A.2 BLM PROPOSED SOLAR ENERGY PROGRAM

A.2.1 Proposed Solar Energy Development Policies

For this Final Solar PEIS, the proposed solar energy development policies are presented as part of the Solar Energy Program in Chapter 2. The ROW authorization policies are presented in Section 2.2.1.1. The authorization policies for projects within solar energy zones (SEZs) are presented in Section 2.2.2.2.1. The variance process for ROW applications submitted in variance areas is presented in Section 2.2.2.2.1.

A.2.2 Proposed Programmatic Design Features

When incorporated into BLM's program in the Record of Decision (ROD), the following proposed programmatic design features will be required to be applied to all solar energy applications submitted to the BLM for consideration (both within and outside of solar energy zones (SEZs). Because of site-specific circumstances, some features may not apply to some projects (e.g., a resource is not present on a given site) and/or may require slight variations from what is described in this section (e.g., a larger or smaller protective area). Applicants will be required to discuss any proposed variations with BLM staff. All variations in programmatic design features will require appropriate analysis and disclosure as part of future project authorizations. It is anticipated that variations in the design features presented will be approved in very limited circumstances. Those design features that do not apply to a given project will need to be described as part of the project case file along with an appropriate rationale. Additional mitigation measures may be identified and required during individual project development and environmental review. The determination of adequate application of the design features for specific projects will remain with the BLM's Authorized Officer.

The proposed design features are presented by resource area and by project phase (i.e., general; site characterization, siting, and design construction; operations and maintenance; and reclamation and decommissioning). These design features were based on the potentially applicable mitigation measures given by resource area in Chapter 5 of the Draft Solar PEIS. All Chapter 5 potentially applicable mitigation measures have been carried forward as proposed programmatic design features of the Draft Solar PEIS. [Note: Citations for applicable agency guidance documents are given in Chapter 5; new citations are found in Section A.2.2.23.] For the Final Solar PEIS, the potentially applicable mitigation measures are not repeated in Chapter 5.

Many of the proposed programmatic design features indicate the need for project-specific mitigation plans (see Table A.2-1). The content of these plans will depend on specific project requirements and locations, and their applicability and effectiveness needs to be evaluated at the project-specific level. In the early stages of the development of required plans, project developers shall coordinate with appropriate federal, state, and local agencies that regulate activities that affect resources both appurtenant and adjacent to the proposed development to determine what permits or approvals may be needed for construction and operation of a solar

TABLE A.2-1 Plans Specified as Elements of the Proposed Design Features[a]

Plan Name	Applicable Design Features[b]
Construction and Operation Waste Management Plan	HMW1-2
Cultural Resources Management and Mitigation Plan	CR1-2, CR2-6, CR2-8
Decommissioning and Site Reclamation Plan	ER4-1, VR2-50, VR4-1, VR4-3
Drainage, Erosion, and Sedimentation Control Plan	SR2-12
Dust Abatement Plan	WR2-23, ER1-5, AQC1-1, AQC-2, AQC-3, AQC-4
Ecological Resource Mitigation and Monitoring Plan	ER1-24
Environmental Justice Plan	EJ1-1
Fire Management and Protection Plan	WF2-1, ER1-31, HMW1-3, HS1-12
Glint and Glare Assessment, Mitigation, and Monitoring Plan	VR1-1, HS1-9
Hazardous Materials and Waste Management Plan	WR2-25, HMW1-1
Historic Properties Treatment Plan	CR1-2, CR2-6
Integrated Vegetation Management Plan	WF1-2, WR2-24, ER1-20, ER2-39, VR2-54
Lighting Plan	VR1-2
Native American Consultation Plan	NA1-1
Nuisance Animal and Pest Control Plan	WR2-24, ER1-18, ER1-19, ER1-24, ER1-40, ER3-8, HMW1-4
Paleontological Resources Management Plan	P1-3
Spill Prevention and Emergency Response Plan	SR1-14, WR1-4, WR2-25, ER1-30, HMW1-5
Special Status Species Clearance and Translocation Plan	ER1-24
Stormwater Management Plan	WR1-3, WR2-25
Traffic Management Plan	HS1-8
Trash Abatement Plan	ER1-32
Unanticipated Burial Contingency Plan	NA1-4
Visual Resource Monitoring and Compliance Plan	VR2-14, VR4-11
Water Resources Monitoring and Mitigation Plan	WR1-12, WR3-1, WR4-3, ER1-27
Worker Education and Awareness Plan	LR1-6, RG1-3, WHB1-2, WF1-3, ER1-2, P1-4, CR1-6

[a] The need for each plan will be determined on a project-specific basis.

[b] The design features specifying the need for individual plans are listed in Sections A.2.2-1 through A.2.2-22.

facility. The BLM's Authorized Officer would need to determine the adequacy of such plans and their updates at the time of permitting specific projects.

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

A.2.2.1 Design Features for Lands and Realty

The following design features were identified to avoid, reduce, and/or mitigate potential impacts to lands and realty from solar development identified and discussed in Sections 5.2.1 and 5.2.2 of the Draft and Final Solar PEIS.

A.2.2.1.1 General

LR1-1 Legal access to private, state, and public lands surrounding the solar facilities shall be retained to avoid creating areas that are inaccessible to the public and/or that would be difficult to manage. The effect on the manageability and uses of public lands around boundaries of solar energy facilities shall be considered during the environmental analysis of project applications.

LR1-2 Coordination with federal, state, and county agencies; Tribes; property owners; and other stakeholders shall be accomplished as early as possible in the planning process to identify potentially significant land use conflicts and issues and state and local rules that govern solar energy development. Significant issues that are raised, and potential modifications to proposed projects to eliminate or mitigate these issues, shall be considered in the environmental analysis of the project application.

LR1-3 Where there are existing BLM ROW authorizations within solar energy development areas, pursuant to Title 43, Part 2807.14 of the *Code of Federal Regulations* (43 CFR 2807.14), the BLM will notify ROW holders that an application that might affect their existing ROW has been filed and request their comments. Early discussion will occur with existing ROW holders to insure their rights are protected and that any issues are resolved.

LR1-4 If a proposed action (including transmission, utilities, access, or other ancillary project facilities.) might have an adverse effect on prime and unique farmland, this possibility must be discussed in the associated environmental analysis, along with a consideration of alternatives or appropriate mitigation measures.

LR1-5 If a proposed action is within one-quarter mile of any project boundary, a Chain of Survey Certificate, conformed to the Departmental standard, must be issued. In some cases, Land Description Reviews, Certificates of Inspection and Possession, Boundary Assurance Certificates, resurveys, re-monumentation, and/or referencing of PLSS corners may be required before the start of any action.

LR1-6 Personnel on project site must be made aware of regional or local laws and rules that they are subject to but are not derived from a specific project design feature. Laws and rules that they may be subject to are international borders, limitations on the removal of salable materials from a project site for personal use such as stone or wood, and use of vehicles off project site in limited access areas. Awareness of the laws and rules may be incorporated into a Worker Education and Awareness Plan (WEAP) that is provided to all project personnel prior to entering the project work site. The WEAP shall be provided on a regular basis, covering multiple resources, to ensure the awareness of key mitigation efforts of the project work site during all phases of the projects life. The base information the WEAP provides shall be reviewed and approved by BLM prior to the issuance of a Notice to Proceed and incorporate adaptive management protocols for addressing changes over the life of the project, should they occur.

A.2.2.1.2 Site Characterization, Siting, and Design Construction

LR2-1 Where a designated transmission corridor is located within the area of proposed solar energy development project, the need for future transmission capacity in the corridor will be reviewed to determine whether the corridor should be excluded from solar development or whether the capacity of the designated transmission corridor can be reduced. Partially relocating the corridor to retain the current planned capacity will also be an option to be considered, as will relocating the solar project outside the designated corridor.

LR2-2 Evidence of the Public Land Survey System (PLSS) and related Federal property boundaries will be identified and protected prior to commencement of any ground-disturbing activity. This will be accomplished by contacting Bureau Land Management (BLM) Cadastral Survey to coordinate data research, evidence examination and evaluation, and locating, referencing or protecting monuments of the PLSS and related land boundary markers from destruction. In the event of obliteration or disturbance of the Federal boundary evidence the responsible party shall immediately report the incident, in writing, to the Authorizing Official. BLM Cadastral Survey will determine how the marker is to be restored. In rehabilitating or replacing the evidence the responsible party will be instructed to use the services of a Certified Federal Surveyor (CFedS), procurement shall be per qualification

based selection, or reimburse the BLM for costs. All surveying activities will conform to the Manual of Surveying Instructions (Manual) and appropriate State laws and regulations. Local surveys will be reviewed by Cadastral Survey before being finalized or filed in the appropriate State or county office. The responsible party shall pay for all survey, investigation, penalties, and administrative costs.

LR2-3 Consolidation of access and other supporting infrastructure shall be required for single projects and for cases in which there is more than one project in close proximity to another in order to maximize the efficient use of public land and minimize impacts.

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

The following design features were identified to avoid, reduce, and/or mitigate potential impacts to specially designated areas and lands with wilderness characteristics from solar development identified and discussed in Sections 5.3.1 and 5.3.2 of the Draft and Final Solar PEIS.

A.2.2.2.1 General

LWC1-1 Protection of existing values of specially designated areas and lands with wilderness characteristics shall be evaluated during the environmental analysis of solar energy project applications, and the results shall be incorporated into the project planning and design to minimize off-site impacts.

A.2.2.2.2 Site Characterization, Siting, and Design Construction

LWC2-1 Solar facilities shall be located and designed to minimize impacts on specially designated areas and lands with wilderness characteristics.[1]

LWC2-2 Any lands that are within or near proposed solar energy facilities that have not been recently inventoried for wilderness characteristics or any lands that have been identified in any citizen's wilderness proposal shall be inventoried to determine if they possess wilderness characteristics as part of the processing of a solar energy ROW application. If lands with wilderness characteristics exist within or near a proposed solar energy facility, impacts on these lands will be evaluated as part of the NEPA process evaluating the proposed facility.

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

A.2.2.3 Design Features for Rangeland Resources—Grazing

The following design features were identified to avoid, reduce, and/or mitigate potential impacts to grazing from solar development identified and discussed in Sections 5.4.1.1 and 5.4.1.2 of the Draft and Final Solar PEIS.

A.2.2.3.1 General

RG1-1 Grazing permittees that may be affected by a solar energy project shall be contacted early in project planning to explore whether modifications could be made to a proposed solar energy project to minimize impacts on grazing use.

RG1-2 Wherever there are reductions in grazing use caused by development of solar energy facilities, opportunities for mitigating this shall be considered as part of the NEPA process evaluating the solar energy proposal. Alternatively, retiring the displaced grazing use shall also be considered.

RG1-3 Key elements to mitigate the impacts to grazing shall be incorporated into a Worker Education and Awareness Plan (WEAP) that is provided to all project personnel prior to entering the project work site. The WEAP shall be provided on a regular basis, covering multiple resources, to ensure the awareness of key grazing mitigation efforts of the project work site during all phases of the projects life. The base information the WEAP provides shall be reviewed and approved by BLM prior to the issuance of a Notice to Proceed and incorporate adaptive management protocols for addressing changes over the life of the project, should they occur.

A.2.2.3.2 Site Characterization, Siting, and Design Construction

RG2-1 Access roads associated with solar energy development shall be constructed, improved, and maintained to minimize their impact on grazing operations. Road design shall include fencing, cattle guards, and speed control and information signs where appropriate.

A.2.2.4 Design Features for Wild Horses and Burros

The following design features were identified to avoid, reduce, and/or mitigate potential impacts to wild horses and burros from solar development identified and discussed in Section 5.4.2.1 and 5.4.2.2 of the Draft and Final Solar PEIS.

A.2.2.4.1 General

WHB1-1 Activities of project developers shall be coordinated with the BLM and other stakeholders to ensure that impacts on wild horses and burros and their management areas are minimized. Issues to be addressed could include the installation of fencing and access control, provision for movement corridors, delineation of open range, traffic management (e.g., vehicle speeds), and access to water sources.

WHB1-2 Key elements to mitigate the impacts to Wild Horse and Burros shall be incorporated into a Worker Education and Awareness Plan (WEAP) that is provided to all project personnel prior to entering the project work site. The WEAP shall be provided on a regular basis, covering multiple resources, to ensure the awareness of key wild horse and burro mitigation efforts of the project work site during all phases of the projects life. The base information the WEAP provides shall be reviewed and approved by BLM prior to the issuance of a Notice to Proceed and incorporate adaptive management protocols for addressing changes over the life of the project, should they occur.

A.2.2.4.2 Site Characterization, Siting, and Design Construction

WHB2-1 Access roads shall be appropriately constructed, improved, and maintained and employ signs to minimize potential horse and burro collisions. Fences shall be built to exclude wild horses and burros from all project facilities, including all water sites built for the development of facilities and roadways where appropriate.

A.2.2.5 Design Features for Wildland Fire

The following design features were identified to avoid, reduce, and/or mitigate potential impacts from wildland fires that could be impacted by solar development as identified and discussed in Sections 5.4.3.1 and 5.4.3.2 of the Draft and Final Solar PEIS.

A.2.2.5.1 General

WF1-1 In areas susceptible to wildland fire, coordination with the BLM and local fire organizations shall be required early in the project planning process to determine design features to be incorporated into the design of the project to prevent an increase in the frequency of wildland fire.

WF1-2 An Integrated Vegetation Management Plan designed to prevent the establishment of non-native, invasive species on the solar energy facility and

along transmission line ROWs and roads shall be developed and implemented to minimize the potential for increasing the frequency of wildland fires.

WF1-3 The effectiveness of developing and implementing a Fire Management and Protection Plan and providing worker training to reduce fire risks shall be evaluated.

WF1-4 Key elements to mitigate the impacts to fire management shall be incorporated into a Worker Education and Awareness Plan (WEAP) that is provided to all project personnel prior to entering the project work site. The WEAP shall be provided on a regular basis, covering multiple resources, to ensure the awareness of key fire management mitigation efforts of the project work site during all phases of the projects life. The information provided in the WEAP shall be reviewed and approved by BLM prior to the issuance of a Notice to Proceed and incorporate adaptive management protocols for addressing changes over the life of the project, should they occur.

A.2.2.5.2 Site Characterization, Siting, and Design Construction

WF2-1 The ROWs for solar facilities shall be large enough to ensure there is a sufficient fire break inside the ROW so there would be no threat to facilities from either a wildland fire approaching from outside the ROW or a fire moving from inside to outside the ROW. This distance shall be determined through coordination with fire management staff, and actions, both active and passive (e.g., vegetation manipulation), shall be undertaken specifically to remove the need for protective responses by the BLM, state, and local fire organizations and addressed in the Fire Management and Protection Plan.

A.2.2.6 Design Features for Recreation Impacts

The following design features were identified to avoid, reduce, and/or mitigate potential recreation impacts from solar development identified and discussed in Sections 5.5.1 and 5.5.2 of the Draft and Final Solar PEIS.

A.2.2.6.1 General

R1-1 Public access through or around solar facilities shall be retained to permit continued use of public lands and non-BLM administered lands.

R1-2 Replacement of acreage lost for off-highway vehicle use shall be considered as part of the analysis of project-specific impacts. Any process for designating a replacement route or use area would include the consideration

of the designation criteria for routes as specified in 43 CFR 8342.1 and would be consistent with existing land use plans.

A.2.2.6.2 Site Characterization, Siting, and Design Construction

R2-1 Solar facilities shall not be placed in areas of unique or important recreation resources. Areas need not be specially designated to fall under this definition.

A.2.2.7 Design Features for Military and Civilian Aviation

The following design features were identified to avoid, reduce, and/or mitigate potential impacts to military and civilian aviation from solar development identified and discussed in Sections 5.6.1 and 5.6.2 of the Draft and Final Solar PEIS.

A.2.2.7.1 General

MCA1-1 Decisions regarding the location of solar facilities and transmission facilities within or near military training routes or near military or civilian airports shall be coordinated with military and civilian airspace managers early in the processing of solar energy project applications, in order to identify and mitigate potential impacts on military and civilian airport and airspace use. Any potential hazards associated with the height of solar energy facilities, glint and glare from reflective surfaces, or other effects potentially associated these facilities, shall be evaluated through coordination with civilian and military airport operators. Proposed construction of any facility that is 200 ft (~61 m) or taller must be submitted to the Federal Aviation Administration (FAA) for evaluation of safety hazards.

