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APPENDIX A:
CURRENT AND PROPOSED BUREAU OF LAND MANAGEMENT
SOLAR ENERGY DEVELOPMENT POLICIES AND DESIGN FEATURES

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1 **APPENDIX A:**

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3 **CURRENT AND PROPOSED BUREAU OF LAND MANAGEMENT**
4 **SOLAR ENERGY DEVELOPMENT POLICIES AND DESIGN FEATURES**

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7 **A.1 CURRENT BLM SOLAR ENERGY DEVELOPMENT POLICIES**

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9 As of December 1, 2010, three solar energy development policies were being used
10 by the U.S. Department of the Interior (DOI) Bureau of Land Management (BLM) to process
11 solar right-of-way (ROW) applications. These policies are presented in Sections A.1.1 through
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1 A.1.1 Instruction Memorandum 2007-097, Solar Energy Development Policy
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UNITED STATES DEPARTMENT OF THE INTERIOR
Bureau of Land Management
Washington, D.C. 20240
<http://www.blm.gov>

April 4, 2007

In Reply Refer To:
2800 (350) P

EMS TRANSMISSION 04/11/2007
Instruction Memorandum No. 2007-097
Expires: 09/30/2009

To: All Field Officials
From: Director
Subject: Solar Energy Development Policy

Program Area: Rights-of-Way Management, Solar Energy
Facilities Management, Solar Energy

Purpose: This Instruction Memorandum (IM) establishes policy for the processing of right-of-way applications for solar energy development projects on public lands administered by the Bureau of Land Management (BLM) and evaluating the feasibility of installing solar energy systems on BLM administrative facilities and projects.

Policy/Action: This IM replaces the Solar Energy Development Policy (IM No. 2005-006), issued October 20, 2004. The BLM's general policy is to facilitate environmentally responsible commercial development of solar energy projects on public lands and to use solar energy systems on BLM facilities where feasible. Applications for commercial solar energy facilities will be processed as right-of-way authorizations under Title V of the Federal Land Policy and Management Act (FLPMA) and Title 43, Part 2804 of the Code of Federal Regulations (CFR). Commercial concentrating solar power (CSP) or photovoltaic (PV) electric generating facilities must comply with the BLM's planning, environmental and right-of-way application requirements, as do other similar commercial uses.

The BLM will evaluate the feasibility of installing PV systems on administrative facilities and on range improvement, resource monitoring, public safety, and recreation projects. Project planning and design should incorporate an appropriate analysis to determine the feasibility, cost and benefits of using PV systems. In June 2006, an Energy Savings Performance Contract was awarded to Johnson Controls, Inc. for the installation of energy efficiency technologies into BLM facilities. Phase II of the contract, expected to be awarded in May 2007, will include the installation of solar and other renewable energy technologies. Trent Duncan, BLM Utah State Office, at 801-539-4090 or Pat Fleming, BLM National Science and Technology Center, at 303-

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987-6856 can provide additional information on installing PV systems on BLM administrative facilities or for other project uses.

Inventory and Planning

The Department of Energy's National Renewable Energy Laboratory (NREL) has prepared solar insolation potential maps at the request of the BLM for Arizona, California, Nevada, and New Mexico. The maps identify areas with one percent or less slope with high levels of solar insolation that have potential for commercial solar energy development. Solar maps from NREL are available at <http://www.nrel.gov/csp/maps.html>.

New or updated BLM land use plans are required to consider NREL maps showing areas having commercial solar energy development potential. The land use plans or revisions should address potential impacts of solar energy development and related environment and local community issues. The land use plans should sufficiently analyze and consider the potential for solar energy development and the local environmental or community issues related to making lands available (or not available) for commercial solar energy development. When necessary, the land use plan amendment and the environmental analysis for the solar energy development proposal can be prepared and processed concurrently. This policy does not require updates for recently completed plans to include an analysis of solar energy development.

Right-of-Way Applications

Applications for commercial solar energy facilities, both PV and CSP, will be processed as right-of-way authorizations under Title V of the FLPMA and Title 43, Part 2804 of the CFR. Applications submitted to the BLM for commercial solar energy development projects will use Form SF-299, Application for Transportation and Utility Systems and Facilities on Federal Land, consistent with the requirements of 43 CFR 2804. No separate authorization is necessary if the installation of a PV system is part of another authorized facility or use. As an example, oil and gas operators may install PV facilities for operating metering equipment and lighting systems on their lease area as part of an approved oil and gas lease operation. In addition, oil and gas pipeline right-of-way authorizations would allow for the use of PV facilities at pump station locations. Those are valid uses that the BLM can encourage and allow.

Right-of-way applications for solar energy development projects will be identified as a high priority Field Office workload and will be processed in a timely manner. This priority is consistent with the President's National Energy Policy of 2001 and the Energy Policy Act of 2005. Adequate resources should be provided to review and process the application. The applicant must submit a complete and acceptable application and provide a cost recovery payment before the BLM will initiate processing of a right-of-way application. It is anticipated that most right-of-way applications for solar energy development will be Category 6, full cost recovery applications. The BLM will apply sound business practices in expediting the application process. For further information regarding the BLM ROW application process, please refer to the following BLM web site:
http://www.blm.gov/wo/st/en/prog/energy/cost_recovery_regulations.html.

The BLM authorized officer should schedule pre-application meetings with applicants (43 CFR 2804.10). This facilitates preparation and processing of applications that identifies potential issues and land use conflicts impacting the authorized officer's decision to grant or not grant the right-of-way authorization. The pre-application process will identify any environmental or cultural resource studies that may be needed, assess public interest and concerns, identify other authorized uses within or near the area, allow consideration of potential alternative site locations, and outline arrangements for paying the costs associated with processing a right-of-way grant.

Early public notification and involvement of local communities and other interests is also important in increasing public acceptance and avoiding potential conflicts, especially in areas where other uses exist on the public lands. The application process is pre-decisional and may or may not result in the BLM granting a right-of-way authorization.

A BLM State or Field Office right-of-way project manager will be assigned to process the application; ensure appropriate cost recovery; and monitor construction and use of the land for the authorized purpose. As an option, the BLM State Director may request assistance of a National Right-of-Way Project Manager from the BLM Washington Office (WO-350).

Solar energy right-of-way applications and authorizations are subject to appropriate cost recovery and rental payments required by 43 CFR 2804.14, 43 CFR 2805.16, and 43 CFR 2806.10, and the bonding requirements of 43 CFR 2805.12(g).

Right-of-Way Authorizations

A right-of-way grant (Form 2800-14) will be used to authorize all facilities held by the holder of the grant on the public lands related to a commercial solar energy development project. This authorization will include the solar collectors, tower, turbine generator, fossil fired generator for hybrid systems, thermal storage, access roads, electrical and transmission facilities, and other testing and support facilities. The lands involved in the right-of-way grant will be defined by aliquot legal land descriptions and be configured to minimize the amount of land involved.

The right-of-way authorization will contain appropriate stipulations relating to all aspects of project development including, but not limited to, road construction and maintenance, vegetation removal, natural, cultural and biological resources mitigation and monitoring, and site reclamation. In addition, an approved Plan of Development (POD) for construction and operation of the solar facility must be completed prior to beginning construction. When possible, the right-of-way authorization and POD can be processed simultaneously.

The right-of-way holder should be encouraged, through terms and conditions of the right-of-way authorization, to work with the BLM to increase public acceptance and awareness of the benefits of solar energy development by providing information and public viewing areas at safe locations near the development. The BLM and right-of-way holder can provide a positive message on the responsible use of renewable resources and the multiple resource use on public lands.

A bond will be required for solar energy development right-of-way grants to ensure compliance with the terms and conditions of the authorization and the requirements of the regulations, including reclamation. The reclamation provisions within the POD should include not only removal of solar collectors and other structures, but also the reclamation of access roads and disturbed areas. The amount of the bond will consider potential reclamation and administrative costs to the BLM.

The term length of the authorization is not limited by regulation; however, it should recognize the overall costs and useful life of solar energy facilities (43 CFR 2805.10(a)(3)). The term of the solar energy authorization for a commercial facility should not exceed the design life of the project, typically 30 years. The authorization may be renewed consistent with the provisions of the regulations (43 CFR 2807.22(a)). Other compatible uses may be authorized, but are unlikely due to the intensive use of the site for PV or CSP facility equipment.

The right-of-way grant may be assigned consistent with the provisions of the regulations (43 CFR 2807.21(b)). However, all assignments shall be approved by the BLM authorized officer and the qualifications of all assignees must comply with 43 CFR 2803.10 and the Due Diligence section of this IM and the requirements of the regulations (43 CFR 2807.21(c)(1) and 43 CFR 2807.21(d)). The assignment shall not interfere with the BLM's enforcement of the terms and conditions of the authorization or management of the associated public lands.

All final decisions issued by the authorized officer in connection to the authorization of solar energy projects can be appealed under 43 CFR part 4 and 43 CFR 2801.10. It should also be noted that right-of-way grants are issued as full force and effect decisions (43 CFR 2801.10(b)) and will remain effective during any appeal period.

Rental

All solar energy right-of-way authorizations are subject to rent in accordance with this IM, unless they are specifically exempt from rent by statute or regulation. Some holders or facilities may be exempt from rent pursuant to the Rural Electrification Act of 1936, as amended (43 CFR 2806.14(d)).

The holder of a right-of-way authorization shall pay an annual rent established by the BLM using real estate appraisals and reviews procured from the Department of the Interior, Appraisal Services Directorate. The rents paid will be in conformance with 43 CFR 2806.10(a). The appraisal should consider the value of the rights to be conveyed and the lease of comparable lands in an early or similar stage of potential development, e.g., commercial land or industrial land, as of the date of the appraisal. The procured appraisal and review report will be prepared on a site-specific basis and reflect market conditions for setting rental payments. Since the rental payment reflects the full use of the public land for solar facilities, similar to a lease for industrial purposes, there are no additional royalty payments for electric generation.

The appraisal assignment to estimate annual rental should also include a request to identify an appropriate rental index for updating the rental payment. The justification for the index should reflect normal market conditions for updating rental payments on similarly used land.

The rental payment will be phased in over a 3-year period to permit additional data collection that may be required after the approval of the grant, preparation and approval of a POD, and construction of the facility. The rent for the first year will be 25 percent of the BLM approved rent, 50 percent the second year, and 100 percent the third year.

Competitive Interest

Right-of-way applications for solar energy development will generally be accepted and processed on a first-come, first-serve basis. The right-of-way regulations (43 CFR 2804.23(c)) provide authority for offering public lands under competitive bidding procedures for solar energy right-of-way authorizations. The BLM will initiate a competitive process if a land use planning decision has specifically identified an area for competitive leasing. The BLM may also consider other public interest and technical factors in determining whether to offer lands for competitive leasing. Competitive bidding will follow the procedures required by 43 CFR 2804.23(c).

Due Diligence

The BLM will discourage applicants from holding right-of-way authorizations for purposes of speculating, controlling, or hindering development of solar energy on public lands. Speculative interest can be mitigated by ensuring the applicant meets qualification requirements of the regulations (43 CFR 2803.10(a-c)), and requiring certain due diligence provisions in the right-of-way authorization for solar energy development.

The regulations clearly provide authority to require that the application include information on the applicant's technical and financial capability to construct, operate, maintain and terminate the solar energy facilities (43 CFR 2803.10(b)). This technical capability can be demonstrated by obtaining the funding, designing, constructing or successfully operating an energy generating project. Actual ownership, development, or successful management of similar-sized electric energy-related facilities within the last 5 years by the applicant would generally constitute evidence of financial capability. The regulations provide the authority to deny the application if the applicant cannot demonstrate adequate technical ability to construct, operate, and maintain the solar energy facilities (43 CFR 2804.26(a)(5)). The BLM may also deny an application if the applicant does not provide, in a timely manner, additional information requested by BLM to process an application or the cost recovery funds required by 43 CFR 2804.14.

In addition, the solar energy development right-of-way grant shall include a due diligence requirement for installation of facilities consistent with an approved POD. If construction of solar energy facilities has not commenced within 3 years after the effective date of the grant, the right-of-way holder shall provide the BLM good cause as to the nature of any delay, evidence of progress toward beginning construction, and the anticipated date of start-up operations. Failure

of the holder to comply with the due diligence provisions of the solar energy development right-of-way grant provides the authorized officer the authority to terminate the authorization (43 CFR 2807.17).

Environmental Review

The scope of the environmental analysis required by the National Environmental Policy Act (NEPA) for a solar energy development project should address all aspects of the solar project, including direct, indirect, and cumulative effects of the proposed action.

The scope of the NEPA analysis and the compliance requirements with the Endangered Species Act, the Migratory Bird Treaty Act, the National Historic Preservation Act, and other laws for a solar energy development right-of-way application should address the installation and maintenance of solar collectors, water for steam generation and cooling purposes, oil or gas used by backup generators, thermal or electrical storage, turbines or engines, access roads and electrical inverters and transmission facilities. The scope and level of site clearance should include the areas of proposed surface disturbance and areas potentially affected by the project.

The level of NEPA analysis will be determined by project scoping and the anticipated potential impacts on the environment. The level of analysis will reflect the amount of land needed for the solar energy collection and associated support facilities, the amount of surface to be disturbed, water requirements, and potential impacts on wildlife and other resources. It may be possible to combine the required environmental review process for a solar energy development project with other required State or local environmental requirements. This would streamline the process and be consistent with Departmental policy on intergovernmental cooperation.

LR 2000 Data Entry

Commodity code 975 will be used to identify solar energy applications and authorizations in LR 2000, the BLM case recordation system. In addition, the data entry will also identify under the comment section whether the authorization is for a PV or CSP facility. This will allow the BLM to track and report solar energy activities on public land within LR 2000.

Timeframe: This policy is effective immediately.

Background: As part of an overall strategy to develop a diverse portfolio of domestic energy supplies for our future, the National Energy Policy of 2001 and the Energy Policy Act of 2005 (Public Law 109-58, August 8, 2005) encourage the development of renewable energy resources, which includes solar energy. Section 211 of the Energy Policy Act of 2005 encourages the approval of at least 10,000 megawatts (MW) of non-hydropower renewable energy projects on the public lands within the next 10 years.

Solar energy has significant potential in the western United States for converting the sun's light into electricity using technology that is rapidly improving. Solar energy currently accounts for

less than one percent of total U.S. electricity supply. As the cost of producing solar energy declines, there will be a greater interest in locating large solar power systems on public lands. Please refer to the attachment for additional information regarding PV and CSP solar systems.

Budget Impact: The application of this policy will have a minimal budget impact. Any land use planning associated with this policy will be part of existing planning efforts. Land use plans will take into account the solar mapping data described under the Inventory and Planning section of this IM. It is assumed that any solar energy commercial development will probably meet the criteria for full cost recovery. In addition, the BLM post authorization monitoring activities are subject to the cost recovery provisions of the regulations. These procedures will minimize any unnecessary budget and workload impacts.

Manual/Handbook Sections Affected: Manual 2801, Right-of-Way Management and Handbook H-2801-1. Land Use Planning Handbook H-1601-1.

Coordination: The Washington Office Planning, Assessment and Community Support Division (WO-210), the Property, Acquisition and Headquarters Services Division (WO-850), and the BLM State Offices were contacted to provide input on this policy prior to finalization.

Contact: Please direct any questions concerning the content of this IM to the Washington Office Division of Lands, Realty and Cadastral Survey, attention: Rick Stamm, at 202- 452-5185; or rick_stamm@blm.gov.

Signed by:
James M. Hughes
Acting, Director

Authenticated by:
Robert M. Williams
Division of IRM Governance,WO-560

1 Attachment
1-Solar Energy Systems (2 pp)

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A.1.2 Instruction Memorandum 2010-141, Solar Energy Interim Rental Policy



United States Department of the Interior
BUREAU OF LAND MANAGEMENT
Washington, D.C. 20240
<http://www.blm.gov>



In Reply Refer To: June 10, 2010
2800 (350) P

EMS TRANSMISSION 06/10/2010
Instruction Memorandum No. 2010-141
Expires: 09/30/2011

To: All Field Officials

From: Director *Robert Colby*

Subject: Solar Energy Interim Rental Policy

Program Area: Right-of-Way Management, Solar Energy

Purpose: This Instruction Memorandum (IM) provides updated guidance on the rental provisions of right-of-way authorizations for solar energy projects on public lands administered by the Bureau of Land Management (BLM).

Policy/Action: Applications for solar energy projects are processed as right-of-way authorizations under Title V of the Federal Land Policy and Management Act (FLPMA) and require the payment of rent in accordance with the requirements of Section 504(g) of FLPMA and the provisions of 43 CFR 2806. This IM establishes an Interim Policy for a solar energy rental schedule for solar energy right-of-way authorizations and replaces the rental provisions of the Solar Energy Development Policy (IM 2007-097) issued April 4, 2007. This Interim Policy will remain in effect until updated by further guidance. Issuance of this IM ensures BLM-wide consistency for solar energy right-of-way rental fees.

Rental Fees

The BLM will calculate rents on all solar energy right-of-way authorizations in accordance with this IM and the provisions of 43 CFR 2806. Some holders or facilities may be exempt from rent pursuant to the Rural Electrification Act of 1936 (REA), as amended (43 CFR 2806.14(d)). Electric facilities that are financed or are eligible for REA financing, qualify for a rent exemption under the provisions of the Act.

The holder of a solar energy right-of-way authorization must pay an annual rent in conformance with the regulations (43 CFR 2806.10(a)). Consistent with 43 CFR 2806.50, the BLM has developed a schedule to calculate rental fees for solar energy right-of-way authorizations. This rental schedule includes a base rent for the acreage of public land included within the solar

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energy right-of-way authorization and an additional megawatt (MW) capacity fee based on the total authorized MW capacity for the approved solar energy project on the public land administrated by the BLM.

As set forth below, the rental schedule for solar right-of-way authorizations will consist of two components: (1) a base rent to be paid upon issuance of the authorization, and (2) a MW capacity fee that will be implemented over a 5-year period once the facility begins generating electricity.

Base Rent

The BLM will calculate and bill the applicant a base rent to be paid upon the date of issuance of the right-of-way authorization consistent with the provisions of 43 CFR 2806.11. As calculated in conformance with the county rates set forth below, the base rent is a per-acre fee that will be charged, regardless of the stage of development or operations, on the entire public land acreage described in the right-of-way authorization.

The base rent will be paid on an annual basis, with no phase-in period. However, the BLM State Director may approve a rental payment plan for the first annual payment, consistent with the provisions of 43 CFR 2806.15(c). This payment plan for the first base rent payment is in response to the unique financing arrangements for some solar projects.

The BLM published regulations in 2008 that used land values published by the National Agricultural Statistics Service (NASS) to establish rental fees for linear right-of-way facilities on the public lands. Per-acre rental fees were established for every county in the U.S. based on the published NASS land values. The per-acre rental fees vary from county to county based on the different rural/agricultural land values in each county. The BLM used a 50 percent encumbrance factor of the land for linear types of rights-of-way to determine the annual rental fee. The BLM will use the same NASS data to establish the base rent for solar energy right-of-way authorizations; however, a 100 percent encumbrance factor will be used to reflect the high density land use common to solar energy projects. The encumbrance factor is a measure of the degree that a particular type of facility encumbers a right-of-way area or excludes other types of land uses. The 100 percent encumbrance factor for solar energy projects reflects the fact that a solar energy project is encumbering the entire right-of-way area to the exclusion of all other uses.

The BLM will adjust base rents for states and counties that are used for solar energy authorizations each year, based on the Implicit Price Deflator-Gross Domestic Product (IPD-GDP) index. The IPD-GDP index is also used to adjust the linear right-of-way rental fee each year (43 CFR 2806.22(a)). The BLM also periodically updates the schedule of county land values as new NASS data is published. The following is a list of the current calendar year (CY) 2010 solar energy base rental fee rates by state and county:

Arizona	CY 2010 Base Rent Fees
La Paz County	\$ 62.78 per acre
Maricopa County	\$188.34 per acre
Mohave County	\$ 31.38 per acre
Pima County	\$ 15.70 per acre

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Yuma County	\$313.88 per acre
Other counties	Double the linear right-of-way rental fee
California	CY 2010 Base Rent Fees
Imperial County	\$188.34 per acre
Kern County	\$ 94.16 per acre
Riverside County	\$313.88 per acre
San Bernardino County	\$125.56 per acre
Other counties	Double the linear right-of-way rental fee
Colorado	CY 2010 Base Rent Fees
Alamosa County	\$ 62.78 per acre
Conejos County	\$ 62.78 per acre
Saguache County	\$ 62.78 per acre
Other counties	Double the linear right-of-way rental fee
Nevada	CY 2010 Base Rent Fees
Clark County	\$188.34 per acre
Esmeralda County	\$ 62.78 per acre
Lincoln County	\$ 62.78 per acre
Mineral County	\$ 15.70 per acre
Nye County	\$ 62.78 per acre
Other counties	Double the linear right-of-way rental fee
New Mexico	CY 2010 Base Rent Fees
Dona Ana County	\$ 94.16 per acre
Hidalgo County	\$ 15.70 per acre
Luna County	\$ 15.70 per acre
Other counties	Double the linear right-of-way rental fee
Utah	CY 2010 Base Rent Fees
Beaver County	\$125.56 per acre
Iron County	\$ 62.78 per acre
Millard County	\$ 62.78 per acre
Other counties	Double the linear right-of-way rental fee

As an example, the base rent for a 4,000 acre solar energy right-of-way authorization in Clark County, Nevada, would be \$753,360 per year (4,000 acres x \$188.34 per acre).

Megawatt Capacity Fee

The BLM will charge a MW capacity fee in addition to the base rent for each solar energy right-of-way authorization. The MW capacity fee captures the increased industrial use value of the authorization, above the limited rural/agricultural land value captured by the base rent. The MW capacity fee will be calculated based on the total authorized MW capacity approved by the BLM

authorized officer for the project, or an approved phase of development. This capacity fee will be charged on an annual basis upon the start of generation of electricity from the facility.

To allow for a reasonable and diligent testing and operational period, the BLM will provide for a 5-year implementation of the MW capacity fee after the start of generation operations (at the rates of 20 percent the first year, 40 percent the second year, 60 percent the third year, 80 percent the fourth year, and 100 percent the fifth and subsequent years of operations). If generation of electricity starts from Phase 1 of a project, the MW capacity fee will be charged for the authorized MW capacity approved for Phase 1 only. The MW capacity fee for subsequent phases of development will start at the time that generation of electricity begins for the subsequent phases of development. The 5-year implementation of the MW capacity fee will apply to each phase of development after the start of generation operations from each phase. In moving from one phase of a project to the next phase, only incremental (newly added) capacity will be subject to the phase-in of the capacity fee. The phase-in does not apply to capacity previously installed.

Some solar energy development projects may include separate right-of-way authorizations issued for support facilities only (administration building, groundwater wells, construction lay down and staging areas, surface water management and control structures, etc.). The rental fee for these right-of-way authorizations would only use the base rent and not a MW capacity fee. Any separate right-of-way authorizations issued for linear right-of-way facilities (pipelines, roads, power lines, etc.) would use the rental fees established for linear rights-of-way (43 CFR 2806.20).

The MW capacity fee established by this IM is: \$5,256 per MW for photovoltaic (PV) solar projects; \$6,570 per MW for concentrated PV and concentrated solar power (parabolic trough, power tower and solar dish/engine) projects without storage capacity; and \$7,884 per MW for concentrated solar power projects with storage capacity of 3 hours or more. The difference in the MW capacity fee for PV solar projects, concentrated PV, and concentrated solar power projects is dependent on the differences in the efficiency or capacity factor of each technology. These technologies include PV technologies (20 percent efficiency factor), concentrated PV and concentrated solar power without storage capacity (25 percent efficiency factor), and concentrated solar power technologies with storage capacity of 3 hours or more (30 percent efficiency factor). The BLM will periodically review the efficiency factors for the various solar technologies and update the MW capacity fee to reflect improvements in technology.

The MW capacity fee is calculated using a formula that includes an average electricity price of \$0.06 per kilowatt hour and an average Federal bond yield of 5.0 percent. The Federal bond yield reflects the rate of return the public would expect for the use of Federal resources. The Federal bond yield is based on the 10-year average of the 20-year Treasury bond yield (as of March 2010). The formula for the MW capacity fee is as follows:

Photovoltaic: The MW capacity fee is \$5,256 per year, calculated as (authorized capacity on public land in MWs) x (8,760 hours per year) x (20 percent capacity factor) x (5.0 percent Federal bond yield) x (\$0.06 average price per kilowatt hour) x (1,000 kilowatts per MW) = \$5,256 per year for each MW of capacity.

Concentrated PV and concentrated solar power without storage: The MW capacity fee is \$6,570 per year, calculated as (authorized capacity on public land in MWs) x (8,760 hours per year) x (25 percent capacity factor) x (5.0 percent Federal bond yield) x (\$0.06 average price per kilowatt hour) x (1,000 kilowatts per MW) = \$6,570 per year for each MW of capacity.

Concentrated solar power with storage capacity of 3 hours or more: The MW capacity fee is \$7,884 per year, calculated as (authorized capacity on public land in MWs) x (8,760 hours per year) x (30 percent capacity factor) x (5.0 percent Federal bond yield) x (\$0.06 average price per kilowatt hour) x (1,000 kilowatts per MW) = \$7,884 per year for each MW of capacity.

As an example, the MW capacity fee for a 400-MW photovoltaic solar energy right-of-way authorization would be \$2,102,400 per year (400 MW x \$5,256 per MW), implemented over a 5-year period after start of generation. The MW capacity fee for a 400-MW concentrated PV or concentrated solar power right-of-way authorization without storage capacity would be \$2,628,000 per year (400 MW x \$6,570 per MW), implemented over a 5-year period after start of generation. The MW capacity fee for a 400-MW concentrated solar power right-of-way authorization with storage capacity of 3 hours would be \$3,153,600 per year (400 MW x \$7,884 per MW), implemented over a 5-year period after start of generation.

The payment of the MW capacity fee is in addition to the annual base rent for the acreage of the right-of-way authorization. The full base rent would be paid upon the date of issuance of the right-of-way authorization, and the MW capacity fee would be implemented over a 5-year period after the start of electricity generation from the facility.

Rent Language in Authorization

The BLM has included standard terms in right-of-way grants to provide for adjustments to both the base rent and the MW capacity fee when necessary to reflect changes in the fair market value of right-of-way authorizations. The following revised standard language will be included in all solar energy right-of-way authorizations to additionally provide for rent adjustments consistent with regulatory changes or provisions of new or revised statutory authorities:

“For and in consideration of the rights granted, the holder agrees to pay the Bureau of Land Management fair market value rental, which includes both base rent and a megawatt capacity fee, as determined by the authorized officer unless specifically exempted from such payment by regulation. Provided, however, that the rental may be adjusted by the authorized officer, whenever necessary, to reflect changes in the fair market rental value as determined by the application of sound business management principles, and as far as practicable and feasible, in accordance with comparable commercial practices. The rental provisions of this authorization may also be modified consistent with the provisions of any regulatory changes or pursuant to the provisions of any new or revised statutory authorities.”

consistent with the provisions of any regulatory changes or pursuant to the provisions of any new or revised statutory authorities.”

Timeframe: This policy is effective immediately. Pending solar energy right-of-way applications will be processed consistent with the provisions of this IM. The rental policy will periodically be reviewed to ensure that the base rent and MW capacity fee represent a fair return to the public.

Budget Impact: The application of this policy will have minimal budget impact. The processing of solar energy right-of-way applications are subject to the cost recovery provisions of the regulations (43 CFR 2804.14).

Background: As part of an overall strategy to develop a diverse portfolio of domestic energy supplies for our future, the Energy Policy Act of 2005 (Public Law 109-58, August 8, 2005) encourages the development of renewable energy resources on the public lands, including solar energy. Section 211 of the Energy Policy Act encourages the approval of at least 10,000 MW of non-hydropower renewable energy projects on the public lands by 2015. Secretarial Order 3285, signed by the Secretary on March 11, 2009, established the development of renewable energy as a priority of the Department of the Interior.

There is significant potential for the development of solar energy on the public lands in the southwestern states. The BLM has identified some 23 million acres of public lands with utility-scale solar energy potential and over 200 right-of-way applications have been submitted to the BLM for processing. As the cost of producing solar energy declines and as additional transmission capacity is developed, there will be an even greater interest in locating utility-scale solar energy projects on the public lands. This policy IM is necessary to ensure BLM-wide consistency in calculating rental fees for solar energy right-of-way authorizations on the public lands.

Manual/Handbook Sections Affected: This IM transmits interim policy that will be incorporated into BLM Manual 2801, Right-of-Way Management, and Handbook H-2801-1 during the next revision.

Coordination: The BLM State Offices reviewed and provided input to this policy prior to its finalization.

Contact: Please direct any questions concerning the content of this IM to Mike Nedd or your staff may contact Ray Brady, Renewable Energy Policy Team, at 202-912-7312, or ray_brady@blm.gov.

Robert V. Abbey
Director

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A.1.3 Instruction Memorandum 2011-003, Solar Energy Development Policy



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Instruction Memorandum No.
Expires: 09/30/2011

To: All Field Officials
From: Director
Subject: Solar Energy Development Policy

Program Area: Right-of-Way Management, Solar Energy.

Purpose: This Instruction Memorandum (IM) provides updated guidance on the processing of right-of-way applications and the administration of right-of-way authorizations for solar energy projects on public lands administered by the Bureau of Land Management (BLM).

Policy/Action: This IM updates the Solar Energy Development Policy (IM 2007-097) issued April 4, 2007. The BLM's policy is to facilitate environmentally responsible development of solar energy projects on the public lands, consistent with the provisions of Secretarial Order 3285A1 dated March 11, 2009, as amended February 22, 2010.

Applications for solar energy projects will be processed and authorized as rights-of-way under Title V of the Federal Land Policy and Management Act (FLPMA) and Title 43, Part 2800, of the Code of Federal Regulations (CFR). Utility-scale concentrating solar power or photovoltaic electric generating facilities must comply with the BLM's planning, environmental, and right-of-way application requirements.

This IM provides policy guidance on early coordination with Federal land managers and stakeholders, the term of solar energy right-of-way authorizations, diligent development requirements, bond coverage, Best Management Practices (BMPs), and BLM access to records. Issuance of this IM ensures effective BLM-wide consistency in the processing of right-of-way applications and the management of authorizations for solar energy development on the public lands.

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Early Coordination with Land Managers and Stakeholders

In order to enhance the consideration and protection of the resources and values associated with shared landscapes (including nearby county, state, tribal, or other Federal agency lands), state and field offices will coordinate and/or consult, as appropriate, with land managers and stakeholders that may be affected by the BLM's decision to grant a right-of-way authorization for a solar energy development project. Land managers and stakeholders include parties such as:

- Federal agencies (e.g., Bureau of Reclamation, Department of Defense, Fish and Wildlife Service, Forest Service, and National Park Service).
- Managers of adjacent or proximate BLM field offices and National Landscape Conservation System units.
- Tribal governments.
- State agencies (e.g., State Land Commission, State Parks, and State Fish and Game).
- County and local community stakeholders (e.g., county jurisdictions, managers of municipal watersheds and local parks).

Potentially affected Federal and state land managers will be provided the opportunity to participate in pre-application meetings with prospective project applicants.

Term of Authorization

In accordance with Title V of FLPMA and the BLM's right-of-way regulations, the term or length of a solar energy right-of-way authorization is limited to a reasonable term (43 U.S.C. 1764(b); 43 CFR 2805.11(b)). The regulations further articulate a number of factors the BLM considers in determining a reasonable term, including the overall costs and useful life of the projects. Most major right-of-way authorizations also include provisions for renewal of the authorization consistent with the provisions of the regulations (43 CFR 2805.15(d) and 2807.22).

Due to the substantial investments required for typical solar energy projects and the projected life of these facilities, it is prudent and in the public interest to provide for a term of solar energy right-of-way authorizations that will provide a reasonable period of time for construction, development, and continued operations. In addition, many Power Purchase Agreements (PPAs) for the purchase of electricity generated from a solar energy facility are for terms of 20 years or longer. The BLM will therefore issue all solar energy right-of-way authorizations for a term not to exceed 30 years. Thirty years provides a reasonable period consistent with the expected needs of a solar energy facility; it also provides for operation periods that are consistent with typical PPAs. The BLM will also include in each solar energy right-of-way authorization a specific provision allowing for renewal, consistent with the regulations at 43 CFR 2807.22.

Diligent Development

The right-of-way regulations set forth the qualifications that an individual, business, or government entity must possess in order to hold a right-of-way grant, including the requirement that the potential grantee be technically and financially able to construct, operate, maintain, and terminate the use of the public lands covered by the grant (43 CFR 2803.10(b) and 2804.12(a)(5)). In carrying out its obligation to limit right-of-way authorizations to qualified individuals or entities and to prevent such individuals or entities from holding right-of-way authorizations merely for purposes of speculating, controlling, or hindering development on the public lands, the BLM will focus on ensuring the applicant meets the qualification requirements in the regulations. In addition, the BLM will include provisions requiring diligent development in each solar energy right-of-way authorization.

In ensuring that an applicant meets the regulatory requirement to demonstrate its technical and financial capability to construct, operate, maintain, and terminate the proposed solar energy facility (43 CFR 2803.10(b) and 43 CFR 2804.12(a)(5)), the BLM will consider whether the applicant has a history of successfully designing, constructing, or obtaining the funding for a project generating electrical energy. Actual ownership, development, or management of a successful similarly-sized project generating electrical energy within the last 5 years by the applicant would generally constitute evidence of financial capability. Absent such showing, the BLM will ask the applicant to estimate the capital investment necessary to bring the facility on-line and explain how the applicant intends to finance the project. The BLM may confer with the Department of Energy to determine whether the applicant's estimates and business plan appear viable. If the applicant cannot demonstrate adequate technical or financial ability to construct, operate, maintain, and terminate the specific solar energy facility, the BLM is authorized to deny the application (43 CFR 2804.26(a)(3) and (5)). The BLM may also deny an application if the applicant does not provide in a timely manner additional information requested by the BLM authorized officer to process an application (43 CFR 2804.26(a)(6)) or the processing fees required by 43 CFR 2804.14.

The right-of-way regulations specify that a right-of-way grant conveys to the holder only the rights that the grant expressly contains (43 CFR 2805.14) and that the holder must comply with all terms and conditions included in the grant (43 CFR 2805.12). All solar energy right-of-way grants will include a provision that specifies that ground disturbing activities cannot begin until the BLM authorized officer issues a Notice to Proceed (43 CFR 2807.10). In order to facilitate efficient development of solar energy on the public lands, the BLM will also include a requirement in each right-of-way grant that the holder begin construction of the initial phase of development within 12 months after issuance of the Notice to Proceed, but no later than 24 months after the effective date of the right-of-way authorization. Each grant will also specify that construction must be completed within the timeframes in the approved Plan of Development, but no later than 24 months after start of construction unless the project has been approved for phased development as described below. A Notice to Proceed will be issued for each phase of development.

The BLM will not authorize more than three development phases for any solar energy right-of-way authorization. If an approved Plan of Development provides for phased development, the right-of-way grant will include provisions specifying that construction of each phase (following the first) must begin within 3 years of the start of construction of the previous phase.

The BLM authorized officer may suspend or terminate the authorization when the holder fails to comply with the diligent development terms and conditions of the authorization (43 CFR 2807.17). The regulations provide that before suspending or terminating the authorization, the BLM will send the holder a written notice that gives the holder a reasonable opportunity to correct any noncompliance or to start or resume use of the right-of-way (43 CFR 2807.18). This notice may be satisfied by the BLM sending a Notice of Failure to Ensure Diligent Development.

To address a failure to comply with a grant's diligent development provisions, the holder must show good cause for any delays in construction, provide the anticipated date of completion of construction and evidence of progress toward the start or resumption of construction, and submit a written request for extension of the timelines in the approved Plan of Development. Good cause may be shown, for example, by delays in equipment delivery, legal challenges, and acts of God. This procedure will apply whether a project has multiple development phases or a single phase.

If, following receipt of a Notice of Failure to Ensure Diligent Development, the holder has satisfactorily complied with each of the requirements of the procedure described above, the authorized officer may grant the holder's request for an extension of the timelines in the approved Plan of Development. If, following receipt of such Notice, the holder does not satisfactorily comply with each of the requirements of this procedure, the authorized officer may elect to suspend or terminate the right-of-way grant pursuant to 43 CFR 2807.17 where such action is justified.

Each right-of-way grant authorizing solar energy development will include terms and conditions requiring the holder to maintain all onsite electrical generation equipment and facilities in accordance with the design standards in the approved Plan of Development. In addition, the grant will specify that any idle, improperly functioning, or abandoned equipment or facilities that have been inoperative for any continuous period of 3 months must be repaired, placed into service, or removed from the site within 30 days from receipt of a written Notice of Failure to Ensure Diligent Development, unless the holder is provided an extension of time by the BLM authorized officer. Upon receipt of such Notice from the BLM authorized officer, the holder must timely repair, place into service, or remove the equipment or facilities described in the Notice. Alternatively, the holder must show good cause for any delays in repairs, use, or removal, estimate when corrective action will be completed, provide evidence of diligent operation of the equipment and/or facilities, and submit a written request for an extension of the 30-day deadline. If the holder satisfies neither approach, the BLM authorized officer may elect to suspend or terminate the authorization in accordance with 43 CFR 2807.17 – 2807.19 where such action is justified. In addition, the BLM may use the posted Performance and Reclamation bond to cover the costs for removal of any idle or abandoned equipment and/or facilities.

All solar energy right-of-way authorizations must include the diligent development provisions of this IM in the terms and conditions of the authorization, consistent with the requirements of 43 U.S.C. 1765(b) and the right-of-way regulations at 43 CFR 2801.2.

Performance and Reclamation Bond

Title V of FLPMA and the right-of-way regulations authorize the BLM to require a right-of-way holder to provide a bond to secure the obligations imposed by the right-of-way grant (43 U.S.C. 1764(i) and 43 CFR 2805.12(g)). The BLM will require a Performance and Reclamation bond for all solar energy projects to ensure compliance with the terms and conditions of the right-of-way authorization.

Acceptable bond instruments include cash, cashier's or certified check, certificate or book entry deposits, negotiable U.S. Treasury securities equal in value to the bond amount, surety bonds from the approved list of sureties (U.S. Treasury Circular 570) payable to the BLM, irrevocable letters of credit payable to the BLM issued by financial institutions that have the authority to issue letters of credit and whose operations are regulated and examined by a federal agency, or a policy of insurance that provides BLM with acceptable rights as a beneficiary and is issued by an insurance carrier that has the authority to issue insurance policies in the applicable jurisdiction and whose insurance operations are regulated and examined by a federal or state agency. The BLM will not accept a corporate guarantee as an acceptable form of bond. If a state regulatory authority requires a bond to cover some portion of environmental liabilities, such as hazardous material damages or releases, reclamation, or other requirements for the project, the BLM must be listed as an additionally named insured on the bond instrument. This inclusion would suffice to cover the BLM's exposure should a holder default in any environmental liability listed in the respective state bond. Each bond instrument will be reviewed by the appropriate Regional Solicitor for the Department of the Interior prior to its acceptance by the BLM.

The BLM authorized officer will review all bonds on an annual basis to ensure adequacy of the bond amount. The bond will also be reviewed at the time of any right-of-way assignment, amendment, or renewal. The BLM authorized officer may increase or decrease the bond amount at any time during the term of the right-of-way authorization, consistent with the regulations (43 CFR 2805.12(g)).

The BLM authorized officer will identify the total amount of the Performance and Reclamation bond in the decision that supports the issuance of the right-of-way authorization. The BLM will require the holder to post the portion of the bond associated with the activities to be approved by the Notice to Proceed prior to the issuance of that Notice. For example, if the Notice to Proceed is limited to an initial phase of development, the bond amount required to be posted before issuance of the Notice to Proceed will be limited to that phase. The bond amount required to be posted would increase with the issuance of a Notice to Proceed for future phases of the project.

The Performance and Reclamation bond will consist of three components for purposes of determining its amount. The first component will address environmental liabilities including hazardous materials liabilities, such as risks associated with hazardous waste and hazardous substances. This component may also account for herbicide use, petroleum-based fluids, and dust control or soil stabilization materials. If a holder uses herbicides extensively, this component of the bond amount may be significant. The second component will address the decommissioning, removal, and proper disposal, as appropriate, of improvements and facilities. All solar projects involve the construction of substantial surface facilities and the bond amount for this component could be substantial. The third component will address reclamation, revegetation, restoration, and

soil stabilization. This component will be determined based on the amount of vegetation retained onsite and the potential for flood events and downstream sedimentation from the site that may result in offsite impacts, including Clean Water Act violations or other violations of law. The holder of the right-of-way authorization can potentially reduce the bond amount for this component by limiting the amount of vegetation removal as part of the project design and limiting the amount of grading required for project construction.

Ultimately, the Performance and Reclamation bond will be a single instrument to cover all potential liabilities. The entire bond amount could be used to address a single risk event such as hazardous materials release or groundwater contamination regardless of the fact that in calculating the total bond amount other risks were also considered. If the bond is used to address a particular risk, the holder would then be required to increase the bond amount to compensate for this use. This approach to establishing a bond is preferable to one allowing holders to maintain separate bonds for each contingency. If separate bonds are held, an underestimation of one type of liability may leave the BLM responsible for making up the difference, as the funds associated with one bond may not be applicable for the purposes of another. Requiring a single, larger bond will ensure that the holders are bonded with a surety that has the capacity to underwrite the entire amount associated with the grant.

The regulations authorize the BLM to require that applicants submit a Decommissioning and Site Reclamation Plan (DSRP) that defines the reclamation, revegetation, restoration, and soil stabilization requirements for the project area as a component of their Plan of Development (43 CFR 2804.25(b)). The DSRP shall require expeditious reclamation of construction areas and the revegetation of disturbed areas to reduce invasive weed infestation and erosion and must be approved by the BLM authorized officer prior to the grant of the right-of-way. The approved DSRP will be used as the basis for determining the standard for reclamation, revegetation, restoration, and soil stabilization of the project area and, ultimately, in determining the full bond amount.

The BLM has issued policy guidance for determining bonding requirements for 43 CFR 3809 mining operations on the public lands (IM 2009-153, dated June 19, 2009) that provides detailed information about the process for determining the appropriate financial guarantees for intensive land uses on the public lands. This guidance can also be used to assist in calculating the bond amount for utility-scale solar energy development projects on public lands. The guidance requires that mining operators submit a Reclamation Cost Estimate (RCE) to the BLM authorized officer for review to assist in determining the bond amount. Although the right-of-way regulations do not specifically require that a holder of a right-of-way submit a RCE to the BLM, the BLM can require a right-of-way applicant to submit a Plan of Development in accordance with 43 CFR 2804.25(b). Because a RCE is key to determining the bond amount, a figure that is set forth in any decision authorizing a solar energy project on the public lands, BLM policy will be to require all solar energy right-of-way applicants to submit a RCE as part of the DSRP and the overall Plan of Development for a solar energy project. Attachment 1 to IM 2009-153 provides Guidelines for Reviewing Reclamation Cost Estimates and can be used as a guideline to assist in reviewing RCEs submitted for solar energy projects.

To assist in the consistent review of RCEs for solar energy projects and the establishment of bonding amounts for individual projects, the BLM will form a Solar Energy Bond Review Team to provide support to the BLM state and field offices. The Solar Energy Bond Review Team will consist of one representative each from California, Nevada, and Arizona and a BLM Washington Office Right-of-Way Project Manager. This Solar Energy Bond Review Team will assist the BLM state and field offices in the review of RCEs for solar energy projects and provide recommendations to the BLM authorized officer on the Performance and Reclamation bond for a solar energy project.

Best Management Practices

The BLM is currently preparing a Solar Energy Development Programmatic Environmental Impact Statement (PEIS) that will identify the impacts of solar energy development and potential BMPs that could mitigate or reduce adverse impacts from solar energy development on the public lands. A preliminary set of potential BMPs has been developed as part of the preparation of the PEIS and posted at <http://teamspace/sites/rmpnepadocs> for consideration by BLM field offices as they analyze individual projects. These potential BMPs are set forth in a document entitled BLM Draft Mitigation Measures (October 2009), which can be found at the above website under the Solar PEIS folder, BLM BMPs folder, and BLM Draft Mitigation Measures folder. This set of potential BMPs is not complete and will continue to be modified as comments are received and as relevant information is collected from the processing of site-specific solar energy projects. This collection of potential BMPs is intended to serve as an interim resource to BLM field offices until the PEIS is completed and a Record of Decision has been issued.

