	**245**	**256**	**400**	**Yes**

a Parish's club-cholla is well-adapted to vegetative propagation. For this reason, calculations of plant protection for this species include the plants salvaged from the construction footprint (in the CLA and Ivanpah 1) and replanted into the RPTA-1 (107 localities and 135 plants), which are not included in Table 5-2. As outlined in the Revised Protection Plan (Solar Partners, 2010a), a total of 8 localities and 15 individuals (clonal mats) were also protected in place, predominantly in the CLA-1 mitigation area. The salvaged and transplanted Parish's club-chollas in the RPTA-1 are available for use as propagules, should remedial measures be required, and for replanting in short-term disturbance areas. The transplanted Parish's club-cholla plants present in the RPTA-1 (135 plants) and the Parish's club-cholla protected in place in the mitigation areas, together, exceed the 75 percent protection goal for this species.

b One of the four original Rusby's desert mallow located in 2010 continues to persist in RPTA-1. This individual is included in the survivorship success criterion.

Notes:

The Solar Field is composed of Ivanpah 1, 2, and 3 (Figure 1-1).

The three mitigation areas total 476 acres and are referred to as the CLA-1, CLA-2, and the NRPMA, north of Ivanpah 3 (Figure 1-1).

Nine-awned pappus grass is a summer annual in California, meaning that it germinates and grows after adequate summer rainfall. Because of the ecology of this species, special protection procedures for nine-awned pappus grass outside the three mitigation areas have not been established. See Table 3-4 of the *2011 BIO-18 Annual Compliance Report* (CH2M, 2012a) for more information on this species.

TABLE 5-2. Special-status Plant Localities and Individuals Protected in 2016

Common Name (Scientific Name)	Site Element	Special Status Plant Localities[a,b] Total No. of Localities (from 2010 Protection Plan)	Special Status Plant Localities[a,b] Total No. of Localities Avoided in 2016	Special Status Plant Localities[a,b] Percent of Localities Avoided in 2016 (%)	Special Status Plant Individuals[a] Total No. of Individuals (from 2010 Protection Plan)	Special Status Plant Individuals[a] Total No. of Plants Avoided in 2016	Special Status Plant Individuals[a] Percent of Individuals Avoided in 2016 (%)	Protection Goal Attained
Mojave milkweed (*Asclepias nyctaginifolia*)[c]								
	CLA	2	0	0	2	0	0	
	Ivanpah 1	11	9	82	32	48	150	
	Ivanpah 2	3	3	100	5	8	160	
	Ivanpah 3[c]	25	16	64	36	57	158	
	Gas Line Corridor	0	0	0	0	0	0	
	CLA-1[c]	4	11	275	24	26	108	
	CLA-2	0	0	0	0	0	0	
	NRPMA[d]	8	11	138	14	40	286	
Total Proposed in 2010 Compared with Total Avoided in 2016		**53**	**50**	**94**	**113**	**179**	**158**	
TOTAL REQUIRED TO ATTAIN 75% PROTECTION GOAL[a]		***40***			***85***			***Yes***
Rusby's desert mallow (*Sphaeralcea rusbyi var. eremicola*)								
	CLA [j]	0	1	100	0	1	100	
	Ivanpah 1	1	0	0	1	0	0	
	Ivanpah 2	1	0	0	1	0	0	
	Ivanpah 3	1	2	200	1	2	200	
	Gas Line Corridor	0	0	0	0	0	0	
	CLA-1	0	0	0	0	0	0	
	CLA-2	0	0	0	0	0	0	
	NRPMA	1	0	0	1	0	0	
Total Proposed in 2010 Compared with Total Avoided in 2016		**4**	**3**	**75**	**4**	**3**	**75**	
TOTAL REQUIRED TO ATTAIN 75% PROTECTION GOAL[a]		***3***			***3***			***Yes***

TABLE 5-2. Special-status Plant Localities and Individuals Protected in 2016

Common Name (Scientific Name)	Site Element	Special Status Plant Localities[a,b] Total No. of Localities (from 2010 Protection Plan)	Special Status Plant Localities[a,b] Total No. of Localities Avoided in 2016	Special Status Plant Localities[a,b] Percent of Localities Avoided in 2016 (%)	Special Status Plant Individuals[a] Total No. of Individuals (from 2010 Protection Plan)	Special Status Plant Individuals[a] Total No. of Plants Avoided in 2016	Special Status Plant Individuals[a] Percent of Individuals Avoided in 2016 (%)	Protection Goal Attained
Desert pincushion *(Coryphantha chlorantha)*								
	CLA	7	0	0	7	0	0	
	Ivanpah 1[e]	32	15	47	33	15	45	
	Ivanpah 2[e]	29	8	28	31	8	26	
	Ivanpah 3	30	16	53	31	16	52	
	Gas Line Corridor	1	0	0	1	0	0	
	CLA-1[d]	7	26	371	7	26	371	
	CLA-2[f]	0	0	0	0	0	0	
	NRPMA[d]	63	123	195	70	130	186	
Total Proposed in 2010 Compared with Total Avoided in 2016		**169**	**188**	**111**	**180**	**195**	**108**	
TOTAL REQUIRED TO ATTAIN 75% PROTECTION GOAL[a, i]			***127***			***135***		***Yes***
Parish's club cholla (*Grusonia [Opuntia] parishii*)[g]								
	CLA	52	0	0	70	0	0	
	Ivanpah 1	55	0	0	65	0	0	
	Ivanpah 2	0	0	0	0	0	0	
	Ivanpah 3	0	0	0	0	0	0	
	Gas line Corridor	0	0	0	0	0	0	
	CLA-1[d]	7	10	143	13	17	131	
	CLA-2[d, h]	1	3	300	1	3	300	
	NRPMA	0	2	0	0	3	0	

TABLE 5-2. Special-status Plant Localities and Individuals Protected in 2016

Common Name (Scientific Name)	Site Element	Special Status Plant Localities[a,b] Total No. of Localities (from 2010 Protection Plan)	Special Status Plant Localities[a,b] Total No. of Localities Avoided in 2016	Special Status Plant Localities[a,b] Percent of Localities Avoided in 2016 (%)	Special Status Plant Individuals[a] Total No. of Individuals (from 2010 Protection Plan)	Special Status Plant Individuals[a] Total No. of Plants Avoided in 2016	Special Status Plant Individuals[a] Percent of Individuals Avoided in 2016 (%)	Protection Goal Attained
Total Proposed in 2010 Compared with Total Avoided in 2016		**115**	**15**	**13**	**149**	**23**	**15**	
TOTAL REQUIRED TO ATTAIN 75% PROTECTION GOAL[d]			***76***			***97***		***Yes***
Avoidance and Salvage in Compliance with Special-status Protection Plan[a,e]								***Yes[g]***

[a] Plants are considered avoided if surrounded by exclusionary fencing ("halo") in the solar field or SSPPA, or if the plant is located within one of the three mitigation areas. The target number of plants and localities proposed for avoidance or salvage are the goals listed in Table 4-1 and as shown on Figures 4-1 through 4-3 of the Revised Protection Plan. On an individual plant basis, the target salvage goals from the Revised Protection Plan are listed in this table instead of the actual number of plants salvaged. This is because many more desert pincushion, Mojave milkweed, and Parish's club-cholla were salvaged from the site compared with the number planned. These individuals were planted in the RPTA-1 and the Common Succulent Transplant Area. If one or more plants were salvaged from a locality with many individuals, the entire locality is not counted as salvaged.

[b] The number of fences in the field is not the same as the number of avoided localities. Some localities were split into two fenced areas because of the layout of the heliostat field spoke roads. In a few places, two localities were placed within a larger fence.

[c] Includes two localities of Mojave milkweed in addition to the number originally proposed that were salvaged (one in CLA-1 because of the gen-tie line and one in Ivanpah 3).

[d] More plants were protected than required in the Revised Protection Plan. In locations where there were no 2010 avoidance percentage goals (for example, NRPMA), percentages are expressed as more than 100 percent in the Percent of Localities Protected and Individuals Avoided columns and included in the total avoidance calculations.

[e] During fencing of the SSPPAs, three desert pincushions in Ivanpah 2 and one desert pincushion in Ivanpah 1 planned for fencing were dead or had been misidentified. When this stem succulent cactus is very small (the size of a quarter or less), it is difficult to distinguish desert pincushion from a very simila- appearing cactus species; therefore, the numbers proposed in this table have been adjusted downward.

[f] A total of 16 desert pincushion were transplanted into CLA-2. These plants are included in the RPTA-1 tally; therefore, they are not included in the survivorship calculations presented in Tables 4-1 and 4-2.

[g] Parish's club-cholla individuals and localities in this table only include those protected in the mitigation areas. Percent survivorship calculations includes those individuals transplanted in RPTA-1 (not shown in this table), which meets the 75 percent protection goal for this species.

[h] The Parish's club-cholla located in CLA-2 was initially salvaged instead of protected within the mitigation area as originally planned because of placement of the tortoise fence, but this locality grew back.

[i] The desert pincushion 75 percent success numbers are different in this table and the Revised Protection Plan (Table 5-1) (Solar Partners, 2010a) because of additional localities and individuals located in 2010 and 2011.

[j] One of the four original Rusby's desert mallow located in 2010 continues to persist in RPTA-1. This individual is included in the survivorship success criterion and is shown in this table in the CLA.

gen-tie = generation tie

Table 5-3. Number of Localities and Plants Protected at Ivanpah Solar Electric Generating System between 2014 and 2016

Special-status Plant Species	Solar Field						Mitigation Areas						Total Avoided					
	No. of Localities			No. of Plants			No. of Localities			No. of Plants			No. of Localities			No. of Plants		
	2014	2015	2016	2014	2015	2016	2014	2015	2016	2014	2015	2016	2014	2015	2016	2014	2015	2016
Mojave milkweed	28	28	28	70	63	113	21	19	22	43	39	66	49	47	50	113	102	179
Desert pincushion	52	54	39	57	57	39	115	124	149	123	130	156	167	178	188	180	187	195
Parish's club-cholla	0	0	0	0	0	0	15	15	15	21	21	23	15	15	15	21	21	23
Rusby's desert mallow	2	2	2	2	2	2	1	1	0	1	1	0	3	3	3	3	3	3
TOTAL	**82**	**84**	**69**	**129**	**122**	**154**	**152**	**159**	**186**	**188**	**191**	**245**	**234**	**243**	**256**	**317**	**313**	**400**

5.2 Special-status Plants

The 75 percent protection goal for special-status plants was attained again in 2016 (Tables 5-1 and 5-2). Figures 5-1 through 5-3 show the location of post-construction special-status plants recorded during the 2016 monitoring. Appendix C provides the location of SSPPAs proposed in the Revised Protection Plan (Solar Partners, 2010a). Tables 5-1 and 5-2 list the number of avoided special-status localities and individuals for 2016, by species, for each project component, compared to the protection goals established in the Revised Protection Plan. Success criterion was met for all five species during Year 1, Year 2, and Year 3 monitoring. Table 5-4 provides a summary of whether each species has met the post-construction success criterion goals by year. If success criterion goals are met during Year 4 (2017) monitoring, success will be met for 4 years out of the 10-year monitoring period, and compliance with BIO-18 Measure 2 will be attained.

Table 5-4. Summary of Meeting Success Criterion per Year

Special-status Plant Species	Success Criterion Met? Year 1 (2014)	Year 2 (2015)	Year 3 (2016)	Success Criterion Met for 4 Years?
Mojave milkweed	Yes	Yes	Yes	No
Desert pincushion	Yes	Yes	Yes	No
Nine-awned pappus grass a	Yes	Yes	Yes	Yes[a]
Parish's club-cholla	Yes	Yes	Yes	No
Rusby's desert mallow	Yes	Yes	Yes	No

[a] Due to the ecology of nine-awned pappus grass, success criterion is not required to be attained for 4 years. Surveys were conducted in 2011, and protection success was attained (CH2M, 2012a). Limited surveys were conducted during post-construction monitoring to verify presence, but full health assessment monitoring is not necessary for BIO-18 compliance.

After accounting for mortality and absence, a total of 254 special-status plant localities (with 398 plants) were present and, therefore, protected in 2016 (Tables 5-1 and 5-2). The total number of localities and plants has increased onsite between 2014 and 2016. This is primarily due to higher numbers of individuals of Mojave milkweed and desert pincushion observed in the mitigation areas (NRPMA and CLA-1), including 23 additional Mojave milkweed and 57 additional desert pincushion (Figures 5-1 and 5-2b). Between 2014 and 2016 in the solar fields, the number of Mojave milkweed individuals increased, but the number of desert pincushion decreased (Mojave milkweed increased by 43 individuals and desert pincushion decreased by 18 individuals). The increase in localities and number of individuals located in the mitigation area has helped meet the success criterion.

For three out of four species, special-status plant observations in the Ivanpah 1, 2, and 3 SSPPAs are decreasing over time; a total of 68 special-status plant localities (as compared to 84 in 2015) and 153 plants were recorded in 2016 (Tables 5-1 and 5-2). The reason that individual plants increased in the solar field was due only to new recruits of Mojave milkweed observed, from 63 (2015) to 113 (2016) (Table 5-3). Especially in Ivanpah 1, signs of black-tailed jack rabbit herbivory were common.

In the three mitigation areas, the number of localities and plants increased slightly between 2014 and 2016. A total of 186 localities with 245 plants were identified in 2016. In 2014, 152 localities and 188 plants were recorded (Table 5-3).

2016 was a good year for Mojave milkweed growth and establishment. In both SSPPAs and mitigation areas, botanists located more Mojave milkweed individuals and localities than any other year. Between 2015 and 2016, Mojave milkweed increased numbers by 3 additional localities and 77 additional individuals (Table 5-3). These were mostly new recruits found downstream from original localities. Eighteen of the Mojave milkweed

were absent (or dead) during Year 3 monitoring (Figure 5-1) (11 in the SSPPAs and 7 in the mitigation areas). An unknown number of Mojave milkweed plants recorded as "absent" may be observed in future years if there is sufficient precipitation to result in regrowth aboveground. There were numerous herbivory observations where black-tailed jack rabbits had eaten the aboveground portions of Mojave milkweed and dug down to eat the upper portion of roots. Since Mojave milkweed have deep roots, it is unlikely that herbivory will result in death of these individuals.

As observed during construction and post-construction monitoring, the numbers of desert pincushion are decreasing in the SSPPAs within the solar field or the mitigation areas. Since 2010, 50 of the 146 original individuals (34 percent) of desert pincushion have died (25 in the SSPPAs and 25 in the mitigation areas). Since 2010, an additional 99 desert pincushion have been located in the mitigation areas, for an overall increase in the total of desert pincushion in protected areas. Many of the individuals have died due to herbivory from black-tailed jack rabbits and wild burros. It is also possible that desert pincushion are short-lived species and may only persist for a limited number of years. Many of the individuals that were located in 2016 were small (the width of a golf ball or smaller) and may have established since the 2010 surveys. From surveys conducted since 2010, the recruited individuals have aided in meeting the project's success criterion goals.

Survival of Parish's club-cholla in the protection areas and RPTA has been constant over time. No individuals have died since 2010, including the 135 transplanted individuals in RPTA-1. Two new individuals of Parish's club-cholla were observed in the mitigation areas during Year 3, for a total of 23 individuals. Only two observations of herbivory were documented on Parish's club-cholla, as compared to over 100 Mojave milkweed and desert pincushions with signs of herbivory. The ecology of this species, including tightly oriented spines and smaller stems (as compared to the round, beehive-shaped desert pincushion or the lush, vegetative leaves of the Mojave milkweed), may be better adapted to resist or block herbivory.

In the protection areas, three out of the four Rusby's desert mallow were present during Year-3 monitoring (Figure 5-1). In 2016, a new recruit was located in a SSPPA established for desert pincushion in Ivanpah 3. The Rusby's desert mallow SSPPA in Ivanpah 3 was present, but it was in poor condition and barely visible. The third Rusby's desert mallow was in RPTA-1 and is one of the original four identified pre-construction that continues to persist. Three Rusby's desert mallow individuals were absent in 2016; one in Ivanpah 1 and two in NRPMA. In the past, the individual in Ivanpah 1 has been very small and cryptic. It is possible that this individual may still persist underground and be visible during a year with sufficient environmental conditions. Both individuals of Rusby's desert mallow in the NRPMA have not been observed in several years. Since both individuals were located on the edge of ephemeral washes, it appears that they were scoured away during rain events. Four additional Rusby's desert mallow were located outside the protection areas but still within the facility boundaries (see Section 5.3 for further discussion), bringing the total number of Rusby's on site to seven.

5.2.1 Plant Salvage and Transplantation

As described in the Revised Protection Plan (Solar Partners, 2010a), SSPPAs within the solar field for Parish's club-cholla were not planned because of the ease with which this species was expected to be salvaged and transplanted. Experience with transplanting this species to date has verified this initial assumption. The approximate location of plants specified for salvage is shown on Figures 5-1 through 5-3 of the Revised Protection Plan (Appendix C).

Substantial numbers of special-status plants were salvaged exceeding the Revised Protection Plan salvage goals (Solar Partners, 2010a). To date, 442 Mojave milkweed, desert pincushion, Parish's club-cholla, and Rusby's desert mallow have been salvaged from the solar field or impacted areas and transplanted into RPTA-1. The one Rusby's desert mallow transplanted into RPTA-1 continues to persist since transplantation in 2010. For the first two seasons, plants were watered regularly when water demands were high. After that, supplemental watering was reduced to more closely match natural conditions.

In addition to the Mojave milkweed, desert pincushion, Parish's club-cholla, and Rusby's desert mallow plants salvaged and replanted in the RPTA-1, approximately 430 desert pincushion in excess of the special-status plant protection goals were salvaged from Units 1, 2, and 3, and other areas impacted during construction. These individuals have been replanted into the Common Succulent Transplant Area.

Special-status plants need to be re-established in the natural gas pipeline (NGL) corridor north of Ivanpah 3 to comply with BIO-18. The location of the NGL is shown on Figure 1-1. Some of the salvaged plants have been used in revegetation along the NGL corridor; other plants will be used in revegetation of the short-term disturbance areas, and the rest will be held in reserve, in case remedial measures are needed. The five Rusby's desert mallow transplanted on the NGL do not appear to have survived for unknown reasons, since the individuals were fenced. Special-status plant revegetation along the gas line corridor is described separately in the *BIO-18 Special-status Plants Gas Line Corridor Revegetation Report* (CH2M, 2017).

5.2.2 Nine-awned Pappus Grass

As described in Section 2 of this report, protection of nine-awned pappus grass is also required in BIO-18. Protection of this species in the solar field with exclusionary fences was not performed (Solar Partners, 2010a). This is because this species is a "summer annual," meaning it germinates and grows in response to summer or fall rainfall and does not persist in exactly the same location year-to-year. Fall surveys were performed for this species in 2011 in compliance with BIO-18, and results of these surveys are described in Appendix D of the *2011 BIO-18 Annual Compliance Report* (CH2M, 2012a). The 75 percent protection goal for nine-awned pappus grass was attained in 2011, and no additional measures are required for compliance with BIO-18.

5.2.3 Recruits Located Outside of the Protection Areas

With limited success observed in Year 3 on transplant survival and herbivory in transplant areas (NGL and RPTA-1), qualified botanists recommended that the project leave individual special-status plants in place, where possible. This procedure is in alignment with BIO-18 goal to ensure healthy and reproductive populations of special-status plants that can be sustained in perpetuity. The procedure includes training Operations staff to recognize that new stakes and small, exclusionary fences are protecting sensitive biological resources, and to avoid those locations.

During Year 3 monitoring, a total of 26 additional special-status species were observed persisting in the project facility outside of the protection areas (Figures 5-1 through 5-3). These individuals were not used in calculating the 75 percent success criteria, however, these additional plants bring the total number of plants above the pre-contruction baseline numbers. This allows for consistency in success criteria evaluation with previous years. Five of these individuals are Rusby's desert mallow. Because of the rarity of Rusby's desert mallow, these individuals were protected with a small, exclusionary fence. The other 21 individuals were marked with several stakes around the perimeter.

Documenting recruits outside of protection areas and still within the facility boundaries is a valuable procedure. This represents actual field conditions not anticipated during the Revised Protection Plan (Solar Partners, 2010a) preparation because of limited data available on these species. The overarching goal of BIO-18 is to ensure healthy and reproductive populations of special-status plants that can be sustained in perpetuity. Including the additional plants persisting in the project facility that are outside the protection areas provides valuable information on actual species distribution and ecology.

5.2.4 Special-status Plant Buffer Environmentally Sensitive Areas

Surveys of the 250-foot buffer were performed in spring 2010 and fall 2011 as required and were updated with any new finds during construction (CH2M, 2012a). As required, special-status plant localities identified within the 250-foot buffer are denoted on project plans and figures as ESAs, and signs were installed next to them (Figures 5-1 through 5-3).

Regular checks and repairs of the signs adjacent to the plants were performed between 2011 through 2016 as part of special-status plant maintenance and construction monitoring. Additional checks during operations and repairs or upkeep of the sensitive resource signs will be conducted to comply with this portion of BIO-18.

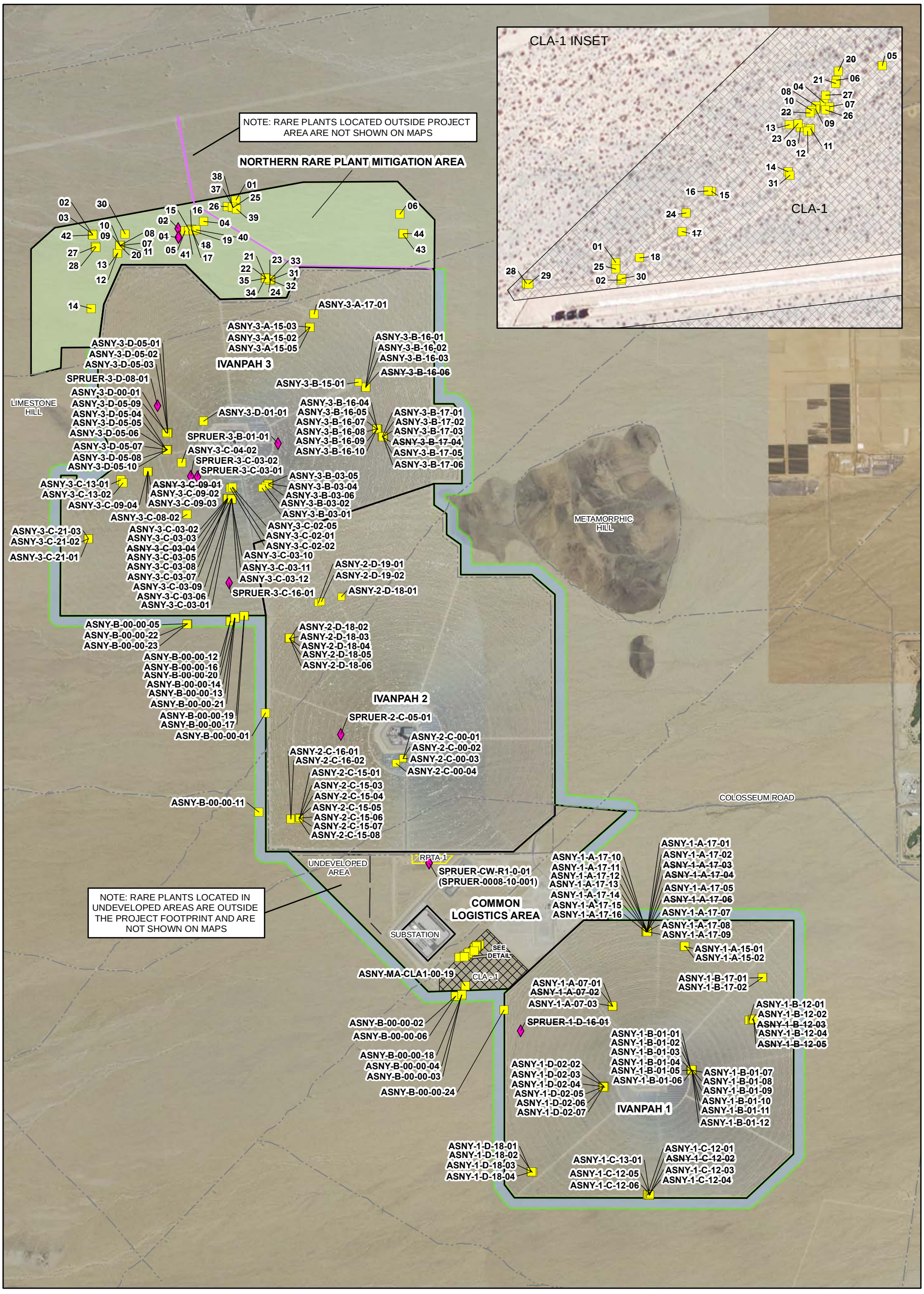
During Year 3 monitoring, botanists visited the ESAs as a control population for those individuals located in the protection areas. All of the individuals in the 250-foot facility buffer were alive except for 2 desert pincushion; total 34 live individuals, Mojave milkweed (19), desert pincushion (11), and Parish's club-cholla (4). Herbivory was observed on ESA locations.

5.3 Additional Special-status Plant Compliance Monitoring

5.3.1 Year 4 (2017) Post-construction Monitoring

Monitoring of the protection areas and other elements of the Special-status Plant Protection Program will be conducted as described in the Revised Protection Plan (Solar Partners, 2010a). Monitoring data will be collected and assessed over the 10-year monitoring period to identify short- and long-term persistence trends. Short- and long-term protection goals, and the monitoring procedures for each special-status species, are described in Sections 7 and 8 of the Revised Protection Plan (Solar Partners, 2010a).

Year 4 of the post-construction monitoring will be performed in 2017. Monitoring data will be evaluated to determine if the 75 percent protection goal continues to be met over time. If success criterion are met during Year 4 monitoring for all species, then BIO-18's 75 percent protection goals will be attained, and monitoring will be complete. If the 75 percent protection standard is not attained, remedial measures will be performed as described in the Remedial Action Plan (Solar Partners, 2010b). Annual monitoring reports following construction will be provided by January 31 of each calendar year within the 10-year monitoring timeframe. The Year 4 (2017) post-construction monitoring report will be submitted by January 31, 2018.



LEGEND

- Mojave milkweed (ASNY) *Asclepias nyctaginifolia*
- Rusby's Desert Mallow (SPRUER) *Sphaeralcea rusbyi var. eremicola*

ASNY - 0060 Plant Present

~~**ASNY - 0100**~~ Plant Missing or Dead

- Trails and Roads
- Project Site
- 250-ft Site Buffer
- 50-foot Corridor of Gas Line
- Rare Plant Mitigation Area
- Mitigation Area
- Rare Plant Transplantation Area (RPTA-1)

Note:
1) Rare plant localities within the 250-foot buffer are Environmental Sensitive Areas (ESAs).

2) Several plants shown are located outside SSPPAs in the solar field and are protected by small exclusionary fences or stakes. These individuals do not count towards success criteria.

Aerial Imagery courtesy of
ESRI Basemaps (NAIP 2014 and 2015): May 30, 2014 and May 28, 2015

N

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Feet

Figure 5-1
Location of Mojave Milkweed and Rusby's Desert Mallow
Year 3 (2016)
Post-Construction Monitoring Report

Ivanpah Solar Electric Generating System

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NOTE: RARE PLANTS LOCATED OUTSIDE PROJECT AREA ARE NOT SHOWN ON MAPS

NORTHERN RARE PLANT MITIGATION AREA (SEE FIGURE 5-2B)

COCH-3-D-21-03
COCH-3-D-19-06
COCH-3-A-32-01
COCH-3-A-14-01
COCH-3-A-13-01
COCH-3-D-17-04
COCH-3-D-11-02
COCH-3-A-19-02
COCH-3-D-15-02
COCH-3-A-12-01
COCH-3-D-12-03
COCH-3-D-05-01
LIMESTONE HILL
IVANPAH 3
COCH-3-B-17-04
COCH-3-B-07-04
COCH-3-B-07-03
COCH-3-B-11-02
COCH-3-B-12-05
COCH-3-C-13-03
COCH-3-C-12-02
COCH-3-B-14-01
COCH-3-B-14-02
COCH-2-D-28-08
COCH-2-D-29-06
COCH-2-D-27-03
METAMORPHIC HILL
COCH-2-D-27-04
COCH-2-D-24-04
COCH-2-D-24-05
COCH-2-D-25-04
COCH-2-D-24-06
COCH-2-D-24-07
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COCH-2-D-26-06
COCH-2-D-21-02
COCH-3-C-18-04
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COCH-B-00-00-15
COCH-2-D-19-03
COCH-B-00-00-16
COCH-2-D-06-01
COCH-B-00-00-03
IVANPAH 2
COCH-2-C-16-01
COCH-2-C-08-01
COCH-2-C-08-02
COCH-2-C-03-01
COLOSSEUM ROAD
COCH-B-00-00-11
RPTA-1
UNDEVELOPED AREA
NOTE: RARE PLANTS LOCATED IN UNDEVELOPED AREAS ARE OUTSIDE THE PROJECT FOOTPRINT AND ARE NOT SHOWN ON MAPS
COMMON LOGISTICS AREA
SUBSTATION
COCH-1-A-17-02
COCH-1-A-17-01
COCH-B-00-00-08
COCH-1-A-18-01
COCH-1-A-18-02
COCH-B-00-00-10
COCH-1-A-18-05
COCH-1-A-16-01
COCH-1-A-18-03
COCH-1-A-18-04
COCH-1-A-16-02
COCH-1-A-16-03
CLA-1 (SEE FIGURE 5-2B)
COCH-1-A-15-01
COCH-1-A-15-02
COCH-1-A-11-01
COCH-1-A-11-02
COCH-1-A-12-01
COCH-B-00-00-13
COCH-B-00-00-02
COCH-B-00-00-17
COCH-B-00-00-04
COCH-1-A-11-04
COCH-1-A-11-03
COCH-1-A-10-01
COCH-1-A-09-01
COCH-1-A-04-01
COCH-B-00-00-01
COCH-1-D-02-01
IVANPAH 1
COCH-1-C-05-01
COCH-1-C-07-01
COCH-1-C-10-01
COCH-B-00-00-09

LEGEND

+ Desert pincushion
Coryphantha chlorantha (COCH)

COCH - 1210 Plant Present

~~**COCH - 1213**~~ Plant Missing or Dead

Trails and Roads
Project Site
250-ft Site Buffer
50-foot Corridor of Gas Line
Rare Plant Mitigation Area
Mitigation Area
Rare Plant Transplantation Area (RPTA-1)

Note:
1) Rare plant localities within the 250-foot buffer are Environmental Sensitive Areas (ESAs).