MCA1-2 The FAA shall be contacted early in the project planning to determine if there might be any potential impacts on aviation and if any mitigation might be required to protect military or civilian aviation use.

MCA1-3 As part of the evaluation of impacts from the development of solar energy facilities, their potential for impacting the operation of existing military installations, either because they displace species onto an installation or because they increase the significance of special status species populations on the installation, shall be included as part of the environmental impact analysis of the solar energy project.

A.2.2.8 Design Features for Soil Resources and Geologic Hazards

The following design features were identified to avoid, reduce, and/or mitigate potential soil impacts from solar development and potential geologic hazards identified and discussed in Sections 5.7.1 and 5.7.2 (soil impacts) and 5.7.3 (geologic hazards) of the Draft and Final Solar PEIS.

A.2.2.8.1 General

SR1-1 Potential soil erosion shall be controlled at culvert outlets with appropriate structures.

SR1-2 Abandoned roads and roads no longer needed shall be subsoiled to increase infiltration and reduce soil compaction, then recontoured and revegetated.

SR1-3 Ground-disturbing activities shall be minimized, especially during the rainy season.

SR1-4 Originally excavated materials shall be used for backfill as appropriate.

SR1-5 The speed of vehicles and equipment on unpaved surfaces shall be controlled to reduce dust emissions (and potential collisions with wildlife).

SR1-6 Runoff from slope tops shall be controlled and directed to settling or rapid infiltration basins (temporarily) until disturbed slopes are stabilized. Disturbed slopes shall be stabilized as quickly as possible.

SR1-7 Drainage crossings shall be stabilized as quickly as possible, and channel erosion from runoff caused by the project shall be prevented.

SR1-8 Sediment-laden waters from disturbed, active areas within the project site shall be retained through the use of barriers and sedimentation devices (e.g., berms, straw bales, sandbags, jute netting, or silt fences). Such barriers and devices shall not be installed in wildlife crossing areas.

SR1-9 Barriers and sedimentation devices shall be placed around drainages and wetlands to prevent contamination by sediment-laden water.

SR1-10 Sediment from barriers and sedimentation devices shall be removed to restore sediment-control capacity.

SR1-11 Routine site inspections shall be conducted to assess the effectiveness and maintenance requirements for erosion and sediment control systems.

SR1-12 Barriers and sedimentation devices shall be maintained, repaired, or replaced as necessary to ensure optimum control.

SR1-13 A Spill Prevention and Emergency Response Plan to identify sources, locations, and quantities of potential chemical releases (through spills, leaks, or fires) and define response measures and notification requirements shall be developed and followed to reduce the potential for soil contamination. The plan shall also identify individuals and their responsibilities for implementing the plan.

A.2.2.8.2 Site Characterization, Siting, and Design Construction

SR2-1 The footprint of disturbed areas—including the number and size/length of roads, fences, borrow areas, and laydown and staging areas—shall be minimized. The boundaries of disturbed area footprints shall be clearly delineated on the ground (e.g., through the use of construction fencing).

SR2-2 Project structures and facilities shall be sited to avoid disturbance in areas with existing biological soil crusts to the extent possible.

SR2-3 Project areas shall be replanted with native vegetation at spaced intervals to the extent possible to break up areas of exposed soil and reduce soil loss by wind erosion.

SR2-4 Land disturbance (including crossings) in natural drainage systems and groundwater recharge zones, specifically ephemeral washes and dry lake beds, are to be avoided. Any structures crossing drainages must be located and constructed so that they do not decrease channel stability or increase water volume or velocity. Developers shall obtain all applicable federal and state permits.

SR2-5 Solar facilities or components (e.g., heliostats, panels, dishes, and troughs) shall not be placed in natural drainage ways.

SR2-6 Adequate space (i.e., setbacks) between solar facilities and natural washes is to be maintained to preserve their hydrological function and provide a buffer for flood control.

SR2-7 Existing roads, disturbed areas, and borrow pits shall be used. In addition, all borrow pits shall be identified beforehand and included in the NEPA direct and indirect analyses. If new roads are necessary, they shall be designed and constructed to the appropriate road design standards, such as those described in BLM Manual 9113.

SR2-8 New roads shall be designed to follow natural land contours and avoid or minimize hill cuts in the project area and avoid existing desert washes. Siting of new roads and walking trails (if any) is to be consistent with the designation criteria specified by the BLM in 43 CFR 8342.1.

SR2-9 Ground-disturbing geotechnical studies (e.g., geotechnical drilling) shall adhere to the permitting requirements specified by the BLM in 43 CFR Part 2800 or 2920 as appropriate and address geologic hazards when appropriate.

SR2-10 Roads shall be designed on the basis of local meteorological conditions, soil moisture, and erosion potential in order to avoid erosion and changes in surface water runoff.

SR2-11 Temporary roads shall be designed with eventual reclamation in mind.

SR2-12 Areas with unstable slopes shall be avoided, and local factors that can cause slope instability (e.g., groundwater conditions, precipitation, earthquake activity, slope angles, and the dip angles of geologic strata) shall be identified and addressed in the Drainage, Erosion and Sedimentation Control Plan.

SR2-13 Excessive grades shall be avoided on roads, road embankments, ditches, and drainages, especially in areas with erodible soils.

SR2-14 The creation of excessive slopes shall be avoided during site preparation and construction. As appropriate, special construction techniques are to be considered and used in areas of steep slopes, erodible soil, and drainage ways.

SR2-15 Construction shall be conducted in stages to limit the areas of exposed soil at any given time. For example, only land that will be actively under construction in the near term (e.g., within the next 6 to 12 months) shall be cleared of vegetation.

SR2-16 Construction activities shall take place over as short a timeframe as possible once ground disturbance has occurred. Activities over long timeframes shall continue using measures to limit wind and water erosion to the extent possible.

SR2-17 Construction traffic shall avoid unpaved surfaces, reducing compaction, and lower driving speeds to lessen fugitive dust emissions.

SR2-18 The clearing and disturbing of sensitive areas (e.g., steep slopes and natural drainages) shall be avoided outside the construction zone. The construction zone boundaries shall be clearly delineated on the ground (e.g., through the

use of construction fencing) so as not to conflict with other resource concerns.

SR2-19 Ground disturbance from construction-related activities, such as vehicle and foot traffic, shall avoid areas with intact biological soil crusts and desert pavement to the extent possible. For cases in which impacts cannot be avoided, soil crusts will be salvaged and restored on the basis of recommendations by BLM once construction has been completed.

SR2-20 The creation of excessive slopes shall be avoided during site preparation and construction (e.g., during excavation). Special construction techniques shall be considered and used, where appropriate, in areas of steep slopes, erodible soil, and stream channel crossings.

SR2-21 Electrical lines from solar collectors shall be buried along existing features (e.g., roads or other paths of disturbance) to minimize the overall area of surface disturbance whenever possible. As feasible, these lines shall be enclosed in conduit to minimize the potential for animals to chew through the electrical lines.

SR2-22 Borrow materials shall be obtained only from authorized and permitted sites.

SR2-23 Construction grading shall be conducted in compliance with industry practice (e.g., the American Society for Testing and Materials [ASTM] international standard methods) and other requirements (e.g., BLM and/or local grading and construction permits), as appropriate.

SR2-24 Erosion-control structures (e.g., rock lining or apron) shall be added at culvert outlets to reduce flow velocity and minimize the potential for scouring.

SR2-25 Temporary stabilization of disturbed areas that are not actively under construction shall occur throughout the construction phase. Soil stabilization methods, such as erosion matting blankets, or soil aggregation (binding), are examples of measures that should be used to limit wind erosion and dust emissions, as site conditions warrant.

SR2-26 Water or other stabilizing agents shall be used to wet roads in active construction areas and laydown areas in order to minimize the windblown erosion of soil.

SR2-27 Topsoil from all excavation and construction activities shall be salvaged so it can be reapplied to the disturbed area once construction is completed.

SR2-28 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 construction is completed.

SR2-29 Construction on wet soils shall be avoided.

SR2-30 Appropriate studies shall be performed to determine whether construction and operation of a solar facility would affect the eolian processes that maintain any nearby sand dunes, if applicable.

Design features to address geologic hazards:

GH2-1 Project structures shall be built in accordance with the design-basis recommendations in the project-specific geotechnical investigation report.

GH2-2 Structure designs must meet the requirements of all applicable federal, state, and county permits and building codes.

GH2-3 In areas of high seismic activity (especially those having soils with a high liquefaction potential) or in areas that encompass 100-year floodplains, consideration shall be given to changing the location or scope of the proposed project.

A.2.2.8.3 Operations and Maintenance

SR3-1 All design features developed for the construction phase shall be applied to similar activities during the operations phase.

SR3-2 The area disturbed by operation of a solar energy project shall be minimized (e.g., by using existing roads).

SR3-3 Catch basins, roadway ditches, and culverts shall be cleaned and maintained regularly.

SR3-4 Permanent stabilization of disturbed areas shall occur during final grading and landscaping of the site and be maintained through the life of the facility.

A.2.2.8.4 Reclamation and Decommissioning

SR4-1 All design features developed for the construction phase shall be applied to similar activities during the decommissioning/reclamation phase.

SR4-2 To the extent possible, the original grade and drainage pattern shall be re-established.

SR4-3 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.2.2.9 Design Features for Mineral Resources

The following design features were identified to avoid, reduce, and/or mitigate potential impacts to mineral resources from solar development identified and discussed in Sections 5.8.1 and 5.8.2 of the Draft and Final Solar PEIS.

A.2.2.9.1 General

MR1-1 Where valid mining claims or mineral 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 adverse effects on mineral development activities.

MR1-2 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.

A.2.2.9.2 Site Characterization, Siting, and Design Construction

MR2-1 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 following design features were identified to avoid, reduce, and/or mitigate potential soil impacts to water resources from solar development identified and discussed in Sections 5.9.1 and 5.9.2 of the Draft and Final Solar PEIS.

A.2.2.10.1 General

The following activities and objectives shall occur or be considered in order to minimize impacts on water resources. They are to be done in coordination with the appropriate local, state, and federal regulating agencies. The following items relate to quantification and characterization of the existing hydrology, land alteration issues, water rights, and water quality.

WR1-1 A Drainage, Erosion, and Sedimentation Control Plan shall be developed that ensures protection of water quality and soil resources, demonstrates no increase in off-site flooding potential, and includes provisions for stormwater and sediment retention on the project site. The plan shall identify site surface water runoff patterns and develop mitigation measures that prevent excessive and unnatural soil deposition and erosion throughout and downslope of the project site and project-related construction areas. The plan shall achieve the following:

- Runoff from parking lots, roofs, or other impervious surfaces shall be directed to retention basins prior to being released down gradient of the site;

- Any landscaping used for stormwater treatment shall require little or no irrigation and would be recessed to create retention basins/areas used to capture runoff;

- The amount of area covered by impervious surfaces shall be reduced through the use of permeable pavement or other pervious surfaces; and

- Natural drainages and a pre-project hydrograph shall be maintained for the area.

WR1-2 A Stormwater Management Plan shall be developed for the site to ensure compliance with applicable regulations and prevent off-site migration of contaminated stormwater, changes in pre-project storm hydrographs, or increased soil erosion.

- Siting in identified 100-year floodplains shall not be allowed within the development;

- Hydrologic analysis and modeling shall be conducted to define the 100-year, 24-hour rainfall for the project area and calculate projected runoff from this storm at the site;

- Project developers shall be required to maintain the pre-development flood hydrograph for all storms up to and including the 100-year rainfall event. All stormwater retention and/or infiltration and treatment systems shall also be designed for all storms up to and including the 100-year storm event.

WR1-3 As part of a Spill Prevention and Emergency Response Plan, measures to prevent potential groundwater and surface water contamination shall be identified.

WR1-4 Developers shall be required to conduct a detailed hydrologic study that demonstrates their clear understanding of the local surface water and groundwater hydrology. At a minimum, this hydrologic study shall include:

- Determination of the relationship of the project site hydrologic basin to the basins in the region;

- Identification of all surface water bodies within the watershed of SEZs or individual projects (including rivers, streams, ephemeral washes/drainages, lakes, wetlands, playas, and floodplains);

- Identification of all applicable groundwater aquifers;

- Quantification of physical characteristics describing surface water features, such as streamflow rates, stream cross sections, channel routings, seasonal flow rates (intermittent streams), peak flow rates (ephemeral washes/drainages), sediment characteristics and transport rates, lake depths, and surface areas of lakes, wetlands, and floodplains;

- Hydrologic analysis and modeling to identify 100-year floodplain boundaries of any surface water feature on the site;

- Quantification of physical characteristics describing the groundwater aquifer, such as physical dimensions of the aquifer, sediment characteristics, confined/unconfined conditions, hydraulic conductivity and transmissivity distribution of the aquifer, groundwater surface elevations, and groundwater flow processes (direction, recharge/discharge, current basin extractions, surface water/groundwater connectivity), and lag times between groundwater withdrawals and surface water depletions);

- Quantification of the regional climate, including seasonal and long-term information on temperatures, precipitation, evaporation, and evapotranspiration; and

- Quantification of the sustainable yield of surface waters and groundwater available to the project. Project developers shall evaluate the water sources in terms of existing water rights and management plans for their adequacy with regard to serving project demands while maintaining aquatic, riparian, and other water-dependent resources. The sophistication in hydrologic analyses required to quantify a sustainable yield will correspond to the amount of water use requirements proposed by a project, with greater water use requirements needing more in-depth analyses in quantifying a sustainable yield of the water source.

WR1-5 Project developers shall quantify water use requirements for project construction, operation, and decommissioning.

WR1-6 Water sources used for potable water supply shall meet federal, state, and local water quality standards (e.g., Sections 303 and 304 of the CWA).

WR1-7 Developers shall identify wastewater treatment measures and new or expanded facilities, if any, to be included as part of the facility's National Pollutant Discharge Elimination System (NPDES) permit.

WR1-8 Developers shall coordinate with state/local regulatory agencies regarding the issuance of permits or "will-serve" agreements for the development and use of water and/or the operation of on-site wastewater treatment systems.

WR1-9 Project developers shall coordinate with appropriate water rights agencies for securing water rights.

WR1-10 Project developers shall choose appropriate water sources with respect to available water rights and management practices and with respect to maintaining aquatic, riparian, and other water-dependent sources (that may vary in water requirements on a temporal basis).

WR1-11 A Water Resources Monitoring and Mitigation Plan shall be developed to monitor for potential impacts to both groundwater and surface waters during construction, operations, and decommissioning phases. Groundwater monitoring includes monitoring the effects of groundwater withdrawal on groundwater surface elevations, groundwater flow paths, changes to groundwater-dependent vegetation, and of aquifer recovery after project decommissioning. Surface water monitoring includes monitoring changes in flows, water volumes, channel characteristic, and water quality. Monitoring frequency shall be decided on a site-specific basis and in coordination with federal, state, and local agencies that manage the water resources of the region.

WR1-12 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;

– Effects on surface water resources such as streams, springs, seeps, and wetlands that provide water and associated habitat for plants and animals or are culturally important to Native Americans; and

– The sophistication in hydrologic analyses required to demonstrate minimal impacts to groundwater resources will correspond to the amount of water use requirements proposed by a project, with greater water use requirements needing more in-depth analyses in quantifying groundwater protection.

WR1-13 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;

– Effects on the natural hydrograph of the supply;

– Effects on the reliability of the supply; and

The sophistication in hydrologic analyses required to demonstrate minimal impacts to surface water resources will correspond to the amount of water use requirements proposed by a project, with greater water use requirements needing more in-depth analyses in quantifying surface water protection.