The BLM Draft Mitigation Measures (October 2009) document also identifies a preliminary list of project-specific plans that will be required for each solar energy project and provides a brief description of the components of each plan. Many of the mitigation measures required for a project would be addressed within these project-specific plans. Examples of some of these plans include the Decommissioning and Site Reclamation Plan; Grading, Drainage, Erosion and Sedimentation Control Plan; Vegetation Management Plan; Habitat Restoration and Management Plan; Hazardous Materials Management Plan; Cultural Resources Management and Mitigation Plan; and Visual Restoration Monitoring and Compliance Plan. These plans are an essential part of a Plan of Development, which the BLM will require of an applicant (43 CFR 2804.25(b)). The terms and conditions of each right-of-way grant shall require that these plans be included in a Plan of Development and that the holder will fully comply with the terms of the plans. It is anticipated that additional plans will be identified as comments are received and as information is collected from the processing of individual solar energy projects.

BLM Access to Records

The BLM may require the holder of a solar energy development right-of-way authorization to provide any pertinent environmental, technical, and financial records, reports, and other information, including Power Purchase and Interconnection Agreements, related to project construction, operation, maintenance, and decommissioning, including the production and sale of electricity generated from the approved facilities on public land (43 CFR 2805.12(p); 43 U.S.C. 1765(b); 43 U.S.C. 1764(g); 43 U.S.C. 1761(b)). The BLM may use this information for the

purpose of monitoring the authorization and for periodic evaluation and adjustment of rental fees or other financial obligations under the authorization.

Upon the request of the BLM authorized officer, the appropriate records, reports, or information shall be made available for inspection and duplication by such officer. Any information marked confidential or proprietary will be kept confidential to the extent allowed by law. Failure to cooperate with such request, provide data, or grant access to information or records, may, at the discretion of the BLM authorized officer, result in suspension or termination of the right-of-way authorization. All solar energy right-of-way authorizations must include such disclosure provisions in the terms and conditions of the authorization in accordance with the regulations (43 CFR 2807.17).

Timeframe: This policy is effective immediately. Pending applications will be processed consistent with the provisions of this IM.

Budget Impact: The application of this policy will have minimal budget impact. The processing of solar energy right-of-way applications are subject to the processing fee provisions of the regulations (43 CFR 2804.14).

Background: As part of an overall strategy to develop a diverse portfolio of domestic energy supplies for our future, the Energy Policy Act of 2005 (Public Law 109-58, August 8, 2005) encourages the development of renewable energy resources on the public lands, including solar energy. Section 211 of the Energy Policy Act encourages approval of non-hydropower renewable energy projects of at least 10,000 megawatts on the public lands by 2015. Secretarial Order 3285A1, signed on March 11, 2009, and amended on February 22, 2010, established the development of renewable energy as a priority of the Department of the Interior.

There is significant potential for the development of solar energy on the public lands in the southwestern states. The BLM has identified some 23 million acres of the public lands with utility-scale solar energy potential, and over 200 right-of-way applications have been submitted to the BLM for processing. As the cost of producing solar energy declines in future years, and as additional transmission capacity is developed, there will be an even greater interest in locating utility-scale solar energy projects on the public lands. This policy IM helps ensure environmentally-responsible development of solar projects on public lands and provides for effective processing of the right-of-way applications.

Manual/Handbook Sections Affected: This IM transmits interim policy that will be incorporated into BLM Manual 2801, Right-of-Way Management, and Handbook H-2801-1 during the next revision.

Coordination: The BLM state offices reviewed and provided input to this policy prior to its finalization.

Contact: If you have questions, please contact Michael Nedd, Assistant Director for Minerals and Realty Management, at 202-208-4201, or your staff may contact Ray Brady, Renewable Energy Policy Team, at 202-912-7312, or ray_brady@blm.gov.

A handwritten signature in black ink, appearing to read "Robert C. Kelley". The signature is written in a cursive style with a large initial "R".

1 **A.2 BLM PROPOSED SOLAR ENERGY PROGRAM**

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4 **A.2.1 Proposed Solar Energy Development Policies**

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7 **A.2.1.1 Proposed Administration Policies**

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9 The BLM is directed to facilitate environmentally responsible development of solar
10 energy projects on the public lands, consistent with the provisions of Secretarial Order 3285A1
11 dated March 11, 2009, as amended February 22, 2010. Applications for solar energy projects
12 will be processed and authorized as ROWs under Title V of the Federal Land Policy and
13 Management Act (FLPMA) and Title 43, Part 2800, of the *Code of Federal Regulations*
14 (43 CFR Part 2800). Utility-scale concentrating solar power facilities or photovoltaic electric
15 generating facilities must comply with the BLM's Solar Energy Program, including all planning,
16 environmental, and ROW application requirements.

- 17
18 • As a land management agency with a multiple-use mission, the BLM will
19 make land use decisions that sustain the health and productivity of public
20 lands for the use and enjoyment of present and future generations. While solar
21 energy development can provide many environmental and economic benefits,
22 the BLM recognizes that such development must also be consistent with
23 protection of other important resources and values, including units of the
24 National Park System (NPS); national wildlife refuges; other specially
25 designated areas; wildlife; and cultural, historic, and paleontological values. In
26 making its decisions, the BLM will implement sound environmental policies,
27 procedures, and siting and mitigation strategies that include coordination and
28 consultation, as appropriate, with other potentially affected land and natural
29 resource managers (both federal and non-federal) aimed at protecting our
30 natural and cultural heritage, including the values and resources of specially
31 designated areas.
- 32
- 33 • BLM authorized officers are encouraged to meet with their U.S. Fish and
34 Wildlife Service (USFWS), NPS, and other local land and natural resource
35 managing agency counterparts to develop an effective, streamlined
36 coordination protocol that addresses local issues and conditions. The agreed-
37 upon protocol may be incorporated into a Memorandum of Understanding.
- 38
- 39 • The BLM, recognizing that data regarding the actual impacts of solar energy
40 development on various resources are still limited, will require the
41 development and implementation of an adaptive management plan to ensure
42 that new data and lessons learned about the impacts of solar energy projects
43 will be reviewed and, as appropriate, incorporated into the Solar Energy
44 Program. The adaptive management plan, to be coordinated with potentially-
45 affected natural resource management agencies, will identify how the impacts
46 of the Solar Energy Program will be evaluated; types of monitoring that would

1 be responsive to the data needs for program evaluation; science-based
2 thresholds for modification to policy or individual project management based
3 upon monitoring results; and a description of the process by which changes
4 will be incorporated into the Solar Energy Program, including revisions to
5 policies and design features. Sources of information to be considered in the
6 context of adaptive management include data from specific project
7 evaluations (for which monitoring would be required) as well as from project-
8 specific and regional long-term monitoring programs. Changes to the BLM's
9 Solar Energy Program will be subject to appropriate environmental analysis
10 and land use planning.

- 11
- 12 • The BLM may offer lands within solar energy zones (SEZs) for competitive
13 ROW authorizations on its own motion or as a result of nominations by the
14 public.
- 15
- 16 • If lands within SEZs are not offered competitively, solar energy development
17 applications for such lands will receive priority processing over other solar
18 energy development applications.
- 19
- 20 • The BLM will discourage applicants from filing ROW applications for the
21 purpose of speculating, controlling, or hindering development of solar energy
22 on public lands.
- 23
- 24 • The BLM will assign all utility-scale solar energy development applications to
25 Processing Category 6.
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- 27 • The BLM will assign all utility-scale solar energy development authorizations
28 to Monitoring Category 6.
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31 **A.2.1.2 Proposed Authorization Policies**

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33 The BLM proposes to adopt the following authorization policies, to be applicable to all
34 future and existing ROW applications, as part of its proposed Solar Energy Program:
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37 ***A.2.1.2.1 Pre-application Meeting***

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- 39 • The BLM authorized officer will schedule a pre-application meeting with
40 developers to explain BLM's Solar Energy Program and to identify potential
41 issues and land use conflicts (43 CFR 2804.10). The BLM will include
42 potentially affected federal and state land managers, including USFWS and
43 NPS representatives, to participate in such pre-application meetings with
44 prospective project applicants. On the basis of these preliminary discussions
45 and the recommendations of affected federal and state land managers, the
46 BLM authorized officer may recommend that an application not be filed for a

1 given action or that a proposed project be modified from its original form
2 prior to submission of an application. Proposals that avoid impacts to
3 resources and values that are the basis for special designations or protections
4 will be given strong consideration.
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7 ***A.2.1.2.2 Application Analysis and Sufficiency*** 8

- 9 • The BLM will review applications for land use plan conformance
10 (43 CFR 1610.5-3). To be considered further, applications must conform
11 to the existing land use plan as amended by the Solar Programmatic
12 Environmental Impact Statement (PEIS), including all solar ROW exclusions
13 identified in Table 2.2-2.
14
- 15 • Entities seeking to develop a solar energy project on BLM-administered
16 lands shall coordinate with potentially affected/appropriate federal agencies
17 (e.g., USFWS, NPS), in conjunction with BLM staff, regarding specific
18 projects as early in the project development process as appropriate to ensure
19 that all issues and concerns (e.g., Migratory Bird Treaty Act [MBTA], Bald
20 and Golden Eagle Protection Act [BGEPA], potential impacts on National
21 Park resources) are identified and to ensure that there is potential for those
22 issues to be adequately addressed.
23
- 24 • Entities seeking to develop a solar energy project on BLM-administered
25 lands shall also coordinate with the U.S. Department of Defense (DoD), in
26 conjunction with BLM staff, regarding the location of solar power tower
27 projects early in the application process. This coordination shall occur
28 concurrently at both the installation/field level and the Pentagon/BLM
29 Washington Office level. An interagency protocol will be developed to
30 establish a coordination process and the scope of issues to be addressed by
31 such coordination.
32
- 33 • Entities seeking to develop a solar energy project on BLM-administered lands
34 shall coordinate with appropriate state agencies and local land managers, in
35 conjunction with BLM staff, regarding specific projects as early in the project
36 development process as appropriate to ensure that all issues and concerns are
37 identified and that there is potential for those issues to be adequately
38 addressed.
39
- 40 • Entities seeking to develop a solar energy project on BLM-administered lands
41 shall contact any potentially affected grazing permittee/lessee, in conjunction
42 with BLM staff, to discuss potential impacts of the proposal, possible
43 alternatives that could be addressed in scoping for the National Environmental
44 Policy Act (NEPA), and potential mitigation and compensation strategies.
45

- 1 • Entities seeking to develop a solar energy project on BLM-administered
2 lands shall contact the owner of any federal mining claim located with the
3 boundaries of the proposed solar energy project, in conjunction with BLM
4 staff, to ensure that there is a potential for resolving any conflicts with federal
5 mining claims.
6
- 7 • The BLM will determine whether the lands included in the proposed solar
8 energy project should be segregated from appropriation under the public land
9 laws, including the mining laws, while the solar energy application is being
10 considered by the BLM for authorization.
11
- 12 • On the basis of the analysis of the application and the necessary coordination
13 described above, the BLM can exercise its discretion to deny an application
14 that it finds to be inappropriate for solar ROW uses (43 CFR 2802.10(3)) or to
15 be insufficient under any section of the ROW regulations. Projects that will
16 cause unacceptable impacts to important resources and values will be denied.
17 The denial of an application is an appealable decision. Offices must develop a
18 rationale and record to support their decision to deny an application. Although
19 they do not form a comprehensive list of items for consideration, the
20 following items must be considered in the analysis of applications:
21
 - 22 – At the time a ROW application is submitted, the BLM will review the best
23 available landscape-scale information (including information developed
24 through complete or ongoing landscape conservation cooperatives [LCCs],
25 partnerships, and rapid ecological assessments [REAs]) and will determine
26 whether areas proposed for solar ROW uses and/or associated
27 transmission facilities are inconsistent with other high-priority
28 conservation, restoration, and/or adaptation objectives.
29
 - 30 – The extent to which the proposal will result in impacts to open space,
31 particularly large and/or regionally important, undisturbed tracts. In
32 general, proposals that utilize previously disturbed areas or areas that
33 otherwise lack important open-space values will be given strong
34 consideration.
35
 - 36 – The extent to which the proposal will result in impacts on areas of critical
37 environmental concern (ACECs) and other special areas or sensitive
38 cultural, recreational, wildlife, or visual resources, including special areas
39 and resources administered by other agencies or organizations. In general,
40 proposals that avoid impacts on resources that are the basis for special
41 designations (e.g., National Parks and Monuments) will be given strong
42 consideration.
43
 - 44 – The extent to which the proposal will result in impacts to high priority
45 landscape features or focal areas important for conservation, restoration,

1 and/or adaptation to climate change, including core areas, corridors, and
2 buffers for vulnerable species.

3
4 – The extent to which the proposal will result in impacts on mitigation lands
5 identified in previously approved projects, including those lands onto
6 which plants or wildlife are translocated and any lands that are restored or
7 managed more intensively to mitigate project impacts.

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9 – The extent to which the proposal will result in impacts to lands donated or
10 acquired for conservation purposes. Applicants will be advised to avoid
11 these lands or provide details on how they would plan to operate or
12 mitigate their project in a manner consistent with the values of the lands
13 donated or acquired for conservation purposes

14
15 • The BLM may consider proposed solar energy projects in areas with potential
16 wilderness characteristics or in areas of citizen-proposed wilderness. Where
17 these lands have not previously been inventoried, or where the BLM
18 determines that the inventory should be updated, then, as part of the
19 environmental review for proposed solar energy projects, these lands will be
20 inventoried for wilderness characteristics. If an inventory determines that the
21 lands have wilderness characteristics, then, consistent with applicable policy,
22 the BLM shall consider whether to initiate a land use plan amendment process
23 to determine how these lands should be managed. After completing the
24 inventory process, if the BLM determines that wilderness characteristics are
25 not present, it may proceed to process the proposed solar energy project
26 consistent with applicable policy.

27
28 • The BLM will review the lands for sensitive resources and resource uses
29 (e.g., paleontological, Endangered Species Act [ESA] listed, and BLM
30 sensitive status species) and for potentially affected resources and values
31 under the administration of other agencies (NPS, etc.). Assessment of the
32 resources will include coordinating with appropriate federal, state, and local
33 agencies that have regulatory authority for such resources. Coordination with
34 the NPS may include a determination by the NPS as to whether a proposed
35 project has the potential to cause unacceptable impacts to the resources and
36 values of NPS-administered areas. (See recommendation to establish a local
37 coordination protocol in Administration Policies above.)

38
39 • The BLM will consider the visual resource values of the public lands that
40 could be affected by proposed solar energy development projects, consistent
41 with BLM visual resource management (VRM) policies and guidance. The
42 BLM will also coordinate with other potentially affected land managing
43 agencies (including the NPS) regarding potential impacts to visual resources
44 within shared viewsheds.

45

- 1 • To enhance the consideration and protection of the resources and values
2 associated with shared landscapes (including nearby county, state, Tribal,
3 or other federal agency lands, such as NPS lands), the BLM will coordinate
4 and/or consult, as appropriate, with stakeholders who may be adversely
5 affected by the BLM’s decision to issue a ROW authorization for a solar
6 energy development project. Potentially affected federal and state land
7 managers will be provided the opportunity to participate in pre-application
8 meetings with prospective project applicants (see Pre-application Meeting
9 section above).
- 10
- 11 • The BLM will review applications to determine if the applicant can
12 demonstrate adequate financial and technical capability to construct,
13 operate, and maintain the solar energy facilities.
- 14
- 15 • The BLM will review applications to determine completeness. If necessary,
16 the applicant will provide, in a timely manner, additional information
17 requested by the BLM to process an application.
- 18
- 19 • Applicants will be required to submit an initial processing fee deposit and
20 enter into a formal cost recovery agreement with the BLM for each solar
21 energy ROW application filed. The applicant will provide, in a timely manner,
22 the required processing fees.
- 23
- 24

25 ***A.2.1.2.3 NEPA Analysis and Compliance with Other Laws and Regulations***
26 ***for Proposed Projects***

- 27
- 28 • Applicants for solar energy development on BLM-administered lands shall
29 develop a BLM-approved plan of development (POD) that incorporates the
30 required programmatic design features and SEZ-specific design features
31 established in the BLM’s Solar Energy Program and, as appropriate, the
32 requirements of other existing and relevant BLM mitigation guidance,
33 approved land use plans, and current policies. The POD must address all
34 components of a solar energy generation facility, including the installation
35 and maintenance of solar collectors, water for steam generation and cooling
36 purposes, oil or gas used by backup generators, thermal or electrical storage,
37 turbines or engines, access roads, and electrical inverters and transmission
38 facilities.
- 39
- 40 • Management goals and objectives for special status species (such as the sage-
41 grouse and desert tortoise) that the BLM has identified in land use plans or
42 goals and objectives substantiated by best available information or science
43 shall be incorporated into the POD for proposed solar energy projects.
- 44
- 45 • Individual projects will incorporate adaptive management strategies to ensure
46 that potential adverse impacts of solar energy development are avoided,

1 minimized, or mitigated to acceptable levels. Operators will be required to
2 develop monitoring programs in coordination with the BLM, to establish
3 metrics against which monitoring observations can be measured, to identify
4 additional potential mitigation measures, and to establish protocols for
5 incorporating monitoring observations and additional mitigation measures
6 into standard operating procedures and project-specific stipulations.
7

- 8 • The BLM must complete an environmental review of solar energy ROW
9 applications in accordance with NEPA prior to issuing a ROW authorization.
10 The coordination and considerations discussed above will also be an integral
11 part of the necessary NEPA analysis. The level of environmental analysis to
12 be required under NEPA will be determined at the field office level on an
13 individual project basis. To the extent that land use plans and/or this PEIS
14 anticipate issues and concerns associated with individual projects, including
15 potential cumulative impacts, the BLM will tier from land use plans and/or
16 the PEIS analysis, thereby limiting the required scope and effort of additional
17 project-specific NEPA analysis. For projects that are proposed in SEZs, only
18 limited additional NEPA analysis may be necessary because of the depth of
19 the analysis contained in the PEIS. Potentially affected federal, state, local,
20 and Tribal land managers and government agencies should be invited to
21 participate as cooperating agencies in BLM's site-specific NEPA processes
22 for solar ROW applications.
23
- 24 • The BLM will conduct project-specific public involvement prior to issuing a
25 ROW authorization for solar energy development to ensure that all concerns
26 and issues are identified and adequately addressed. Public involvement may
27 occur as part of the NEPA process or separately, depending on the type of
28 NEPA analysis undertaken. Opportunities for public involvement include, but
29 are not limited to, scoping, public meetings, and public review and comment
30 on completed NEPA documentation.
31
- 32 • The BLM will initiate government-to-government consultation with Indian
33 Tribal governments whose interests might be directly and substantially
34 affected by activities on BLM-administered lands and as required under
35 Section 106 of the National Historic Preservation Act of 1966 (NHPA) as
36 early in the project development process as appropriate to ensure that
37 construction, operation, and decommissioning issues and concerns are
38 identified and adequately addressed.
39
- 40 • The BLM will consult with the appropriate State Historic Preservation
41 Officer(s) (SHPOs) and the Advisory Council of Historic Preservation, as
42 required by Section 106 of NHPA.
43
- 44 • When lands are identified for project mitigation, the BLM will consider
45 amending the applicable land use plan to identify those lands as ROW
46 exclusion areas. Examples of project mitigation lands may include, but are not

1 limited to, lands onto which plants or wildlife are translocated and any lands
2 that are restored or managed more intensively to mitigate project impacts.

- 3
- 4 • The BLM will determine if the proposed action may affect any listed or
5 proposed threatened or endangered species or critical habitat. If so, the
6 authorized officer would comply with Section 7 of the ESA.
7
- 8 • On the basis of the required NEPA analysis and public process, the BLM may
9 decide to deny an application for a solar ROW authorization.
10

11 ***A.2.1.2.4 ROW Authorization***

- 12
- 13
- 14 • Utility-scale solar energy projects will be authorized as ROW authorizations
15 under Title V of the Federal Land Policy and Management Act and
16 43 CFR Part 2800.
17
- 18 • The BLM will issue all solar energy ROW authorizations for a term not to
19 exceed 30 years; shorter terms may be justified in some cases. Each solar
20 energy ROW authorization will contain a specific provision allowing for
21 renewal, consistent with the regulations.
22
- 23 • All solar energy ROW authorizations will be issued subject to valid existing
24 rights.
25
- 26 • The BLM will require payment of annual rent for use of the public lands on
27 the basis of a rental schedule. The rental schedule will include a base rent for
28 the acreage of public land included within the solar energy ROW
29 authorization and an additional megawatt capacity fee based on the total
30 authorized megawatt capacity for the approved solar energy project on public
31 lands administered by the BLM. The BLM may adjust the rental whenever
32 necessary, to reflect changes in fair market value as determined by the
33 application of sound business management principles, and so far as
34 practicable and feasible, in accordance with comparable commercial practices.
35 The rental provisions of the authorization may also be modified consistent
36 with the provisions of any regulatory changes or pursuant to the provisions of
37 new or revised statutory authorities.
38
- 39 • The BLM will require a Performance and Reclamation Bond, in an amount
40 determined by the authorized officer, for all solar energy development
41 projects on BLM-administered lands to ensure compliance with the terms and
42 conditions of the ROW authorization and to address environmental liabilities
43 associated with hazardous waste and hazardous substances; decommissioning,
44 removal, and proper disposal of improvements and facilities; and reclamation,
45 revegetation, restoration, and soil stabilization. The authorized officer will
46 require that the holder submit a Reclamation Cost Estimate for review and to

1 assist the authorized officer in determining the bond amount. The authorized
2 officer will review the bond on an annual basis to ensure the adequacy of the
3 bond amount. The authorized officer may increase or decrease the bond
4 amount at any time during the term of the ROW authorization, consistent with
5 the regulations.
6

- 7 • All solar energy ROW authorizations will include a provision that specifies
8 that ground-disturbing activities cannot begin until the BLM authorized
9 officer issues a Notice to Proceed (Form 2800-15). Each Notice to Proceed
10 will authorize construction or use and occupancy only as therein expressly
11 stated and only for the particular location or use and occupancy therein
12 described (i.e., a construction phase or site location). The holder will not
13 initiate any construction or other surface disturbing-activities on the ROW
14 without such prior written authorization of the BLM authorized officer.
15
- 16 • Upon issuance of a ROW authorization that precludes livestock grazing, the
17 BLM authorized officer will issue a separate proposed grazing decision to the
18 grazing permittee/lessee that includes a copy of the ROW authorization. The
19 proposed grazing decision will (a) state that the effective date of the
20 permit/lease cancellation, and issuance of a new permit/lease for any
21 remaining permitted use, will be 2 years from the permittee's/lessee's receipt
22 of the certified letter; (b) address compensation for range improvements;
23 (c) inform the permittee/lessee of his/her ability to unconditionally waive the
24 2-year notification requirement; and (d) address grazing management changes
25 as required by the ROW issuance decision. The proposed grazing decision
26 will become final unless protested.
27
- 28 • Upon issuance of a ROW authorization that includes meteorological or power
29 towers or other tall structures that could pose a hazard to air navigation, the
30 BLM will ensure the locations of such facilities are noted on aerial navigation
31 hazard maps for low-level flight operations that may be undertaken by the
32 BLM and other federal or state agencies for fire operations, wild horse and
33 burro censuses and gathers, wildlife inventories, facility maintenance, or other
34 activities.
35
- 36 • Failure of the holder to comply with any diligent development provision of the
37 authorization may cause the authorized officer to suspend or terminate the
38 authorization in accordance with 43 CFR 2807.17–2807.19 and use the posted
39 Performance and Reclamation Bond to cover the costs for removal of any idle
40 or abandoned equipment and/or facilities.
41
- 42 • The holder shall perform all operations in a good and workmanlike manner,
43 consistent with the approved POD, so as to ensure protection of the
44 environment and the health and safety of the public. The authorized officer
45 may order an immediate temporary suspension of operations, orally or in

1 writing, in accordance with 43 CFR 2807.16 to protect public health or safety
2 or the environment.

- 3
- 4 • Upon the request of the BLM authorized officer, the holder shall provide
5 access to environmental, technical, and financial records, reports, and
6 information related to construction, operation, maintenance, and
7 decommissioning of the ROW authorization.
8
- 9 • The BLM authorized officer may change the terms and conditions of the
10 authorization as a result of changes in legislation, regulations, or as otherwise
11 necessary to protect public health or safety or the environment in accordance
12 with 43 CFR 2801.15(e).
13
- 14 • Operators of solar power facilities on BLM-administered lands shall
15 coordinate with the BLM and other appropriate federal, state, and local
16 agencies regarding any planned upgrades or changes to the solar facility
17 design or operation. Proposed changes of this nature may require additional
18 environmental analysis and/or revision of the POD.
19
- 20 • The solar ROW authorization, shall, at a minimum, be reviewed by the BLM
21 authorized officer at the end of the 10th year and at regular intervals thereafter
22 not to exceed 10 years.
23
- 24 • The solar ROW authorization may be assigned consistent with the regulations,
25 but all assignments are subject to approval by the BLM authorized officer.
26
- 27 • An application for renewal must be submitted at least 120 days prior to the
28 expiration of the existing authorization. The BLM authorized officer will
29 review the application for renewal to ensure the holder is complying with the
30 terms, conditions, and stipulations of the existing authorization instrument and
31 applicable laws and regulations. If renewed, the ROW authorization shall be
32 subject to the regulations existing at the time of renewal and any other terms
33 and conditions that the authorized officer deems necessary to protect the
34 public interest.
35
36

37 **A.2.2 Proposed Design Features**

38

39 When incorporated into BLM's program in the Record of Decision (ROD), the following
40 proposed design features will be required to be applied to all solar energy applications submitted
41 to the BLM for consideration. Because of site-specific circumstances, some features may not
42 apply to some projects (e.g., a resource is not present on a given site) and/or may require slight
43 variations from what is described in the PEIS (e.g., a larger or smaller protective area).
44 Applicants will be required to discuss any proposed variations with BLM staff. All variations in
45 design features will require appropriate analysis and disclosure as part of future project
46 authorizations. It is anticipated that variations in the design features presented will be approved
47 in very limited circumstances. Those design features that do not apply to a given project will

1 need to be described as part of the project file along with an appropriate rationale. Additional
2 mitigation measures may be identified and required during individual project development and
3 environmental review.
4

5 The proposed design features are presented by resource area and also by project phase
6 (e.g., siting and design, site characterization, construction, operations, and decommissioning).
7 These design features were based on the potentially applicable mitigation measures given by
8 resource area in Chapter 5. All Chapter 5 potentially applicable mitigation measures have been
9 carried forward as proposed design features [Note: Citations for applicable agency guidance
10 documents are given in Chapter 5].
11

12 Many of the proposed design features indicate the need for project-specific mitigation
13 plans (see Table A.2-1). The content of these plans will depend on specific project requirements
14 and locations, and their applicability and effectiveness also needs to be evaluated at the project-
15 specific level. The BLM would need to determine the adequacy of such plans at the time of
16 permitting for specific projects.
17
18

**TABLE A.2-1 Mitigation Plans Specified as
Elements of the Proposed Design Features^a**

Access Road Siting and Management Plan
Compensatory Mitigation and Monitoring Plan
Construction and Operation Waste Management Plan
Cultural Resources Management and Mitigation Plan
Decommissioning and Site Reclamation Plan
Drainage, Erosion, and Sedimentation Control Plan
Dust Abatement Plan
Ecological Resource Mitigation and Monitoring Plan
Fire Management and Protection Plan
Glint and Glare Assessment, Mitigation, and Monitoring Plan
Habitat Restoration and Management Plan
Hazardous Materials and Waste Management Plan
Heliostat Positioning Plan
Historic Treatment Plan
Integrated Vegetation Management Plan
Lighting Plan
Nuisance Animal and Pest Control Plan
Paleontological Resources Management Plan
Spill Prevention and Emergency Response Plan
Stormwater Management Plan
Traffic Management Plan
Trash Abatement Plan
Unanticipated Burial Contingency Plan
Water Resources Monitoring and Mitigation Plan
Wind Erosion Management Plan

^a The need for each plan will need to be determined for specific projects.

1 In the very early stages of the development of siting and design plans, project developers
2 shall coordinate with appropriate federal, state, and local agencies that regulate activities that
3 affect land and water resources both appurtenant and adjacent to the proposed development to
4 determine what permits or approvals may be needed for construction and operation of a solar
5 facility.
6
7

8 **A.2.2.1 Design Features for Lands and Realty** 9

- 10 • Where there are existing BLM ROW authorizations within solar energy
11 development areas, pursuant to Title 43, Part 2807.14 of the *Code of Federal*
12 *Regulations* (43 CFR 2807.14), the BLM will notify ROW holders that an
13 application that might affect their existing ROW has been filed and request
14 their comments. Early discussion will occur with existing ROW holders to
15 insure their rights are protected and that any issues are resolved.
16
- 17 • Where a designated transmission corridor is located within the area of
18 proposed solar energy development project, the need for future transmission
19 capacity in the corridor will be reviewed to determine whether the corridor
20 should be excluded from solar development or whether the capacity of the
21 designated transmission corridor can be reduced. Partially relocating the
22 corridor to retain the current planned capacity will also be an option to be
23 considered, as will relocating the solar project outside the designated corridor.
24
- 25 • Legal access to private, state, and public lands surrounding the solar facilities
26 shall be retained to avoid creating areas that are inaccessible to the public
27 and/or that would be difficult to manage. The effect on the manageability and
28 uses of public lands remaining around boundaries of solar energy facilities
29 shall be considered during the environmental analysis of project applications.
30
- 31 • Coordination with federal, state, and county agencies; Tribes; property
32 owners; and other stakeholders shall be accomplished as early as possible in
33 the planning process to identify potentially significant land use conflicts and
34 issues and state and local rules that govern solar energy development.
35 Significant issues that are raised, and potential modifications to proposed
36 projects to eliminate or mitigate these issues, shall be considered in the
37 environmental analysis of the project application.
38
- 39 • Consolidation of access and other supporting infrastructure shall be required
40 for single projects and for cases in which there is more than one project in
41 close proximity to another in order to maximize the efficient use of public
42 land.
43
- 44 • The protection and preservation of evidence of Public Land Survey System
45 (PLSS) and related federal property boundaries are required of project
46 developers. Prior to commencing any action, evidence of the PLSS and related

1 property boundaries will be marked for protection. Coordination with BLM
2 cadastral survey staff shall be accomplished to help provide data, search for
3 and evaluate evidence, locate monuments of the PLSS and related property
4 boundaries, and protect them from destruction. If a proposed action is within
5 one-quarter mile of any project boundary, a Chain of Survey Certificate,
6 conformal to the Departmental standard, must be issued. In some cases, Land
7 Description Reviews, Certificates of Inspection and Possession, Boundary
8 Assurance Certificates, resurveys, re-monumentation, and/or referencing of
9 PLSS corners may be required before the start of any action.

- 10
- 11 • If a proposed action might have an adverse effect on prime and unique
12 farmland, this possibility must be discussed in the associated environmental
13 analysis, along with a consideration of alternatives or appropriate mitigation
14 measures.
- 15
- 16 • For solar energy and related transmission facilities, the hazards associated
17 with the heights of facilities and the glare from reflective surfaces shall be
18 evaluated through coordination with local airport operators. Proposed
19 construction of any facility that is taller than 200 ft (61 m) must be submitted
20 to the Federal Aviation Administration (FAA) for evaluation of safety
21 hazards.
- 22
- 23

24 **A.2.2.2 Design Features for Specially Designated Areas and Lands with** 25 **Wilderness Characteristics**

- 26
- 27 • Solar facilities shall be located and designed to minimize impacts on specially
28 designated areas and lands with wilderness characteristics¹.
- 29
- 30 • Protection of existing values of specially designated areas and lands with
31 wilderness characteristics shall be evaluated during the environmental analysis
32 of solar energy project applications, and the results shall be incorporated into
33 the project planning and design to minimize off-site impacts.
- 34
- 35 • Any lands that have not been recently inventoried for wilderness
36 characteristics or any lands that have been identified in any citizen's
37 wilderness proposal shall be inventoried for wilderness characteristics prior to
38 any solar development action being approved within these areas.
- 39

40

41 **A.2.2.3 Design Features for Rangeland Resources—Grazing**

- 42
- 43 • Contact with grazing permittees shall be initiated at the earliest possible time
44 to explore whether modifications could be made to a solar development

¹ See Section 4.3 for details on areas included in these categories.

1 proposal to minimize impacts on grazing use, especially impacts related to
2 water availability, livestock improvements, access road location, and
3 movement of livestock between pastures. Compensation for or relocation
4 of range improvements shall also be discussed. The ROW applicant and
5 permittee/lessee shall be strongly encouraged to enter into an agreement that
6 addresses mitigation and compensation for range improvements.
7

- 8 • Access roads shall be constructed, improved, and maintained to minimize
9 their impact on grazing operations. Road design shall include fencing, cattle
10 guards, and signs.
11
- 12 • Wherever there are reductions in grazing use, opportunities for mitigating this
13 loss through changes in livestock management or the installation of range
14 improvements shall be considered.
15

16 **A.2.2.4 Design Features for Wild Horses and Burros**

- 17 • Activities of project developers shall be coordinated with the BLM and other
18 stakeholders to ensure that impacts on wild horses and burros and their
19 management areas are minimized. Issues to be addressed could include the
20 installation of fencing and access control, provision for movement corridors,
21 delineation of open range, traffic management (e.g., vehicle speeds), and
22 access to water sources.
23
- 24 • Access roads shall be appropriately constructed, improved, and maintained
25 and employ signs to minimize potential horse and burro collisions. Fences
26 shall be built to exclude wild horses and burros from all project facilities,
27 including all water sites built for the development of facilities and roadways.
28
29
30
31

32 **A.2.2.5 Design Features for Wildland Fire**

- 33 • In areas susceptible to wildland fire, coordination with the BLM and local
34 fire organizations shall be required early in the project planning process to
35 determine design features to be incorporated into the design of the project
36 to prevent an increase in wildland fire frequency.
37
- 38 • A vegetation plan designed to prevent the establishment of non-native,
39 invasive species on the solar energy facility and along transmission line
40 ROWs and roads shall be developed and implemented to minimize the
41 potential for increasing the frequency of wildland fires.
42
- 43 • The ROWs for solar facilities shall be large enough to ensure there is a
44 sufficient fire break inside the ROW so there would be no threat to facilities
45 from either a wildland fire approaching from outside the ROW or a fire
46

1 moving from inside to outside the ROW. This distance shall be determined
2 through coordination with fire management staff, and actions, both active and
3 passive (e.g., vegetation manipulation), shall be undertaken specifically to
4 remove the need for protective responses by the BLM, state, and local fire
5 organizations.

- 6
- 7 • The effectiveness of developing and adhering to a fire safety plan and
8 providing worker training to reduce fire risks shall be evaluated.
- 9

10 **A.2.2.6 Design Features for Recreation Impacts**

- 11
- 12
- 13 • Public access through or around solar facilities shall be retained to permit
14 continued use of public lands and non-BLM administered lands.
- 15
- 16 • Solar facilities shall not be placed in areas of unique or important recreation
17 resources.
- 18
- 19 • Replacement of acreage lost for off-highway vehicle use shall be considered
20 as part of the analysis of project-specific impacts. Any process for designating
21 a replacement route would include the consideration of the designation criteria
22 for routes as specified in 43 CFR 8342.1 and would be consistent with
23 existing land use plans.
- 24
- 25

26 **A.2.2.7 Design Features for Military and Civilian Aviation**

- 27
- 28 • Decisions regarding the location of solar facilities and transmission facilities
29 near or within military training routes or adjacent to military or civilian
30 airports shall be coordinated with military and civilian airspace managers very
31 early in the processing of solar project applications, in order to identify and
32 mitigate potential impacts on military and civilian airport and airspace use.
- 33
- 34 • The FAA shall be contacted early in the process of considering a solar energy
35 project application to determine if there might be any potential impacts on
36 aviation and if any mitigation might be required to protect military or civilian
37 aviation use.
- 38
- 39 • As part of the evaluation of impacts from the development of solar energy
40 facilities, their potential for impacting the operation of existing military
41 installations, either because they displace species onto an installation or
42 because they increase the significance of special status species populations on
43 the installation, shall be included as part of the environmental impact analysis
44 of the solar energy project.
- 45
- 46

1 **A.2.2.8 Design Features for Soil Resources and Geologic Hazards**
2

3 Erosion-control measures shall be based on an assessment of site-specific conditions and
4 include minimizing the extent of disturbed areas, stabilizing disturbed areas, and protecting
5 slopes and channels in the project area. Measures to control sedimentation shall focus on
6 retaining sediment on-site and implementing controls along the project site perimeter.
7

8 Developers shall conduct (as necessary) geotechnical engineering and hydrology studies
9 to characterize site conditions related to drainage patterns, soils, vegetation, surface water bodies,
10 land subsidence, and steep or unstable slopes. The results of such studies shall be compiled into
11 reports to aid in the permitting, design, and construction of a proposed solar project. In the
12 geotechnical engineering report, factors such as soil properties, engineering constraints, the
13 corrosive potential of construction materials, stability, and facility design criteria shall be
14 identified. The hydrology report shall present data on local water bodies, surface water drainage
15 patterns, floodplains, rainfall, and expected runoff and runoff volumes and flow rates. Many of
16 the design features listed below shall be components of the various plans required to mitigate the
17 impacts of solar energy facilities, particularly the Drainage, Erosion, and Sedimentation Control
18 Plan, Wind Erosion Management Plan, Access Road Siting and Management Plan, Dust
19 Abatement Plan, Integrated Vegetation Management Plan, Ecological Resource Mitigation and
20 Monitoring Plan, Habitat Restoration and Management Plan, Spill Prevention and Emergency
21 Response Plan, and Stormwater Management Plan. Plans shall be revised or amended as
22 necessary to account for changes in site conditions as a project proceeds from construction
23 through the decommissioning phases. Applicants must obtain and meet the requirements of all
24 applicable federal, state, and county permits and building codes.
25

26 Studies may also be needed to determine whether construction and operation of a solar
27 facility within a proposed SEZ would affect the eolian processes that maintain nearby sand dunes
28 (e.g., Big Dune in Amargosa Valley). The need for such studies would be evaluated on a case-
29 by-case basis.
30

31 Project developers shall implement the design features for soil resources given below and
32 develop others that address unique site conditions not anticipated here. Routine site inspections
33 shall be conducted to identify and correct improperly installed, damaged, or ineffective design
34 features. Inspections shall be made more frequently during the rainy season and during and
35 following intense rainfall events to ensure the timeliness of corrective actions.
36
37

38 ***A.2.2.8.1 Siting and Design***
39

- 40 • The footprint of disturbed areas—including the number and size/length of
41 roads, fences, borrow areas, and laydown and staging areas—shall be
42 minimized. The boundaries of disturbed area footprints shall be clearly
43 delineated on the ground (e.g., through the use of construction fencing).
44
- 45 • Project structures and facilities should be sited to avoid disturbance in areas
46 with existing biological soil crusts to the extent possible.
47

- 1 • Project areas shall be replanted with native vegetation at spaced intervals to
2 the extent possible to break up areas of exposed soil and reduce soil loss by
3 wind erosion.
4
- 5 • Land disturbance (including crossings) in natural drainage systems and
6 groundwater recharge zones, specifically ephemeral washes and dry lake beds,
7 are to be avoided. Any structures crossing drainages must be located and
8 constructed so that they do not decrease channel stability or increase water
9 volume or velocity. Developers shall obtain all applicable federal and state
10 permits.
11
- 12 • Solar facilities or components (e.g., heliostats, panels, dishes, and troughs)
13 shall not be placed in natural drainage ways.
14
- 15 • Adequate space (i.e., setbacks) between solar facilities and natural washes is
16 to be maintained to preserve their hydrological function and provide a buffer
17 for flood control.
18
- 19 • Existing roads, disturbed areas, and borrow pits shall be used. In addition, all
20 borrow pits shall be identified beforehand and included in the NEPA direct
21 and indirect analyses. If new roads are necessary, they shall be designed and
22 constructed to the appropriate road design standards, such as those described
23 in BLM Manual 9113. The specifications and codes developed by the
24 U.S. Department of Transportation (DOT) are also to be taken into account.
25
- 26 • New roads shall be designed to follow natural land contours and avoid or
27 minimize hill cuts in the project area and avoid existing desert washes.
28 Siting of new roads and walking trails (if any) is to be consistent with the
29 designation criteria specified by the BLM in 43 CFR 8342.1.
30
- 31 • Ground-disturbing geotechnical studies (e.g., geotechnical drilling)
32 shall adhere to the permitting requirements specified by the BLM in
33 43 CFR Part 2920.
34
- 35 • Roads shall be designed on the basis of local meteorological conditions, soil
36 moisture, and erosion potential in order to avoid erosion and changes in
37 surface water runoff .
38
- 39 • Temporary roads shall be designed with eventual reclamation in mind.
40
- 41 • Areas with unstable slopes shall be avoided, and local factors that can cause
42 slope instability (e.g., groundwater conditions, precipitation, earthquake
43 activity, slope angles, and the dip angles of geologic strata) shall be identified.
44
- 45 • Excessive grades shall be avoided on roads, road embankments, ditches, and
46 drainages, especially in areas with erodible soils.
47

- 1 • The creation of excessive slopes shall be avoided during site preparation and
2 construction. Special construction techniques are to be used in areas of steep
3 slopes, erodible soil, and drainage ways.
4
- 5 • Construction shall be conducted in stages to limit the areas of exposed soil at
6 any given time. For example, only land that will be actively under
7 construction in the near term (e.g., within the next 6 to 12 months) should be
8 cleared of vegetation.
9

10 ***A.2.2.8.2 General Multiphase Measures***

- 11 • Potential soil erosion shall be controlled at culvert outlets with appropriate
12 structures.
13
- 14 • Catch basins, roadway ditches, and culverts shall be cleaned and maintained
15 regularly.
16
- 17 • Abandoned roads and roads no longer needed shall be subsoiled to increase
18 infiltration and reduce soil compaction, then recontoured and revegetated.
19
- 20 • Ground-disturbing activities shall be minimized, especially during the rainy
21 season.
22
- 23 • Originally excavated materials shall be used for backfill.
24
- 25 • The speed of vehicles and equipment on unpaved surfaces shall be controlled
26 to reduce dust emissions.
27
- 28 • Runoff from slope tops shall be controlled and directed to settling or rapid
29 infiltration basins (temporarily) until disturbed slopes are stabilized. Disturbed
30 slopes shall be stabilized as quickly as possible.
31
- 32 • Drainage crossings shall be stabilized as quickly as possible, and channel
33 erosion from runoff caused by the project shall be prevented.
34
- 35 • Sediment-laden waters from disturbed, active areas within the project site
36 shall be retained through the use of barriers and sedimentation devices
37 (e.g., berms, straw bales, sandbags, jute netting, or silt fences). Such barriers
38 and devices should not be installed in wildlife crossing areas.
39
- 40 • Barriers and sedimentation devices shall be placed around drainages and
41 wetlands to prevent contamination by sediment-laden water.
42
- 43 • Sediment from barriers and sedimentation devices shall be removed to restore
44 sediment-control capacity.
45
- 46
- 47

- 1 • Routine site inspections shall be conducted to assess the effectiveness and
2 maintenance requirements for erosion and sediment control systems.
- 3
- 4 • Barriers and sedimentation devices shall be maintained, repaired, or replaced
5 as necessary to ensure optimum control.
- 6
- 7 • A spill prevention plan to identify sources, locations, and quantities of
8 potential chemical releases (through spills, leaks, or fires) and define response
9 measures and notification requirements shall be developed and followed to
10 reduce the potential for soil contamination. The plan shall also identify
11 individuals and their responsibilities for implementing the plan.
- 12
- 13

14 ***A.2.2.8.3 Site Characterization and Construction***

- 15
- 16 • Construction activities shall take place over as short a timeframe as possible
17 once ground disturbance has occurred. If an activity requires an extended
18 schedule, measures to limit wind and water erosion shall be employed during
19 the activity (rather than after the activity) to the extent possible.
- 20
- 21 • Construction traffic shall avoid unpaved surfaces (to reduce the risk of
22 compaction) and reduce speed to lessen fugitive dust emissions.
- 23
- 24 • The clearing and disturbing of sensitive areas (e.g., steep slopes and natural
25 drainages) and other areas shall be avoided outside the construction zone.
26 The construction zone boundaries shall be clearly delineated on the ground
27 (e.g., through the use of construction fencing).
- 28
- 29 • Ground disturbance from construction-related activities, such as vehicle and
30 foot traffic, shall avoid areas with intact biological soil crusts to the extent
31 possible. For cases in which impacts cannot be avoided, soil crusts will be
32 salvaged and restored on the basis of recommendations by BLM once
33 construction has been completed.
- 34
- 35 • The creation of excessive slopes shall be avoided during site preparation and
36 construction (e.g., during excavation). Special construction techniques shall
37 be used, where applicable, in areas of steep slopes, erodible soil, and stream
38 channel crossings.
- 39
- 40 • Electrical lines from solar collectors shall be buried along existing features
41 (e.g., roads or other paths of disturbance) to minimize the overall area of
42 surface disturbance whenever possible.
- 43
- 44 • Borrow materials shall be obtained only from authorized and permitted sites.
- 45

- 1 • Construction grading shall be conducted in compliance with good industry
2 practice (e.g., the American Society for Testing and Materials [ASTM]
3 international standard methods) and other requirements (e.g., BLM and/or
4 local grading and construction permits), as they apply.
5
- 6 • Erosion-control structures (e.g., rock lining or apron) shall be added at culvert
7 outlets to reduce flow velocity and minimize the potential for scouring.
8
- 9 • Temporary stabilization of disturbed areas that are not actively under
10 construction shall occur throughout the construction phase. Soil stabilization
11 methods, such as erosion matting (organic or synthetic mats or blankets) or
12 soil aggregation (binding), are examples of measures that should be used to
13 limit wind erosion and dust emissions, as site conditions warrant.
14
- 15 • Permanent stabilization of disturbed areas shall occur during final grading and
16 landscaping of the site.
17
- 18 • Water or other stabilizing agents shall be used to wet roads in active
19 construction areas and laydown areas in order to minimize the windblown
20 erosion of soil.
21
- 22 • Topsoil from all excavation and construction activities shall be salvaged so it
23 can be reapplied to the disturbed area once construction is completed.
24
- 25 • Native plant communities in disturbed areas shall be restored by natural
26 revegetation or by seeding and transplanting (using weed-free native grasses,
27 forbs, and shrubs), on the basis of BLM recommendations, as early as possible
28 once construction is completed.
29
- 30 • Construction on wet soils shall be avoided.
31

32 ***A.2.2.8.4 Operations***

- 33 • All design features developed for the construction phase shall be applied to
34 similar activities during the operations phase.
35
- 36 • The area disturbed by operation of a solar energy project shall be minimized
37 (e.g., by using existing roads).
38

39 ***A.2.2.8.5 Decommissioning/Reclamation***

- 40 • All design features developed for the construction phase shall be applied to
41 similar activities during the decommissioning/reclamation phase.
42

- The original grade and drainage pattern shall be re-established.
- Native plant communities in disturbed areas shall be restored by natural revegetation or by seeding and transplanting (using weed-free native grasses, forbs, and shrubs), on the basis of BLM recommendations, as early as possible once decommissioning is completed.