2) Several plants shown are located outside SSPPAs in the solar field and are protected by small exclusionary fences or stakes. These individuals do not count towards success criteria.

Aerial Imagery courtesy of
ESRI Basemaps (NAIP 2014 and 2015): May 30, 2014 and May 28, 2015

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Feet

Figure 5-2a
Location of Desert Pincushion
Year 4 (2016)
Post-Construction Monitoring Report
Ivanpah Solar Electric Generating System

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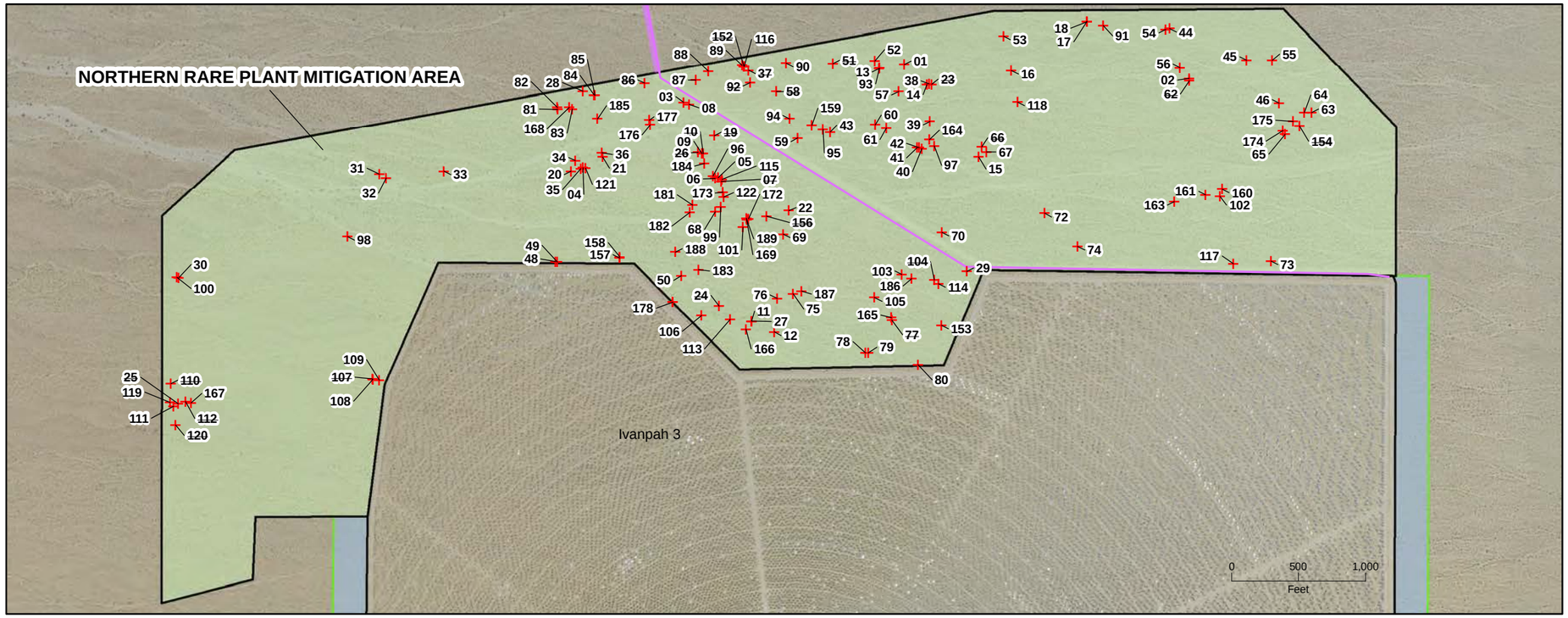
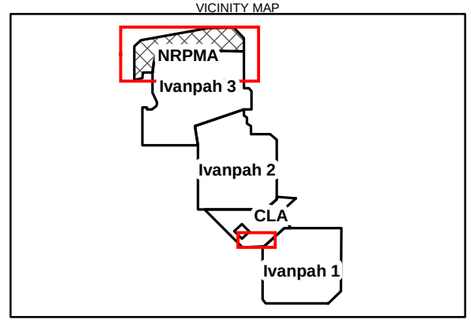


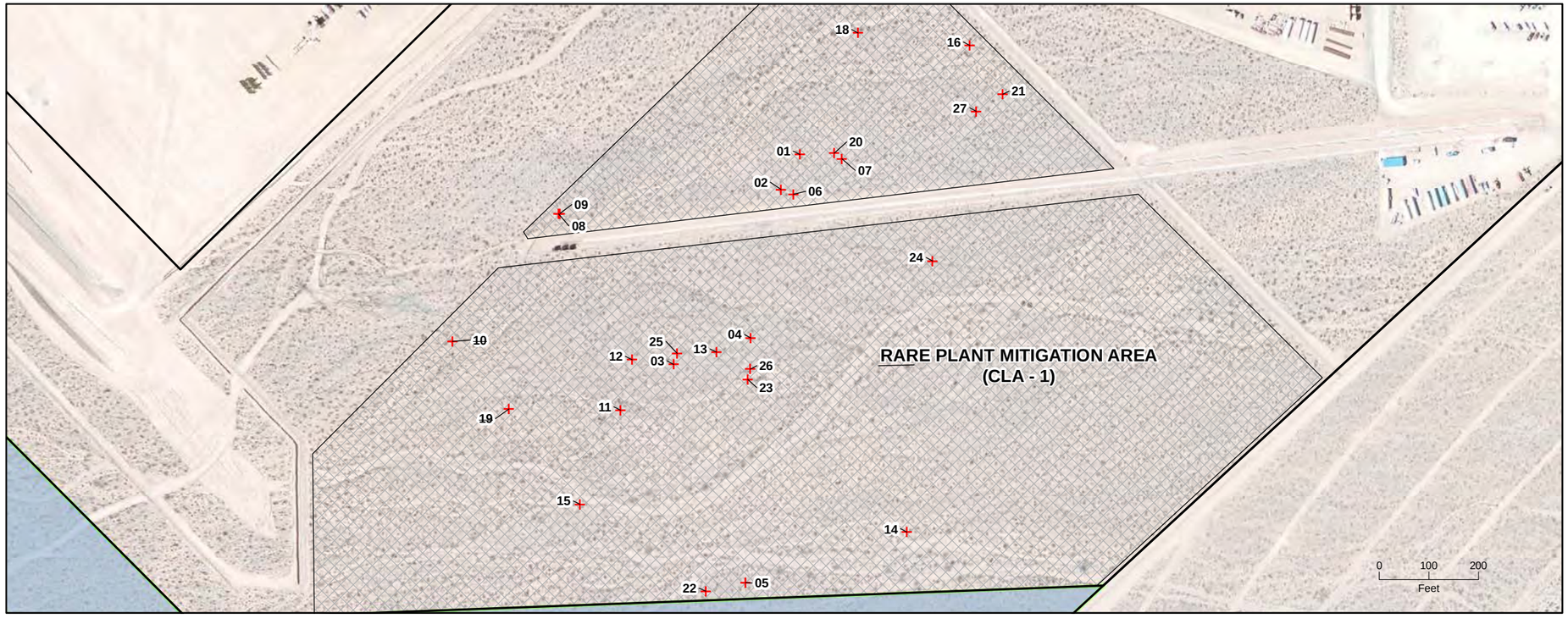
VICINITY MAP



LEGEND

- Desert pincushion *Coryphantha chlorantha (COCH)*
- Mitigation Area
- Rare Plant Mitigation Area
- 250-ft Site Buffer
- 50-foot Corridor of Gas Line
- Project Site

COCH - 1210 Plant Present
~~COCH - 1213~~ Plant Missing or Dead



Note:
1) Rare plant localities within the 250-foot buffer are Environmental Sensitive Areas (ESAs).

Aerial Imagery courtesy of
ESRI Basemaps (NAIP 2014 and 2015):
May 30, 2014 and May 28, 2015

N

Figure 5-2b
Location of Desert Pincushion
Year 3 (2016) - Mitigation Areas
Post-Construction Monitoring Report
Ivanpah Solar Electric Generating System

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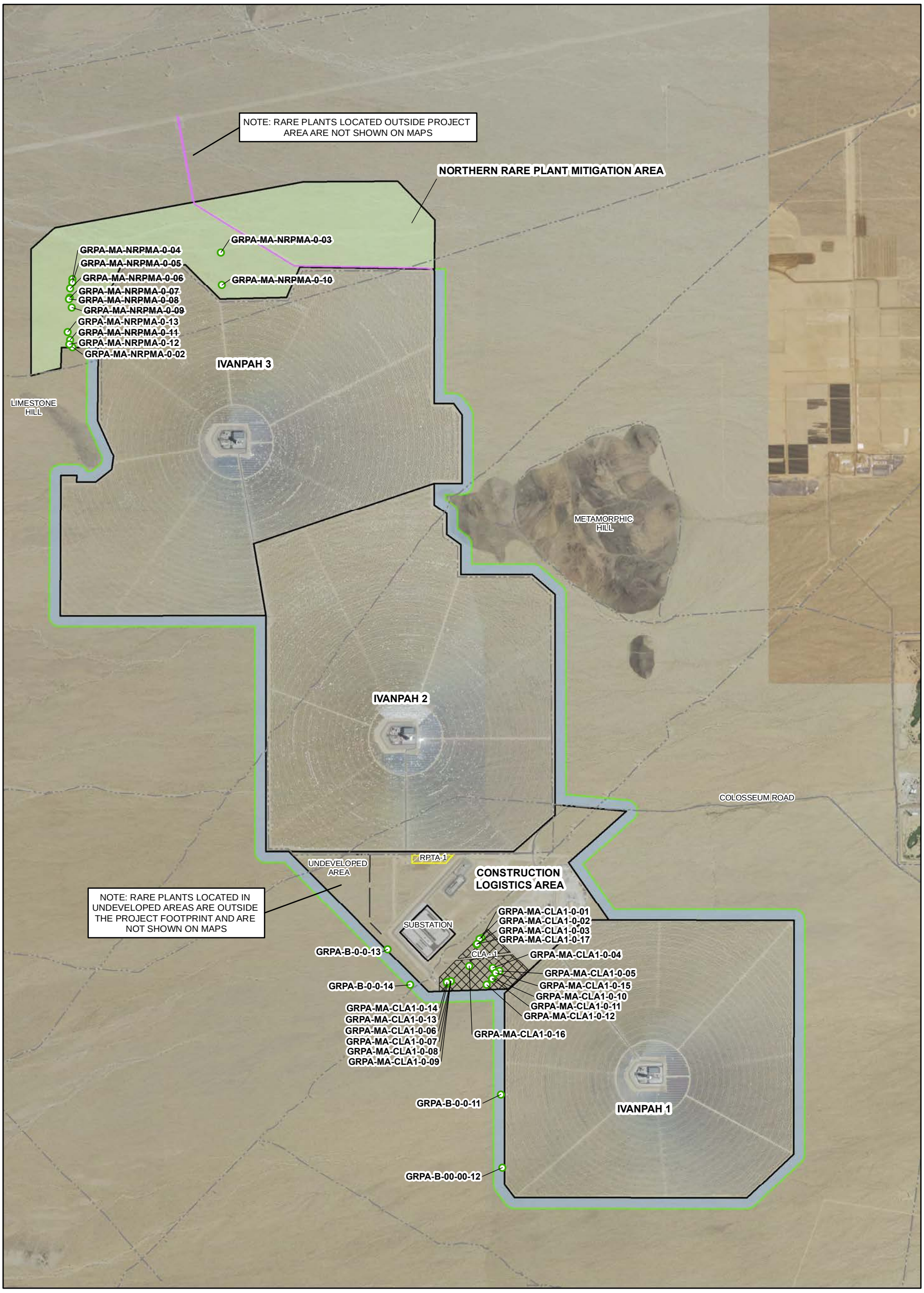

LEGEND

- Parish's club cholla
  Grusonia (=Opuntia) parishii (GRPA)

GRPA - 00002 Plant Present

~~**GRPA - 00002**~~ Plant Missing or Dead

- Trails and Roads
- Project Site
- 250-ft Site Buffer
- 50-foot Corridor of Gas Line
- Rare Plant Mitigation Area
- Mitigation Area
- Rare Plant Transplantation Area (RPTA-1)

Note:
1) Rare plant localities within the 250-foot buffer are Environmental Sensitive Areas (ESAs).

N

0 1,000 2,000
Feet

Figure 5-3
Location of Parish's Club-cholla
Year 3 (2016)
Post-Construction Monitoring Report
Ivanpah Solar Electric Generating System

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SECTION 6

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CH2M HILL (CH2M). 2015b. *Condition of Certification (COC) BIO-18 Special-status Plants As-built Report for the Ivanpah Solar Electric Generating System (ISEGS)*. Prepared for NRG Energy Services, LLC. December.

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Appendix A
Condition of Certification BIO-18

sections 2069 and 2099 or any other applicable in-lieu fee provision, the Project owner shall notify the Commission that it would like a determination that the Project's in-lieu fee proposal meets CEQA and CESA requirements.

SPECIAL-STATUS PLANT IMPACT AVOIDANCE AND MINIMIZATION

BIO-18 The project owner shall implement the following measures to avoid and minimize impacts to special-status plant species. Items 2, 3, 5, 6, 7, 10, and 11 are recommended exclusively by Energy Commission staff.

1. On-Site Plant Avoidance/Minimization Areas: To the extent feasible the project owner shall avoid and minimize disturbance to all special-status plant species within the project site. Impact avoidance (i.e., protection from project-related impacts of any kind through removal of acreage from the project footprint) and impact minimization efforts shall occur in all feasible locations. Impact avoidance shall focus on areas that support the highest density and diversity of special-status plant species and shall remove, at a minimum, the three areas totaling 476 acres and labeled "Rare Plant Mitigation Area" in Project Description Figure 13 from the Staff's FSA Addendum dated March 16, 2010 (Exhibit 315). The natural gas pipeline shall be aligned and narrowed to avoid special-status plant occurrences north of Ivanpah 3 as depicted in Project Description Figure 13. Impact minimization shall be conducted throughout the site. Impact minimization within the solar field shall consist of protecting small perimeters ("halos") around Mojave milkweed, desert pincushion, and Rusby's desert-mallow plants as indicated in the applicant's January 2010 draft Special-Status Plant Avoidance and Protection Plan (Exhibit 81, Appendix B).

2. Protection Goals : The project owner shall implement all feasible measures to protect 75 percent of the individuals of Mojave milkweed, Rusby's desert-mallow, desert pincushion, nine-awned pappus grass, and Parish's club-cholla within the project area (as mapped in Figure 5-3 of the applicant's final botanical survey report [CH2M Hill 2008x]). Each year during construction the measurement of percent protection achieved shall be calculated based on a comparison of numbers of individuals of each of these five species present in this area identified before construction compared to numbers remaining post –construction. These pre- and post-construction plant numbers shall be based on floristic surveys conducted by a qualified botanist.

3. Identify and Establish Special-Status Plant Protection Areas: The project owner shall identify Special-Status Plant Protection Areas for exclusion from the project footprint and avoidance of project-related impacts of any kind to facilitate achieving the 75 percent

protection goal. To accurately identify the boundaries of these areas, pre-construction floristic surveys shall be conducted by a qualified botanist at the appropriate time of year for special-status plant identification, including both spring and summer/fall blooming periods. Summer/fall surveys will be conducted after rains that are likely to cause plant germination and may be suspended in years where no such rains occur. The surveys shall encompass at a minimum the three areas totaling 476 acres and labeled "Rare Plant Mitigation Area" in Project Description Figure 13 and shall extend 150 feet on both sides of the proposed gas pipeline alignment and 250 feet out from the project fenceline. The locations of the Special-Status Plant Protection Areas shall be clearly depicted on all final maps and project drawings and descriptions for exclusion of all project activities.

4. Protection of Adjacent Occurrences: The project owner shall identify special-status plants occurrences within 250 feet of the project fenceline during the pre-construction plant surveys described above. A qualified botanist shall delineate the boundaries of these special status plant occurrences prior to the initiation of ground disturbing activities. These flagged special status plant occurrences shall be designated as Environmentally Sensitive Areas on plans and specifications, and shall be protected from accidental impacts during construction (e.g. vehicle traffic, temporary placement of soils or vegetation) and from the indirect impacts of project operation (e.g., herbicide spraying, changes in upstream hydrology, etc).

5. Develop and Implement a Special-Status Plant Protection and Monitoring Plan: The project owner shall develop and implement a Special-Status Plant Protection and Monitoring Plan for special-status plants occurring within the Special-Status Plant Protection Areas and on-site areas designated for impact minimization. The goal of the Special-Status Plant Protection and Monitoring Plan shall be to maintain the special-status plant species as healthy, reproductive populations that can be sustained in perpetuity. At a minimum, the Special-Status Plant Protection and Monitoring Plan shall:

   - establish baseline conditions and numbers of the plant occurrences in all protected areas (i.e., those to be excluded from the footprint and on-site areas to be protected) and success standards for protection of special-status plant occurrences;

   - provide information about microhabitat preferences and fecundity, essential pollinators, reproductive biology, and

propagation and culture requirements for each special-status species;

- describe measures (e.g., fencing, signage) to avoid direct construction and operation impacts to special-status plants within all protected areas;
- describe measures to avoid or minimize indirect construction and operations impacts to special-status plants within protected areas (e.g., runoff from mirror-washing, use of soil stabilizers/tackifiers, alterations of hydrology from drainage diversions, erosion/sedimentation from disturbed soils upslope, herbicide drift, the spread of non-native plants, etc);
- provide a monitoring schedule and plan for assessing the numbers and condition of special-status plants; and
- identify specific triggers for remedial action (e.g., numbers of plants dropping below a threshold).

6. Develop Special-Status Plant Remedial Action Plan: The project owner shall develop a detailed Special-Status Plant Remedial Action Plan to be implemented if special-status plants within the 476 acres of protected area and on-site minimization "halos" fail to meet success standards described in the Special-Status Plant Protection and Monitoring Plan. The Plant Remedial Action Plan shall include specifications for ex-situ/offsite conservation of seed and other propagules, and the seed bank and other symbionts contained in the topsoil where these plants occur. The remedial measures described in the Plant Remedial Action Plan shall not substitute for plant protection or other mitigation measures. The Special-Status Plant Remedial Action Plan shall include, at a minimum:
   - guidelines for pre-construction seed collection (and/or other propagules) for each species;
   - specifications for collecting, storing, and preserving the upper layer of soil containing seed and important soil organisms;
   - detailed replacement planting program with biologically meaningful quantitative and qualitative success criteria (see Pavlik 1996), monitoring specifications, and triggers for remedial action; and
   - ecological specifications for suitable planting sites.
7. Seed Collection: Implementation of the Special-Status Plant Remedial Action Plan would require a source of local source of seeds/propagules. In addition, seed collection would serve to

preserve germplasm in the event that all mitigation fails. The project owner shall develop and implement a Seed Collection Plan to collect and store seed for Mojave milkweed, Rusby's desert-mallow, desert pincushion, nine-awned pappus grass, and Parish's club-cholla. The source of these seeds shall be from plants proposed for removal within the project footprint. The project owner shall engage the services of a qualified contractor approved by the CPM to undertake seed collection and storage.

8. Gas Pipeline Revegetation and Monitoring: In the natural gas pipeline construction corridor where disturbed soils will be revegetated, the topsoil excavated shall be segregated, kept intact, and protected, under conditions shown to sustain seed bank viability. At a minimum, the top 2 cm of the soil shall be separately stored and preserved. Topsoil salvage, storing, and replacement shall be replaced in its original vertical orientation following pipeline installation ensuring the integrity of the top 2 cm in particular. The project owner shall prepare a Gas Pipeline Revegetation and Monitoring Plan targeted at re-establishment of Rusby's desertmallow, desert pincushion, Mojave milkweed, and potentially other special-status plant species. The Gas Pipeline Revegetation and Monitoring Plan shall identify success criteria for re-establishment and shall continue for a period of no less than 10 years until the defined success criteria are achieved. The Gas Pipeline Revegetation and Monitoring Plan shall include measures for seeding or other remedial actions. If no individuals of Rusby's desert-mallow, desert pincushion, or Mojave milkweed, are located during the first year of monitoring, the project owner shall conduct supplemental seeding or other remedial measures in the area disturbed by natural gas pipeline installation.

9. Surveys on Acquired and Public Lands: The project owner shall conduct floristic surveys for Rusby's desert-mallow and Mojave milkweed on all lands that will be acquired as part of the desert tortoise compensatory mitigation requirements (see Condition of Certification BIO-17). The goal of the surveys shall be to identify at least the same number of occurrences on off-site compensation or public lands as the number of occurrences in the project area excluding the occurrences in the Special-Status Plant Protection Areas in Project Description Figure 13. If this goal is not met by surveys on proposed acquisition lands, additional surveys shall be conducted within suitable habitat on public lands. To be counted toward fulfillment of the goal the occurrences must reflect new data not previously documented in other survey efforts. The survey requirements shall include the following:

- All surveys shall be conducted by a qualified botanist in accordance with BLM, CDFG, and CNPS plant survey guidelines;
- Surveys shall occur the first spring after construction begins and continue each year for a maximum of ten years until the same number of Mohave milkweed and Rusby's desert-mallow occurrences are identified on acquisition lands and/or public lands as located outside Special-Status Plant Protection Areas;
- For each year surveys are conducted yearly survey results shall be provided to the CPM, BLM's Authorized Officer and CDFG, and shall include CNDDB field survey forms for all special-status plant species encountered during the surveys; and
- All field survey forms shall be submitted to the CNDDB at the time of submittal to the CPM, BLM and CDFG.
- The project owner's qualified botanist shall submit a completion report documenting fulfillment of the target goals and which describe the number of new, previously undiscovered occurrences identified and mapped. Locations shall be reported with GPS coordinates compatible with inclusion in a GIS database.

10. Security for Implementation of Plans: The project owner shall provide security adequate to fund implementation of the Special-Status Plant Protection and Monitoring Plan, the Special-Status Plant Remedial Action Plan for the life of the project, as well as the Seed Collection Plan, and the Gas Pipeline Revegetation Monitoring Plan.

11. Acquire Off- Site Occurrence of Mojave Milkweed or Adjacent Land: The project owner shall acquire, in fee or in easement, a parcel or parcels of land that includes at least 30 acres supporting a viable occurrence of Mojave milkweed (or suitable habitat adjacent to a known occurrence). The terms and conditions of this acquisition or easement shall be as described in Condition of Certification BIO-17 with the additional criteria that the Mojave milkweed mitigation lands: 1) provide habitat for the special-status plant species that is of similar or better quality (e.g., in terms of native plant composition) than that impacted; 2) contain OR abut a known occurrence of Mojave milkweed, ideally with populations that are stable, recovering, or likely to recover, that shares the same watershed as the land; and 3) be adequately sized and buffered to support self-sustaining special-status plant populations. These mitigation lands may be included with the desert tortoise mitigation lands ONLY if the above criteria are met. Estimated security for acquisition of compensation lands for Mojave milkweed is

$107,265. If the project owner elects to construct the project in two phases in accordance with Condition of Certification BIO-22, the project owner shall provide Security in the amount of $47,755 prior to initiating any ground-disturbing activities associated with Phase 1, and shall provide Security in the amount of $77,510 prior to initiating any ground-disturbing activities associated with Phase 2. If sufficient new Mojave milkweed occurrences are discovered on desert tortoise compensation lands (not public lands) in accordance with item 9 above prior to acquiring this land, the associated security shall be refunded to the project owner.

Verification: No less than 30 days following the publication of the Energy Commission Decision the project owner shall submit final maps and design drawings depicting the location of Special-Status Plant Protection Areas within and adjacent to the project site, and shall identify the species and numbers of plants within each of the Special-Status Plant Protection Areas.

No less than 30 days following the publication of the Energy Commission Decision the project owner shall submit draft versions of the Special-Status Plant Protection and Monitoring Plan, the Special-Status Plant Remedial Action Plan, the Seed Collection Plan, and the Gas Pipeline Revegetation Monitoring Plan for review by the CPM, BLM's Authorized Agent, and CDFG. The project owner shall also provide a cost estimate for implementation of these plans which is subject to approval by the CPM, BLM's authorized agent, and the CDFG. The final plans shall be submitted for approval by the CPM, in consultation with BLM's Authorized Agent, CDFG, and CNPS within 90 days of the publication of the Commission Decision. The final plans shall be incorporated into the BRMIMP. At this time, the project owner shall also provide security sufficient to fund the implementation of the plans.

Within 30 days of the start of construction, the project owner shall submit copies of the contract with the CPM-approved seed contractor and the check for seed collection and curation fees to the CPM.

The project owner shall identify special-status plants occurrences within 250 feet of the project fence line during the pre-construction plant surveys described above. A qualified botanist shall delineate the boundaries of these special status plant occurrences at least 30 days prior to the initiation of ground disturbing activities.

On January 31st of each year following construction the project owner's qualified botanist shall submit a report, including CNDDB field survey forms, describing the results of off-site plant surveys for Mojave milkweed and Rusby's desert-mallow to the BLM's authorized officer, the CPM, CDFG, and CNDDB. Submittal of survey reports shall continue for a maximum of 10 years until the same number of occurrences in the project area excluding the occurrences in the

Special-Status Plant Protection Areas. The project owner's qualified botanist shall submit a completion report documenting fulfillment of the target goals and which describe the number of new, previously undiscovered occurrences identified and mapped using GIS techniques for each species. Mapping results shall include GPS coordinates of the plants found.

The Designated Biologist shall maintain written and photographic records of the tasks described above, and summaries of these records shall be submitted along with the Monthly Compliance Reports to the CPM, BLM Authorized Agent, and CDFG. During project operation, the Designated Biologist shall submit record summaries in the Annual Compliance Report for a period not less than 10 years for the Gas Pipeline Revegetation Plan, and for the life of the project for the Special-Status Plant Protection and Monitoring Plan, and the Special-Status Plant Remedial Action Plan, including funding for the seed storage.

No less than 90 days prior to acquisition of the parcel(s) containing or adjacent to a known Mojave milkweed occurrence, the project owner, or a third-party approved by the CPM, in consultation with CDFG, shall submit a formal acquisition proposal to the CPM and CDFG describing the parcel(s) intended for purchase.

Draft agreements to delegate land acquisition to CDFG or an approved third party and agreements to manage compensation lands shall be submitted to Energy Commission staff for review and approval (in consultation with CDFG) prior to land acquisition. Such agreements shall be mutually approved and executed at least 60 days prior to start of any project-related ground disturbance activities. The project owner shall provide written verification to the CPM that the compensation lands have been acquired and recorded in favor of the approved recipients(s). Alternatively, before beginning project ground-disturbing activities, the project owner shall provide Security in accordance with this condition. Within 90 days after the lands purchase, as determined by the date on the title, the project owner shall provide the CPM with a management plan for review and approval, in consultation with CDFG, for the compensation lands and associated funds.

Nelson's Bighorn Sheep Mitigation

BIO-19 To compensate for project impacts to Nelson's bighorn sheep the project owner shall finance, construct and manage an artificial water source in the eastern part of the Clark Mountain range or in the State Line Hills outside of designated Wilderness. The project owner shall monitor and control noxious and invasive weeds within 100 feet of the artificial water source. Control of weeds shall be coordinated with the CPM and BLM staff and shall consist of removal by mechanical methods, rather than herbicides. To minimize potential impacts to Nelson bighorn sheep, the project owner shall not use barbed wire fence on the northern perimeter of the Ivanpah 3 site, unless the project

Appendix B
Representative Photographs from 2016 Post-construction Monitoring

PHOTOGRAPH B-1
Mojave Milkweed Special-status Plant Protection Area (ASNY-1-A-17-14) in Ivanpah 1.

PHOTOGRAPH B-2
Flowering Mojave milkweed (ASNY-1-B-12-01) in Ivanpah 1.

PHOTOGRAPH B-3
Small sprouts of Mojave Milkweed (ASNY-2-D-18-05) in Ivanpah 2 SSPPA.

PHOTOGRAPH B-4
Robust flowering Mojave milkweed (ASNY-3-C-08-02) in Ivanpah 3 SSPPA.

PHOTOGRAPH B-5
Mojave milkweed SSPPA (ASNY-3-B-16-01) in Ivanpah 3.

PHOTOGRAPH B-6
Mojave milkweed (ASNY-3-C-03-10) in Ivanpah 3 SSPPA. Small sprout in center of the photo.

PHOTOGRAPH B-7
Fruiting Mojave milkweed (ASNY-3-A-17-01) in Ivanpah 3 SSPPA.

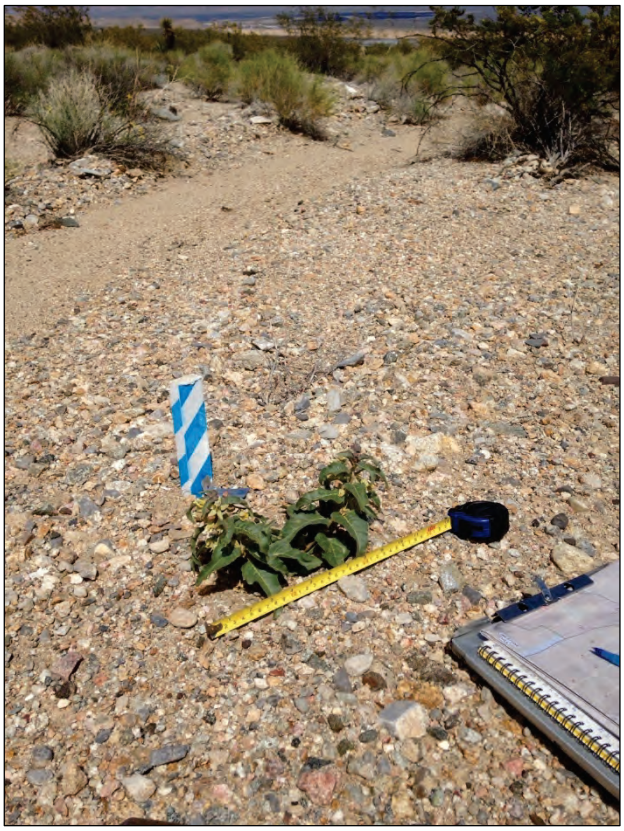
PHOTOGRAPH B-8
Mojave milkweed (ASNY-B-00-00-01) in 250-foot buffer next to perimeter fence. The buffer locality is signed as an Environmentally Sensitive Area (ESA).