WR1-14 Early consultation shall be done with the U.S. Army Corps of Engineers (USACE) regarding the siting of solar energy generating facilities and its transmission in relation to hydrological features that have the potential to be subject to USACE jurisdiction. Consultation with the USACE shall include submittal of a jurisdictional delineation in accordance with the 1987 wetlands delineation manual and appropriate regional supplement; avoidance, minimization and compensation proposals, as necessary. A Least Environmentally Damaging Practicable Alternative (LEDPA) shall also be identified and analyzed within the environmental analysis. A USACE permit, Nationwide verification or approved jurisdiction letter shall be provided to

the BLM prior to a decision (Note: this is also presented as design feature ER1-41).

A.2.2.10.2 Site Characterization, Siting, and Design Construction

WR2-1 In the very early stages of the development of siting and design plans, project developers shall coordinate with appropriate federal, state, and local agencies that regulate activities that affect land and water resources to determine what permits or approvals may be needed for construction and operation of a solar facility and shall be applied when appropriate.

WR2-2 Project developers shall plan to implement water conservation measures related to solar energy technology water needs in order to reduce project water requirements. Developers shall minimize the consumptive use of fresh water for power plant cooling by, for example, using dry cooling, using recycled or impaired water, or selecting solar energy technologies that do not require cooling water.

WR2-3 Project developers shall plan to avoid impacts on existing surface water features, including streams, lakes, wetlands, floodplains, intermittent streams, playas, and ephemeral washes/drainages (any unavoidable impacts would be minimized or mitigated) of the development and in nearby regions according to:

- All sections of the Clean Water Act (CWA), including Sections 401, 402, and 404 addressing licensing and permitting issues;
- Executive Orders (E.O.s) 11988 and 11990 of May 24, 1977, regarding floodplain and wetland management: E.O. 11988, "Floodplain Management" (*Federal Register*, Volume 42, page 26951 [42 FR 26951]), and E.O. 11990, "Protection of Wetlands" (42 FR 26961);
- U.S. Environmental Protection Agency (EPA) stormwater management guidelines and applicable state and local guidelines;
- National Wild and Scenic Rivers System (Public Law 90-542; 16 *United States Code* [U.S.C.] 1271 et seq.); and
- Identification of impaired surface water bodies in accordance with Section 303(d) of the CWA.

WR2-4 Project developers shall plan to minimize impacts to groundwater aquifers.

- Impacts on sole source aquifers shall be avoided according to EPA guidelines.

WR2-5 Project developers shall avoid impacts on local surface water and groundwater drinking water supplies (amounts and water quality) and develop mitigation plans in the event that local drinking water sources are contaminated or depleted by project activities.

WR2-6 The facility shall obtain and comply with a construction stormwater permit through the EPA or state-run NPDES program (whichever applies within the state). In addition, the EPA requires that any development larger than 20 acres (0.08 km^2) and begun after August 2011 must comply with a requirement to monitor construction discharges for turbidity concentrations.

WR2-7 Groundwater wells constructed during any stage of the project shall conform to state and local standards and include:

- Legal description (township, range, section, and quarter section);
- Project map with proposed and existing well locations;
- Well design characteristics: casing diameter, screened interval(s), well depth, and static water level;
- Results of groundwater pumping tests or other tests done in the well;
- Anticipated pumping capacity and peak pumping rates;
- Identification of the groundwater aquifer and its hydrogeologic characteristics;
- Estimation of the potential cone of depression that might be produced by the proposed pumping throughout the lifetime of a project by using an analytical or numerical model; and
- Estimate 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 by using an analytical or numerical model.

WR2-8 Construction activities shall avoid land disturbance in ephemeral washes and dry lakebeds; any unavoidable disturbance would be minimized. Stormwater facilities shall be designed to route flow around the facility and maintain pre-

project hydrographs and to ensure protection of existing properties adjacent to developments.

WR2-9 When stream or wash crossings are constructed, culverts or water conveyances for temporary and permanent roads shall be designed to comply with county standards or to accommodate the runoff of a 100-year storm, whichever is larger.

WR2-10 Geotextile mats shall be used to stabilize disturbed channels and streambanks.

WR2-11 Earth dikes, swales, and lined ditches shall be used to divert work-site runoff that would otherwise enter a disturbed stream.

WR2-12 Certified weed-free straw bale barriers shall be installed to control sediment in runoff water; straw bale barriers shall be installed only where sediment-laden water can pond, thus allowing the sediment to settle out.

WR2-13 Check dams (i.e., small barriers constructed of rock, gravel bags, sandbags, fiber rolls, or reusable products) shall be placed across a constructed swale or drainage ditch to reduce the velocity of flowing water, thus allowing sediment to settle and reducing erosion.

WR2-14 Special construction techniques shall be used, where applicable, in areas of erodible soil, alluvial fans, and stream channel/wash crossings.

WR2-15 Disturbed soils shall be reclaimed as quickly as possible, or protective covers shall be applied.

WR2-16 Topsoil removed during construction shall be reused for reclamation.

WR2-17 Foundations and trenches shall be backfilled with originally excavated material as much as possible; excess excavated material shall be disposed of according to state and federal laws.

WR2-18 If drilling activities are required as part of site characterization, any drilling fluids or cuttings shall be maintained so that cuttings, fluids, or runoff from storage areas will not come in contact with aquatic habitats. Temporary impoundments for storing drilling fluids and cuttings shall be lined to minimize the infiltration of runoff into groundwater or surface water.

WR2-19 Washing equipment or vehicles in streams and wetlands shall be avoided because doing so increases their sediment loads and potential for contamination or invasive species transfer.

WR2-20 Entry and exit pits shall be constructed in work areas to trap sediments from vehicles so that they do not enter into streams at stream crossings. Prerequisites to excavating the entry and exit pits shall include:

- Locating the entry and exit pits far enough from stream banks and at a sufficient elevation to avoid inundation by storm flow stream levels and to minimize excessive migration of groundwater into the entry or exit pits;

- Isolating the excavation for the entry and exit pits from the surface water by using silt fencing to avoid sediment transport by stormwater; and

- Isolating the spoils storage resulting from excavation of the entry and exit pits by using silt fencing to avoid sediment transport by stormwater.

WR2-21 Waste management practices shall be adopted for handling, storing, and disposing of wastes generated by a construction project to prevent the release of waste materials into stormwater discharges. Waste management includes the following: spill prevention and control, construction debris and litter management, concrete waste management, and liquid waste management.

WR2-22 Any wastewater generated in association with temporary, portable sanitary facilities shall be periodically removed by a licensed hauler and introduced into an existing municipal sewage treatment facility. Portable sanitary facilities provided for construction crews shall be adequate to support expected on-site personnel.

WR2-23 The creation of hydrologic conduits shall be avoided between two aquifers during foundation excavation and other activities.

WR2-24 If chemical dust palliatives (suppressants) are used, they shall be selected and applied in accordance with the facilities Dust Abatement Plan.

WR2-25 When an herbicide/pesticide is used to control vegetation, the climate, soil type, slope, and vegetation type shall be considered in determining the risk of herbicide/pesticide contamination. In addition, a Nuisance Animal and Pest Control Plan and an Integrated Vegetation Management Plan shall be developed to ensure that applications will be conducted within the framework of BLM and DOI policies and standard operating procedures and will entail the use of only EPA-registered pesticides/herbicides that also comply with state and local regulations.

WR2-26 All hazardous materials and vehicle/equipment fuels shall be transported, stored, managed, and disposed of in accordance with accepted best management practices (BMPs) and in compliance with all applicable regulations and the requirements of approved plans, including, where

applicable, a Stormwater Management Plan, Spill Prevention and Emergency Response Plan, and Hazardous Materials and Waste Management Plan.

WR2-27 Project developers shall avoid or minimize and mitigate the degradation of water quality (e.g., chemical contamination, increased salinity, increased temperature, decreased dissolved oxygen, and increased sediment loads) that could result from construction activities. Water quality in areas adjacent to or downstream from development areas shall be monitored during the life of the project to ensure that water quality is protected.

A.2.2.10.3 Operations and Maintenance

WR3-1 Groundwater and surface water monitoring activities shall be implemented as outlined in the established Water Resources Monitoring and Mitigation Plan for the site. Adaptive management plans will ensure that long-term water use during operations shall not contribute to the significant long-term decline of groundwater levels or surface water flows and volumes. Any project-related water use shall not contribute to withdrawals that exceed the sustainable yield of the surface water or groundwater source.

WR3-2 The treatment of sanitary and industrial wastewater either on-site or off-site shall comply with federal, state, and local regulations. Any discharges to surface waters would require NPDES permitting. Any storage or treatment of wastewater on-site shall have to ensure proper lining of holding ponds and tanks to prevent leaks.

WR3-3 Berms and other controls shall be used at facilities to prevent off-site migration of any leaked or spilled heat transfer fluid (HTF), thermal energy storage (TES) fluids, or any other chemicals stored or used at the site.

WR3-4 Project developers shall avoid or minimize and mitigate the degradation of water quality (e.g., chemical contamination, increased salinity, increased temperature, decreased dissolved oxygen, and increased sediment loads) that could result from operations. Water quality in areas adjacent to or downstream from development areas shall be monitored during the life of the project to ensure that water quality is protected.

A.2.2.10.4 Reclamation and Decommissioning

WR4-1 All management plans, design features, and stipulations developed for the construction phase shall be applied to similar activities during the decommissioning/reclamation phase.

WR4-2 Topsoil removed during construction shall be reused during reclamation activities immediately following construction.

WR4-3 Groundwater and surface water monitoring activities shall continue as outlined in the established Water Resources Monitoring and Mitigation Plan for the site.

A.2.2.11 Design Features for Ecological Resources

Many design features are similar for the different types of ecological resources (plant communities and habitats, wildlife, aquatic resources, and special status species[2]). Design features for eliminating or reducing impacts on all these types of ecological resources in general and during the various project phases are presented in the following sections Design features to minimize impacts from transmission facility construction and operation are included.

A.2.2.11.1 General

ER1-1 Project developers shall designate a qualified biologist who will be responsible for overseeing compliance with all design features related to the protection of ecological resources throughout all project phases, particularly in areas requiring avoidance or containing sensitive biological resources, such as special status species and important habitats. Additional qualified biological monitors may be required on site during all project phases as determined by the BLM, USFWS, and appropriate state agencies.

ER1-2 Workers must be aware that only qualified biologists are permitted to handle listed species according to specialized protocols approved by the USFWS. A biologist shall be reviewed and approved by the USFWS and the BLM for designation as a qualified biologist on a project by project basis.

ER1-3 All personnel shall be instructed on the identification and protection of ecological resources (especially for special status species), including knowledge of required design features. The required ecological knowledge shall be incorporated into a Worker Education and Awareness Plan (WEAP) that is provided to all project personnel prior to entering the project work site. The WEAP shall be provided on a regular basis, so as to ensure the continued

[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.

ecological awareness of the project work site during all phases of the projects life. The base information the WEAP provides shall be reviewed and approved by BLM prior to the issuance of a Notice to Proceed and incorporate adaptive management protocols for addressing ecological changes over the life of the project, should they occur.

ER1-4 Workers shall not unnecessarily disturb or feed wildlife. The collection, harassment, or disturbance of plants, wildlife, and their habitats (particularly special status species) shall be reduced through employee and contractor education about applicable state and federal laws. In addition, the following measures shall be implemented: (1) all personnel shall be instructed to avoid harassment and disturbance of local plants and wildlife; (2) personnel shall be made aware of the potential for wildlife interactions around facility structures; (3) food refuse and other garbage shall be placed in closed containers so it is not available to scavengers; and (4) workers shall be prohibited from bringing firearms and pets to project sites.

ER1-5 Section 5.10.1.1.2 discusses the potential impacts on vegetation from site clearing and grading. Projects shall maintain native vegetation cover and soils to the extent possible and minimize grading to reduce flooding, maintain natural infiltration rates, maintain wildlife habitat, maintain soil health, and reduce erosion potential. All short (i.e., less than 7-in. [18-cm] tall) native vegetation shall be retained to the maximum extent possible. Blading within the project site shall be minimized to the maximum extent possible. Where necessary and feasible, shrub cover may be mowed and/or raked to smooth out the surface. Retention of native root structure and seeds within the project area would help retain soil stability, minimize soil erosion, and minimize fugitive dust pollution. Retention of native seed and roots within the project site will also facilitate recovery of vegetative cover. Use of native plant species will minimize the need to water the vegetation, because native species are already adapted to the local climate and moisture regime of the area.

ER1-6 Plants, wildlife, and their habitats shall be protected from fugitive dust through measures included in the facility's Dust Abatement Plan.

ER1-7 Section 5.10.2.1.2 discusses the potential impacts of construction on wildlife. Activities shall be timed to avoid, minimize, or mitigate impacts on wildlife. For example, crucial winter ranges, migration corridors, and calving areas for elk, deer, pronghorn, and other species shall be avoided, especially during their periods of use. If activities are planned during bird breeding seasons, a nesting bird survey shall be conducted first. If active nests are detected, the nest area shall be flagged, and no activity shall take place near the nest (at a distance determined in coordination with the USFWS) until nesting is completed (i.e., nestlings have fledged or the nest has failed) or until appropriate agencies agree that construction can proceed with the

incorporation of agreed-upon monitoring measures. The timing of activities shall be coordinated with the BLM, USFWS, and appropriate state agencies.

ER1-8 Noise reduction devices (e.g., mufflers) shall be employed to minimize the impacts on wildlife and special status species populations. Explosives shall be used only within specified times and at specified distances from sensitive wildlife or surface waters as established by the BLM or other federal and state agencies. Operators shall ensure that all equipment is adequately muffled and maintained in order to minimize disturbance to wildlife. As practicable, vehicles and equipment shall not be left idling as this not only contributes to air pollution but also can be a source of noise impacts on wildlife. Section 5.10.2.1.2 includes a discussion of potential noise impacts during construction on wildlife.

ER1-9 Design features for hazardous materials and waste management regarding refueling, equipment maintenance, and spill prevention and response shall be applied to reduce the potential for impacts on ecological resources.

ER1-10 Low-water crossings (fords) shall be used only as a last resort, and then during the driest time of the year. Rocked approaches to fords shall be used. The pre-existing stream channel, including bed and banks, shall be restored after the need for a low-water ford has passed.

ER1-11 The number of areas where wildlife could hide or be trapped (e.g., open sheds, pits, uncovered basins, and laydown areas) shall be minimized. For example, an uncovered pipe that has been placed in a trench should be capped at the end of each workday to prevent animals from entering the pipe. If a special status species is discovered inside a component, that component must not be moved, or, if necessary, moved only to remove the animal from the path of activity, until the animal has escaped.

ER1-12 During all project phases, buffer zones shall be established around sensitive habitats, and project facilities and activities shall be excluded or modified within those areas, to the extent practicable. Sections 5.10.1.1.1 and 5.10.1.1.2 discuss potential impacts to sensitive habitats.

ER1-13 In order to reduce the potential for impacts to special status species (described in Section 5.10.4), project activities shall not be located in or near habitats occupied by special status animal species. Buffer zones shall be established around these areas (e.g., identified in the land use plan or substantiated by best available information or science) to prevent any destructive impacts associated with project activities.

ER1-14 If any federally listed threatened and endangered species are found during any phase of the project, the USFWS shall be consulted as required by Section 7 of the ESA, and an appropriate course of action shall be determined

to avoid or mitigate impacts. All applicable terms and conditions and conservation measures listed in the programmatic Biological Opinion, issued by the USFWS, shall be followed.

ER1-15 Access roads shall be appropriately constructed, improved, maintained, and provided with signs to minimize potential wildlife/vehicle collisions and facilitate wildlife movement through the project area. Sections 5.10.2.1.2 and 5.10.2.1.3 discuss the potential impacts of construction and operation (including wildlife/vehicle collisions) on wildlife, respectively.

ER1-16 Project vehicle speeds shall be limited in areas occupied by special status animal species in order to reduce the potential for collision. Traffic shall stop to allow wildlife to cross roads. Shuttle vans or carpooling shall be used where feasible to reduce the amount of traffic on access roads.

ER1-17 Unless authorized, personnel shall not attempt to move live, injured, or dead wildlife off roads, ROWs, or the project site. Honking horns, revving engines, yelling, and excessive speed are inappropriate and considered a form of harassment. If traffic is being unreasonably delayed by wildlife in roads, personnel shall contact the project biologist and security, who will take necessary action.