A.2.2.8.6 Geologic Hazards

The potential geologic hazards that could be significant at solar project sites in the six-state study area include seismic ground shaking, ground rupture, liquefaction, slope instability, subsidence (collapse) and settlement, expansive soils, and flooding and debris flows. Solar project developers shall conduct geotechnical studies (as needed) to identify and assess these hazards and to propose facility design criteria and site-specific design features. The design feature to address geologic hazards would therefore be to build project structures in accordance with the design-basis recommendations specified in the project-specific geotechnical investigation report. Structure designs must meet the requirements of all applicable federal, state, and county permits and building codes.

In areas of high seismic activity (especially those having soils with a high liquefaction potential) or in areas that encompass 100-year floodplains, the most effective design feature is to alter the location or scope of the proposed project.

A.2.2.9 Design Features for Mineral Resources

- Where valid mining claims or leases exist, early consultation with claim or lease holders shall be initiated to determine whether it would be possible to locate solar facilities in or near these areas in such a way as to avoid future adverse effects on mineral development activities.
- All solar energy development ROWs will contain the stipulation that BLM retains the right to issue oil and gas or geothermal leases with a stipulation of no surface occupancy within the ROW area. Upon designation, SEZs will be classified as no surface occupancy areas for oil and gas and geothermal leasing.
- Transmission lines shall be located to avoid conflicts with mining activities in areas with active mineral development.

A.2.2.10 Design Features for Water Resources

The main objectives of the design features for water resources are to (1) promote the sustainable use of water resources through appropriate technology selection and conservation

1 practices and (2) protect the quality of natural water bodies (including streams, wetlands,
2 ephemeral washes, and floodplains, as well as groundwater aquifers) in and around solar energy
3 facilities. An important aspect of implementing these measures is coordinating with federal,
4 state, and local agencies that regulate the use of water resources to meet the requirements of
5 permits and approvals needed to (1) obtain water for development and (2) alter the land surface.
6 In the following subsections, design features for solar energy facilities are given, grouped by
7 phase of development.
8
9

10 ***A.2.2.10.1 Siting and Design***

11
12 In the very early stages of the development of siting and design plans, project developers
13 shall coordinate with appropriate federal, state, and local agencies that regulate activities that
14 affect land and water resources to determine what permits or approvals may be needed for
15 construction and operation of a solar facility. This coordination would facilitate the following
16 activities and objectives:
17

- 18 • All structures related to the solar energy facility shall be sited in locations that
19 minimize impacts on surface water bodies, ephemeral washes, playas, and
20 natural drainage areas (including groundwater recharge areas).
21
- 22 • Project developers shall plan to implement water conservation measures
23 related to solar energy technology water needs in order to reduce project water
24 requirements. Developers shall minimize the consumptive use of fresh water
25 for power plant cooling by, for example, using dry cooling, using recycled or
26 impaired water, or selecting solar energy technologies that do not require
27 cooling water.
28
- 29 • Project developers shall conduct a preliminary hydrologic study
30 demonstrating a clear understanding of the local surface water and
31 groundwater hydrology. The primary purpose of this preliminary hydrologic
32 study is to identify surface watersheds and groundwater basins directly
33 affected and connected to the location of the project site, and the study will
34 include the following information:
35
 - 36 – The relationship of the project site hydrologic basin to the basins in the
37 region;
 - 38
 - 39 – Identification of all surface water bodies (including rivers, streams,
40 ephemeral washes/drainages, lakes, wetlands, playas, and floodplains);
41
 - 42 – Identification of all applicable groundwater aquifers; and
43
 - 44 – Preliminary estimates of the physical characteristics of surface water
45 features and groundwater aquifers, the connectivity of surface water and
46 groundwater, and the regional climate (seasonal and long term).
47

- 1 • Project developers shall plan to avoid impacts on existing surface water
2 features, including streams, lakes, wetlands, floodplains, intermittent streams,
3 playas, and ephemeral washes/drainages (any unavoidable impacts would be
4 minimized) of the development and in nearby regions according to:
5
 - 6 – All sections of the Clean Water Act (CWA), including Sections 401, 402,
7 and 404 addressing licensing and permitting issues;
8
 - 9 – Executive Orders (E.O.s) 11988 and 11990 of May 24, 1977, regarding
10 floodplain and wetland management: E.O. 11988, “Floodplain
11 Management” (*Federal Register*, Volume 42, page 26951 [42 FR 26951]),
12 and E.O. 11990, “Protection of Wetlands” (42 FR 26961);
13
 - 14 – U.S. Environmental Protection Agency (EPA) stormwater management
15 guidelines and applicable state and local guidelines;
16
 - 17 – National Wild and Scenic Rivers System (Public Law 90-542;
18 16 *United States Code* [U.S.C.] 1271 et seq.); and
19
 - 20 – Identification of impaired surface water bodies in accordance with
21 Section 303(d) of the CWA.
22
- 23 • Project developers shall plan to minimize impacts to groundwater aquifers.
24
 - 25 – Impacts on sole source aquifers shall be avoided according to EPA
26 guidelines.
27
- 28 • Project developers should avoid impacts on local surface water and
29 groundwater drinking water supplies (amounts and water quality) and develop
30 mitigation plans in the event that local drinking water sources are
31 contaminated or depleted by project activities.
32

33 As project developers formulate final siting and design plans for solar energy facilities,
34 the following activities and objectives shall occur or be considered in order to minimize impacts
35 on water resources, They are to be done in coordination with the appropriate local, state, and
36 federal regulating agencies. The following items relate to quantification and characterization of
37 the existing hydrology, land alteration issues, water rights, and water quality.
38

- 39 • Mitigation plans shall be developed as described in Section 5.1.
40
- 41 • A Drainage, Erosion, and Sedimentation Control Plan shall be developed that
42 ensures protection of water quality and soil resources, demonstrates no
43 increase in off-site flooding potential, and includes provisions for stormwater
44 and sediment retention on the project site. The plan shall identify site surface
45 water runoff patterns and develop mitigation measures that prevent excessive
46 and unnatural soil deposition and erosion throughout and downslope of the

1 project site and project-related construction areas. The plan shall achieve the
2 following:

- 3
- 4 – Runoff from parking lots, roofs, or other impervious surfaces shall be
5 directed to retention basins prior to being released downgradient of the
6 site;
- 7
- 8 – Any landscaping used for stormwater treatment shall require little or no
9 irrigation and would be recessed to create retention basins/areas used to
10 capture runoff;
- 11
- 12 – The amount of area covered by impervious surfaces shall be reduced
13 through the use of permeable pavement or other pervious surfaces; and
- 14
- 15 – Natural drainages and a pre-project hydrograph shall be maintained for the
16 area.
- 17

- 18 • A Stormwater Management Plan shall be developed for the site to ensure
19 compliance with applicable regulations and prevent off-site migration of
20 contaminated stormwater, changes in pre-project storm hydrographs, or
21 increased soil erosion.
22
- 23 – Siting in identified 100-year floodplains shall not be allowed within the
24 development.
25
- 26 – Project developers shall be required to maintain the pre-development flood
27 hydrograph for all storms up to and including the 100-year rainfall event.
28 All stormwater retention and/or infiltration and treatment systems shall
29 also be designed for all storms up to and including the 100-year storm
30 event.
31
- 32 • As part of a Spill Prevention and Emergency Response Plan, measures to
33 prevent potential groundwater and surface water contamination shall be
34 identified.
35
- 36 • Developers shall be required to conduct a detailed hydrologic study that
37 demonstrates their clear understanding of the local surface water and
38 groundwater hydrology. At a minimum, this hydrologic study shall include:
39
- 40 – Quantification of physical characteristics describing surface water
41 features, such as streamflow rates, stream cross sections, channel routings,
42 seasonal flow rates (intermittent streams), peak flow rates (ephemeral
43 washes/drainages), sediment characteristics and transport rates, lake
44 depths, and surface areas of lakes, wetlands, and floodplains;
45

- 1 – Hydrologic analysis and modeling to define the 100-year, 24-hour rainfall
2 for the project area and calculate projected runoff from this storm at the
3 site;
- 4
- 5 – Hydrologic analysis and modeling to identify 100-year floodplain
6 boundaries of any surface water feature on the site;
- 7
- 8 – Quantification of physical characteristics describing the groundwater
9 aquifer, such as physical dimensions of the aquifer, sediment
10 characteristics, confined/unconfined conditions, hydraulic conductivity
11 and transmissivity distribution of the aquifer, groundwater surface
12 elevations, and groundwater flow processes (direction, recharge/discharge,
13 current basin extractions, surface water/groundwater connectivity), and lag
14 times between groundwater withdrawals and surface water depletions);
- 15
- 16 – Quantification of the regional climate, including seasonal and long-term
17 information on temperatures, precipitation, evaporation, and
18 evapotranspiration; and
- 19
- 20 – Quantification of the sustainable yield of surface waters and groundwater
21 available to the project. Project developers should evaluate the water
22 sources in terms of existing water rights and management plans for their
23 adequacy with regard to serving project demands while maintaining
24 aquatic, riparian, and other water-dependent resources.
- 25
- 26 • Project developers shall quantify water use requirements for project
27 construction, operation, and decommissioning.
- 28
- 29 • Water sources used for potable water supply shall meet federal, state, and
30 local water quality standards (e.g., Sections 303 and 304 of the CWA).
- 31
- 32 • Developers shall identify wastewater treatment measures and new or
33 expanded facilities, if any, to be included as part of the facility’s National
34 Pollutant Discharge Elimination System (NPDES) permit.
- 35
- 36 • Developers shall coordinate with state/local regulatory agencies regarding the
37 issuance of permits or “will-serve” agreements for the development and use of
38 water and/or the operation of on-site wastewater treatment systems.
- 39
- 40 • Project developers shall coordinate with appropriate water rights agencies for
41 securing water rights.
- 42
- 43 • Project developers shall choose appropriate water sources with respect to
44 available water rights and management practices and with respect to
45 maintaining aquatic, riparian, and other water-dependent sources (that may
46 vary in water requirements on a temporal basis).
- 47

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- Project developers who plan to use groundwater shall develop and implement a groundwater monitoring plan that includes monitoring the effects of groundwater withdrawal for project uses, of vegetation restoration and dust control uses during decommissioning, and of aquifer recovery after project decommissioning. Monitoring frequency shall be decided on a site-specific basis and in coordination with federal, state, and local agencies that manage the groundwater resources of the region.

- If groundwater use is proposed, project developers shall ensure that a comprehensive analysis of the groundwater basin is provided and that the following potential significant impacts are evaluated:
 - Creation or exacerbation of overdraft conditions and their potential to cause subsidence and loss of aquifer storage capacity;
 - Uses that cause injury to other water rights claims in the basin;
 - Estimates of the total cone of depression considering cumulative drawdown from all potential pumping in the basin, including the project, for the life of the project through the decommissioning phase;
 - Changes in water quality that affect other beneficial use; and
 - Effects on surface water resources such as streams, springs, seeps, and wetlands that provide water and associated habitat for plants and animals.

- Project developers who plan to use surface water sources shall develop a surface water monitoring plan that includes monitoring changes in flows, volumes, and water quality during construction and operations, as well as their recovery during decommissioning. Monitoring frequency shall be decided on a site-specific basis and in coordination with federal, state, and local agencies that manage the surface water resources of the region.

- If surface water use is proposed, project developers shall ensure that a comprehensive analysis of the supply is provided and that the following potential significant impacts are evaluated:
 - Effects on other users;
 - Effects on water quality;
 - Effects on other water resources;
 - Effects on other environmental resources, including plants and animals that directly or indirectly depend on those water sources;

- 1 – Effects on the natural hydrograph of the supply; and
- 2
- 3 – Effects on the reliability of the supply.
- 4
- 5

6 ***A.2.2.10.2 Site Characterization and Construction***

- 7
- 8 • The facility shall obtain and comply with a construction stormwater permit
- 9 through the EPA or state-run NPDES program (whichever applies within the
- 10 state). In addition, the EPA requires that any development larger than 20 acres
- 11 (0.08 km²) and begun after August 2011 must comply with a requirement to
- 12 monitor construction discharges for turbidity concentrations.
- 13
- 14 • Groundwater wells constructed during any stage of the project shall conform
- 15 to state and local standards and include:
 - 16
 - 17 – Legal description (township, range, section, and quarter section);
 - 18
 - 19 – Project map with proposed and existing well locations;
 - 20
 - 21 – Well design characteristics: casing diameter, screened interval(s), well
 - 22 depth, and static water level;
 - 23
 - 24 – Results of groundwater pumping tests or other tests done in the well;
 - 25
 - 26 – Anticipated pumping capacity and peak pumping rates;
 - 27
 - 28 – Identification of the groundwater aquifer and its hydrogeologic
 - 29 characteristics;
 - 30
 - 31 – Estimation of the potential cone of depression that might be produced by
 - 32 the proposed pumping throughout the lifetime of a project by using an
 - 33 analytical or numerical model; and
 - 34
 - 35 – Estimate of the total cone of depression considering cumulative drawdown
 - 36 from all potential pumping in the basin, including the project, for the life
 - 37 of the project through the decommissioning phase by using an analytical
 - 38 or numerical model.
 - 39
- 40 • Construction activities shall avoid land disturbance in ephemeral washes and
- 41 dry lakebeds; any unavoidable disturbance would be minimized. Stormwater
- 42 facilities shall be designed to route flow around the facility and maintain pre-
- 43 project hydrographs.
- 44
- 45 • When stream or wash crossings are constructed, culverts or water
- 46 conveyances for temporary and permanent roads shall be designed to comply

1 with county standards or to accommodate the runoff of a 100-year storm,
2 whichever is larger.

- 3
- 4 • Geotextile mats shall be used to stabilize disturbed channels and streambanks.
- 5
- 6 • Earth dikes, swales, and lined ditches shall be used to divert work-site runoff
7 that would otherwise enter a disturbed stream.
- 8
- 9 • Certified weed-free straw bale barriers shall be installed to control sediment in
10 runoff water; straw bale barriers shall be installed only where sediment-laden
11 water can pond, thus allowing the sediment to settle out.
- 12
- 13 • Check dams (i.e., small barriers constructed of rock, gravel bags, sandbags,
14 fiber rolls, or reusable products) shall be placed across a constructed swale or
15 drainage ditch to reduce the velocity of flowing water, thus allowing sediment
16 to settle and reducing erosion.
- 17
- 18 • Special construction techniques shall be used, where applicable, in areas of
19 erodible soil, alluvial fans, and stream channel/wash crossings.
- 20
- 21 • Disturbed soils shall be reclaimed as quickly as possible, or protective covers
22 should be applied.
- 23
- 24 • Topsoil removed during construction shall be reused for reclamation.
- 25
- 26 • Foundations and trenches shall be backfilled with originally excavated
27 material as much as possible; excess excavated material shall be disposed of
28 according to state and federal laws.
- 29
- 30 • If drilling activities are required as part of site characterization, any drilling
31 fluids or cuttings shall be maintained so that cuttings, fluids, or runoff from
32 storage areas will not come in contact with aquatic habitats. Temporary
33 impoundments for storing drilling fluids and cuttings shall be lined to
34 minimize the infiltration of runoff into groundwater or surface water.
- 35
- 36 • Washing equipment or vehicles in streams and wetlands shall be avoided
37 because doing so increases their sediment loads.
- 38
- 39 • Entry and exit pits shall be constructed in work areas to trap sediments from
40 vehicles so that they do not enter into streams at stream crossings.
41 Prerequisites to excavating the entry and exit pits shall include:
42
 - 43 – Locating the entry and exit pits far enough from stream banks and at a
44 sufficient elevation to avoid inundation by storm flow stream levels and to
45 minimize excessive migration of groundwater into the entry or exit pits;
- 46

- 1 – Isolating the excavation for the entry and exit pits from the surface water
2 by using silt fencing to avoid sediment transport by stormwater; and
3
4 – Isolating the spoils storage resulting from excavation of the entry and exit
5 pits by using silt fencing to avoid sediment transport by stormwater.
6
7 • Good waste management practices shall be adopted for handling, storing, and
8 disposing of wastes generated by a construction project to prevent the release
9 of waste materials into stormwater discharges. Waste management includes
10 the following: spill prevention and control, construction debris and litter
11 management, concrete waste management, and liquid waste management.
12
13 • Any wastewater generated in association with temporary, portable sanitary
14 facilities shall be periodically removed by a licensed hauler and introduced
15 into an existing municipal sewage treatment facility. Portable sanitary
16 facilities provided for construction crews shall be adequate to support
17 expected on-site personnel.
18
19 • The creation of hydrologic conduits shall be avoided between two aquifers
20 during foundation excavation and other activities.
21
22 • If chemical dust palliatives (suppressants) are used, they shall be selected and
23 applied in accordance with the facilities Dust Abatement Plan.
24
25 • When an herbicide/pesticide is used to control vegetation, the climate, soil
26 type, slope, and vegetation type shall be considered in determining the risk of
27 herbicide/pesticide contamination. In addition, a Nuisance Animal and Pest
28 Control Plan and an Integrated Vegetation Management Plan shall be
29 developed to ensure that applications will be conducted within the framework
30 of BLM and DOI policies and standard operating procedures and will entail
31 the use of only EPA-registered pesticides/herbicides that also comply with
32 state and local regulations.
33
34 • All hazardous materials and vehicle/equipment fuels shall be transported,
35 stored, managed, and disposed of in accordance with accepted best
36 management practices (BMPs) and in compliance with all applicable
37 regulations and the requirements of approved plans, including, where
38 applicable, a Stormwater Management Plan, Spill Prevention and Emergency
39 Response Plan, and Hazardous Materials and Waste Management Plan.
40
41 • Project developers shall avoid or minimize and mitigate the degradation of
42 water quality (e.g., chemical contamination, increased salinity, increased
43 temperature, decreased dissolved oxygen, and increased sediment loads) that
44

1 could result from construction activities. Water quality in areas adjacent to or
2 downstream from development areas shall be monitored during the life of the
3 project to ensure that water quality is protected.
4
5

6 ***A.2.2.10.3 Operations*** 7

- 8 • The use of water shall not contribute to the significant long-term decline of
9 groundwater levels or surface water flows and volumes. Any project-related
10 water use shall not contribute to withdrawals that exceed the sustainable yield
11 of the surface water or groundwater source.
12
- 13 • Water use shall be minimized by implementing conservation practices, such
14 as treating spent wash water and storing it for reuse.
15
- 16 • The treatment of sanitary and industrial wastewater either on-site or off-site
17 shall comply with federal, state, and local regulations. Any discharges to
18 surface waters would require NPDES permitting. Any storage or treatment of
19 wastewater on-site shall have to ensure proper lining of holding ponds and
20 tanks to prevent leaks.
21
- 22 • Berms and other controls shall be used at facilities to prevent off-site
23 migration of any leaked or spilled heat transfer fluid (HTF), thermal energy
24 storage (TES) fluids, or any other chemicals stored or used at the site.
25
- 26 • Project developers shall avoid or minimize and mitigate the degradation of
27 water quality (e.g., chemical contamination, increased salinity, increased
28 temperature, decreased dissolved oxygen, and increased sediment loads) that
29 could result from operations. Water quality in areas adjacent to or downstream
30 from development areas shall be monitored during the life of the project to
31 ensure that water quality is protected.
32

33 ***A.2.2.10.4 Decommissioning/Reclamation*** 34

- 35
- 36 • All management plans, design features, and stipulations developed for the
37 construction phase shall be applied to similar activities during the
38 decommissioning/reclamation phase.
39
- 40 • Topsoil removed during construction shall be reused during reclamation.
41
- 42 • Groundwater and/or surface water monitoring activities shall be as outlined in
43 the established groundwater monitoring plan for the site.
44
45
46

1 **A.2.2.11 Design Features for Ecological Resources**
2

3 Many design features are similar for the different types of ecological resources (plant
4 communities and habitats, wildlife, aquatic resources, and special status species²). The more
5 general design features are presented first for each phase, followed by more specific measures
6 for specific resource types.
7

8
9 **A.2.2.11.1 Siting and Design**

- 10
- 11 • To the extent practicable, projects shall be sited on previously disturbed lands
12 in close proximity to energy load centers to avoid and minimize impacts on
13 remote, undisturbed lands.
14
 - 15 • Existing access roads, utility corridors, and other infrastructure shall be used
16 to the maximum extent feasible.
17
 - 18 • As practical, staging and parking areas shall be located within the site of the
19 utility-scale solar energy facility to minimize habitat disturbance in areas
20 adjacent to the site.
21
 - 22 • Appropriate agencies (e.g., BLM, USFWS, and state resource management
23 agencies) shall be contacted early in the planning process to identify
24 potentially sensitive ecological resources, including, but not limited to, aquatic
25 habitats, wetland habitats, unique biological communities, crucial wildlife
26 habitats, and special status species locations and habitats, including designated
27 critical habitat, that might be present in the area proposed for a solar energy
28 facility and associated access roads and ROWs. This coordination shall be
29 used to identify the need for and scope of predisturbance surveys of the
30 project area and vicinity.
31
 - 32 • All pre-disturbance surveys shall be conducted by qualified biologists
33 following accepted protocols established by the U.S. Army Corps of
34 Engineers (USACE), BLM, USFWS, or other federal or state regulatory
35 agencies, as determined appropriate by the BLM, to identify and delineate the
36 boundaries of important, sensitive, or unique habitats in the project vicinity,
37 including but not limited to, waters of the United States, wetlands, springs,
38 seeps, ephemeral streams, intermittent streams, 100-year floodplains, ponds

² Special status species include the following types of species: (1) species listed as threatened or endangered under the ESA; (2) species that are proposed for listing, under review, or candidates for listing under the ESA; (3) species that are listed as threatened or endangered by the state or are identified as fully protected by the state; (4) species that are listed by the BLM as sensitive; and (5) species that have been ranked S1 or S2 by the state or as species of concern by the state or USFWS. Note that some of the categories of species included here do not fit BLM's definition of special status species as defined in BLM Manual 6840 (BLM 2008). These species are included here to ensure broad consideration of species that may be most vulnerable to impacts.

1 and other aquatic habitats, riparian habitat, remnant vegetation associations,
2 rare or unique natural communities, and habitats supporting special status
3 species populations.
4

- 5 • Projects shall be sited and designed to avoid direct and indirect impacts on
6 important, sensitive, or unique habitats in the project vicinity, including, but
7 not limited to, waters of the United States, wetlands (both jurisdictional and
8 nonjurisdictional), springs, seeps, streams (ephemeral, intermittent, and
9 perennial), 100-year floodplains, ponds and other aquatic habitats, riparian
10 habitat, remnant vegetation associations, rare or unique biological
11 communities, crucial wildlife habitats, and habitats supporting special status
12 species populations (including designated and proposed critical habitat). For
13 cases in which impacts cannot be avoided, they shall be minimized and
14 mitigated appropriately. Project planning shall be coordinated with the
15 appropriate federal and state resource management agencies.
16
- 17 • Projects shall not be sited in designated critical habitat, ACECs, or other
18 specially designated areas that are considered necessary for special status
19 species and habitat conservation.
20
- 21 • Projects shall be designed to avoid, minimize, and mitigate impacts on
22 wetlands, waters of the United States, and other special aquatic sites.
23
- 24 • Project facilities and activities, including associated roads and utility
25 corridors, shall not be located in or near occupied habitats of special status
26 animal species. Buffer zones shall be established (e.g., identified in the land
27 use plan or substantiated by best available information or science) around
28 these areas to prevent any destructive impacts associated with project
29 activities.
30
- 31 • Buffer zones shall be established around sensitive habitats, and project
32 facilities and activities shall be excluded or modified within those areas
33 (e.g., identified in the land use plan or substantiated by best available
34 information or science).
35
- 36 • Habitat loss, habitat fragmentation, and resulting edge habitat due to project
37 development shall be minimized to the extent practicable. Habitat
38 fragmentation could be reduced by consolidating facilities (e.g., access roads
39 and utilities could share common ROWs, where feasible), reducing the
40 number of access roads to the minimum amount required, minimizing the
41 number of stream crossings within a particular stream or watershed, and
42 locating facilities in areas where habitat disturbance has already occurred.
43 Individual project facilities shall be located and designed to minimize
44 disruption of animal movement patterns and connectivity of habitats.
45

- 1 • Locating solar power facilities near open water or other areas that are known
2 to attract a large number of birds shall be avoided.
3
- 4 • Plant species that would attract wildlife shall not be planted along high-speed
5 or high-traffic roads.
6
- 7 • Tall structures shall be located to avoid known flight paths of birds and bats.
8
- 9 • Transmission line conductors shall span important or sensitive habitats within
10 limits of standard structure design.
11
- 12 • If cattle guards are identified for the design for new roads, they shall be
13 wildlife friendly. To the extent practicable, improvements shall be made to
14 existing ways and trails that require cattle to pass through existing fences,
15 fence-line gates, new gates, and standard wire gates alongside them.
16
- 17 • Fences shall be built (as practicable) to exclude livestock and wildlife from all
18 project facilities, including all water sites.
19
- 20 • Project developers shall identify surface water runoff patterns at the project
21 site and develop mitigation that prevents soil deposition and erosion
22 throughout and downhill from the site.
23
- 24 • Developers shall avoid the placement of facilities or roads in drainages and
25 make necessary accommodations for the disruption of runoff.
26
- 27 • Any necessary stream crossings shall be designed to provide in-stream
28 conditions that allow for and maintain uninterrupted movement and safe
29 passage of fish during all project periods. Section 5.9.3 presents mitigation
30 recommendations to minimize impacts on water quality associated with
31 stream crossings.
32
- 33 • Projects shall avoid surface water or groundwater withdrawals that affect
34 sensitive habitats (e.g., aquatic, wetland, and riparian habitats) and any
35 habitats occupied by special status species. Applicants shall demonstrate,
36 through hydrologic modeling, that the withdrawals required for their project
37 are not going to affect groundwater discharges that support special status
38 species or their habitats.
39
- 40 • The capability of local surface water or groundwater supplies to provide
41 adequate water for the operation of proposed solar facilities shall be
42 considered early in the project siting and design. Technologies that would
43 result in large withdrawals that would affect water bodies that support special
44 status species shall not be considered.
45

- 1 • New roads shall be designed and constructed to meet the appropriate BLM
2 road design standards, such as those described in *BLM Manual 9113*, and be
3 no larger than necessary to accommodate their intended functions (e.g., traffic
4 volume and weight of vehicles). Roads internal to solar facility sites shall be
5 designed to minimize ground disturbance.
6
- 7 • Pipelines that transport hazardous liquids (e.g., oils) that will pass through
8 aquatic or other habitats containing sensitive species shall be designed with
9 block or check valves on both sides of the waterway or habitat to minimize the
10 amount of product that could be released as a result of leaks. Such pipelines
11 shall be constructed of double-walled pipe at river crossings.
12

13 14 ***A.2.2.11.2 General Multiphase Measures***

15
16 General design features for eliminating or reducing impacts on plant communities and
17 habitats, wildlife resources, aquatic resources, and special status species that apply to all or
18 nearly all of the project phases include the following:
19

- 20 • Project developers shall designate a qualified biologist who will be
21 responsible for overseeing compliance with all design features related to the
22 protection of ecological resources throughout all project phases, particularly in
23 areas requiring avoidance or containing sensitive biological resources, such as
24 special status species and important habitats. Additional qualified biological
25 monitors may be required on site during all project phases as determined by
26 the BLM, USFWS, and appropriate state agencies.
27
- 28 • All personnel shall be instructed on the identification and protection of
29 ecological resources (especially for special status species), including
30 knowledge of required design features. Workers must be aware that only
31 qualified biologists are permitted to handle listed species according to
32 specialized protocols approved by the USFWS. Workers shall not approach
33 wildlife for photographs or feed wildlife.
34
- 35 • The collection, harassment, or disturbance of plants, wildlife, and their
36 habitats (particularly special status species) shall be reduced through
37 employee and contractor education about applicable state and federal laws. In
38 addition, the following measures shall be implemented: (1) all personnel shall
39 be instructed to avoid harassment and disturbance of local plants and wildlife;
40 (2) personnel shall be made aware of the potential for wildlife interactions
41 around facility structures; (3) food refuse and other garbage shall be placed in
42 closed containers so it is not available to scavengers; and (4) workers shall be
43 prohibited from bringing firearms and pets to project sites.
44
- 45 • Projects shall maintain native vegetation cover and soils to the extent possible
46 and minimize grading to reduce flooding, maintain natural infiltration rates,

1 maintain wildlife habitat, maintain soil health, and reduce erosion potential.
2 All short (i.e., less than 7-in. [18-cm] tall) native vegetation shall be retained
3 to the maximum extent possible. Blading within the project site shall be
4 minimized to the maximum extent possible. Where necessary and feasible,
5 shrub cover may be mowed and/or raked to smooth out the surface. Retention
6 of native root structure and seeds within the project area would help retain
7 soil stability, minimize soil erosion, and minimize fugitive dust pollution.
8 Retention of native seed and roots within the project site will also facilitate
9 recovery of vegetative cover. Use of native plant species will minimize the
10 need to water the vegetation, because native species are already adapted to the
11 local climate and moisture regime of the area.

- 12
- 13 • Plants, wildlife, and their habitats shall be protected from fugitive dust
14 through measures included in the facility's Dust Abatement Plan.
- 15
- 16 • Activities shall be timed to avoid, minimize, or mitigate impacts on wildlife.
17 For example, crucial winter ranges for elk, deer, pronghorn, and other species
18 should be avoided, especially during their periods of use. If activities are
19 planned during bird breeding seasons, a nesting bird survey shall be conducted
20 first. If active nests are detected, the nest area shall be flagged, and no activity
21 should take place near the nest (at a distance determined in coordination with
22 the USFWS) until nesting is completed (i.e., nestlings have fledged or the nest
23 has failed) or until appropriate agencies agree that construction can proceed
24 with the incorporation of agreed-upon monitoring measures. The timing of
25 activities shall be coordinated with the BLM, USFWS, and appropriate state
26 agencies.
- 27
- 28 • Noise reduction devices (e.g., mufflers) shall be employed to minimize the
29 impacts on wildlife and special status species populations. Explosives shall
30 be used only within specified times and at specified distances from sensitive
31 wildlife or surface waters as established by the BLM or other federal and state
32 agencies. Operators shall ensure that all equipment is adequately muffled and
33 maintained in order to minimize disturbance to wildlife.
- 34
- 35 • Design features for hazardous materials and waste management regarding
36 refueling, equipment maintenance, and spill prevention and response shall be
37 applied to reduce the potential for impacts on ecological resources.
- 38
- 39 • Low-water crossings (fords) shall be used only as a last resort, and then during
40 the driest time of the year. Rocked approaches to fords shall be used. The
41 pre-existing stream channel, including bed and banks, shall be restored after
42 the need for a low-water ford has passed.
- 43
- 44 • The number of areas where wildlife could hide or be trapped (e.g., open sheds,
45 pits, uncovered basins, and laydown areas) shall be minimized. For example,
46 an uncovered pipe that has been placed in a trench should be capped at the end

1 of each workday to prevent animals from entering the pipe. If a special status
2 species is discovered inside a component, that component must not be moved,
3 or, if necessary, moved only to remove the animal from the path of activity,
4 until the animal has escaped.

- 5
- 6 • During all project phases, buffer zones shall be established around sensitive
7 habitats, and project facilities and activities should be excluded or modified
8 within those areas, to the extent practicable.
- 9
- 10 • Project activities shall not be located in or near occupied habitats of special
11 status animal species. Buffer zones shall be established around these areas
12 (e.g., identified in the land use plan or substantiated by best available
13 information or science) to prevent any destructive impacts associated with
14 project activities.
- 15
- 16 • If any federally listed threatened and endangered species are found during any
17 phase of the project, the USFWS shall be consulted as required by Section 7
18 of the ESA, and an appropriate course of action shall be determined to avoid
19 or mitigate impacts.
- 20
- 21 • Access roads shall be appropriately constructed, improved, maintained, and
22 provided with signs to minimize potential wildlife/vehicle collisions and
23 facilitate wildlife movement through the project area.
- 24
- 25 • Project vehicle speeds shall be limited in areas occupied by special status
26 animal species. Traffic shall stop to allow wildlife to cross roads. Shuttle vans
27 or car pooling shall be used where feasible to reduce the amount of traffic on
28 access roads.
- 29
- 30 • Unless authorized, personnel shall not attempt to move live, injured, or dead
31 wildlife off roads, ROWs, or the project site. Honking horns, revving engines,
32 yelling, and excessive speed are inappropriate and considered a form of
33 harassment. If traffic is being unreasonably delayed by wildlife in roads,
34 personnel shall contact the project biologist and security, who will take any
35 necessary action.
- 36
- 37 • Road closures or other travel modifications (e.g., lower speed limits, no foot
38 travel) shall be considered during crucial periods (e.g., extreme winter
39 conditions, calving/fawning seasons, raptor nesting). Personnel shall be
40 advised to minimize stopping and exiting their vehicles in the winter ranges
41 of large game while there is snow on the ground.
- 42
- 43 • Any vehicle-wildlife collisions shall be immediately reported to security.
44 Observations of potential wildlife problems, including wildlife mortality, shall
45 be immediately reported to the BLM or other appropriate agency authorized
46 officer. Procedures for removal of wildlife carcasses on-site and along access

1 roads shall be addressed in the Nuisance Animal and Pest Control Plan, to
2 avoid vehicle-related mortality of carrion-eaters.

- 3
4 • A Nuisance Animal and Pest Control Plan should be developed that identifies
5 management practices to minimize increases in nuisance animals and pests in
6 the project area, particularly those individuals and species that would affect
7 human health and safety or have the potential to adversely affect native plants
8 and animals. The plan would identify nuisance and pest species that are likely
9 to occur in the area, risks associated with these species, species-specific
10 control measures, and monitoring requirements.
- 11
12 • An Integrated Vegetation Management Plan shall be developed that is
13 consistent with applicable regulations and agency policies for the control of
14 noxious weeds and invasive plant species. The plan shall address monitoring;
15 ROW vegetation management; the use of certified weed-free seed and
16 mulching; the cleaning of vehicles to avoid introducing invasive weeds; and
17 the education of personnel on weed identification, the manner in which weeds
18 spread, and methods for treating infestations. For transmission line ROWs,
19 the plan shall be consistent with the existing vegetation management plan for
20 that ROW. Principles of integrated pest management, including biological
21 controls, shall be used to prevent the spread of invasive species, per the
22 *Vegetation Treatments Using Herbicides on BLM Lands in 17 Western States*,
23 and the *National Invasive Species Management Plan, 2009*. The plan shall
24 cover periodic monitoring, reporting, and immediate eradication of noxious
25 weed or invasive species occurring within all managed areas. A controlled
26 inspection and cleaning area shall be established to visually inspect
27 construction equipment arriving at the project area and to remove and collect
28 seeds that may be adhering to tires and other equipment surfaces. To prevent
29 the spread of invasive species, project developers shall work with the local
30 BLM field office to determine whether a pre-activity survey is warranted, and
31 if so, to conduct the survey. If invasive plant species are present, project
32 developers shall work with the local BLM field office to develop a control
33 strategy. The plan shall include a post-construction monitoring element that
34 incorporates adaptive management protocols.
- 35
36 • Where revegetation and restoration are used as a tool to mitigate or
37 rehabilitate project impacts following construction and/or decommissioning,
38 the proponent shall assist in ongoing BLM efforts to procure and develop
39 locally and regionally appropriate native plant materials. Where conditions
40 permit, the project developer could collect and voucher seeds from native
41 plant species identified on BLM target lists for regional native plant material
42 development by following the BLM Seeds of Success Protocol as described in
43 BLM's Handbook H1740-2, *Integrated Vegetation Management*. On the basis
44 of the expected need for native plant materials, the project developer could
45 contribute funding to support the BLM Native Plant Materials Development
46 Program. The suggested funding rate is \$100 in U.S. dollars per acre for each

1 acre on which restoration or revegetation will be used to mitigate project
2 impacts and for each acre expected to be rehabilitated following site
3 decommissioning.

- 4
- 5 • To reduce the risk of non-native and nuisance aquatic species introductions,
6 equipment used in surface water should be decontaminated as appropriate,
7 especially equipment used to convey water (i.e., pumps).
8
- 9 • Herbicide use shall be limited to nonpersistent, immobile substances. Only
10 herbicides with low toxicity to wildlife and nontarget native plant species
11 shall be used, as determined in consultation with the USFWS. The typical
12 herbicide application rate rather than the maximum application rate shall be
13 used where this rate is effective. All herbicides shall be applied in a manner
14 consistent with their label requirements and in accordance with guidance
15 provided in the Final PEIS on vegetation treatments using herbicides. No
16 herbicides should be used near or in surface water, streams (including
17 ephemeral, intermittent, or perennial), riparian areas, or wetlands. Setback
18 distances should be determined through coordination with federal and state
19 resource management agencies. Before herbicide treatments are begun, a
20 qualified biologist shall conduct surveys of bird nests and of special status
21 species to identify the special measures or BMPs necessary to avoid and
22 minimize impacts on migratory birds and special status species.
23
- 24 • An Ecological Resources Mitigation and Monitoring Plan shall be developed
25 to avoid, minimize, or mitigate adverse impacts on important ecological
26 resources. The plan shall include, but not necessarily be limited to, the
27 following elements, where applicable:
28
 - 29 – Revegetation, soil stabilization, and erosion reduction measures that shall
30 be implemented to ensure that all temporary use areas are restored. The
31 plan shall require that restoration occurs as soon as possible after activities
32 are completed in order to reduce the amount of habitat converted at any
33 one time and to speed up the recovery to natural habitats.
 - 34
 - 35 – Mitigation and monitoring of unavoidable impacts on waters of the
36 United States, including wetlands.
37
 - 38 – Compensatory mitigation and monitoring to address any significant direct,
39 indirect, and cumulative impacts on, and loss of habitat for, special status
40 plant and animal species.
 - 41
 - 42 – Demonstration of compliance of the project with the regulatory
43 requirements of the BGEPA for bald and golden eagles. The plan
44 should be developed in coordination with the USFWS.
45

- 1 – Measures to protect birds (including migratory species protected under the
- 2 MBTA) developed in coordination with the appropriate federal and state
- 3 agencies (e.g., BLM, USFWS, and state resource management agencies).
- 4
- 5 – Measures to protect raptors developed in coordination with the appropriate
- 6 federal and state agencies (e.g., BLM, USFWS, and state resource
- 7 management agencies).
- 8
- 9 – Measures to protect bats developed in coordination with the appropriate
- 10 federal and state agencies (e.g., BLM, USFWS, and state resource
- 11 management agencies).
- 12
- 13 – Measures to mitigate and monitor impacts on special status species
- 14 developed in coordination with the appropriate federal and state agencies
- 15 (e.g., BLM, USFWS, and state resource management agencies).
- 16
- 17 – Monitoring the potential for increase in predation of special status species
- 18 (e.g., desert tortoise, Utah prairie dog, and greater sage-grouse) from
- 19 ravens and other species that are attracted to developed areas and use tall
- 20 structures opportunistically to spot vulnerable prey. Raven and other
- 21 predator monitoring also should be addressed in the Nuisance Animal and
- 22 Pest Control Plan.
- 23
- 24 – Clearing and translocation of special status species, including the steps to
- 25 implement the translocation, as well as the follow-up monitoring of
- 26 populations in the receptor locations, as determined in coordination with
- 27 the appropriate federal and state agencies. The need for a Special Status
- 28 Species Clearance and Translocation Plan should be determined on a
- 29 project-specific basis.
- 30
- 31 • At the project level, recommendations contained in *Interim Golden Eagle*
- 32 *Technical Guidance: Inventory and Monitoring Protocol and Other*
- 33 *Recommendations in Support of Golden Eagle Management and Permit*
- 34 *Issuance* shall be considered in project planning, as appropriate. In addition,
- 35 Instruction Memorandum [IM] 2010-156, the *Bald and Golden Eagle*
- 36 *Protection Act–Golden Eagle National Environmental Policy Act and Avian*
- 37 *Protection Plan Guidance for Renewable Energy*, shall be adhered to until
- 38 programmatic permits from the USFWS are available. The analysis of
- 39 potential impacts on, and mitigation for, golden eagles should be made in
- 40 coordination with the USFWS, and the initiation of interagency coordination
- 41 on golden eagle issues should occur early in the planning process.
- 42

- 1 • Take³ of golden eagles and other raptors should be avoided. Mitigation
2 regarding the golden eagle should be developed in consultation with the
3 USFWS and appropriate state natural resource agencies. A permit may be
4 required under the Bald and Golden Eagle Protection Act.
5
6 • A Water Resources Mitigation and Monitoring Plan shall be developed for
7 each project. Changes in surface water or groundwater quality (e.g., chemical
8 contamination, increased salinity, increased temperature, decreased dissolved
9 oxygen, and increased sediment loads) or flow that result in the alteration of
10 terrestrial plant communities or communities in wetlands, springs, seeps,
11 intermittent streams, perennial streams, and riparian areas (including the
12 alteration of cover and community structure, species composition, and
13 diversity) off the project site shall be avoided to the extent practicable. A
14 monitoring plan shall be developed that determines the effects of groundwater
15 withdrawals on plant communities.
16
17 • Ecological monitoring programs shall provide for monitoring during all
18 project phases, including periods prior to construction (to establish baseline
19 conditions) and during construction, operations, and decommissioning.
20
21 • The monitoring program requirements, including adaptive strategies, shall be
22 established at the project level to ensure that potential adverse impacts are
23 mitigated. Monitoring programs shall consider the monitoring requirements
24 for each ecological resource present at the project site, establish metrics
25 against which monitoring observations can be measured, identify potential
26 mitigation measures, and establish protocols for incorporating monitoring
27 observations and additional mitigation measures into standard operating
28 procedures.
29
30 • A Spill Prevention and Emergency Response Plan shall be developed that
31 considers sensitive ecological resources. Spills of any toxic substances shall
32 be promptly addressed and cleaned up before they can enter aquatic or other
33 sensitive habitats as a result of runoff or leaching. Section 5.9.3 also discusses
34 the need for a Spill Prevention and Emergency Response Plan.
35
36 • A Fire Management and Protection Plan shall be developed to implement
37 measures that minimize the potential for a human-caused fire to affect
38 ecological resources and that responds to natural fire situations.
39

³ Under the Bald and Golden Eagle Protection Act, “take” means to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, destroy, molest, or disturb. “Disturb” means to agitate or bother a bald eagle or a golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an eagle; (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior; or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior.