PHOTOGRAPH B-9
Mojave milkweed (ASNY-MA-CLA1-00-01) in CLA-1 Mitigation Area. One small fruit is visible in left corner.

PHOTOGRAPH B-10
Desert wash habitat for Mojave milkweed (ASNY-MA-CLA1-00-19) in the CLA-1 Mitigation Area. This plant is located in middle of photo.

PHOTOGRAPH B-11
Mojave milkweed (ASNY-MA-CLA-1-00-07) in the CLA-1 Mitigation Area. Plant is flowering.

PHOTOGRAPH B-12
Flowering Mojave milkweed (ASNY-MA-NRPMA-00-02) in the NRPMA Mitigation Area.



PHOTOGRAPH B-13
Mojave milkweed (ASNY-MA-NRPMA-00-43) and rocky dry wash habitat in the NRPMA Mitigation Area.

PHOTOGRAPH B-14
Mojave milkweed (ASNY-MA-NRPMA-00-44) in the NRPMA Mitigation Area.

PHOTOGRAPH B-15
Desert pincushion (COCH-1-A-09-01) in Ivanpah 1 SSPPA. The individual is located to the left of the blue and white stake.

PHOTOGRAPH B-16
Desert pincushion (COCH-1-A-17-02) in Ivanpah 1 SSPPA. This plant has signs of herbivory.

PHOTOGRAPH B-17
Flowering desert pincushion (COCH-2-D-29-06) Ivanpah 2 SSPPA.

PHOTOGRAPH B-18
Desert pincushion (COCH-2-D-26-05) in Ivanpah 2 SSPPA. This invidual is located to the left of the orange stake.

PHOTOGRAPH B-19
Closeup of desert pincushion (COCH-2-C-03-01) in Ivanpah 2 SSPPA. This plant has signs of herbivory.

PHOTOGRAPH B-21
Flowering desert pincushion (COCH-3-D-11-02) in Ivanpah 3 SSPPA. This polycephalus individual has five heads.

PHOTOGRAPH B-20
Overview of desert pincushion (COCH-3-D-08-01) in Ivanpah 3 SSPPA. This plant has signs of herbivory. The individual is located to the right of the orange stake.

PHOTOGRAPH B-22
A polycephalus desert pincushion (COCH-B-00-00-01) in 250-foot site buffer. This individual has five heads.

PHOTOGRAPH B-23
Desert pincushion (COCH-B-00-00-14) in 250-foot site buffer. The buffer locality is signed as an ESA.

PHOTOGRAPH B-24
Desert pincushion (COCH-MA-CLA1-00-17) in CLA-1 Mitigation Area.

PHOTOGRAPH B-25
A polycephalous desert pincushion (COCH-MA-CLA1-00-12) has seven heads in CLA-1 Mitigation Area.

PHOTOGRAPH B-26
Flowering desert pincushion (COCH-MA-NRPMA-00-40) in NRPMA Mitigation Area.

PHOTOGRAPH B-27
Desert pincushion (COCH-MA-NRPMA-00-80) with a crown of flower buds in the NRPMA Mitigation Area.

PHOTOGRAPH B-28
Flowering desert pincushion (COCH-MA-NRPMA-00-161) in the NRPMA Mitigation Area.

PHOTOGRAPH B-29
Flowering desert pincushion (COCH-MA-NRPMA-00-174) in the NRPMA Mitigation Area.

PHOTOGRAPH B-30
Flowering desert pincushion (COCH-MA-NRPMA-00-175) in the NRPMA Mitigation Area.

PHOTOGRAPH B-31
Small sprout of vegetative grown on Rusby's desert mallow (SPRUER-3-C-16-01) in a SSPPA in Ivanpah 3. This is the only Rusby's desert mallow observed in SSPPA or Mitigation Areas in

PHOTOGRAPH B-32
Overview of Rusby's desert mallow (SPRUER-3-C-16-01) in Ivanpah 3. The individual is located to right of the yellow stake.

PHOTOGRAPH B-33
Several Rusby's desert mallow's have been found in the solar field, outside of the SSPPA or Mitigation Area. These individuals were left in place and protected with a small fence. This Rusby's desert mallow (SPRUER-3-C-03-01) is located in Ivanpah 3 solar field.

PHOTOGRAPH B-34
Close-up photo of leaves of Rusby's desert mallow (SPRUER-3-C-03-01) in Ivanpah 3 solar field. The stellate hairs are visible in this photo.

PHOTOGRAPH B-35
Rusby's desert mallow (SPRUER-3-C-03-01) in flower. This individual is protected with a small fence in the Ivanpah 3 solar field.

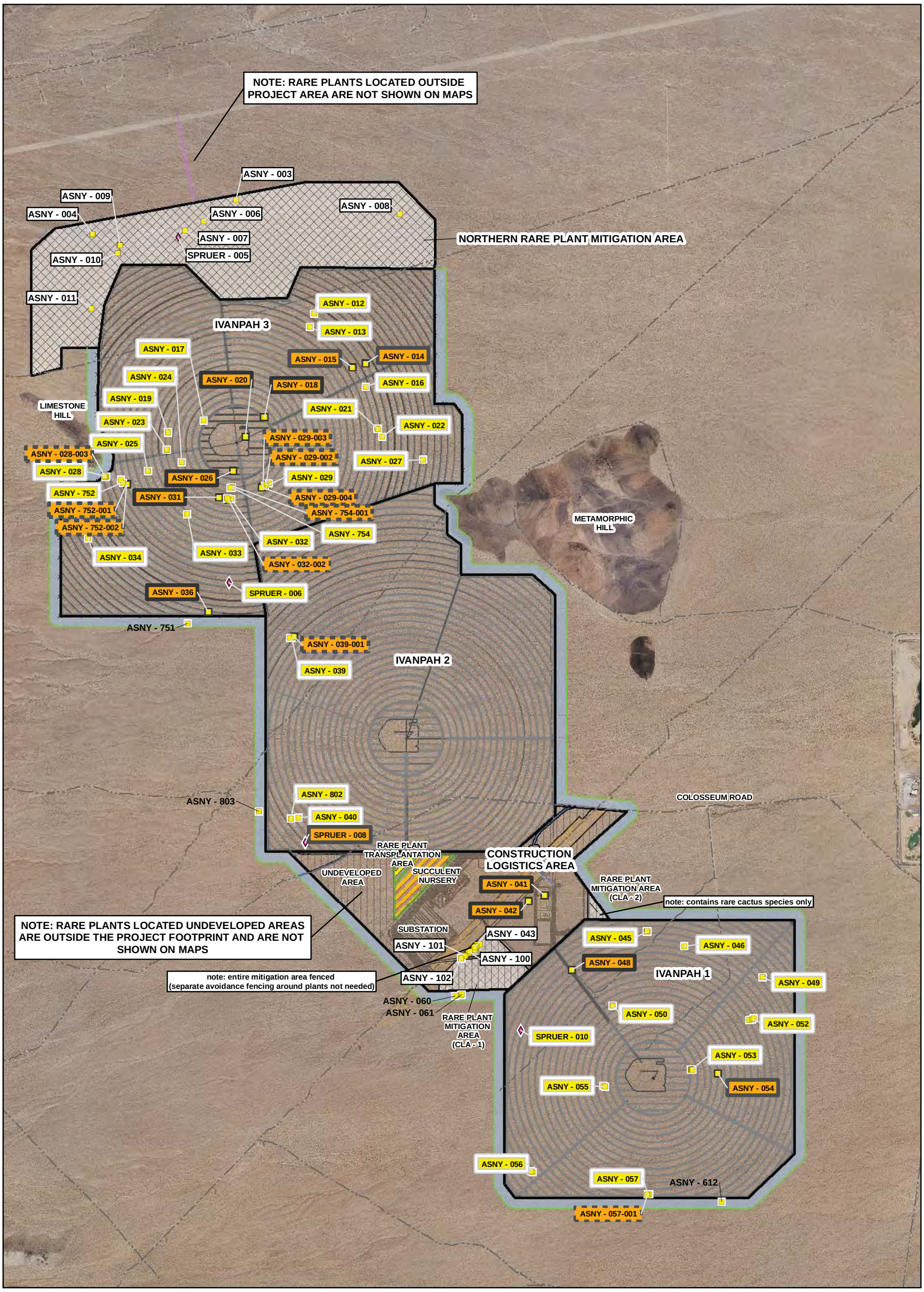
PHOTOGRAPH B-36
Vegetative Rusby's desert mallow (SPRUER-3-C-03-02) that is protected with a small fence in the solar field in Ivanpah 3.

PHOTOGRAPH B-37
Parish's club-cholla (GRPA-MA-CLA1-0-01) in the CLA-1 Mitigation Area.

PHOTOGRAPH B-38
Flowering Parish's club-cholla (GRPA-B-0-0-09) in the 250-foot site buffer.

PHOTOGRAPH B-39
Parish's club-cholla (GRPA-MA-CLA1-0-03) in the CLA-1 Mitigation Area. This individual is in bud and flowering.

Appendix C
Revised Special-status Plant Protection Plan Figures 5-1 through 5-3 (Solar Partners, 2010a)



LEGEND

Mojave Milkweed
Asclepias nyctaginifolia (ASNY)

Rusby's desert mallow
Sphaeralcea rusbyi var. eremicola (SPRUER)

Rare Plant Locality ID:	Rare Plant Treatment:
ASNY- 006	Special-Status Plant Protection Area (SSPPA)
ASNY-018	Salvaged
ASNY-057-001	Plant salvaged from a fenced (avoided) locality
ASNY-003	Mitigation Area (Not fenced or salvaged)
ASNY-060	Not Fenced or Salvaged (Located outside of Project Impact Area)

- Trails and Roads
- 250-ft Site Buffer
- 50-foot Corridor of Gas Line
- Project Site
- Mitigation Area
- Rare Plant Transplantation Area
- Succulent Nursery
- Undeveloped Area

DRAFT

Notes:
1) Rare plant avoidance fencing, salvage and mitigation locations based on project design dated July 7, 2010.

2) Rare cactus localities are not shown on this map.

3) Rare plant localities within the 250-foot buffer are Environmental Sensitive Areas (ESAs).

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Figure 5-1
The Location of Mojave Milkweed and Rusby's Desert Mallow Localities to be Fenced, Salvaged or Included in Mitigation Area
Ivanpah Solar Electric Generating System

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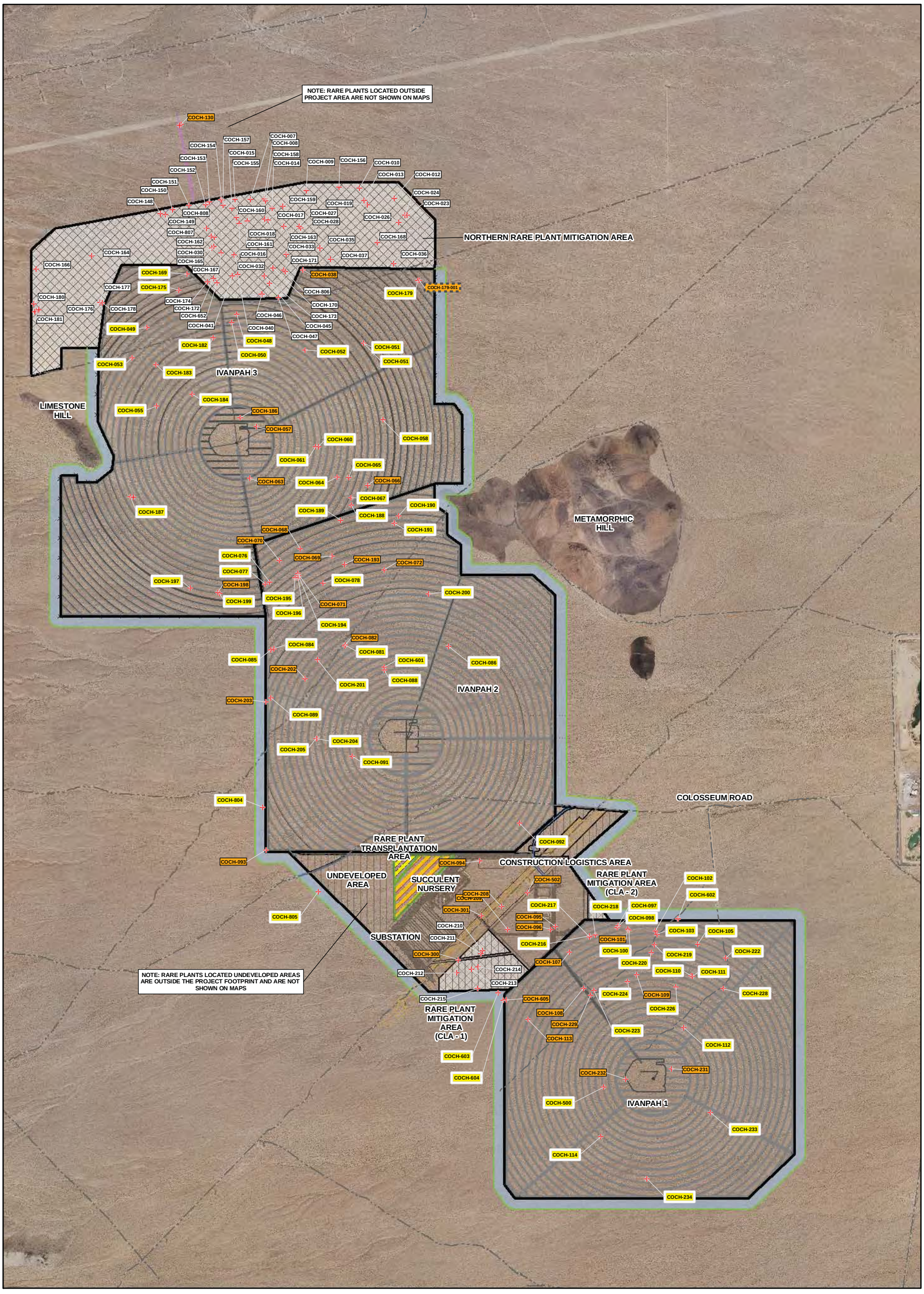

Figure 5-2
Location of Desert Pincushion Localities to be Fenced, Salvaged or Included in Mitigation Area
Ivanpah Solar Electric Generating System

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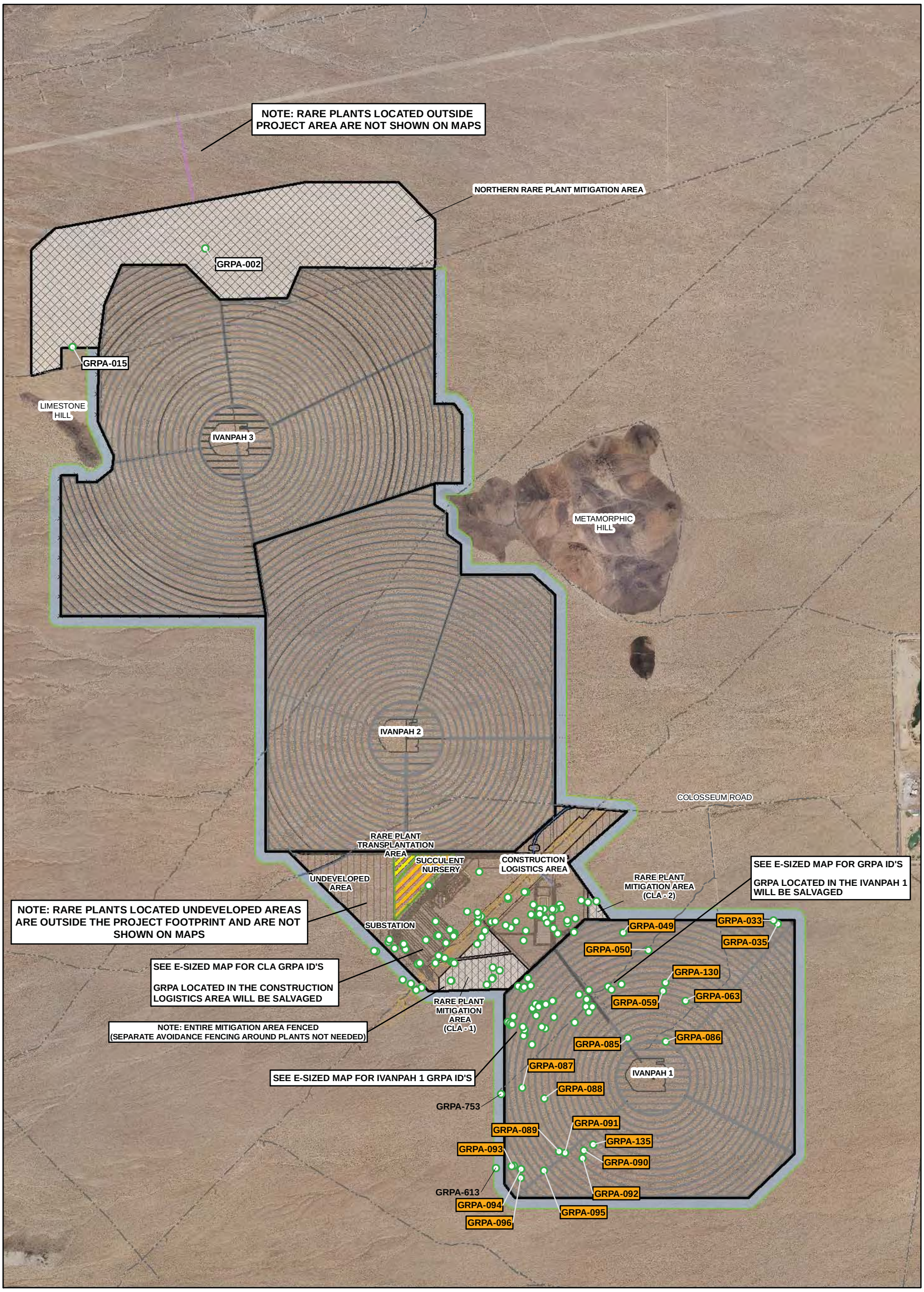

LEGEND

Parish's club cholla
Grusonia (=Opuntia) parishii (GRPA)

Rare Plant Locality ID:	Rare Plant Treatment:
GRPA- 000	Special-Status Plant Protection Area (SSPPA)
GRPA-123	Salvaged
GRPA-002	Mitigation Area (Not fenced or salvaged)
GRPA-154	Not Fenced or Salvaged (Located outside of Project Impact Area)

- Project Fence Line
- Trails and Roads
- 250-ft Site Buffer
- 50-foot Corridor of Gas Line
- Project Site
- Mitigation Area
- Rare Plant Transplantation Area
- Succulent Nursery
- Undeveloped Area

DRAFT

Notes:
1) Rare plant avoidance fencing, salvage and mitigation locations based on project design dated July 7, 2010.

2) All GRPA's located within the Construction Logistics Area will be salvaged.

3) Rare plant localities within the 250-foot buffer are Environmental Sensitive Areas (ESAs).

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Figure 5-3
Location of Parish's Club Cholla Localities to be Fenced, Salvaged or Included in Mitigation Area
Ivanpah Solar Electric Generating System

Appendix D
Monitoring Datasheets

IVANPAH SEGS PROJECT
San Bernardino County, CA

SPECIAL-STATUS PLANT PROTECTION PROGRAM
Rare Plant Health Assessment

Asclepias nyctaginifolia

General Location: _____ **Date:** _____

Name(s) of Data Collector: _____

Plant Unique ID #		Health Assessment						Reproduction					Other	Maintenance			Comments / Photo Log
Identification Number	New Plant Y/N	Plant Absent Y/N/R	Seedling/ Sprout Count	Vigor Score 1-5	Phenol V/B/F FR/OF W/D	Grazing Damage 0-3	DigDown Depress None or #AL/#AN	# Fwr Clust.	# Fruits	Seeds N/IF/OG	Good Seed Source Y/N/F	Pollin-ators Observ. Y/N	Photo Y/N	ID Stake N/G I/R	ID Tag N/G I/R	Weed spp. Y/N	

NOTES:

revised April 29, 2013

IVANPAH SEGS PROJECT
San Bernardino County, CA

SPECIAL-STATUS PLANT PROTECTION PROGRAM
Rare Plant Health Assessment

Coryphantha chlorantha

General Location: _____ **Date:** _____

Name(s) of Data Collector: _____

Plant Unique ID #			Health Assessment						Reproduction			Other	Maintenance			Comments / Photo Log
Identification Number	New Plant Y/N	Plant Absent Y/N	Plant Dead Y/N	Plant Mortal. DP/DD	Vigor Score 1-5	Phenol V/B/FL FR/PF	Polyceph. # Heads (N=)	Grazing Damage 0-3	# Flws	# Fruits	Pollinators Observ. Y/N	Photo Y/N	ID Stake NGIR	ID Tag NGIR	Weed spp. Y/N	

NOTES:

revised April 29, 2013

IVANPAH SEGS PROJECT
San Bernardino County, CA

SPECIAL-STATUS PLANT PROTECTION PROGRAM
Rare Plant Health Assessment

Grusonia parishii

General Location: _____ **Date:** _____

Name(s) of Data Collector: _____

Plant Unique ID #		Health Assessment							Reproduction				Other	Maintenance			Comments / Photo Log
Identification Number	New Plant Y/N	Plant Absent Y/N	Plant Dead Y/N	Vigor Score 1-5	New Growth Y/N	% Dead 0-3	Phenol V/B FL/FR	# Clumps	# Flws	# Frts	# LYSF Y/N	Pollinators Observed Y/N	Photo Y/N	ID Stake N/G I/R	ID Tag N/G I/R	Weed spp. Y/N	

NOTES:

IVANPAH SEGS PROJECT
San Bernardino County, CA

SPECIAL-STATUS PLANT PROTECTION PROGRAM
Rare Plant Health Assessment

Sphaeralcea rusbyi var. eremicola

Date:

Plant Unique ID #		Health Assessment											Other	Maintenance			Comments / Photo Log
Identification Number	New Plant Y/N	Plant Absent Y/N	Plant Dead Y/N	Vigor Score 1-5	Phenol V/B/F FR/W/S	Grazing Damage 0-3	# Stems	# Flws	# Fruits	Seeds N/IF/OG	Good Seed Source Y/N/F	Pollin-ators Observ. Y/N	Photo Y/N	ID Stake N/G I/R	ID Tag N/G I/R	Weed spp. Y/N	

NOTES:

Appendix K

Condition of Certification BIO-18

Special-status Plants Post-Construction Natural Gas Pipeline Monitoring Report

CONDITION OF CERTIFICATION BIO-18

Year 3 (2016) Special-status Plants Postconstruction Natural Gas Pipeline Monitoring Report

Ivanpah Solar Electric Generating System

Prepared for
Solar Partners II, LLC; Solar Partners I, LLC;
and Solar Partners VIII, LLC

January 2017

ch2m

2485 Natomas Park Drive
Suite 600
Sacramento, CA 95833

Contents

Acronyms and Abbreviations

BIO-18	Condition of Certification BIO-18
BLM	Bureau of Land Management
CDFW	California Department of Fish and Wildlife
CNDDB	California Natural Diversity Database
CEC	California Energy Commission
CH2M	CH2M Engineers Inc.
CLA	Construction Logistics Area
COC	Condition of Certification
CRPR	California Rare Plant Rank
GANDA	Garcia and Associates
gen-tie	generation tie
GIS	geographic information system
GPS	global positioning system
ID	identification
ISEGS	Ivanpah Solar Electric Generating System
kV	kilovolt
MW	megawatt
NGL	natural gas pipeline
No.	number
NRPMA	Northern Rare Plant Mitigation Area
Remedial Action Plan	*Ivanpah SEGS Special-status Plant Remedial Action Plan*
Revegetation Plan	*Closure, Revegetation, and Rehabilitation Plan, COCs BIO-14, BIO-18 & COMP-11, Revision 4; includes the Gas Pipeline Revegetation and Monitoring Plan*
Revised Protection Plan	*Ivanpah SEGS Special-status Plant Protection and Monitoring Plan*, *Revision 1*
ROW	right-of-way
RPTA	Rare Plant Transplantation Area
Seed Collection Plan	*Seed Collection and Revegetation Proposed Plan, Revision 1*
Solar Partners	Solar Partners I, LLC; Solar Partners II, LLC; and Solar Partners VIII, LLC
SSPPA	Special-status Plant Protection Area

SECTION 1

Introduction

1.1 Project Description

Solar Partners I, LLC; Solar Partners II, LLC; and Solar Partners VIII, LLC (Solar Partners) are the owners of the Ivanpah Solar Electric Generating System (ISEGS), a nominal 370-megawatt (MW) solar energy project in southern California's Mojave Desert, near the Nevada border. The project was developed by BrightSource Energy, Inc. and is operated for Solar Partners by NRG Energy Services, LLC. The project is located on a 3,471-acre site west of the Ivanpah Dry Lake, on land managed by the Bureau of Land Management (BLM). CH2M (CH2M) provides environmental compliance support during construction and operations of the solar facility.

Ivanpah 1 (the southern unit) covers approximately 913.5 acres (1.4 square miles); Ivanpah 2 (the middle unit) covers approximately 1,077 acres (1.7 square miles); and Ivanpah 3 (the northern unit) is larger and covers approximately 1,235 acres (1.9 square miles). The remaining disturbance areas include common access roads, gas lines, generation tie (gen-tie) lines, and construction and operations facilities. All three phases share an administration building, an operations and maintenance building, a substation located between Ivanpah 1 and 2, and paved roads to access each site. The project ties into the existing Kern River Gas Transmission Line about 0.5-mile north of the Northern Rare Plant Mitigation Area (NRPMA) and into the Southern California Edison 230/115-kilovolt (kV) line that crosses between the Ivanpah 1 and 2 sites (Figure 1-1) (CEC, 2010).

Each unit consists of solar arrays of heliostats (or mirrors) that focus solar energy on central solar power tower receivers near the center of each of the heliostat arrays. Ivanpah 1 (nominal 120 MW) has a heliostat array consisting of approximately 53,500 heliostats. Ivanpah 2 and 3 (nominal 125 MW each) have heliostat arrays consisting of approximately 60,000 heliostats. The heliostat array of each unit is arranged around a single centralized solar power tower that is 140 meters (459 feet) in height, including a boiler and superheater panel with an upper steam drum and protective ceramic insulation panels (20 meters [65.5 feet]) on top. Each solar power plant has a power block in the approximate center of the heliostat array. The power block includes a solar power tower (SPT), a receiver boiler, a steam turbine generator (STG) set, an air-cooled condenser, and other auxiliary systems. The solar field and power generation equipment are started each morning after sunrise and shut down in the evening when insolation drops below the level required to keep the turbine online (CEC, 2010).

1.2 Report Objective

The objective of this report is to present the results of the Year 3 (2016) postconstruction special-status plant revegetation monitoring of the natural gas pipeline (NGL) corridor. This report complies with the annual reporting requirement of BIO-18 Measure 8, Gas Pipeline Revegetation and Monitoring. This report also complies with measures included in Section 8 of the *ISEGS Special-status Plant Protection and Monitoring Plan, Revision 1* (Revised Protection Plan) (Solar Partners, 2010a), and sections that pertain to special-status plants in the *Closure, Revegetation, and Rehabilitation Plan for the Ivanpah Solar Electric Generating System*. *COCs BIO-14, BIO-18 & COMP-11. Eastern Mojave Desert. San Bernardino County, California* (Revegetation Plan) (CH2M, 2010), which includes the Gas Pipeline Revegetation and Monitoring Plan, as required by the BLM Right-of-Way (ROW) Grant.

As outlined in the California Energy Commission (CEC) ISEGS Commission Decision (CEC, 2010), project construction resulted in impacts to five special-status plants.

These species are:

1. Rusby's desert mallow (*Sphaeralcea rusbyi var. eremicola*)
2. Mojave milkweed (*Asclepias nyctaginifolia*)
3. Desert pincushion (*Coryphantha chlorantha*)
4. Nine-awned pappus grass (*Enneapogon desvauxii*)
5. Parish's club-cholla (*Grusonia [Opuntia] parishii*)

Year 3 monitoring of the NGL revegetation shows that the reclamation success criterion has been met through establishment of target densities of Mojave milkweed, desert pincushion, Parish's club-cholla, and nine-awned pappus grass on the NGL corridor. Nine-awned pappus grass was not surveyed during Year 2 (2015) monitoring. Nine-awned pappus grass is a summer annual in California, meaning that it germinates and grows after summer rain, and does not occur every year. Not monitoring in low rainfall years is not considered nonperformance. Success criteria goals for nine-awned pappus grass were met during Year 1 (2014) and Year 3 (2016) monitoring; therefore, meeting the goal of 2 consecutive years of presence. In accordance with the BIO-18 verification, NGL annual reporting will continue for 10 years.

The CEC included special-status plant avoidance, minimization, and protection goals in Condition of Certification (COC) BIO-18 (CEC, 2010). The text of BIO-18 is included in Appendix A of this report. The objectives of BIO-18 are to avoid and minimize disturbance to all special-status plants onsite to the extent feasible. BIO-18, Measure 8, Gas Pipeline Corridor Revegetation and Monitoring, includes a requirement to reestablish special-status plants within the NGL corridor.