ER1-18 Road closures or other travel modifications (e.g., lower speed limits, no foot travel) shall be considered during crucial periods (e.g., extreme winter conditions, calving/fawning seasons, raptor nesting). Personnel shall be advised to minimize stopping and exiting their vehicles in the winter ranges of large game while there is snow on the ground. Sections 5.10.2.1.2 and 5.10.2.1.3 discuss the potential impacts of construction and operation (including disturbance) on wildlife, respectively.

ER1-19 Any vehicle-wildlife collisions shall be immediately reported to security. Observations of potential wildlife problems, including wildlife mortality, shall be immediately reported to the BLM or other appropriate agency authorized officer. Procedures for removal of wildlife carcasses on-site and along access roads shall be addressed in the Nuisance Animal and Pest Control Plan, to avoid vehicle-related mortality of carrion-eaters.

ER1-20 A Nuisance Animal and Pest Control Plan shall be developed that identifies management practices to minimize increases in nuisance animals and pests in the project area, particularly those individuals and species that would affect human health and safety or have the potential to adversely affect native plants and animals. The plan would identify nuisance and pest species that are likely to occur in the area, risks associated with these species, species-specific control measures, and monitoring requirements. Sections 5.10.2.1.2, 5.10.2.1.3, and 5.10.2.1.4 discuss the potential impacts of construction,

operation, and decommissioning on wildlife, respectively. It would be during these phases that nuisance animals and pests could be of most concern.

ER1-21 Sections 5.10.1.1.2 and 5.10.1.1.4 discuss the need for local and regional native plants in revegetation and restoration. An Integrated Vegetation Management Plan shall be developed that is consistent with applicable regulations and agency policies for the control of noxious weeds and invasive plant species. The plan shall address monitoring; ROW vegetation management; the use of certified weed-free seed and mulching; the cleaning of vehicles to avoid introducing invasive weeds; and the education of personnel on weed identification, the manner in which weeds spread, and methods for treating infestations. For transmission line ROWs, the plan shall be consistent with the existing vegetation management plan for that ROW. Principles of integrated pest management, including biological controls, shall be used to prevent the spread of invasive species, per the *Vegetation Treatments Using Herbicides on BLM Lands in 17 Western States*, and the *National Invasive Species Management Plan, 2009.* The plan shall cover periodic monitoring, reporting, and immediate eradication of noxious weed or invasive species occurring within all managed areas. A controlled inspection and cleaning area shall be established to visually inspect construction equipment arriving at the project area and to remove and collect seeds that may be adhering to tires and other equipment surfaces. To prevent the spread of invasive species, project developers shall work with the local BLM field office to determine whether a pre-activity survey is warranted, and if so, to conduct the survey. If invasive plant species are present, project developers shall work with the local BLM field office to develop a control strategy. The plan shall include a post-construction monitoring element that incorporates adaptive management protocols.

ER1-22 Where revegetation and restoration are used as a tool to mitigate or rehabilitate project impacts following construction and/or decommissioning, the proponent shall assist in ongoing BLM efforts to procure and develop locally and regionally appropriate native plant materials. Where conditions permit, the project developer could collect and voucher seeds from native plant species identified on BLM target lists for regional native plant material development by following the BLM Seeds of Success Protocol as described in BLM's Handbook H1740-2, *Integrated Vegetation Management*. On the basis of the expected need for native plant materials, the project developer could contribute funding to support the BLM Native Plant Materials Development Program. The suggested funding rate is $100 in U.S. dollars per acre for each acre on which restoration or revegetation will be used to mitigate project impacts and for each acre expected to be rehabilitated following site decommissioning. Section 5.10.1.1.2 discusses potential impacts associated with the spread of noxious weeds and invasive plant species.

ER1-23 To reduce the risk of non-native and nuisance aquatic species introductions, equipment used in surface water shall be decontaminated as appropriate, especially equipment used to convey water (i.e., pumps). Section 5.10.3 discusses the need for decontaminating equipment to avoid the transfer of nuisance aquatic species.

ER1-24 Herbicide use shall be limited to nonpersistent, immobile substances. Only herbicides with low toxicity to wildlife and nontarget native plant species shall be used, as determined in consultation with the USFWS. Section 5.10.2.1.5 discusses the potential impacts of herbicides on wildlife. The typical herbicide application rate rather than the maximum application rate shall be used where this rate is effective. All herbicides shall be applied in a manner consistent with their label requirements and in accordance with guidance provided in the Final Solar PEIS on vegetation treatments using herbicides. No herbicides shall be used near or in surface water, streams (including ephemeral, intermittent, or perennial), riparian areas, or wetlands. Section 5.10.1.1.5 discusses potential impacts to plant communities, including wetlands, from the use of herbicides and Section 5.10.3 discusses the potential for contaminant impacts to aquatic biota. Setback distances shall be determined through coordination with federal and state resource management agencies. Before herbicide treatments are begun, a qualified biologist shall conduct surveys of bird nests and of special status species to identify the special measures or BMPs necessary to avoid and minimize impacts on migratory birds and special status species.

ER1-25 An Ecological Resources Mitigation and Monitoring Plan shall be developed to avoid, minimize, or mitigate adverse impacts on important ecological resources. The plan shall include, but not necessarily be limited to, the following elements, where applicable:

- Revegetation, soil stabilization, and erosion reduction measures that shall be implemented to ensure that all temporary use areas are restored. The plan shall require that restoration occurs as soon as possible after activities are completed in order to reduce the amount of habitat converted at any one time and to speed up the recovery to natural habitats.

- Mitigation and monitoring of unavoidable impacts on waters of the United States, including wetlands.

- Compensatory mitigation and monitoring to address any significant direct, indirect, and cumulative impacts on, and loss of habitat for, special status plant and animal species.

- Compliance with the regulatory requirements of the BGEPA for bald and golden eagles. Compliance strategies shall be developed in coordination with the USFWS.

- Measures to protect birds (including migratory species protected under the MBTA) developed in coordination with the appropriate federal and state agencies (e.g., BLM, USFWS, and state resource management agencies).

- Measures to protect raptors developed in coordination with the appropriate federal and state agencies (e.g., BLM, USFWS, and state resource management agencies).

- Measures to protect bats developed in coordination with the appropriate federal and state agencies (e.g., BLM, USFWS, and state resource management agencies).

- Measures to mitigate and monitor impacts on special status species developed in coordination with the appropriate federal and state agencies (e.g., BLM, USFWS, and state resource management agencies).

- Monitoring the potential for increase in predation of special status species (e.g., desert tortoise, Utah prairie dog, and greater sage-grouse) from ravens and other species that are attracted to developed areas and use tall structures opportunistically to spot vulnerable prey. Raven and other predator monitoring also shall be addressed in the Nuisance Animal and Pest Control Plan.

- Clearing and translocation of special status species, including the steps to implement the translocation, as well as the follow-up monitoring of populations in the receptor locations, as determined in coordination with the appropriate federal and state agencies. The need for a Special Status Species Clearance and Translocation Plan shall be determined on a project-specific basis.

ER1-26 At the project level, recommendations contained in Interim Golden Eagle Technical Guidance: Inventory and Monitoring Protocol and Other Recommendations in Support of Golden Eagle Management and Permit Issuance shall be considered in project planning, as appropriate. In addition, Instruction Memorandum [IM] 2010-156, the Bald and Golden Eagle Protection Act–Golden Eagle National Environmental Policy Act and Avian Protection Plan Guidance for Renewable Energy, shall be adhered to until programmatic permits from the USFWS are available. The analysis of potential impacts on, and mitigation for, golden eagles shall be made in coordination with the USFWS, and the initiation of interagency coordination on golden eagle issues shall occur early in the planning process.

ER1-27 Take[3] of golden eagles and other raptors shall be avoided. Mitigation regarding the golden eagle shall be developed in consultation with the USFWS and appropriate state natural resource agencies. A permit may be required under the Bald and Golden Eagle Protection Act.

ER1-28 A Water Resources Monitoring and Mitigation Plan shall be developed for each project. Changes in surface water or groundwater quality (e.g., chemical contamination, increased salinity, increased temperature, decreased dissolved oxygen, and increased sediment loads) or flow that result in the alteration of terrestrial plant communities or communities in wetlands, springs, seeps, intermittent streams, perennial streams, and riparian areas (including the alteration of cover and community structure, species composition, and diversity) off the project site shall be avoided to the extent practicable. The monitoring plan shall determine the effects of groundwater withdrawals on plant communities.

ER1-29 Pre-construction ecological monitoring shall be conducted based on BLM, USFWS, and state agency statutes, programs, and policies. Ecological monitoring programs shall also be conducted at intervals determined by these agencies and during construction, operations, and decommissioning.

ER1-30 The monitoring program requirements, including adaptive strategies, shall be established at the project level to ensure that potential adverse impacts are mitigated. Monitoring programs shall consider the monitoring requirements for each ecological resource present at the project site, establish metrics against which monitoring observations can be measured, identify potential mitigation measures, and establish protocols for incorporating monitoring observations and additional mitigation measures into standard operating procedures.

ER1-31 A Spill Prevention and Emergency Response Plan shall be developed that considers sensitive ecological resources. Spills of any toxic substances shall be promptly addressed and cleaned up before they can enter aquatic or other sensitive habitats as a result of runoff or leaching. See Section 5.10.1.1.1-4 and 5.10.1.2 for discussions of impacts of spills on plant communities and 5.10.3.1.2 for a discussion of contaminant impacts on aquatic biota. Section 5.9.3 also discusses the need for a Spill Prevention and Emergency Response Plan.

[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.

ER1-32 Section 5.10.1.1.2-3 discusses the potential impacts of fire on native plant communities. A Fire Management and Protection Plan shall be developed to implement measures that minimize the potential for a human-caused fire to affect ecological resources and that responds to natural fire situations.

ER1-33 A Trash Abatement Plan shall be developed that focuses on containing trash and food in closed and secured containers and removing them periodically to reduce their attractiveness to opportunistic species, such as common ravens, coyotes, feral cats and dogs, that could serve as predators on native wildlife and special status animals.

ER1-34 Prior to any ground-disturbing activity, seasonally appropriate walkthroughs shall be conducted by a qualified biologist or team of biologists to ensure that important or sensitive species or habitats are not present in or near project areas. Attendees at the walkthrough shall include appropriate federal agency representatives, state natural resource agencies, and construction contractors, as appropriate. Habitats or locations to be avoided (with appropriately sized buffers) shall be clearly marked.

ER1-35 If it is determined through coordination with the appropriate federal and state agencies (e.g., BLM, USFWS, and state resource management agencies) that it is necessary to translocate plant and wildlife species from project areas, developers shall ensure that qualified biologists conduct pre- and post-translocation surveys for target species (especially if the target species are special status species) and release individuals to protected off-site locations as approved by the federal and state agencies. The biologists shall coordinate with appropriate agencies in the safe handling and transport of any special status species encountered.

ER1-36 In accordance with adaptive management strategies, new BLM Instruction Memorandums (IMs) addressing wildlife and plants issues shall be incorporated as appropriate.

ER1-37 The establishment and spread of invasive species and noxious weeds within the ROW and in associated areas where there is ground surface disturbance or vegetation cutting shall be prevented. The area shall be monitored regularly, and invasive species shall be eradicated immediately. Section 5.10.1.1.2 discusses potential impacts associated with the spread of noxious weeds and invasive plant species.

ER1-38 Restrictions on timing and duration may be required to minimize impacts on nesting birds (especially neotropical migrants and listed species) and shall be developed in coordination with the USFWS. Sections 5.10.2.1.2 discusses the potential impacts of construction on wildlife.

ER1-39 To the extent practicable, work personnel shall stay within the ROW and/or easements.

ER1-40 Removal of raptor nests shall take place only if the birds are not actively using the nest, particularly during the nesting and brood-rearing period. Nests shall be relocated to nesting platforms, when possible; otherwise, they must be destroyed when removed. An annual report on all nests moved or destroyed will be provided to the appropriate federal and/or state agencies. Coordination with the USFWS and BLM project wildlife biologist will occur in the event that a raptor nest is located on a transmission line support structure. Sections 5.10.2.1.2 and 5.10.2.1.5 discuss the potential impacts of construction and transmission lines on wildlife (including raptors), respectively. Removal or relocation of a golden eagle or bald eagle nest (even an inactive nest) requires a permit from the USFWS.

ER1-41 Raven nests shall be removed from transmission towers to reduce predation pressure on sensitive species, such as the desert tortoise, greater sage-grouse, and Utah prairie dog. Raven nests can be removed only when inactive (i.e., no eggs or young); if removal is otherwise necessary, an MBTA take permit from the USFWS is required. The removal of raven nests shall be addressed in the Nuisance Animal and Pest Control Plan and shall incorporate the most current USFWS guidance (e.g. FONSI, *Implementation of a Desert Tortoise Recovery Plan Task: Reduce Common Raven Predation on the Desert Tortoise* [USFWS 2008]).

ER1-42 Section 5.10.1.1.2 discusses potential impacts to wetlands and other plant communities associated with hydrological features under USACE jurisdiction. Early consultation shall be done with the U.S. Army Corps of Engineers (USACE) regarding the siting of solar energy generating facilities and its transmission in relation to hydrological features that have the potential to be subject to USACE jurisdiction. Consultation with the USACE shall include submittal of a jurisdictional delineation in accordance with the 1987 wetlands delineation manual and appropriate regional supplement; avoidance, minimization and compensation proposals, as necessary. A Least Environmentally Damaging Practicable Alternative (LEDPA) shall also be identified and analyzed within the environmental analysis. A USACE permit, Nationwide verification or approved jurisdiction letter shall be provided to the BLM prior to a decision (Note: this is also presented as design feature WR1-15).

ER1-43 Any mortality of bird species (e.g., raptors) that is associated with power lines shall be monitored and reported to the BLM and the USFWS, and measures shall be taken to prevent future mortality. Sections 5.10.2.1.5 discuss the potential impacts of transmission lines on wildlife, particularly birds.

A.2.2.11.2 Site Characterization, Siting, and Design Construction

ER2-1 To the extent practicable, projects shall be sited on previously disturbed lands in close proximity to energy load centers to avoid and minimize impacts on remote, undisturbed lands.

ER2-2 Existing access roads, utility corridors, and other infrastructure shall be used to the maximum extent feasible.

ER2-3 As practical, staging and parking areas shall be located within the site of the utility-scale solar energy facility to minimize habitat disturbance in areas adjacent to the site.

ER2-4 Appropriate agencies (e.g., BLM, USFWS, and state resource management agencies) shall be contacted early in the project planning process to identify potentially sensitive ecological resources, including, but not limited to, aquatic habitats, wetland habitats, unique biological communities, crucial wildlife habitats, and special status species locations and habitats, including designated critical habitat, that might be present in the area proposed for a solar energy facility and associated access roads and ROWs. This coordination shall be used to identify the need for and scope of pre-disturbance surveys of the project area and vicinity.

ER2-5 All pre-disturbance surveys shall be conducted by qualified biologists following accepted protocols established by the USACE, BLM, USFWS, or other federal or state regulatory agencies, as determined appropriate by the BLM, to identify and delineate the boundaries of important, sensitive, or unique habitats in the project vicinity, including but not limited to, waters of the United States, wetlands, springs, seeps, ephemeral streams, intermittent streams, 100-year floodplains, ponds and other aquatic habitats, riparian habitat, remnant vegetation associations, rare or unique natural communities, and habitats supporting special status species populations.

ER2-6 To the extent practicable, projects shall be sited and designed to avoid direct and indirect impacts on important, sensitive, or unique habitats in the project vicinity, including, but not limited to, waters of the United States, wetlands (both jurisdictional and non-jurisdictional), springs, seeps, streams (ephemeral, intermittent, and perennial), 100-year floodplains, ponds and other aquatic habitats, riparian habitat, remnant vegetation associations, rare or unique biological communities, crucial wildlife habitats, and habitats supporting special status species populations (including designated and proposed critical habitat). For cases in which impacts cannot be avoided, they shall be minimized and mitigated appropriately. Project planning shall be coordinated with the appropriate federal and state resource management agencies.