- 1 • A Trash Abatement Plan shall be developed that focuses on containing trash
2 and food in closed and secured containers and removing them periodically to
3 reduce their attractiveness to opportunistic species, such as common ravens,
4 coyotes, and feral dogs, that could serve as predators on native wildlife and
5 special status animals.
6
- 7 • Prior to any ground-disturbing activity, seasonally appropriate walkthroughs
8 shall be conducted by a qualified biologist or team of biologists to ensure that
9 important or sensitive species or habitats are not present in or near project
10 areas. Attendees at the walkthrough shall include appropriate federal agency
11 representatives, state natural resource agencies, and construction contractors,
12 as appropriate. Habitats or locations to be avoided (with appropriately sized
13 buffers) shall be clearly marked.
14
- 15 • If it is determined through coordination with the appropriate federal and state
16 agencies (e.g., BLM, USFWS, and state resource management agencies) that
17 it is necessary to translocate plant and wildlife species from project areas,
18 developers shall ensure that qualified biologists conduct pre- and post-
19 translocation surveys for target species (especially if the target species are
20 special status species) and release individuals to protected off-site locations as
21 approved by the federal and state agencies. The biologists shall coordinate
22 with appropriate agencies in the safe handling and transport of any special
23 status species encountered.
24
- 25 • In accordance with adaptive management strategies, new BLM Instruction
26 Memorandums (IMs) addressing wildlife and plants issues shall be
27 incorporated as appropriate.
28
29

30 ***A.2.2.11.3 Site Characterization***

31
32 Site characterization activities would generally result in only minimal impacts on
33 ecological resources. The amount and extent of necessary pre-project survey data shall be
34 determined, in part, on the basis of the environmental setting of the proposed project location.
35 Design features include the following:

- 36
37 • Vehicles and site workers shall avoid entering aquatic habitats, such as
38 streams and springs, during site characterization activities until surveys by
39 qualified biologists have evaluated the potential for unique flora and fauna to
40 be present.
41
- 42 • Meteorological towers and solar sensors shall be located to avoid sensitive
43 habitats or areas where wildlife (e.g., sage-grouse) is known to be sensitive to
44 human activities; applicable land use plans or best available information and
45 science shall be referred to in order to determine avoidance distances.
46 Installation of these components shall be scheduled to avoid disrupting

1 wildlife reproductive activities or migratory or other important behaviors. Guy
2 wires on meteorological towers shall be avoided. If guy wires are necessary,
3 permanent markers (bird flight diverters) shall be attached to them to increase
4 their visibility.

- 5
- 6 • Meteorological towers, soil borings, wells, and travel routes shall be located to
7 avoid important, sensitive, or unique habitats, including, but not limited to,
8 wetlands, springs, seeps, ephemeral streams, intermittent streams, 100-year
9 floodplains, ponds and other aquatic habitats, riparian habitat, remnant
10 vegetation associations, rare natural communities, and habitats supporting
11 special status species populations as identified in applicable land use plans or
12 best available information and science.

13

14

15 ***A.2.2.11.4 Construction***

16

17 Implementation of design features during the construction phase may eliminate or reduce
18 the potential for direct or indirect impacts on ecological resources. Design features for ecological
19 resources during the construction phase of a solar energy project include the following:

- 20
- 21 • Prior to construction of the facility, environmental training shall be provided
22 to contractor personnel whose activities or responsibilities could affect the
23 environment during construction. An environmental compliance officer and
24 other inspectors, the contractor's construction field supervisor(s), and all
25 construction personnel are expected to play an important role in maintaining
26 strict compliance with all permit conditions in order to protect wildlife and
27 their habitats to the extent practicable during construction.
- 28
- 29 • Prior to construction, all areas to be disturbed shall be surveyed by qualified
30 biologists using approved survey techniques or established species-specific
31 survey protocols to determine the presence of special status species in the
32 project area.
- 33
- 34 • If possible, on-site construction access routes shall be rolled and compacted to
35 allow trucks and equipment to access construction locations. Following
36 construction, disturbed areas shall be lightly raked and/or ripped and reseeded
37 with seeds from low-stature plant species collected from the immediate
38 vicinity.
- 39
- 40 • To the extent practicable, vegetation clearing, grading, and other construction
41 activities shall occur outside the bird breeding season. If activities are planned
42 for the breeding season, a survey of nesting birds shall be conducted first. If
43 active nests are not detected, construction activities may be conducted. If
44 active nests are detected, the nest area shall be flagged, and no activity shall
45 take place near the nest (at a distance coordinated with the USFWS) until
46 nesting is completed (i.e., nestlings have fledged or the nest has failed) or until

1 appropriate agencies agree that construction can proceed with the
2 incorporation of agreed-upon monitoring measures. If active nests are not
3 detected, appropriate agencies shall be consulted to confirm that construction
4 may proceed.

- 5
- 6 • Explosives shall be used only within specified times and at specified distances
7 from sensitive wildlife or surface waters, as established by the BLM or other
8 federal and state agencies. The occurrence of flyrock from blasting shall be
9 limited by using blasting mats.
- 10
- 11 • The extent of habitat disturbance during construction shall be reduced by
12 keeping vehicles on access roads and minimizing foot and vehicle traffic
13 through undisturbed areas.
- 14
- 15 • Temporary or project-created access roads shall be closed to unauthorized
16 vehicle use, where appropriate.
- 17
- 18 • Where a pipeline trench may drain a wetland, trench breakers shall be
19 constructed, and/or the trench bottom shall be sealed to maintain the original
20 wetland hydrology.
- 21
- 22 • Because open trenches could impede the seasonal movements of large game
23 animals and alter their distribution, they shall be backfilled as quickly as is
24 possible. Open trenches could also entrap smaller animals; therefore, escape
25 ramps shall be installed along open trench segments at distances identified in
26 the applicable land use plan or best available information and science.
- 27
- 28 • An appropriate number of qualified biological monitors (as determined by the
29 federal authorizing agency and USFWS) shall be on-site during initial site
30 preparation and during the construction period to monitor, capture, and
31 relocate animals that could be harmed and are unable to leave the site on their
32 own.
- 33
- 34 • When possible, any reptile or amphibian species found in harm's way shall be
35 relocated away from the activity.
- 36
- 37 • Construction debris, especially treated wood, shall not be stored or disposed
38 of in areas where it could come in contact with aquatic habitats.
- 39
- 40 • As directed by the local BLM field office, Joshua trees (*Yucca brevifolia*),
41 other *Yucca* species, and most cactus species shall be salvaged prior to land
42 clearing, and they shall be transplanted, held for use to revegetate temporarily
43 disturbed areas, or otherwise protected as prescribed by state or local BLM
44 requirements.
- 45

- 1 • Project-specific Integrated Vegetation Management Plans shall investigate the
2 possibility of revegetating parts of the solar array area. Where revegetation is
3 accomplished, fire breaks are required, such that the vegetated areas would
4 not result in an increased fire hazard.
5
- 6 • Reestablishment of vegetation within temporarily disturbed areas shall be
7 done immediately following the completion of construction activities,
8 provided such revegetation will not compromise the function of the buried
9 utilities. Species salvaged during construction could be transplanted into these
10 areas at a density similar to preconstruction conditions. Revegetation shall
11 focus on the establishment of native plant communities similar to those
12 present in the vicinity of the project site. Species used shall consist of native
13 species dominant within the plant communities that exist in adjacent areas and
14 have similar soil conditions. Certified weed-free seed mixes of native shrubs,
15 grasses, and forbs of local origin shall be used. In areas where suitable native
16 species are unavailable, other plant species approved by the BLM could be
17 used.
18

19 ***A.2.2.11.5 Operations***

20 Design features that limit periodic or continued impacts from operations of a solar energy
21 facility include the following:
22

- 23 • Areas left in a natural condition during construction (e.g., wildlife crossings)
24 shall be maintained in as natural a condition as possible within safety and
25 operational constraints.
26
- 27 • To minimize habitat loss and fragmentation, as much habitat as possible shall
28 be reestablished after construction is complete by maximizing the area
29 reclaimed during solar energy operations.
30
- 31 • Lighting shall be designed to provide the minimum illumination needed to
32 achieve safety and security objectives. It shall be shielded and orientated to
33 focus illumination on the desired areas and to minimize or eliminate lighting
34 of off-site areas or the sky. All unnecessary lighting shall be turned off at
35 night to limit attracting migratory birds or special status species.
36
- 37 • To minimize the potential for bird strikes, applicants shall use audio visual
38 warning system (AVWS) technology for any structures exceeding 200 ft
39 (60 m) in height. If the FAA denies a permit for use of AVWSs, applicants
40 shall coordinate with the USFWS and appropriate state natural resource
41 agencies to identify lighting that meets the minimum FAA safety requirements
42 and minimizes the possibility of bird strikes.
43
44
45

- 1 • Evaporation ponds shall be fenced and netted to prevent use by wildlife where
2 feasible. Open water sources in the desert provide subsidies to ravens and
3 other predators that feed on special status species (e.g., desert tortoise, greater
4 sage-grouse, and Utah prairie dog). In addition, these water sources may have
5 elevated levels of harmful contaminants (e.g., total dissolved solids and
6 selenium) and could attract wildlife into an industrialized area, where they are
7 more likely to be killed. The lower 18 in. (46 cm) of the fencing shall be a
8 solid barrier that would exclude entrance by amphibians and other small
9 animals.
- 10
- 11 • In order to prevent the effects of the West Nile virus on wildlife, a mosquito
12 abatement program shall be implemented for all evaporation ponds or other
13 standing bodies of water that have the potential to support mosquito
14 reproduction.
- 15
- 16 • Appropriate fish screens shall be installed on cooling water intakes to limit the
17 potential for impingement impacts on organisms in surface water sources used
18 for cooling water. Intake designs shall minimize the potential for aquatic
19 organisms from surface waters to be entrained in cooling water systems.
- 20
- 21 • Pesticide/herbicide use should be conducted in accordance with a Nuisance
22 Animal and Pest Control Plan and an Integrated Vegetation Management
23 Plan.
- 24
- 25

26 ***A.2.2.11.6 Decommissioning/Reclamation***

27
28 Design features to protect ecological resources during and following decommissioning
29 and reclamation include the following:

- 30
- 31 • A Decommissioning and Site Reclamation Plan that is specific to the project
32 shall be developed, approved by the BLM, and implemented and shall include
33 the following elements:
- 34
- 35 – The plan shall contain an adaptive management component that allows for
36 the incorporation of lessons learned from monitoring data.
- 37
- 38 – The plan shall require that land surfaces be returned to pre-development
39 contours to the greatest extent feasible immediately following
40 decommissioning.
- 41
- 42 – The plan shall be designed to expedite the reestablishment of vegetation
43 and require restoration to be completed as soon as practicable.
- 44
- 45 – To ensure rapid and successful reestablishment efforts, the plan shall
46 specify site-specific measurable success criteria, including target dates,

1 which shall be developed in coordination with the BLM and be required to
2 be met by the operator.

- 3
- 4 – Vegetation reestablishment efforts shall continue until all success criteria
5 have been met.
- 6
- 7 – Bonding to cover the full cost of vegetation reestablishment shall be
8 required.
- 9
- 10 – Species used for reestablishing vegetation shall consist of native species
11 that are dominant within the plant communities in adjacent areas that have
12 similar soil conditions.
- 13
- 14 – The plan shall require the use of weed-free seed mixes of native shrubs,
15 grasses, and forbs of local sources where available. When available, seeds
16 of known origin, as labeled by state seed certification programs, shall be
17 used. Local native genotypes shall be used where practicable. If cultivars
18 of native species are used, certified seeds (i.e., blue tag) shall be used.
19 “Source identified” seeds (i.e., yellow tag) shall be used when native seeds
20 are collected from wildland sites.
- 21
- 22 – The cover, species composition, and diversity of the reestablished plant
23 community shall be similar to those present on-site prior to project
24 development and in the vicinity of the site. Baseline data should be
25 collected in each project area prior to its development as a benchmark for
26 measuring the success of reclamation efforts. In areas where suitable
27 native species are unavailable, other plant species approved by the
28 BLM could be used. If non-native plants are necessary, they shall be
29 noninvasive, noncompetitive, and, ideally, be short-lived, have low
30 reproductive capabilities, or be self-pollinating to prevent gene flow into
31 the native community. The non-native plants that are used shall not
32 exchange genetic material with common native plant species.
- 33
- 34 – The plan shall be developed in coordination with appropriate federal and
35 state agencies.
- 36
- 37 • Access roads shall be reclaimed when they are no longer needed. However,
38 seasonal restrictions (e.g., nest and brood rearing) shall be considered
39 (e.g., identified in the land use plan or substantiated by best available
40 information or science)
- 41
- 42 • All holes and ruts created by the removal of structures and access roads shall
43 be filled or graded.
- 44
- 45 • While structures are being dismantled, care shall be taken to avoid leaving
46 debris on the ground in areas where wildlife regularly move.
- 47

- 1 • Post-decommissioning protocols shall include monitoring for the recovery of
2 native vegetation, colonization and spread of invasive species, use by wildlife,
3 and use by special status species. Monitoring data shall be used to determine
4 the success of reclamation activities and the need for changes in ongoing
5 management or for additional reclamation measures. Ongoing visual
6 inspections for a minimum of 5 years following decommissioning activities
7 shall be required to ensure that there is adequate restoration and minimal
8 environmental degradation. This period shall be extended until satisfactory
9 results are obtained.
- 10
11 • The facility fence shall remain in place for several years to help reclamation
12 (e.g., the fence could preclude large mammals and vehicles from disturbing
13 revegetation efforts). Shorter times for maintaining fencing may be
14 appropriate in cases where the likelihood of disturbance by cattle and wildlife
15 is low. In some cases, it may be appropriate to replace the original exclusion
16 fence with a new fence that excludes cattle and vehicles but allows for use by
17 pronghorn and large-game wildlife. This secondary fencing shall remain in
18 place until the revegetation efforts meet success criteria.

21 ***A.2.2.11.7 Transmission Lines and Roads***

22
23 Many of the design features presented above could also reduce, minimize, or avoid
24 impacts on ecological resources from the construction and operation of transmission lines. In
25 addition, the following design features are specifically applicable to protecting ecological
26 resources from transmission lines construction, operation, and maintenance:

- 27
28 • The placement of transmission towers within aquatic and wetland habitats
29 shall be avoided whenever feasible. If towers must be placed within these
30 habitats, they shall not impede flows or fish passage.
- 31
32 • If transmission lines are located near aquatic habitats or riparian areas
33 (e.g., minimum buffers identified in the applicable land use plan or best
34 available science and information), vegetation maintenance shall be limited
35 and performed mechanically rather than with herbicides. Cutting in wetlands
36 or stream and wetland buffers shall be done by hand or by feller-bunchers.
37 Tree cutting in stream buffers shall only target trees able to grow into a
38 transmission line conductor clearance zone within 3 to 4 years. Cutting in
39 such areas for construction or vegetation management shall be minimized, and
40 the disturbance of soil and remaining vegetation shall be minimized.
- 41
42 • Habitat disturbance shall be minimized by using helicopters for construction
43 to lessen the need for access roads, and by locating transmission facilities in
44 previously disturbed areas. Existing utility corridors and other support
45 structures shall be used to the maximum extent feasible.

- 1 • The establishment and spread of invasive species and noxious weeds within
2 the ROW and in associated areas where there is ground surface disturbance or
3 vegetation cutting shall be prevented. The area shall be monitored regularly,
4 and invasive species shall be eradicated immediately.
5
- 6 • If needed, temporary access roads shall be developed, primarily by the
7 removal of woody vegetation, although temporary timber mats should be used
8 in areas of wet soils. Wide-tracked or balloon-tired equipment, timber
9 corduroy, or timber mat work areas shall be used on wet soils where wetland
10 or stream crossings are unavoidable and where crossing on frozen ground is
11 not possible in winter. Areas rutted by equipment shall be immediately
12 regraded and revegetated. Towers shall be installed by airlift helicopters,
13 where necessary, to avoid extensive crossing of wetlands or highly sensitive
14 areas (such as those identified as rare natural habitats).
15
- 16 • ROW development and construction activities shall adhere to locally
17 established wildlife and/or habitat protection provisions. Exceptions or
18 modifications to spatial buffers or timing limitations will be evaluated on
19 a site-specific/species-specific basis in coordination with the local federal
20 administrator and state wildlife agency.
21
- 22 • Restrictions on timing and duration may be required to minimize impacts on
23 nesting birds (especially neotropical migrants and listed species) and should
24 be developed in coordination with the USFWS.
25
- 26 • To the extent practicable, work personnel shall stay within the ROW and/or
27 easements.
28
- 29 • Removal of raptor nests shall take place only if the birds are not actively using
30 the nest, particularly during the nesting and brood-rearing period. Nests shall
31 be relocated to nesting platforms, when possible; otherwise, they must be
32 destroyed when removed. An annual report on all nests moved or destroyed
33 will be provided to the appropriate federal and/or state agencies. Coordination
34 with the USFWS and BLM project wildlife biologist will occur in the event
35 that a raptor nest is located on a transmission line support structure. Removal
36 or relocation of a golden eagle or bald eagle nest (even an inactive nest)
37 requires a permit from the USFWS.
38
- 39 • Raven nests shall be removed from transmission towers to reduce predation
40 pressure on sensitive species, such as the desert tortoise, greater sage-grouse,
41 and Utah prairie dog. Raven nests can be removed only when inactive (i.e., no
42 eggs or young); if removal is otherwise necessary, an MBTA take permit from
43 the USFWS is required. The removal of raven nests should be addressed in the
44 Nuisance Animal and Pest Control Plan.
45

- 1 • Current guidelines and methodologies would be used in the design and
2 analysis of proposed transmission facilities in order to minimize the potential
3 for raptors and other birds to be electrocuted by them or to collide with them.
4
- 5 • Transmission line support structures and other facility structures shall be
6 designed to discourage their use by raptors for perching or nesting (e.g., by
7 use of anti-perching devices). This design would also reduce the potential for
8 increased predation of special status species, such as the desert tortoise, sage-
9 grouse, and Utah prairie dog. Mechanisms to visually warn birds (permanent
10 markers or bird flight diverters) shall be placed on transmission lines at
11 regular intervals to prevent birds from colliding with the lines.
12
- 13 • To the extent practicable, the use of guy wires shall be avoided because they
14 pose a collision hazard for birds and bats. Guy wires shall be clearly marked
15 with bird flight diverters to reduce the probability of collision.
16
- 17 • Shield wires shall be marked with devices that have been scientifically tested
18 and found to significantly reduce the potential for bird collisions.
19
- 20 • Any mortality of bird species (e.g., raptors) that is associated with power lines
21 shall be monitored and reported to the BLM and the USFWS, and measures
22 shall be taken to prevent future mortality.
23
24

25 **A.2.2.12 Design Features for Air Quality and Climate**

26
27 Most solar facilities would be located in desert environments. Fugitive dust emissions
28 from vehicle traffic on unpaved roads and/or from soil-disturbing activities would be the greatest
29 concern with respect to air quality impacts, especially during construction. These fugitive dust
30 emissions and other combustion-related emissions shall be controlled through stipulations
31 included in the ROW authorization and other permitting processes.
32

33 A project- and location-specific Dust Abatement Plan shall be prepared for all solar
34 facilities. Water spraying, which is widely used as a dust control measure, is sometimes not cost
35 effective (in water-deprived locations, for example). Paving is also not justifiable for roads that
36 have a low volume of traffic within and around a solar facility. Gravel can be used to reduce
37 fugitive dust from roads. Another solution for controlling dust is to apply a dust suppressant,
38 although this is not a permanent solution.
39

40 ***A.2.2.12.1 Siting and Design***

- 41
42
43 • All heavy equipment shall meet emission standards specified in the state code
44 of regulations, and routine preventive maintenance, including tune-ups to
45 meet the manufacturer's specifications, shall be implemented to ensure

1 efficient combustion and minimal emissions. Newer and cleaner equipment
2 that meets more stringent emission controls shall be leased or purchased.
3
4

5 ***A.2.2.12.2 General Multiphase Measures*** 6

- 7 • Access roads, on-site roads, and parking lots shall be surfaced with aggregate
8 that is hard enough that vehicles cannot crush it and thus cause dust or
9 compacted soil conditions. Paving could also be used on access roads and
10 parking lots. Alternatively, chemical dust suppressants or durable polymeric
11 soil stabilizers shall be used on these locations. The choice of dust suppression
12 measures shall consider the potential impacts on wildlife from the windborne
13 dispersal of fugitive dust containing dust suppressants and the potential impact
14 on future reclamation.
15
- 16 • All unpaved roads, disturbed areas (e.g., areas of scraping, excavation,
17 backfilling, grading, and compacting), and loose materials generated during
18 project activities shall be watered as frequently as necessary to minimize
19 fugitive dust generation. In water-deprived locations, water spraying shall be
20 limited to active disturbance areas only, and non-water-based dust control
21 measures shall be implemented in areas with intermittent use or use that is not
22 heavy, such as stockpiles or access roads.
23
- 24 • Machinery shall use air-emission-control devices as required by federal, state,
25 and local regulations or ordinances.
26
- 27 • On-site vehicle use shall be reduced to the extent feasible.
28
- 29 • Travel shall be limited to stabilized roads.
30
- 31 • The main access road to the main power block and the main maintenance
32 building area shall be paved.
33
- 34 • Speed limits (e.g., 10 mph [16 km/h]) within the construction site shall be
35 posted with visible signs and enforced to minimize airborne fugitive dust.
36
- 37 • All vehicles that transport loose materials as they travel on public roads shall
38 be covered, and their loads should be sufficiently wet and kept below the
39 freeboard of the truck.
40
- 41 • Workers shall be trained to comply with the speed limit, use good engineering
42 practices, minimize the drop height of materials, and minimize the number
43 and extent of disturbed areas. The project developer shall enforce these
44 requirements.
45

- 1 • Wind fences shall be installed around disturbed areas that could affect the area
2 beyond the site boundaries (e.g., nearby residences).
3
- 4 • All soil disturbance activities and travel on unpaved roads shall be suspended
5 during periods of high winds. A critical site-specific wind speed shall be
6 determined on the basis of soil properties determined during site
7 characterization, and monitoring of the wind speed shall be required at the site
8 during construction, operation, and reclamation.
9
- 10 • Any stockpiles created shall be kept on-site, with an upslope barrier in place
11 to divert runoff. Stockpiles shall be sprayed with water, covered with
12 tarpaulins, and/or treated with appropriate dust suppressants, especially in
13 preparation for high wind or storm conditions. Compatible native vegetative
14 plantings may also be used to limit dust generation from stockpiles that will
15 be inactive for a relatively long period. Chemical dust suppressants that emit
16 volatile organic compounds shall be avoided within or near ozone
17 nonattainment areas.
18
- 19 • All diesel engines used in the facility shall be fueled only with ultra-low sulfur
20 diesel with a sulfur content of 15 parts per million (ppm) or less.
21
- 22 • The idling time of diesel equipment shall be limited to no more than
23 10 minutes, unless idling must be maintained for proper operation
24 (e.g., drilling, hoisting, and trenching).
25
- 26 • Potential environmental impacts from the use of dust palliatives shall be
27 minimized by taking all necessary measures to keep the chemicals out of
28 sensitive soil and streams. In addition, the application of dust palliatives shall
29 comply with federal, state, and local laws and regulations. Dust palliatives
30 must meet the requirements of the applicable transmission system operator
31 (e.g., Western Area Power Administration construction standards prohibit the
32 use of oil as a dust suppressant).
33

34 ***A.2.2.12.3 Construction***

- 35
- 36
- 37 • Access to the construction site and staging areas shall be limited to authorized
38 vehicles only through the designated treated roads.
39
- 40 • Construction shall be staged to limit the exposed area at any time, whenever
41 practical.
42
- 43 • Tires of all construction-related vehicles shall be inspected and cleaned as
44 necessary so they are free of dirt before they enter paved public roadways.
45

- 1 • Visible trackout or runoff dirt on public roadways from the construction site
2 shall be cleaned (e.g., through street vacuum sweeping).
3
- 4 • Topsoil from all excavations and construction activities shall be salvaged and
5 reapplied during reclamation or, where feasible, used for interim reclamation
6 by being reapplied to construction areas not needed for facility operation as
7 soon as activities in that area have ceased.
8
- 9 • Because of low winds and stable atmospheric conditions occurring in the early
10 morning from late fall to early spring, the highest 24-hour concentrations of
11 particulate matter during construction would be attributable to activities
12 occurring during those hours. Thus, soil disturbance activities should be
13 eliminated or minimized under these atmospheric conditions, particularly for
14 construction activities occurring near facility boundaries.
15
- 16 • All soil-disturbing activities and travel on unpaved roads during high-wind
17 events shall be limited.
18
19

20 ***A.2.2.12.4 Operations***

21
22 Typically, a utility-scale solar facility would have few emission sources during normal
23 operations; however, the following design features are appropriate:
24

- 25 • All combustion sources shall comply with state emission standards (e.g., best
26 available control technology requirements).
27
- 28 • For portions of facilities that are maintained to be free of vegetation during
29 operations, the dust control design features that were used to limit fugitive
30 dust emissions during the construction phase shall be implemented to
31 minimize fugitive dust emissions from bare surfaces and unpaved access
32 roads.
33
- 34 • Alternative-fuel, electric, or latest-model-year vehicles shall be used, when
35 available, as facility service vehicles.
36
37

38 ***A.2.2.12.5 Decommissioning/Reclamation***

39
40 Decommissioning activities are generally the reverse of construction activities, so the
41 design features applied during construction shall also be applied during decommissioning.
42
43
44

1 **A.2.2.12.6 Transmission Lines and Roads**

2
3 Most design features applied to the construction, operation, and decommissioning
4 activities discussed above shall also be implemented during the entire life of transmission lines.
5 An additional design feature is to access the transmission lines from public roads and designated
6 routes to the maximum extent possible in order to minimize fugitive dust emissions.
7

8
9 **A.2.2.13 Design Features for Visual Resources**

10
11 The nature, extent, and magnitude of visual impacts from utility-scale solar facilities will
12 vary on a site-specific basis and depend on the specific phase of the project (e.g., construction or
13 operation). Similarly, visual impact mitigation measures will vary on a site-specific basis and
14 depend on the specific phase of the project.
15

16 The BLM and DOI, as well as other federal agencies such as the U.S. Forest Service
17 (USFS), have established measures for mitigating the visual impacts of energy production,
18 transmission, roads, and other forms of development on federal lands of the western
19 United States. Several of their publications were primary sources for the design features listed
20 in this section.
21

22 Solar energy development and related activities proposed on BLM-administered lands
23 and connected actions shall abide by VRM policies and procedures defined in BLM’s Manual
24 M-8400, *Visual Resource Management*, and Handbooks H-8410-1, *Visual Resource Inventory*,
25 and H-8431-1, *Visual Resource Contrast Rating*. Other policy requirements and clarifications are
26 available in IM 98-164 and IM 2009-167.
27

28
29 **A.2.2.13.1 Siting and Design**

30
31 The greatest potential for visual impact mitigation associated with a utility-scale solar
32 energy project and associated electricity transmission facilities occurs as a result of decisions
33 made during the siting and design of the project. Visual impacts can be substantially reduced or
34 avoided by careful project siting.
35

36 The BLM resource management plans (RMPs) designate VRM Classes I–IV, which
37 establish objectives for managing allowable levels of visual change to the landscape. Solar
38 development and related activities are required to meet the VRM class objectives. Project
39 developers shall consult the VRM class designations and associated management objectives
40 during the early phases of project planning, including those related to project due diligence, site
41 selection, planning, and design. It is the developer’s responsibility to conduct an early
42 investigation of the respective project’s compatibility with the VRM class objectives and the
43 potential that these objectives can be met by applying thoughtful and creative design principles.
44 Project developers shall document and demonstrate how the visual management objectives were
45 factored into the various phases of project planning and decision rationale.
46

1 The BLM visual resource inventory (VRI) class values—including those for scenic
2 quality, sensitivity, and distance zones—shall also be factored into the project planning, design,
3 and decision making. Project developers shall demonstrate how the visual values influence
4 project design and document how impacts on these values are minimized through consideration
5 for the proposed project location and its relationship to the surrounding viewshed. This
6 information shall be included as a part of the critical due diligence information considered when
7 determining and selecting solar development sites and ROW boundaries. ROW location, size,
8 and boundary determinations shall consider terrain characteristics and opportunities for full or
9 partial project concealment by recessing the project into the landscape terrain.

10
11 Project developers shall consult with the BLM in the early phases of project planning to
12 help determine the proposed project’s potential conformance to the applicable RMP’s VRM
13 class designation and other potential constraints, thus avoiding costly unforeseen planning
14 implications and re-design.

15
16 A qualified and licensed professional landscape architect with demonstrated experience
17 with the BLM’s VRM policies and procedures shall be a part of the developer’s and the BLM’s
18 respective planning teams, evaluating visual resource issues as project siting options are
19 considered. The visual issues shall be addressed throughout the planning and design process, and
20 the final project plans shall reflect intended methods for mitigating visual impacts.

21
22 The appropriate BLM field office and locally based public shall be consulted to provide
23 input on identifying important visual resources in the project area and on the siting and design
24 process. The public shall be involved and informed about the visual site design elements of the
25 proposed solar energy facilities. Possible approaches include conducting public forums for
26 disseminating information, offering organized tours of operating solar energy development
27 projects, and using computer and visualization simulations in public presentations.

28
29 Project developers shall also consult on viewshed protection objectives and practices with
30 the respective land management agencies that have been assigned administrative responsibility
31 for landscapes having special designations, such as Wilderness Areas, National Scenic and
32 Historic Trails, Wild and Scenic Rivers, etc., National Parks, and National Wildlife Refuges
33 located within the project’s viewshed. Developers shall demonstrate a concerted effort to
34 reconcile conflicts while recognizing that the BLM retains authority for final decisions
35 determining project approval and conditions.

36
37 The following are specific to National Historic Trails but possibly pertain to other
38 specially designated lands, such as Wild and Scenic Rivers, Wilderness Areas, National Parks,
39 and National Wildlife Refuges:

- 40
41 • For applications that include artifacts and remnants of a National Historic
42 Trail, are located within the viewshed of a National Historic Trail’s designated
43 centerline, or include or are within the viewshed of a trail eligible for listing
44 on the *National Register of Historic Places* (NRHP) by virtue of its important
45 historical or cultural values and integrity of setting, the applicant shall
46 evaluate the potential visual impacts on the trail associated with the proposed

1 project; minimize, avoid, or mitigate adverse effects through the Section 106
2 consultation process; and identify appropriate mitigation measures for
3 inclusion as stipulations in the POD. This requirement does not supersede or
4 amend National Historic Trails requirements cited in other sections but is in
5 addition to and supportive of them.
6

- 7 • Because the landscape setting observed from units of the National Park
8 system, national historic sites, national trails, and Tribal cultural resources
9 may be a part of the historic context contributing to the historic significance of
10 the site or trail, project siting shall avoid locating facilities that would alter the
11 visual setting in a way that would reduce the historic significance or function,
12 even if compliant with VRM objectives. This requirement does not supersede
13 or amend national historic sites, national trails, and Tribal cultural resources
14 requirements cited in other sections but is in addition to and supportive of
15 them.
16

17 Project developers shall obtain topographical data of engineering-design quality and use
18 digital terrain mapping tools at a landscape-viewshed scale for project location selection, site
19 planning and design, visual impact analysis, and visual impact mitigation planning and design.
20 Visual mitigation planning and design shall be performed through field assessments, applied
21 global positioning system (GPS) technology, photo documentation, use of computer-aided design
22 and development software, three-dimensional GIS modeling software, and imaging software to
23 depict visual simulations to reflect a full range of visual resource mitigation measures. The
24 digital terrain mapping tools shall be at a resolution and contour interval suitable for site design
25 and accurate placement of proposed developments into the digital viewshed. Visual simulations
26 shall be prepared and evaluated in accordance with BLM Handbook H-8431-1 and other agency
27 directives, to create spatially accurate depictions of the appearance of proposed facilities.
28 Simulations shall depict proposed project facilities from key observation points (KOPs) and
29 other visual resource sensitive locations.
30

31 The siting and design of solar facilities, structures, roads, and other project elements shall
32 explore and document design considerations for repeating the natural form, line, color, and
33 texture of the existing landscape in accordance and compliance with the VRM class objectives.
34

35 The full range of visual BMPs shall be considered, and plans shall incorporate all
36 pertinent BMPs. Visual resource monitoring and compliance strategies shall be included as a part
37 of the project mitigation plans to cover the construction, operation, and decommissioning phases.
38

39 Conformance with VRM objectives shall be determined through the use of the BLM
40 contrast rating procedures defined in BLM Handbook H-8431-1. Visual contrast rating
41 mitigation of visual impacts shall abide by the requirements outlined in the handbook and other
42 BLM directives. Plans for facilities determined not to be in conformance with VRM objectives
43 either shall not be approved or shall be redesigned in order to meet the VRM objectives, and
44 updated visual simulations shall be prepared. Revised project plans and simulations shall be
45 reevaluated by using the contrast rating procedures and repeated until the proposed action is
46 found to be in conformance.
47

1 KOPs shall be selected by first determining the extent of the viewshed by using the
2 viewshed modeling tools previously cited. The viewshed modeling should illustrate the areas
3 from which the proposed facilities may be seen out to 25 mi (40 km)—line-of-sight measured
4 from the top elevations of facilities out to 5.5 ft (1.7 m) above the ground terrain. From within
5 the areas, KOPs would then be selected at places where people would be expected: at roads,
6 trails, campgrounds, recreationally active river corridors, residential areas, etc. For the purpose
7 of conducting a visual contrast rating evaluation, the number of KOPs would be reduced to those
8 that serve as the best representations for demonstrating conformance to the respective VRM class
9 objectives. The BLM must approve KOP selections, and the BLM reserves the right to require
10 additional KOPs to further determine the extent of visual impact and conformance to VRM class
11 objectives.

12
13 Visual design elements shall be integrated into the construction plans, details, shop
14 drawings, and specifications; these shall include, but not be limited to, grubbing and clearing,
15 vegetation thinning and clearing, grading, revegetation, drainage, and structural plans. Visual
16 design elements within the plans shall be measurable and monitored while under construction,
17 while operational, and when decommissioned. The plans shall include a monitoring and
18 compliance plan that establishes the monitoring requirements and thresholds for acceptable
19 performance. The contrast rating procedures shall also be integrated as a field measuring
20 compliance tool during operations and after decommissioning.

21
22 The following specific project siting measures can help reduce visual impacts of solar
23 energy development projects and associated but independent facilities. Project planning and
24 designs shall demonstrate the relevance and application of all BLM visual BMPs to the specific
25 project, including, but not limited to, the following:

26 27 28 **Viewshed-Based Site Selection and Siting**

- 29
30 • Project developers shall exhaust opportunities to minimize visual dominance
31 of projects by siting projects outside the viewsheds of KOPs or by siting them
32 as far away as possible, diminishing dominance by maximizing visible
33 separation with distance.
- 34
35 • Facility siting shall incorporate measures to minimize the profile of all
36 facility-related structures to reduce visibility and visual dominance within
37 the viewshed—particularly for facilities proposed within the foreground/
38 middleground distance zone (0–5 mi [0–8 km]) of sensitive viewing locations
39 with extended viewing opportunities and/or moving viewpoints including, but
40 not limited to, National Scenic Byways, All-American Roads, State Scenic
41 Byways, BLM Backcountry Byways, Special Recreation Management Areas
42 (SRMAs), trails, residential areas, etc.
- 43
44 • Siting shall take advantage of both topography and vegetation as screening or
45 partially screening devices to interrupt and restrict the views of projects from
46 KOPs and visually sensitive areas.
- 47

- 1 • Locating facilities near visually prominent landscape features (e.g., knobs and
2 waterfalls) that naturally draw an observer’s attention shall be avoided.
3
- 4 • Visual “skylining” shall be avoided by placing structures, transmission lines,
5 and other facilities away from ridgelines, summits, or other locations where
6 they would silhouette against the sky from important viewing locations. Siting
7 shall take advantage of opportunities to use topography as a backdrop for
8 views of facilities and structures to avoid skylining. Alternatives shall be
9 evaluated, and the least visually intrusive option shall be selected when linear
10 facilities (e.g. transmission lines) cross over ridgelines.
11
- 12 • Siting of linear features (e.g., ROWs and roads) shall follow natural land
13 contours rather than straight lines, particularly up slopes. Fall-line cuts shall
14 be avoided. Following natural contours echoes the lines found in the natural
15 landscape and often reduces cut-and-fill requirements; straight lines can
16 introduce conspicuous linear contrasts that appear unnatural.
17
- 18 • Linear developments (e.g., transmission lines, pipelines, roads) shall follow
19 the edges of natural clearings or natural lines of transition between vegetation
20 type, topography, etc. (where they would be less conspicuous) rather than pass
21 through the center of clearings.
22

23
24 **Reduction of Surface Disturbance, Grading and Edge Treatments**
25

- 26 • In visually sensitive areas, air transport capability shall be used to mobilize
27 equipment and materials for clearing, grading, and erecting transmission
28 towers, thereby preserving the natural landscape conditions between tower
29 locations and reducing the need for permanent and/or temporary access roads.
30
- 31 • Vegetation and ground disturbance shall be minimized and take advantage of
32 existing clearings.
33
- 34 • Structures and roads shall be designed and located to minimize and balance
35 cuts and fills. Retaining walls, binwalls, half bridges, and tunnels shall be used
36 to reduce cut and fill.
37
- 38 • Road-cut slopes shall be rounded, and the cut-and-fill pitch shall be varied to
39 reduce contrasts in form and line; the slope shall be varied to preserve
40 specimen trees and nonhazardous rock outcroppings.
41
- 42 • Natural or previously excavated bedrock landforms shall be sculpted and
43 shaped when excavation of these landforms is required. Percent backslope,
44 benches, and vertical variations shall be integrated into a final landform that
45 repeats the natural shapes, forms, textures, and lines of the surrounding
46 landscape. The earthen landform shall be integrated and transitioned into the

1 excavated bedrock landform. Sculpted rock face angles, bench formations,
2 and backslope need to adhere to the natural bedding planes of the natural
3 bedrock geology. Half-case drill traces from pre-split blasting shall not remain
4 evident in the final rock face. The color contrast from the excavated rock faces
5 shall be removed by color treating with a rock stain. Native vegetation (where
6 feasible) or a mix of native and non-native species (if necessary to ensure
7 successful revegetation) shall be reestablished with the benches and cavities
8 created within the created bedrock formation.
9

- 10 • Where screening topography and vegetation are absent or minimal, natural-
11 looking earthwork landforms, vegetative, or architectural screening shall be
12 used to minimize visual impacts. The shape and height of earthwork
13 landforms must be adapted to the surrounding landscape, and must consider
14 the distance and viewing angle from KOPs in order to ensure that the
15 earthworks are visually unobtrusive.
16
- 17 • Openings in vegetation for facilities, structures, roads, etc., shall be feathered
18 and shaped to repeat the size, shape, and characteristics of naturally occurring
19 openings.
20
- 21 • Topsoil from the site shall be stripped, stockpiled, and stabilized before
22 excavating earth for facility construction.
23
- 24 • All electrical collector lines and pipelines shall be buried in a manner that
25 minimizes additional surface disturbance (e.g., along roads or other paths of
26 surface disturbance).
27

28 **Building and Structural Materials**

29
30
31 Visual impacts associated with solar energy and electricity transmission projects shall be
32 mitigated by choosing appropriate building and structural materials and surface treatments
33 (i.e., paints or coatings designed to reduce contrast and reflectivity). A careful study of the site
34 shall be performed to identify appropriate colors and textures for materials; both summer and
35 winter appearance shall be considered, as well as seasons of peak visitor use. Massing and scale
36 of structures and the architectural character appropriate to the region where a solar facility is to
37 be located shall be considered. Architectural character considerations shall include integration of
38 vertical and horizontal relief variation to create shadow lines that diminish the overall visual
39 scale and dominance of facilities. The choice of colors shall be based on the appearance at
40 typical viewing distances and consider the entire landscape around the proposed development.
41 Appropriate colors for smooth surfaces often need to be two to three shades darker than the
42 background color to compensate for shadows that darken most textured natural surfaces. The
43 BLM Standard Environmental Color Chart CC-001 and guidance shall be referenced when
44 selecting colors.
45
46

1 Specific design features include the following:
2

- 3 • Materials and surface treatments shall repeat and/or blend with the existing
4 form, line, color, and texture of the landscape.
5
- 6 • Appropriately colored materials shall be selected for structures, or appropriate
7 stains/coatings shall be applied to blend with the project's backdrop.
8
- 9 • Solar panel backs shall be color-treated to reduce visual contrast with the
10 landscape setting.
11
- 12 • Solar towers shall be color-treated to reduce visual contrast.
13
- 14 • Materials, coatings, or paints having little or no reflectivity shall be used
15 whenever possible.
16
- 17 • Grouped structures shall be painted the same color to reduce visual
18 complexity and color contrast.
19
- 20 • Multiple color camouflage technology applications shall be considered for
21 projects within sensitive viewsheds and with a visibility distance that is
22 between 0.25 and 2 mi (0.40 and 3.20 km). BLM guidance on the use of color
23 to mitigate visual impacts should be consulted.
24
- 25 • Aboveground pipelines shall be painted or coated to match their surroundings.
26
- 27 • Consideration shall be given to the appropriate choice of monopoles vs. lattice
28 towers for a given landscape setting. Monopoles may reduce visual impacts
29 more effectively than lattice towers in foreground and midground views
30 within built or partially built environments, while lattice towers tend to be
31 more appropriate for less-developed rural landscapes, where the latticework
32 would be more transparent against background textures and colors.
33

34 **Glint and Glare**

- 35 • Solar facilities shall be sited and designed properly to eliminate glint and glare
36 effects on roadway users, nearby residences, commercial areas, or other
37 highly sensitive viewing locations or to reduce them to the lowest achievable
38 levels. Regardless of the solar technology proposed, a Glint and Glare
39 Assessment, Mitigation, and Monitoring Plan must assess accurately and
40 quantify potential glint and glare effects and determine the potential health,
41 safety, and visual impacts associated with glint and glare. The assessment
42 shall be conducted by qualified individuals using appropriate and commonly
43 accepted software and procedures. The assessment results must be made
44 available to the BLM in advance of project approval. If the project design is
45
46

1 changed during the siting and design process such that substantial changes to
2 glint and glare effects may occur, glint and glare effects shall be recalculated,
3 and the results shall be made available to BLM.