1.3 Special-status Plant Compliance Documents

Plans prepared for ISEGS to comply with BIO-18 include the following:

- Revegetation Plan, which includes the Gas Pipeline Revegetation and Monitoring Plan (BIO-18) (CH2M, 2010)
- *Ivanpah SEGS Special-status Plant Remedial Action Plan* (Remedial Action Plan) (Solar Partners, 2010b)
- Revised Protection Plan (Solar Partners, 2010a)
- *Seed Collection and Revegetation Proposed Plan,* Revision 1 (Seed Collection Plan) (Solar Partners, 2010c)

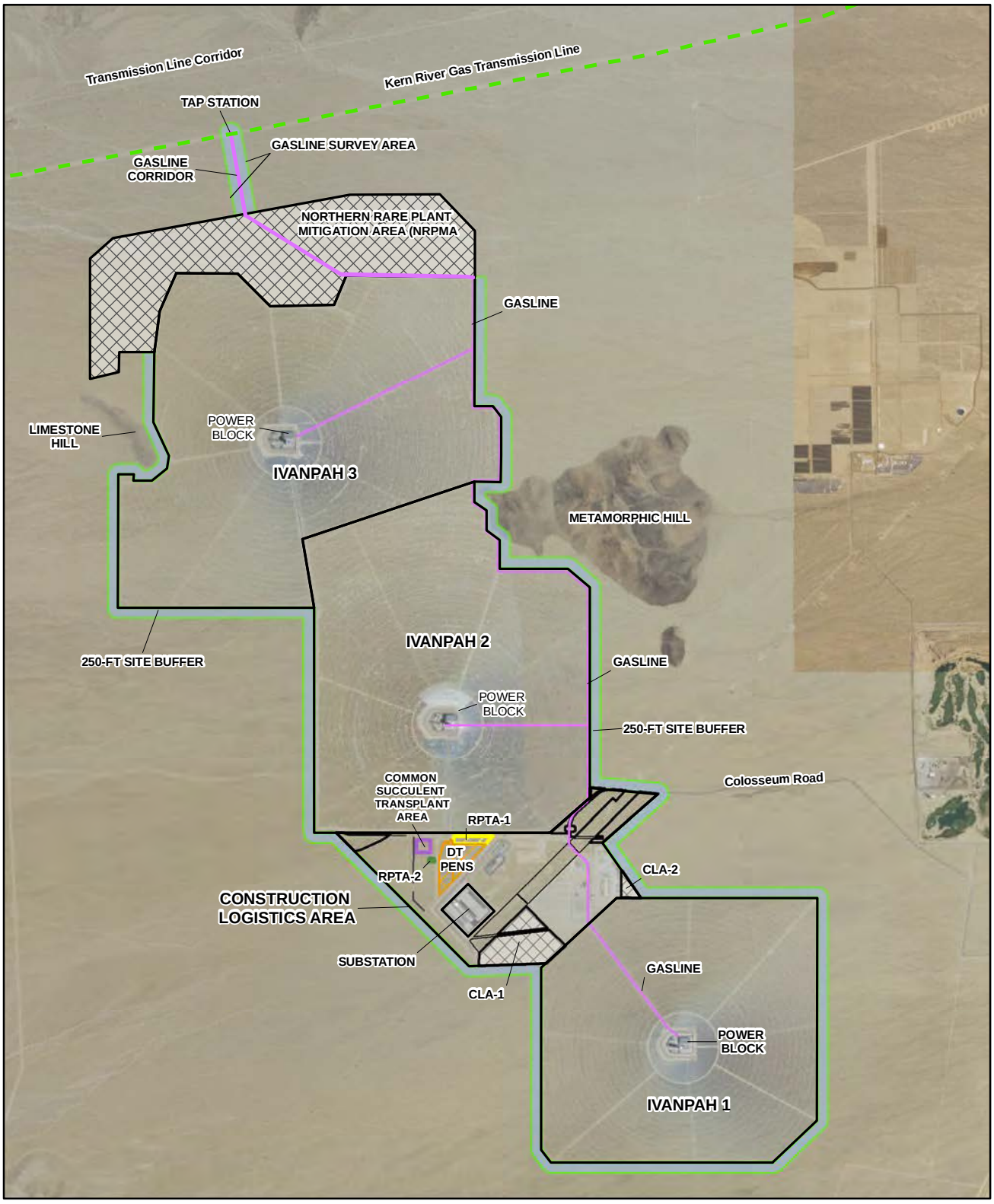
Special-status plant protection measures, plant salvage, and transplantation procedures are described in the Revised Protection Plan and the Revegetation Rehabilitation Plan, which includes the Gas Pipeline Revegetation and Monitoring Plan. The Seed Collection Plan describes seed collection procedures for special-status plants and common species. The Remedial Action Plan describes the special-status plant seed (and other propagules [that is, live plants]) that have been collected and transplanted in the onsite nursery for use as a source of plant material should protection measures fail and special-status plants need to be re-established. The implementation of these plans is described in detail in the BIO-18 Year 1 (2014) postconstruction special-status plant monitoring and as-built reports (CH2M, 2015a; 2015b). Results of the first year of NGL monitoring are included in the *Year 1 (2014) Postconstruction Natural Gas Line Monitoring Report* (CH2M, 2015c). Results of the second year of NGL monitoring are included in the *Year 2 (2015) Postconstruction Natural Gas Line Monitoring Report* (CH2M, 2016).

1.4 Document Contents

This Monitoring Report includes the following information:

- **Section 2** includes a summary of the compliance measures required, undertaken, and in progress to comply with BIO-18 Measure 8.
- **Section 3** contains a summary description of the special-status plants that are the subject of this plan.

- A description of the restoration process and monitoring methods are described in **Section 4**.
- Monitoring results are provided in **Section 5**.
- References used in developing this report are included in **Section 6**.
- The BIO-18 COC is included as **Appendix A**.
- Photographs from the 2016 compliance monitoring are included in **Appendix B**.
- Datasheets used to collect field data are provided in **Appendix C**.
- Plant density calculations used to develop the revegetation success criterion and target numbers of plants are provided in **Appendix D**.



LEGEND

- Gasline (50-foot Corridor)
- Common Succulent Transplant Area
- Rare Plant Transplantation Area (RPTA-1)
- Rare Plant Transplantation Area (RPTA-2)
- Desert Tortoise Pen Area
- 250-foot Site Buffer
- Project Site

N

0 1,750 3,500

Feet

Figure 1-1
Site Layout
Ivanpah Solar Electric Generating System

CH2MHILL

SAC \\SACFPP02\SACGIS\PROJ\352897_IVANPAH\MAPFILES\2016_IVANPAH\FINALMAPS_HA_2016\NGL_SEEDMAPS\FIGURE1-1_SITE_LAYOUT.MXD SSCOPES 1/19/2017 9:51:33 AM

SECTION 2

BIO-18 Compliance Measures

This section includes a summary of the compliance measures required, undertaken, or that are in progress to comply with BIO-18 Measure 8, Gas Pipeline Revegetation and Monitoring. The text of BIO-18 is included in Appendix A of this report.

2.1 Summary

The CEC included special-status plant avoidance, minimization, and protection goals in COC BIO-18 (Measures 1 through 11) (CEC, 2010). The text of BIO-18 is included in Appendix A of this report. Measure 8 of BIO-18, Gas Pipeline Revegetation and Monitoring, includes the requirements regarding special-status plant re-establishment along the NGL corridor. The steps and procedures completed or planned to re-establish special-status plants along the NGL corridor include the following:

- Development of a Seed Collection Plan for special-status plants; Appendix B of the Remedial Action Plan (Solar Partners, 2010b) describes seed collection procedures for common species, as well as special-status plants
- Preparation of the Revegetation Plan (CH2M, 2010); this plan includes the Gas Pipeline Revegetation and Monitoring Plan required by BIO-18
- Preparation of the Revised Protection Plan (Solar Partners, 2010a)
- Preparation of the Remedial Action Plan (Solar Partners, 2010b).
- Implementation of special-status plant protection goals of 75 percent, as described in Section 7 of the Revised Protection Plan (Solar Partners, 2010a)
- Salvage and relocation of the special-status plant localities listed in Table 5-1 in the Revised Protection Plan (Solar Partners, 2010a)
- Maintenance, including irrigation, of salvaged special-status plants within the Rare Plant Transplantation Area (RPTA-1)

2.2 Compliance with BIO-18, Measure 8

This report provides results of 2016 (Year 3) monitoring, the third year of postconstruction monitoring, as described in the Revegetation Plan (CH2M, 2010) and Revised Protection Plan (Solar Partners, 2010a). The project complies with Measure 8 of BIO-18, Gas Pipeline Revegetation and Monitoring; however, Measure 8 is not complete because it has a long-term reporting component. Section 7.9 of the Revegetation Plan contains information on success criteria that were used to gauge the success of the site revegetation effort. Monitoring methods and elements of the success criteria in Section 7.9 of the Revegetation Plan that will also be applied to the special-status plant revegetation effort are described in Section 4. Monitoring results are described in Section 5. Results of the first year of NGL monitoring are included in the *Year 1 (2014) Postconstruction Natural Gas Line Monitoring Report* (CH2M, 2015c). Results of the second year of NGL monitoring are included in the *Year 2 (2015) Postconstruction Natural Gas Line Monitoring Report* (CH2M, 2016).

SECTION 3

Special-status Plant Descriptions

This section provides a brief description of the five special-status plants included in BIO-18 and the Revised Protection Plan (Solar Partners, 2010a). More detailed information on the basic distributional and ecological information known for each of these special-status plants can be found in the *Special-status Plant Survey Report* (GANDA, 2008), the Revised Protection Plan (Solar Partners, 2010a), and the Remedial Action Plan (Solar Partners, 2010b). Photographs of the special-status plant revegetation are included in Appendix B. Photographs of nine-awned pappus grass obtained during the focused 2011 surveys for this species were included in the *2011 BIO-18 Annual Compliance Report* (CH2M, 2012a). Additional photographs of the special-status plants are provided in the annual compliance reports (CH2M, 2013, 2014, 2015c) and *BIO-18, Special-status Plant As-built Report* (CH2M, 2015b).

3.1 Mojave Milkweed (Asclepias nyctaginifolia)

Mojave milkweed is a perennial herb with stems and leaves that die back completely at the end of the growing season. In California, it produces showy, cream-colored flowers from May to June and again in fall, if summer rainfall is adequate.

The habitat of this species in California includes washes and dry slopes in Mojave Desert scrub and pinyon-juniper woodland, from about 3,000 to 5,100 feet in elevation (Solar Partners, 2010a). The distribution of Mojave milkweed in California is limited to a few locations in the eastern Mojave Desert. Mojave milkweed is not federally or state-listed, nor is it considered a BLM-sensitive species, but it has a California Rare Plant Rank (CRPR) of 2B.1 and a Heritage Program Rank of G4G5/S2 (CDFW, 2017).

3.2 Desert Pincushion (Coryphantha chlorantha)

Desert pincushion is a small, leafless, stem succulent that produces yellow-green flowers (Appendix B). At the ISEGS site, this species was observed in flower between April and May. The habitat of desert pincushion in California is described as Mojave Desert scrub, Joshua tree woodland, and pinyon-juniper woodland, on gravelly or rocky carbonate (limestone) substrates, from about 3,000 to 7,000 feet in elevation (GANDA 2008). The distribution of desert pincushion in California is restricted to the eastern Mojave Desert in Inyo and San Bernardino counties. Desert pincushion is not federally or state-listed, nor is it a BLM-sensitive species. Desert pincushion is a CRPR List 2B.1 species and has a Heritage Program Rank of G4/S3 (CDFW, 2017).

3.3 Parish's Club-cholla (*Grusonia parishii)*

Parish's club-cholla is a clonal stem succulent that forms large, spreading mats of prostrate stems (Appendix B). The flowers are yellow to red, and appear from May to July in California. The habitat of this species in California is described as Sonoran Desert scrub, Mojave Desert scrub, and Joshua tree woodland, in sandy flats, from about 2,950 to 5,000 feet in elevation (Solar Partners, 2010a). The distribution of Parish's club-cholla in California includes the Mojave and Colorado deserts in San Bernardino, Riverside, and Imperial counties. Parish's club-cholla is not federally or state-listed, nor is it a BLM-sensitive species. Parish's club-cholla has a CRPR of 2B.2 and a Heritage Program Rank of G3G4/S2 (CDFW, 2017).

3.4 Nine-awned Pappus Grass (*Enneapogon desvauxii)*

Nine-awned pappus grass is a summer annual in California, meaning that it germinates and grows after summer rain. It flowers in California from August to September. The habitat of nine-awned pappus grass in

California is described as rocky, calcareous (limestone) soils in pinyon-juniper woodland from 3,825 to 5,475 feet in elevation (Solar Partners, 2010a). The ISEGS surveys and recent collections show that this species also occurs in Mojave Desert scrub down to elevations of 2,900 feet (GANDA, 2008). The distribution of nine-awned pappus grass in California is limited to the eastern Mojave Desert in San Bernardino County. Photographs of nine-awned pappus grass obtained during the focused 2011 surveys for this species were included in the *2011-BIO-18 Annual Compliance Report* (CH2M, 2012a).

Nine-awned pappus grass has a CRPR of 2B.2 and a Heritage Program Rank of G5/S2 (CDFW, 2017). It is not federally or state-listed, nor is it a BLM-sensitive species. As described in the Revised Plant Protection and Remedial Action plans (Solar Partners, 2010a, 2010b), this species germinates and grows from an existing seed bank whenever summer rainfall is adequate. No special avoidance or salvage procedures were, therefore, proposed other than seed collection from onsite localities in case species-specific remedial measures are needed (Solar Partners, 2010a). Several localities of nine-awned pappus grass were identified during focused surveys in 2011 (CH2M, 2012a).

3.5 Rusby's Desert Mallow (*Sphaeralcea rusbyi* var. *eremicola)*

Rusby's desert mallow is a small (up to 18 inches high), soft-woody subshrub with showy, dark apricot-colored flowers and drought deciduous leaves (Appendix B). Information on how to identify Rusby's desert mallow and additional photographs of this species are provided in the *2011 BIO-18 Annual Compliance Report* (CH2M, 2012a). The palmately compound leaves distinguish this species from the much more common species, desert mallow (*Sphaeralcea ambigua*). The habitat of Rusby's desert mallow includes Mojave Desert scrub and Joshua tree woodland at elevations of 2,925 to 4,500 feet (Solar Partners, 2010a).

Rusby's desert mallow is endemic to California, where it is restricted to the eastern Mojave Desert. Rusby's desert mallow is not federally or state-listed. It has a CRPR of 1B.2 and a Heritage Program Rank of G4T2/S2 (CDFW, 2017). Species with a CRPR of 1B are considered a sensitive species by BLM.

SECTION 4

Restoration and Monitoring Methods

This section describes the methods used to hand-broadcast special-status plant seed and to salvage and transplant special-status plants into the disturbed portions of the NGL corridor. Seed collection, seeding, and planting was performed from 2012 through 2014. At the end of December 2013, substantial completion of construction was achieved, and the ISEGS project commenced commercial operation in January 2014. Year 1 of postconstruction monitoring was performed in fall 2014 (CH2M, 2015c). Year 2 of postconstruction monitoring was performed in 2015 (CH2M, 2016). Year 3 (2016) monitoring is the subject of this report. Postconstruction monitoring methods are also described in this section.

4.1 Special-status Plant Revegetation Areas

Special-status plant revegetation areas were established in suitable habitat NGL line corridor included in special-status revegetation.

4.1.1 Personnel and Dates of Field Work

Two botanists with several years of Mojave Desert botanical survey experience and familiarity with the special-status plants of the site performed the special-status plant seeding and planting within the NGL disturbance area. Task oversight and direction was provided by Amy Hiss/CH2M, with field assistance from Morgan King/CH2M. During construction, seeding, planting, and monitoring were conducted on the following dates: November 8 and 11, 2012; and June 4-6, September 30, and December 1, 3, 5, and 7, 2013. Postconstruction monitoring, and additional seeding and planting, was performed on September 9, 15, and 16, and November 4, 5, 6, 7, 11, 12, and 14, 2014. Year 2 of postconstruction monitoring and minor supplemental planting was performed on April 24-27, 2015.

4.1.2 Soil Preparation

The soil within the NGL disturbance area was prepared to specifications contained in the Revegetation Plan (CH2M, 2010). Prior to revegetation, the soil along the NGL corridor was roughened up with a grader equipped with a ripping claw. The top 2 inches of the soil were decompacted and roughened up to create pits and microswales in the soil surface that may function as micro-catchments to capture and hold moisture, seeds, and organic debris, and to enhance plant re-establishment. The ripping stage also unearthed many small- and medium-sized rocks that contribute to surface heterogeneity and which, in turn, may also aid in seedling and plant establishment.

4.1.3 Hand Broadcast Seeding

Special-status plant seeding and planting activities were performed by hand and on foot using small landscaping equipment, such as trowels and shovels. Special-status seed used was collected onsite between 2010 and 2013. Seed had been cleaned, dried, and placed in cold storage. Special-status plant seed was removed from the cold storage and acclimatized. Rusby's desert mallow seed was scarified (roughened up) to help break dormancy and increase germination. Scarification was performed by placing individual seed lots in small plastic bottles along with small pebbles and sand and then shaken by hand.

The NGL corridor was divided into three broad elevation categories (higher, medium, and lower). Seed lots originally collected from higher elevations were sown in the upper part (northerly end) of the NGL corridor at higher elevations (Figure 4-1). Seed originally collected onsite from more southern portions of the site fell into the middle and lower elevation category, and was sown into the middle and lower parts of the NGL.

Seed was broadcast onto the soil surface by hand into small seed beds (ranging in size from 0.5 square meter to rectangular-shaped seed beds approximately 2 meters by 0.5 meter in width). Seed was covered by a thin layer of dirt (less than a few centimeters) and lightly compacted by hand or foot to firmly place the seeds in the seed bed.

4.1.4 Planting

In addition to seeding, live plants were salvaged from the solar fields (outside of special-status plant protection areas [SSPPAs] or from the RPTA-1Nursery) using shovels and other hand-tools and then transplanted the same day. To increase the potential for plant survivorship, transplanting was generally performed during the fall, when temperatures tended to be relatively cooler. Prior to salvaging and transplanting activities, areas along the corridor that contained suitable microhabitat elements were identified for each special-status species (for example, Mojave milkweed was placed at the edge of smaller washes). These locations were flagged and mapped in the field. Transplanting to areas containing similar micro-habitats and other variables is important because it could increase plant survivorship. For example, Mojave milkweed was transplanted at the bottom or toe of drainages because that is the habitat where this species typically is found onsite. Additionally, the shrub configuration near the salvaged special-status plant was also replicated in the planting location. If a special-status plant (for example, desert pincushion) was originally located under a yucca or another shrub that functioned as a 'nurse plant,' a site with a similar shrub configuration was selected for the transplanting location. For desert pincushion, the north-facing side of the plant was marked with a small dot of paint to make sure it was replanted facing the same direction.

Like the seeding effort, the NGL corridor was divided into three broad elevation categories (higher, medium, and lower). Plants were transplanted within the NGL corridor into their respective elevation category. Plants from higher elevations were installed into the more northerly portions of the NGL. Plants originally salvaged from lower elevations (within Ivanpah 1, 2, or the Construction Logistics Area [CLA]) were placed at middle to lower elevations in the southern part of the NGL. All live plants were thoroughly watered immediately after transplanting. Plants were also irrigated twice more during December 2013; January, September, and November 2014; and April 2015. The onsite biological monitors also watered the plants occasionally if work was performed in that part of the project site.

4.1.5 Data Collection

The locations where individual plants were transplanted and seed was hand-broadcasted were assigned a unique identification number to track these areas over time. Stakes and tags were labelled with the unique identification number and installed next to each plant and nearby the seed bed. Photographs of each seed bed and transplanted plant were taken to document field conditions. Representative photographs from Year 3 (2016) monitoring are provided in Appendix B. The location of each seed bed and plant was mapped using a global positioning system (GPS) unit with sub-meter accuracy. A project-specific data sheet was created to record data on plant location, habitat, substrate, elevation, and GPS coordinates. A copy of the datasheet used during the field work is included in Appendix C. Data on survivorship and germination were collected during Year 3 (2016) postconstruction monitoring. Photographs of each seed bed and transplanted plant were taken to document field conditions.

4.2 Monitoring Methods

This section describes the postconstruction monitoring methods conducted for the 8.84-acre NGL. Figure 4-1 shows the general location of the revegetation area along the NGL corridor. The objective of the special-status plant revegetation effort is to re-establish special-status plants within the NGL corridor and comply with BIO-18, Measure 8, Gas Pipeline Revegetation and Monitoring. Special-status plant monitoring and success criteria for the NGL were guided by both the Revegetation Plan (CH2M, 2010) and the Revised Protection Plan (Solar Partners, 2010a).

The parameters and success criteria outlined in the Revegetation Plan (CH2M, 2010) were adjusted for revegetation of special-status plant species on the NGL. The Revegetation Plan used belt-transects and quadrats to survey a subset (or sample) of a large area (more than 10 acres). Since the NGL is a relatively small area (8.84 acres), surveys can be comprehensive, which negates the need for belt-transects and quadrats.

The Revegetation Plan uses cover and richness as success criteria. Richness (number of unique species) cannot be used because BIO-18 Measure 8 has already defined the five species for re-establishment. Cover should not be used for four out of the five species because they are perennials, and there is not a defined area to calculate cover. Cover can be used to assess success of nine-awned pappus grass because it is an annual, and the plot area can be defined as the area where seed was sown. Instead of using richness and cover as success criteria, density and survivorship were substituted as success criteria, which address the BIO-18 goal of re-establishing special-status plant species on the NGL.

No revegetation, soil treatment, salvage, transplanting, seed collection, seeding, or planting methods were performed in 2016; therefore, they are not discussed in this report.

4.2.1 Data Collection

Two botanists with several years of Mojave Desert botanical survey experience and familiarity with the special-status plants of the site conducted the annual monitoring during the appropriate time of year to observe each species. Each special-status plant locality was visited by botanists navigating by an ArcGIS Online program loaded to an iOS or Android device, with the project area and plant localities loaded as background files. A copy of the datasheet used during the field work is included in Appendix C. Photographs of each seed bed and transplanted plant were taken to document field conditions. In addition, botanists walked the extent of the NGL area looking for special-status plant recruits that are not associated with seed beds.

4.3 Data Analysis

4.3.1 Density and Survivorship

Perennial species density measurements (that is, number of live individuals present per unit area) were used to estimate survivorship. For this measurement, the unit area is defined as the 8.84-acre NGL corridor. Percent survivorship of a target number of plants was used to evaluate revegetation success (target number of plants is defined in Section 4.3.3). Field datasheets used during the monitoring are included in Appendix C.

The population present at the time of the first monitoring session (t_1) is defined as the original cohort. Survivorship at Year 1 was set to 1.0 for the original cohort of special-status plants, equal to the proportion of the population surviving at subsequent monitoring dates. Values can be either greater or less than 1, depending on whether there is reduction of or recruitment to the population within the sampled area.

4.3.2 Percent Cover

Percent cover is defined as the amount of plant cover recorded over a discrete area. Percent cover was only collected for nine-awned pappus grass, assuming each entire seed bed was one plot. These data were collected only to assess trends of the seeded areas to increase in cover over time. Field datasheets used during the monitoring are included in Appendix C.

4.3.3 Progress Criteria

Success criteria for revegetating special-status plants on the NGL were based on target density and survivorship of five special-status plants. The target density (number of plants), goals, and success criteria were calculated based on density results from 2007, 2008, and 2011 floristic surveys (GANDA, 2008;

CH2M, 2012a). Tables D-1 through D-5 in Appendix D provide more detailed special-status plant density calculations for each species and project element.

Table 4-1 summarizes the findings of the baseline data analysis and lists the number of target special-status plants (that is, the goal) that the project is trying to establish along the NGL corridor. The numbers in Table 4-1 (last two columns) match or exceed the preconstruction condition, which is the average number of these special-status plants per acre that occurred in either the NRPMA or the NGL corridor prior to the start of construction times the 8.84 acres for the NGL corridor area. The number of target plants (the goal) is an average based upon the highest end-point in the range of plant densities throughout the project site. However, the minimum success criterion (Table 4-1, last column) is all that is required to re-establish these special-status plants.

Table 4-1. Target Number of Special-status Plants to Re-establish Along the Natural Gas Pipeline Corridor Based on Preconstruction Densities

Species	Range of Plant Density Values per acre	Range of Plant Density Values per 8.4 acres	Target No. of Plants (Goal)	Minimum Acceptable Success Criterion
Mojave milkweed	0 to 0.64	0 to 5.4 plants	5	1
Desert pincushion	0 to 0.24	0 to 2 plants	2	2
Rusby's desert mallow	0 to 0.002	0 to 0.2 plants	1	0
Parish's club-cholla	0 to 0.35	0 to 2.9 plants	3	0
Nine-awned pappus grass	0 to 11.72	0 to 98 plants	98	17
Total			**109**	**20**

Source:

Plant census data source: 2007-2008 Rare Plant Surveys (GANDA, 2008)

Nine-awned pappus grass data source: 2011 Annual Compliance Report (CH2M, 2012a).

Notes:

Target numbers are based on the density of special-status plants prior to construction on a per-acre basis (Tables D-1 through D-5, Appendix D).

The NGL corridor and tap station total is approximately 8.4 acres.

Rusby's desert mallow occurs in very low numbers in the project area, and it may not be practicable to re-establish this species.

Parish's club-cholla is primarily distributed in the southern part of the project site (in the CLA and Unit 1). It may be difficult to re-establish this species at higher elevations of the NGL.

The density of nine-awned pappus grass may only reach the target or minimum densities during years with above-average summer rainfall. For this reason, baseline density in the NRPMA alone was used to calculate the minimum acceptable target number of plants for nine-awned pappus grass rather than the higher NGL density (Density Table D-5, Appendix D).

The number of target plants (the goal) is an average based upon the highest end-point in the range of plant densities throughout the project site (i.e., all seven project features). However, based on calculations of preconstruction densities, the minimum success criterion (Tables 4-1 and 5-1, last column) is all that is required to re-establish these special-status plants. No more than two attempts will be made to meet the goals. However, continued attempts will be made until the success criterion is met, or the California Energy Commission Compliance Project Manager determines that additional attempts are not warranted.

No. = number

4.3.3.1 Supplemental Seeding or Other Remedial Measures

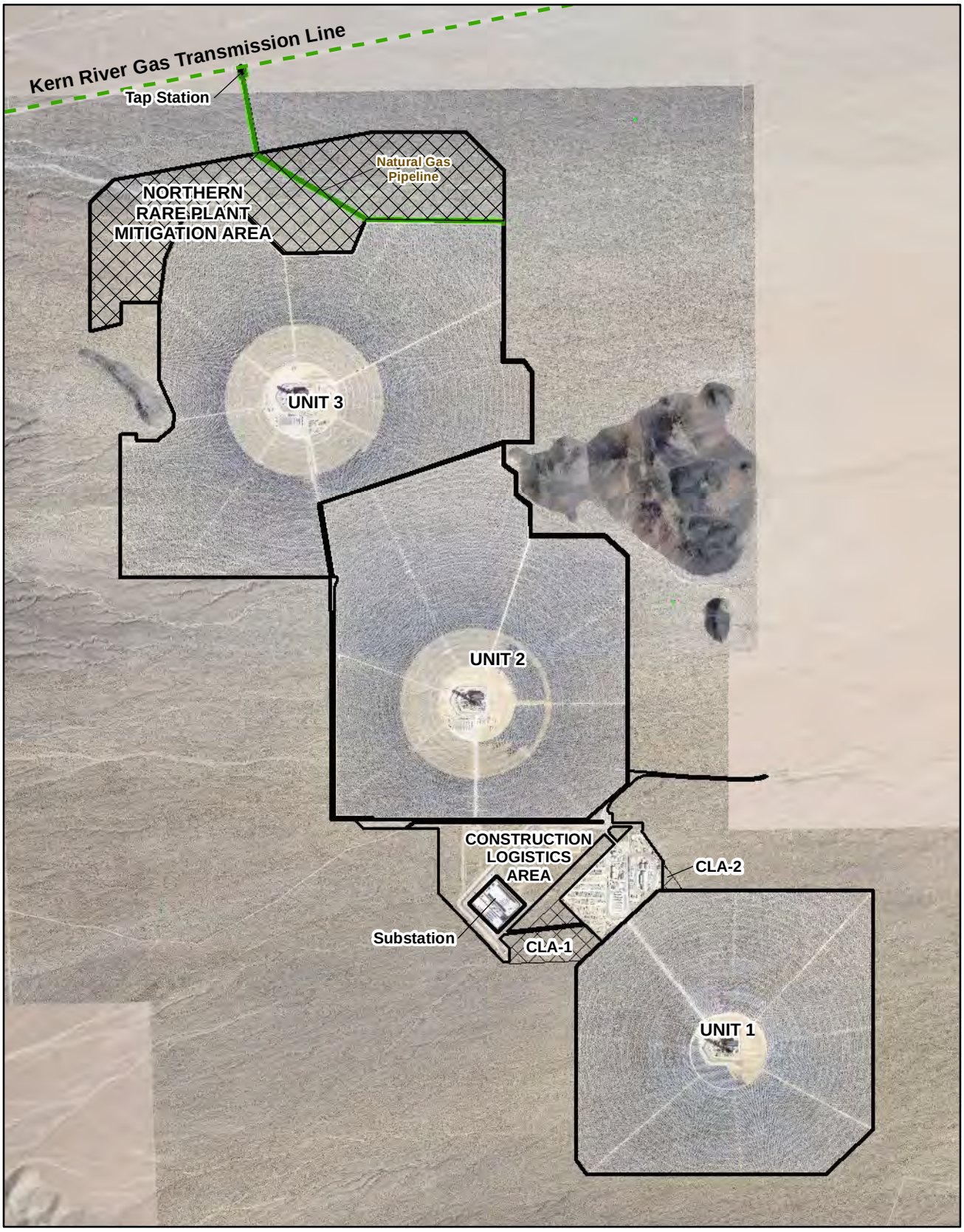
BIO-18 requires supplemental seeding or other remedial measures only if ***no*** Rusby's desert mallow, desert pincushion, or Mojave milkweed are found after the first year of monitoring. Both desert pincushion and

Mojave milkweed were identified during the first and second years of monitoring; therefore, supplemental seeding or other remedial measures are not necessary.

4.3.4 Monitoring and Reporting Schedule

Monitoring will be performed for no less than 10 years, or until the minimum acceptable target plant number success criterion is achieved (CH2M, 2012). The first year of postconstruction monitoring commenced in fall 2014 (CH2M, 2016c). The second year of monitoring was performed in 2015 (CH2M, 2016). Success criterion were met during Year 3, and monitoring is now complete.

As required by BIO-18, Verification, record summaries of the NGL revegetation will continue to be submitted in Annual Compliance Reports for a period of not less than 10 years, regardless of the success criterion being met earlier in the 10-year monitoring period. Annual monitoring summaries will be provided by January 31 of each calendar year within the 10-year monitoring timeframe.



Aerial Imagery courtesy of Google Earth (© 2013 Google). Imagery Date: 03/22/2013

LEGEND

- Project Boundary
- Revegetation Area
- Mitigation Area

N

0 1,500 3,000

Feet

Figure 4-1
Location of Gas Line Special-status Plant Revegetation
Ivanpah Solar Electric Generating System

CH2MHILL

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SECTION 5

Monitoring Results

This section presents the results and discussion of the Year 3 postconstruction special-status plant revegetation monitoring of the NGL. Special-status plant success criterion was met during Year 3, and special-status plant revegetation monitoring on the NGL is now complete. Table 5-1 presents the number of successful special-status plant seeding and planting locations observed in 2016, by species, compared to the target goals presented in Table 4-1. Figure 5-1 shows the location of special-status plant revegetation seeding and planting.