ER2-7 Solar energy development activities have the potential to affect special status species in multiple ways as described in Section 5.10.4. Therefore, projects shall not be sited in designated critical habitat, ACECs, or other specially designated areas that are considered necessary for special status species and habitat conservation.

ER2-8 Projects shall be designed to avoid, minimize, and mitigate impacts on wetlands, waters of the United States, and other special aquatic sites. Sections 5.10.1.1.1-5 and 5.10.1.2 discuss potential impacts to wetlands and other water-related habitats.

ER2-9 In order to avoid and minimize impacts associated with solar energy development (Section 5.10.4), project facilities and activities, including associated roads and utility corridors, shall not be located in or near occupied habitats of special status animal species. Buffer zones shall be established (e.g., identified in the land use plan or substantiated by best available information or science) around these areas to prevent any destructive impacts associated with project activities.

ER2-10 Buffer zones shall be established around sensitive habitats, and project facilities and activities shall be excluded or modified within those areas (e.g., identified in the land use plan or substantiated by best available information or science). Sections 5.10.1.1.1 and 5.10.1.1.2 discuss potential impacts to sensitive habitats.

ER2-11 Habitat loss, habitat fragmentation, and resulting edge habitat due to project development shall be minimized to the extent practicable. Habitat fragmentation could be reduced by consolidating facilities (e.g., access roads and utilities could share common ROWs, where feasible), reducing the number of access roads to the minimum amount required, minimizing the number of stream crossings within a particular stream or watershed, and locating facilities in areas where habitat disturbance has already occurred. Individual project facilities shall be located and designed to minimize disruption of animal movement patterns and connectivity of habitats. Sections 5.10.2.1.2 discuss the potential impacts of habitat loss and fragmentation on wildlife.

ER2-12 Locating solar power facilities near open water or other areas that are known to attract a large number of birds shall be avoided. Sections 5.10.2.1.2 and 5.10.2.1.3 discuss the potential impacts of construction and operation on wildlife, respectively.

ER2-13 Tall structures such as meteorological towers and solar power towers shall be located to avoid known flight paths of birds and bats. The need for this design features shall be determined in consultation with BLM, USFWS, and state natural resource agencies. Sections 5.10.2.1.1 discusses potential

collisions of birds and/or bats with meteorological towers; Section 5.10.2.1.3 discussions potential collisions with solar facilities (e.g., power towers); and Section 5.10.2.1.5 discusses potential collisions with transmission lines.

ER2-14 Transmission line conductors shall span important or sensitive habitats, such as wetlands, dry washes, riparian habitats, playas, sand dunes and sand transport areas, within limits of standard structure design. See Section 5.10.1.1.5 for a discussion of potential impacts of transmission lines on plant communities and habitats and 5.10.3.1.5 for a discussion of the impacts of transmission lines on aquatic habitat and biota.

ER2-15 Fences shall be built (as practicable) to exclude livestock and wildlife from all project facilities, including all water sites. Sections 5.10.2.1.2 and 5.10.2.1.3 discuss the potential impacts of construction and operation on wildlife, respectively.

ER2-16 Project developers shall identify surface water runoff patterns at the project site and develop mitigation that prevents soil deposition and erosion throughout and downhill from the site.

ER2-17 Developers shall avoid the placement of facilities or roads in drainages and make necessary accommodations for the disruption of runoff. See Section 5.10.3.1.5 for a discussion of the impacts of roads on aquatic habitat and biota.

ER2-18 Any necessary stream crossings shall be designed to provide in-stream conditions that allow for and maintain uninterrupted movement and safe passage of fish during all project periods. It is also recommended, if stream crossings are required, that care be taken to minimize removal of deadfall or overhanging vegetation which provides shelter and shading to aquatic organisms. See Section 5.10.3.1.2 for a discussion of the impacts of stream crossings on aquatic habitat and biota.

ER2-19 Projects shall avoid surface water or groundwater withdrawals that affect sensitive habitats (e.g., aquatic, wetland, playa, microphyll woodland, and riparian habitats) and any habitats occupied by special status species. Applicants shall demonstrate, through hydrologic modeling, that the withdrawals required for their project are not going to affect groundwater discharges that support special status species or their habitats. Applicants shall avoid impacts to groundwater discharges that support any groundwater-dependent habitats (as determined, for example, through hydrologic modeling), minimize unavoidable impacts, and develop mitigation in coordination with appropriate agencies. Sections 5.10.1.1.3 and 5.10.1.2 discuss potential impacts on habitats from water use.

ER2-20 The capability of local surface water or groundwater supplies to provide adequate water for the operation of proposed solar facilities shall be considered early in the project siting and design. As described in Section 5.10.4.1.3, groundwater withdrawal can alter or eliminate special status species habitat. Therefore, technologies that would result in withdrawals that would affect habitats that support special status species shall not be considered.

ER2-21 New roads shall be designed and constructed to meet the appropriate BLM road design standards, such as those described in *BLM Manual 9113*, and be no larger than necessary to accommodate their intended functions (e.g., traffic volume and weight of vehicles). Roads internal to solar facility sites shall be designed to minimize ground disturbance. Section 5.10.2.1.2 discusses the potential impacts of construction (including access roads) on wildlife.

ER2-22 Pipelines that transport hazardous liquids (e.g., oils) that will pass through aquatic or other habitats containing sensitive species shall be designed with block or check valves on both sides of the waterway or habitat to minimize the amount of product that could be released as a result of leaks. Such pipelines shall be constructed of double-walled pipe at river crossings.

ER2-23 Vehicles and site workers shall avoid entering aquatic habitats, such as streams and springs, during site characterization activities until surveys by qualified biologists have evaluated the potential for unique flora and fauna to be present.

ER2-24 Meteorological towers and solar sensors shall be located to avoid sensitive habitats or areas where wildlife (e.g., sage-grouse) is known to be sensitive to human activities; applicable land use plans or best available information and science shall be referred to in order to determine avoidance distances. Installation of these components shall be scheduled to avoid disrupting wildlife reproductive activities or migratory or other important behaviors. Guy wires on meteorological towers shall be avoided. If guy wires are necessary, permanent markers (bird flight diverters) shall be attached to them to increase their visibility. Section 5.10.2.1.1 discusses the potential impacts of meteorological towers on wildlife.

ER2-25 Meteorological towers, soil borings, wells, and travel routes shall be located to avoid important, sensitive, or unique habitats, including, but not limited to, wetlands, springs, seeps, ephemeral streams, intermittent streams, 100-year floodplains, ponds and other aquatic habitats, riparian habitat, remnant vegetation associations, rare natural communities, and habitats supporting special status species populations as identified in applicable land use plans or best available information and science.

ER2-26 Prior to construction of the facility, environmental training shall be provided to contractor personnel whose activities or responsibilities could affect the environment during construction. An environmental compliance officer and other inspectors, the contractor's construction field supervisor(s), and all construction personnel are expected to play an important role in maintaining strict compliance with all permit conditions in order to protect wildlife and their habitats during construction.

ER2-27 Construction activities have the potential to adversely affect special status species (Section 5.10.4.1.1). Therefore, prior to construction, all areas to be disturbed shall be surveyed by qualified biologists using approved survey techniques or established species-specific survey protocols to determine the presence of special status species in the project area.

ER2-28 If possible, on-site construction access routes shall be rolled and compacted to allow trucks and equipment to access construction locations. Following construction, disturbed areas shall be lightly raked and/or ripped and reseeded with seeds from low-stature plant species collected from the immediate vicinity.

ER2-29 To the extent practicable, vegetation clearing, grading, and other construction activities shall occur outside the bird breeding season. If activities are planned for the breeding season, a survey of nesting birds shall be conducted first. If active nests are not detected, construction activities may be conducted. If active nests are detected, the nest area shall be flagged, and no activity shall take place near the nest (at a distance coordinated with the USFWS) until nesting is completed (i.e., nestlings have fledged or the nest has failed) or until appropriate agencies agree that construction can proceed with the incorporation of agreed-upon monitoring measures.

ER2-30 Explosives shall be used only within specified times and at specified distances from sensitive wildlife or surface waters, as established by the BLM or other federal and state agencies. The occurrence of flyrock from blasting shall be limited by using blasting mats.

ER2-31 The extent of habitat disturbance during construction shall be reduced by keeping vehicles on access roads and minimizing foot and vehicle traffic through undisturbed areas. Section 5.10.2.1.2 discusses the potential impacts of construction (including blasting) on wildlife.

ER2-32 Temporary or project-created access roads shall be closed to unauthorized vehicle use, where appropriate.

ER2-33 Where a pipeline trench may drain a wetland, trench breakers shall be constructed, and/or the trench bottom shall be sealed to maintain the original

wetland hydrology. Section 5.10.1.1.2 discusses potential impacts to wetlands from construction of structures such as pipelines.

ER2-34 Because open trenches could impede the seasonal movements of large game animals and alter their distribution, they shall be backfilled as quickly as is possible. Open trenches could also entrap smaller animals; therefore, escape ramps shall be installed along open trench segments at distances identified in the applicable land use plan or best available information and science. Section 5.10.2.1.2 discusses the potential impacts of construction on wildlife.

ER2-35 An appropriate number of qualified biological monitors (as determined by the federal authorizing agency and USFWS) shall be on-site during initial site preparation and during the construction period to monitor, capture, and relocate animals that could be harmed and are unable to leave the site on their own.

ER2-36 Wildlife found in harm's way shall be relocated away from the area of the activity. Qualified personnel shall be required to relocate some animals such as rattlesnakes.

ER2-37 Construction debris, especially treated wood, shall not be stored or disposed of in areas where it could come in contact with aquatic habitats.

ER2-38 As directed by the local BLM field office, Joshua trees (*Yucca brevifolia*), other *Yucca* species, and most cactus species shall be salvaged prior to land clearing, and they shall be transplanted, held for use to revegetate temporarily disturbed areas, or otherwise protected as prescribed by state or local BLM requirements.

ER2-39 Project-specific Integrated Vegetation Management Plans shall investigate the possibility of revegetating parts of the solar array area. Where revegetation is accomplished, fire breaks are required, such that the vegetated areas would not result in an increased fire hazard. Section 5.10.1.1.2 discusses potential impacts to native species from land clearing.

ER2-40 Reestablishment of vegetation within temporarily disturbed areas shall be done immediately following the completion of construction activities, provided such revegetation will not compromise the function of the buried utilities. Species salvaged during construction could be transplanted into these areas at a density similar to preconstruction conditions. Revegetation shall focus on the establishment of native plant communities similar to those present in the vicinity of the project site. Species used shall consist of native species dominant within the plant communities that exist in adjacent areas and have similar soil conditions. Certified weed-free seed mixes of native shrubs, grasses, and forbs of local origin shall be used. In areas where suitable native species are unavailable, other plant species approved by the

BLM could be used. Section 5.10.1.1.2 discusses the potential effects of vegetation removal.

ER2-41 The placement of transmission towers within aquatic and wetland habitats, or other sensitive habitats such as riparian habitats, playas, or dry washes, shall be avoided whenever feasible. If towers must be placed within these habitats, they shall not impede flows or fish passage.

ER2-42 If transmission lines are located near aquatic habitats or riparian areas (e.g., minimum buffers identified in the applicable land use plan or best available science and information), vegetation maintenance shall be limited and performed mechanically rather than with herbicides. Cutting in wetlands or stream and wetland buffers shall be done by hand or by feller-bunchers. Tree cutting in stream buffers shall only target trees able to grow into a transmission line conductor clearance zone within 3 to 4 years. Cutting in such areas for construction or vegetation management shall be minimized, and the disturbance of soil and remaining vegetation shall be minimized. Sections 5.10.1.1.2 and 5.10.1.1.5 discusses potential impacts on wetlands and riparian areas from activities associated with transmission lines.

ER2-43 To the extent practicable, habitat disturbance for transmission line construction shall be minimized by using helicopters where access roads do not exist or where access roads could not be constructed without significantly impacting habitats, and by locating transmission facilities in previously disturbed areas. The impact of helicopters to noise and air pollution shall be minimized. Existing utility corridors and other support structures shall be used to the maximum extent feasible.

ER2-44 Sections 5.10.1.1.1, 5.10.1.1.2, and 5.10.1.1.5 discuss potential impacts on sensitive habitats from operation of vehicles and construction of structures including transmission lines. If needed, temporary access roads shall be developed, primarily by the removal of woody vegetation, although temporary timber mats should be used in areas of wet soils. Wide-tracked or balloon-tired equipment, timber corduroy, or timber mat work areas shall be used on wet soils where wetland or stream crossings are unavoidable and where crossing on frozen ground is not possible in winter. Areas rutted by equipment shall be immediately regraded and revegetated. Towers shall be installed by airlift helicopters, where necessary, to avoid extensive crossing of wetlands or highly sensitive areas (such as those identified as rare natural habitats).

ER2-45 ROW development and construction activities shall adhere to locally established wildlife and/or habitat protection provisions. Exceptions or modifications to spatial buffers or timing limitations will be evaluated on a site-specific/species-specific basis in coordination with the local federal

administrator and state wildlife agency. Section 5.10.2.1.2 discusses the potential impacts of construction on wildlife.

ER2-46 Current guidelines and methodologies would be used in the design and analysis of proposed transmission facilities in order to minimize the potential for raptors and other birds to be electrocuted by them or to collide with them. Section 5.10.2.1.5 discusses the potential impacts of transmission lines on birds.

ER2-47 Transmission line support structures and other facility structures shall be designed to discourage their use by raptors for perching or nesting (e.g., by using monopoles rather than lattice support structures or by use of anti-perching devices). This design would also reduce the potential for increased predation of special status species, such as the desert tortoise, sage grouse, and Utah prairie dog. Mechanisms to visually warn birds (permanent markers or bird flight diverters) shall be placed on transmission lines at regular intervals to prevent birds from colliding with the lines.

ER2-48 To the extent practicable, the use of guy wires shall be avoided because they pose a collision hazard for birds and bats. Guy wires shall be clearly marked with bird flight diverters to reduce the probability of collision. Section 5.10.2.1.1 discusses the potential impacts of meteorological towers on birds and bats, while 5.10.2.1.5 discusses the potential impacts of transmission lines.

ER2-49 Shield wires shall be marked with devices that have been scientifically tested and found to significantly reduce the potential for bird collisions. Section 5.10.2.1.5 discusses the potential impacts of transmission lines on birds.

A.2.2.11.3 Operations and Maintenance

ER3-1 Areas left in a natural condition during construction (e.g., wildlife crossings) shall be maintained in as natural a condition as possible within safety and operational constraints.

ER3-2 To minimize habitat loss and fragmentation, as much habitat as possible shall be reestablished after construction is complete by maximizing the area reclaimed during solar energy operations. Sections 5.10.2.1.2 and 5.10.2.1.3 discuss the potential impacts of habitat fragmentation on wildlife.

ER3-3 Lighting shall be designed to provide the minimum illumination needed to achieve safety and security objectives. It shall be shielded and orientated to focus illumination on the desired areas and to minimize or eliminate lighting of off-site areas or the sky. All unnecessary lighting shall be turned off at

night to limit attracting migratory birds or special status species. Section 5.10.2.1.3 discusses the potential impacts of operation (including lighting) on wildlife.

ER3-4 For structures that exceed 200 ft (~60 m) in height, applicants shall coordinate with the USFWS and appropriate state natural resource agencies to identify obstruction marking, lighting, or other air safety measures that meet the minimum safety requirements and minimize the potential of bird strikes. Section 5.10.2.1.3 discusses the potential impacts of operation (including collisions of birds with power towers) on wildlife.

ER3-5 Evaporation ponds shall be fenced and netted to prevent use by wildlife where feasible. Open water sources in the desert provide subsidies to ravens and other predators that feed on special status species (e.g., desert tortoise, greater sage-grouse, and Utah prairie dog). In addition, these water sources may have elevated levels of harmful contaminants (e.g., total dissolved solids and selenium) and could attract wildlife into an industrialized area, where they are more likely to be killed. The lower 18 in. (46 cm) of the fencing shall be a solid barrier that would exclude entrance by amphibians and other small animals. Section 5.10.2.1.3 discusses the potential impacts of operation (including evaporation ponds) on wildlife.