- 4
- 5 • Mirrors/heliostats shall be deployed and operated to avoid high-intensity light
6 (glare) being reflected toward off-site ground receptors. Where off-site glare
7 is unavoidable and project site/off-site spatial relationships favor effective
8 results, fencing with privacy slats or similar screening materials shall be
9 employed.
- 10
- 11 • Electricity transmission/distribution projects shall utilize nonspecular
12 conductors and nonreflective coatings on insulators.
- 13
- 14

15 **Night-Sky Protection**

- 16
- 17 • A lighting plan shall be prepared that documents how lighting will be
18 designed and installed to minimize night-sky impacts during facility
19 construction and operations. Lighting for facilities shall not exceed the
20 minimum number of lights and brightness required for safety and security and
21 shall not cause excessive reflected glare. Low-pressure sodium light sources
22 shall be used to reduce light pollution. Full cut-off luminaires shall be used to
23 minimize uplighting. Lights shall be directed downward or toward the area to
24 be illuminated. Light fixtures shall not spill light beyond the project boundary.
25 Lights in highly illuminated areas that are not occupied on a continuous basis
26 shall have switches, timer switches, or motion detectors so that the lights
27 operate only when the area is occupied. Where feasible, vehicle-mounted
28 lights shall be used for night maintenance activities. Wherever feasible,
29 consistent with safety and security, lighting shall be kept off when not in use.
30 The lighting plan shall include a process for promptly addressing and
31 mitigating complaints about potential lighting impacts.
- 32
- 33 • In order to minimize night-sky impacts from hazard navigation lighting
34 associated with solar facilities, the applicant shall use AVWS technology for
35 any structures exceeding 200 ft (61 m) in height. If the FAA denies a permit
36 for use of AVWS, the applicant shall limit lighting to the minimum required
37 to meet FAA safety requirements. The use of red or white strobe lighting shall
38 be prohibited unless BLM approves its use because of conflicting mitigation
39 requirements.
- 40
- 41 • The use of signs and project construction signs shall be minimized. Necessary
42 signs shall be made of nonglare materials and utilize unobtrusive colors. The
43 reverse sides of signs and mounts shall be painted or coated by using the most
44 suitable color selected from the BLM Standard Environmental Color Chart to
45 reduce color contrasts with the existing landscape; however, placement and

1 design of any signs required by safety regulations must conform to regulatory
2 requirements.

- 3
4 • Commercial symbols or signs and associated lighting on buildings or other
5 structures shall be prohibited.
6

7 8 ***A.2.2.13.2 General Multiphase Measures***

- 9
10 • “Good housekeeping” procedures shall be developed to ensure that the site is
11 kept clean of debris, garbage, fugitive trash or waste, and graffiti; to prohibit
12 scrap heaps and dumps; and to minimize storage yards. Design features for
13 effective waste management shall be applied.
14

15 16 ***A.2.2.13.3 Construction***

17
18 A pre-construction meeting with BLM landscape architects or other designated
19 visual/scenic resource specialists shall be held before construction begins to coordinate the VRM
20 mitigation strategy and confirm the compliance-checking schedule and procedures. Final design
21 and construction documents will be reviewed for completeness with regard to the visual
22 mitigation elements, assuring that requirements and commitments are adequately addressed. The
23 construction documents shall include, but not be limited to, grading, drainage, revegetation,
24 vegetation clearing and feathering plans, and they must demonstrate how VRM objectives will
25 be met, monitored, and measured for conformance.
26

27 Project developers shall integrate interim/final reclamation VRM mitigation elements
28 early in the construction process; these may include treatments, such as thinning and feathering
29 vegetation along project edges, enhanced contour grading, salvaging landscape materials from
30 within construction areas, special revegetation requirements, etc. Developers shall coordinate
31 with BLM in advance to have BLM landscape architects or other designated visual/scenic
32 resource specialists on-site during construction to work on implementing visual resource
33 requirements and BMPs.
34

35 Visual impacts associated with construction activities can be partially mitigated by
36 implementing the following design features, where feasible:
37

- 38 • Project developers shall reduce visual impacts during construction by clearly
39 delineating construction boundaries and minimizing areas of surface
40 disturbance; preserving vegetation to the greatest extent possible; utilizing
41 undulating surface disturbance edges; stripping, salvaging, and replacing
42 topsoil; using contoured grading; controlling erosion; using dust suppression
43 techniques; and restoring exposed soils to their original contour and
44 vegetation.
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- A Decommissioning and Site Reclamation Plan shall be in place prior to construction. Reclamation of the construction site shall begin immediately after construction to reduce the likelihood of visual contrasts associated with erosion and invasive weed infestation and to reduce the visibility of temporarily disturbed areas as quickly as possible.
- Visual impact mitigation objectives and activities shall be discussed with equipment operators before construction activities begin.
- Existing rocks, vegetation, and drainage patterns shall be preserved to the maximum extent possible.
- Brush-beating, mowing, or using protective surface matting rather than removing vegetation shall be employed where feasible.
- Slash from vegetation removal shall be mulched and spread to cover fresh soil disturbances as part of the revegetation plan. Slash piles shall not be left in sensitive viewing areas.
- All areas of disturbed soil shall be reclaimed by using weed-free native grasses, forbs, and shrubs representative of the surrounding and intact native vegetation composition and/or using non-native species, if necessary, to ensure successful revegetation.
- The visual color contrast of graveled surfaces shall be reduced with approved color treatment practices.
- Horizontal and vertical pipeline bending shall be used in place of cut-and-fill activities where feasible.
- Road-cut slopes shall be rounded, and the cut-and-fill pitch shall be varied to reduce contrasts in form and line. The slope shall be varied to preserve specimen trees and nonhazardous rock outcroppings.
- Topsoil from cut-and-fill activities shall be segregated and spread on freshly disturbed areas to reduce color contrast and aid rapid revegetation. Topsoil piles shall not be left in sensitive viewing areas.
- Excess fill material shall not be disposed of downslope, in order to avoid creating color contrast with existing vegetation and soils.
- Excess cut-and-fill materials shall be hauled in or out to minimize ground disturbance and impacts from fill piles.
- Natural or previously excavated bedrock landforms shall be sculpted and shaped when excavation of these landforms is required, and landforms shall

1 conform to the requirements listed and further described under A.2.2.13.1,
2 Siting and Design. Half-case drill traces from pre-split blasting shall not
3 remain evident in the final rock face. The color contrast from the excavated
4 rock faces shall be removed by color-treating with a rock stain. Native
5 vegetation (where feasible) or a mix of native and non-native species (if
6 necessary to ensure successful revegetation) shall be reestablished with the
7 benches and cavities created within the created bedrock formation.
8

- 9 • Communication and other local utility cables shall be buried where feasible.
- 10
- 11 • Culvert ends shall be painted or coated to reduce color contrasts with the
12 existing landscape.
- 13
- 14 • No paint or permanent discoloring agents shall be applied to rocks or
15 vegetation to indicate surveyor construction activity limits.
- 16
- 17 • All stakes and flagging shall be removed from the construction area and
18 disposed of in an approved facility.
19

20

21 ***A.2.2.13.4 Operations***

22

23 Terms and conditions for VRM mitigation compliance shall be maintained and monitored
24 for compliance with visual objectives, adaptive management adjustments, and modifications, as
25 necessary and approved by the BLM landscape architect or other designated visual/scenic
26 resource specialist.
27

28 Visual impacts associated with operation and maintenance activities could be partially
29 mitigated by implementing the following measures, where applicable:
30

- 31 • The project developer shall maintain revegetated surfaces until a self-
32 sustaining stand of vegetation is reestablished and visually adapted to the
33 undisturbed surrounding vegetation. No new disturbance shall be created
34 during operations without completion of a VRM analysis and approval by the
35 authorized officer.
36
- 37 • Interim restoration shall be undertaken during the operating life of the project
38 as soon as possible after disturbances.
- 39
- 40 • Maintenance activities shall include dust abatement (in arid environments)
41 and noxious weed control.
42
- 43 • Road maintenance activities shall avoid blading existing forbs and grasses in
44 ditches and adjacent to roads.
45

- 1 • Painted facilities shall be kept in good repair and repainted when the color
2 fades or flakes.
- 3
- 4 • Color-treated solar panel/mirror backs/supports shall be kept in good repair
5 and be retreated when the color fades and flakes.
- 6
- 7

8 ***A.2.2.13.5 Decommissioning/Reclamation***

9

10 A Decommissioning and Site Reclamation Plan, covering visual impact design features,
11 shall be in place prior to construction, and reclamation activities shall be undertaken as soon as
12 possible after disturbances occur and be maintained throughout the life of the project. The
13 following decommissioning/reclamation activities/practices can partially mitigate visual impacts
14 associated with solar energy development, where feasible:

- 15
- 16 • Predevelopment visual conditions and the inventoried visual quality rating
17 (A, B, C) and integrity shall be reviewed, and the visual elements of form,
18 line, color, and texture shall be restored to predevelopment visual
19 compatibility or to that of the surrounding landscape setting conditions,
20 whichever achieves the better visual quality and most ecologically sound
21 outcome.
- 22
- 23 • A Decommissioning and Site Reclamation Plan shall be developed, approved
24 by the BLM, and implemented. The plan shall require that all aboveground
25 and near-ground structures be removed. Some structures shall only be
26 removed to a level below the ground surface that will allow reclamation/
27 restoration. Topsoil from all decommissioning activities shall be salvaged and
28 reapplied during final reclamation. The plan shall include provisions for
29 monitoring and determining compliance with the project's visual mitigation
30 and reclamation objectives.
- 31
- 32 • Soil borrow areas, cut-and-fill slopes, berms, water bars, and other disturbed
33 areas shall be contoured to approximate naturally occurring slopes, thereby
34 avoiding form and line contrasts with the existing landscapes. Contouring to a
35 rough texture would trap seeds and discourage off-road travel, thereby
36 reducing associated visual impacts.
- 37
- 38 • Cut slopes shall be randomly scarified and roughened to reduce texture
39 contrasts with existing landscapes and aid in revegetation.
- 40
- 41 • A combination of seeding, planting nursery stock, and transplanting local
42 vegetation within the proposed disturbance areas and staging of construction
43 enabling direct transplanting shall be considered. Where feasible, native
44 vegetation shall be used for revegetating, to establish a composition consistent
45 with the form, line, color, and texture of the surrounding undisturbed
46 landscape.
- 47

- 1 • Stockpiled topsoil shall be reapplied to disturbed areas, and the areas shall be
2 revegetated by using a mix of native species selected for visual compatibility
3 with existing vegetation, where applicable, or by using a mix of native and
4 non-native species if necessary to ensure successful revegetation.
5
- 6 • Gravel and other surface treatments shall be removed or buried.
7
- 8 • Rocks, brush, and forest debris shall be restored whenever possible to
9 approximate pre-existing visual conditions.
10
- 11 • Edges of revegetated areas shall be feathered to reduce form and line contrasts
12 with the existing landscapes.
13
- 14 • A decommissioning VRM monitoring and compliance plan shall be prepared
15 by the operator and approved by the BLM that establishes the schedule and
16 terms for monitoring and the conditions and methods of measurement for
17 determining compliance,
18

19 ***A.2.2.13.6 Use of Off-Site Mitigation***

- 21 • In addition to mitigation measures that directly reduce the impacts of solar
22 energy and associated facilities, the off-site mitigation of visual impacts may
23 be an option in some situations. Off-site mitigation shall be considered in
24 situations where nonconforming proposed actions may lead to changing the
25 VRM class objectives through an RMP amendment. Unavoidable visual
26 impacts may then be mitigated by a correction or remediation of a
27 nonconforming existing condition resulting from a different proposed action
28 located within the same viewshed for impacts of approximately equal
29 magnitude, and within the same or a more protective VRM class. The off-site
30 mitigation serves as a means to offset and recover the loss of visual landscape
31 integrity. For example, off-site mitigation could include reclaiming
32 unnecessary roads, removing abandoned buildings, reclaiming abandoned
33 mine sites, putting utility lines underground, rehabilitating and revegetating
34 existing erosion or disturbed areas, or establishing scenic conservation
35 easements. In situations where off-site mitigation opportunities are absent
36 within the same viewshed, then different viewsheds that need mitigation of
37 visual impacts because they could affect highly sensitive visual resources (for
38 example, along National Scenic and Historic Trails, Wild and Scenic River
39 corridors, Scenic or Backcountry Byways, etc.) may be considered. BLM
40 policy guidance on off-site mitigation procedures is contained in BLM
41 IM 2008-204, *Offsite Mitigation*.
42
43
44
45

1 **A.2.2.14 Design Features for Noise**
2
3

4 ***A.2.2.14.1 Siting and Design***
5

- 6 • Project developers shall take measurements to assess the existing background
7 ambient sound levels both within and outside the project site and compare
8 these with the anticipated noise levels associated with the proposed facility.
9 The ambient measurement protocols of all affected land management agencies
10 shall be considered and utilized. Nearby residences and likely sensitive human
11 and wildlife receptor locations shall be identified at this time.
12
- 13 • Siting of stationary construction equipment (e.g., compressors and generators)
14 shall be far from nearby residences and other sensitive receptors.
15
- 16 • Permanent sound-generating facilities (e.g., compressors, pumps) shall be
17 sited away from residences and other sensitive receptors. In areas of known
18 conflicts, acoustic screening will be required.
19
- 20 • Where feasible, low-noise systems (e.g., for ventilation systems, pumps,
21 generators, compressors, and fans) shall be incorporated, and equipment that
22 has no prominent discrete tones shall be selected.
23
- 24 • If a wet cooling tower is to be used, the louvered side shall be sited to face
25 away from sensitive receptors. The cooling tower shall be located in such a
26 manner that nearby equipment can act as a barrier and further reduce noise.
27 Quieter fans shall be selected in the facility design, and fans operated at a
28 lower speed, particularly if they are to operate at night. If a high degree of
29 reduction in noise is required, silencers shall be used on the fan stacks.
30
- 31 • Noise reduction measures that shall be considered include siting noise sources
32 to take advantage of topography and distance and constructing engineered
33 sound barriers and/or berms or sound-insulated buildings, if needed, to reduce
34 potential noise impacts at the locations of nearby sensitive receptors. As an
35 alternative, solar facilities generating higher operational noise (e.g., a solar
36 dish engine facility) could take advantage of higher background noise. For
37 example, they could be sited within an existing noisy area, such as close to a
38 well-traveled highway, where the ambient sounds partially mask the noise
39 from the facility.
40

41
42 ***A.2.2.14.2 General Multiphase Measures***
43

- 44 • All equipment shall be maintained in good working order in accordance with
45 manufacturers' specifications. For example, suitable mufflers and/or air-inlet

1 silencers shall be installed on all internal combustion engines (ICEs) and
2 certain compressor components.

- 3
- 4 • If residences or sensitive receptors are nearby, noisy equipment, such as
5 turbines and motors, shall be placed in enclosures.
- 6
- 7 • All vehicles traveling within and around the project area shall be operated in
8 accordance with posted speed limits to reduce vehicle noise levels.
- 9
- 10 • Warning signs shall be posted in high-noise areas, and a hearing protection
11 program shall be implemented for work areas with noise in excess of 85 dBA.
- 12
- 13 • Project developers shall realize that complaints about noise may still occur,
14 even when the noise levels from the facility do not exceed regulatory levels.
15 Accordingly, a noise complaint process and hotline for the surrounding
16 communities shall be implemented, including documentation, investigation,
17 evaluation, and resolution of all legitimate project-related noise complaints.
- 18
- 19

20 ***A.2.2.14.3 Construction and Decommissioning/Reclamation***

- 21
- 22 • Construction and decommissioning activities and construction traffic shall be
23 scheduled to minimize disruption to nearby residents and existing operations
24 surrounding the project areas.
- 25
- 26 • If residences or sensitive receptors are nearby, noisy construction and
27 decommissioning activities shall be limited to the least noise-sensitive times
28 of day (daytime between 7 a.m. and 7 p.m.) and weekdays. Quieter activities,
29 such as instrumentation or interior installation, could be conducted at any
30 time.
- 31
- 32 • Whenever feasible, different noisy activities shall be scheduled to occur at the
33 same time, since additional sources of noise generally do not increase noise
34 levels at the site boundary by much. That is, less-frequent but noisy activities
35 would generally be less annoying than lower-level noise occurring more
36 frequently.
- 37
- 38 • Noise control measures (e.g., erection of temporary wooden noise barriers)
39 shall be implemented if noisy activities are expected near sensitive receptors.
- 40
- 41 • If noisy activities, such as blasting or pile driving, are required during the
42 construction or decommissioning period, nearby residents shall be notified in
43 advance.
- 44
- 45
- 46

1 **A.2.2.14.4 Operations**
2

- 3 • If a noise from a transformer becomes an issue, a new transformer with
4 reduced flux density, which generates noise levels as much as 10 to 20 dB
5 lower than National Electrical Manufacturers Association (NEMA) standard
6 values, could be installed. Alternatively, barrier walls, partial enclosures, or
7 full enclosures could be adopted to shield or contain the transformer noise,
8 depending on the degree of noise control needed.
9

10 **A.2.2.14.5 Transmission Lines and Roads**
11

12
13 Most design features applied to the construction, operation, and decommissioning
14 activities discussed above shall also be implemented during the entire life of transmission lines.
15 An additional design feature in the case of helicopter use, typically of short duration but with
16 high-level noise, is the following:
17

- 18 • Helicopter flights at low altitude (under 1,500 ft [457 m]) near noise-sensitive
19 receptors shall be minimized except at locations where only helicopter
20 activities can perform the task.
21

22 **A.2.2.15 Design Features for Paleontological Resources**
23

24
25 Coordination between the project developer and the BLM shall be required for all
26 projects before areas are developed. The use of management practices, such as training/education
27 programs to reduce the amount of inadvertent destruction to paleontological sites, could also
28 reduce the occurrences of human-related disturbances to nearby sites. The specifics of these
29 management practices shall be established in project-specific coordination between the project
30 developer and the BLM. BLM IM 2009-011 provides guidance for assessing potential impacts
31 on paleontological resources and determining mitigation measures.
32

33 Design features to reduce impacts on paleontological resources shall be required and
34 could include the following:
35

- 36 • Project developers shall determine whether paleontological resources exist in
37 a project area on the basis of the following: the sedimentary context of the
38 area and its potential to contain paleontological resources (potential fossil
39 yield classification [PFYC] class, if it is available); a records search of
40 published and unpublished literature for past paleontological finds in the area;
41 coordination with paleontological researchers working locally in potentially
42 affected geographic areas and geologic strata; and/or depending on the extent
43 of existing information, the completion of a paleontological survey.
44
45 • If paleontological resources are present at the site or if areas with a high
46 potential to contain paleontological material have been identified, a

1 paleontological resources management plan shall be developed. This shall
2 include a mitigation plan; mitigation may include avoidance, removal of
3 fossils (data recovery), stabilization, monitoring, use of protective barriers and
4 signs, or use of other physical or administrative protection measures. The
5 paleontological resources management plan shall also identify measures to
6 prevent potential looting/vandalism or erosion impacts and address the
7 education of workers and the public to make them aware of the consequences
8 of unauthorized collection of fossils on public land.

- 9
- 10 • If an area has a high potential for fossils but no fossils are observed during the
11 survey, monitoring by a qualified paleontologist may be required by the BLM
12 during all excavation and earthmoving activities in the sensitive area.
13 Development of a monitoring plan is recommended.
 - 14
 - 15 • If fossils are discovered during construction, the BLM shall be notified
16 immediately. Work shall be halted at the fossil site and continued elsewhere
17 until a qualified paleontologist can visit the site and make site-specific
18 recommendations for collection or other resource protection. The area of the
19 discovery shall be protected to ensure that the fossils are not removed,
20 handled, altered, or damaged.

21

22 Adopting the approaches above does not mean that there would be no impacts on
23 paleontological resources. The exact nature and magnitude of the impacts would vary from
24 project to project and would need to be examined in detail in future NEPA reviews of site-
25 specific projects.

26

27

28 **A.2.2.16 Design Features for Cultural Resources**

29

30 Section 106 consultations between the BLM and SHPOs, appropriate Tribes, and other
31 consulting parties shall be required. Thresholds for the involvement of and review by the
32 Advisory Council on Historic Preservation (ACHP) include nonroutine interstate and/or
33 interagency programs; undertakings directly and adversely affecting National Historic
34 Landmarks or National Register eligible properties of national significance; and/or highly
35 controversial undertakings when ACHP review is requested by the BLM, SHPO, Indian Tribe,
36 local government, or applicant for a BLM authorization. Ongoing Tribal consultation, in
37 accordance with the NHPA, would help in determining areas of sensitivity, appropriate survey
38 and mitigation needs, and other issues of concern (such as access rights or disruption of cultural
39 practices) and taking those concerns into consideration during project development. The
40 following describes the process that the BLM follows to address impacts on historic properties
41 for individual projects.

42

43 Site-specific NEPA analyses and a Section 106 review shall be conducted on individual
44 projects. The BLM will require the completion of comprehensive identification (e.g., field
45 inventory), evaluation, protection, and mitigation following the policies and procedures

1 contained in the 1997 BLM National Programmatic Agreement (PA) and under state protocols.⁴
2 If significant cultural resources are present at the project location or if there is a high potential
3 for the project area to contain significant cultural resources that could be adversely affected, a
4 formalized agreement may be required to address management and mitigation options
5 (e.g., avoidance, data recovery, monitoring, preventative measures for looting/vandalism and
6 erosion, and worker education) in the form of various planning documents (e.g., cultural
7 resources monitoring and mitigation plan, cultural data recovery plan, historic properties
8 treatment plan, etc.). The agreement shall be developed in consultation with the SHPO,
9 appropriate federally recognized Tribes, and any consulting parties. Also, the BLM will
10 continue to implement government-to-government consultation with Tribes and state and
11 local governments on a case-by-case basis.

12
13 The BLM does not approve any ground-disturbing activities that may affect any historic
14 properties, sacred sites or landscapes, and/or resources protected under the NHPA; American
15 Indian Religious Freedom Act; Native American Graves Protection and Repatriation Act
16 (NAGPRA); E.O. 13007, "Indian Sacred Sites," (61 FR 26771; May 24, 1996); or other statutes
17 and E.O.s until it completes its obligations under applicable requirements of the NHPA and other
18 authorities. The BLM may require modification to development proposals to protect such
19 properties, or it may disapprove any activity that is likely to result in adverse effects that cannot
20 be successfully avoided, minimized, or otherwise mitigated.

21
22 The BLM develops specific design features on a project-by-project basis. Avoidance of
23 the resource is the preferred option. Data recovery is a common option for addressing adverse
24 effects, but it does not eliminate the adverse effect. Mitigation of adverse effects can include
25 many other options, such as monitoring and surveillance to protect sites from looting or
26 vandalism; off-site mitigation; education and interpretive programs, including the use of
27 volunteers; and funding of historic preservation efforts proportionate to the anticipated effects.
28 Several design features for other disciplines (soils, air quality, vegetation, hydrology), which
29 encourage use of previously disturbed lands, prevent erosion, and require use of designated
30 routes only to prevent off-road damage, are also appropriate for protecting historic properties,
31 but are not all repeated here (access roads and water control structures would be considered part
32 of the area of potential effect and would require a survey). To protect sacred sites and portions of
33 historic trails that are potentially eligible for listing on the NRHP from visual intrusion, and to
34 maintain the integrity of the historic cultural setting, the BLM could require that surface
35 disturbance be restricted or prohibited within the viewshed of a sacred site or within the
36 viewshed of the trail along those portions of the trail for which eligibility is tied to the visual
37 setting. Mitigation for the demolition of historic structures typically entails detailed architectural
38 records and historical documentation; for impacts on settings of historic structures, measures
39 such as those used for historic trails and sacred sites are appropriate. Ultimately, mitigation
40 strategies will be determined during project-specific consultation.

41

⁴ A PA specific to solar development on BLM-administered lands is under development by the BLM, National Council of SHPOs, and ACHP. This paragraph will be replaced with a summary of relevant information from the Solar PA once it is completed.

1 Specific design features to reduce impacts on cultural resources shall be required and
2 include the following, as applicable.
3
4

5 ***A.2.2.16.1 Siting and Design***
6

- 7 • The use of previously disturbed lands, rather than pristine lands, shall be
8 encouraged.
9
- 10 • The BLM will consult with the appropriate SHPOs, the ACHP, and affected
11 Native American governments and notify the public early in the planning
12 process to identify issues and areas of concern regarding any proposed solar
13 energy project. Such consultation is required by the NHPA and other
14 authorities.
15
- 16 • Project developers shall conduct a records search of published and
17 unpublished literature for past cultural resource finds in the area; coordinate
18 with researchers working locally in the area; and, depending on the extent of
19 existing information, develop a survey design in coordination with the BLM
20 and SHPO and complete a Class III cultural resources inventory. The
21 inventory shall be conducted according to the standards set forth in the
22 Secretary of Interior's *Standards and Guidelines for Archaeology and*
23 *Historic Preservation* (48 FR 44716); BLM Handbook H-8110: *Guidelines*
24 *for Identifying Cultural Resources*, and revised BLM Manual 8110. All
25 inventory data must be provided to the BLM in digitized format that meets the
26 BLM accuracy standards, including shape files for surveyed areas.
27
- 28 • A phased sampling strategy, beginning with a Class II inventory to assess
29 various alternative development areas, is recommended prior to the selection
30 of individual project locations. The Class II inventory shall meet the standards
31 set forth in the Secretary of Interior's *Standards and Guidelines for*
32 *Archaeology and Historic Preservation*, BLM Handbook H-8110, and revised
33 BLM Manual 8110.
34
- 35 • If significant or NRHP-eligible cultural resources are present at the site and
36 would be adversely affected, or if areas with a high potential to contain
37 additional cultural material have been identified, a formalized agreement will
38 be required to address management and mitigation options in the form of
39 various planning documents (such as a monitoring and mitigation plan, data
40 recovery plan, historic treatment plan, etc.). The agreement shall be developed
41 in consultation with the SHPO, appropriate federally recognized Tribes, and
42 any consulting parties. The agreement also shall identify measures to prevent
43 potential looting/vandalism or erosion impacts and address the education of
44 workers and the public to make them aware of the consequences of
45 unauthorized collection of cultural resources on public land.
46

- 1 • To protect historic properties, sacred sites, and portions of historic trails that
2 are potentially eligible for listing on the NRHP from visual intrusion and to
3 maintain the integrity of the historic cultural setting, the BLM could require
4 that surface disturbance be restricted or prohibited within the viewshed of a
5 historic property, sacred site, or trail segment for which eligibility is tied to
6 the visual setting. These types of adverse effects will be minimized, avoided,
7 or mitigated through the Section 106 consultation process.
8

9
10 **A.2.2.16.2 Construction, Operation, and Decommissioning/Reclamation**
11

- 12 • In cases where there is a probability of encountering cultural resources during
13 construction that could not be fully detected during a Class III inventory,
14 cultural field monitors (appropriate for the resource anticipated) shall be
15 employed to monitor ground-disturbing activities. Development of a
16 monitoring plan is recommended.
17
- 18 • The unexpected discovery of cultural resources during construction shall
19 be brought to the attention of the responsible BLM authorized officer
20 immediately. Work shall be halted in the vicinity of the find. The area of the
21 find shall be protected to ensure that resources are not removed, handled,
22 altered, or damaged while they are being evaluated and to ensure that
23 appropriate mitigation measures are being developed.
24
- 25 • The use of management practices, such as training/education programs for
26 workers and the public, shall be implemented to reduce occurrences of
27 human-related disturbances to nearby cultural sites. The specifics of these
28 management practices shall be established in project-specific consultations
29 between the applicant and the BLM as well as with the SHPO and Tribes,
30 as appropriate.
31
32

33 **A.2.2.17 Design Features for Native American Concerns**
34

35 Government-to-government consultations among BLM and the directly and substantially
36 affected Tribes are required under E.O. 13175, “Consultation and Coordination with Indian
37 Tribal Governments” (65 FR 67249). In addition, Section 106 of the NHPA requires federal
38 agencies to consult with Indian Tribes for undertakings on Tribal lands and for historic properties
39 of significance to the Tribes that may be affected by an undertaking (36 CFR Part 800.2(c)(2)).
40 BLM Manual 8120 and Handbook H-8120-1 provide guidance for Native American
41 consultations.
42

43 For those resources not considered historic properties under NHPA, ongoing Tribal
44 consultation shall be conducted to determine other issues of concern, including, but not limited
45 to, access rights, disruption of cultural practices, impacts on visual resources important to the
46 Tribes, and impacts on subsistence resources. It should be noted that even when consultation and

1 an extensive inventory or data collection occur, not all impacts on tribally sensitive resources can
2 be fully mitigated.

3
4 Some specific design features are listed below:

- 5
6 • The BLM shall consult with Native American governments early in the
7 planning process to identify issues and areas of concern regarding any
8 proposed solar energy project. Such consultation is required by the NHPA
9 and other authorities and is necessary to determine whether construction and
10 operation of the project are likely to disturb Tribally sensitive resources,
11 impede access to culturally important locations, disrupt traditional cultural
12 practices, affect movements of animals important to Tribes, or visually affect
13 culturally important landscapes. It may be possible to negotiate a mutually
14 acceptable means of minimizing adverse effects to resources important to
15 Tribes.
- 16
17 • The importance of any Native American archaeological or other culturally
18 important sites identified in archaeological inventories in project areas shall be
19 determined and validated through consultation with appropriate Native
20 American governments and cultural authorities. Appropriate mitigation steps,
21 such as avoidance, removal, repatriation of Native American human remains
22 and associated items of cultural patrimony, or curation, shall be determined
23 during this consultation.
- 24
25 • Visual intrusion on sacred areas shall be avoided to the extent practical
26 through the selection of the solar facility location and solar technology. When
27 avoidance is not possible, timely and meaningful consultation with the
28 affected Tribe(s) shall be conducted to formulate a mutually acceptable plan
29 to mitigate or reduce the adverse effect.
- 30
31 • Tribal burial sites shall be avoided. A contingency plan for encountering
32 unanticipated burials and funerary goods during construction, maintenance,
33 or operation of a solar facility shall be developed as part of a formalized
34 agreement to address management and mitigation options for significant
35 cultural resources in consultation with the appropriate Tribal governments
36 and cultural authorities well in advance of any ground disturbances. The
37 contingency plan shall include consultation with the lineal descendants or
38 Tribal affiliates of the deceased, and human remains and objects of cultural
39 patrimony shall be protected and repatriated according to NAGPRA statutory
40 procedures and regulations.
- 41
42 • Springs and other water sources that are or may be sacred or culturally
43 important shall be avoided whenever possible. If it is necessary for
44 construction, maintenance, or operational activities to take place in proximity
45 to springs or other water sources, appropriate measures, such as the use of
46 geotextiles or silt fencing, shall be taken to prevent silt from degrading water

1 sources. The effectiveness of these mitigating barriers shall be monitored.
2 Measures for preventing water depletion impacts on springs shall also be
3 employed. Particular mitigations shall be determined in consultation with the
4 appropriate Native American Tribe(s).
5

- 6 • Culturally important plant species shall be avoided when possible. When it is
7 not possible to avoid these plant resources, consultations shall be undertaken
8 with the affected Tribe(s). If the species is available elsewhere on agency-
9 managed lands, guaranteeing access may suffice. For rare or less common
10 species, establishing (transplanting) an equal amount of the plant resource
11 elsewhere on agency-managed land accessible to the affected Tribe may be
12 acceptable.
13
- 14 • Culturally important wildlife species and their habitats shall be avoided. When
15 it is not possible to avoid these habitats, solar facilities shall be designed to
16 minimize impacts on game trails, migration routes, and nesting and breeding
17 areas of Tribally important species. Mitigation and monitoring procedures
18 shall be developed in consultation with the affected Tribe(s).
19
- 20 • Archaeological sites created by ancestral Native American populations shall
21 be avoided whenever possible. However, when archaeological excavations are
22 necessary, affiliated Tribe(s) shall be consulted, and the concerns of the
23 affected descendant Native American population shall be taken into account
24 when developing a data recovery strategy. Possible mitigations include
25 scientific excavation; monitoring or participation in excavations by Tribal
26 representatives; and repatriation or approved curation of artifacts.
27
- 28 • Rock art (panels of petroglyphs and/or pictographs) shall be avoided
29 whenever possible. These panels may be just one component of a larger
30 sacred landscape, in which avoidance of all impacts may not be possible.
31 Mitigation plans for eliminating or reducing (minimizing) potential impacts
32 on rock art shall be formulated in consultation with the appropriate Tribal
33 cultural authorities.
34
- 35 • Standard noise design features shall be employed when solar facilities would
36 be located near sacred sites to minimize the impacts of noise on culturally
37 significant areas.
38
- 39 • Health and safety design features for the general public shall be employed
40 when solar facilities are located near Native American traditional use areas in
41 order to minimize potential health and safety impacts on Native Americans.
42
- 43 • Prior to construction, training shall be provided to contractor personnel whose
44 activities or responsibilities could affect resources of significance to Native
45 Americans during construction.
46

- When there is a reasonable expectation of encountering previously unidentified cultural resources during construction, monitoring of construction by a qualified cultural resource specialist shall be considered to minimize impacts on resources of significance to Tribes to the extent possible.

A.2.2.18 Design Features for Socioeconomic Impacts

The economic effects of solar energy projects can be positive, with increases in employment, income, and state tax revenues; thus, few, if any, mitigation measures may be necessary. On the basis of the potential magnitude of employment impacts of each solar technology, however, it is possible that the socioeconomic impacts of solar development projects, notably the impacts of in-migrating workers on local housing markets and on local government expenditures and employment, would require mitigation measures. A large in-migrant labor force has the potential to produce some degree of social disruption, whereby the cultural and social values of in-migrants conflict with those of the resident population, potentially creating alienation, crime, alcoholism, drug use, mental health problems, and the disruption of family life. The following design features shall be applied to avoid or reduce these impacts, depending on site- and project-specific conditions.

- To address impacts to local issues, the BLM may include stipulations in the ROW authorization or require solar developers to enter into mitigation agreements with individual local jurisdictions and county agencies, as necessary.
- Project developers shall collect and evaluate available information describing the socioeconomic conditions in the vicinity of the proposed project, as needed, to predict potential impacts of the project.
- If the BLM authorized officer concludes that the project is likely to have a substantial impact on the economic or social conditions of local communities, the project developers shall work with state, local, and Tribal agencies and governments to develop community monitoring programs that would be sufficient to identify and evaluate socioeconomic impacts resulting from solar energy development. Monitoring programs shall collect data reflecting the economic, fiscal, and social impacts of development at the state, local, and Tribal level. Parameters to be evaluated could include impacts on local labor and housing markets, local consumer product prices and availability, local public services (police, fire, and public health), and educational services. Programs also could monitor indicators of social disruption (e.g., crime, alcoholism, drug use, and mental health) and the effectiveness of community welfare programs in addressing these problems.
- If the BLM authorized officer concludes that the project is likely to have a substantial impact on the economic or social conditions of local communities, the BLM may include stipulations in the ROW authorization or require solar

1 developers to enter into mitigation agreements with individual local
2 jurisdictions and county agencies, as necessary, to address local issues. Also,
3 project developers shall work with state, local, and Tribal agencies to develop
4 community outreach programs that would help communities adjust to changes
5 triggered by solar energy development. Such programs could include any of
6 the following activities:

- 7
- 8 – Establishing vocational training programs for the local workforce to
9 promote development of skills required by the solar energy industry.
- 10
- 11 – Developing instructional materials for use in area schools to educate the
12 local communities on the solar energy industry.
- 13
- 14 – Supporting community health screenings.
- 15
- 16 – Providing financial support to local libraries for the development of
17 information repositories on solar energy, including materials on the
18 hazards and benefits of commercial development. Electronic repositories
19 established by the operators could also be of great value.
- 20

21

22 **A.2.2.19 Design Features for Environmental Justice Impacts**

23

24 Although the environmental impacts of solar development on low-income and minority
25 populations are likely to be small, where such environmental justice impacts occur, the
26 developer shall make a plan to implement a number of design features to mitigate the potential
27 environmental, economic, cultural, and health impacts on low-income and minority populations.
28 These design features may include any or all of the following:

- 29
- 30 • Focused public information campaigns could be developed and implemented
31 to provide technical and environmental health information directly to
32 low-income and minority groups or to local agencies and representative
33 groups. Key information would include the extent of any likely impact on air
34 quality, drinking water supplies, subsistence resources, public services, and
35 the relevant preventative measures that may be taken.
- 36
- 37 • Community health screenings for low-income and minority groups.
- 38
- 39 • Financial support to local libraries in low-income and minority communities
40 could be provided for the development of information repositories on solar
41 energy, including materials on the hazards and benefits of commercial
42 development.
- 43
- 44 • Vocational training programs for the local low-income and minority
45 workforce could be established to promote development of skills required by
46 the solar energy industry.
- 47

- Instructional materials could be developed for use in area schools to educate the local communities on the solar energy industry.
- Key information could be provided to local governments and directly to low-income and minority populations on the scale and timeline of expected solar projects and on the experience of other low-income and minority communities that have followed the same energy development path. In addition, information on planning activities that may be initiated to provide local infrastructure, public services, education, and housing could be made available.

A.2.2.20 Design Features for Transportation Impacts

Depending on site-specific characteristics, a number of design features may be required to mitigate transportation impacts. Appropriate measures shall be determined during the siting and design phase through the development of a Transportation Plan and a Traffic Management Plan. Measures appropriate to implement include the following:

- Easements could be required for public roadway corridors through a site to maintain proper traffic flows and retain more direct routing for the local population.
- To mitigate impacts related to the daily commutes of construction workers, the operator may be required to implement local road improvements, provide multiple site access locations and routes, stagger work schedules, and implement a ride-sharing or shuttle program.
- To reduce hazards for incoming and outgoing traffic, as well as to expedite traffic flow, the operator may be required to implement traffic control measures, such as intersection realignment coupled with speed limit reduction; the installation of traffic lights and/or other signage; and the addition of acceleration, deceleration, and turn lanes on routes with site entrances.

A.2.2.21 Design Features for Hazardous Materials and Waste

Means to eliminate or reduce adverse impacts from hazardous materials and wastes include compliance with applicable laws, ordinances, and regulations and conformance with relevant industry standards (including those issued by nonregulatory bodies, such as the National Fire Protection Association). For the solar facility projects issued ROWs by the BLM, construction and operation plans must also incorporate elements of relevant construction

1 standards and interconnection requirements of the transmission system operator as well as the
2 reliability requirements of Federal Energy Regulatory Commission (FERC) orders.⁵

3
4
5 ***A.2.2.21.1 Required Plans***
6

- 7 • A Hazardous Materials and Waste Management Plan shall address the
8 selection, transport, storage, and use of all hazardous materials needed for
9 construction, operation, and decommissioning of the facility for local
10 emergency response and public safety authorities and for the designated BLM
11 land manager, and it shall address the characterization, on-site storage,
12 recycling, and disposal of all resulting wastes.⁶ The plan shall, at a minimum,
13 include the following: facility identification; comprehensive hazardous
14 materials inventory; Material Safety Data Sheets (MSDSs) for each type of
15 hazardous material; emergency contacts and mutual aid agreements, if any;
16 site map showing all hazardous materials and waste storage and use locations;
17 copies of spill and emergency response plans (see below), and hazardous
18 materials-related elements of a decommissioning/closure plan.
19
- 20 • A Construction and Operation Waste Management Plan shall identify the
21 waste streams that are expected to be generated at the site and address
22 hazardous waste determination procedures, waste storage locations, waste-
23 specific management and disposal requirements, inspection procedures, and
24 waste minimization procedures. The plan shall address all solid and liquid
25 wastes that may be generated at the site in compliance with the CWA
26 requirements to obtain the project’s NPDES permit.
27
- 28 • A Fire Management and Protection Plan shall be developed to implement
29 measures to minimize the potential for fires associated with substances used
30 and stored at the site. The flammability of the specific HTF used at the facility
31 shall be considered.
32
- 33 • If pesticides/herbicides are to be used on the site, a Nuisance Animal and
34 Pest Control Plan and an Integrated Vegetation Management Plan shall be
35 developed to ensure that applications will be conducted within the
36 framework of BLM policies and will entail the use of only EPA-registered
37 pesticides/herbicides that are nonpersistent and immobile and approved by
38 the BLM land manager.
39

⁵ See, for example, the construction standards issued by the Western Area Power Administration and the generator responsibilities established by the California independent system operator (<http://www.caiso.com/thegrid/operations/opsdoc/gcp/index.html>).

⁶ It is not anticipated that any solar energy facility would have hazardous chemicals present on-site in such quantities as to require development of a Risk Management Plan as specified in 40 CFR Part 68.

- 1 • A comprehensive Spill Prevention and Emergency Response Plan shall be
2 developed for the facility, and it shall meet the following criteria. It will be
3 written, periodically updated, and made available to the entire workforce;
4 contain procedures for timely notification of appropriate authorities, including
5 the designated BLM land manager; provide spill/emergency contingency
6 planning for each type of hazardous material present, including the abatement
7 or stabilizing of the release, recovery of the spilled product, and remediation
8 of the impacted environmental media; be supported by the strategic
9 deployment of appropriate spill response materials and equipment, including
10 personal protective equipment (PPE) for individuals with spill or emergency
11 response assignments; provide for prompt response to spills and timely
12 delivery of recovered spill materials and contaminated environmental media
13 to appropriately permitted off-site treatment or disposal facilities; formally
14 assign spill and emergency response duties to specified individuals; provide
15 general awareness training to remaining facility personnel; and provide for
16 written documentation of each event, including root cause analysis,
17 description of corrective actions taken, and characterization of the resulting
18 environmental or health and safety impacts.
19
20

21 ***A.2.2.21.2 Other Design Features***

- 22
23 • All site characterization, construction, operation, and decommissioning
24 activities shall be conducted in compliance with applicable federal and state
25 laws and regulations, including the Toxic Substances Control Act of 1976, as
26 amended (15 USC 2601, et seq.). In addition, any release of toxic substances
27 (leaks, spills, etc.) in excess of the reportable quantity established by
28 40 CFR Part 117 shall be reported as required by the Comprehensive
29 Environmental Response, Compensation, and Liability Act (CERCLA) of
30 1980, Section 102b. A copy of any report required or requested by any federal
31 agency or state government as a result of a reportable release or spill of any
32 toxic substances shall be furnished to the authorized officer concurrent with
33 the filing of the reports to the involved federal agency or state government. In
34 addition, the United States shall be indemnified against any liability arising
35 from the release of any hazardous substance or hazardous waste on the facility
36 or associated with facility activities.
37
- 38 • Project developers shall survey project sites for unexploded ordnance,
39 especially if projects are within 20 mi (32 km) of a current DoD installation or
40 formally used defense site.
- 41
42 • Pollution prevention opportunities shall be identified and implemented,
43 including material substitution of less hazardous alternatives, recycling, and
44 waste minimization.
45

- 1 • Systems containing hazardous materials shall be designed and operated in a
2 manner that limits the potential for their release; measures shall include
3 construction of compatible materials in good condition (as verified by periodic
4 inspections); provision of secondary containment features (to the extent
5 practical); installation of sensors or other devices to monitor system integrity;
6 installation of strategically placed valves to isolate damaged portions and limit
7 the amount of hazardous materials in jeopardy of release; and use of robust
8 inspection and repair procedures.
9
- 10 • Dedicated areas with secondary containment shall be established for
11 off-loading hazardous materials transport vehicles.
12
- 13 • To the greatest extent practical and by considering the remoteness of a given
14 facility, “just-in-time” ordering procedures shall be employed that are
15 designed to limit the amounts of hazardous materials present on the site to
16 quantities minimally necessary to support continued operations. Excess
17 hazardous materials should receive prompt disposition.
18
- 19 • Written procedures for the storage, use, and transportation of each type of
20 hazardous material present shall be provided, including all vehicle and
21 equipment fuels.
22
- 23 • Authorized users for each type of hazardous material shall be identified.
24
- 25 • Procedures shall be established for fuel storage and dispensing, including
26 shutting off vehicle (equipment) engines; using only authorized hoses, pumps,
27 and other equipment in good working order; maintaining appropriate fire and
28 spill response materials at equipment fueling stations; providing emergency
29 shutoffs for fuel pumps; ensuring that fueling stations are paved; ensuring that
30 both aboveground fuel tanks and fueling both have adequate secondary
31 containment; prohibiting smoking, welding, or open flames in fuel storage and
32 dispensing areas; equipping the area with fire suppression devices, as
33 appropriate; conducting routine inspections of fuel storage and dispensing
34 areas; requiring prompt recovery and remediation of all spills; and providing
35 for the prompt removal of all fuel and fuel tanks used to support construction
36 vehicles and equipment at the completion of facility construction and
37 decommissioning phases.
38
- 39 • Refueling areas shall be located away from surface water locations and
40 drainages and on paved surfaces; features shall be added to direct spilled
41 materials to sumps or safe storage areas where they can be subsequently
42 recovered.
43
- 44 • All vehicles and equipment shall be in proper working condition to ensure that
45 there is no potential for leaks of motor oil, antifreeze, hydraulic fluid, grease,
46 or other hazardous materials.
47

- 1 • Hazardous materials and waste storage areas or facilities shall be formally
2 designated and access to them restricted to authorized personnel. Construction
3 debris, especially treated wood, shall not be disposed of or stored in areas
4 where it could come in contact with aquatic habitats.
5
- 6 • Design requirements shall be established for hazardous materials and waste
7 storage areas that are consistent with accepted industry practices as well as
8 applicable federal, state, and local regulations and that include, at a minimum,
9 (1) containers constructed of compatible materials, properly labeled, and in
10 good condition; (2) secondary containment features for liquid hazardous
11 materials and wastes; (3) physical separation of incompatible chemicals; and
12 (4) fire-fighting capabilities when warranted.
13
- 14 • Written procedures shall be established for inspecting hazardous materials and
15 waste storage areas and for plant systems containing hazardous materials;
16 identified deficiencies and their resolution shall be documented.
17
- 18 • Schedules shall be established for the regular removal of wastes (including
19 sanitary wastewater generated in temporary, portable sanitary facilities) for
20 delivery by licensed haulers to appropriate off-site treatment or disposal
21 facilities.
22
- 23 • During facility decommissioning, the following shall occur: Emergency
24 response capabilities shall be maintained throughout the decommissioning
25 period as long as hazardous materials and wastes remain on-site, and
26 emergency response planning shall be extended to any temporary material and
27 equipment storage areas that may have been established. Temporary waste
28 storage areas shall be properly designated, designed, and equipped. Hazardous
29 materials removed from systems shall be properly containerized and
30 characterized, and recycling options shall be identified and pursued. Off-site
31 transportation of recovered hazardous materials and wastes resulting from
32 decommissioning activities shall be conducted by authorized carriers. All
33 hazardous materials and waste shall be removed from on-site storage and
34 management areas (including surface impoundments), and the areas shall be
35 surveyed for contamination and remediated as necessary.
36
37

38 **A.2.2.22 Design Features to Ensure Health and Safety**

39 ***A.2.2.22.1 Occupational Health and Safety***

- 40
- 41
- 42
- 43 • All site characterization, construction, operation, and decommissioning
44 activities shall be conducted in compliance with applicable federal and state
45 occupational safety and health standards (e.g., the Occupational Health and

1 Safety Administration's [OSHA's] Occupational Health and Safety Standards,
2 29 CFR Parts 1910 and 1926, respectively).