5.1 Background

5.1.1 Special-status Plant Revegetation

Between 2012 and 2015, a total of 47 special-status plants were salvaged from unprotected areas in the solar field and CLA and transplanted into the NGL corridor: 21 Mojave milkweed, 20 desert pincushion, 1 Parish's club-cholla, and 5 Rusby's desert mallow (Figure 5-1). Between 2012 and 2014, special-status plant seed was hand-broadcasted into 69 suitable habitat locations (referred to as "seed beds") within the NGL corridor: 15 Mojave milkweed, 9 desert pincushion, 13 nine-awned pappus grass, and 32 Rusby's desert mallow (Figure 5-1). In 2016, no new special-status plants were transplanted or seeded along the NGL corridor.

5.1.2 Year 1 (2014) and Year 2 (2015) Results

Monitoring shows that success criteria were met in Year 1 (2014) for all five special-status species. Success criteria were also met in Year 2 (2015) for four species - Mojave milkweed, desert pincushion, Parish's club-cholla, and Rusby's desert mallow; no surveys were conducted for nine-awned pappus grass because of a lack of summer precipitation. Nine-awned pappus grass is a summer annual in California, meaning that it germinates and grows after summer rain, so it does not occur every year. Not monitoring in low rainfall years is not considered nonperformance. Lack of observation of nine-awned pappus grass during Year 2 monitoring does not count against the project.

5.2 Year 3 (2016) Results

Success criteria was met by establishment of Mojave milkweed, desert pincushion, Parish's club cholla, and nine-awned pappus grass on the natural gas pipeline corridor during Year 3.

5.2.1 Dates and Staff

Annual monitoring was conducted on May 26, July 20, and October 28, 2016, by CH2M botanists, Morgan King and Jason Brooks.

5.2.2 Seed Beds

A total of 25 special-status plant individuals were observed in the seed beds during Year 3 (2016) monitoring (Table 5-1). Out of the 15 Mojave milkweed seed beds, botanists recorded 5 individuals at 2 localities. Out of the 13 nine-awned pappus grass seed beds, botanists recorded 20 individuals at 2 localities. No individuals of desert pincushion, Parish's club-cholla, or Rusby's desert mallow were observed at sown seed beds. Representative photographs of the special-status plants observed in 2016 are provided in Appendix B.

Similar to Year 2 results, Year 3 results showed several of the seed beds had been scoured or were buried with new wash deposits and were likely no longer present.

5.2.3 Transplants and New Recruits

A total of 14 special-status plants were observed alive during Year 3 monitoring (Table 5-1). Of the 14 observed alive, 13 had been salvaged and transplanted on the NGL corridor. None of the transplanted Mojave milkweed survived. In 2016, one Mojave milkweed was observed in a wash in the revegetation corridor. This individual was not located at a seed bed, so it is a naturally occurring recruitment to the NGL corridor. Twelve out of 20 desert pincushion were observed alive in 2016. The Parish's club-cholla that was transplanted in 2012 was still present and alive in 2016. In 2016, three of the Rusby's desert mallow plants had dead stems, but it is unknown if this is old plant material or if it is more recent growth, meaning that the plants could still be alive.

5.2.4 Density and Survivorship

During Year 3 monitoring, a total of 39 special-status plants were observed established on the NGL. These individuals were either established by seed or transplanting live individuals from unprotected project features. Compared to Year 2 results (29 species total), the density is increasing over time.

Table 5-2 presents the survivorship or growth rates for the NGL special-status plant revegetation. Survivorship is calculated against Year 1 results. Survivorship or growth rate values greater than 1.0 indicate that more individuals are present than during Year 1, and values less than 1.0 indicate that fewer individuals are present. Mojave milkweed, desert pincushion, and Rusby's desert mallow have decreasing survivorship over 3 years, but are still present. Parish's club-cholla are exhibiting stable survivorship, and nine-awned pappus grass is increasing in growth rate over time.

5.2.5 Percent Cover

Percent cover is defined as amount of plant cover recorded over a discrete area. During Year 3 monitoring, percent cover for nine-awned pappus grass was less than 1 percent for both localities. Percent cover is not analyzed for the other four plant species.

5.2.6 Other Remedial Measures

BIO-18 requires supplemental seeding or other remedial measures only if no Rusby's desert-mallow, desert pincushion, or Mojave milkweed are found after the first year of monitoring. Both desert pincushion and Mojave milkweed were identified during Year 1, Year 2, and Year 3 of monitoring; therefore, supplemental seeding or other remedial measures are not necessary.

5.3 Discussion

Monitoring of the revegetation shows that the reclamation success criteria have been met by establishment of target densities of Mojave milkweed, desert pincushion, Parish's club-cholla, and nine-awned pappus grass on the NGL corridor.

During Year 3 monitoring, a total of 39 special-status plants were observed on the NGL corridor (Table 5-1). These individuals were either established by seed or transplanting live individuals from unprotected project features. This is an increase from Year 2, which had 29 total special-status plants observed. The increase was mostly due to presence of nine-awned pappus grass. Both species of cactus (desert pincushion and Parish's club-cholla) were successfully transplanted and continued to persist. Mojave milkweed and nine-awned pappus grass have been successfully seeded into the target area.

Table 5-1. Number of Special-status Plant Seeding and Planting Locations in the Natural Gas Pipeline Corridor Compared to Target Goals

Special-status Plant Species	No. of Seed Beds Installed 2012-2014	No. of Plants Salvaged and Transplanted 2012-2015	No. of Plants Counted in Seed Beds in 2016	No. of Plants Alive in 2016	Total No. of Plants Identified in 2016 Surveys	Target No. of Plants (Goal)	Minimum Acceptable No. of Plants (Success Criterion)	Goals Met?	Success Criterion Met?
Mojave milkweed	15	21	5	1a	6	5	1	Yes	Yes
Desert pincushion	9	20	0	12	12	2	2	Yes	Yes
Nine-awned pappus grass	13	0	20	0	20	98	17	No	Yes
Parish's club-cholla	0	1	0	1	1	3	0	No	Yes
Rusby's desert mallow	32	5	0	0	0	1	0	No	Yes
Total	**69**	**47**	**25**	**14**	**39**	**109**	**20**	**No**	**Yes**

[a] One new Mojave milkweed was observed in 2016. This individual was not transplanted, nor was it associated with a sown seed bed. This individual naturally established in a wash within the NGL corridor.

Notes:

The number of target plants (the goal) is an average based upon the highest end-point in the range of plant densities throughout the project site (i.e., all seven project features). However, based on calculations of preconstruction densities, the minimum success criterion (Tables 3-1, last column) is all that is required to re-establish these special-status plants.

Figure 4-1 shows the location of seed beds and transplanted special-status plants, and one new Mojave milkweed recruit not associated with a seed bed.

Table 5-2. Special-status Plant Survivorship at Natural Gas Pipeline at Years 1, 2 and 3

Species	Year 1[a]	Year 2	Year 3
Mojave milkweed	1	1.6	1.2
Desert pincushion	1	1	0.7
Nine-awned pappus grass	1	No surveys were conducted in Year 2[b]	1.1
Parish's club-cholla	1	1	1
Rusby's desert mallow	1	1[c]	0

[a] Year 1 is the baseline cohort ($t_1 = 1$) future survivorship is calculated from.

[b] Surveys were not conducted for nine-awned pappus grass during Year 2 monitoring because of lack of summer precipitation.

[c] Three Rusby's desert mallow were transplanted in Year 2, which reset the baseline t_1 at this time.

The number of target plants (the goal) is an average based upon the highest end-point in the range of plant densities throughout the project site (that is, all seven project features). Target goals were exceeded for both Mojave milkweed and desert pincushion (Table 5-1). Although nine-awned pappus grass did not exceed the goals during Year 3 monitoring, it is expected that seeds persist in the ground and the goal will be exceeded. In 2013, prior to postconstruction monitoring, several hundred individuals of nine-awned pappus grass were incidentally observed on the NGL corridor after sufficient summer rains. In Year 3, botanists only observed limited growth of nine-awned pappus grass in the Ivanpah Valley. Botanists expect that nine-awned pappus grass will exceed the target goals on the NGL corridor after appropriate summer rains.

After 3 years of monitoring, special-status plant survivorship has remained relatively constant over time, with the exception of Rusby's desert mallow (Table 5-2). Desert pincushion density has slightly decreased over time, mostly due to predation and herbivory. In general, both 2015 and 2016 were poor years for annual plant development in the Ivanpah Valley. Lack of available annual forage may have contributed to increased animal (rabbit, burrow, and ground squirrel) herbivory on perennial cactus, such as desert pincushion. Survivorship of Mojave milkweed decreased slightly since Year 2. Observations of Mojave milkweed and nine-awned pappus grass vary drastically between years, depending on timing of rains. Perennial Mojave milkweed may be alive through low rain years, but not visible above ground. Although 2016 was not the best year for nine-awned pappus grass germination, this species increased survivorship in Year 3 and met success criteria goals. Lastly, Rusby's desert mallow does not appear to be successfully transplanted or seeded into the NGL corridor. Dead plant material is visible for three of the transplanted (and fenced) individuals, but it is unlikely that they are still alive. Seeds are still present in the topsoil, so germination may still occur under appropriate conditions.

Although observations of individual plants may vary between years, the ISGES project has successfully met BIO-18 Measure 8 by re-establishing target special-status plants densities on the NGL.

5.4 Reporting

As required by BIO-18, Verification, record summaries of the NGL revegetation will continue to be submitted in Annual Compliance Reports for a period of not less than 10 years, regardless of whether special-status plant revegetation success criteria were met during Year 3 monitoring.

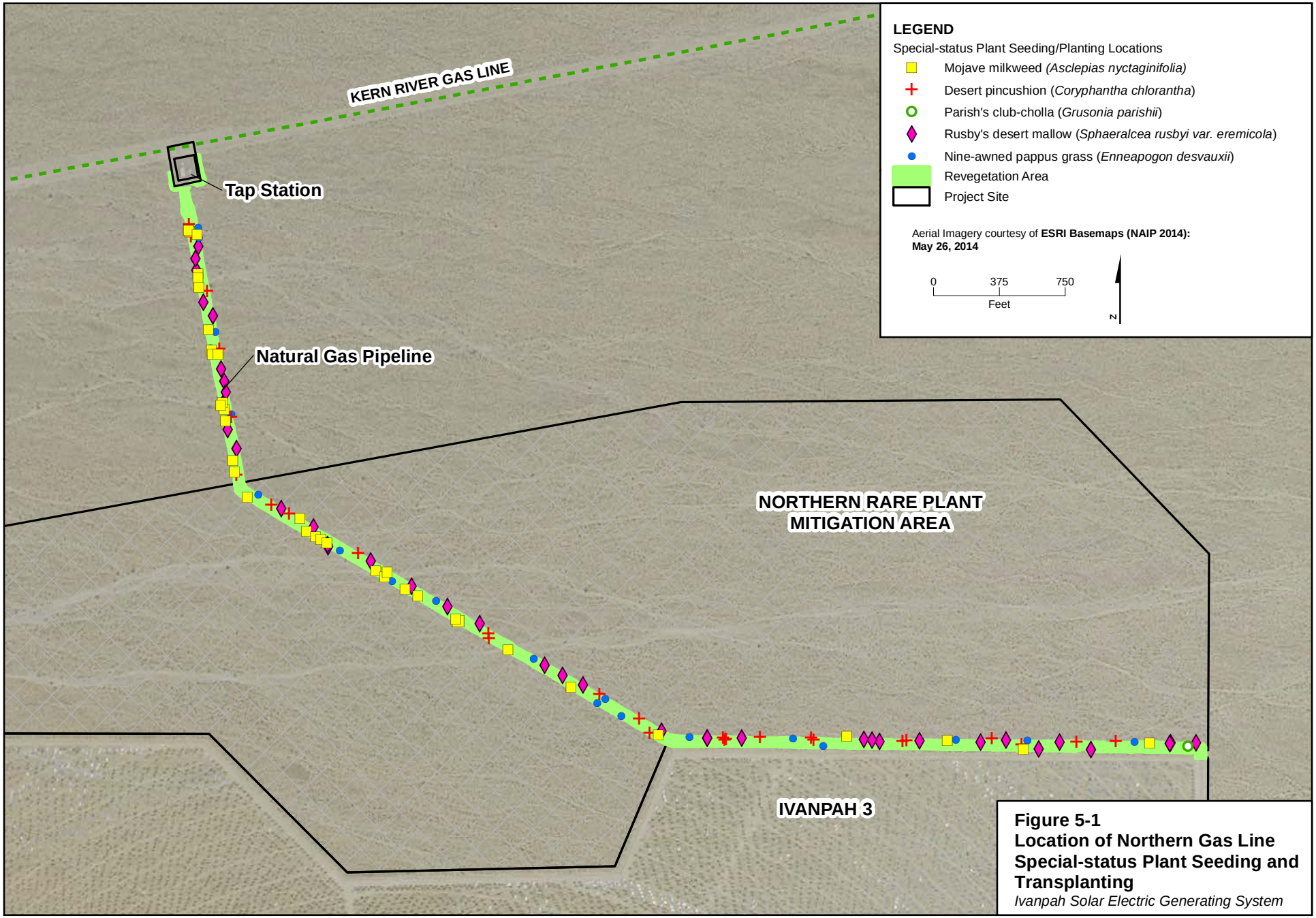

Figure 5-1
Location of Northern Gas Line Special-status Plant Seeding and Transplanting
Ivanpah Solar Electric Generating System

SECTION 6

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Appendix A
Condition of Certification BIO-18

sections 2069 and 2099 or any other applicable in-lieu fee provision, the Project owner shall notify the Commission that it would like a determination that the Project's in-lieu fee proposal meets CEQA and CESA requirements.

SPECIAL-STATUS PLANT IMPACT AVOIDANCE AND MINIMIZATION

BIO-18 The project owner shall implement the following measures to avoid and minimize impacts to special-status plant species. Items 2, 3, 5, 6, 7, 10, and 11 are recommended exclusively by Energy Commission staff.

1. On-Site Plant Avoidance/Minimization Areas: To the extent feasible the project owner shall avoid and minimize disturbance to all special-status plant species within the project site. Impact avoidance (i.e., protection from project-related impacts of any kind through removal of acreage from the project footprint) and impact minimization efforts shall occur in all feasible locations. Impact avoidance shall focus on areas that support the highest density and diversity of special-status plant species and shall remove, at a minimum, the three areas totaling 476 acres and labeled "Rare Plant Mitigation Area" in Project Description Figure 13 from the Staff's FSA Addendum dated March 16, 2010 (Exhibit 315). The natural gas pipeline shall be aligned and narrowed to avoid special-status plant occurrences north of Ivanpah 3 as depicted in Project Description Figure 13. Impact minimization shall be conducted throughout the site. Impact minimization within the solar field shall consist of protecting small perimeters ("halos") around Mojave milkweed, desert pincushion, and Rusby's desert-mallow plants as indicated in the applicant's January 2010 draft Special-Status Plant Avoidance and Protection Plan (Exhibit 81, Appendix B).

2. Protection Goals : The project owner shall implement all feasible measures to protect 75 percent of the individuals of Mojave milkweed, Rusby's desert-mallow, desert pincushion, nine-awned pappus grass, and Parish's club-cholla within the project area (as mapped in Figure 5-3 of the applicant's final botanical survey report [CH2M Hill 2008x]). Each year during construction the measurement of percent protection achieved shall be calculated based on a comparison of numbers of individuals of each of these five species present in this area identified before construction compared to numbers remaining post –construction. These pre- and post-construction plant numbers shall be based on floristic surveys conducted by a qualified botanist.

3. Identify and Establish Special-Status Plant Protection Areas: The project owner shall identify Special-Status Plant Protection Areas for exclusion from the project footprint and avoidance of project-related impacts of any kind to facilitate achieving the 75 percent

protection goal. To accurately identify the boundaries of these areas, pre-construction floristic surveys shall be conducted by a qualified botanist at the appropriate time of year for special-status plant identification, including both spring and summer/fall blooming periods. Summer/fall surveys will be conducted after rains that are likely to cause plant germination and may be suspended in years where no such rains occur. The surveys shall encompass at a minimum the three areas totaling 476 acres and labeled "Rare Plant Mitigation Area" in Project Description Figure 13 and shall extend 150 feet on both sides of the proposed gas pipeline alignment and 250 feet out from the project fenceline. The locations of the Special-Status Plant Protection Areas shall be clearly depicted on all final maps and project drawings and descriptions for exclusion of all project activities.

4. Protection of Adjacent Occurrences: The project owner shall identify special-status plants occurrences within 250 feet of the project fenceline during the pre-construction plant surveys described above. A qualified botanist shall delineate the boundaries of these special status plant occurrences prior to the initiation of ground disturbing activities. These flagged special status plant occurrences shall be designated as Environmentally Sensitive Areas on plans and specifications, and shall be protected from accidental impacts during construction (e.g. vehicle traffic, temporary placement of soils or vegetation) and from the indirect impacts of project operation (e.g., herbicide spraying, changes in upstream hydrology, etc).

5. Develop and Implement a Special-Status Plant Protection and Monitoring Plan: The project owner shall develop and implement a Special-Status Plant Protection and Monitoring Plan for special-status plants occurring within the Special-Status Plant Protection Areas and on-site areas designated for impact minimization. The goal of the Special-Status Plant Protection and Monitoring Plan shall be to maintain the special-status plant species as healthy, reproductive populations that can be sustained in perpetuity. At a minimum, the Special-Status Plant Protection and Monitoring Plan shall:

   - establish baseline conditions and numbers of the plant occurrences in all protected areas (i.e., those to be excluded from the footprint and on-site areas to be protected) and success standards for protection of special-status plant occurrences;

   - provide information about microhabitat preferences and fecundity, essential pollinators, reproductive biology, and

propagation and culture requirements for each special-status species;

- describe measures (e.g., fencing, signage) to avoid direct construction and operation impacts to special-status plants within all protected areas;
- describe measures to avoid or minimize indirect construction and operations impacts to special-status plants within protected areas (e.g., runoff from mirror-washing, use of soil stabilizers/tackifiers, alterations of hydrology from drainage diversions, erosion/sedimentation from disturbed soils upslope, herbicide drift, the spread of non-native plants, etc);
- provide a monitoring schedule and plan for assessing the numbers and condition of special-status plants; and
- identify specific triggers for remedial action (e.g., numbers of plants dropping below a threshold).

6. Develop Special-Status Plant Remedial Action Plan: The project owner shall develop a detailed Special-Status Plant Remedial Action Plan to be implemented if special-status plants within the 476 acres of protected area and on-site minimization "halos" fail to meet success standards described in the Special-Status Plant Protection and Monitoring Plan. The Plant Remedial Action Plan shall include specifications for ex-situ/offsite conservation of seed and other propagules, and the seed bank and other symbionts contained in the topsoil where these plants occur. The remedial measures described in the Plant Remedial Action Plan shall not substitute for plant protection or other mitigation measures. The Special-Status Plant Remedial Action Plan shall include, at a minimum:
   - guidelines for pre-construction seed collection (and/or other propagules) for each species;
   - specifications for collecting, storing, and preserving the upper layer of soil containing seed and important soil organisms;
   - detailed replacement planting program with biologically meaningful quantitative and qualitative success criteria (see Pavlik 1996), monitoring specifications, and triggers for remedial action; and
   - ecological specifications for suitable planting sites.
7. Seed Collection: Implementation of the Special-Status Plant Remedial Action Plan would require a source of local source of seeds/propagules. In addition, seed collection would serve to

preserve germplasm in the event that all mitigation fails. The project owner shall develop and implement a Seed Collection Plan to collect and store seed for Mojave milkweed, Rusby's desert-mallow, desert pincushion, nine-awned pappus grass, and Parish's club-cholla. The source of these seeds shall be from plants proposed for removal within the project footprint. The project owner shall engage the services of a qualified contractor approved by the CPM to undertake seed collection and storage.

8. Gas Pipeline Revegetation and Monitoring: In the natural gas pipeline construction corridor where disturbed soils will be revegetated, the topsoil excavated shall be segregated, kept intact, and protected, under conditions shown to sustain seed bank viability. At a minimum, the top 2 cm of the soil shall be separately stored and preserved. Topsoil salvage, storing, and replacement shall be replaced in its original vertical orientation following pipeline installation ensuring the integrity of the top 2 cm in particular. The project owner shall prepare a Gas Pipeline Revegetation and Monitoring Plan targeted at re-establishment of Rusby's desertmallow, desert pincushion, Mojave milkweed, and potentially other special-status plant species. The Gas Pipeline Revegetation and Monitoring Plan shall identify success criteria for re-establishment and shall continue for a period of no less than 10 years until the defined success criteria are achieved. The Gas Pipeline Revegetation and Monitoring Plan shall include measures for seeding or other remedial actions. If no individuals of Rusby's desert-mallow, desert pincushion, or Mojave milkweed, are located during the first year of monitoring, the project owner shall conduct supplemental seeding or other remedial measures in the area disturbed by natural gas pipeline installation.

9. Surveys on Acquired and Public Lands: The project owner shall conduct floristic surveys for Rusby's desert-mallow and Mojave milkweed on all lands that will be acquired as part of the desert tortoise compensatory mitigation requirements (see Condition of Certification BIO-17). The goal of the surveys shall be to identify at least the same number of occurrences on off-site compensation or public lands as the number of occurrences in the project area excluding the occurrences in the Special-Status Plant Protection Areas in Project Description Figure 13. If this goal is not met by surveys on proposed acquisition lands, additional surveys shall be conducted within suitable habitat on public lands. To be counted toward fulfillment of the goal the occurrences must reflect new data not previously documented in other survey efforts. The survey requirements shall include the following:

- All surveys shall be conducted by a qualified botanist in accordance with BLM, CDFG, and CNPS plant survey guidelines;
- Surveys shall occur the first spring after construction begins and continue each year for a maximum of ten years until the same number of Mohave milkweed and Rusby's desert-mallow occurrences are identified on acquisition lands and/or public lands as located outside Special-Status Plant Protection Areas;
- For each year surveys are conducted yearly survey results shall be provided to the CPM, BLM's Authorized Officer and CDFG, and shall include CNDDB field survey forms for all special-status plant species encountered during the surveys; and
- All field survey forms shall be submitted to the CNDDB at the time of submittal to the CPM, BLM and CDFG.
- The project owner's qualified botanist shall submit a completion report documenting fulfillment of the target goals and which describe the number of new, previously undiscovered occurrences identified and mapped. Locations shall be reported with GPS coordinates compatible with inclusion in a GIS database.

10. Security for Implementation of Plans: The project owner shall provide security adequate to fund implementation of the Special-Status Plant Protection and Monitoring Plan, the Special-Status Plant Remedial Action Plan for the life of the project, as well as the Seed Collection Plan, and the Gas Pipeline Revegetation Monitoring Plan.

11. Acquire Off- Site Occurrence of Mojave Milkweed or Adjacent Land: The project owner shall acquire, in fee or in easement, a parcel or parcels of land that includes at least 30 acres supporting a viable occurrence of Mojave milkweed (or suitable habitat adjacent to a known occurrence). The terms and conditions of this acquisition or easement shall be as described in Condition of Certification BIO-17 with the additional criteria that the Mojave milkweed mitigation lands: 1) provide habitat for the special-status plant species that is of similar or better quality (e.g., in terms of native plant composition) than that impacted; 2) contain OR abut a known occurrence of Mojave milkweed, ideally with populations that are stable, recovering, or likely to recover, that shares the same watershed as the land; and 3) be adequately sized and buffered to support self-sustaining special-status plant populations. These mitigation lands may be included with the desert tortoise mitigation lands ONLY if the above criteria are met. Estimated security for acquisition of compensation lands for Mojave milkweed is

$107,265. If the project owner elects to construct the project in two phases in accordance with Condition of Certification BIO-22, the project owner shall provide Security in the amount of $47,755 prior to initiating any ground-disturbing activities associated with Phase 1, and shall provide Security in the amount of $77,510 prior to initiating any ground-disturbing activities associated with Phase 2. If sufficient new Mojave milkweed occurrences are discovered on desert tortoise compensation lands (not public lands) in accordance with item 9 above prior to acquiring this land, the associated security shall be refunded to the project owner.

Verification: No less than 30 days following the publication of the Energy Commission Decision the project owner shall submit final maps and design drawings depicting the location of Special-Status Plant Protection Areas within and adjacent to the project site, and shall identify the species and numbers of plants within each of the Special-Status Plant Protection Areas.

No less than 30 days following the publication of the Energy Commission Decision the project owner shall submit draft versions of the Special-Status Plant Protection and Monitoring Plan, the Special-Status Plant Remedial Action Plan, the Seed Collection Plan, and the Gas Pipeline Revegetation Monitoring Plan for review by the CPM, BLM's Authorized Agent, and CDFG. The project owner shall also provide a cost estimate for implementation of these plans which is subject to approval by the CPM, BLM's authorized agent, and the CDFG. The final plans shall be submitted for approval by the CPM, in consultation with BLM's Authorized Agent, CDFG, and CNPS within 90 days of the publication of the Commission Decision. The final plans shall be incorporated into the BRMIMP. At this time, the project owner shall also provide security sufficient to fund the implementation of the plans.

Within 30 days of the start of construction, the project owner shall submit copies of the contract with the CPM-approved seed contractor and the check for seed collection and curation fees to the CPM.

The project owner shall identify special-status plants occurrences within 250 feet of the project fence line during the pre-construction plant surveys described above. A qualified botanist shall delineate the boundaries of these special status plant occurrences at least 30 days prior to the initiation of ground disturbing activities.

On January 31st of each year following construction the project owner's qualified botanist shall submit a report, including CNDDB field survey forms, describing the results of off-site plant surveys for Mojave milkweed and Rusby's desert-mallow to the BLM's authorized officer, the CPM, CDFG, and CNDDB. Submittal of survey reports shall continue for a maximum of 10 years until the same number of occurrences in the project area excluding the occurrences in the

Special-Status Plant Protection Areas. The project owner's qualified botanist shall submit a completion report documenting fulfillment of the target goals and which describe the number of new, previously undiscovered occurrences identified and mapped using GIS techniques for each species. Mapping results shall include GPS coordinates of the plants found.

The Designated Biologist shall maintain written and photographic records of the tasks described above, and summaries of these records shall be submitted along with the Monthly Compliance Reports to the CPM, BLM Authorized Agent, and CDFG. During project operation, the Designated Biologist shall submit record summaries in the Annual Compliance Report for a period not less than 10 years for the Gas Pipeline Revegetation Plan, and for the life of the project for the Special-Status Plant Protection and Monitoring Plan, and the Special-Status Plant Remedial Action Plan, including funding for the seed storage.

No less than 90 days prior to acquisition of the parcel(s) containing or adjacent to a known Mojave milkweed occurrence, the project owner, or a third-party approved by the CPM, in consultation with CDFG, shall submit a formal acquisition proposal to the CPM and CDFG describing the parcel(s) intended for purchase.

Draft agreements to delegate land acquisition to CDFG or an approved third party and agreements to manage compensation lands shall be submitted to Energy Commission staff for review and approval (in consultation with CDFG) prior to land acquisition. Such agreements shall be mutually approved and executed at least 60 days prior to start of any project-related ground disturbance activities. The project owner shall provide written verification to the CPM that the compensation lands have been acquired and recorded in favor of the approved recipients(s). Alternatively, before beginning project ground-disturbing activities, the project owner shall provide Security in accordance with this condition. Within 90 days after the lands purchase, as determined by the date on the title, the project owner shall provide the CPM with a management plan for review and approval, in consultation with CDFG, for the compensation lands and associated funds.

Nelson's Bighorn Sheep Mitigation

BIO-19 To compensate for project impacts to Nelson's bighorn sheep the project owner shall finance, construct and manage an artificial water source in the eastern part of the Clark Mountain range or in the State Line Hills outside of designated Wilderness. The project owner shall monitor and control noxious and invasive weeds within 100 feet of the artificial water source. Control of weeds shall be coordinated with the CPM and BLM staff and shall consist of removal by mechanical methods, rather than herbicides. To minimize potential impacts to Nelson bighorn sheep, the project owner shall not use barbed wire fence on the northern perimeter of the Ivanpah 3 site, unless the project

Appendix B
2016 Representative Photographs

PHOTOGRAPH B-1
Flowering desert pincushion, COCH-1.

PHOTOGRAPH B-2
Flowering desert pincushion, COCH-6. Plant is located in front of the orange stake.

PHOTOGRAPH B-3
Desert pincushion, COCH-11, with signs of herbivory. Plant is located in front of orange stake.

PHOTOGRAPH B-4
Desert pincushion COCH-10. Plant is located to right of the orange stake.

PHOTOGRAPH B-5
Overview of two desert pincushions, COCH-12 and COCH-13. Plants are located bwteen the orange stakes.

PHOTOGRAPH B-6
New recruit of Mojave milkweed found in spring 2016, ASNY-20.

PHOTOGRAPH B-7
Close up photo of new Mojave milkweed found in spring 2016, ASNY-20.

PHOTOGRAPH B-8
Mojave milkweed ASNY Seed 7.

PHOTOGRAPH B-9
Close up photo of Mojave milkweed in bud, ASNY Seed 7.

PHOTOGRAPH B-10
Close up photo of nine-awned pappus grass, ENDE Seed 4.

PHOTOGRAPH B-11
Parish's club cholla, GRPA-0043-10-001.

PHOTOGRAPH B-12
Dead stems of Rusby's desert mallow, SPRUER-0015-15-001.

PHOTOGRAPH B-13
Rusby's desert mallow, SPRUER-0011-13-001. Individuial not observed in 2016.

PHOTOGRAPH B-14
Dead stems of Rusby's desert mallow, SPRUER-0011-13-001.

Appendix C
Monitoring Datasheets

IVANPAH SEGS PROJECT **PLANT RESTORATION SUCCESS**

NORTHERN GAS LINE

DATE: **BIOLOGISTS:**

CH MAP FIG.1 Moving NW to SE, descending in elevation.