ER3-6 In order to prevent the effects of the West Nile virus on wildlife, a mosquito abatement program shall be implemented for all evaporation ponds or other standing bodies of water that have the potential to support mosquito reproduction.

ER3-7 Appropriate fish screens shall be installed on cooling water intakes to limit the potential for impingement impacts on organisms in surface water sources used for cooling water. Intake designs shall minimize the potential for aquatic organisms from surface waters to be entrained in cooling water systems. See Section 5.10.3.1.3 for a discussion of the impacts of water withdrawals on aquatic habitat and biota.

ER3-8 Pesticide/herbicide use should be conducted in accordance with a Nuisance Animal and Pest Control Plan and an Integrated Vegetation Management Plan.

A.2.2.11.4 Reclamation and Decommissioning

ER4-1 A Decommissioning and Site Reclamation Plan that is specific to the project shall be developed, approved by the BLM, and implemented and shall include the following elements:

- The plan shall contain an adaptive management component that allows for the incorporation of lessons learned from monitoring data.

- The plan shall require that land surfaces be returned to pre-development contours to the greatest extent feasible immediately following decommissioning.

- The plan shall be designed to expedite the reestablishment of vegetation and require restoration to be completed as soon as practicable.

- To ensure rapid and successful reestablishment efforts, the plan shall specify site-specific measurable success criteria, including target dates, which shall be developed in coordination with the BLM and be required to be met by the operator.

- Vegetation reestablishment efforts shall continue until all success criteria have been met.

- Bonding to cover the full cost of vegetation reestablishment shall be required (see ROW authorization policies, Section 2.2.2.1).

- Species used for reestablishing vegetation shall consist of native species that are dominant within the plant communities in adjacent areas that have similar soil conditions.

- The plan shall require the use of weed-free seed mixes of native shrubs, grasses, and forbs of local sources where available. When available, seeds of known origin, as labeled by state seed certification programs, shall be used. Local native genotypes shall be used where practicable. If cultivars of native species are used, certified seeds (i.e., blue tag) shall be used. “Source identified” seeds (i.e., yellow tag) shall be used when native seeds are collected from wildland sites.

- The cover, species composition, and diversity of the reestablished plant community shall be similar to those present on-site prior to project development and in the vicinity of the site. Baseline data shall be collected in each project area prior to its development as a benchmark for measuring the success of reclamation efforts. In areas where suitable native species are unavailable, other plant species approved by the BLM could be used. If non-native plants are necessary, they shall be noninvasive, noncompetitive, and, ideally, be short-lived, have low reproductive capabilities, or be self-pollinating to prevent gene flow into the native community. The non-native plants that are used shall not exchange genetic material with common native plant species.

– The plan shall be developed in coordination with appropriate federal and state agencies.

ER4-2 Access roads shall be reclaimed when they are no longer needed. However, seasonal restrictions (e.g., nest and brood rearing) shall be considered (e.g., identified in the land use plan or substantiated by best available information or science). Section 5.10.2.1.4 discusses the potential impacts of decommissioning on wildlife.

ER4-3 All holes and ruts created by the removal of structures and access roads shall be filled or graded. Section 5.10.2.1.4 discusses the potential impacts of decommissioning on wildlife.

ER4-4 While structures are being dismantled, care shall be taken to avoid leaving debris on the ground in areas where wildlife regularly move.

ER4-5 Post-decommissioning protocols shall include monitoring for the recovery of native vegetation, colonization and spread of invasive species, use by wildlife, and use by special status species. Monitoring data shall be used to determine the success of reclamation activities and the need for changes in ongoing management or for additional reclamation measures. Ongoing visual inspections for a minimum of 5 years following decommissioning activities shall be required to ensure that there is adequate restoration and minimal environmental degradation. This period shall be extended until satisfactory results are obtained.

ER4-6 The facility fence shall remain in place for several years to help reclamation (e.g., the fence could preclude large mammals and vehicles from disturbing revegetation efforts). Shorter times for maintaining fencing may be appropriate in cases where the likelihood of disturbance by cattle and wildlife is low. In some cases, it may be appropriate to replace the original exclusion fence with a new fence that excludes cattle and vehicles but allows for use by pronghorn and large-game wildlife. This secondary fencing shall remain in place until the revegetation efforts meet success criteria.

A.2.2.12 Design Features for Air Quality and Climate

The following design features were identified to avoid, reduce, and/or mitigate potential impacts on ambient air quality and climate from solar development that were identified and discussed in Sections 5.11.1 and 5.11.2 of the Draft and Final Solar PEIS

A.2.2.12.1 General

AQC1-1 A project- and location-specific Dust Abatement Plan shall be prepared for all solar facilities. Water spraying, which is widely used as a dust control measure, is sometimes not cost effective (in water-deprived locations, for example). Paving is also not justifiable for roads that have a low volume of traffic within and around a solar facility. Gravel can be used to reduce fugitive dust from roads. Another solution for controlling dust is to apply a dust suppressant, although this is not a permanent solution.

AQC1-2 Access roads, on-site roads, and parking lots shall be surfaced with aggregate that is hard enough that vehicles cannot crush it and thus cause dust or compacted soil conditions. Paving could also be used on access roads and parking lots. Alternatively, chemical dust suppressants or durable polymeric soil stabilizers shall be used on these locations. The choice of dust suppression measures shall consider the potential impacts on wildlife from the windborne dispersal of fugitive dust containing dust suppressants and the potential impact on future reclamation.

AQC1-3 All unpaved roads, disturbed areas (e.g., areas of scraping, excavation, backfilling, grading, and compacting), and loose materials generated during project activities shall be watered as frequently as necessary to minimize fugitive dust generation. In water-deprived locations, water spraying shall be limited to active disturbance areas only, and non-water-based dust control measures shall be implemented in areas with intermittent use or use that is not heavy, such as stockpiles or access roads if allowed by the BLM field office.

AQC1-4 Machinery shall use air-emission-control devices as required by federal, state, and local regulations or ordinances.

AQC1-5 On-site vehicle use shall be reduced to the extent feasible.

AQC1-6 Travel shall be limited to stabilized roads.

AQC1-7 The main access road to the main power block and the main maintenance building area shall be paved.

AQC1-8 Speed limits (e.g., 10 mph [16 km/hour]) within the construction site shall be posted with visible signs and enforced to minimize airborne fugitive dust.

AQC1-9 All vehicles that transport loose materials as they travel on public roads shall be covered, and their loads shall be sufficiently wet and kept below the freeboard of the truck.

AQC1-10 Workers shall be trained to comply with the speed limit, use standard engineering practices, minimize the drop height of materials, and minimize the number and extent of disturbed areas. The project developer shall enforce these requirements.

AQC1-11 Wind fences shall be installed around disturbed areas that could affect the area beyond the site boundaries (e.g., nearby residences) as appropriate.

AQC1-12 All soil disturbance activities and travel on unpaved roads during periods when dust may become windborne shall be suspended during periods of high winds. A critical site-specific wind speed shall be determined on the basis of soil properties determined during site characterization, and monitoring of the wind speed shall be required at the site during construction, operation, and reclamation.

AQC1-13 Any stockpiles created shall be kept on-site, with an upslope barrier in place to divert runoff. Stockpiles shall be sprayed with water, covered with tarpaulins, and/or treated with appropriate dust suppressants, especially in preparation for high wind or storm conditions. Compatible native vegetative plantings may also be used to limit dust generation from stockpiles that will be inactive for a relatively long period. Chemical dust suppressants that emit volatile organic compounds shall be avoided within or near ozone nonattainment areas.

AQC1-14 All diesel engines used in the facility shall be fueled only with ultra-low sulfur diesel with a sulfur content of 15 parts per million (ppm) or less.

AQC1-15 The idling time of diesel equipment shall be limited to no more than 10 minutes, unless idling must be maintained for proper operation (e.g., drilling, hoisting, and trenching).

AQC1-16 Potential environmental impacts from the use of dust palliatives shall be minimized by taking all necessary measures to keep the chemicals out of sensitive soil and streams. In addition, the application of dust palliatives shall comply with federal, state, and local laws and regulations. Dust palliatives must meet the requirements of the applicable transmission system operator (e.g., Western Area Power Administration construction standards prohibit the use of oil as a dust suppressant).

AQC1-17 The transmission lines shall be accessed from public roads and designated routes to the maximum extent possible in order to minimize fugitive dust emissions.

A.2.2.12.2 Site Characterization, Siting, and Design Construction

AQC2-1 All heavy equipment shall meet emission standards specified in the state code of regulations, and routine preventive maintenance, including tune-ups to meet the manufacturer's specifications, shall be implemented to ensure efficient combustion and minimal emissions. Newer and cleaner equipment that meets more stringent emission controls shall be leased or purchased if available.

AQC2-2 Access to the construction site and staging areas shall be limited to authorized vehicles only through the designated treated roads.

AQC2-3 Construction shall be staged to limit the exposed area at any time, whenever practical.

AQC2-4 Tires of all construction-related vehicles shall be inspected and cleaned as necessary so they are free of dirt before they enter paved public roadways.

AQC2-5 Visible trackout or runoff dirt on public roadways from the construction site shall be cleaned (e.g., through street vacuum sweeping).

AQC2-6 Topsoil from all excavations and construction activities shall be salvaged and reapplied during reclamation or, where feasible, used for interim reclamation by being reapplied to construction areas not needed for facility operation as soon as activities in that area have ceased.

AQC2-7 Because of low winds and stable atmospheric conditions occurring in the early morning from late fall to early spring, the highest 24-hour concentrations of particulate matter during construction would be attributable to activities occurring during those hours. Thus, soil disturbance activities shall be eliminated or minimized under these atmospheric conditions unless dust can be substantially mitigated, particularly for construction activities occurring near facility boundaries.

AQC2-8 All soil-disturbing activities and travel on unpaved roads during high-wind events shall be limited.

AQC2-9 Ground disturbance from construction-related activities shall avoid areas with intact biological soil crusts and desert pavement to the extent possible. For cases in which impacts cannot be avoided, soil crusts will be salvaged and restored on the basis of recommendations by BLM once construction has been completed.

A.2.2.12.3 Operations and Maintenance

AQC3-1 All combustion sources shall comply with state emission standards (e.g., best available control technology requirements).

AQC3-2 For portions of facilities that are maintained to be free of vegetation during operations, the dust control design features that were used to limit fugitive dust emissions during the construction phase shall be implemented to minimize fugitive dust emissions from bare surfaces and unpaved access roads. Section 5.11.1.3 discusses fugitive dust emission impacts.

A.2.2.12.4 Reclamation and Decommissioning

AQC4-1 Decommissioning activities are generally the reverse of construction activities. Impacts from decommissioning are discussed in Section 5.11.1.4. The design features applied during construction shall also be applied during decommissioning.

A.2.2.13 Design Features for Visual Resources

The following design features were identified to avoid, reduce, and/or mitigate potential impacts to visual resources from solar development identified and discussed in Section 5.12.3 of the Draft and Final Solar PEIS.

A.2.2.13.1 General

VR1-1 Solar facilities shall be sited and designed properly to eliminate glint and glare effects on roadway users, nearby residences, commercial areas, or other highly sensitive viewing locations, or to reduce them to the lowest achievable levels. Regardless of the solar technology proposed, a Glint and Glare Assessment, Mitigation, and Monitoring Plan must assess accurately and quantify potential glint and glare effects and determine the potential health, safety, and visual impacts associated with glint and glare. The assessment shall be conducted by qualified individuals using appropriate and commonly accepted software and procedures. The assessment results must be made available to the BLM in advance of project approval. If the project design is changed during the siting and design process such that substantial changes to glint and glare effects may occur, glint and glare effects shall be recalculated, and the results shall be made available to BLM.

VR1-2 A Lighting Plan shall be prepared that documents how lighting will be designed and installed to minimize night-sky impacts and impacts to nocturnal wildlife during construction and operations. Lighting for hazard

marking shall be the minimum necessary to meet the safety requirement. Lighting for facilities shall not exceed the minimum number, intensity, and coverage required for safety and basic security. All area lighting shall be controlled through timer, sensor, or switch that is available to facility operators; dusk to dawn lighting controlled by photocell alone shall not be allowed except for building egress lighting. Area lights shall only be switched on when there is a specific need (e.g. cleaning mirrors and panels, pumping fuel, persons occupying an area, or alarm situation). When not needed, lights shall be switched off or dimmed to <20% of their full operational intensity. Exceptions to dimmed or switched off lighting for safety purposes shall be articulated in the Lighting Plan.

All permanent lighting shall be fully shielded (e.g., full cut-off), except for collision markers required by FAA or other emergency lighting triggered by alarms. Such lighting shall be mounted so that no light is emitted above an imaginary horizontal plane through the fixture.

Vehicle mounted lights are preferred over permanently mounted lighting for nighttime maintenance activities. When possible, such vehicle mounted lighting shall be aimed toward the ground to avoid causing glare and skyglow.

Retro-reflective or luminescent markers are encouraged in lieu of permanent lighting.

All lighting shall be of minimum intensity to meet safety criteria. When accurate color rendition is not required (e.g., roadway, basic security), lighting shall be amber in color, using either low-pressure sodium lamps or yellow LED lighting, or equivalent. Such lighting reduces skyglow and wildlife impacts. When white light is required for accurate color rendition, it shall be equal to 3500° Kelvin color temperature. Bluish-white lighting shall be prohibited. The Lighting Plan shall include a process for promptly addressing and mitigating complaints about potential lighting impacts.

VR1-3 In order to minimize night-sky impacts from hazard navigation lighting associated with solar facilities, the applicant shall use AVWS technology for any structures exceeding 200 ft (61 m) in height. If the FAA denies a permit for use of AVWS, the applicant shall limit lighting to the minimum required to meet FAA safety requirements. The use of red or white strobe lighting shall be prohibited unless BLM approves its use because of conflicting mitigation requirements.

VR1-4 The use of signs and project construction signs shall be minimized. Beyond those required for basic facility and company identification for safety, navigation, and delivery purposes, commercial symbols or signs and associated lighting on buildings and other structures shall be prohibited. All

commercial symbols and signs and associated lighting shall be designed to minimize offsite visibility. Necessary signs shall be made of non-glare materials and utilize unobtrusive colors. The reverse sides of signs and mounts shall be painted or coated by using the most suitable color selected from the BLM Standard Environmental Color Chart to reduce contrasts with the existing landscape; however, placement and design of any signs required by safety regulations must conform to regulatory requirements..

VR1-5 "Housekeeping" procedures shall be developed to ensure that the site is kept clean of debris, garbage, fugitive trash or waste, and graffiti; to prohibit scrap heaps and dumps; and to minimize storage yards. Design features for effective waste management shall be applied.

VR1-6 **"**Housekeeping" procedures shall be developed to ensure lands adjacent to project site are kept clean of debris, garbage, graffiti, fugitive trash or waste generated onsite, and trackout or runoff dirt. Design features for effective waste and site management shall be applied.

VR1-7 In addition to mitigation measures that directly reduce the impacts of solar energy and associated facilities, the off-site mitigation of visual impacts may be an option in some situations. Off-site mitigation shall be considered in situations where nonconforming proposed actions may lead to changing the VRM class objectives through an RMP amendment. Unavoidable visual impacts may then be mitigated by a correction or remediation of a nonconforming existing condition resulting from a different proposed action located within the same viewshed for impacts of approximately equal magnitude, and within the same or a more protective VRM class. The off-site mitigation serves as a means to offset and recover the loss of visual landscape integrity. For example, off-site mitigation could include reclaiming unnecessary roads, removing abandoned buildings, reclaiming abandoned mine sites, putting utility lines underground, rehabilitating and revegetating existing erosion or disturbed areas, or establishing scenic conservation easements. In situations where off-site mitigation opportunities are absent within the same viewshed, then different viewsheds that need mitigation of visual impacts because they could affect highly sensitive visual resources (for example, along National Scenic and Historic Trails, Wild and Scenic River corridors, Scenic or Backcountry Byways, etc.) may be considered. Appropriate offsite mitigation will be determined on a project-specific basis in consultation with BLM. BLM policy guidance on off-site mitigation procedures is contained in BLM IM 2008-204, *Offsite Mitigation.*

A.2.2.13.2 Site Characterization, Siting, and Design Construction

VR2-1 Project developers shall consult the VRM class designations and associated management objectives during the early phases of project planning, including

those related to project due diligence, site selection, planning, and design. It is the developer's responsibility to conduct an early investigation of the respective project's compatibility with the VRM class objectives and the potential that these objectives can be met by applying thoughtful and creative design principles. Project developers shall document and demonstrate how the visual management objectives were factored into the various phases of project planning and decision rationale. The BLM visual resource inventory (VRI) class values—including those for scenic quality, sensitivity, and distance zones—shall also be factored into the project planning, design, and decision making.