- 3
- 4 • A safety assessment shall be conducted to describe potential safety issues and
5 the means that would be taken to mitigate them, covering issues such as site
6 access; construction; safe work practices; glare exposure from mirrors,
7 heliostats, and/or power towers; security; heavy equipment transportation;
8 traffic management; emergency procedures; and fire control.
9
- 10 • A health and safety program shall be developed to protect workers during site
11 characterization, construction, operation, and decommissioning of a solar
12 energy project. The program shall identify all applicable federal and state
13 occupational safety standards and establish safe work practices addressing all
14 hazards, including requirements for developing the following plans: general
15 injury prevention; PPE requirements and training; respiratory protection;
16 hearing conservation; electrical safety; hazardous materials safety and
17 communication; housekeeping and material handling; confined space entry;
18 hand and portable power tool use; gas-filled equipment use; and rescue
19 response and emergency medical support, including on-site first aid
20 capability.
21
- 22 • In addition, the health and safety program shall address OSHA standard
23 practices for the safe use of explosives and blasting agents (e.g., if used to
24 construct foundations for power tower facilities); measures for reducing
25 occupational electric and magnetic field (EMF) exposures; the establishment
26 of fire safety evacuation procedures; and required safety performance
27 standards (e.g., electrical system standards and lighting protection standards).
28 The program shall include training requirements for applicable tasks for
29 workers and establish procedures for providing required training to all
30 workers. Documentation of training and a mechanism for reporting serious
31 accidents to appropriate agencies shall be established.
32
- 33 • A health risk assessment shall evaluate potential cancer and noncancer risks to
34 workers from exposure to facility emission sources during construction and
35 operations. If potential risks are found to exceed applicable threshold levels,
36 measures shall be taken to decrease emissions from the source.
37
- 38 • Electrical systems shall be designed to meet all applicable safety standards
39 (e.g., National Electrical Code [NEC]) and comply with the interconnection
40 requirements of the transmission system operator.
41
- 42 • In the event of an accidental release of hazardous substances to the
43 environment, project developers shall document the event, including a root
44 cause analysis, a description of appropriate corrective actions taken, and a
45 characterization of the resulting environmental or health and safety impacts.

1 Documentation of the event shall be provided to the permitting agencies and
2 other federal and state agencies within 30 days, as required.

- 3
- 4 • For the mitigation of explosive hazards, workers shall be required to comply
5 with the OSHA standard (29 CFR 1910.109) for the safe use of explosives and
6 blasting agents.
- 7
- 8 • Measures shall be considered to reduce occupational EMF exposures, such
9 as backing electrical generators with iron to block the EMF, shutting down
10 generators when work is being done near them, and otherwise limiting
11 exposure time and proximity while generators are running.
- 12
- 13

14 ***A.2.2.22.2 Public Health and Safety***

- 15
- 16 • The project health and safety program shall address protection of public
17 health and safety during site characterization, construction, operation, and
18 decommissioning for a solar energy project. The program shall establish a
19 safety zone or setback for solar facilities and associated transmission lines
20 from residences and occupied buildings, roads, ROWs, and other public
21 access areas that is sufficient to prevent accidents resulting from various
22 hazards during all phases of development. It shall identify requirements for
23 temporary fencing around staging areas, storage yards, and excavations during
24 construction or decommissioning activities. It shall also identify measures to
25 be taken during the operations phase to limit public access to facilities
26 (e.g., equipment with access doors shall be locked to limit public access, and
27 permanent fencing with slats shall be installed around electrical substations).
- 28
- 29 • A Traffic Management Plan shall be prepared for the site access roads to
30 control hazards that could result from increased truck traffic (most likely
31 during construction or decommissioning), to ensure that traffic flow would not
32 be adversely affected and that specific issues of concern (e.g., the locations of
33 school bus routes and stops) are identified and addressed. This plan shall
34 incorporate measures, such as informational signs, flaggers (when equipment
35 may result in blocked throughways), and traffic cones to identify any
36 necessary changes in temporary lane configurations. The plan shall be
37 developed in coordination with local planning authorities.
- 38
- 39 • Solar facilities shall be sited and designed properly to eliminate glint and glare
40 effects on roadway users, nearby residences, commercial areas, or other
41 highly sensitive viewing locations or to reduce it to the lowest achievable
42 levels (see similar design feature under Section A.2.2.13). Regardless of the
43 solar technology proposed, a Glint and Glare Assessment, Mitigation, and
44 Monitoring Plan must accurately assess and quantify potential glint and glare
45 effects and determine potential health, safety, and visual impacts associated
46 with glint and glare effects. The assessment shall be conducted by qualified

1 individuals using appropriate and commonly accepted software and
2 procedures. The assessment results must be made available to BLM in
3 advance of project approval. If the project design is changed during the siting
4 and design process such that substantial changes to glint and glare effects may
5 occur, glint and glare effects shall be recalculated, and the results shall be
6 made available to BLM. If any potential for exposure at levels that could
7 cause retinal damage is identified, measures to eliminate the exposure shall be
8 implemented (e.g., slatted fencing to shield views from outside the facility).
9 The Plan shall also set up a system for logging, investigating, and responding
10 to complaints regarding glare.

- 11
- 12 • A health risk assessment shall evaluate potential cancer and noncancer risks to
13 the general public from exposure to facility emission sources during
14 construction and operations. If potential risks are found to exceed applicable
15 threshold levels, measures shall be taken to decrease emissions from the
16 source.
- 17
- 18 • Because of the high global warming potential of sulfur hexafluoride (SF₆), the
19 use of alternative dielectric fluids that do not have a high global warming
20 potential shall be required.
- 21
- 22 • If operation of the solar facility and associated transmission lines and
23 substations is expected to cause potential adverse impacts on nearby
24 residences and occupied buildings from noise, sun reflection, or EMF,
25 recommendations for addressing these concerns shall be incorporated into the
26 project design (e.g., establishing a sufficient setback from transmission lines).
- 27
- 28 • The project shall be planned to comply with FAA regulations, including
29 lighting requirements, and to avoid potential safety issues associated with
30 proximity to airports, military bases or training areas, or landing strips.
- 31
- 32 • Operators shall develop a Fire Management and Protection Plan to implement
33 measures to minimize the potential for a human-caused fire and to respond to
34 human-caused or natural-caused fires.
- 35
- 36 • Project developers shall work with appropriate agencies (e.g., the
37 U.S. Department of Energy [DOE] and Transportation Security
38 Administration [TSA]) to address critical infrastructure and key resource
39 vulnerabilities at solar facilities in order to minimize and plan for potential
40 risks from natural events, sabotage, and terrorism.
- 41

42

43 **A.2.3 Proposed Solar Energy Zone-Specific Design Features**

44

45 For projects to be located within SEZs, applicable SEZ-specific design features will be
46 required in addition to the programmatic design features. The SEZ-specific design features have

1 been established to address specific resource conflicts within individual SEZs identified through
2 the course of the PEIS impact analyses. The proposed SEZ-specific design features for all the
3 proposed SEZs are listed in Table A.2-2 (note that the SEZ-specific design features common to
4 all SEZs are listed at the end of the table). These design features are proposed as elements of
5 BLM's Solar Development Program. With the signing of the Record of Decision (ROD) for the
6 Final PEIS, the design features that are carried forward in the ROD will be required for all
7 development within the applicable SEZs.

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TABLE A.2-2 Proposed Solar Energy Zone-Specific Design Features