		PLANT		IDENTIFICATION		PHOTOGRAPHS	SEE
N0	**RARE ELEMENT**	**ABSENT**	**PRESENT**	**STAKE**	**TAG**	**AND NOTES**	**FORM**
	KERN RIVER TAP VALVE						
1	COCH 1						
2	ASNY 1						
3	ASNY 2						
4	ASNY SEED 5						
5	COCH 2						
6	ENDE N1 location						
7	SPRUER SEED 1						
8	ASNY 3						
9	ASNY 4						
10	ASNY 5						
11	COCH 3						
12	ENDE SEED 4						
13	ASNY 6						
14	ENDE N2 location						
15	COCH SEED 1						
16	ASNY 7						
17	ASNY 8						
18	ASNY SEED 6						
19	ASNY 9						
20	SPRUER SEED 2						
21	ASNY SEED 14						
22	ASNY 2096-13-001						
23	ASNY 10						
24	ENDE SEED 1						
25	COCH 4						
26	ASNY 11						

ASNY

COCH

ENDE

SPRUER

IVANPAH SEGS PROJECT **PLANT RESTORATION SUCCESS**
NORTHERN GAS LINE

DATE: **BIOLOGISTS:**

CH MAP FIG.2 Moving NW to SE, descending in elevation.

N0	RARE ELEMENT	PLANT ABSENT	PLANT PRESENT	IDENTIFICATION STAKE	IDENTIFICATION TAG	PHOTOGRAPHS AND NOTES	SEE FORM
27	ASNY 12	☐	☐	☐	☐		☐
28	ASNY 13	☐	☐	☐	☐		☐
29	COCH 5	☐	☐	☐	☐		☐
	P.I. ANGLE						
30	ASNY SEED 7	☐	☐	☐	☐		☐
31	ENDE SEED 22	☐	☐	☐	☐		☐
32	COCH 6	☐	☐	☐	☐		☐
33	SPRUER SEED 16	☐	☐	☐	☐		☐
34	COCH SEED 12	☐	☐	☐	☐		☐
35	ASNY SEED 20	☐	☐	☐	☐		☐
36	ASNY 14	☐	☐	☐	☐		☐
37	SPRUER SEED 15	☐	☐	☐	☐		☐
38	ASNY 15	☐	☐	☐	☐		☐
39	ASNY 16	☐	☐	☐	☐		☐
40	ASNY 17	☐	☐	☐	☐		☐
41	SPRUER 0011-13-001	☐	☐	☐	☐		☐
42	SPRUER SEED 3	☐	☐	☐	☐		☐
43	ENDE SEED 21	☐	☐	☐	☐		☐
44	COCH 7	☐	☐	☐	☐		☐
45	COCH SEED 11	☐	☐	☐	☐		☐
46	SPRUER SEED 14	☐	☐	☐	☐		☐
47	ASNY 18	☐	☐	☐	☐		☐
48	ASNY SEED 8	☐	☐	☐	☐		☐
49	ASNY 19	☐	☐	☐	☐		☐
50	ENDE SEED 20	☐	☐	☐	☐		☐
51	ASNY SEED 20	☐	☐	☐	☐		☐
52	SPRUER SEED 13	☐	☐	☐	☐		☐
53	ASNY SEED 19	☐	☐	☐	☐		☐
54	ENDE SEED 5	☐	☐	☐	☐		☐
55	SPRUER SEED 12	☐	☐	☐	☐		☐
56	ASNY SEED 1	☐	☐	☐	☐		☐
57	SPRUER SEED 4	☐	☐	☐	☐		☐
58	COCH 8	☐	☐	☐	☐		☐
59	COCH 9	☐	☐	☐	☐		☐
60	ASNY SEED 2	☐	☐	☐	☐		☐
	NOTE:						
61	ENDE SEED 2	☐	☐	☐	☐		☐

IVANPAH SEGS PROJECT **PLANT RESTORATION SUCCESS**
NORTHERN GAS LINE

DATE: **BIOLOGISTS:**

CH MAP FIG.3 Moving NW to SE to E, descending in elevation.

N0	RARE ELEMENT	PLANT ABSENT	PLANT PRESENT	IDENTIFICATION STAKE	IDENTIFICATION TAG	PHOTOGRAPHS AND NOTES	SEE FORM
62	ASNY SEED 18						
63	COCH SEED 2						
64	ENDE SEED 19						
65	ENDE N3 location						
66	COCH SEED 10						
67	COCH 11						
68	COCH 10						
69	ASNY SEED 9						
70	SPRUER SEED 11						
	P.I. ANGLE						
71	ENDE SEED 11						
72	COCH 14 (new location)						
73	COCH 12						
74	COCH 13						
75	SPRUER SEED 10						
76	COCH SEED 9						
77	ENDE SEED 10						
78	COCH 16 (new location)						
79	COCH 15						
80	ENDE N4 location						
81	ASNY SEED 10						

ASNY

COCH

ENDE

SPRUER

IVANPAH SEGS PROJECT **PLANT RESTORATION SUCCESS**
NORTHERN GAS LINE

DATE: **BIOLOGISTS:**

CH MAP FIG.4 Moving W to E, descending in elevation gradually.

N0	RARE ELEMENT	PLANT ABSENT	PLANT PRESENT	IDENTIFICATION STAKE	IDENTIFICATION TAG	PHOTOGRAPHS AND NOTES	SEE FORM
82	COCH 17						
83	COCH 18						
84	SPRUER SEED 9						
85	ASNY SEED 17						
86	ENDE SEED 9						
87	SPRUER SEED 8						
88	COCH SEED 3						
89	COCH SEED 8						
90	ASNY SEED 16						
91	ENDE SEED 8						
92	COCH 19						
93	COCH 20						
	ACCESS ROAD INTERSECTION						
94	SPRUER SEED 7						
95	COCH SEED 7						
96	ENDE SEED 7						
97	ASNY SEED 15						
98	GRPA 0043-10-001						
99	SPRUER SEED 6						

ASNY

COCH

ENDE

SPRUER

ISEGS BIO-18 COMPLIANCE MONITORING

NORTHERN GAS LINE SPECIAL-STATUS PLANT PLANTING/SEEDING DATA SHEET

CREW:						DATE:			
SCIENTIFIC NAME:									
SEEDING PLANTING (UNIQUE ID): example: COCH-1 (seeded)						Elev (MSL) __ , __ __ __ ft			
GPS Data: UTM, NAD 83 Conus, Z11	N __ __ __ __ __ __ __ . __ __					E __ __ __ __ __ __ . __ __			
LOCATION DESCRIPTION (examples: north of Unit 3, in middle of NRPMA, on west side of NGL, etc.)									
Species Found?	Yes	☐	No	☐	Species Dead?	Yes	☐	No	☐
SEEDLING DATA									
Germination Observed? (seeding sites)	Yes	☐	No	If no germination observed, explain: (insufficient rain, incorrect season for this species, etc.)					
% Cover Estimates (within seeded area) (circle one)	>75%		50-75%	25-50%		5-25%		<5%	<1% (trace)
TRANSPLANTED SPECIES DATA									
# Individuals =	vegetative:		in bud/flowering:			in fruit:		Total:	
Note the Microhabitat Data in seeded/planted area:									
Herbivory Present?	Yes	☐	No	☐	What species?				
Stake/tag need to be refreshed?									
Remedial actions needed? If so, explain?									
List other species observed:									
Other Comments:									

Appendix D
Density Calculations

APPENDIX D

Density Calculations

Table D-1. Density of Mojave Milkweed by Project Element

Project Element	Project Feature (acres)	No. of Plants Found (by Project Feature)	Plant Density (No. of Plants per Acre)	Range of Plant Density Values in 8.4 acres	Target No. of Mojave Milkweed Plants to Re-establish (Goal)
CLA-1	37.3	24	0.64	5.40	
CLA-2	3.8	0	0.00	0.00	
NRPMA	433.4	14	0.03	0.27	
Ivanpah 1	913.5	32	0.04	0.29	
Ivanpah 2	1,096.7	5	0.00	0.04	
Ivanpah 3	1,227.0	36	0.03	0.25	
NGL	8.4	0	0.00	0.00	
Average Density			**0.11**	**0.89**	
No. of Plants Expected in 8.4 acres (NGL corridor)				**Range: 0 to 5.4 plants**	
Target No. of Plants to Re-establish					**5 plants**

Source: Plant Census Data: 2007-2008 Rare Plant Surveys (GANDA, 2008)

Notes:

NGL corridor and tap station total, 8.4 acres

CLA = Construction Logistics Area
NGL = natural gas line
No. = number
NRPMA = Northern Rare Plant Mitigation Area

Table D-2. Density of Desert Pincushion by Project Element

Project Element	Project Feature (acres)	No. of Plants Found (by Project Feature)	Plant Density (No. of plants per acre)	Range of Plant Density Values in 8.4 acres	Target No. of Desert Pincushion Plants to Re-establish (Goal)
CLA-1	37.3	7	0.19	1.58	
CLA-2	3.8	0	0.00	0.00	
NRPMA	433.4	70	0.16	1.36	
Ivanpah 1	913.5	33	0.04	0.30	
Ivanpah 2	1096.7	31	0.03	0.24	
Ivanpah 3	1227.0	31	0.03	0.21	
NGL	8.4	2	0.24	2.00	
Average Density			**0.10**	**0.81**	
No. of Plants Expected in 8.4 acres (NGL corridor)				**Range: 0 to 2 plants**	
Target No. of Plants to Re-establish					**2 plants**

Source: Plant Census Data: 2007-2008 Rare Plant Surveys (GANDA, 2008)

Notes:

NGL corridor and tap station total, 8.4 acres

Table D-3. Density of Rusby's Desert Mallow by Project Element

Project Element	Project Feature (acres)	No. of Plants Found (by Project Feature)	Plant Density (No. of plants per acre)	Range of Plant Density Values in 8.4 acres	Target No. of Rusby's Desert Mallow Plants to Re-establish (Goal)
CLA-1	37.3	0	0.000	0.00	
CLA-2	3.8	0	0.000	0.00	
NRPMA	433.4	1	0.002	0.02	
Ivanpah 1	913.5	1	0.001	0.01	
Ivanpah 2	1096.7	1	0.001	0.01	
Ivanpah 3	1227.0	1	0.001	0.01	
NGL	8.4	0	0.000	0.00	
Average Density			0.001	0.01	
No. of Plants Expected in 8.4 acres (NGL corridor)				**Range: 0 to 0.2 plant**	
Target Number of Plants to Re-establish					**1 plant**

Source: Plant Census Data: 2007-2008 Rare Plant Surveys (GANDA, 2008)

Notes:

NGL corridor and tap station total, 8.4 acres

Table D-4. Density of Parish's Club-cholla by Project Element

Project Element	Project Feature (acres)	No. of Plants Found (by Project Feature)	Plant Density (No. of plants per acre)	Range of Plant Density Values in 8.4 acres	Target Number of Parish's Club-cholla Plants to Re-establish (Goal)
CLA-1	37.3	13	0.35	2.93	
CLA-2	3.8	1	0.27	2.24	
NRPMA	433.4	0	0.00	0.00	
Ivanpah 1	913.5	65	0.07	0.60	
Ivanpah 2	1096.7	0	0.00	0.00	
Ivanpah 3	1227.0	0	0.00	0.00	
NGL	8.4	0	0.00	0.00	
Average Density			**0.10**	**0.82**	
No. of Plants Expected in 8.4 acres (NGL corridor)				**Range: 0 to 2.9 plants**	
Target No. of Plants to Reestablish					**3 plants**

Source: Plant Census Data: 2007-2008 Rare Plant Surveys (GANDA, 2008)

Notes:

NGL corridor and tap station total, 8.4 acres

TABLE D-5
Density of Nine-awned Pappus Grass by Project Element

Project Element	Project Feature (acres)	No. of Plants Found (by Project Feature)	Plant Density (No. of plants per acre)	Range of Plant Density Values in 8.4 acres	Target No. of Nine-awned Pappus Grass Plants to Re-establish (Goal)
CLA-1	37.3	431	11.55	97.06	
CLA-2	3.8	13	3.46	29.08	
NRPMA	433.4	877	2.02	17.00	
Ivanpah 1	913.5	140	0.15	1.29	
Ivanpah 2	1096.7	0	0.00	0.00	
Ivanpah 3	1227.0	124	0.10	0.85	
NGL	8.4	98	11.72	98.45	
Average Density			4.14	34.82	
No. of Plants Expected in 8.4 acres (NGL corridor)				**Range: 0 to 98 plants**	
Target No. of Plants to Re-establish					**98 plants**

Source: Plant Census Data: 2007-2008 Rare Plant Surveys (GANDA, 2008)

Notes:

NGL corridor and tap station total, 8.4 acres

Appendix L

Condition of Certification BIO-18

Mojave Milkweed Land Acquisition (Hudgen's Parcel) Annual Report

TECHNICAL MEMORANDUM

ISEGS BIO-18 Mojave Milkweed Land Acquisition Annual Report for 2016

PREPARED FOR:	Doug Davis and Tim Sisk/NRG
PREPARED BY:	Bruce Weise and Amanda Scheib
DATE:	January 10, 2017

Introduction

As required by the Ivanpah Solar Electric Generating System (ISEGS) Commission Decision, Solar Partners' acquired the Hudgens parcel to mitigate the loss of Mojave milkweed (*Asclepias nyctaginifolia*) habitat. Condition BIO-18, measure 11 requires that the project owner acquire, "in fee or in easement, a parcel or parcels of land that includes at least 30 acres supporting a viable occurrence of Mojave milkweed . . .". The parcel also meets the BIO-17, measure 2 selection criteria by being an in-holding within the National Park Service's (NPS) managed Mojave National Preserve. The Hudgens parcel is approximately 21 miles southeast of ISEGS.

Solar Partners provided security for the acquisition but NPS has not yet taken ownership or management of the parcel. Upon transfer of the Hudgens parcel to NPS, the Solar Partners will have met all Mojave milkweed land acquisition compliance requirements in BIO-17 and BIO-18.

This report documents the progress of finalizing transfer of the Hudgens parcel to the NPS.

Summary

During 2016, efforts were made to finalize the land transfer from Solar Partners to NPS. A Phase I assessment was completed and field verified. Final agreements between Solar Partners and NPS continued throughout 2016. An endowment account agreement continues to be modified by National Fish and Wildlife Foundation, Department of Interior and California, and the Department of Fish and Wildlife. NRG continues tracking the progress and anticipates that this land transfer will occur in 2017.

NRG staff and the ISEGS Designated Biologist visited the property in 2016. No unauthorized disturbance was observed. No new plants were documented. Results from previous surveys are included below.

Table 1: Mojave Milkweed Observations at Hudgens Parcel

Location	Number of located in 2012	Number located in 2015
North of Ivanpah Road	1	3
East of Building in ephemeral drainage	4	19
Southeast of buildings in ephemeral drainage	0	1
Totals	**5**	**23**

Appendix M

Condition of Certification BIO-19

Society for Conservation of Bighorn Sheep Annual Report

energyservices
an NRG service

NRG Ivanpah Solar Electric Generating System
100302 Yates Well Road, HCR1, Box 280 Nipton, CA 92364
Ph: 702-815-2021 Fax: 702-815-2030

January 20, 2017

Mr. Joseph Douglas
Compliance Project Manager
California Energy Commission, Siting, Transportation and Environmental Protection Division
1516 9th Street
Sacramento, CA 95814

Mr. Michael Ahrens
Authorized Officer
Bureau of Land Management, Needles Field Office
1303 U.S. Hwy 95 S.
Needles, CA 92363

RE: Ivanpah Solar Electric Generating System (07-AFC-5C)
Big Horn Sheep Mitigation Plan Society For Conservation for the Conservation of Bighorn Sheep (SCBS) Annual Report, to fulfill California Energy Commission Conditions of Certification, BIO-19

Dear Mr. Douglas and Mr. Ahrens,

In accordance with the requirements of Section 3.3 of the Big Horn Sheep Mitigation Plan, of the Conditions of Certification BIO-19 of the Commission's approval of the Ivanpah Solar Electric Generating System (ISEGS), the SCBS will provide to the project owner an annual report no later than January 15th of each year, and the project owner will provide to the CEC and BLM the annual report no later than January 31st of each year.

We are unable to provide the annual report from the Society for the Conservation of Bighorn Sheep (SCBS) at this time as required by the above-stated Condition in this report. ISEGS has not received a response or any communication from SCBS, in spite of our repeated requests. However, ISEGS will continue to request this information from SCBS, and will provide a separate submittal to the CEC and BLM as soon as this information is received. A copy of the request to SCBS is attached.

Please feel free to contact me with any questions.

Thank you.

William Dusenbury

General Manager,
NRG Ivanpah Solar Electric Generating System
100302 Yates Well Road, Nipton, CA – 92364

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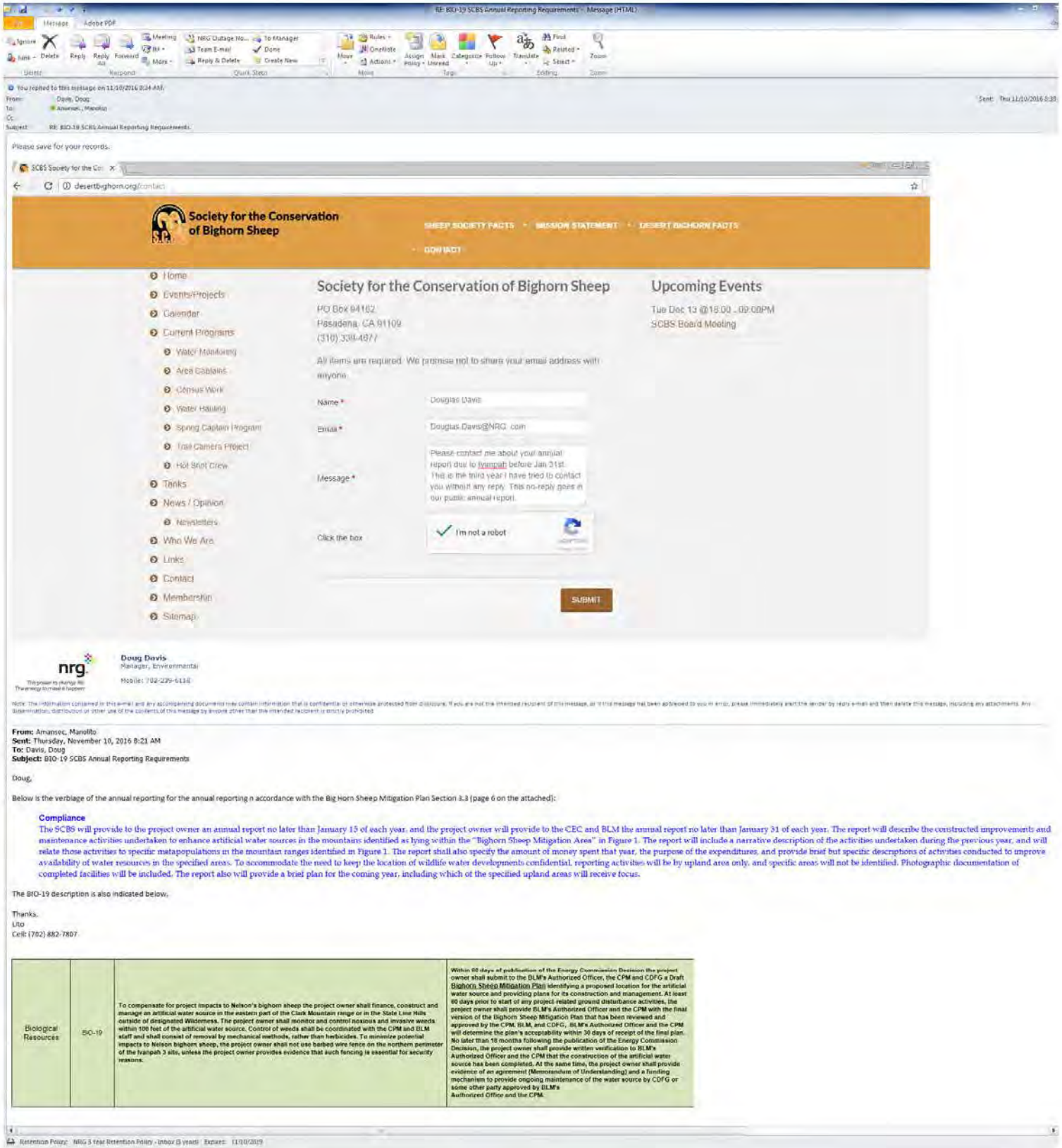
an NRG service

NRG Ivanpah Solar Electric Generating System
100302 Yates Well Road, HCR1, Box 280 Nipton, CA 92364
Ph: 702-815-2021 Fax: 702-815-2030

CC: Doug Davis, NRG
Tim Sisk, NRG
Document Control Specialist – NRG.



From: Amansec, Manolito
Sent: Thursday, November 10, 2016 8:21 AM
To: Davis, Doug
Subject: BIO-19 SCBS Annual Reporting Requirements

Doug,

Below is the verbiage of the annual reporting for the annual reporting n accordance with the Big Horn Sheep Mitigation Plan Section 3.3 (page 6 on the attached):

Compliance
The SCBS will provide to the project owner an annual report no later than January 15 of each year, and the project owner will provide to the CEC and BLM the annual report no later than January 31 of each year. The report will describe the constructed improvements and maintenance activities undertaken to enhance artificial water sources in the mountains identified as lying within the "Bighorn Sheep Mitigation Area" in Figure 1. The report will include a narrative description of the activities undertaken during the previous year, and will relate those activities to specific metapopulations in the mountain ranges identified in Figure 1. The report shall also specify the amount of money spent that year, the purpose of the expenditures, and provide brief but specific descriptions of activities conducted to improve availability of water resources in the specified areas. To accommodate the need to keep the location of wildlife water developments confidential, reporting activities will be by upland area only, and specific areas will not be identified. Photographic documentation of completed facilities will be included. The report also will provide a brief plan for the coming year, including which of the specified upland areas will receive focus.

The BIO-19 description is also indicated below:

Thanks.
Lito
Cell: (702) 882-7807

Biological Resources	BIO-19	To compensate for project impacts to Nelson's bighorn sheep the project owner shall finance, construct and manage an artificial water source in the eastern part of the Clark Mountain range or in the State Line Hills outside of designated Wilderness. The project owner shall monitor and control noxious and invasive weeds within 100 feet of the artificial water source. Control of weeds shall be coordinated with the CPM and BLM staff and shall consist of removal by mechanical methods, rather than herbicides. To minimize potential impacts to Nelson bighorn sheep, the project owner shall not use barbed wire fence on the northern perimeter of the Ivanpah 3 site, unless the project owner provides evidence that such fencing is essential for security reasons.	Within 90 days of publication of the Energy Commission Decision the project owner shall submit to the BLM's Authorized Officer, the CPM and CDFG a Draft Bighorn Sheep Mitigation Plan identifying a proposed location for the artificial water source and providing plans for its construction and management. At least 60 days prior to start of any project-related ground disturbance activities, the project owner shall provide BLM's Authorized Officer and the CPM with the final version of the Bighorn Sheep Mitigation Plan that has been reviewed and approved by the CPM, BLM, and CDFG. BLM's Authorized Officer and the CPM will determine the plan's acceptability within 30 days of receipt of the final plan. No later than 18 months following the publication of the Energy Commission Decision, the project owner shall provide written verification to BLM's Authorized Officer and the CPM that the construction of the artificial water source has been completed. At the same time, the project owner shall provide evidence of an agreement (Memorandum of Understanding) and a funding mechanism to provide ongoing maintenance of the water source by CDFG or some other party approved by BLM's Authorized Officer and the CPM.

Appendix N

Condition of Certification BIO-20

Streambed Impact Minimization Measure
Change of Condition Report

energyservices
an NRG service

NRG Ivanpah Solar Electric Generating System
100302 Yates Well Road, HCR1, Box 280 Nipton, CA 92364
Ph: 702-815-2021 Fax: 702-815-2030

January 6, 2017

Mr. Joseph Douglas
Compliance Project Manager
California Energy Commission, Siting, Transportation and Environmental Protection Division
1516 9th Street
Sacramento, CA 95814

Mr. Michael Ahrens
Authorized Officer
Bureau of Land Management, Needles Field Office
1303 U.S. Hwy 95 S.
Needles, CA 92363

RE: Ivanpah Solar Electric Generating System (07-AFC-5C)
Streambed Impact Minimization and Compensation Measures – Notifying Change of Conditions Report to fulfill California Energy Commission Conditions of Certification, BIO-20

Dear Mr. Douglas and Mr. Ahrens,

In accordance with the requirements of Conditions of Certification BIO-20 of the Commission's approval of the Ivanpah Solar Electric Generating System, a copy of the notifying change of conditions report shall be included in the annual reports.

The notifying change of conditions report was included in the Annual Biological Report, Appendix E.

Thank you.

William Dusenbury

General Manager,
NRG Ivanpah Solar Electric Generating System
100302 Yates Well Road, Nipton, CA – 92364

CC: Doug Davis, NRG
Tim Sisk, NRG
Document Control Specialist – NRG.

Exhibit 5

Hazardous Materials
Conditions of Certification

Appendix O

Condition of Certification HAZ-1

List of Hazardous Materials Contained in ISEGS Facility

LIST OF HAZARDOUS MATERIALS CONTAINED AT ISEGS FACILITY

In accordance with the requirements of the Conditions of Certification HAZ-1 of the Commission's approval of the Ivanpah Solar Electric Generating System (ISEGS) (07-AFC-5C), the project owner shall provide to BLM's Authorized Officer and the CPM in the Annual Compliance Report a list of hazardous material contained at the facility.

Table 1 provides the list of Hazardous Materials contained and currently in use at the ISEGS facility.

Table 1 - List of Chemicals Contained at ISEGS Facility (2016)

In accordance with CEC Condition of Certification HAZ-1, the following is the list of hazardous materials contained in the facility.

Common Name	Chemical Name	Chemical Location	CAS Number	Largest Container	Estimated Average Daily Amount	Maximum Quantity	Units	Application
Ammonium Hydroxide	Ammonium Hydroxide	Power Block 1, 2, & 3 Injection Skids and West side parking lots (spares)	1336-21-6	300	330	1,800	gallons	Used for pH control on the condensate and feed water systems.
Mineral Oil	Mineral Oil	Power Block Transformers/Switchyards, Solar Field Transformers, Admin Building and HAB Transformers	8012-95-1	9,900	9,900	57,445	gallons	Insulating oil used for transformers
Lubricating oil	Turbinas EP 32 (Turbine Oil)	Power Block STG Lube Oil System, Boiler Feed Pump Turbine, Startup Boiler Feed Pump, Emergency Generators, Diesel fire pumps and Chemical Storage Areas	64742-54-7	5,800	20,000	28,408	gallons	Lubricate rotating equipment (e.g., steam turbine bearings)
Lead Acid Batteries	Lead	Power Block PSB/Battery Rooms, SRSG - UPS EEM Baterry Rooms, Admin. Bldg Battery Room, Emergency Generator Enclosures, Diesel Fire Pump Enclosures	7439-92-1	727	311,348	311,348	pounds	Back-up power / electrical
Lead Acid Batteries	Sulfuric Acid	Power Block PSB/Battery Rooms, SRSG - UPS EEM Baterry Rooms, Admin. Bldg Battery Room, Emergency Generator Enclosures, Diesel Fire Pump Enclosures	7664-93-9	145	52,849	52,849	pounds	Back-up power / electrical
Sodium Hypochlorite	Sodium Hypochlorite	Unit 1, 2 & 3 and Administration Building WSAC Chemical Skid	7681-52-9	275	275	1,100	gallons	Potable water treatment and WSAC oxidizer
Polypropylene glycol	Poly[oxy(methyl-1,2-ethanediyl)], .alpha.-hydro-.omega.-hydroxy-	Contained as a mixture in the WSAC reservoir tank	25322-69-4	800	350	798	gallons	Propylene gylcol is in mixture with water in the WSAC system.
Polypropylene glycol	Poly[oxy(methyl-1,2-ethanediyl)], .alpha.-hydro-.omega.-hydroxy-	Satelitte Accumulation Storage Areas Units 1,2,3; Hazardous Waste Storage Areas	25322-69-4	55	30	385	gallons	Waste propylene gycol for disposal
Sodium carbonate in Solution	Carbonic acid sodium salt (1:2)	Unit 1, 2 & 3 WSAC Chemical Skid	497-19-8	300	275	900	gallons	Soda Ash solution is used in the WSAC chemistry
Nalco 73801WR (Corrosion Inhibitor)	Sodium Tolyltriazole	Unit 1, 2 & 3 WSAC Chemical Skid	64665-57-2	275	275	825	gallons	Corrosion inhibitor used in the WSAC system
Diesel Fuel No. 2	Diesel Fuel No. 2	Unit 1, Unit 2, Unit 3 and Admin. Building Emergency and Fire Pump Generators	68476-34-6	840	2,852	3,565	gallons	Fuel for Emergency Generators and Fire Pump engines
Methane	Methane	Piped in supply to Units 1, 2 & 3	74-82-8	Metered	3,346,329	1,575,000,000	cu. feet	Fuel for Auxiliary Boilers and Nighttime Preservation Boilers
Sulfur Hexafluoride	Sulfur Hexafluoride	Switchgear assemblies	2551-62-4	73	73	403	pounds	Used in switchyard/switchgear devices
Heptafluoropropane - HFC 227	1,1,1,2,3,3,3-Heptafluoropropane	Power Block PSB & Administration Building	431-89-0	475	475	8,485	pounds	Fire/explosion extinguishing, suppression and prevention agent
Acetylene	Acetylene	Heliostat Assembly Building	74-86-2	130	750	1,595	cu. feet	Used for welding/cutting metals
Air Compressed	Air	Heliostat Assembly Building	132259-10-0	218	218	872	cu. feet	used for remote tools
Argon Compressed	Argon Compressed	Heliostat Assembly Building	7440-37-1	336	436	9,525	cu. feet	Used for welding
Carbon Dioxide	Carbon Dioxide	Power Block Emergency Generator Enclosure	124-38-9	180	436	1,620	cu. feet	Fire suppression
Helium	Helium	Heliostat Assembly Building	7440-59-7	218	654	1,744	cu. feet	For leak detection

Common Name	Chemical Name	Chemical Location	CAS Number	Largest Container	Estimated Average Daily Amount	Maximum Quantity	Units	Application
Liquefied Petroleum Gas (lpg)	Propane	Heliostat Assembly Building & Administration Building	74-98-6	22	53	125	gallons	Used as fuel for equipment
Nitrogen	Nitrogen	Heliostat Assembly Building	7727-37-9	304	3,924	12,160	cu. feet	Used for purging gas systems
Oxygen	Oxygen	Heliostat Assembly Building	7782-44-7	251	1,800	5,620	cu. feet	Used for welding/cutting metals
Oily Debris - Hazardous Waste	Oily Debris	Satellite Accumulation Storage Areas Units 1,2,3; Hazardous Waste Storage Areas	70514-12-4	55	165	440	gallons	Waste - for disposal
Lubricating oils, used	Used lubricating oils	Satellite Accumulation Storage Are Units 1,2,3; Hazardous Waste Storage Area	70514-12-4	55	165	440	gallons	Waste - for disposal
Lead	Broken Mirrors - Primer Paint Lead Content	Heliostat Assembly Building	7439-92-1	40,000	690	30,960	pounds	Waste - for disposal
Used Oil Filters - Hazardous Waste	Used Oil Filters (Drained)	Power Block 1, 2, & 3	122-39-4	55	165	330	gallons	Waste - for disposal
Soil Impacted with Hydraulic Oil	Soil Impacted with Hydraulic Oil	Heliostat Assembly Building	64742-54-7	40,000	1,500	31,080	pounds	Waste - for disposal

Appendix P

Condition of Certification HAZ-5

Operations Security Plan
Background Investigations for All Employees and Contractors

energyservices
an NRG service

NRG Ivanpah Solar Electric Generating /system
100302 Yates Well Road, HCR1, Box 280 Nipton, CA 92364
Ph: 702-815-2012 Fax: 702-815-2030

December 28, 2016

Mr. Joseph Douglas
Compliance Project Manager
California Energy Commission, Siting, Transportation and Environmental Protection Division
1516 9th Street
Sacramento, CA 95814

Mr. Michael Ahrens
Authorized Officer
Bureau of Land Management, Needles Field Office
1303 U.S. Hwy 95 S.
Needles, CA 9236

RE: Ivanpah Solar Electric Generating System (07-AFC-5C) Project Owner Statement Pertaining to Operations Security Plan Includes Hazardous Materials Transport Vendor Certifications for Security Plans and Employee Background Certifications to fulfill California Energy Commission Conditions of Certification, HAZ-5

Dear Mr. Douglas and Mr. Ahrens,

In accordance with the requirements of Conditions of Certification HAZ-5 of the Commission's approval of the Ivanpah Solar Electric Generating System, we are providing the following statement as a requirement in the Annual Compliance Report:

ISEGS Operations do not transport hazardous materials. Hazardous wastes generated on site are transported to the TDSF (Treatment Storage and Disposal Facility) by the approved vendor. The vendor certification and employee background certifications are appended in the Operations Security Plan.