VR2-2 Project developers shall demonstrate how the visual values influence project design and document how impacts on these values are minimized through consideration for the proposed project location and its relationship to the surrounding viewshed. This information shall be included as a part of the critical due diligence information considered when determining and selecting solar development sites and ROW boundaries. ROW location, size, and boundary determinations shall consider terrain characteristics and opportunities for full or partial project concealment by recessing the project into the landscape terrain.

VR2-3 Project developers shall consult with the BLM in the early phases of project planning to help determine the proposed project's potential conformance to the applicable RMP's VRM class designation and other potential constraints, thus avoiding costly unforeseen planning implications and re-design.

VR2-4 A qualified professional landscape architect with demonstrated experience with the BLM's VRM policies and procedures shall be a part of the developer's and the BLM's respective planning teams, evaluating visual resource issues as project siting options are considered. The visual issues shall be addressed throughout the planning and design process, and the final project plans shall reflect intended methods for mitigating visual impacts.

VR2-5 The appropriate BLM field office and locally based public shall be consulted to provide input on identifying important visual resources in the project area and on the siting and design process. The public shall be involved and informed about the visual site design elements of the proposed solar energy facilities. Possible approaches include conducting public forums for disseminating information, offering organized tours of operating solar energy development projects, and using computer and visualization simulations in public presentations.

VR2-6 Project developers shall also consult on viewshed protection objectives and practices with the respective land management agencies that have been assigned administrative responsibility for landscapes having special designations, such as Wilderness Areas, National Scenic and Historic Trails,

Wild and Scenic Rivers, etc., National Parks, and National Wildlife Refuges located within the project's viewshed. Developers shall demonstrate a concerted effort to reconcile conflicts while recognizing that the BLM retains authority for final decisions determining project approval and conditions.

VR2-7 For applications that include artifacts and remnants of a National Historic Trail, are located within the viewshed of a National Historic Trail's designated centerline, or include or are within the viewshed of a trail eligible for listing on the *National Register of Historic Places* (NRHP) by virtue of its important historical or cultural values and integrity of setting, the applicant shall evaluate the potential visual impacts on the trail associated with the proposed project; minimize, avoid, or mitigate adverse effects through the Section 106 consultation process; and identify appropriate mitigation measures for inclusion as stipulations in the POD. This requirement does not supersede or amend National Historic Trails requirements cited in other sections but is in addition to and supportive of them.

VR2-8 Landscape settings observed from a unit of the National Park system, national historic sites, national trails, and Tribal cultural resources may be a part of the historic context contributing to the historic significance of the site or trail, project siting shall avoid locating facilities that would alter the visual setting in a way that would reduce the historic significance or function, even if compliant with VRM objectives. This requirement does not supersede or amend national historic sites, national trails, and Tribal cultural resources requirements cited in other sections but is in addition to and supportive of them.

VR2-9 Project developers shall obtain topographical data of engineering-design quality and use digital terrain mapping tools at a landscape-viewshed scale for project location selection, site planning and design, visual impact analysis, and visual impact mitigation planning and design. Visual mitigation planning and design shall be performed through field assessments, applied global positioning system (GPS) technology, photo documentation, use of computer-aided design and development software, three-dimensional GIS modeling software, and imaging software to depict visual simulations to reflect a full range of visual resource mitigation measures. The digital terrain mapping tools shall be at a resolution and contour interval suitable for site design and accurate placement of proposed developments into the digital viewshed. Visual simulations shall be prepared and evaluated in accordance with BLM Handbook H-8431-1 and other agency directives, to create spatially accurate and realistic depictions of the appearance of proposed facilities. Simulations shall depict proposed project facilities from key observation points (KOPs) and other visual resource sensitive locations.

VR2-10 The siting and design of solar facilities, structures, roads, and other project elements shall explore and document design considerations for repeating the

natural form, line, color, and texture of the existing landscape in accordance and compliance with the VRM class objectives.

VR2-11 The full range of visual BMPs shall be considered, and plans shall incorporate all pertinent BMPs. Visual resource monitoring and compliance strategies shall be included as a part of the project mitigation plans to cover the construction, operation, and decommissioning phases.

VR2-12 Conformance with VRM objectives shall be determined through the use of the BLM contrast rating procedures defined in BLM Handbook H-8431-1. Visual contrast rating mitigation of visual impacts shall abide by the requirements outlined in the handbook and other BLM directives. Plans for facilities determined not to be in conformance with VRM objectives either shall not be approved or shall be redesigned in order to meet the VRM objectives, and updated visual simulations shall be prepared. Revised project plans and simulations shall be reevaluated by using the contrast rating procedures and repeated until the proposed action is found to be in conformance.

VR2-13 KOPs shall be selected by first determining the extent of the viewshed by using the viewshed modeling tools previously cited. The viewshed modeling shall illustrate the areas from which the proposed facilities may be seen out to 25 mi (40 km)—line-of-sight measured from the top elevations of facilities out to 5.5 ft (1.7 m) above the ground terrain. From within the areas, KOPs would then be selected at places where people would be expected: at scenic overlooks, roads, trails, campgrounds, recreationally active river corridors, residential areas, etc. For the purpose of conducting a visual contrast rating evaluation, the number of KOPs would be reduced to those that serve as the best representations for demonstrating conformance to the respective VRM class objectives. The BLM must approve KOP selections, and the BLM reserves the right to require additional KOPs to further determine the extent of visual impact and conformance to VRM class objectives.

VR2-14 Visual design elements shall be integrated into the construction plans, details, shop drawings, and specifications through a Visual Resource Monitoring and Compliance Plan; these shall include, but not be limited to, grubbing and clearing, vegetation thinning and clearing, grading, revegetation, drainage, and structural plans. Visual design elements within the plan shall be measureable and monitored while under construction, while operational, and when decommissioned. The plan shall include monitoring and compliance elements that establish the monitoring requirements and thresholds for acceptable performance. The contrast rating procedures shall also be integrated as a field measuring compliance tool during operations and after decommissioning.

VR2-15 Project developers shall exhaust opportunities to minimize visual dominance of projects by siting projects outside the viewsheds of KOPs or by siting them as far away as possible, diminishing dominance by maximizing visible separation with distance.

VR2-16 Facility siting shall incorporate measures to minimize the profile of all facility-related structures to reduce visibility and visual dominance within the viewshed—particularly for facilities proposed within the foreground/middleground distance zone (0–5 mi [0–8 km]) of sensitive viewing locations with extended viewing opportunities and/or moving viewpoints including, but not limited to, National Scenic Byways, All-American Roads, State Scenic Byways, BLM Backcountry Byways, Special Recreation Management Areas (SRMAs), trails, residential areas, etc.

VR2-17 Siting shall take advantage of both topography and vegetation as screening or partially screening devices to interrupt and restrict the views of projects from KOPs and visually sensitive areas.

VR2-18 Locating facilities near visually prominent landscape features (e.g., knobs and waterfalls) that naturally draw an observer's attention shall be avoided.

VR2-19 Visual "skylining" shall be avoided by placing structures, transmission lines, and other facilities away from ridgelines, summits, or other locations where they would silhouette against the sky from important viewing locations. Siting shall take advantage of opportunities to use topography as a backdrop for views of facilities and structures to avoid skylining. Alternatives shall be evaluated, and the least visually intrusive option shall be selected when linear facilities (e.g. transmission lines) cross over ridgelines.

VR2-20 Siting of linear features (e.g., ROWs and roads) shall follow natural land contours rather than straight lines, particularly up slopes. Fall-line cuts shall be avoided. Following natural contours echoes the lines found in the natural landscape and often reduces cut-and-fill requirements; straight lines can introduce conspicuous linear contrasts that appear unnatural.

VR2-21 Linear developments (e.g., transmission lines, pipelines, roads) shall follow the edges of natural clearings or natural lines of transition between vegetation type, topography, etc. (where they would be less conspicuous), rather than pass through the center of clearings.

VR2-22 In visually sensitive areas, air transport capability shall be used to mobilize equipment and materials for clearing, grading, and erecting transmission towers, thereby preserving the natural landscape conditions between tower locations and reducing the need for permanent and/or temporary access roads.

VR2-23 Vegetation and ground disturbance shall be minimized, and shall take advantage of existing clearings.

VR2-24 Structures and roads shall be designed and located to minimize and balance cuts and fills. Retaining walls, binwalls, half bridges, and tunnels shall be used to reduce cut and fill.

VR2-25 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.

VR2-26 Natural or previously excavated bedrock landforms shall be sculpted and shaped when excavation of these landforms is required. Percent backslope, benches, and vertical variations shall be integrated into a final landform that repeats the natural shapes, forms, textures, and lines of the surrounding landscape. The earthen landform shall be integrated and transitioned into the excavated bedrock landform. Sculpted rock face angles, bench formations, and backslope need to adhere to the natural bedding planes of the natural bedrock geology. Half-case drill traces from pre-split blasting shall not remain evident in the final rock face. The color contrast from the excavated rock faces shall be removed by color treating with a rock stain. Native vegetation (where feasible) or a mix of native and non-native species (if necessary to ensure successful revegetation) shall be reestablished with the benches and cavities created within the created bedrock formation.

VR2-27 Where screening topography and vegetation are absent or minimal, natural-looking earthwork landforms, vegetative, or architectural screening shall be used to minimize visual impacts. The shape and height of earthwork landforms must be adapted to the surrounding landscape, and must consider the distance and viewing angle from KOPs in order to ensure that the earthworks are visually unobtrusive.

VR2-28 Openings in vegetation for facilities, structures, roads, etc., shall be feathered and shaped to repeat the size, shape, and characteristics of naturally occurring openings.

VR2-29 Topsoil from the site shall be stripped, stockpiled, and stabilized before excavating earth for facility construction.

VR2-30 All electrical collector lines and pipelines shall be buried in a manner that minimizes additional surface disturbance where feasible(e.g., along roads or other paths of surface disturbance). As feasible, these lines shall be enclosed in conduit to minimize the potential for animals to chew through the electrical lines.

VR2-31 Visual impacts associated with solar energy and electricity transmission projects shall be mitigated by choosing appropriate building and structural

materials and surface treatments (i.e., paints or coatings designed to reduce contrast and reflectivity).

VR2-32 A careful study of the site shall be performed to identify appropriate colors and textures for materials; both summer and winter appearance shall be considered, as well as seasons of peak visitor use.

VR2-33 Massing and scale of structures and the architectural character appropriate to the region where a solar facility is to be located shall be considered.

VR2-34 Architectural character considerations shall include integration of vertical and horizontal relief variation to create shadow lines that diminish the overall visual scale and dominance of facilities.

VR2-35 The choice of colors shall be based on the appearance at typical viewing distances and consider the entire landscape around the proposed development. Appropriate colors for smooth surfaces often need to be two to three shades darker than the background color to compensate for shadows that darken most textured natural surfaces. The BLM Standard Environmental Color Chart CC-001 and guidance shall be referenced when selecting colors.

VR2-36 Materials and surface treatments shall repeat and/or blend with the existing form, line, color, and texture of the landscape.

VR2-37 Appropriately colored materials shall be selected for structures, or appropriate stains/coatings shall be applied to blend with the project's backdrop.

VR2-38 Solar panel/mirror/heliostat backs/supports shall be color-treated to reduce visual contrast with the landscape setting.

VR2-39 Solar towers shall be color-treated to reduce visual contrast.

VR2-40 Materials, coatings, or paints having little or no reflectivity shall be used whenever possible.

VR2-41 Grouped structures shall be painted the same color to reduce visual complexity and color contrast.

VR2-42 Multiple color camouflage technology applications shall be considered for projects within sensitive viewsheds and with a visibility distance that is between 0.25 and 2 mi (0.40 and 3.20 km). BLM guidance on the use of color to mitigate visual impacts shall be consulted.

VR2-43 Aboveground pipelines shall be painted or coated to match their surroundings.

VR2-44 Consideration shall be given to the appropriate choice of monopoles vs. lattice towers for a given landscape setting. Monopoles may reduce visual impacts more effectively than lattice towers in foreground and midground views within built or partially built environments, while lattice towers tend to be more appropriate for less-developed rural landscapes, where the latticework would be more transparent against background textures and colors.

VR2-45 Electricity transmission/distribution projects shall utilize nonspecular conductors and nonreflective coatings on insulators.

VR2-46 The use of signs and project construction signs shall be minimized. Necessary signs shall be made of nonglare materials and utilize unobtrusive colors. The reverse sides of signs and mounts shall be painted or coated by using the most suitable color selected from the BLM Standard Environmental Color Chart to reduce color contrasts with the existing landscape; however, placement and design of any signs required by safety regulations must conform to regulatory requirements.

VR2-47 A pre-construction meeting with BLM landscape architects or other designated visual/scenic resource specialists shall be held before construction begins to coordinate the VRM mitigation strategy and confirm the compliance-checking schedule and procedures. Final design and construction documents will be reviewed for completeness with regard to the visual mitigation elements, assuring that requirements and commitments are adequately addressed. The construction documents shall include, but not be limited to, grading, drainage, revegetation, vegetation clearing and feathering plans, and they must demonstrate how VRM objectives will be met, monitored, and measured for conformance.

VR2-48 Project developers shall integrate interim/final reclamation VRM mitigation elements early in the construction process; these may include treatments, such as thinning and feathering vegetation along project edges, enhanced contour grading, salvaging landscape materials from within construction areas, special revegetation requirements, etc. Developers shall coordinate with BLM in advance to have BLM landscape architects or other designated visual/scenic resource specialists on-site during construction to work on implementing visual resource requirements and BMPs.

VR2-49 Project developers shall reduce visual impacts during construction by clearly delineating construction boundaries and minimizing areas of surface disturbance; preserving vegetation to the greatest extent possible; utilizing undulating surface disturbance edges; stripping, salvaging, and replacing

topsoil; using contoured grading; controlling erosion; using dust suppression techniques; and restoring exposed soils to their original contour and vegetation.

VR2-50 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.

VR2-51 Visual impact mitigation objectives and activities shall be discussed with equipment operators before construction activities begin.

VR2-52 Existing rocks, vegetation, and drainage patterns shall be preserved to the maximum extent possible.

VR2-53 Brush-beating, mowing, or using protective surface matting rather than removing vegetation shall be employed where feasible.

VR2-54 Slash from vegetation removal shall be mulched and spread to cover fresh soil disturbances as part of the Integrated Vegetation Management Plan. Slash piles shall not be left in sensitive viewing areas.

VR2-55 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.

VR2-56 The visual color contrast of graveled surfaces shall be reduced with approved color treatment practices.

VR2-57 Horizontal and vertical pipeline bending shall be used in place of cut-and-fill activities where feasible.

VR2-58 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.

VR2-59 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.

VR2-60 Excess fill material shall not be disposed of downslope, in order to avoid creating color contrast with existing vegetation and soils.

VR2-61 Excess cut-and-fill materials shall be hauled in or out to minimize ground disturbance and impacts from fill piles.

VR2-62 Natural or previously excavated bedrock landforms shall be sculpted and shaped when excavation of these landforms is required, and landforms shall conform to the requirements listed and further described under A.2.2.13.1, Siting and Design. Half-case drill traces from pre-split blasting shall not remain evident in the final rock face. The color contrast from the excavated rock faces shall be removed by color-treating with a rock stain. Native vegetation (where feasible) or a mix of native and non-native species (if necessary to ensure successful revegetation) shall be reestablished with the benches and cavities created within the created bedrock formation.

VR3-63 Communication and other local utility cables shall be buried where feasible.

VR2-64 Culvert ends shall be painted or coated to reduce color contrasts with the existing landscape.

VR2-65 No paint or permanent discoloring agents shall be applied to rocks or vegetation to indicate surveyor construction activity limits.