SEZ	SEZ-Specific Design Features ^a
<p>Arizona Brenda</p>	<p><i>Specially Designated Areas and Lands with Wilderness Characteristics:</i> To reduce potential impacts on the Plomosa SRMA, consideration should be given to restricting solar energy development in the SEZ to areas east of the county road. In addition, if the SEZ was restricted to the use of lower profile solar energy facilities, potential visual impacts would be reduced in the Plomosa SRMA, the Kofa and New Water WAs, and the Dripping Springs ACEC.</p> <p><i>Rangeland Resources (Livestock Grazing):</i> Development of range improvements and changes in grazing management should be considered to mitigate the loss of AUMs in the grazing allotment.</p> <p><i>Recreation:</i> To reduce potential impacts on recreation use in the Plomosa SRMA, consideration should be given to restricting solar energy development in the SEZ to areas east of the county road. In addition, if the SEZ was restricted to the use of lower profile solar energy facilities, impacts on recreation use in the SRMA would likely be reduced.</p> <p><i>Water Resources:</i> Water resource analysis indicates that wet-cooling options would not be feasible. Other technologies should incorporate water conservation measures.</p> <p>Before drilling a new well within the Ranegras Plain basin, a Notice of Intent to Drill must be filed with ADWR, and any groundwater rights policy of the ADWR must be followed.</p> <p>Land disturbance and operations activities should prevent erosion and sedimentation in the vicinity of the ephemeral washes present on the site.</p> <p>Development should be avoided in the vicinity of Bouse Wash.</p> <p><i>Vegetation:</i> An Integrated Vegetation Management Plan addressing invasive species control, and an Ecological Resources Mitigation and Monitoring Plan addressing habitat restoration should be approved and implemented to increase the potential for successful restoration of creosotebush-white bursage desert scrub communities and other affected habitats and minimize the potential for the spread of invasive species such as those occurring in Le Paz County or the Lake Havasu Field Office Planning Area, that could be introduced as a result of solar energy project activities.</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
<p>Arizona (Cont.) Brenda (Cont.)</p>	<p>All dry wash, dry wash woodland, chenopod scrub habitats, and saguaro cactus communities within the SEZ and all dry wash, dry wash woodland, mesquite bosque, chenopod scrub, and saguaro cactus communities within the assumed transmission line corridor should be avoided to the extent practicable, and any impacts minimized and mitigated. A buffer area should be maintained around dry washes, dry wash woodland, and mesquite bosque habitats to reduce the potential for impacts.</p> <p>Appropriate engineering controls should be used to minimize impacts on dry wash, dry wash woodland, mesquite bosque, and chenopod scrub, including downstream occurrences, resulting from surface water runoff, erosion, sedimentation, altered hydrology, accidental spills, or fugitive dust deposition to these habitats. Appropriate buffers and engineering controls would be determined through agency consultation.</p> <p>Transmission line towers should be sited and constructed to minimize impacts on dry washes, dry wash woodlands, and mesquite bosque communities; towers should span such areas whenever practicable.</p> <p>Groundwater withdrawals should be limited to reduce the potential for indirect impacts on groundwater-dependent communities, such as mesquite bosque communities.</p> <p><i>Wildlife (All):</i> Bouse Wash should be avoided by solar energy development, and Tyson Wash should be spanned by the transmission line.</p> <p><i>Wildlife (Mammals):</i> The fencing around the solar energy facility should not block the free movement of mammals, particularly big game species.</p> <p><i>Special Status Species:</i> Avoiding or minimizing disturbance of sand dunes, sand transport systems, sand flats, agricultural and riparian habitats in the area of direct effects could reduce impacts on two special status species.</p> <p>Consultation with the USFWS and AZGFD should be conducted to address the potential for impacts on the Sonoran bald eagle as required under the ESA. Consultation would identify an appropriate survey protocol, and, if appropriate, reasonable and prudent alternatives, reasonable and prudent measures, and terms and conditions for incidental take statements.</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
Arizona (Cont.)	
Brenda (Cont.)	<p>Coordination with the USFWS and AZGFD should be conducted to address the potential for impacts on the Sonoran population of the desert tortoise, a species under review for listing under the ESA. Coordination would identify an appropriate survey protocol and mitigation requirements, which may include avoidance, minimization, translocation, or compensation.</p> <p><i>Acoustic Environment:</i> Dish engine facilities within the Brenda SEZ should be located more than 1 to 2 mi (1.6 to 3 km) from the nearby residences (i.e., the facilities should be located in the northern portion of the proposed SEZ).</p>
Bullard Wash	<p><i>Lands and Realty:</i> Priority consideration should be given to utilizing the existing Alamo Road to provide construction and operational access to the SEZ.</p> <p><i>Specially Designated Areas and Lands with Wilderness Characteristics:</i> Consideration should be given to restricting development of solar facilities within 5 mi (8 km) of the Tres Alamos WA to avoid the most serious impacts on the WA.</p> <p>Consideration should be given to restricting solar facilities within the SEZ to lower profile facilities.</p> <p><i>Rangeland Resources (Livestock Grazing):</i> Development of additional range improvements within the allotments should be considered to reduce the expected loss of livestock forage.</p> <p><i>Water Resources:</i> Water resource analysis indicates that wet cooling options would not be feasible. Other technologies should incorporate water conservation measures.</p> <p>Before a new well is drilled within the Bill Williams basin, a Notice of Intent to Drill must be filed with ADWR, and any groundwater rights policy of the ADWR must be followed</p> <p>Land disturbance and operations activities should prevent erosion and sedimentation in the vicinity of the ephemeral washes present on the site and downstream in Bullard Wash.</p> <p><i>Vegetation:</i> An Integrated Vegetation Management Plan addressing invasive species control, and an Ecological Resources Mitigation and Monitoring Plan addressing habitat restoration should be approved and implemented to increase the potential for successful restoration of creosotebush-white bursage desert scrub communities and other affected habitats and to minimize the potential for the spread of invasive species such as those occurring in Yavapai County or the Bradshaw-Harquahala Planning Area, which could be introduced as a result of solar energy project activities.</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
<p>Arizona (Cont.) Bullard Wash (Cont.)</p>	<p>All wetland, dry wash, dry wash woodland, mesquite bosque, riparian, Joshua tree, and saguaro cactus communities within the SEZ or corridors should be avoided to the extent practicable and any impacts minimized and mitigated. Any Joshua trees or cacti that cannot be avoided should be salvaged. A buffer area should be maintained around wetland and riparian habitats to reduce the potential for impacts. Transmission line towers should be sited and constructed to minimize impacts on riparian areas and to span them whenever practicable.</p> <p>Appropriate engineering controls should be used to minimize impacts on wetland, dry wash, dry wash woodland, mesquite bosque, and riparian habitats, including downstream occurrences resulting from surface water runoff, erosion, sedimentation, altered hydrology, accidental spills, or fugitive dust deposition. Appropriate buffers and engineering controls would be determined through agency consultation.</p> <p>Groundwater withdrawals should be limited to reduce the potential for indirect impacts on groundwater-dependent communities, such as mesquite bosque communities, or riparian communities associated with springs, such as Yerba Mansa Spring or Tres Alamos Spring, or along the Santa Maria River.</p> <p><i>Wildlife (Amphibians and Reptiles):</i> Isolated wetlands should be avoided.</p> <p><i>Wildlife (Birds):</i> Wetland habitats, which could provide occasional watering and feeding sites for some bird species, should be avoided.</p> <p><i>Wildlife (Mammals):</i> The fencing around the solar energy development should not block the free movement of mammals, particularly big game species.</p> <p>Wetland habitats, which could provide occasional watering and feeding sites for some mammal species, should be avoided.</p> <p><i>Aquatic Biota:</i> Any wetlands within the SEZ should be avoided.</p> <p><i>Special Status Species:</i> Avoiding or minimizing disturbance to desert wash and riparian habitats within the area of direct effects could reduce or eliminate impacts on 15 special status species.</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
<p>Arizona (Cont.) Bullard Wash (Cont.)</p>	<p>Consultation with the USFWS and AZGFD should be conducted to address the potential for impacts on the following species currently listed as threatened or endangered under the ESA: Arizona cliff rose, desert pupfish, Gila topminnow, Sonoran bald eagle, and southwestern willow flycatcher. Consultation would identify an appropriate survey protocol, avoidance and minimization measures, and, if appropriate, reasonable and prudent alternatives, reasonable and prudent measures, and terms and conditions for incidental take statements (if necessary).</p> <p>Coordination with the USFWS and AZGFD should be conducted to address the potential for impacts on the Sonoran population of the desert tortoise, a species under review for listing under the ESA. Coordination would identify an appropriate survey protocol and mitigation requirements, which may include avoidance, minimization, translocation, or compensation.</p> <p>Avoidance or minimization of groundwater withdrawals to serve solar energy development on the SEZ could reduce or eliminate impacts on four status species. In particular, impacts on aquatic and riparian habitat associated with the Tres Alamos and Yerba Mansa springs should be avoided</p>
<p>Gillespie</p>	<p><i>Lands and Realty:</i> Priority consideration should be given to utilizing Agua Caliente Road to provide construction and operational access to the SEZ.</p> <p><i>Specially Designated Areas and Lands with Wilderness Characteristics:</i> Requiring that the solar technologies with lower profiles be used within the SEZ would substantially reduce visual impacts on wilderness and scenic resources.</p> <p><i>Rangeland Resources (Livestock Grazing):</i> Development of range improvements and changes in grazing management should be considered to mitigate the loss of AUMs in the grazing allotment.</p> <p><i>Water Resources:</i> Wet-cooling options would not be feasible if groundwater was the chosen water source for a solar project; other technologies should incorporate water conservation measures.</p> <p>Before drilling a new well, permits must be obtained from the ADWR, and all groundwater rights policies of the ADWR must be followed.</p> <p>Land disturbance and operations activities should prevent erosion and sedimentation in the vicinity of the ephemeral washes present on the site and downstream in Centennial Wash.</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
<p>Arizona (Cont.) Gillespie (Cont.)</p>	<p><i>Vegetation:</i> An Integrated Vegetation Management Plan addressing invasive species control and an Ecological Resources Mitigation and Monitoring Plan addressing habitat restoration should be approved and implemented to increase the potential for successful restoration of creosotebush-white bursage desert scrub and Sonoran Paloverde-Mixed Cacti Desert Scrub communities, as well as other affected habitats, and to minimize the potential for the spread of invasive species, such as those occurring in Maricopa County.</p> <p>All wetland, dry wash, dry wash woodland, mesquite bosque, riparian, and saguaro cactus communities within the SEZ or access road corridor should be avoided to the extent practicable, and any impacts minimized and mitigated. Any cacti that cannot be avoided should be salvaged. A buffer area should be maintained around dry washes, dry wash woodland, mesquite bosque, wetland, and riparian habitats to reduce the potential for impacts.</p> <p>Appropriate engineering controls should be used to minimize impacts on wetland, dry wash, dry wash woodland, mesquite bosque, and riparian habitats, including downstream occurrences, resulting from surface water runoff, erosion, sedimentation, altered hydrology, accidental spills, or fugitive dust deposition to these habitats. Appropriate buffers and engineering controls would be determined through agency consultation.</p> <p>Groundwater withdrawals should be limited to reduce the potential for indirect impacts on groundwater-dependent communities, such as mesquite bosque communities or riparian habitats along the Gila or Hassayampa Rivers.</p> <p><i>Wildlife (Mammals):</i> The fencing around the solar energy development should not block the free movement of mammals, particularly big game species.</p> <p><i>Special Status Species:</i> Consultation with the USFWS and AZGFD should be conducted to address the potential for impacts on the following species currently listed as threatened or endangered under the ESA: Sonoran bald eagle, southwestern willow flycatcher, and Yuma clapper rail. Consultation would identify an appropriate survey protocol, avoidance and minimization measures, and, if appropriate, reasonable and prudent alternatives, reasonable and prudent measures, and terms and conditions for incidental take statements (if necessary).</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
<p>Arizona (Cont.) Gillespie (Cont.)</p>	<p>Coordination with the USFWS and AZGFD should be conducted to address the potential for impacts on the following species that are candidates or under review for listing under the ESA: Sonoran desert tortoise, Tucson shovel-nosed snake, and western yellow-billed cuckoo. Coordination would identify an appropriate survey protocol, and mitigation, which may include avoidance, minimization, translocation, or compensation.</p> <p>Avoiding or minimizing disturbance to desert wash and riparian habitats could reduce impacts on 17 special status species.</p> <p>Avoidance or minimization of groundwater withdrawals to serve solar energy development on the SEZ could reduce or eliminate impacts to nine special status species.</p> <p><i>Visual Resources:</i> The development of power tower facilities should be prohibited within the SEZ.</p> <p><i>Acoustic Environment:</i> Dish engine facilities within the Gillespie SEZ should be located more than 1 to 2 mi (1.6 to 3 km) from the nearest residences (i.e., the facilities should be located in the central or northwestern portion of the proposed SEZ).</p>
<p>California Imperial East</p>	<p><i>Specially Designated Areas and Lands with Wilderness Characteristics:</i> Once construction of solar energy facilities begins, the BLM would monitor to determine whether increases in traffic in the ACECs occur and whether additional management measures are required to protect the resources in these areas.</p> <p><i>Military and Civilian Aviation:</i> Should power tower facilities be proposed for the SEZ, coordination across the international border should be required to ensure that there is no airspace management concern associated with the Mexicali Airport.</p> <p><i>Minerals:</i> To protect the option for geothermal leasing under solar energy facilities, ROW authorizations for solar energy facilities shall specifically note the potential for geothermal leasing with no surface occupancy stipulations.</p> <p><i>Water Resources:</i> Water resource analysis indicates that wet-cooling options would not be feasible. Other technologies should incorporate water conservation measures.</p> <p>Land disturbance activities should avoid impacts in the vicinity of the existing and mitigation wetlands located along the southern boundary of the site.</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
<p>California (Cont.) Imperial East (Cont.)</p>	<p>During site characterization, coordination and permitting with CDFG regarding California’s Lake and Streambed Alteration Program would be required for any proposed alterations to surface water features, both perennial and ephemeral.</p> <p>The groundwater-permitting process should be in compliance with the Imperial County groundwater ordinance.</p> <p><i>Vegetation:</i> An Integrated Vegetation Management Plan addressing invasive species control, and an Ecological Resources Mitigation and Monitoring Plan addressing habitat restoration should be approved and implemented to increase the potential for successful restoration of Sonoran Desert habitats, such as desert scrub and dunes, and to minimize the potential for the spread of invasive species.</p> <p>Wetland, riparian habitats, and desert dry washes, primarily within the western and southern portions of the SEZ, and sand dune habitats and sand transport areas, primarily in the northern and eastern portions of the SEZ, should be avoided to the extent practicable. A buffer area should be maintained around wetlands to reduce the potential for impacts on wetlands on or near the SEZ.</p> <p>An appropriate buffer shall be maintained between project impacts and the wetland south of the Imperial Valley SEZ to ensure all impacts from construction, operations, and maintenance of solar facilities do not impair the current functions and values associated with wetland resources, including habitat support for sensitive species.</p> <p>Groundwater withdrawals should be limited to reduce the potential for indirect impacts on wetland habitats that are associated with groundwater discharges, such as the wetlands near the AAC and EHC.</p> <p><i>Wildlife (All):</i> Wetland habitats along the southern boundary of the SEZ should be avoided to the extent practicable.</p> <p><i>Wildlife (Amphibians and Reptiles):</i> The potential for indirect impacts on several amphibian species could be reduced by maximizing the distance between solar energy development and the All American Canal.</p> <p><i>Wildlife (Birds):</i> Pre-disturbance surveys should be conducted within the SEZ for bird species listed under the Migratory Bird Treaty Act. Impacts on potential nesting habitat of these species should be avoided, particularly during the nesting season.</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
<p>California (Cont.) Imperial East (Cont.)</p>	<p>Pre-disturbance surveys should be conducted within the SEZ for the following desert bird focal species: ash-throated flycatcher, black-tailed gnatcatcher, black-throated sparrow, burrowing owl, common raven, Costa’s hummingbird, crissal thrasher, ladder-backed woodpecker, Le Conte’s thrasher, phainopepla, and verdin. Impacts on potential nesting habitat of these species should be avoided.</p> <p>Plant species that positively influence the presence and abundance of the desert bird focal species should be avoided to the extent practicable. These species include Goodding’s willow, yucca, Joshua tree, mesquite, honey mesquite, screwbean, desert mistletoe, big saltbush, smoketree, and catclaw acacia.</p> <p><i>Wildlife (Mammals):</i> Ensure that solar project development does not prevent mule deer free access to the unlined section of the All American Canal.</p> <p><i>Special Status Species:</i> Disturbance of sand dunes and sand transport systems, desert riparian, wash, and wetland habitats should be avoided or minimized to the extent practicable. Avoiding or minimizing disturbance of these habitats could reduce impacts on 30 special status species.</p> <p>Because the California black rail and Yuma clapper rail are fully protected species, direct and indirect impacts on them should be completely avoided. This includes the complete avoidance of occupied and potentially suitable wetlands on and in the vicinity of the SEZ (particularly those seepage wetlands and enhanced wetlands associated with the All-American Canal). Consultations with the CDFG are required to address the potential for impacts on these species as required under the CESA. Consultations with the USFWS and CDFG are required to address the potential for impacts on these species as required under the CESA.</p> <p>Consultations with the USFWS and the CDFG should be conducted to address the potential for impacts on the Yuma clapper rail a species listed as endangered under the ESA and CESA. Consultation would identify an appropriate survey protocol, avoidance measures, and, if appropriate, reasonable and prudent alternatives, reasonable and prudent measures, and determine any additional mitigation requirements beyond those already afforded to the Yuma clapper rail as a California fully protected species.</p> <p>Coordination with the USFWS and CDFG should be conducted to address the potential for impacts on the flat-tailed horned lizard, a species that is proposed for listing under the ESA. Coordination would identify an appropriate survey protocol, avoidance measures, and, potentially, translocation or compensatory mitigation (if necessary).</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
California (Cont.)	
Imperial East (Cont.)	<p><i>Acoustic Environment:</i> Dish engine facilities within the Imperial East SEZ should be located more than 1 to 2 mi (1.6 to 3.2 km) from nearby residences located southwest of the SEZ (i.e., the facilities should be located in the central or eastern portion of the proposed SEZ).</p> <p><i>Cultural Resources:</i> Because of the possibility of burials in the vicinity of the proposed Imperial East SEZ, and its location along the Yuma-San Diego Trail, it is recommended that for surveys conducted in the SEZ consideration be given to include Native American representatives in the development of survey designs and historic property treatment and monitoring plans.</p>
Iron Mountain	<p><i>Lands and Realty:</i> Survey of solar energy development sites for possible unexploded military ordnance would be required.</p> <p><i>Specially Designated Areas and Lands with Wilderness Characteristics:</i> Application of SEZ-specific design features for visual resource impacts may reduce the visual impact on wilderness characteristics, scenic resources, and night sky viewing opportunities.</p> <p><i>Minerals:</i> The presence of the KSLA must be addressed to evaluate the compatibility of solar development in the KSLA with continuation of sodium mineral leasing. Alternatively, the KSLA could be excluded from the SEZ.</p> <p>Planning and identification for retention of sand and gravel resources within the SEZ should be completed prior to authorization of solar energy leases.</p> <p><i>Water Resources:</i> Water resource analysis indicates that wet-cooling options would not be feasible. Other technologies should incorporate water conservation measures.</p> <p>Land disturbance activities should avoid impacts to the extent possible in the vicinity of Danby Lake to reduce impacts to the regional drainage outlet and salt mining operations.</p> <p>During site characterization, coordination and permitting with CDFG regarding California’s Lake and Streambed Alteration Program would be required for any proposed alterations to surface water features (both perennial and ephemeral).</p> <p>----- The groundwater-permitting process should be in compliance with the San Bernardino County groundwater ordinance.</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
California (Cont.)	
<p>Iron Mountain (Cont.)</p>	<p>Construction of groundwater production wells in the Danby Lake region should be avoided because the water is nonpotable and contains corrosive levels of TDS.</p> <p><i>Vegetation:</i> An Integrated Vegetation Management Plan addressing invasive species control, and an Ecological Resources Mitigation and Monitoring Plan addressing habitat restoration should be approved and implemented to increase the potential for successful restoration of affected Sonoran Desert habitats and minimize the potential for the spread of invasive species, such as tamarisk, cheatgrass, and sahara mustard.</p> <p>Riparian, playa, chenopod scrub, sand dune, and desert dry wash habitats should be avoided to the extent practicable, and any impacts should be minimized and mitigated. A buffer area should be maintained around riparian areas, playas, and dry washes to reduce the potential for impacts on these habitats on or near the SEZ. Appropriate engineering controls should be used to minimize impacts on these areas resulting from surface water runoff, erosion, sedimentation, altered hydrology, accidental spills, or fugitive dust deposition to these habitats. Appropriate buffers and engineering controls would be determined through agency consultation.</p> <p>Groundwater withdrawals should be limited to reduce the potential for indirect impacts on riparian habitat that is associated with groundwater discharge or groundwater-dependent communities, such as mesquite bosque.</p> <p><i>Wildlife (Amphibians and Reptiles):</i> Design features should be implemented to reduce the potential for direct effects on amphibians and reptiles that depend on specific habitat types that can be easily avoided (e.g., Colorado River Aqueduct, Homer Wash, and portions of Danby Lake).</p> <p><i>Wildlife (Birds):</i> Pre-disturbance surveys should be conducted within the SEZ for the following desert bird focal species: ash-throated flycatcher, black-tailed gnatcatcher, black-throated sparrow, burrowing owl, common raven, Costa’s hummingbird, crissal thrasher, ladder-backed woodpecker, Le Conte’s thrasher, phainopepla, and verdin. Impacts on potential nesting habitat of these species should be avoided.</p> <p>Plant species that positively influence the presence and abundance of the desert bird focal species should be avoided to the extent practicable. These species include Goodding’s willow, yucca, Joshua tree, mesquite, honey mesquite, screwbean, desert mistletoe, big saltbush, smoketree, and catclaw acacia.</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
California (Cont.)	
<p>Iron Mountain (Cont.)</p>	<p>Minimize development in Danby Lake and preclude development on Homer Wash. This could reduce impacts on species such as the killdeer, least sandpiper, ash-throated flycatcher, black-tailed gnatcatcher, Costa’s hummingbird, Le Conte’s thrasher, and verdin.</p> <p><i>Wildlife (Mammals):</i> Development in Homer Wash should be avoided in order to reduce impacts on species such as the roundtailed ground squirrel, white-tailed antelope squirrel, little pocket mouse, long-tailed pocket mouse, and any other mammal species that inhabit wash habitats.</p> <p><i>Wildlife (Aquatic Biota):</i> The amount of ground disturbance near Danby Lake should be minimized.</p> <p><i>Special Status Species:</i> Disturbance of desert riparian, wash, and playa habitats within the SEZ should be avoided or minimized to the extent practicable. In particular, development should be avoided within Danby Lake, which covers approximately 25,000 acres (100 km²), and within Homer Wash. Avoiding or minimizing disturbance of these habitats could reduce impacts on four special status species.</p> <p>Avoiding or minimizing disturbance of desert dunes and sand transport systems on the SEZ could reduce impacts on 9 special status species.</p> <p>Avoiding or minimizing disturbance of sand dunes and sand transport systems, rocky cliffs, and outcrops on the SEZ could reduce impacts on 15 special status species.</p> <p>Consultations with the USFWS and the CDFG should be conducted to address the potential for impacts on the desert tortoise, a species listed as threatened under the ESA and CESA. Consultation would identify an appropriate survey protocol, avoidance measures, and, if appropriate, reasonable and prudent alternatives, reasonable and prudent measures, and terms and conditions for incidental take statements.</p> <p><i>Visual Resources:</i> Within the SEZ, in areas visible from and within 1 mi (1.6 km) of the boundary of the Old Woman Mountains WA, visual impacts associated with solar energy project operation should be consistent with VRM Class II management objectives, as experienced from KOPs (to be determined by the BLM) within the WA, and in areas visible from between 1 and 3 mi (1.6 and 4.8 km). Visual impacts should be consistent with VRM Class III management objectives.</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
<i>California (Cont.)</i>	
Iron Mountain (Cont.)	<p>Within the SEZ, in areas visible from and south of State Highway 62, visual impacts associated with solar energy project operation should be consistent with VRM Class III management objectives, as experienced from KOPs (to be determined by the BLM) within the Palen McCoy WA.</p> <p>Within the SEZ, in areas visible from and within 3 mi (4.8 km) of the boundary of the Turtle Mountains WA, visual impacts associated with solar energy project operation should be consistent with VRM Class II management objectives, as experienced from KOPs (to be determined by the BLM) within the WA, and in areas visible from between 3 and 5 mi (4.8 and 8 km); visual impacts should be consistent with VRM Class III management objectives.</p> <p><i>Acoustic Environment:</i> Dish engine facilities within the Iron Mountain SEZ should be located more than 1 to 2 mi (1.6 to 3 km) from the nearest residences, west of the west-central SEZ (i.e., the facilities should be located in other portions of the proposed SEZ).</p> <p><i>Cultural Resources:</i> Avoidance of significant sites (historic properties) within the proposed Iron Mountain SEZ, specifically in the vicinity of Danby Lake and near the Iron Mountain Divisional Camp, is recommended.</p> <p>Because of the possibility of burials in the vicinity of the proposed Iron Mountain SEZ and its location along the Salt Song Trail, it is recommended that for surveys conducted in the SEZ, consideration be given to include Native American representatives in the development of survey designs and historic property treatment and monitoring plans.</p> <p>Troops in training for World War II often used the same locations that Native Americans did for similar purposes. Any excavation of historic sites should take into consideration the potential for the co-location of prehistoric and ethnohistoric components.</p>
Pisgah	<p><i>Specially Designated Areas and Lands with Wilderness Characteristics:</i> Application of SEZ-specific design features for visual resource impacts may reduce the visual impact on wilderness characteristics.</p> <p>Once construction of solar energy facilities begins, the BLM would monitor to determine whether increases in traffic to the Ord-Rodman DWMA, Rodman Mountains Cultural Area, and Pisgah ACECs occur and whether additional management measures are required to protect the resources in these areas.</p> <p><i>Minerals:</i> Consideration should be given to altering the boundaries of the SEZ to remove the areas with mining claims.</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
<p><i>California (Cont.)</i> Pisgah (Cont.)</p>	<p><i>Water Resources:</i> Water resource analysis indicates that wet-cooling options would not be feasible. Other technologies should incorporate water conservation measures.</p> <p>Land disturbance activities should avoid impacts to the extent possible in the vicinity of Troy Lake and ephemeral washes onsite.</p> <p>During site characterization, coordination and permitting with CDFG regarding California’s Lake and Streambed Alteration Program would be required for any proposed alterations to surface water features (both perennial and ephemeral).</p> <p>Groundwater should be used in accordance with rules and regulations set forth by the MWA regarding the Mojave River adjudicated groundwater basin for the portions of the SEZ located in Analysis Area 1.</p> <p>The groundwater permitting process should be in compliance with the San Bernardino County groundwater ordinance.</p> <p><i>Vegetation:</i> An Integrated Vegetation Management Plan addressing invasive species control and an Ecological Resources Mitigation and Monitoring Plan addressing habitat restoration should be approved and implemented to increase the potential for successful restoration of creosotebush-white bursage desert scrub communities and other affected habitats and to minimize the potential for the spread of tamarisk, Sahara mustard, schismus, or other invasive species.</p> <p>All playa, chenopod scrub, sand dune and sand transport areas, and desert dry wash habitats shall be avoided to the extent practicable, and any impacts minimized and mitigated. A buffer area shall be maintained around riparian areas, playas, and dry washes to reduce the potential for impacts on these habitats on or near the SEZ.</p> <p>Groundwater withdrawals should be limited to reduce the potential for indirect impacts on riparian habitat along the Mojave River that is associated with groundwater-dependent communities, such as mesquite bosque..</p> <p><i>Wildlife (Amphibians and Reptiles):</i> Implement design features and other mitigation measures to reduce the potential for effects on amphibians and reptiles, especially for those species that depend on habitat types that can be avoided (e.g., Troy Lake, which could provide habitat for the red-spotted toad).</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
<p>California (Cont.) Pisgah (Cont.)</p>	<p><i>Wildlife (Birds):</i> Plant species that positively influence the presence and abundance of the desert bird focal species should be avoided to the extent practicable. These species include Goodding’s willow, yucca, Joshua tree, mesquite, honey mesquite, screwbean, desert mistletoe, big saltbush, smoketree, and catclaw acacia.</p>
	<p>Development within the area of Troy Lake should be avoided.</p>
	<p><i>Wildlife (Mammals):</i> Development within the ephemeral drainages should be avoided in order to reduce impacts on species such as the round-tailed ground squirrel, white-tailed antelope squirrel, little pocket mouse, long-tailed pocket mouse, and any other mammal species that inhabit wash habitats.</p>
	<p><i>Special Status Species:</i> Disturbance of desert playa and wash habitats within the SEZ should be avoided or minimized to the extent practicable. In particular, development should be avoided in and near Troy Lake in the western portion of the SEZ. Avoiding or minimizing disturbance of these habitats could reduce impacts on 11 special status species.</p>
	<p>Avoiding or minimizing disturbance of sand dunes and sand transport systems, rocky cliffs, and outcrops on the SEZ could reduce impacts on 11 special status species.</p>
	<p>Avoiding or minimizing groundwater withdrawals from the SEZ would reduce or prevent impacts on 3 special status species that may occur in aquatic habitats outside of the affected area.</p>
	<p>Because the Mohave tui chub is a California fully protected species, direct and indirect impacts on it should be completely avoided. This includes the avoidance of groundwater withdrawals from the SEZ that may affect habitats at Camp Cady and in the Mojave River. Coordination with the CDFG should be conducted for the Mohave tui chub to address the potential for impact when project-related groundwater demands are better identified.</p>
	<p>Consultations with the USFWS and CDFG are required to address the potential for impacts on the Mohave tui chub and desert tortoise as required under the ESA and CESA. Consultation would identify appropriate survey protocols, avoidance and minimization measures, and, if appropriate, reasonable and prudent alternatives, reasonable and prudent measures, and terms and conditions for incidental take statements.</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
<p>California (Cont.) Pisgah (Cont.)</p>	<p><i>Visual Resources:</i> Within the SEZ, in areas visible from and within 1 mi (1.6 km) of the Cady Mountains WSA, visual impacts associated with solar energy project operation should be consistent with VRM Class II management objectives, as experienced from KOPs (to be determined by the BLM) within the WSA, and in areas visible from between 1 and 3 mi (1.6 and 4.8 km); visual impacts should be consistent with VRM Class III management objectives.</p> <p>Within the SEZ, in areas located south of I-40 and visible from and between 1 and 3 mi (1.6 and 4.7 km) of the Rodman Mountains WA, visual impacts associated with solar energy project operation should be consistent with VRM Class III management objectives, as experienced from KOPs determined by the BLM within the WA.</p> <p><i>Acoustic Environment:</i> Dish engine facilities within the Pisgah SEZ should be located more than 1 to 2 mi (1.6 to 3.2 km) from nearby residences to the northwest and the south of the SEZ (i.e., the facilities should be located in other portions of the proposed SEZ).</p> <p><i>Cultural Resources:</i> Areas of significant prehistoric remains within the SEZ that are identified through the Calico Solar Power Project (to date an area including a 400-ft [122-m] buffer and in some instances fencing) should be avoided.</p>
<p>Riverside East</p>	<p><i>Specially Designated Areas and Lands with Wilderness Characteristics:</i> Application of SEZ-specific design features for visual resource impacts may reduce the visual impact on wilderness characteristics.</p> <p>Once construction of solar energy facilities begins, the BLM would monitor resource conditions in the seven ACECs near the SEZ to determine whether additional design features would be required to protect the resources in these areas.</p> <p><i>Recreation:</i> A buffer area between the Midland LTVA and solar development should be established to preserve the LTVA area. The size of the buffer should be determined based on the site and visitor specific criteria.</p> <p><i>Military and Civilian Aviation:</i> Coordination with the FAA and local airport authorities should be required early in the project planning process to identify and mitigate potential impacts on the local airports. Precautions should be taken for pilots to avoid interference with flight paths or related flight operations and to avoid reflector glare hazards and thermal plumes.</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
California (Cont.)	
Riverside East (Cont.)	<p><i>Minerals:</i> Existing mining claims should be avoided.</p> <p><i>Water Resources:</i> Water resource analysis indicates that wet-cooling options would not be feasible. Other technologies should incorporate water conservation measures.</p> <p>Land disturbance activities should avoid impacts to the extent possible near the regions surrounding Palen Lake, Ford Dry Lake, and McCoy Wash.</p> <p>During site characterization, coordination and permitting with CDFG regarding California’s Lake and Streambed Alteration Program would be required for any proposed alterations to surface water features (both perennial and ephemeral).</p> <p>Groundwater withdrawals should comply with rules and regulations set forth by the PVID for the portions of the SEZ located within PVID boundaries.</p> <p>The use of groundwater in the Chuckwalla Valley and Palo Verde Mesa should be planned for and monitored in cooperation with the BOR and the USGS regarding the Colorado River Accounting Surface and the rules set forth in the Law of the River.</p> <p><i>Vegetation:</i> An Integrated Vegetation Management Plan addressing invasive species control, and an Ecological Resources Mitigation and Monitoring Plan addressing habitat restoration should be approved and implemented to increase the potential for successful restoration of creosotebush-white bursage desert scrub communities and other affected habitats and to minimize the potential for the spread of tamarisk Sahara mustard, cheatgrass, or other invasive species.</p> <p>All wetland, riparian, playa, dry wash (including dry wash microphyll woodland), sand dune and sand transport areas, and chenopod scrub habitats within the SEZ should be avoided to the extent practicable, and any impacts minimized and mitigated. A buffer area should be maintained around wetland, riparian, playa, and dry wash communities to reduce the potential for impacts on these communities on or near the SEZ.</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
California (Cont.)	
Riverside East (Cont.)	<p>Appropriate engineering controls should be used to minimize impacts on wetland, riparian, playa, dry wash woodland, and chenopod scrub, including downstream occurrences, resulting from surface water runoff, erosion, sedimentation, altered hydrology, accidental spills, or fugitive dust deposition to these habitats. Appropriate buffers and engineering controls would be determined through agency consultation.</p> <p>Groundwater withdrawals should be limited to reduce the potential for indirect impacts on riparian habitat that is associated with groundwater discharge or groundwater-dependent communities, such as mesquite bosque or bush seep-weed communities.</p> <p><i>Wildlife (All):</i> To the extent practicable, avoid ephemeral drainages, Palen Lake and Ford Dry Lake, wetlands, McCoy Wash, and the Colorado River Aqueduct.</p> <p><i>Wildlife (Amphibians and Reptiles):</i> The potential for indirect impacts on several amphibian species could be reduced by maximizing the distance between solar energy development and the Colorado River Aqueduct.</p> <p><i>Wildlife (Birds):</i> Plant species that positively influence the presence and abundance of the desert bird focal species should be avoided to the extent practicable. These species include Goodding’s willow, yucca, Joshua tree, mesquite, honey mesquite, screwbean, desert mistletoe, big saltbush, smoketree, and catclaw acacia.</p> <p><i>Wildlife (Mammals):</i> Ensure that fencing around the solar energy development does not block the free passage of mule deer between the Colorado River and mountains or foothills.</p> <p><i>Aquatic Biota:</i> Appropriate engineering controls should be implemented to minimize the amount of surface water runoff that reaches wetlands associated with Palen Lake.</p> <p><i>Special Status Species:</i> Disturbance of desert playa and wash habitats within the SEZ should be avoided or minimized to the extent practicable. In particular, development should be avoided in and near Ford Dry Lake, Palen Lake, and McCoy Wash within the SEZ. Avoiding or minimizing disturbance of these habitats could reduce impacts on 9 special status species.</p> <p>Avoiding or minimizing disturbance of sand dunes and sand transport systems, woodlands, rocky cliffs, and outcrops on the SEZ could reduce impacts on 20 special status species.</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
California (Cont.)	
Riverside East (Cont.)	<p>Consultations with the USFWS and the CDFG should be conducted to address the potential for impacts on the desert tortoise—a species listed as threatened under the ESA and CESA. Consultation would identify an appropriate survey protocol, avoidance measures, and, if appropriate, reasonable and prudent alternatives, reasonable and prudent measures, and terms and conditions for incidental take statements.</p> <p><i>Visual Resources:</i> Within the SEZ, in areas west of the northwest corner of Section 6 of Township 006S Range 017E, and in areas north and west of the northwest corner of Section 30 of Township 005S Range 018E, visual impacts associated with solar energy development in the SEZ should be consistent with VRM Class II management objectives, as determined from KOPs to be selected by the BLM within Joshua Tree NP and the Palen-McCoy WA.</p> <p>Within the SEZ, in areas visible from and within 3 mi (4.8 km) of the Rice Valley or Big Maria Mountains WSAs, visual impacts associated with solar energy project operation should be consistent with VRM Class II management objectives, as experienced from KOPs (to be determined by the BLM) within the WSAs, and in areas visible from between 3 and 5 mi (4.8 and 8.0 km); visual impacts should be consistent with VRM Class III management objectives.</p> <p><i>Acoustic Environment:</i> Dish engine facilities within the Riverside East SEZ should be located more than 1 to 2 mi (1.6 to 3 km) from the nearby residences to the west and the east of the SEZ (i.e., the facilities should be located in other portions of the proposed SEZ).</p> <p><i>Cultural Resources:</i> Significant resources clustered in specific areas, such as those in the vicinity of Palen and Ford Dry Lakes, focused DTC/C-AMA activity areas that retain sufficient integrity, and Native American trails evident in the desert pavement should be avoided.</p> <p>Troops in training for World War II often used the same locations that Native Americans did for similar purposes. Any excavation of historic sites should take into consideration the potential for the co-location of prehistoric and ethnohistoric components.</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
<p>Colorado Antonito Southeast</p>	<p><i>Lands and Realty:</i> Future management of the 1,240-acre (5-km²) BLM parcel that would be isolated by development of the proposed SEZ should be addressed as part of the site-specific analysis of any future solar development.</p> <p><i>Specially Designated Areas and Lands with Wilderness Characteristics:</i> Restricting the type of solar technology or eliminating solar development in portions of the visible area of the SEZ within 3 mi (5 km) of the Cumbres & Toltec Scenic Railroad ACEC is recommended to limit impacts on scenic values in the ACEC.</p> <p>Pending congressional review of the BLM recommendations for wilderness designations, restricting or eliminating solar development in portions of the visible area of the SEZ within 5 mi (8 km) of the San Antonio WSA is recommended to avoid impacts on wilderness characteristics in the WSA.</p> <p>Early consultation should be initiated with the entity responsible for developing the management plan for the Sangre de Cristo NHA to understand how development of the SEZ could be consistent with NHA plans/goals.</p> <p>Pending completion of a study on the significance and definition of management needs (if any) of the West Fork of the North Branch of the Old Spanish Trail, solar development should be restricted to areas that do not have the potential to adversely affect the setting of the trail.</p> <p><i>Water Resources:</i> Water resource analysis indicates that wet-cooling options would not be feasible. Other technologies should incorporate water conservation measures.</p> <p>Land disturbance activities should avoid impacts to the extent possible in the vicinity of Alta Lake and two additional wetland areas, along with ephemeral washes present on the site.</p> <p>Groundwater rights must be obtained from the Division 3 Water Court in coordination with the Colorado Division of Water Resources, existing water right holders, and applicable water conservation districts.</p> <p><i>Vegetation:</i> An Integrated Vegetation Management Plan addressing invasive species control, and an Ecological Resources Mitigation and Monitoring Plan addressing habitat restoration should be approved and implemented to increase the potential for successful restoration of Inter-Mountain Basins Semi-Desert Shrub Steppe and Inter-Mountain Basins Semi-Desert Grassland habitats and minimize the potential for the spread of invasive species, such as Russian thistle or cheatgrass.</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
<p>Colorado (Cont.) Antonito Southeast (Cont.)</p>	<p>All wetland, dry wash, and riparian habitats within the SEZ (e.g., Alta Lake) and assumed transmission line corridor (e.g., the Rio San Antonio) should be avoided to the extent practicable. A buffer area should be maintained around wetlands, dry washes, and riparian habitats to reduce the potential for impacts on Alta Lake and other wetlands on or near the SEZ and riparian habitats associated with the Rio San Antonio, the Rio de los Pinos, the Conejos River, and Cove Lake Reservoir.</p> <p>Appropriate engineering controls should be used to minimize impacts on wetland, dry wash, and riparian habitats, including downstream occurrences, resulting from surface- water runoff, erosion, sedimentation, altered hydrology, accidental spills, or fugitive dust deposition. Appropriate buffers and engineering controls would be determined through agency consultation</p> <p>Transmission line towers should be sited and constructed to minimize impacts on wetlands and riparian areas associated with the Rio San Antonio, the Rio de los Pinos, and the Conejos River and span them whenever practicable.</p> <p>Groundwater withdrawals should be limited to reduce potential for indirect impacts on wetland habitats along the Rio San Antonio or the Conejos River or on springs that are associated with groundwater discharge.</p> <p><i>Wildlife (Amphibians and Reptiles):</i> All wetland and riparian habitats within the SEZ (e.g., Alta Lake) and transmission line corridor (e.g., the Rio San Antonio) should be avoided to the extent practicable.</p> <p>Appropriate engineering controls should be used to minimize impacts on aquatic, riparian, and wetland habitats associated with Alta Lake, the Rio San Antonio, the Rio de los Pinos, the Conejos River, and Cove Lake Reservoir resulting from surface- water runoff, erosion, sedimentation, accidental spills, or fugitive dust deposition to these habitats.</p> <p>Transmission line towers should be sited and constructed to minimize impacts on wetlands and riparian areas and span them whenever practicable.</p> <p><i>Wildlife (Birds):</i> All wetland and riparian habitats within the SEZ (e.g., Alta Lake) and transmission line corridor (e.g., the Rio San Antonio) should be avoided to the extent practicable. Transmission line towers should be sited and constructed to minimize impacts on wetlands and riparian areas and to span them whenever practicable.</p> <p>Appropriate engineering controls should be used to minimize impacts on aquatic, riparian, and wetland habitats associated with Alta Lake, the Rio San Antonio, the Rio de los Pinos, the Conejos River, and Cove Lake Reservoir resulting from surface-water runoff, erosion, sedimentation, accidental spills, or fugitive dust deposition to these habitats.</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
<p>Colorado (Cont.) Antonito Southeast (Cont.)</p>	<p>Prairie dog colonies (which could provide habitat or food source for some bird species) should be avoided to the extent practicable.</p> <p><i>Wildlife (Mammals):</i> Prairie dog colonies should be avoided to the extent practicable to reduce impacts on species such as the desert cottontail and thirteen-lined ground squirrel.</p> <p>Construction should be curtailed during winter when big game species are present.</p> <p>Disturbance near the elk and mule deer resident population areas should be avoided.</p> <p>Where big game winter ranges intersect or are within close proximity to the SEZ, use of motorized vehicles and other human disturbances should be controlled (e.g., through road closures).</p> <p>Development in the 253-acre (1- km²) portion of the SEZ that overlaps the pronghorn summer concentration area should be avoided.</p> <p>The fencing around the solar energy development should not block the free movement of mammals, particularly big game species.</p> <p>Transmission lines should be sited to avoid disturbance of suitable roosting and foraging habitat for bat species that may be affected by such activities.</p> <p><i>Aquatic Biota:</i> All aquatic habitats within the SEZ (e.g., Alta Lake) and transmission line corridor should be avoided to the extent practicable.</p> <p>Transmission line towers should be sited and constructed to minimize impacts on aquatic habitats and span them whenever practicable.</p> <p><i>Special Status Species:</i> Avoiding or minimizing disturbance of wetland, riparian, grassland, sagebrush, and woodland habitats in the area of direct effect could reduce impacts on 19 special status species.</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
<p>Colorado (Cont.) Antonito Southeast (Cont.)</p>	<p>Transmission towers should be sited to allow spanning of wetlands and riparian areas whenever such habitats must be crossed.</p> <p>Consultations with the USFWS and CDOW should be conducted to address the potential for impacts on the southwestern willow flycatcher, a species listed as endangered under the ESA. Consultation would identify an appropriate survey protocol, avoidance measures, and, if appropriate, reasonable and prudent alternatives, reasonable and prudent measures, and terms and conditions for incidental take statements.</p> <p>Coordination with the USFWS and CDOW should be conducted to address the potential for impacts on the Gunnison's prairie dog and northern leopard frog – species that are either candidate or under review for listing under the ESA. Coordination would identify an appropriate survey protocol, avoidance measures, and, potentially, translocation or compensatory mitigation.</p> <p><i>Visual Resources:</i> The development of power tower facilities should be prohibited within the SEZ.</p> <p>Within the SEZ, in areas visible from and within 3 mi (55 km) of the San Antonio WSA, visual impacts associated with solar energy project operation should be consistent with VRM Class III management objectives.</p> <p>Within the SEZ, in areas visible from and within 3 mi (5 km) of the Cumbres & Toltec Scenic Railroad ACEC, visual impacts associated with solar energy project operation should be consistent with VRM Class III management objectives.</p> <p>Within the SEZ, in areas visible from and within 1 mi (1.6 km) of the centerline of the West Fork of the North Branch of the Old Spanish Trail, visual impacts associated with solar energy project operation should be consistent with VRM Class II management objectives, as experienced from the WSA, and in areas visible from between 1 and 3 mi (1.2 and 5 km); visual impacts should be consistent with VRM Class III management objectives.</p> <p><i>Acoustic Environment:</i> Dish engine facilities within the SEZ should be located more than 1 to 2 mi (1.6 to 3 km) from nearby residences around the SEZ (i.e., the facilities should be located in the central or southeast area of the proposed SEZ).</p> <p><i>Paleontological Resources:</i> Avoidance of PFYC Class 4/5 areas is recommended for development within the SEZ (i.e., the 4-acre [0.016-km²] parcel in the north part of the SEZ) and transmission corridor placement. Where avoidance of Class 4/5 deposits is not possible in order to connect to existing transmission, a paleontological survey or monitoring may be required by the BLM.</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
Colorado (Cont.)	
Antonito Southeast (Cont.)	<p><i>Cultural Resources:</i> A PA may need to be developed among the BLM, DOE, Colorado SHPO, ACHP, and the Trail Administration for the Old Spanish Trail to consistently address impacts on significant cultural resources from solar energy development within the San Luis Valley.</p> <p>Additional coordination with the Cumbres & Toltec Scenic Railroad Commission is recommended to address possible mitigation measures for reducing visual impacts.</p>
De Tilla Gulch	<p><i>Specially Designated Areas:</i> Pending completion of a study on the significance and definition of management needs (if any) of the Old Spanish National Historic Trail, solar development should be restricted to areas that do not have the potential to adversely affect the setting of the trail.</p> <p><i>Water Resources:</i> Wet-cooling technologies should incorporate water conservation measures to reduce water needs.</p> <p>Groundwater rights must be obtained from the Division 3 Water Court in coordination with the Colorado Division of Water Resources, existing water right holders, and applicable water conservation districts.</p> <p><i>Vegetation:</i> An Integrated Vegetation Management Plan addressing invasive species control, and an Ecological Resources Mitigation and Monitoring Plan addressing habitat restoration should be approved and implemented to increase the potential for successful restoration of Shrub Steppe, Greasewood Flat, or Grassland habitats and minimize the potential for the spread of invasive species, such as black henbane or spotted knapweed. Invasive species control should focus on biological and mechanical methods where possible to reduce the use of herbicides.</p> <p>Appropriate engineering controls should be used to minimize impacts on riparian and wetland habitats, including downstream occurrences, such as those associated with Saguache Creek or San Luis Creek, resulting from surface water runoff, erosion, sedimentation, altered hydrology, or accidental spills, and fugitive dust deposition to these and nearby upland habitats. Appropriate engineering controls would be determined through agency consultation.</p> <p>All ephemeral dry wash habitats should be avoided to the extent practicable, and any impacts minimized and mitigated. A buffer area shall be maintained around dry washes to reduce the potential for impacts on these habitats on or near the SEZ.</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
Colorado (Cont.)	
De Tilla Gulch (Cont.)	<p>Appropriate engineering controls should be used to minimize impacts on riparian, dry wash, and wetland habitats, including downstream occurrences, such as those associated with Saguache Creek or San Luis Creek.</p> <p>Groundwater withdrawals should be limited to reduce the potential for indirect impacts on wetlands or springs near or downgradient from the SEZ, such as many of the wetlands south, southwest, or southeast of the SEZ, including the wetland complexes associated with Saguache and San Luis Creeks that are associated with groundwater discharge.</p> <p><i>Wildlife (Amphibians and Reptiles):</i> Ephemeral drainages within the SEZ should be avoided to the extent practicable.</p> <p><i>Wildlife (Amphibians, Reptiles, and Birds):</i> Appropriate engineering controls should be used to minimize impacts resulting from surface water runoff, erosion, sedimentation, accidental spills, or fugitive dust deposition on aquatic, riparian, and wetland habitats associated with Saguache Creek, San Luis Creek, Rio Grande Canal, and wetland areas located within the area of indirect effects.</p> <p><i>Wildlife (Birds):</i> Prairie dog colonies (which could provide habitat or food resources for some bird species) should be avoided to the extent practicable.</p> <p><i>Wildlife (Mammals):</i> Prairie dog colonies should be avoided to the extent practicable to reduce impacts on species such as the desert cottontail and thirteen-lined ground squirrel.</p> <p>The extent of habitat disturbance should be minimized within elk severe winter range and pronghorn winter concentration area.</p> <p>Construction should be curtailed during winter when big game species are present.</p> <p>Where big game winter ranges intersect or are within close proximity to the SEZ, motorized vehicles and other human disturbances should be controlled (e.g., through road closures).</p> <p><i>Aquatic Biota:</i> Sediment and erosion controls should be implemented along intermittent drainages that drain toward Saguache or San Luis Creeks.</p> <p><i>Special Status Species:</i> Avoiding or minimizing impacts on grassland habitat on the SEZ could reduce impacts on three special status species.</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
Colorado (Cont.)	
De Tilla Gulch (Cont.)	<p>Coordination with the USFWS and CDOW should be conducted to address the potential for impacts on the Gunnison’s prairie dog and Gunnison sage-grouse, species that are either a candidate or under review for listing under the ESA. Coordination would identify an appropriate survey protocol, avoidance measures, and, potentially, translocation or compensatory mitigation.</p> <p><i>Visual Resources:</i> The development of power tower facilities should be prohibited within the SEZ.</p> <p><i>Acoustic Environment:</i> Dish engine facilities within the proposed De Tilla Gulch SEZ should be located more than 1 mi (1.6 km) from nearby residences to the east and the south of the SEZ (i.e., the facilities should be located in the western area of the proposed SEZ).</p> <p><i>Cultural Resources:</i> A PA may need to be developed among the BLM, DOE, Colorado SHPO, ACHP, and the Trail Administration for the Old Spanish Trail to consistently address impacts on significant cultural resources from solar energy development in the San Luis Valley.</p>
Fourmile East	<p><i>Specially Designated Areas and Lands with Wilderness Characteristics:</i> Solar technologies in the SEZ should be restricted to those with the lowest profile to minimize the visual impact on nearby specially designated areas. Additionally, lighting within the SEZ should be carefully designed to minimize visual impacts on surrounding specially designated areas.</p> <p>Pending outcome of a study of the significance of potentially affected segments of the Old Spanish National Historic Trail, restrictions on solar facility development that might adversely impact trail resources should be put in place.</p> <p>Solar development on the east side of the Los Caminos Antiguos Scenic Byway should not be approved, in order to reduce the negative visual effect on visitors from traveling on the road. This would also reduce the adverse impact on the scenic view from the highway looking to the east toward Blanca Peak and the WA. It could also reduce the potential impacts on the Old Spanish National Historic Trail.</p> <p>Consultation would be conducted to determine whether there would be adverse impacts on Native American religious values, and if so, what mitigation measures might be possible to reduce or eliminate such impacts.</p> <p>Early consultation should be initiated with the entity responsible for developing the management plan for the Sangre de Cristo NHA to understand how development of the SEZ could be consistent with NHA plans/goals.</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
<p>Colorado (Cont.) Fourmile East (Cont.)</p>	<p>Adoption of programmatic design features for visual resources would reduce visual impacts on wilderness, historic, and scenic values and should be considered as part of any solar project analysis.</p> <p><i>Recreation:</i> The portion of the SEZ on the east side of the scenic byway should be eliminated to reduce the negative visual effect on visitors of traveling on the scenic byway, and to reduce the visual impacts looking to the east toward Blanca Peak and the Sangre de Cristo Mountains.</p> <p>Solar technologies in the SEZ should be restricted to those with the lowest profile to minimize the visual impact and the accompanying adverse effect on recreational visitors.</p> <p><i>Soil Resources:</i> A study to evaluate the potential impacts of building a solar facility in close proximity to the Great Sand Dunes may be required.</p> <p><i>Water Resources:</i> Water resource analysis indicates that wet-cooling options would not be feasible. Other technologies should incorporate water conservation measures.</p> <p>Land disturbance activities should avoid impacts to the extent possible in the wetland areas on the western boundary of the site.</p> <p>Groundwater rights must be obtained from the Division 3 Water Court in coordination with the Colorado Division of Water Resources, existing water right holders, and applicable water conservation districts.</p> <p><i>Vegetation:</i> An Integrated Vegetation Management Plan addressing invasive species control and an Ecological Resources Mitigation and Monitoring Plan addressing habitat restoration should be approved and implemented to increase the potential for successful restoration of semidesert shrub steppe and greasewood flat habitats and minimize the potential for the spread of invasive species.</p> <p>All wetland, sand dune, playa, and riparian habitats within the SEZ and assumed transmission line corridor should be avoided to the extent practicable, and any impacts minimized and mitigated. A buffer area should be maintained around wetlands to reduce the potential for impacts on wetlands on or near the SEZ.</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
Colorado (Cont.)	
Fourmile East (Cont.)	<p>Appropriate engineering controls should be used to minimize impacts on wetland, playa, and riparian habitats, including downstream occurrences.</p> <p>Transmission line towers should be sited and constructed to minimize impacts on wetlands and span them whenever practicable.</p> <p>Groundwater withdrawals should be limited to reduce the potential for indirect impacts on wetlands or springs on or near the SEZ associated with groundwater discharge, such as the Blanca wetlands.</p> <p><i>Wildlife (Amphibians and Reptiles):</i> Wetland habitats within the SEZ should be avoided to the extent practicable.</p> <p>Appropriate engineering controls should be used to minimize impacts on the washes that drain off of the Sangre de Cristo Mountains and on Smith Reservoir resulting from surface water runoff, erosion, sedimentation, accidental spills, or fugitive dust deposition to these habitats.</p> <p>Transmission line towers should be sited and constructed to minimize impacts on wetlands and riparian areas (if present within the finalized ROW location) and span them whenever practicable.</p> <p><i>Wildlife (Birds):</i> If present, prairie dog colonies should be avoided to the extent practicable.</p> <p>Transmission line towers should be sited and constructed to minimize impacts on wetlands and riparian areas (if present within the finalized ROW location) and span them whenever practicable.</p> <p><i>Wildlife (Mammals):</i> Prairie dog colonies should be avoided to the extent practicable to reduce impacts on species such as the desert cottontail and thirteen-lined ground squirrel.</p> <p>To the extent practicable, construction activities should be avoided while pronghorn are on their winter range within the immediate area of the proposed Fourmile East SEZ.</p> <p>Development in the 213-acre (0.9-km²) portion of the SEZ that overlaps elk summer range should be avoided.</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
<p>Colorado (Cont.) Fourmile East (Cont.)</p>	<p><i>Aquatic Biota:</i> Undisturbed buffer areas and sediment and erosion controls should be maintained around wetlands on the SEZ. The use of heavy machinery and pesticides should be avoided in the immediate catchment basin for those wetlands.</p> <p><i>Special Status Species:</i> Avoiding or minimizing impacts on grassland habitat in the transmission corridor could reduce impacts on three special status species.</p> <p>Coordination with the USFWS and CDOW should be conducted to address the potential for impacts on the Gunnison’s prairie dog, a candidate species for listing under the ESA. Coordination would identify an appropriate survey protocol, avoidance measures, and, potentially, translocation or compensatory mitigation.</p> <p><i>Visual Resources:</i> The development of power tower facilities should be prohibited within the SEZ.</p> <p>Within the SEZ, in areas visible from and within 0.25 mi (0.4 km) of the Los Caminos Antiguos Scenic Byway, visual impacts associated with solar energy project operation should be consistent with VRM Class II management objectives, as experienced from key observation points on the byway.</p> <p>Within the SEZ, in areas visible from and within 3 mi (4.8 km) of the centerline of the high-potential segment of the Old Spanish National Historic Trail, visual impacts associated with solar energy project operation should be consistent with VRM Class II management objectives, as experienced from key observation points on the high-potential segment of the Old Spanish National Historic Trail. Within the SEZ, in areas visible from and between 3 mi (4.8 km) and 5 mi (8 km) of the centerline of the high-potential segment of the trail, visual impacts associated with solar energy project operation should be consistent with VRM Class III management objectives, as experienced from key observation points on the high-potential segment of the trail.</p> <p>Within the SEZ, in areas visible from and within 3 mi (4.8 km) of the Sangre de Cristo WA, visual impacts associated with solar energy project operation should be consistent with VRM Class II management objectives, as experienced from key observation points within the WA. Within the SEZ, in areas visible from and between 3 mi (4.8 km) and 5 mi (8 km) of the WA, visual impacts associated with solar energy project operation should be consistent with VRM Class III management objectives, as experienced from key observation points within the WA.</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
Colorado (Cont.)	
<p>Fourmile East (Cont.)</p>	<p><i>Acoustic Environment:</i> Dish engine facilities within the proposed Fourmile East SEZ should be located more than 1 to 2 mi (1.6 to 3 km) from nearby residences located southwest of the SEZ (i.e., the facilities should be located in the central or northern portion of the proposed SEZ).</p> <p><i>Paleontological Resources:</i> The depth to the Alamosa Formation within the SEZ should be determined to identify what design features might be needed in that area if solar energy development occurs.</p> <p><i>Cultural Resources:</i> A PA may need to be developed among the BLM, DOE, Colorado SHPO, ACHP, and the Trail Administration for the Old Spanish Trail to consistently address impacts on significant cultural resources from solar energy development within the San Luis Valley.</p> <p>Because of the possibility of encountering Native American human remains in the vicinity of the proposed Fourmile East SEZ, it is recommended that consideration be given to include Native American participation in the development of survey designs and historic property treatment and monitoring plans.</p> <p>Ongoing consultation with the Colorado SHPO and the appropriate Native American governments should be continued so that most adverse effects on significant resources in the valley could be mitigated to some degree. Some impacts may not be mitigable.</p>
<p>Los Mogotes East</p>	<p><i>Specially Designated Areas and Lands with Wilderness Characteristics:</i> Impacts on the wildlife values of the Los Mogotes ACEC would likely not be mitigable.</p> <p>Early consultation should be initiated with the entity responsible for developing the management plan for the Sangre de Cristo NHA to understand how development of the SEZ could be consistent with NHA plans/goals.</p> <p>Pending completion of a study on the significance and definition of management needs (if any) of the West Fork of the North Branch of the Old Spanish National Historic Trail, solar development should be restricted to areas that do not have the potential to adversely affect the setting of the trail. After the study is completed, if management actions are warranted for this portion of the trail, solar energy development should be consistent with protection of identified values of the trail.</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
<p>Colorado (Cont.) Los Mogotes East (Cont.)</p>	<p><i>Rangeland Resources (Livestock Grazing):</i> It may be possible to mitigate the loss of livestock grazing from the Capulin and Little Mogotes permits by changing management of the allotments and/or providing new range improvements (e.g., fences, water development) elsewhere in the allotments. It also may be possible to mitigate some or all of the loss by altering allotment boundaries or possibly offering an exchange of allotments with other un-occupied allotments.</p> <p><i>Water Resources:</i> Water resource analysis indicates that wet cooling options would not be feasible. Other technologies should incorporate water conservation measures.</p> <p>Land disturbance activities should avoid impacts to the extent possible near ephemeral washes on site and surrounding wetlands.</p> <p>Groundwater rights must be obtained from the Division 3 Water Court in coordination with the Colorado Division of Water Resources, existing water right holders, and applicable water conservation districts.</p> <p><i>Vegetation:</i> An Integrated Vegetation Management Plan addressing invasive species control, and an Ecological Resources Mitigation and Monitoring Plan addressing habitat restoration should be approved and implemented to increase the potential for successful restoration of semidesert shrub steppe and semidesert grassland habitats and minimize the potential for the spread of invasive species.</p> <p>All dry wash habitats within the SEZ and all wetland and dry wash habitats within the assumed access road corridor should be avoided to the extent practicable, and any impacts minimized and mitigated. A buffer area should be maintained around wetlands and dry washes to reduce the potential for impacts on these habitats.</p> <p>Appropriate engineering controls should be used to minimize impacts on wetland and riparian habitats, including downstream occurrences.</p> <p>Groundwater withdrawals should be limited to reduce the potential for indirect impacts on wetlands or springs near or downgradient from the SEZ associated with groundwater discharge, such as the wetlands along the Conejos River.</p> <p><i>Wildlife (Amphibians and Reptiles):</i> Wash habitats within the SEZ should be avoided to the extent practicable.</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
Colorado (Cont.)	
Los Mogotes East (Cont.)	<p>The access road should be sited and constructed to minimize impacts on wetlands (if present within the finalized access road location).</p> <p><i>Wildlife (Birds):</i> The access road should be sited and constructed to minimize impacts on wetlands and riparian areas (if present within the finalized access road location).</p> <p>If present, prairie dog colonies (which could provide habitat or a food source for some bird species) should be avoided to the extent practicable.</p> <p><i>Wildlife (Mammals):</i> Prairie dog colonies should be avoided to the extent practicable. This could reduce impacts on species such as the desert cottontail and thirteen-lined ground squirrel.</p> <p>Construction should be curtailed during winter when big game species are present.</p> <p>Where big game winter ranges intersect or are within close proximity to the SEZ, use of motorized vehicles and other human disturbances should be controlled (e.g., through temporary road closures when big game are present).</p> <p>Development in the 135-acre (0.55 km²) portion of the SEZ that overlaps the mule deer winter range should be avoided.</p> <p>Loss of pronghorn winter concentration area should be minimized.</p> <p><i>Aquatic Biota:</i> Undisturbed buffer areas and sediment and erosion controls should be maintained around drainages associated with wetland areas located in the immediate vicinity of the SEZ.</p> <p><i>Special Status Species:</i> Avoiding or minimizing disturbance of grassland, marsh, meadow, and woodland habitat in the area of direct effects could reduce impacts on 24 special status species.</p> <p>Coordination with the USFWS and CDOW should be conducted to address the potential for impacts on the Gunnison’s prairie dog and northern leopard frog – species that are either candidate or under review for listing under the ESA. Coordination would identify an appropriate survey protocol, avoidance measures, and, potentially, translocation or compensatory mitigation.</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
<p>Colorado (Cont.) Los Mogotes East (Cont.)</p>	<p><i>Visual Resources:</i> The development of power tower facilities should be prohibited within the SEZ.</p> <p><i>Acoustic Environment:</i> Dish engine facilities within the SEZ should be located more than 1 to 2 mi (1.6 to 3 km) from nearby residences around the SEZ (i.e., the facilities should be located in the western area of the proposed SEZ).</p> <p><i>Paleontological Resources:</i> Avoidance of PFYC Class 4/5 areas is recommended for development within the SEZ and for access road placement. Where avoidance of these areas is not possible, a paleontological survey would be required.</p> <p><i>Cultural Resources:</i> A PA may need to be developed among the BLM, DOE, Colorado SHPO, ACHP and the Trail Administration for the Old Spanish Trail to consistently address impacts on significant cultural resources from solar energy development within the San Luis Valley.</p> <p>Additional coordination with the CTSR Commission is recommended to address possible mitigation measures for reducing visual impacts on the Cumbres and Toltec Scenic Railroad.</p>
<p>Nevada Amargosa Valley</p>	<p><i>Specially Designated Areas and Lands with Wilderness Characteristics:</i> Design features for visual resources should be implemented to reduce impacts on wilderness characteristics.</p> <p>Water use for any solar energy development would be reviewed to ensure that impacts on Death Valley NP, the NWR, or ACECs would be neutral or positive.</p> <p><i>Recreation:</i> Relocation of the designated route used for desert racing and commercial tours should be considered at the time specific solar development proposals are analyzed.</p> <p><i>Water Resources:</i> Water resource analysis indicates that wet-cooling options would not be feasible. Other technologies should incorporate water conservation measures.</p> <p>Land disturbance activities should minimize impacts on natural drainage patterns near the Amargosa River to avoid erosion issues and clogging of groundwater recharge zones and affecting critical habitats.</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
<p><i>Nevada (Cont.)</i> Amargosa Valley (Cont.)</p>	<p>Siting of solar facilities and construction activities should be avoided within the 100-year floodplain of the Amargosa River (3,915 acres [16 km²]).</p> <p>Coordination with the NDWR should be conducted during the process of obtaining water rights in the over-allocated Amargosa Desert Basin in order to reduce basin-wide groundwater extractions and to comply with the State Engineer’s Order 1197 addressing the priority water rights and protections pertaining to Ash Meadows National Wildlife Refuge and Devils Hole.</p> <p><i>Vegetation:</i> An Integrated Vegetation Management Plan addressing invasive species control, and an Ecological Resources Mitigation and Monitoring Plan addressing habitat restoration should be approved and implemented to increase the potential for successful restoration of affected habitats and minimize the potential for the spread of invasive species, such as Mediterranean grass.</p> <p>All playa, chenopod scrub, and desert dry wash habitats, shall be avoided to the extent practicable, and any impacts minimized and mitigated.</p> <p>Appropriate engineering controls should be used to minimize impacts on the Amargosa River, and dry wash, playa, riparian, marsh, and greasewood flat habitats, including downstream occurrences.</p> <p>Groundwater withdrawals should be limited to reduce the potential for indirect impacts on groundwater-dependent habitats in the Amargosa Desert groundwater basin, or in other hydraulically connected basins, such as springs at Ash Meadows and Death Valley NP, other locations of groundwater discharge, such as the Amargosa River, or other groundwater-dependent habitats in the vicinity of the SEZ, such as mesquite bosque communities.</p> <p><i>Wildlife (All):</i> The Amargosa River should be avoided.</p> <p><i>Wildlife (Mammals):</i> The fencing around the solar energy development should not block the free movement of mammals, particularly big game species.</p> <p><i>Aquatic Biota:</i> Appropriate engineering controls should be implemented to minimize the amount of contaminants and sediment entering the Amargosa River.</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
<p><i>Nevada (Cont.)</i> Amargosa Valley (Cont.)</p>	<p>If groundwater is used, withdrawal should not affect aquatic habitat in the Amargosa River ACEC and the Ash Meadows NWR.</p> <p><i>Special Status Species:</i> Avoiding or minimizing disturbance to desert wash and riparian habitats on the SEZ could reduce impacts on 3 special status species.</p> <p>Avoidance or minimization of groundwater withdrawals from the Amargosa Basin to serve solar energy development on the SEZ would reduce or prevent impacts on the 25 groundwater-dependent special status species. In particular, impacts on aquatic and riparian habitat associated with the Ash Meadows system should be avoided.</p> <p>Consultation with the USFWS and NDOW should be conducted to address the potential for impacts on the following species currently listed as threatened or endangered under the ESA: Amargosa niterwort, Ash Meadows blazingstar, Ash Meadows gumplant, Ash Meadows ivesia, Ash Meadows sunray, spring-loving centaury, Ash Meadows naucorid, Ash Meadows Amargosa pupfish, Ash Meadows speckled dace, Devils Hole pupfish, Warm Springs Amargosa pupfish, and desert tortoise. Consultation would identify an appropriate survey protocol, avoidance and minimization measures, and, if appropriate, reasonable and prudent alternatives, reasonable and prudent measures, and terms and conditions for incidental take statements.</p> <p>Coordination with the USFWS and NDOW should be conducted to address the potential for impacts on species under review for listing under the ESA that may be affected by solar energy development on the SEZ: Amargosa tryonia, Ash Meadows pebblesnail, crystal springsnail, distal gland springsnail, elongate gland springsnail, Fairbanks springsnail, median gland springsnail, minute tryonia, Oasis Valley springsnail, Point of Rocks tryonia, sporting goods tryonia, Amargosa naucorid, Oasis Valley speckled dace, and Amargosa toad. Coordination would identify an appropriate survey protocol, and mitigation requirements, which may include avoidance, minimization, translocation, or compensation.</p> <p>Coordination with the USFWS and NDOW should be conducted to address potential indirect impacts (e.g., site runoff and erosion) and the effectiveness of design features for three special status species that are endemic to the Big Dune system.</p> <p><i>Visual Resources:</i> Within the SEZ, in areas visible from and within 5 mi (8 km) of Death Valley NP, visual impacts associated with solar energy project operation should be consistent with VRM Class II management objectives, as experienced from KOPs (to be determined by BLM) within the NP.</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
<p><i>Nevada (Cont.)</i> Delamar Valley</p>	<p><i>Lands and Realty:</i> Consideration should be given to relocating the existing transmission corridor and proposed SNWA ROW outside of the SEZ.</p> <p>Priority consideration should be given to utilizing/improving existing roads to provide construction and operational access to the SEZ.</p> <p><i>Specially Designated Areas and Lands with Wilderness Characteristics:</i> The design features for visual resources should be adopted to minimize impacts on wilderness characteristics.</p> <p><i>Water Resources:</i> Water resource analysis indicates that wet-cooling options would not be feasible. Other technologies should incorporate water conservation measures.</p> <p>Land-disturbance activities should avoid impacts to the extent possible in the vicinity of the intermittent streams, ephemeral washes, and the dry lake present on the site.</p> <p>Siting of solar facilities and construction activities should avoid any areas identified as within a 100-year floodplain or jurisdictional waters.</p> <p>Groundwater rights must be obtained from the NDWR (dry-cooling and dish engine technologies may have to negotiate with the SNWA for water rights).</p> <p><i>Vegetation:</i> An Integrated Vegetation Management Plan addressing invasive species control and an Ecological Resources Mitigation and Monitoring Plan addressing habitat restoration should be approved and implemented to increase the potential for successful restoration of affected habitats and minimize the potential for the spread of invasive species, such as halogeton or tumbleweed.</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
<p><i>Nevada (Cont.)</i> Delamar Valley <i>(Cont.)</i></p>	<p>Dry washes, Delamar Lake playa, and the nearby marsh should be avoided to the extent practicable, and any impacts minimized and mitigated. Appropriate engineering controls should be used to minimize impacts on wetlands within the assumed access road corridor, as well as dry washes, Delamar Lake and other playas, riparian, marsh, and greasewood flat habitats within the SEZ and corridor, including downstream occurrences, resulting from surface water runoff, erosion, sedimentation, altered hydrology, accidental spills, or fugitive dust deposition to these habitats. All wetland, dry wash, and riparian habitats within the assumed access road corridor should be avoided to the extent practicable, and any impacts minimized and mitigated.</p> <p>Joshua tree communities are protected by the State of Nevada and should be avoided in the northern areas of the SEZ and along the assumed access road corridor. Any Joshua trees in areas of direct impacts should be salvaged.</p> <p>Cactus species, including cholla, or ocotillo should be avoided. Any cacti that cannot be avoided should be salvaged.</p> <p>Groundwater withdrawals should be limited to reduce the potential for indirect impacts on springs and wetlands in the vicinity of the SEZ, at Pahranaagat NWR. Potential impacts on springs should be determined through hydrological studies.</p> <p><i>Wildlife (All)</i>: Delamar Lake, Jumbo Wash, and the unnamed wash should be avoided.</p> <p><i>Wildlife (Mammals)</i>: The fencing around the solar energy development should not block the free movement of mammals, particularly big game species.</p> <p><i>Aquatic Biota</i>: Appropriate engineering controls should be implemented to minimize the amount of contaminants and sediment entering washes and Delamar Lake and Pahranaagat Creek.</p> <p><i>Special Status Species</i>: Consultation with the USFWS and NDOW should be conducted to address the potential for impacts on the following five species currently listed as threatened or endangered under the ESA: Hiko White River springfish, Pahranaagat roundtail chub, White River springfish, desert tortoise, and southwestern willow flycatcher. Consultation would identify an appropriate survey protocol, avoidance and minimization measures, and, if appropriate, reasonable and prudent alternatives, reasonable and prudent measures, and terms and conditions for incidental take statements.</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
<p><i>Nevada (Cont.)</i> Delamar Valley (Cont.)</p>	<p>Coordination with the USFWS and NDOW should be conducted to address the potential for impacts on the following four species under review for listing under the ESA that may be affected by solar energy development on the SEZ: graded tryonia, Hubbs springsnail, Pahrnagat pebblesnail, and northern leopard frog. Coordination would identify an appropriate survey protocol and mitigation requirements, which may include avoidance, minimization, translocation, or compensation.</p> <p>Avoiding or minimizing disturbance to riparian, desert wash, playa, cliff, and rock outcrop habitats on the SEZ could reduce or eliminate impacts on 13 special status species.</p> <p>Avoidance or minimization of groundwater withdrawals to serve solar energy development on the SEZ could reduce or eliminate impacts on 15 special status species. In particular, impacts on aquatic and riparian habitat in the Pahrnagat Valley should be avoided.</p> <p><i>Visual Resources:</i> Within the SEZ, in areas visible from and within 3 mi (4.8 km) of the boundary of the Delamar Mountains WA, visual impacts associated with solar energy project operation should be consistent with VRM Class II management objectives, as experienced from KOPs (to be determined by the BLM) within the WA. In areas visible from between 3 and 5 mi (4.8 and 8 km), visual impacts should be consistent with VRM Class III management objectives. The VRM Class II consistency mitigation would affect approximately 2,080 acres (8.417 km²) within the western portion of the SEZ. The VRM Class III consistency mitigation would affect approximately 5,485 additional acres (22.20 km²).</p> <p>Within the SEZ, in areas visible from between 3 and 5 mi (4.8 and 8 km) of the boundary of the South Pahroc Range WA, visual impacts associated with solar energy project operation should be consistent with VRM Class III management objectives, as experienced from KOPs (to be determined by the BLM) within the WA. The VRM Class III consistency mitigation would affect approximately 4,921 acres (19.91 km²).</p> <p><i>Cultural Resources:</i> Avoidance of significant sites within the proposed SEZ, especially in the vicinity of the dry lake, is recommended.</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
<p><i>Nevada (Cont.)</i> Dry Lake</p>	<p><i>Specially Designated Areas and Lands with Wilderness Characteristics:</i> The design features for visual resources should be applied to minimize adverse impacts.</p> <p><i>Water Resources:</i> Wet-cooling and dry-cooling options would not be feasible unless further hydrologic study of the basin reveals that more water is available. Other technologies should incorporate water conservation measures.</p> <p>Land-disturbance activities should avoid impacts to the extent possible in the vicinity of the ephemeral washes and the dry lake present on the site.</p> <p>Siting of solar facilities and construction activities should avoid areas identified as being within a 100-year floodplain, which totals 1,569 acres [6.3 km²] of the proposed SEZ.</p> <p>Groundwater rights must be obtained from the NDWR.</p> <p><i>Vegetation:</i> An Integrated Vegetation Management Plan addressing invasive species control and an Ecological Resources Mitigation and Monitoring Plan addressing habitat restoration should be approved and implemented to increase the potential for successful restoration of desert scrub and other affected habitats, and to minimize the potential for the spread of invasive species such as salt cedar or Mediterranean grass.</p> <p>All dry wash, dry wash woodland, chenopod scrub, and playa communities within the SEZ should be avoided to the extent practicable, and any impacts minimized and mitigated. Any yucca, cacti, or succulent plant species that cannot be avoided should be salvaged.</p> <p>Appropriate engineering controls should be used to minimize impacts on dry wash, dry wash woodland, wetland, and playa habitats, including downstream occurrences.</p> <p>Groundwater withdrawals should be limited to reduce the potential for indirect impacts on groundwater-dependent communities, such as mesquite communities. Potential impacts on springs should be determined through hydrological studies.</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
<p><i>Nevada (Cont.)</i> Dry Lake (Cont.)</p>	<p><i>Wildlife (All):</i> The dry lake and wash habitats, which could provide potential breeding sites for amphibians, including Great Plains and red-spotted toads, should be avoided.</p> <p><i>Wildlife (Mammals):</i> The fencing around the solar energy development should not block the free movement of mammals, particularly big game species.</p> <p><i>Aquatic Biota:</i> Appropriate engineering controls should be implemented to minimize the amount of runoff and fugitive dust that reaches California Wash and Gypsum Wash.</p> <p>Minimize or eliminate the impact of groundwater withdrawals on streams near the SEZ, such as the Muddy River, and springs such as those along the north shore of Lake Meade and within Desert NWR and Moapa NWR.</p> <p><i>Special Status Species:</i> Avoiding or minimizing disturbance to desert wash, playa, and desert pavement habitats on the SEZ could reduce or eliminate impacts on 14 special status species.</p> <p>Avoidance or minimization of groundwater withdrawals to serve solar energy development on the SEZ could reduce or eliminate impacts on 13 special status species. In particular, impacts on aquatic and riparian habitat in the Corn Creek Spring, Moapa Warm Springs and Muddy River should be avoided.</p> <p>Consultation with the USFWS and NDOW should be conducted to address the potential for impacts on the following four species currently listed as threatened or endangered under the ESA: Moapa dace, Pahrump poolfish, desert tortoise, and southwestern willow flycatcher. Consultation would identify an appropriate survey protocol, avoidance and minimization measures, and, if appropriate, reasonable and prudent alternatives, reasonable and prudent measures, and terms and conditions for incidental take statements.</p> <p>Coordination with the USFWS and NDOW should be conducted to address the potential for impacts on the following seven species under review for listing under the ESA that may be affected by solar energy development on the SEZ: Las Vegas buckwheat, grated tryonia, Moapa pebblesnail, Moapa Valley pebblesnail, Moapa Warm Spring riffle beetle, Moapa speckled dace, and Moapa White River springfish. Coordination would identify an appropriate survey protocol and mitigation requirements, which may include avoidance, minimization, translocation, or compensation.</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
<i>Nevada (Cont.)</i>	
Dry Lake (Cont.)	<i>Cultural Resources:</i> Coordination with the Trail Administration for the Old Spanish Trail and Old Spanish Trail Association is recommended for identifying potential mitigation strategies for avoiding or minimizing potential impacts on the congressionally designated Old Spanish National Historic Trail and also to any remnants of the NRHP-listed site associated with the Old Spanish Trail/Mormon Road that may be located within the SEZ. Avoidance of the Old Spanish Trail NRHP-listed site within the southeastern portion of the proposed SEZ is recommended.
Dry Lake Valley North	<p><i>Lands and Realty:</i> Priority consideration should be given to utilizing existing county roads to provide construction and operational access to the SEZ.</p> <p><i>Rangeland Resources (Livestock Grazing):</i> Within the Ely Springs cattle allotment, solar development should be sited to minimize the number of pastures affected.</p> <p><i>Rangeland Resources (Horses and Burros):</i> Installation of fencing and access control, provision for wild horse movement corridors, delineation of open range, traffic management, compensatory habitat restoration, and access to or development of water sources should be coordinated with the BLM.</p> <p><i>Recreation:</i> If solar development obstructs the route currently permitted for desert racing, alternative locations for that use should be considered at the time specific solar development proposals are analyzed.</p> <p><i>Water Resources:</i> Water resource analysis indicates that wet-cooling options would not be feasible. Other technologies should incorporate water conservation measures.</p> <p>Land disturbance activities should avoid impacts to the extent possible in the vicinity of the ephemeral stream washes and the dry lake present on the site.</p> <p>Groundwater rights must be obtained from the NDWR.</p> <p>Land disturbance activities should avoid impacts to the extent possible in the vicinity of the ephemeral stream washes and the dry lake present on the site.</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
<p><i>Nevada (Cont.)</i> Dry Lake Valley North (Cont.)</p>	<p><i>Vegetation:</i> An Integrated Vegetation Management Plan addressing invasive species control and an Ecological Resources Mitigation and Monitoring Plan addressing habitat restoration should be approved and implemented to increase the potential for successful restoration of affected habitats and minimize the potential for the spread of invasive species, such as cheatgrass or halogeton.</p> <p>Dry washes, playas, and wetlands within the SEZ, and dry washes within the access road corridor, should be avoided to the extent practicable, and any impacts minimized and mitigated. A buffer area should be maintained around wetlands, playas, and dry washes to reduce the potential for impacts.</p> <p>Appropriate engineering controls should be used to minimize impacts on dry wash, playa, marsh, scrub-shrub wetland, riparian, and greasewood flat habitats, including downstream occurrences.</p> <p>Groundwater withdrawals should be limited to reduce the potential for indirect impacts on habitats dependent on springs associated with the Dry Lake Valley Basin, Delamar Valley Basin, or other hydrologically connected basins. Potential impacts on springs should be determined through hydrological studies.</p> <p><i>Wildlife (All):</i> The unnamed dry lake and wash habitats should be avoided.</p> <p><i>Wildlife (Mammals):</i> The fencing around the solar energy development should not block the free movement of mammals, particularly big game species.</p> <p><i>Aquatic Biota:</i> Appropriate engineering controls should be implemented to minimize the amount of contaminants and sediment entering Coyote Wash and the unnamed washes and dry lakes within the SEZ.</p> <p><i>Special Status Species:</i> Avoiding or minimizing disturbance to playa habitat on the SEZ could reduce or eliminate impacts on 5 special status species.</p> <p>Consultation with the USFWS and NDOW may be needed to address the potential for impacts on the desert tortoise. Consultation would identify an appropriate survey protocol, avoidance and minimization measures, and, if appropriate, reasonable and prudent alternatives, reasonable and prudent measures, and terms and conditions for incidental take statements.</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
<p><i>Nevada (Cont.)</i> East Mormon Mountain</p>	<p><i>Specially Designated Areas and Lands with Wilderness Characteristics:</i> Design features for visual resources should be applied to minimize adverse visual impacts.</p> <p>The access road to the SEZ should be designed and built to minimize impacts on desert tortoises and tortoise habitat within the Mormon Mesa ACEC.</p> <p><i>Recreation:</i> Design features for visual resources should be applied to minimize adverse impacts on wilderness recreation use.</p> <p><i>Water Resources:</i> Water resource analysis indicates that wet-cooling options would not be feasible. Other technologies should incorporate water conservation measures.</p> <p>Land-disturbance activities should minimize impacts on the ephemeral stream channels found within the SEZ, including but not limited to Toquop Wash and South Fork Toquop Wash, as well as alluvial fan features throughout the SEZ.</p> <p>Groundwater rights must be purchased and transferred through coordination with the NDWR and current water rights holders.</p> <p><i>Vegetation:</i> An Integrated Vegetation Management Plan addressing invasive species control, and an Ecological Resources Mitigation and Monitoring Plan addressing habitat restoration should be approved and implemented to increase the potential for successful restoration of desert scrub and other affected habitats, and to minimize the potential for the spread of invasive species such as Mediterranean grass.</p> <p>All desert dry wash, playa, riparian, and Joshua tree communities within the SEZ and access road corridor should be avoided to the extent practicable, and any impacts minimized and mitigated. Any Joshua trees, other yucca species, cacti, or succulent plant species in areas of direct impacts that cannot be avoided should be salvaged.</p> <p>Appropriate engineering controls should be used to minimize impacts on dry wash, playa, wetland, and riparian habitats, including downstream occurrences.</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
<p><i>Nevada (Cont.)</i> East Mormon Mountain (Cont.)</p>	<p>Groundwater withdrawals should be limited to reduce the potential for indirect impacts on wetlands associated with springs, such as Tule Spring and Abe Spring. Potential impacts on springs should be determined through hydrological studies.</p> <p><i>Wildlife (All):</i> Development in wash, playa and rock outcrop habitats should be avoided.</p> <p><i>Wildlife (Mammals):</i> The fencing around the solar energy development should not block the free movement of mammals, particularly big game species.</p> <p><i>Aquatic Biota:</i> Ground disturbance and contaminant spills near Toquop Wash and the other unnamed washes within the SEZ should be minimized.</p> <p>Appropriate engineering controls should be implemented to minimize the amount of surface water runoff and fugitive dust reaching springs, Toquop Wash and unnamed washes in the SEZ and in the area of indirect effects.</p> <p>The impact of groundwater withdrawals on surface water features near the SEZ (such as Tule Spring, Abe Spring, Gourd Spring and Peach Spring) should be eliminated or minimized.</p> <p><i>Special Status Species:</i> Consultation with the USFWS and the NDOW should be conducted to address the potential for impacts on the desert tortoise. Consultation would identify an appropriate survey protocol, avoidance and minimization measures, and, if appropriate, reasonable and prudent alternatives, reasonable and prudent measures, and terms and conditions for incidental take statements.</p> <p>Coordination with the USFWS and NDOW should be conducted to address the potential for impacts on the Las Vegas buckwheat—a candidate species for listing under the ESA. Coordination would identify an appropriate survey protocol and mitigation requirements, which may include avoidance minimization, translocation, or compensation.</p> <p>Avoiding or minimizing disturbance to desert wash, playa, rocky cliffs, and outcrop habitats could reduce or eliminate impacts on 17 special status species.</p> <p><i>Visual Resources:</i> The development of power tower facilities within the SEZ should be prohibited.</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
<p><i>Nevada (Cont.)</i> East Mormon Mountain (Cont.)</p>	<p><i>Cultural Resources:</i> Avoidance of South Fork and Toquop Wash areas is recommended.</p> <p>Coordination with the Trail Administration for the Old Spanish Trail and Old Spanish Trail Association is recommended to identify potential mitigation strategies for avoiding or minimizing potential impacts, if impacts are identified in future studies, on the congressionally designated Old Spanish National Historic Trail.</p>
<p>Gold Point</p>	<p><i>Specially Designated Areas and Lands with Wilderness Characteristics:</i> Transmission lines should be routed and constructed in such a way as to minimize visual impacts on specially designated areas.</p> <p><i>Water Resources:</i> Water resource analysis indicates that wet-cooling options would not be feasible. Other technologies should incorporate water conservation measures.</p> <p>Land-disturbance activities should minimize impacts on the unnamed intermittent stream, the playa area in the northeast corner, and ephemeral washes on-site.</p> <p>Groundwater supplies during the construction and operations phases would need to be secured with coordination of the NDWR in terms of obtaining groundwater rights within the Lida Valley groundwater basin, and potentially from off-site sources and adjacent groundwater basins for the construction phase</p> <p><i>Vegetation:</i> An Integrated Vegetation Management Plan addressing invasive species control, and an Ecological Resources Mitigation and Monitoring Plan addressing habitat restoration should be approved and implemented to increase the potential for successful restoration of desert scrub, greasewood flat, and other affected habitats, and to minimize the potential for the spread of invasive species.</p> <p>All riparian, dry wash, and playa communities within the SEZ and transmission line corridor should be avoided to the extent practicable, and any impacts minimized and mitigated. Any Joshua tree or other <i>Yucca</i> species, cacti, or succulent plant species that cannot be avoided should be salvaged.</p> <p>Appropriate engineering controls should be used to minimize impacts on dry wash, playa, wetland, greasewood flat, and riparian habitats, including downstream occurrences.</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
<p><i>Nevada (Cont.)</i> Gold Point (Cont.)</p>	<p>Groundwater withdrawals should be limited to reduce the potential for indirect impacts on habitats associated with springs. Potential impacts on springs should be determined through hydrological studies.</p> <p><i>Wildlife (All):</i> Development in wash and playa habitats should be avoided.</p> <p><i>Wildlife (Mammals):</i> The fencing around the solar energy development should not block the free movement of mammals, particularly big game species.</p> <p><i>Special Status Species:</i> Avoiding or minimizing disturbance to desert wash, playa, and sagebrush habitats could reduce or eliminate impacts on two special status species.</p> <p>Coordination with the USFWS and the NDOW should be conducted for the greater sage-grouse—a candidate species for listing under the ESA. Coordination would identify an appropriate survey protocol and mitigation requirements, which may include avoidance, minimization, translocation, or compensation.</p> <p><i>Acoustic Environment:</i> Dish engine facilities within the Gold Point SEZ should be located more than 1 to 2 mi (1.6 to 3.2 km) from the nearby residences.</p>
<p>Millers</p>	<p><i>Rangeland Resources (Livestock Grazing):</i> Development of range improvements in the Monte Cristo allotment should be considered if site-specific analysis determines there would need to be a reduction in permitted AUMs because of lost grazing capacity.</p> <p><i>Recreation:</i> Alternative routes for the race course should be considered consistent with local land use plan requirements.</p> <p><i>Water Resources:</i> Water resource analysis indicates that wet-cooling options would not be feasible. Other technologies should incorporate water conservation measures.</p> <p>Land-disturbance activities should minimize impacts on the ephemeral stream channels of Ione Wash and Peavine Creek, as well as alluvial fan features along the western edge of the SEZ.</p> <p>Groundwater rights must be obtained through coordination with the NDWR and current water rights holders.</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
<i>Nevada (Cont.)</i> Millers (<i>Cont.</i>)	<p><i>Vegetation:</i> An Integrated Vegetation Management Plan addressing invasive species control and an Ecological Resources Mitigation and Monitoring Plan addressing habitat restoration should be approved and implemented to increase the potential for successful restoration of affected habitats and minimize the potential for the spread of invasive species.</p> <p>Dry washes, Ione Wash, playas, and wetlands within the SEZ should be avoided to the extent practicable, and any impacts minimized and mitigated. A buffer area should be maintained around wetlands, playas, and dry washes to reduce the potential for impacts.</p> <p>Appropriate engineering controls should be used to minimize impacts on the playa wetland and other playas, as well as Ione Wash shrub communities, dry washes, and greasewood flat habitats within the SEZ, and downstream occurrences.</p> <p>Groundwater withdrawals should be limited to reduce the potential for indirect impacts on plant communities that access groundwater, such as those in the vicinity of playas. Potential impacts on springs should be determined through hydrological studies.</p> <p>A qualified botanist or plant ecologist should survey for candelaria blazing star during a period when it is flowering and easily documented prior to any construction activities within the SEZ. If individuals are located, individuals or populations should be avoided through fencing and flagging of the area, including an appropriate buffer zone.</p> <p><i>Wildlife (All):</i> Wash and playa habitats should be avoided.</p> <p><i>Wildlife (Mammals):</i> The fencing around the solar energy development should not block the free movement of mammals, particularly big game species.</p> <p><i>Special Status Species:</i> Consultations with the USFWS and NDOW should be conducted to address the potential for impacts on the greater sage-grouse, a candidate species for listing under the ESA. These consultations would identify an appropriate pre-disturbance survey protocol, avoidance or minimization measures, and development of other mitigation measures that could include compensation and translocation.</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
<p>Nevada (Cont.) Millers (Cont.)</p>	<p>Coordination should be conducted with the USFWS and NDOW for the Crescent Dunes aegialian scarab beetle, Crescent Dunes serican scarab beetle, and greater sage-grouse—species that are candidates or under review for ESA listing. Coordination would identify an appropriate survey protocol and mitigation requirements, which may include avoidance, minimization, translocation, or compensation.</p> <p><i>Cultural Resources:</i> Avoidance of areas with a high potential for a high density of sites, such as in the vicinity of both the former Lake Tonopah and Millers town site, is recommended.</p>
<p>New Mexico Afton</p>	<p><i>Specially Designated Areas and Lands with Wilderness Characteristics:</i> Pending congressional review of the BLM recommendations for wilderness designations, restricting or eliminating solar development in portions of the visible area of the SEZ within 5 mi (8 km) of the Aden Lava Flow is recommended to avoid impacts on wilderness characteristics in the WSA.</p> <p>The eastern boundary of the SEZ should be restricted to the top of West Mesa to avoid areas sloping to the east which are more highly visible to the national historic trail, Mesilla Plaza, and to the scenic byway.</p> <p>The height of solar facilities in the SEZ should be restricted to reduce the adverse impact on the specially designated areas within the viewshed of the SEZ.</p> <p><i>Rangeland Resources (Livestock Grazing):</i> Development of range improvements to mitigate the loss of AUMs in the Aden Hills, Corralitos Ranch, and La Mesa allotments should be considered. Consideration should also be given to adding portions of the Home Ranch and Black Mesa allotments outside of, and on the southwestern side of the SEZ, to the Aden Hills and West La Mesa allotments.</p> <p><i>Recreation:</i> The height of solar facilities within the SEZ should be restricted to reduce impacts on recreation use within these areas.</p> <p><i>Civilian Aviation:</i> Because Las Cruces International Airport is within 3 mi (4.8 km) of the SEZ, project developers must provide necessary safety restriction information to FAA addressing required distances from flight paths, hazard lighting of facilities, impacts on radar performance, and other requirements.</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
<i>New Mexico (Cont.)</i> Afton (Cont.)	<p><i>Water Resources:</i> Water resource analysis indicates that wet-cooling and dry-cooling options would not be feasible. Other technologies should incorporate water conservation measures.</p> <p>Land-disturbance activities should minimize impacts on ephemeral streams located within the proposed SEZ.</p> <p>Siting of solar facilities and construction activities should avoid the areas identified as within a 100-year floodplain that total 1,654 acres (6.7 km²) within the proposed SEZ.</p> <p>Groundwater management/rights should be coordinated with the NMOSE with respect to the Lower Rio Grande AWRM priority basin.</p> <p><i>Vegetation:</i> An Integrated Vegetation Management Plan addressing invasive species control, and an Ecological Resources Mitigation and Monitoring Plan addressing habitat restoration should be approved and implemented to increase the potential for successful restoration of desert scrub, dune, steppe, grassland communities, and other affected habitats and minimize the potential for the spread of invasive species.</p> <p>All wetland, dry wash, playa, riparian, succulent, and dune communities within the SEZ should be avoided to the extent practicable. Any yucca, agave, ocotillo, cacti (including <i>Opuntia</i> spp., <i>Cylindropuntia</i> spp., and <i>Echinocactus</i> spp.) and other succulent plant species that cannot be avoided should be salvaged.</p> <p>Appropriate engineering controls should be used to minimize impacts on wetland, dry wash, playa and riparian habitats, including downstream occurrences.</p> <p>Groundwater withdrawals should be limited to reduce the potential for indirect impacts on groundwater dependent communities, such as wetland or riparian communities associated with the Rio Grande floodplain.</p> <p><i>Wildlife (All):</i> Wash, riparian, playa, rock outcrop, and wetland habitats should be avoided</p> <p><i>Wildlife (Mammals):</i> The fencing around the solar energy development should not block the free movement of mammals, particularly big game species.</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
<p><i>New Mexico (Cont.)</i> Afton (Cont.)</p>	<p><i>Aquatic Biota:</i> Appropriate engineering controls should be implemented to minimize the amount of surface water runoff and fugitive dust that reaches the Rio Grande River and associated wetlands and canals.</p> <p>Wetlands and streams located within the SEZ should be avoided to the extent practicable.</p> <p><i>Special Status Species:</i> Avoiding or minimizing disturbance to desert grasslands, sand dune habitat and sand transport systems, rocky slopes, cliffs, and outcrops on the SEZ could reduce or eliminate impacts on 18 special status species.</p> <p>Consultation with the USFWS and NMDGF should be conducted to address the potential for impacts on the following species currently listed as endangered under the ESA: Sneed’s pincushion cactus and northern aplomado falcon. Consultation would identify an appropriate survey protocol, avoidance and minimization measures, and, if appropriate, reasonable and prudent alternatives, reasonable and prudent measures, and terms and conditions for incidental take statements. These consultations should include plans to conduct pre-disturbance surveys and identify mitigation requirements, which may include avoidance, minimization, timing restrictions, or compensation.</p> <p>Coordination with the USFWS and NMDGF should be conducted to address the potential for impacts on the western yellow-billed cuckoo, a candidate species for listing under the ESA. Coordination would identify an appropriate survey protocol and mitigation requirements, which may include avoidance, minimization, translocation, or compensation.</p> <p><i>Visual Resources:</i> Within the SEZ, in areas east of a line between the northwest corner of Section 5 of Township 024S Range 001E extending through and beyond the southeast corner of Section 24 of Township 025S Range 001E, visual impacts associated with solar energy development in the SEZ should be consistent with VRM Class II management objectives, as determined from KOPs to be selected by the BLM within the Mesilla Valley west of a line 0.25 mi (0.4 km) east of I-10 (for KOPs south of the I-10I-25 interchange) or I-25 (for KOPs north of the I-10I-25 interchange), and east of the toe of the slope of West Mesa.</p> <p>Within the SEZ, in areas visible from and within 3 mi (5 km) of the Aden Lava Flow WSA, visual impacts associated with solar energy project operation should be consistent with VRM Class II management objectives, as determined from key observation points to be selected by the BLM within the WSA, and in areas visible from between 3 and 5 mi (5 and 8 km), visual impacts should be consistent with VRM Class III management objectives.</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
<p><i>New Mexico (Cont.)</i> Afton (Cont.)</p>	<p>Within the SEZ, the height of power towers should be restricted such that the receiver and any navigation hazard lighting would not be directly visible from points within the Mesilla Valley west of a line 0.25 mi (0.4 km) east of I-10 (for points south of the I-10–I-25 interchange) or I-25 (for points north of the I-10–I-25 interchange), and east of the toe of the slope of West Mesa.</p> <p><i>Acoustic Environment:</i> Dish engine facilities in the SEZ should be farther than 1 to 2 mi (1.6 to 3.2 km) from nearby residences around the SEZ (i.e., the facilities would be located anywhere within the SEZ, except the northeastern and southeastern portions of the proposed SEZ).</p> <p><i>Paleontological Resources:</i> Avoidance of the eastern edge of the SEZ may be warranted if a paleontological survey results in findings similar to those known south of the SEZ.</p> <p><i>Cultural Resources:</i> Coordination with trails associations and historical societies regarding impacts on El Camino Real de Tierra Adentro, the Butterfield Trail, and Mesilla Plaza, as well as other NRHP-listed properties is recommended.</p>
<p>Mason Draw</p>	<p><i>Specially Designated Areas and Lands with Wilderness Characteristics:</i> The historic setting of the route of the Butterfield Trail would be adversely affected by construction of solar facilities in the SEZ and would be difficult to mitigate. Pending the outcome of the study of the significance of the trail, restrictions on solar facility development in the SEZ that might affect trail resources should be put in place.</p> <p>Consideration should be given to restricting the height of solar facilities in portions of the SEZ to minimize impacts on the Prehistoric Trackways National Monument and the Robledo Mountains WSA and ACEC.</p> <p><i>Rangeland Resources (Livestock Grazing):</i> The development of range improvements and/or changing existing grazing management to mitigate the loss of AUMs in the Corralitos allotment should be considered.</p> <p><i>Water Resources:</i> Water resource analysis indicates that wet-cooling options would not be feasible. Other technologies should incorporate water conservation measures.</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
<p><i>New Mexico (Cont.)</i> Mason Draw (<i>Cont.</i>)</p>	<p>Land-disturbance activities should minimize impacts on ephemeral streams within the proposed SEZ.</p> <p>Siting of solar facilities and construction activities should avoid the areas identified as within a 100-year floodplain of Kimble Draw that total 325 acres [1.3 km²] within the proposed SEZ.</p> <p>Groundwater management/rights should be coordinated with the NMOSE with respect to the Rio Mimbres AWRM priority basin.</p> <p><i>Vegetation:</i> An Integrated Vegetation Management Plan addressing invasive species control, and an Ecological Resources Mitigation and Monitoring Plan addressing habitat restoration should be approved and implemented to increase the potential for successful restoration of desert scrub, dune, steppe, riparian, playa, and grassland communities, and other affected habitats and minimize the potential for the spread of invasive species.</p> <p>All wetland, dry wash, dry wash woodland, riparian, playa, succulent, and dune communities within the SEZ should be avoided to the extent practicable, and any impacts should be minimized and mitigated. Any yucca, agave, ocotillo, and cacti (including <i>Opuntia</i> spp. <i>Cylindropuntia</i> spp. and <i>Echinocactus</i> spp.) and other succulent plant species that cannot be avoided should be salvaged. A buffer area should be maintained around wetland, dry wash, dry wash woodland, playa, and riparian habitats to reduce the potential for impacts.</p> <p>Appropriate engineering controls should be used to minimize impacts on wetland, dry wash, dry wash woodland, playa, and riparian habitats, including downstream occurrences.</p> <p>Groundwater withdrawals should be limited to reduce the potential for indirect impacts on groundwater-dependent communities, such as mesquite communities. Potential impacts to springs should be determined through hydrological studies.</p> <p><i>Wildlife (All):</i> Wash, riparian, and rock outcrop habitats should be avoided.</p> <p><i>Wildlife (Mammals):</i> The fencing around the solar energy development should not block the free movement of mammals, particularly big game species.</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
<p><i>New Mexico (Cont.)</i> Mason Draw <i>(Cont.)</i></p>	<p><i>Aquatic Biota:</i> Appropriate engineering controls should be implemented to minimize the amount of ground disturbance, contaminants, runoff, and fugitive dust near wetlands located within the SEZ.</p> <p><i>Special Status Species:</i> Avoiding or minimizing disturbance to desert grasslands, sand dune habitat, and sand transport systems on the SEZ could reduce or eliminate impacts on seven special status species.</p> <p>Consultations with the USFWS and NMDGF should be conducted to address the potential for impacts on the following species currently listed as threatened or endangered under the ESA: Sneed’s pincushion cactus and northern aplomado falcon. Consultation would identify an appropriate survey protocol, avoidance and minimization measures, and, if appropriate, reasonable and prudent alternatives, reasonable and prudent measures, and terms and conditions for incidental take statements (if necessary).</p> <p><i>Cultural Resources:</i> Coordination with trails associations and historical societies regarding impacts on El Camino Real de Tierra Adentro, the Butterfield Trail, and Mesilla Plaza, as well as other NRHP-listed properties is recommended.</p>
<p>Red Sands</p>	<p><i>Specially Designated Areas and Lands with Wilderness Characteristics:</i> Design features for visual resources should be implemented to reduce adverse impacts on White Sands National Monument, wilderness characteristics in Culp Canyon WSA, and recreation and scenic resources along the Sacramento Front.</p> <p><i>Rangeland Resources (Livestock Grazing):</i> Development of range improvements and changes in grazing management should be considered to mitigate the loss of AUMs in the five affected grazing allotments.</p> <p><i>Recreation:</i> Adoption of design features for visual resources would reduce adverse impacts on recreation use in some specially designated areas and should be considered.</p> <p><i>Military and Civilian Aviation:</i> The BLM should modify its land records to require consultation with the DoD in any areas of the SEZ under military airspace.</p> <p>Because White Sands Regional Airport is within 3 mi (4.8 km) of the SEZ, project developers must provide necessary safety restriction information to FAA addressing required distances from flight paths, hazard lighting of facilities, impacts on radar performance, and other requirements.</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
<p><i>New Mexico (Cont.)</i> Red Sands (Cont.)</p>	<p><i>Soil Resources:</i> Avoid disturbing gypsite crusts to the extent possible to minimize the risk of soil loss by wind erosion.</p> <p><i>Water Resources:</i> Water resource analysis indicates that wet-cooling options would not be feasible. Other technologies should incorporate water conservation measures.</p> <p>Land-disturbance activities should minimize impacts on ephemeral streams located within the proposed SEZ.</p> <p>Siting of solar facilities and construction activities should avoid the areas identified as within a 100-year floodplain of the unnamed ephemeral wash running north to south through the center of the proposed SEZ totaling 54 acres (0.22 km²).</p> <p>Groundwater management and water right plans of New Mexico should be followed.</p> <p><i>Vegetation:</i> An Integrated Vegetation Management Plan addressing invasive species control and an Ecological Resources Mitigation and Monitoring Plan addressing habitat restoration should be approved and implemented to increase the potential for successful restoration of desertscrub, dune, steppe, riparian, playa, and grassland communities and other affected habitats and to minimize the potential for the spread of invasive species, such as African rue.</p> <p>All wetland, riparian, dry wash, playa, succulent, and sand dune communities within the SEZ should be avoided to the extent practicable, and any impacts minimized and mitigated. A buffer area should be maintained around wetland and riparian habitats to reduce the potential for impacts. Any yucca, agave, ocotillo, and cacti (including <i>Opuntia</i> spp., <i>Cylindropuntia</i> spp., <i>Echinocactus</i> spp., and <i>Sclerocactus</i> spp.) and other succulent plant species that cannot be avoided should be salvaged.</p> <p>Appropriate engineering controls should be used to minimize impacts on wetland, dry wash, and playa habitats, including downstream occurrences.</p> <p>Groundwater withdrawals should be limited to reduce the potential for indirect impacts on groundwater-dependent communities, such as mesquite, wetland, or riparian communities, or gypsum dune field communities, including those communities found on White Sands National Monument. Potential impacts on springs should be determined through hydrological studies.</p> <p><i>Wildlife (All):</i> Wash, playa, and wetland habitats should be avoided.</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
<p><i>New Mexico (Cont.)</i> Red Sands (<i>Cont.</i>)</p>	<p><i>Wildlife (Mammals):</i> The fencing around the solar energy development should not block the free movement of mammals, particularly big game species.</p> <p><i>Aquatic Biota:</i> Implement appropriate engineering controls to minimize the amount of ground disturbance, contaminants, surface water runoff, and fugitive dust that reaches intermittent streams and wetlands within the SEZ.</p> <p>Implement appropriate engineering controls to minimize the amount of surface water runoff and fugitive dust that reaches Holloman Lake and the intermittent streams and wetlands outside of the SEZ.</p> <p><i>Special Status Species:</i> Avoiding or minimizing disturbance to desert grasslands, sand dune habitat and sand transport systems, and playas on the SEZ could reduce or eliminate impacts on 11 special status species.</p> <p>Avoidance or minimization of groundwater withdrawals from the Tularosa Basin to serve solar energy development on the SEZ could reduce or eliminate impacts on the White Sands pupfish. In particular, impacts on spring-fed habitats in the Lost River and Salt Creek could be reduced with the avoidance of groundwater withdrawals in the region.</p> <p>Consultation with the USFWS and NMDGF should be conducted to address the potential for impacts on the following species currently listed as threatened or endangered under the ESA: Kuenzler’s hedgehog cactus, Sacramento Mountains prickly-poppy, interior least tern, and northern aplomado falcon. Consultation would identify an appropriate survey protocol, avoidance and minimization measures, and, if appropriate, reasonable and prudent alternatives, reasonable and prudent measures, and terms and conditions for incidental take statements (if necessary).</p> <p><i>Visual Resources:</i> The development of power tower facilities within the SEZ should be prohibited.</p> <p><i>Acoustic Environment:</i> Dish engine facilities within the Red Sands SEZ should be located more than 1 to 2 mi (1.6 to 3 km) from the nearby residences (i.e., the facilities should be located in the western or southern portion of the proposed SEZ).</p> <p><i>Cultural Resources:</i> Coordination with the White Sands National Monument and local historical societies regarding impacts on nearby NRHP-listed properties is recommended.</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
Utah	
Escalante Valley	<p><i>Lands and Realty:</i> Priority consideration should be given to utilizing existing county roads to provide construction and operational access to the SEZ.</p> <p><i>Rangeland Resources (Livestock Grazing):</i> Consideration should be given to the feasibility of replacing all or part of the lost AUMs through changes in grazing management or in development of additional range improvements on public lands remaining in the allotment.</p> <p><i>Water Resources:</i> Water resource analysis indicates that wet-cooling options would not be feasible. Other technologies should incorporate water conservation measures.</p> <p>Land disturbance and operations activities should prevent erosion and sedimentation in the vicinity of the ephemeral washes and dry lake present on the site.</p> <p>Groundwater rights must be obtained from the Utah Division of Water Rights.</p> <p><i>Vegetation:</i> An Integrated Vegetation Management Plan addressing invasive species control and an Ecological Resources Mitigation and Monitoring Plan addressing habitat restoration should be approved and implemented to increase the potential for successful restoration of affected habitats and minimize the potential for the spread of invasive species, such as those occurring in Iron County, that could be introduced as a result of solar energy project activities.</p> <p>All playa, sand dune and sand transport areas, and dry wash habitats should be avoided to the extent practicable, and any impacts minimized and mitigated.</p> <p>Appropriate engineering controls should be used to minimize impacts on dry wash and dry lake habitats, including downstream occurrences.</p> <p><i>Wildlife (All):</i> Ephemeral washes and the dry lakebed in the southwestern portion of the SEZ should be avoided.</p> <p><i>Wildlife (Birds):</i> The steps outlined in the <i>Utah Field Office Guidelines for Raptor Protection from Human and Land Use Disturbances</i> should be followed.</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
<p>Utah (Cont.) Escalante Valley (Cont.)</p>	<p><i>Wildlife (Mammals):</i> The fencing around the solar energy development should not block the free movement of mammals, particularly big game species.</p> <p><i>Special Status Species:</i> Avoidance of pinyon-juniper and oak/mahogany woodlands in the area of direct effect could reduce impacts on two special status species.</p> <p>Consultation with the USFWS and the UDWR should be conducted to address the potential for impacts on the Utah prairie dog, a species listed as threatened under the ESA. Consultation would identify an appropriate survey protocol, avoidance measures, and, if appropriate, reasonable and prudent alternatives, reasonable and prudent measures, and terms and conditions for incidental take statements.</p> <p>Coordination with the USFWS and the UDWR should be conducted to address the potential for impacts on the greater sage-grouse, a candidate species for listing under the ESA. Coordination would identify an appropriate pre-disturbance survey protocol, avoidance measures, and any potential compensatory mitigation actions.</p> <p><i>Acoustic Environment:</i> Dish engine facilities within the Escalante Valley SEZ should be located more than 1 to 2 mi (1.6 to 3 km) from the nearest residences (i.e., the facilities should be located in the eastern or southwestern area of the proposed SEZ).</p> <p><i>Cultural Resources:</i> Avoidance of the dune area within the southwest portion of the proposed SEZ is recommended.</p>
Milford Flats South	<p><i>Lands and Realty:</i> Priority consideration should be given to utilizing upgraded existing county roads to provide construction and operations access to the SEZ.</p> <p><i>Rangeland Resources (Livestock Grazing):</i> Consideration should be given to the feasibility of replacing all or part of the lost AUMs through development of additional range improvements on public lands remaining in the allotment.</p> <p><i>Minerals:</i> Coordination with existing oil and gas lessees should be required in the earliest project planning stages to determine the feasibility of protecting oil and gas lessees' development rights.</p> <p><i>Water Resources:</i> Water resource analysis indicates that wet-cooling options would not be feasible. Other technologies should incorporate water conservation measures.</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
<p>Utah (Cont.) Milford Flats South (Cont.)</p>	<p>Land disturbance and operations activities should prevent erosion and sedimentation in the vicinity of the ephemeral washes on the site.</p> <p>Groundwater rights must be obtained from the Utah Division of Water Rights.</p> <p><i>Vegetation:</i> An Integrated Vegetation Management Plan addressing invasive species control, and an Ecological Resources Mitigation and Monitoring Plan addressing habitat restoration should be approved and implemented to increase the potential for successful restoration of affected habitats and minimize the potential for the spread of invasive species, such as such as those occurring in Beaver County, that could be introduced as a result of solar energy project activities.</p> <p>All dry wash habitats within the SEZ and all dry wash and riparian habitats within the assumed transmission line corridor should be avoided to the extent practicable, and any impacts minimized and mitigated. Transmission line towers should be sited and constructed to minimize impacts on dry washes and riparian areas; towers should span such areas whenever practicable.</p> <p>Appropriate engineering controls should be used to minimize impacts on dry wash, playa, and greasewood flat habitats, including downstream occurrences.</p> <p><i>Wildlife (All):</i> Minersville Canal should be avoided.</p> <p><i>Wildlife (Birds):</i> The steps outlined in the <i>Utah Field Office Guidelines for Raptor Protection from Human and Land Use Disturbances</i> should be followed.</p> <p><i>Wildlife (Mammals):</i> The fencing around the solar energy development should not block the free movement of mammals, particularly big game species.</p> <p><i>Special Status Species:</i> Avoidance of woodland habitats, rocky cliffs, and outcrops in the area of direct effects could reduce impacts on six special status species.</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
Utah (Cont.)	
Milford Flats South (Cont.)	<p>Consultations with the USFWS and the UDWR should be conducted to address the potential for impacts on the Utah prairie dog, a species listed as threatened under the ESA. Consultation would identify an appropriate survey protocol, avoidance measures, and, if appropriate, reasonable and prudent alternatives, reasonable and prudent measures, and terms and conditions for incidental take statements.</p> <p>Coordination with the USFWS and the UDWR should be conducted to address the potential for impacts on the greater sage-grouse—a candidate species for listing under the ESA. Coordination would identify an appropriate pre-disturbance survey protocol, avoidance measures, and any potential compensatory mitigation actions.</p> <p><i>Acoustic Environment:</i> Dish engine facilities within the Milford Flats South SEZ should be located more than 1 to 2 mi (1.6 to 3 km) from the nearest residence around the SEZ (i.e., the facilities should be located in the central or western area of the proposed SEZ).</p>
Wah Wah Valley	<p><i>Livestock Grazing:</i> Consideration should be given to the feasibility of replacing all or part of any lost AUMs through development of additional range improvements on public lands remaining in the allotment.</p> <p><i>Water Resources:</i> Water resource analysis indicates that wet-cooling options would not be feasible. Other technologies should incorporate water conservation measures.</p> <p>Land disturbance and operations activities should avoid increasing drainage to the Wah Wah Wash to prevent further channel incisions and sedimentation issues.</p> <p>Groundwater rights must be obtained from the Utah Division of Water Rights.</p> <p><i>Vegetation:</i> An Integrated Vegetation Management Plan addressing invasive species control and an Ecological Resources Mitigation and Monitoring Plan addressing habitat restoration should be approved and implemented to increase the potential for successful restoration of affected habitats and to minimize the potential for the spread of invasive species, such as those occurring in Beaver County, that could be introduced as a result of solar energy project activities.</p> <p>Appropriate engineering controls should be used to minimize impacts on dry wash, playa, and greasewood flat habitats, including downstream occurrences.</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
<p>Utah (Cont.) Wah Wah Valley (Cont.)</p>	<p>All dry wash and playa habitats within the SEZ and all dry wash, wetland and riparian habitats within the assumed transmission line corridor (e.g., Beaver Creek) should be avoided to the extent practicable, and any impacts minimized and mitigated.</p> <p>Transmission line towers should be sited and constructed to minimize impacts on wetlands and riparian areas, such as those associated with Beaver Creek, and span them whenever practicable.</p> <p>Groundwater studies should be conducted to evaluate the potential for indirect impacts on springs located in the vicinity of the SEZ.</p> <p><i>Wildlife (All):</i> Wah Wah Wash should be avoided.</p> <p>Instream and nearshore disturbance of the Beaver River should be avoided during construction of the transmission line.</p> <p><i>Wildlife (Birds):</i> The steps outlined in the <i>Utah Field Office Guidelines for Raptor Protection from Human and Land Use Disturbances</i> should be followed.</p> <p><i>Wildlife (Mammals):</i> The fencing around the solar energy development should not block the free movement of mammals, particularly big game species.</p> <p>The inter-mountain basins big sagebrush shrubland cover type in the southeastern portion of the SEZ, which is the only identified suitable land cover for the elk and sagebrush vole and about a third of the suitable habitat for the American black bear in the SEZ, should be avoided.</p> <p><i>Wildlife (Aquatic Biota):</i> Transmission lines should be sited and constructed to minimize impacts to aquatic habitats whenever possible and transmission lines should span Beaver River.</p> <p><i>Special Status Species:</i> Avoiding or minimizing disturbance of woodland, rocky cliffs, and outcrops in the area of direct effects could reduce impacts on nine special status species.</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
<p>Utah (Cont.) Wah Wah Valley (Cont.)</p>	<p>Consultation with the USFWS and the UDWR should be conducted to address the potential for impacts on the Utah prairie dog—a species listed as threatened under the ESA. Consultation would identify an appropriate survey protocol, avoidance measures, and, if appropriate, reasonable and prudent alternatives, reasonable and prudent measures, and terms and conditions for incidental take statements.</p> <p>Coordination with the USFWS and UDWR should be conducted to address the potential for impacts on the greater sage-grouse—a candidate species for listing under the ESA. Coordination with the USFWS and UDWR should also be conducted for the following species that are under review for listing under the ESA: Frisco buckwheat, Frisco clover, and Ostler’s pepper-grass. Coordination with the USFWS and UDWR would identify an appropriate pre-disturbance survey protocol, avoidance measures, and any potential compensatory mitigation actions for each of these species.</p> <p><i>Acoustic Environment:</i> Dish engine facilities within the Wah Wah Valley SEZ should be located more than 1 to 2 mi (1.6 to 3 km) from the nearest residences (i.e., the facilities should be located in the lower half of the proposed SEZ).</p>
<p>Design Features Applicable to All SEZs</p>	<p><i>Water Resources:</i> During site characterization, hydrologic investigations would need to identify 100-year floodplains and potential jurisdictional water bodies subject to Clean Water Act Section 404 permitting. Siting of solar facilities and construction activities should avoid areas identified as within a 100-year floodplain. Stormwater management plans and BMPs should comply with standards developed by the regulating state agency. Groundwater monitoring and production wells should be constructed in accordance with state standards. Water for potable uses would have to meet or be treated to meet drinking water quality standards. Stormwater management BMPs should be coordinated with the regulating state agency.</p> <p><i>Vegetation:</i> Invasive species control should focus on biological and mechanical methods where possible to reduce the use of herbicides. Appropriate engineering controls should be used to minimize impacts on dry wash and other sensitive habitats resulting from surface water runoff, erosion, sedimentation, altered hydrology, accidental spills, or fugitive dust deposition. Appropriate buffers, BMPs, and engineering controls would be determined through agency consultation.</p> <p><i>Wildlife (General):</i> Indirect impacts should be reduced by implementing design features and engineering controls that reduce runoff, sedimentation, spills, and fugitive dust.</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
Design Features Applicable to All SEZs (Cont.)	<p><i>Wildlife (Birds):</i> For solar energy developments within the SEZ, the requirements contained within the 2010 Memorandum of Understanding between the BLM and USFWS to promote the conservation of migratory birds will be followed. Take of golden eagles and other raptors should be avoided. Mitigation regarding the golden eagle should be developed in consultation with the USFWS and appropriate state agencies. A permit may be required under the Bald and Golden Eagle Protection Act.</p> <p>Pre-disturbance surveys should be conducted within SEZs for bird species listed under the Migratory Bird Treaty Act. Impacts on potential nesting habitat of these species should be avoided, particularly during the nesting season.</p> <p><i>Special Status Species:</i> Pre-disturbance surveys should be conducted within the area of direct effects to determine the presence and abundance of special status species. Disturbance to occupied habitats for these species should be avoided or minimized to the extent practicable. If avoiding or minimizing impacts to occupied habitats is not possible for some species, translocation of individuals from areas of direct effect or compensatory mitigation of direct effects on occupied habitats could reduce impacts. A comprehensive mitigation strategy for special status species that uses one or more of these options to offset the impacts of development should be developed in coordination with the appropriate federal and state agencies.</p> <p>Harassment or disturbance of special status species and their habitats in the affected area should be avoided or minimized. This can be accomplished by identifying any additional sensitive areas and implementing necessary protection measures based upon consultation with the USFWS and the appropriate state agency.</p> <p><i>Acoustic Environment:</i> To reduce noise impacts on nearby residents from parabolic trough and power tower facilities equipped with TES, such facilities should be located so that off-site noise levels are within appropriate guideline levels. Operations at parabolic trough and power tower facilities should be minimized or limited to a few hours after sunset when temperature inversions would be relatively weak. Additional noise control measures for cooling systems, such as installing silencers, operating fans at lower speeds, and/or locating them farther from residences (more than 1 to 2 mi [1.6 to 3.2 km]), would be warranted if a TES option with longer storage time (e.g., 6 hours or more) were used.</p> <p>Direct noise control measures applied to individual dish engine systems may be used to reduce noise impacts on nearby residences.</p> <p><i>Paleontological Resources:</i> The need for and the nature of any SEZ-specific design features would depend on the results of future paleontological investigations.</p>