William Dusenbury

General Manager,
NRG Ivanpah Solar Electric Generating System
100302 Yates Well Road, Nipton, CA – 92364

CC: Doug Davis, NRG
Tim Sisk, NRG
Document Control Specialist – NRG.

energyservices
an NRG service

NRG Ivanpah Solar Electric Generating System
100302 Yates Well Road, HCR1, Box 280 Nipton, CA 92364
Ph: 702-815-2012 Fax: 702-815-2030

December 28, 2016

Mr. Joseph Douglas
Compliance Project Manager
California Energy Commission, Siting, Transportation and Environmental Protection Division
1516 9th Street
Sacramento, CA 95814

Mr. Michael Ahrens
Authorized Officer
Bureau of Land Management, Needles Field Office
1303 U.S. Hwy 95 S.
Needles, CA 9236

RE: Ivanpah Solar Electric Generating System (07-AFC-5C) Operation Security Plan Project Owner Statement Pertaining to All Current Employee and Contractor Background Investigation to fulfill California Energy Commission Conditions of Certification, HAZ-5

Dear Mr. Douglas and Mr. Ahrens,

In accordance with the requirements of Conditions of Certification HAZ-5 of the Commission's approval of the Ivanpah Solar Electric Generating System, we are providing the following statement as a requirement in the Annual Compliance Report:

All current NRG employees undergo full background investigations as required in NRG hiring process. All contractors (vendors) who provide services to the project/facility go through pre-qualification process and NRG internal approval process, "Adapt-one". The certification statements are appended in the Operations Security Plan.

William Dusenbury

General Manager,
NRG Ivanpah Solar Electric Generating System
100302 Yates Well Road, Nipton, CA – 92364

CC: Doug Davis, NRG
Tim Sisk, NRG
Document Control Specialist – NRG.

Affidavit of Compliance for Project Owners

I, **William Dusenbury, General Manager**

(Name of Person signing Affidavit and Title)

do hereby certify that background investigations to ascertain accuracy of the identity and employment history of all employees of

NRG Energy Services

(Company Name)

for employment at

Ivanpah Solar Electric Generating System located at 100302 Yates Well Rd, Nipton, CA 92364

(Project Name and location)

have been conducted as required by the U.S. Bureau of Land Management Right-of-Way and California Energy Commission Decision for the above-named project.

Will Dusenbury

(Signature of Officer or Agent)

Dated this 28th day of December, 2016.

THIS AFFIDAVIT OF COMPLIANCE SHALL BE APPENDED TO THE PROJECT SECURITY PLAN AND SHALL BE RETAINED AT ALL TIMES AT THE PROJECT SITE FOR REVIEW BY BLM's AUTHORIZED OFFICER AND THE CALIFORNIA ENERGY COMMISSION COMPLIANCE PROJECT MANAGER.

Affidavit of Compliance for Contractors by Project Owners

I, **William Dusenbury, General Manager**

(Name of Person signing Affidavit and Title)

do hereby certify that all Contractors who are approved to work at Ivanpah Solar Electric Generating Station have gone through NRG energy internal approval process "Adopt-one"

for contract work at

Ivanpah Solar Electric Generating System located at 100302 Yates Well Rd, Nipton, CA 92364

(Project Name and location)

have been conducted as required by the U.S. Bureau of Land Management Right-of-Way and California Energy Commission Decision for the above-named project.

William Dusenbury

(Signature of Officer or Agent)

Dated this 28th day of DECEMBER, 2016.

THIS AFFIDAVIT OF COMPLIANCE SHALL BE APPENDED TO THE PROJECT SECURITY PLAN AND SHALL BE RETAINED AT ALL TIMES AT THE PROJECT SITE FOR REVIEW BY BLM's AUTHORIZED OFFICER AND THE CALIFORNIA ENERGY COMMISSION COMPLIANCE PROJECT MANAGER.

Exhibit 6

Land Use and Recreation
Conditions of Certification

Appendix Q

Conditions of Certification
LAND-3 & RECREATION-1

Solar/Ecological Interpretive
Center Annual Report

energyservices
an NRG service

NRG Ivanpah Solar Electric Generating System
100302 Yates Well Road, HCR1, Box 280 Nipton, CA 92364
Ph: 702-815-2021 Fax: 702-815-2030

January 4, 2017

Mr. Joseph Douglas
Compliance Project Manager
California Energy Commission, Siting, Transportation and Environmental Protection Division
1516 9th Street
Sacramento, CA 95814

Mr. Michael Ahrens
Authorized Officer
Bureau of Land Management, Needles Field Office
1303 U.S. Hwy 95 S.
Needles, CA 92363

RE: Ivanpah Solar Electric Generating System (07-AFC-5C) / Bureau of Land Management (CACA-055108) Summary of Estimated Public Use of Solar/Ecological Interpretive Center and Issues Associated with Operating and Maintenance Activities, to fulfill California Energy Commission Conditions of Certification, LAND-3 AND RECREATION-1

Dear Mr. Douglas and Mr. Ahrens,

Pursuant to the requirements of Conditions of Certification LAND-3 and RECREATION-1 of the Commission's approval of the Ivanpah Solar Electric Generating System (ISEGS), we are providing the following information as a requirement in the Annual Compliance Report:

As required by COC LAND-3 and REC-1 Verification, the project owner shall provide a summary of estimated public use of the Solar / Ecological Interpretive Center (SEIC) and summarize any issues associated with operating and maintenance activities in each Annual Compliance Report. The Solar/Ecological Interpretive Center was constructed by Solar Partners I, II, and VIII LLC's as a mitigation measure of the ISEGS project. The completed SEIC facility was inspected and deemed that the verification of LAND-3 and REC-1 had been fulfilled by BLM on May 13, 2015 and by CEC on May 19, 2015. Since BLM's acceptance of the constructed SEIC facility, ISEGS has transferred ownership of the facility to BLM; including operations and maintenance activities. ISEGS has no longer has jurisdiction of the facility; therefore, we are unable to provide information on annual estimated public use or issues related to operations and maintenance activities on this report, and in future reports.

Although the facility has been accepted by BLM, ISEGS is required to provide a panel that will be posted into the information kiosk, and a replacement panel that will be provided to BLM for safekeeping. The panel design has been completed based on BLM's guidelines, and was submitted to BLM for final review and approval on December 19, 2016. Once the kiosk panels have been approved and completed, ISEGS

energyservices
an NRG service
NRG Ivanpah Solar Electric Generating System
100302 Yates Well Road, HCR1, Box 280 Nipton, CA 92364
Ph: 702-815-2021 Fax: 702-815-2030

will have completed its responsibility for the SEIC facility requirements. ISEGS anticipates completing this effort in 2017.

Please feel free to contact me with any questions.

Thank you.

William Dusenbury

General Manager,
NRG Ivanpah Solar Electric Generating System
100302 Yates Well Road, Nipton, CA – 92364

CC: Doug Davis, NRG,
Tim Sisk, NRG
Document Control Specialist – NRG.

Exhibit 7

Soil & Water Conditions of Certification

Appendix R

Condition of Certification S&W-1

Storm Water BMP Monitoring and Maintenance Activities Report

Ivanpah Solar Electric Generating System

California Energy Commission (07-AFC-5C)
Bureau of Land Management
(CACA-48668, 49502, 49503, and 49504)
Condition of Certification Soil&Water-1

Stormwater Best Management Practices Annual Report

January 1, 2016 – December 31, 2016
Reporting Period

January 10, 2017

Prepared by: Designated Biologist
(on behalf of Solar Partners I, II, VIII LLC's)

100302 Yates Well Road
Nipton, CA 92364

In accordance with the requirements of the Conditions of Certification SOIL & WATER-1 of the Commission's approval of the Ivanpah Solar Electric Generating System (07-AFC-5C), the project owner shall provide in the annual compliance report, information on the results of storm water best management practices (BMP) monitoring and maintenance activities.

Table 1 outlines the repairs performed during 2016 to SWPPP BMP at ISEGS.

Table 1: Storm Water Pollution Prevention Plan BMP Repairs

Date	Description
7/1/16	Remove debris, perform repairs, reset straw bales and wattles, and sand bags.
7/2/16	Remove debris, perform repairs, reset straw bales and wattles, and sand bags.
7/3/16	Remove debris, perform repairs, reset straw bales and wattles, and sand bags.
7/5/16	Remove debris, perform repairs, reset straw bales and wattles, and sand bags.
7/7/16	Remove debris, perform repairs, reset straw bales and wattles, and sand bags.
7/8/16	Remove debris, perform repairs, reset straw bales and wattles, and sand bags.
7/11/16	Remove debris, perform repairs, reset straw bales and wattles, and sand bags.
7/12/16	Remove debris, perform repairs, reset straw bales and wattles, and sand bags.
8/29/16	Remove debris, perform repairs, reset straw bales and wattles, and sand bags.

Appendix S

Condition of Certification S&W-2

Storm Water Pollution Prevention Plan Annual Report

2015-2016
ANNUAL REPORT
FOR STORM WATER DISCHARGES
ASSOCIATED WITH INDUSTRIAL ACTIVITIES

Reporting Period July 1, 2015 through June 30, 2016

Retain a copy of the completed Annual Report for your records.

Please remember that a Notice of Termination and new Notice of Intent are required whenever a facility operation is relocated or changes ownership.

If you have any questions, please contact your Regional Board Industrial Storm Water Permit Contact. The names, telephone numbers, and e-mail addresses of the Regional Board contacts, as well was the Regional Board office addresses, can be found at:
http://www.waterboards.ca.gov/water_issues/programs/stormwater/contact.shtml

General Information

A. Facility Information

WDID: 6B36I024279

Business Name: ISEGS
Physical Address: 100302 Yates Well Road
City: Nipton
State: CA
Zip: 92364
Contact Person: Timothy Higdon
Phone: 702-815-2016
Email: tim.higdon@nrg.com
Standard Industrial Classification (SIC) Codes: 4911-Electric Services

B. Facility Owner Information

Business Name: NRG EnergyServices LLC
Mailing Address: 100302 Yates Well Road
City: Nipton
State: CA
Zip: 92364
Contact Person: Timothy Higdon
Phone: 702-815-2016
Email: tim.higdon@nrg.com

C. Facility Billing Information

Business Name: Ivanpah Solar Electric Generating Station
Mailing Address: HCR1 Box 280
City: Nipton
State: CA
Zip: 92364
Contact Person: Timothy Higdon
Phone: 702-815-2016
Email:

Question Information

1. Has the Discharger conducted monthly visual observations (including authorized and unauthorized Non-Storm Water Discharges and Best Management Practices) in accordance with Section XI.A.1?

☒ Yes ☐ No

If No, see Attachment 1, Summary of Explanation.

2. Has the Discharger conducted sampling event visual observations at each discharge location where a sample was obtained in accordance with Section XI.A.2?

☒ Yes ☐ No

If No, see Attachment 1, Summary of Explanation.

3. Did you sample the required number of Qualifying Storm Events during the reporting year for all discharge locations, in accordance with Section XI.B?

☐ Yes ☒ No

If No, see Attachment 1, Summary of Explanation.

4. How many storm water discharge locations are at your facility?

4

5. Has the Discharger chosen to select Alternative Discharge Locations in accordance with Section XI.C.3?

☐ Yes ☒ No

6. Has the Discharger reduced the number of sampling locations within a drainage area in accordance with the Representative Sampling Reduction in Section XI.C.4?

☐ Yes ☒ No

7. Permitted facilities located within an impaired watershed must assess for potential pollutants that may be present in the facility's industrial storm water discharge. Using the table below, populated based on the facility's location, indicate the presence of the potential pollutant at the facility.

The facility is not located within an impaired HUC 10 watershed. You are not required to select any Industrial Pollutants. Skip Questions 8 and 9.

8. Has the Discharger included the above pollutants in the SWPPP pollutant source assessment and assessed the need for analytical monitoring for the pollutants?

☒ Yes ☐ No

If No, what date will the parameter(s) will be added to the SWPPP and Monitoring Implementation Plan?

9. Were all samples collected in accordance with Section XI.B.5?

☒ Yes ☐ No

If No, see Attachment 1, Summary of Explanation.

10. Has any contained storm water been discharged from the facility this reporting year?

☐ Yes ☒ No

If Yes, see Attachment 1, Summary of Explanation.

11. Has the Discharger conducted one (1) annual evaluation during the reporting year as required in Section XV?

☒ Yes ☐ No

If Yes, what date was the annual evaluation conducted? 06/15/2016

If No, see Attachment 1, Summary of Explanation.

12. Has the Discharger maintained records on-site for the reporting year in accordance with XXI.J.3?

☒ Yes ☐ No

If No, see Attachment 1, Summary of Explanation.

If your facility is subject to Effluent Limitation Guidelines in Attachment F of the Industrial General Permit, include your specific requirements as an attachment to the Annual Report (attach as file type: Supporting Documentation).

ANNUAL REPORT CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under the direction or supervision in accordance with a system designed to assure that qualified personnel propoerly gether and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Printed Name: WILLIAM DUSENBURY

Title: GENERAL MANAGER Date: 7/1/16

2015-2016

Annual Report for WDID 6B36I024279

Summary of Explanations

Explanation Question	Explanation Text
Question 3	As discussed in the SWPPP, the power block and the areas where the Administration Building and production wells are located are graded with moderate slopes to direct runoff to drainage outlet aprons to reduce erosion in these localized areas and to promote a natural sheet flow condition in the downstream area. Further, the surface area of the power blocks have a layer of aggregate that absorbs storm water and reduces run off. ISEGS only experienced two qualifying storm water events one on 4/25/16 for which a sample was obtained at the Admin sampling location and one on 6/30/16 for which a sample could not be obtained due to a "shelter in place" order due to the proximity of lightning.

Summary of Attachments

Attachment Type	Attachment Title	Description	Date Uploaded	Part Number	Attachment Hash

2015-2016

Annual Report for WDID 6B36I024279

List of Identified Pollutants within the Impaired Watershed

Parameter	Pollutant	Present at Facility?

Appendix T

Condition of Certification S&W-4

Annual Groundwater Consumption Record

2016 IVAPAH SOLAR ELECTRIC GENERATING SYSTEM WATER CONSUMPTION

(Compliance with SOIL&WATER-4)

MONTH	Well #1 Permit #2010110649 (WP 6877) Pump A Common FIT1010				Well #2 Permit #2010110649 (WP 6877) Pump B Common FIT2010				CONSUMPTION DISTRIBUTION UNIT 1		UNIT 2		UNIT 3		COMMON AREA		TOTAL BY MONTH
	Start (Meter Reading)	Finish (Meter Reading)	(gallons)	(acre feet)	Start (Meter Reading)	Finish (Meter Reading)	(gallons)	(acre feet)	(gallons)	(acre feet)	(gallons)	(acre feet)	(gallons)	(acre feet)	(gallons)	(acre feet)	(acre feet)
Jan-2016	0	224,930	224,930	0.6903	0	666,850	666,850	2.0465	217,263	0.6668	314,346	0.9647	306,656	0.9411	53,515	0.1642	2.7368
Feb-2016	224,930	613,193	388,263	1.1915	666,850	1,139,986	473,136	1.4520	286,592	0.8795	232,314	0.7129	287,086	0.8810	55,407	0.1700	2.6435
Mar-2016	613,193	1,423,609	810,416	2.4871	1,139,986	1,851,429	711,443	2.1833	363,264	1.1148	479,488	1.4715	512,527	1.5729	166,580	0.5112	4.6704
Apr-2016	1,423,609	2,007,314	583,705	1.7913	1,851,429	2,441,574	590,145	1.8111	311,296	0.9553	192,185	0.5898	486,320	1.4925	184,049	0.5648	3.6024
May-2016	2,007,314	2,636,607	629,293	1.9312	2,441,574	3,032,492	590,918	1.8135	697,814	2.1415	3,303	0.0101	356,489	1.0940	162,605	0.4990	3.7447
Jun-2016	2,636,607	3,856,207	1,219,600	3.7428	3,032,492	4,260,852	1,228,360	3.7697	710,105	2.1792	784,060	2.4062	729,191	2.2378	224,604	0.6893	7.5125
Jul-2016	3,856,207	5,600,917	1,744,710	5.3543	4,260,852	5,994,252	1,733,400	5.3196	973,092	2.9863	961,597	2.9510	944,521	2.8986	598,900	1.8380	10.6739
Aug-2016	5,600,917	6,924,037	1,323,120	4.0605	5,994,252	7,368,532	1,374,280	4.2175	755,835	2.3196	1,058,606	3.2487	520,798	1.5983	362,162	1.1114	8.2780
Sep-2016	6,924,037	8,116,247	1,192,210	3.6588	7,368,532	8,489,982	1,121,450	3.4416	613,749	1.8835	855,995	2.6270	630,002	1.9334	213,914	0.6565	7.1004
Oct-2016	8,116,247	9,006,097	889,850	2.7308	8,489,982	9,378,138	888,156	2.7257	485,577	1.4902	711,424	2.1833	387,132	1.1881	193,873	0.5950	5.4565
Nov-2016	9,006,097	9,825,870	819,773	2.5158	9,378,138	10,274,224	896,086	2.7500	373,402	1.1459	672,243	2.0630	350,950	1.0770	319,264	0.9798	5.2658
Dec-2016	9,825,870	10,279,879	454,009	1.3933	10,274,224	10,750,160	475,936	1.4606	277,341	0.8511	342,682	1.0517	232,024	0.7121	77,898	0.2391	2.8539
TOTAL			**10,279,879**	**31.5478**			**10,750,160**	**32.9910**	**6,065,330**	**18.6138**	**6,608,243**	**20.2800**	**5,743,695**	**17.6268**	**2,612,771**	**8.0183**	**64.5388**
YTD (gallons)	**21,030,039**								**21,030,039**								
YTD (acre feet)	**64.54**								**64.54**								
ANNUAL LIMIT (acre feet)	**100.00**								**100.00**								
REMAINING CAPACITY (acre feet)	**35.46**								**35.46**								

Appendix U

Condition of Certification S&W-5

Annual Summary of Heliostats Failed, Cause of Failure, Cleanup and Mitigation Performed

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NRG Ivanpah Solar Electric Generating System
100302 Yates Well Road, HCR1, Box 280 Nipton, CA 92364
Ph: 702-815-2021 Fax: 702-815-2030

January 4, 2017

Mr. Joseph Douglas
Compliance Project Manager
California Energy Commission, Siting, Transportation and Environmental Protection Division
1516 9th Street
Sacramento, CA 95814

Mr. Michael Ahrens
Authorized Officer
Bureau of Land Management, Needles Field Office
1303 U.S. Hwy 95 S.
Needles, CA 92363

RE: Ivanpah Solar Electric Generating System (07-AFC-5C) Annual Summary Heliostats Failed, Cause of the Failure, Cleanup and Mitigation Performed, to fulfill California Energy Commission Conditions of Certification, SOIL&WATER-5

Dear Mr. Douglas and Mr. Ahrens,

In accordance with the requirements of Condition of Certification SOIL&WATER-5 of the Commission's approval of the Ivanpah Solar Electric Generating System (ISEGS), the project owner shall prepare an annual summary of the number of heliostats failed, cause of the failure, and cleanup and mitigation performed for each failed heliostat.

Ivanpah Solar Electric Generating System has a total of 173,655 heliostats as designed through Ivanpah 1, 2, and 3. High winds contributed to two types of heliostat failures.

- Broken mirrors - Either one of both of the mirrors are broken
- Pylon Assembly Failure - The heliostat assembly has come off the pylon resulting in broken mirrors

The table below shows the number of days wind speeds exceeded 50mph at ISEGS taken from the Distributed Control System.

Month	No. of Days Wind Speed Exceeded 50mph
Jan	3
Feb	0
March	4
April	5

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Month	No. of Days Wind Speed Exceeded 50mph
May	8
Jun	0
Jul	1
Aug	0
Sep	0
Oct	1
Nov	4
Dec	2

Trained contractors safely clean up broken mirrors on a regular basis, and transfer them to a central broken mirror waste bin accumulation area located within the Heliostat Assembly Building area. The mirror waste bins are covered with lock and signage. Waste accumulation bins are removed from the site once they are full or are approaching the 90 day waste storage limit. The waste accumulation bins are transported by a licensed waste hauler to an approved facility, currently U.S. Ecology in Beatty, Nevada. Efforts are being made to locate a recycler able to accommodate the mirrors; however none have been found to date.

To date, the three solar array fields combined have a 1.48% breakage rate. Mirror only replacement methods are currently being analyzed, and 80 mirrors have been replaced in the field. ISEGS is currently making arrangements to manufacture/assemble heliostats onsite in 2017. Once a substantial amount of heliostats have been assembled, the replacement of failed heliostats will begin. A summary of failed heliostats resulting in broken mirrors is shown by location on the table below.

2016 Heliostat Annual Summary Report

	Ivanpah 1	Ivanpah 2	Ivanpah 3	Total
No. of Heliostats (As Designed)	53,555	60,050	60,050	**173,655**
No. Broken Heliostats (Through 2016)	1260	504	804	**2,568**
Broken Heliostat Percentage	2.35%	0.84%	1.34%	**1.48%**

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100302 Yates Well Road, HCR1, Box 280 Nipton, CA 92364
Ph: 702-815-2021 Fax: 702-815-2030

A summary of the above listed components is tracked to potentially assist in predicting component failures in future operating years.

Please feel free to contact me if you have questions.

William Dusenbury

General Manager,
NRG Ivanpah Solar Electric Generating System
100302 Yates Well Road, Nipton, CA – 92364

CC: Doug Davis, NRG
Tim Sisk, NRG
Mitch Samuelian, NRG
Document Control Specialist – NRG.

Exhibit 8

Traffic and Transportation Conditions of Certification

Appendix V

Condition of Certification TRANS-3

Heliostat Positioning Plan Update

2016 Update Report to Ivanpah Solar Electric Generating System Heliostat Positioning Plan

Background:

This report is provided specific to the annual HPP update as required by Section 6 of the monitoring plan per TRANS-3. As required by TRANS-3, the Heliostat Positioning Plan (HPP) Section 6.0 provides for a monitoring plan that a) obtains field measurements in response to legitimate complaints; b) verifies that the HPP would avoid the potential for human health and safety hazards including temporary or permanent blindness at locations of observers; and c) provides requirements and procedures to document, investigate and resolve legitimate complaints regarding glare. Furthermore, TRANS-3 requires that the monitoring plan should be coordinated with the FAA, U.S. Department of the Navy, CalTrans, CHP, and Clark County Department of Aviation in relation to the proposed Southern Nevada Supplemental Airport. The HPP is to be updated on an annual basis for the first 5 years, and at 2-year intervals thereafter for the life of the project.

Previously, Sandia National Laboratories (Sandia) obtained ground-based measurements of glare on April 24, 2014. The established threshold level for glare is the "potential after image" as described in Section 2.1.1 and 2.2 and Figure 2-1 of the approved HPP. Ground-based measurements have not shown levels above this threshold. As a result, a report was submitted on December 8, 2014 that recommended removing the requirement for ground-based cameras to monitor for glare from the facility.

Aerial measurements obtained of glare from the facility during the April 24, 2015 monitoring did show two measurements in excess of the established threshold. The ISEGS facility implemented new flux/standby dispersal algorithms in response to these measurements on July 17, 2014. Subsequently, measurements were obtained of glare from the facility on July 22, 2014. None of the measurements obtained were above the threshold established in the approved HPP. However, as reported by Sandia, glare was bright enough that reports from aerial observers may still be expected.

Pilot Reports and HPP Modifications in 2016:

In 2016, two pilot reports that cited glare from the facility were provided by the CEC Staff. The first report was provided to ISEGS via email on August 4, 2016 (Pilot Report ACN 1353100), and was from a May 2016 pilot report. Adjustments had been made to the heliostat operations on March 23, 2015, and the results of the subsequent monitoring provided to the CEC on May 20, 2015. The pilot report from May 2016 was the first to have been generated in this busy airspace in the year since these adjustments were made. To place the report in context, according to the FAA approximately 12,000 aircraft were tracked within 15 nautical miles of Ivanpah in May of 2014. This is equivalent to 144,000 aircraft per year.

The second pilot report was provided on October 28, 2016 (Pilot Report ACN 1390571). As per the HPP reporting requirements, a preliminary investigation report was provided to the CEC and stakeholders on November 10, 2016. The preliminary report indicated that unusual circumstances related to variance in solar insolation combined with facility shut down procedures may have resulted in brief, subjective observations of temporary glare.

Since no measurements obtained from the facility following the algorithm modification in July of 2014 have been above the threshold level as established in the approved HPP, no updates to the HPP are necessary in 2016, despite the two pilot reports received in an airspace that sees hundreds of thousands of flights annually. While ISEGS is constantly exploring potential enhancements to the operational algorithms, the approved HPP is working as intended. The facility will continue to remain in compliance with the requirements of the approved HPP.

Activities in 2016 and 2017:

The ISEGS facility continues to refine the positioning algorithms to reduce the potential for reports from aerial observers, in collaboration with the CEC, the BLM, the other agencies named in TRANS-3 as well as Dr. Clifford Ho and Sandia. Sandia, in cooperation and with the support of the ISEGS facility, was awarded a multi-year grant to develop revised positioning algorithms to decrease glare from the facility. These efforts commenced in 2016 and will be ongoing in 2017.

The efforts to date by Sandia have included enhancements to a suite of software used for the analysis of glare, flux and optical modeling. The first of the tools that has been enhanced is the Solar Glare Hazard Analysis Tool (SGHAT), a model determines when and where solar glare can occur throughout the year from a user-specified array and observation points. This tool, in combination with SolTrace, a model that displays data as flux maps and SolarPILOT, a comprehensive power tower optical-modeling tool, will be used to analyze different heliostat aiming strategies in 2017.

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December 7, 2016

Joseph Douglas, Compliance Project Manager
California Energy Commission
Siting, Transportation and Environmental Protection Division
1516 9th Street
Sacramento, CA 95814

Mike Ahrens
Authorized Officer
BLM, Needles Field Office
1303 U.S. Hwy 95 S.
Needles, CA 92363

RE: 2016 Update to Ivanpah Solar Electric Generating System Heliostat Positioning Plan

Dear Mr. Douglas and Mr. Ahrens:

The Ivanpah Solar Electric Generation System (ISEGS) is providing this letter to the California Energy Commission (CEC) and the Bureau of Land Management (BLM) in compliance with Condition of Certification TRANS-3 and the Monitoring Section of the approved Heliostat Positioning Plan (HPP) (HPP Section 6.0). The CEC approved the Final HPP on December 10, 2013. The BLM provided approval for the plan on June 13, 2013.

As required by TRANS-3, the HPP Section 6.0 provides for a monitoring plan that a) obtains field measurements in response to legitimate complaints; b) verifies that the Heliostat Positioning Plan would avoid the potential for human health and safety hazards including temporary or permanent blindness at locations of observers; and c) provides requirements and procedures to document, investigate and resolve legitimate complaints regarding glare. Furthermore, TRANS-3 requires that the monitoring plan should be coordinated with the FAA, U.S. Department of the Navy, CalTrans, CHP, and Clark County Department of Aviation in relation to the proposed Southern Nevada Supplemental Airport. The HPP is to be updated on an annual basis for the first 5 years, and at 2-year intervals thereafter for the life of the project. This letter provides an annual update to the monitoring plan as required by TRANS-3.

Previously, Sandia National Laboratories (Sandia) obtained ground-based measurements of glare on April 24, 2014. The established threshold level for glare is the "potential after image" as described in Section 2.1.1 and 2.2 and Figure 2-1 of the approved HPP. Ground-based measurements have not shown levels above this threshold. As a result, a report was submitted on December 8, 2014 that recommended removing the requirement for ground-based cameras to monitor for glare from the facility.

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Since no measurements obtained from the facility following the algorithm modification in July of 2014 have been above the threshold level as established in the approved HPP, no updates to the HPP are necessary in 2016, despite the two pilot reports received in an airspace that sees hundreds of thousands of flights annually. While ISEGS is constantly exploring potential enhancements to the operational algorithms, the approved HPP is working as intended. The facility will continue to remain in compliance with the requirements of the approved HPP.

The ISEGS facility continues to refine the positioning algorithms to reduce the potential for reports from aerial observers, in collaboration with the CEC, the BLM, the other agencies named in TRANS-3 as well as Dr. Clifford Ho and Sandia. Sandia, in cooperation and with the support of the ISEGS facility, was awarded a multi-year grant to develop revised positioning algorithms to decrease glare from the facility. These efforts commenced in 2016 and will be ongoing in 2017.

This report is provided specific to the annual HPP update as required by Section 6 of the monitoring plan per TRANS-3. ISEGS will provide a HPP annual compliance update in the Annual Compliance Report. ISEGS appreciates the continuing cooperation of the Commission staff. Please feel free to contact me directly should you have any questions.

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NRG Ivanpah Solar Electric Generating System
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Sincerely,

William R. Dusenbury
General Manager, Ivanpah Solar
100302 Yates Well Road
Nipton, CA 92364
Office: (702)558-1134

CC:

Federal Aviation Administration
FAA Southwest Regional Office
Obstruction Evaluation Service, AJR-32
2601 Meacham Boulevard
Fort Worth, TX 76137-0520
California:
Karen McDonald
karen.mcdonald@faa.gov
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Ivanpah Solar Electric Generating System

California Energy Commission (07-AFC-5C)
Bureau of Land Management
(CACA-48668, 49502, 49503, and 49504)
Condition of Certification TLSN-3

Summary of Inspection Results Along the Right-of-Way

January 1, 2016 – December 31, 2016
Reporting Period

January 6, 2017

Prepared by: Designated Biologist
(on behalf of Solar Partners I, II, VIII LLC's)

100302 Yates Well Road
Nipton, CA 92364`

Introduction

This report is submitted in accordance with condition of certification (COC) TLSN-3 of the California Energy Commission (CEC) Ivanpah Solar Electric Generating System (ISEGS) Commission Decision, which states "During the first 5 years of plant operation, the project owner shall provide a summary of inspection results and any fire prevention activities carried out along the rights-of-way and provide such summaries in the Annual Compliance Report provided to BLM's Authorized Officer and the CPM."

Summary

Infestations of weeds are a known fuel source for fires. Biological monitors conducted bi-monthly weed surveys per COC BIO-13 from February through November on perimeter fence lines, which includes the generation tie line. Data was collected when noxious weeds were located and the plants were collected for reporting and disposal.

Exhibit 10

Visual Resources
Conditions of Certification

Appendix X

Condition of Certification VIS-1

Surface Treatment of Project Structures and Buildings Status Report

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January 6, 2016

Mr. Joseph Douglas
Compliance Project Manager
California Energy Commission, Siting, Transportation and Environmental Protection Division
1516 9th Street
Sacramento, CA 95814

Mr. Michael Ahrens
Authorized Officer
Bureau of Land Management, Needles Field Office
1303 U.S. Hwy 95 S.
Needles, CA 92363

RE: Ivanpah Solar Electric Generating System (07-AFC-5C) Surface Treatment of Project Structures and Buildings Status Report to fulfill California Energy Commission Conditions of Certification, VIS-01

Dear Mr. Douglas and Mr. Ahrens,

In accordance with the requirements of Conditions of Certification VIS-01 of the Commission's approval of the Ivanpah Solar Electric Generating System, we are providing the following status report as a requirement in the Annual Compliance Report:

The permanent structures Administration Building and the Units 1, 2, & 3 Plant Services Buildings (PSB'S) are in good condition. No structural repairs or modifications were performed during the reporting period to Units 1, 2 or 3. Unit 2's Steam Turbine Generator Enclosure roof was temporarily removed to allow access for repairs to the generator. Following completion of repairs, the roof was replaced in its original condition. The Heliostat Assembly Building (HAB) sustained wind related damages to the material seams and has required repairs.

Maintenance for the Administration Building and Units 1, 2, & 3 (PSB'S) included bi-monthly HVAC service, quarterly and annual fire system inspections, and some minor door repairs. HAB maintenance and repairs have consisted of bi-monthly HVAC service, quarterly and annual fire system inspections, patching of torn tent seams, insulation replacement due to wind/rain damage, and strapping of tent panels to secure to frame structure during wind events.

Scheduled maintenance for structures and buildings for 2017 include bi-monthly HVAC service, quarterly and annual fire system inspections, and minor repairs as necessary. Continued repairs or replacement of panels and insulation on the HAB are being reviewed by a project development team, and a final decision on future maintenance will be made during 2017. Until a permanent solution is developed, repairs to seams and insulation will continue on an as needed basis.

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NRG Ivanpah Solar Electric Generating System
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Please feel free to contact me with any questions.

William Dusenbury

General Manager,
NRG Ivanpah Solar Electric Generating System
100302 Yates Well Road, Nipton, CA – 92364

CC: Doug Davis, NRG
Tim Sisk, NRG
Document Control Specialist – NRG.

Appendix Y

Condition of Certification VIS-2

Golf Course Landscape Screening Maintenance Activities Report

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NRG Ivanpah Solar Electric Generating System
100302 Yates Well Road, HCR1, Box 280 Nipton, CA 92364
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January 5, 2017

Mr. Joseph Douglas
Compliance Project Manager
California Energy Commission, Siting, Transportation and Environmental Protection Division
1516 9th Street
Sacramento, CA 95814

Mr. Michael Ahrens
Authorized Officer
Bureau of Land Management, Needles Field Office
1303 U.S. Hwy 95 S.
Needles, CA 92363

RE: Ivanpah Solar Electric Generating System (07-AFC-5C)
Golf Course Landscape Screening Maintenance Report, to fulfill California Energy Commission Conditions of Certification, VIS-2

Dear Mr. Douglas and Mr. Ahrens,

In accordance with the requirements of the Conditions of Certification VIS-2 of the Commission's approval of the Ivanpah Solar Electric Generating System, the project owner shall report landscape maintenance activities, including replacement of dead or dying vegetation, for the previous year of operation in each annual compliance report.

On September 16, 2015, Primm Valley Golf Club (PVGC) requested Solar Partners replace 24 plant materials, and proposed that they will assume responsibility for the maintenance and irrigation for these new plants and other plant materials that were previously installed at their property pursuant to the CSA. In this regard, ISEGS deemed that its responsibility under the requirement of Condition of Certification VIS-2 has been fully satisfied. Therefore, we are unable to provide information on the landscape maintenance activities, including replacement of dead or dying vegetation in this report, and will not be providing such information in future reports since PVGC will not provide this information to ISEGS; as they assumed full responsibility of the golf course landscape screening required under CEC Condition of Certification VIS-2.

Please feel free to contact me with any questions.

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NRG Ivanpah Solar Electric Generating System
100302 Yates Well Road, HCR1, Box 280 Nipton, CA 92364
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Thank you.

William Dusenbury

General Manager,
NRG Ivanpah Solar Electric Generating System
100302 Yates Well Road, Nipton, CA – 92364

CC: Doug Davis, NRG, Ivanpah
Tim Sisk, NRG
Document Control Specialist – NRG.

September 16, 2015

Solar Partners II, I & VIII, LLC
c/o Doug Davis
Ivanpah Solar Thermal Power Plant
100302 Yates Well Road, HCR1, Box 280
Nipton, CA 92364

Dear Solar Partners :

At our request, the Solar Partners Ivanpah Solar Thermal Power Plant project ("Ivanpah") prepared and implemented a perimeter landscape screening plan to reduce the visibility of the Ivanpah project as seen from our golf course. This plan and its purposes are described by the California Energy Commission ("CEC") in its Condition VIS-2 for Ivanpah. The purpose of the VIS-2 plan was to provide screening of the power project while retaining as much of the scenic portion of the overall views of Ivanpah Valley and Clark Mountains as feasible.

To implement CEC Condition VIS-2, Ivanpah entered into a Consulting Services Agreement with Par-3 Landscape and Maintenance, Inc., dated August 20, 2013 (the "CSA"). The CSA called for the installation of Modell Pines trees and hybrid Mexican Fan Palms. The trees were installed under the CSA, and the work completed in October of 2013.

As a result of our most recent meetings, Ivanpah has agreed to pay the replacement costs for twenty-two (22) trees: ten (10) Modell Pines trees and twelve (12) hybrid Mexican Fan Palms. The trees will be installed by PVGC, and Ivanpah will reimburse PVGC for the costs of installation.

As a result of these actions, PVGC believes that Ivanpah has fully satisfied the spirit and the letter of CEC Condition VIS-2, and we are satisfied with the result of Ivanpah's cooperative efforts. Accordingly, from this date forward, PVGC will assume responsibility for maintenance and irrigation of these new plantings as well as the other plantings made on our property pursuant to the CSA. No further action by ISEGS with respect to these plantings is required.

Sincerely,

Kam Brian
Chief Operating Officer
Par 4 Golf Management, Inc.

Exhibit 11

Waste Management

Conditions of Certification

Appendix Z

Condition of Certification WASTE-6

Operations Waste Management Plan Annual Report

OPERATIONS WASTE MANAGEMENT PLAN ANNUAL REPORT

In accordance with the requirements of the Conditions of Certification WASTE-6 of the Commission's approval of the Ivanpah Solar Electric Generating System (07-AFC-5C), the project owner shall also document in each Annual Compliance Report the following information:

- Actual volume of wastes generated, and the waste management methods used during the year.
- Provide a comparison of the actual waste generation and management methods used to those proposed in the original Operation Waste Management Plan.
- Update the Operation Waste Management Plan as necessary to address current waste generation and management practices.

Wastes at ISEGS are managed according to the Ivanpah Solar Electric Generating System, Environmental Procedures, and Operations Waste Management Plan. Wastes are classified according to California Code of Regulations (CCR) Title 22, Division 4.5, and Chapter 11. Starting in June 2016 Patriot Environmental Services (Patriot) replaced Veolia Environmental Services as ISEGS waste transporter. While Veolia remains a contractor, Patriot is the primary transporter of hazardous waste, and U.S. Ecology 12 miles south of Beatty Nevada is now the primary destination facility, with the exception of non-hazardous wastewater which is transported to Patriot Waste Water in Orange County, CA. Onsite records are maintained in the Environmental Specialists office and electronically on a centralized server. The Plan divides wastes into two streams. However for efficiency of disposal. both streams are mixed for transportation. *Tables 1 and 2* provide a comparison of the projected and actual waste streams from Operations and Maintenance respectively. *Table 3* lists the manifested wastes shipped from ISEGS during 2016.

Table 1: Waste Stream Summary - Operations Phase

Waste	Frequency	Projected Amount	Actual Amount	Notes
Oily water and oil-water separator sludge	Continuously	1,000 gal/year	980 gal	The majority of oily water came from rinsing down concrete from two lube oil releases, the remainder came from rinsing containers and miscellaneous equipment.
Waste oil	Continuously	750 gal/year	495 gal	Waste oil
Oily Debris	Continuously	2 tons/year	173,395 / 78.65 tons	Used rags and absorbents account for 1,125 lbs while hydrocarbon impacted soil accounts for 172,270 lbs (99%), of which only 550lbs are from what we consider routine pick up of contaminated soil from minor leaks.
Universal wastes (fluorescent light tubes, batteries, mercury-containing devices, electronic wastes, aerosol cans)	Continuously	500 lb/year	155 lb	Should remain well under 500 lb/yr. Primarily alkaline batteries with some lithium batteries, aerosols, and fluorescent tubes
Empty containers <55 gallons	Continuously	200 lb/year	0	No empty containers were shipped in 2016.
Empty containers > 5 gallons	Continuously	200 lb/year	0	We do not ship these
Municipal refuse and garbage	Continuously	50 CY/year	1,560 CY	Working on recycling program with vendor
Broken Mirrors with Lead Paint	Continuously	Unknown due to unanticipated breakage	227,580 lbs	Mirrors are divided into two categories those with RCRA levels of lead contamination and those with California only levels.

Table 2: Waste Stream Summary – Maintenance Activities

Waste	Frequency	Projected Amount	Actual Amount	Notes
Uncontaminated scrap metal, including equipment, machinery, piping	Infrequently	20 CY/year	0	Minor amounts of scrap metal were shipped but the weight has not been reported.
Uncontaminated soil and asphalt	Infrequently	10 CY/year	40 CY	A minor amount of asphalt was removed to expose a cable which experienced a grounding fault. This material was recycled at Apex in Las Vegas.
Waste paint and paint-related debris	Infrequently	25 lb/year	80 lbs	Used aerosol cans which would normally be shipped as universal waste had to be shipped
Waste maintenance chemicals (oils, greases, paints, etc.)	Infrequently	500 lb/year	0 lbs	Waste maintenance chemicals are captured in the waste oil and oily debris identified above as they are accumulated together.
Waste/spent corrosives	Infrequently	50 gal/year	20 lbs	Material was hypochlorite solids cleaned out from containment.
Water treatment resins	Infrequently	0 gal/year	0	Water treatment resins are recharged (recycled) and reused.
Lead-acid batteries	Infrequently	8 batteries/year	75 lbs	2 containers of batteries were shipped for recycle.
Decontamination wastewater (e.g., tank and sump emptying and cleaning)	Infrequently	2,000 gal/year	7,895 gal	295 gal of oily water from rinsing out containers. Remaining 7,600 gal is from pumping out non-hazardous process water from boiler feed pump skids.

In 2016, projected wastes and actual wastes differed slightly in certain areas, but are consistent in others. *Table 3* includes broken mirrors which account for the majority of Ivanpah's waste stream. Additionally, there are two releases from main Boiler Feed Pumps which resulted in greater amounts of oily dirt and debris as well as oily water due to clean up. These events are unanticipated and not likely to repeat due to measures put in place following the events. After 3 years of operation, the following list is the projected most common waste stream from both Operations and Maintenance;

- Universal Waste Fluorescent Tubes, Used for Recycling
- Non-RCRA Hazardous Waste Solid, (Oily Debris, Absorbents, and Rags)
- Non-RCRA Hazardous Waste Liquid, (Oily water, Waste Oil, Waste Lubricants, Glycol Water, Rinseate)
- UN3090 Lithium Battery, 9, II
- Batteries, Dry sealed n.o.s. (Alkaline Batteries, Universal Waste)
- Batteries Wet filled with acid, Electric Storage 8, III
- Hazardous Waste Solid, n.o.s. (Broken Glass, Lead Paint), 9, III

Due to the quantity of mirrors being shipped, Ivanpah became a Large Quantity Hazardous Waste Generator in 2016. ISEGS continues to refine procedures and maintenance activities and schedules, which affect the type and frequency of waste generation. For example, procedures have been put in place to reduce, or potentially eliminate the disposal of propylene glycol. Municipal wastes are being shipped offsite by Republic Services, and a contract to provide documented recycling services is currently anticipated for 2017.

Table 3 - 2016 HAZARDOUS WASTE SHIPMENT

Date Shipped	Profile #	Manifest #	Material	Waste Classification	Container		Total Quantity	Unit Wt. / Vol	Total Weight	Unit	Federal Waste Code	State Waste Code	Haz Waste Report Management Method Code	Manifest Signed By	Shipper / Transporter	Transporter US EPA ID No.	Receiving Facility	Receiving Facility US EPA ID No.
					No.	*Type*												
2/15/2016	814213	000890992 VES	NA3077, Broken Glass, Lead Paint, 9, III	RCRA Hazardous Waste Solid, n.o.s.	1	CM	25	Cu. Yard	30,580	Pounds	D008	181	H132	Tim Higdon	Veolia ES Technical Solutions	NJD080631369	US Ecology, Inc.	NVT330010000
2/16/2016	814213	000890998 VES	NA3077, Broken Glass, Lead Paint, 9, III	RCRA Hazardous Waste Solid, n.o.s.	1	CM	16	Cu. Yard	19,720	Pounds	D008	181	H132	Tim Higdon	Veolia ES Technical Solutions	NJD080631369	US Ecology, Inc.	NVT330010000
2/18/2016	814213	000890997 VES	NA3077, Broken Glass, Lead Paint, 9, III	RCRA Hazardous Waste Solid, n.o.s.	1	CM	18	Cu. Yard	13,820	Pounds	D008	181	H132	Tim Higdon	Veolia ES Technical Solutions	NJD080631369	US Ecology, Inc.	NVT330010000
2/19/2016	814213	000890993 VES	NA3077, Broken Glass, Lead Paint, 9, III	RCRA Hazardous Waste Solid, n.o.s.	1	CM	25	Cu. Yard	30,960	Pounds	D008	181	H132	Tim Higdon	Veolia ES Technical Solutions	NJD080631369	US Ecology, Inc.	NVT330010000
5/16/2016	814213	001036657 VES	NA3077, Broken Glass, Lead Paint, 9, III	RCRA Hazardous Waste Solid, n.o.s.	1	CM	20	Cu. Yard	18,740	Pounds	D008	181	H132	Tim Higdon	Veolia ES Technical Solutions	NJD080631369	US Ecology, Inc.	NVT330010000
5/17/2016	814213	001036658 VES	NA3077, Broken Glass, Lead Paint, 9, III	RCRA Hazardous Waste Solid, n.o.s.	1	CM	20	Cu. Yard	17,440	Pounds	D008	181	H132	Tim Higdon	Veolia ES Technical Solutions	NJD080631369	US Ecology, Inc.	NVT330010000
5/17/2016	750292	001109817 VES	Used Oil	Non-RCRA Hazardous Waste Liquid	1	DM	400	Pounds	400	Pounds	N/A	221	H061	Tim Higdon	Veolia ES Technical Solutions	NJD080631369	Veolia ES Technical Solutions	CAD008302903
5/17/2016	685835	001109817 VES	Propylene Glycol Water	Non RCRA Hazardous Waste, Liquid	1	DM	400	Pounds	400	Pounds	N/A	343	H020	Tim Higdon	Veolia ES Technical Solutions	NJD080631369	Veolia ES Technical Solutions	CAD008302903
5/17/2016	540413	001109817 VES	Waste Oil, Water	Non RCRA Hazardous Waste, Liquid	2	DM	800	Pounds	800	Pounds	N/A	221	H141	Tim Higdon	Veolia ES Technical Solutions	NJD080631369	Veolia ES Technical Solutions	CAD008302903
5/17/2016	750292	001109817 VES	Used Oil	Non-RCRA Hazardous Waste Liquid	4	DM	1,600	Pounds	1,600	Pounds	N/A	221	H061	Tim Higdon	Veolia ES Technical Solutions	NJD080631369	Veolia ES Technical Solutions	CAD008302903
5/17/2016	540405	001109817 VES	Absorbent Rags	Non-RCRA Hazardous Waste Solid	1	DM	2,250	Pounds	2,250	Pounds	N/A	352	H141	Tim Higdon	Veolia ES Technical Solutions	NJD080631369	Veolia ES Technical Solutions	CAD008302903
5/17/2016	720150	ZZ 00527450	UN2794 Batteries, Wet Filled with Acid, Electric Storage, 8 (Lead Acid Battery for Recycle)	Non RCRA Universal Waste	1	DF	30	Pounds	30	Pounds	N/A	N/A	H141	Tim Higdon	Veolia ES Technical Solutions	NJD080631369	Veolia ES Technical Solutions	CAD008302903
5/17/2016	720150	ZZ 00527450	UN2794 Batteries, Wet Filled with Acid, Electric Storage, 8 (Lead Acid Battery for Recycle)	Non RCRA Universal Waste	1	DF	45	Pounds	45	Pounds	N/A	N/A	H141	Tim Higdon	Veolia ES Technical Solutions	NJD080631369	Veolia ES Technical Solutions	CAD008302903
6/14/2016	070137710-31370	015770269 JJK	UN1791, Waste Hypochlorite Solutions 8, PG II	RCRA Hazardous Waste Liquid	1	DM	20	Pounds	20	Pounds	D002	122	H039	Tim Higdon	Patriot Environmental Services	CAD053866794	US Ecology, Inc.	NVT330010000
7/25/2016	814213	001036735 VES	NA3077, Broken Glass, Lead Paint, 9, III	RCRA Hazardous Waste Solid, n.o.s.	2	CM	15	Cu. Yard	12,040	Pounds	D008	181	H132	Tim Higdon	Veolia ES Technical Solutions	NJD080631369	US Ecology, Inc.	NVT330010000
8/9/2016	070242831	015770312 JJK	Soil Impacted with Lubricating Oil	Non-RCRA Hazardous Waste Solid	1	CM	20	Pounds	16,540	Pounds	N/A	181	H132	Tim Higdon	Patriot Environmental Services	CAD053866794	US Ecology, Inc.	NVT330010000
8/9/2016	070242831	015770314 JJK	Debris Impacted with Lubricating Oil	Non-RCRA Hazardous Waste Solid	1	CM	20	Pounds	980	Pounds	N/A	181	H132	Tim Higdon	Patriot Environmental Services	CAD053866794	US Ecology, Inc.	NVT330010000
8/10/2016	070242831	015770313 JJK	Soil Impacted with Lubricating Oil	Non-RCRA Hazardous Waste Solid	1	CM	20	Pounds	27,500	Pounds	N/A	181	H132	Tim Higdon	Patriot Environmental Services	CAD053866794	US Ecology, Inc.	NVT330010000
8/11/2016	070242831	015770307 JJK	Oily Rags Impacted with Lubricating Oil	Non-RCRA Hazardous Waste Solid	5	DM	275	Pounds	275	Pounds	N/A	181	H132	Tim Higdon	Patriot Environmental Services	CAD053866794	US Ecology, Inc.	NVT330010000
8/11/2016	070131570-31643	015770307 JJK	Oily Water	Non-RCRA Hazardous Waste Liquid	3	DM	165	Gallons	165	Gallons	N/A	223	H039	Tim Higdon	Patriot Environmental Services	CAD053866794	US Ecology, Inc.	NVT330010000
8/11/2016	070131570-31643	015770307 JJK	Used Lube Oil	Non-RCRA Hazardous Waste Liquid	3	DM	165	Gallons	165	Gallons	N/A	223	H039	Tim Higdon	Patriot Environmental Services	CAD053866794	US Ecology, Inc.	NVT330010000
8/11/2016	070131570-31643	015770307 JJK	Propylene Glycol and Water	Non-RCRA Hazardous Waste Liquid	1	DF	5	Gallons	5	Gallons	N/A	343	H039	Tim Higdon	Patriot Environmental Services	CAD053866794	US Ecology, Inc.	NVT330010000
8/11/2016	070242831	015770309 JJK	Absorbent Impacted with Lubricating Oil	Non-RCRA Hazardous Waste Solid	5	DM	275	Pounds	275	Pounds	N/A	181	H132	Tim Higdon	Patriot Environmental Services	CAD053866794	US Ecology, Inc.	NVT330010000
8/11/2016	070131570-31643	015770309 JJK	Rinseate Water Impacted with Lubricating Oil	Non-RCRA Hazardous Waste Liquid	5	DM	275	Gallons	275	Gallons	N/A	223	H039	Tim Higdon	Patriot Environmental Services	CAD053866794	US Ecology, Inc.	NVT330010000
9/22/2016	070242785	015770332 JJK	UN3175, Waste Solids Containing Flammable Liquid, n.o.s. 4.1, PG II	RCRA Hazardous Waste Solid, n.o.s.	1	DM	80	Pounds	80	Pounds	D001	181	H141	Tim Higdon	Patriot Environmental Services	CAD053866794	US Ecology, Inc.	NVT330010000
9/22/2016	070242831	015770374 JJK	Soil Impacted with Hydraulic Oil	Non-RCRA Hazardous Waste Solid	1	DM	550	Pounds	550	Pounds	N/A	181	H132	Tim Higdon	Patriot Environmental Services	CAD053866794	US Ecology, Inc.	NVT330010000
9/22/2016	070242831	015770374 JJK	Oily Rags and Debris	Non-RCRA Hazardous Waste Solid	6	DM	850	Pounds	850	Pounds	N/A	181	H132	Tim Higdon	Patriot Environmental Services	CAD053866794	US Ecology, Inc.	NVT330010000
9/22/2016	070131570-31643	015770374 JJK	Glycol Rinseate Water	Non-RCRA Hazardous Waste Liquid	1	DM	55	Gallons	55	Gallons	N/A	223	H039	Tim Higdon	Patriot Environmental Services	CAD053866794	US Ecology, Inc.	NVT330010000

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					No.	*Type*												
9/22/2016	070131570-31643	015770374 JJK	Used Hydraulic Oil	Non-RCRA Hazardous Waste Liquid	2	DM	110	Gallons	110	Gallons	N/A	223	H039	Tim Higdon	Patriot Environmental Services	CAD053866794	US Ecology, Inc.	NVT330010000
9/22/2016			Used Lithium Baterries	Universal Waste (for recycling)	1	DF	25	Pounds	25	Pounds	N/A	N/A	N/A	Tim Higdon	Patriot Environmental Services	CAD053866794	US Ecology, Inc.	NVT330010000
9/22/2016			Batteries, Dry, Sealed, n.o.s. (Alkaline Batteries)	Universal Waste (for recycling)	1	DF	60	Pounds	60	Pounds	N/A	N/A	N/A	Tim Higdon	Patriot Environmental Services	CAD053866794	US Ecology, Inc.	NVT330010000
9/22/2016			Batteries, Dry, Sealed, n.o.s. (Nickel Cadmium Dry Batteries)	Universal Waste (for recycling)	1	DF	90	Pounds	90	Pounds	N/A	N/A	N/A	Tim Higdon	Patriot Environmental Services	CAD053866794	US Ecology, Inc.	NVT330010000
9/22/2016			Fluorescent Tubes	Universal Waste (for recycling)	1	CF	30	Pounds	30	Pounds	N/A	N/A	N/A	Tim Higdon	Patriot Environmental Services	CAD053866794	US Ecology, Inc.	NVT330010000
9/28/2016	070131570-31643	015770371 JJK	Rinseate Water Impacted with Turbine Oil Oil	Non-RCRA Hazardous Waste Liquid	3	DM	75	Gallons	75	Gallons	N/A	223	H039	Tim Higdon	Patriot Environmental Services	CAD053866794	US Ecology, Inc.	NVT330010000
10/3/2016	070131570-31643	015770370 JJK	Water Impacted with Hydraulic Oil	Non-RCRA Hazardous Waste Liquid	1	TP	300	Gallons	300	Gallons	N/A	223	H039	Tim Higdon	Patriot Environmental Services	CAD053866794	US Ecology, Inc.	NVT330010000
10/4/2016	070242831	015770366 JJK	Soil Impacted with Hydraulic Oil	Non-RCRA Hazardous Waste Solid	1	CM	20	Cu. Yard	27,780	Pounds	N/A	181	H132	Tim Higdon	Patriot Environmental Services	CAD053866794	US Ecology, Inc.	NVT330010000
10/4/2016	070242831	015770367 JJK	Soil Impacted with Hydraulic Oil	Non-RCRA Hazardous Waste Solid	1	CM	20	Cu. Yard	31,080	Pounds	N/A	181	H132	Tim Higdon	Patriot Environmental Services	CAD053866794	US Ecology, Inc.	NVT330010000
10/4/2016	070242831	015770368 JJK	Soil Impacted with Hydraulic Oil	Non-RCRA Hazardous Waste Solid	1	CM	20	Cu. Yard	19,560	Pounds	N/A	181	H132	Tim Higdon	Patriot Environmental Services	CAD053866794	US Ecology, Inc.	NVT330010000
10/4/2016	070242831	015770369 JJK	Soil Impacted with Hydraulic Oil	Non-RCRA Hazardous Waste Solid	1	CM	20	Cu. Yard	21,380	Pounds	N/A	181	H132	Tim Higdon	Patriot Environmental Services	CAD053866794	US Ecology, Inc.	NVT330010000
10/7/2016	070242831	015770362 JJK	Soil Impacted with Hydraulic Oil	Non-RCRA Hazardous Waste Solid	1	CM	20	Pounds	15,980	Pounds	N/A	181	H132	Tim Higdon	Patriot Environmental Services	CAD053866794	US Ecology, Inc.	NVT330010000
11/1/2016	070242098-1	015766933 JJK	NA3077, Broken Glass, Lead Paint, 9, III	RCRA Hazardous Waste Solid, n.o.s.	1	CM	20	Cu. Yard	19,000	Pounds	D008	181	H132	Tim Higdon	Patriot Environmental Services	CAD053866794	US Ecology, Inc.	NVT330010000
11/1/2016	070242098-1	015766934 JJK	NA3077, Broken Glass, Lead Paint, 9, III	RCRA Hazardous Waste Solid, n.o.s.	1	CM	20	Cu. Yard	20,700	Pounds	D008	181	H132	Tim Higdon	Patriot Environmental Services	CAD053866794	US Ecology, Inc.	NVT330010000
11/10/2016	070242831	015770351 JJK	Soil Impacted with Hydraulic Oil	Non-RCRA Hazardous Waste Solid	17	DM	11,900	Pounds	11,900	Pounds	N/A	181	H132	Tim Higdon	Patriot Environmental Services	CAD053866794	US Ecology, Inc.	NVT330010000
11/10/2016	070242831	015770351 JJK	Absorbent Pads and Debris Impacted with Hydraulic Oil	Non-RCRA Hazardous Waste Solid	10	DM	1,500	Pounds	1,500	Pounds	N/A	181	H132	Tim Higdon	Patriot Environmental Services	CAD053866794	US Ecology, Inc.	NVT330010000
11/10/2016	070131570-31643	015770351 JJK	Oily Water Impacted with Hydraulic Oil	Non-RCRA Hazardous Waste Liquid	1	DM	55	Gallons	55	Gallons	N/A	223	H039	Tim Higdon	Patriot Environmental Services	CAD053866794	US Ecology, Inc.	NVT330010000
11/11/2016	070242098-1	015770430 JJK	NA3077, Broken Glass, Lead Paint, 9, III	RCRA Hazardous Waste Solid, n.o.s.	1	CM	20	Cu. Yard	24,200	Pounds	D008	181	H132	Tim Higdon	Patriot Environmental Services	CAD053866794	US Ecology, Inc.	NVT330010000
11/17/2016	070242098-1	015770352 JJK	NA3077, Broken Glass, Lead Paint, 9, III	RCRA Hazardous Waste Solid, n.o.s.	1	CM	20	Cu. Yard	20,380	Pounds	D008	181	H132	Tim Higdon	Patriot Environmental Services	CAD053866794	US Ecology, Inc.	NVT330010000