TABLE A.2-2 (Cont.)

SEZ	SEZ-Specific Design Features ^a
Design Features Applicable to All SEZs (Cont.)	<p><i>Cultural Resources:</i> SEZ-specific design features would be determined through consultation with the State SHPO and affected Tribes and would depend on the results of future investigations.</p> <p><i>Native American Concerns:</i> The need for and nature of SEZ-specific design features addressing issues of potential concern would be determined during government-to-government consultation with the affected Tribes.</p>

Abbreviations: ACEC = Area of Critical Environmental Concern; ACHP = Advisory Council on Historic Places; ADWR = Arizona Department of Water Resources; AUM = animal unit month; AZGFD = Arizona Game and Fish Department; BLM = Bureau of Land Management; BMP = best management practice; CDOW = Colorado Division of Wildlife; DOE = Department of Energy; EPA = U.S. Environmental Protection Agency; ESA = Endangered Species Act; CDFG = California Department of Fish and Game; CESA = California Endangered Species Act; DWMA = Desert Wildlife Management Area; KSLA = known sodium leasing area; LTVA – long-term visitor area; NDOW = Nevada Department of Wildlife; NDWR = Nevada Division of Water Resources; NHA = National Heritage Area; NMDGF = New Mexico Department of Game and Fish; NMOSE = New Mexico Office of the State Engineer; NP = National Park; NRHP = *National Register of Historic Places*; PA = Programmatic Agreement; PEIS = programmatic environmental impact statement; PYFC = potential fossil yield classification; ROW = right-of-way; SEZ = solar energy zone; SHPO = State Historic Preservation Office; SNWA = Southern Nevada Water Authority; SRMA = Special Recreation Management Area; USFWS = U.S. Fish and Wildlife Service; VRM = visual resource management; WA = Wilderness Area; WRM = water resource management; WSA = Wilderness Study Area.

- ^a The SEZ-specific design features listed in this table are proposed as an element of BLM’s Solar Development Program. With the signing of the ROD for the Final PEIS, the design features will be required for all development within the applicable SEZs.
- ^b The scientific names of all plants, wildlife, aquatic biota, and special status species are provided in Chapters 8 through 13.