VR2-66 All stakes and flagging shall be removed from the construction area and disposed of in an approved facility.

A.2.2.13.3 Operations and Maintenance

VR3-1 Terms and conditions for VRM mitigation compliance shall be maintained and monitored for compliance with visual objectives, adaptive management adjustments, and modifications, as necessary and approved by the BLM landscape architect or other designated visual/scenic resource specialist.

VR3-2 The project developer shall maintain revegetated surfaces until a self-sustaining stand of vegetation is reestablished and visually adapted to the undisturbed surrounding vegetation. No new disturbance shall be created during operations without completion of a VRM analysis and approval by the authorized officer.

VR3-3 Interim restoration shall be undertaken during the operating life of the project as soon as possible after disturbances.

VR3-4 Maintenance activities shall include dust abatement (in arid environments) and noxious weed control.

VR3-5 Road maintenance activities shall avoid blading existing forbs and grasses in ditches and adjacent to roads.

VR3-6 Painted facilities shall be kept in good repair and repainted when the color fades or flakes.

VR3-7 Color-treated solar panel/mirror/heliostat backs/supports shall be kept in good repair and be retreated when the color fades and flakes.

VR3-8 Mirrors/heliostats shall be deployed and operated to avoid high-intensity light (glare) being reflected toward off-site ground receptors. Where off-site glare is unavoidable and project site/off-site spatial relationships favor effective results, fencing with privacy slats or similar screening materials shall be employed.

A.2.2.13.4 Reclamation and Decommissioning

VR4-1 A Decommissioning and Site Reclamation Plan, covering visual impact design features, shall be in place prior to construction, and reclamation activities shall be undertaken as soon as possible after disturbances occur and be maintained throughout the life of the project. The following decommissioning/reclamation activities/practices can partially mitigate visual impacts associated with solar energy development, where feasible.

VR4-2 Predevelopment visual conditions and the inventoried visual quality rating (A, B, C) and integrity shall be reviewed, and the visual elements of form, line, color, and texture shall be restored to predevelopment visual compatibility or to that of the surrounding landscape setting conditions, whichever achieves the better visual quality and most ecologically sound outcome.

VR4-3 A Decommissioning and Site Reclamation Plan shall be developed, approved by the BLM, and implemented. The plan shall require that all aboveground and near-ground structures be removed. Some structures shall only be removed to a level below the ground surface that will allow reclamation/ restoration. Topsoil from all decommissioning activities shall be salvaged and reapplied during final reclamation. The plan shall include provisions for monitoring and determining compliance with the project's visual mitigation and reclamation objectives.

VR4-4 Soil borrow areas, cut-and-fill slopes, berms, water bars, and other disturbed areas shall be contoured to approximate naturally occurring slopes, thereby avoiding form and line contrasts with the existing landscapes. Contouring to a rough texture would trap seeds and discourage off-road travel, thereby reducing associated visual impacts.

VR4-5 Cut slopes shall be randomly scarified and roughened to reduce texture contrasts with existing landscapes and aid in revegetation.

VR4-6 A combination of seeding, planting nursery stock, and transplanting local vegetation within the proposed disturbance areas and staging of construction enabling direct transplanting shall be considered. Where feasible, native vegetation shall be used for revegetating, to establish a composition consistent with the form, line, color, and texture of the surrounding undisturbed landscape.

VR4-7 Stockpiled topsoil shall be reapplied to disturbed areas, and the areas shall be revegetated by using a mix of native species selected for visual compatibility with existing vegetation, where applicable, or by using a mix of native and non-native species if necessary to ensure successful revegetation.

VR4-8 Gravel and other surface treatments shall be removed or buried.

VR4-9 Rocks, brush, and forest debris shall be restored whenever possible to approximate pre-existing visual conditions.

VR4-10 Edges of revegetated areas shall be feathered to reduce form and line contrasts with the existing landscapes.

VR4-11 The Visual Resource Monitoring and Compliance Plan shall be prepared by the operator and approved by the BLM that establishes the schedule and terms for monitoring during decommissioning and the conditions and methods of measurement for determining compliance.

A.2.2.14 Design Features for Noise

The following design features were identified to avoid, reduce, and/or mitigate potential impacts on acoustic environment from solar development that were identified and discussed in Sections 5.13.1 and 5.13.2 of the Draft and Final Solar PEIS.

A.2.2.14.1 General

N1-1 All equipment shall be maintained in working order in accordance with manufacturers' specifications. For example, suitable mufflers and/or air-inlet silencers shall be installed on all internal combustion engines (ICEs) and certain compressor components.

N1-2 If residences or sensitive receptors are nearby, noisy equipment, such as turbines and motors, shall be placed in enclosures.

N1-3 All vehicles traveling within and around the project area shall be operated in accordance with posted speed limits to reduce vehicle noise levels.

N1-4 Warning signs shall be posted in high-noise areas, and a hearing protection program shall be implemented for work areas with noise in excess of 85 dBA.

N1-5 Project developers shall realize that complaints about noise may still occur, even when the noise levels from the facility do not exceed regulatory levels. Accordingly, a noise complaint process and hotline for the surrounding communities shall be implemented, including documentation, investigation, evaluation, and resolution of all legitimate project-related noise complaints.

N1-6 If helicopters are used for installation of transmission lines, flights at low altitude (under 1,500 ft [457 m]) near noise-sensitive receptors shall be minimized except at locations where only helicopter activities can perform the task.

A.2.2.14.2 Site Characterization, Siting, and Design Construction

N2-1 Construction activities and construction traffic shall be scheduled to minimize disruption to nearby residents and existing operations surrounding the project areas.

N2-2 If residences or sensitive receptors are nearby, noisy construction activities shall be limited to the least noise-sensitive times of day (daytime between 7 a.m. and 7 p.m.) and weekdays. Quieter activities, such as instrumentation or interior installation, could be conducted at any time.

N2-3 Whenever feasible, different noisy activities shall be scheduled to occur at the same time, since additional sources of noise generally do not increase noise levels at the site boundary by much. That is, less-frequent but noisy activities would generally be less annoying than lower-level noise occurring more frequently.

N2-4 Noise control measures (e.g., erection of temporary wooden noise barriers) shall be implemented if noisy activities are expected near sensitive receptors.

N2-5 If noisy activities such as blasting or pile driving are required during the construction period, nearby residents shall be notified in advance.

N2-6 Project developers shall take measurements to assess the existing background ambient sound levels both within and outside the project site and compare these with the anticipated noise levels associated with the proposed facility. The ambient measurement protocols of all affected land management agencies shall be considered and utilized. Nearby residences and likely sensitive human and wildlife receptor locations shall be identified at this time.

N2-7 Siting of stationary construction equipment (e.g., compressors and generators) shall be far from nearby residences and other sensitive receptors.

N2-8 Permanent sound-generating facilities (e.g., compressors, pumps) shall be sited away from residences and other sensitive receptors. In areas of known conflicts, acoustic screening will be required.

N2-9 Where feasible, low-noise systems (e.g., for ventilation systems, pumps, generators, compressors, and fans) shall be incorporated, and equipment that has no prominent discrete tones shall be selected.

N2-10 If a wet cooling tower is to be used, the louvered side shall be sited to face away from sensitive receptors. The cooling tower shall be located in such a manner that nearby equipment can act as a barrier and further reduce noise. Quieter fans shall be selected in the facility design, and fans operated at a lower speed, particularly if they are to operate at night. If a high degree of reduction in noise is required, silencers shall be used on the fan stacks.

N2-11 Noise reduction measures that shall be considered include siting noise sources to take advantage of topography and distance and constructing engineered sound barriers and/or berms or sound-insulated buildings, if needed, to reduce potential noise impacts at the locations of nearby sensitive receptors. As an alternative, solar facilities generating higher operational noise (e.g., a solar dish engine facility) could take advantage of higher background noise. For example, they could be sited within an existing noisy area, such as close to a well-traveled highway, where the ambient sounds partially mask the noise from the facility.

A.2.2.14.3 Operations and Maintenance

N3-1 Noise levels from cooling systems equipped with TES should be managed so that levels at the nearest residences and specially designated areas near the facility boundary are kept within applicable guidelines. This could be accomplished in several ways, for example, through placing the power block far from residences, limiting operations to a few hours after sunset, and/or installing fan silencers. Section 5.13.2.1 discusses noise impacts from TES systems.

N3-2 Dish engine facilities shall be managed so that noise levels at the nearest residences and specially designated areas near the facility boundary are kept within applicable guidelines. This could be accomplished in several ways, for example, through placing dish engines far from nearby residences, or through direct noise control engineering applied to individual dish engine systems or components. Section 5.13.2.2 discusses noise impacts from dish engine facilities.

N3-3 If a noise from a transformer becomes an issue, a new transformer with reduced flux density, which generates noise levels as much as 10 to 20 dB lower than National Electrical Manufacturers Association (NEMA) standard values, shall be installed. Alternatively, barrier walls, partial enclosures, or full enclosures shall be adopted to shield or contain the transformer noise, depending on the degree of noise control needed.

A.2.2.14.4 Reclamation and Decommissioning

N4-1 Decommissioning activities shall be scheduled to minimize disruption to nearby residents and existing operations surrounding the project areas. Impacts from decommissioning are discussed in Section 5.13.1.4.

N4-2 If residences or sensitive receptors are nearby, noisy decommissioning activities shall be limited to the least noise-sensitive times of day (daytime between 7 a.m. and 7 p.m.) and weekdays. Quieter activities, such as instrumentation or interior installation, could be conducted at any time.

N4-3 If noisy activities such as blasting are required during the decommissioning period nearby residents shall be notified in advance.

A.2.2.15 Design Features for Paleontological Resources

The following design features were identified to avoid, reduce, and/or mitigate potential impacts on paleontological resources from solar development that were identified and discussed in Sections 5.14.1 and 5.14.2 of the Draft and Final Solar PEIS.

A.2.2.15.1 General

P1-1 Coordination between the project developer and the BLM shall be required for all projects before areas are developed. The use of management practices, such as training/education programs to reduce the amount of inadvertent destruction to paleontological sites (see P1-4 below), could reduce the occurrences of human-related disturbances to nearby sites. The specifics of these management practices shall be established in project-specific coordination between the project developer and the BLM. BLM IM 2009-011 provides guidance for assessing potential impacts on paleontological resources and determining mitigation measures.

P1-2 Project developers shall determine in coordination with the BLM whether paleontological resources exist in a project area on the basis of the following: the sedimentary context of the area and its potential to contain paleontological resources (potential fossil yield classification [PFYC] class, if it is available); a records search of published and unpublished literature for

past paleontological finds in the area; coordination with paleontological researchers working locally in potentially affected geographic areas and geologic strata; and/or depending on the extent of existing information, the completion of a paleontological survey.

P1-3 If paleontological resources are present at the site or if areas with a high potential to contain paleontological material have been identified, a Paleontological Resources Management Plan shall be developed. This shall include a mitigation plan; mitigation may include avoidance, removal of fossils (data recovery), stabilization, monitoring, use of protective barriers and signs, or use of other physical or administrative protection measures. The Paleontological Resources Management Plan shall also identify measures to prevent potential looting/vandalism or erosion impacts and address the education of workers and the public to make them aware of the consequences of unauthorized collection of fossils on public land.

P1-4 Key elements to mitigate the impacts to paleontological resources shall be incorporated into a Worker Education and Awareness Plan (WEAP) that is provided to all project personnel prior to entering the project work site. The WEAP shall be provided on a regular basis, covering multiple resources, to ensure the awareness of key mitigation efforts for paleontological resources of the project work site during all phases of the project's life. The base information the WEAP provides shall be reviewed and approved by BLM prior to the issuance of a Notice to Proceed and incorporate adaptive management protocols for addressing changes over the life of the project, should they occur.

A.2.2.15.2 Site Characterization, Siting, and Design Construction

P2-1 If an area has a high potential for fossils but no fossils are observed during a survey if completed, monitoring by a qualified paleontologist may be required by the BLM during all excavation and earthmoving activities in the sensitive area. Development of a Paleontological Resources Monitoring Plan is will be required and approvable by BLM prior to a Notice to Proceed.

P2-2 If fossils are discovered during construction, the BLM shall be notified immediately. Work shall be halted at the fossil site and continued elsewhere until a qualified paleontologist can visit the site, determine the significance of the find, and, if significant, make site-specific recommendations for collection or other resource protection. The area of the discovery shall be protected to ensure that the fossils are not removed, handled, altered, or damaged until the site is properly evaluated and further action determined.

A.2.2.16 Design Features for Cultural Resources

The following design features were identified to avoid, reduce, and/or mitigate potential impacts on cultural resources from solar development that were identified and discussed in Sections 5.15.1 and 5.15.2 of the Draft and Final Solar PEIS.

A.2.2.16.1 General

CR1-1 Section 106 consultations between the BLM and SHPOs, appropriate Tribes, and other consulting parties shall be required beginning early in the planning process. Thresholds for the involvement of and review by the Advisory Council on Historic Preservation (ACHP) include nonroutine interstate and/or interagency programs; undertakings directly and adversely affecting National Historic Landmarks or National Register eligible properties of national significance; and/or highly controversial undertakings when ACHP review is requested by the BLM, SHPO, Indian Tribe, local government, or applicant for a BLM authorization. Ongoing Tribal consultation, in accordance with the NHPA, would help in determining areas of sensitivity, appropriate survey and mitigation needs, and other issues of concern (such as access rights or disruption of cultural practices) and taking those concerns into consideration during project development. The following describes the process that the BLM follows to address impacts on historic properties for individual projects.

CR1-2 Site-specific NEPA analyses and a Section 106 review shall be conducted on individual projects. The BLM will require the completion of comprehensive identification (e.g., field inventory), evaluation, protection, and mitigation following the policies and procedures contained in the BLM National Programmatic Agreement (PA), as amended in 2012, and under state protocols.[4] If significant cultural resources are present at the project location or if there is a high potential for the project area to contain significant cultural resources that could be adversely affected, a formalized agreement may be required to address management and mitigation options (e.g., avoidance, data recovery, monitoring, preventative measures for looting/vandalism and erosion, and worker education) in the form of various planning documents (e.g., Cultural Resources Management and Mitigation Plan (including specifications for data recovery), Historic Properties Treatment Plan, etc.). The agreement shall be developed in consultation with the SHPO, appropriate federally recognized Tribes, and any consulting parties. Also, the BLM will continue to implement government-to-government consultation with Tribes and state and local governments on a case-by-case basis.

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

CR1-3 The use of management practices, such as training/education programs for workers and the public see also CR1-6), shall be implemented to reduce occurrences of human-related disturbances to nearby cultural sites. The specifics of these management practices shall be established in project-specific consultations between the applicant and the BLM as well as with the SHPO and Tribes, as appropriate.

CR1-4 The unexpected discovery of cultural resources during any phase of development (construction, operations and maintenance, and decommissioning) shall be brought to the attention of the responsible BLM authorized officer immediately. Work shall be halted in the vicinity of the find. The area of the find shall be protected to ensure that resources are not removed, handled, altered, or damaged while they are being evaluated and to ensure that appropriate mitigation measures are being developed.

CR1-5 The BLM will consult with the appropriate SHPOs, the ACHP, and/or affected Native American governments and notify the public early in the planning process to identify issues and areas of concern regarding any proposed solar energy project. Such consultation is required by the NHPA and other authorities.

CR1-6 Key elements to mitigate the impacts to cultural resources shall be incorporated into a Worker Education and Awareness Plan (WEAP) that is provided to all project personnel prior to entering the project work site. The WEAP shall be provided on a regular basis, covering multiple resources, to ensure the awareness of key cultural resource mitigation efforts at the project work site during all phases of the projects life. The base information the WEAP provides shall be reviewed and approved by BLM prior to the issuance of a Notice to Proceed and incorporate adaptive management protocols for addressing changes over the life of the project, should they occur.

CR1-7 The BLM will require a Performance and Reclamation bond for all solar energy projects. This will ensure compliance with the terms and conditions of the ROW authorization. When establishing bond amounts and conditions, the BLM authorized officer will require coverage of personnel and contracting expenses tied to cultural resources identification, protection, and mitigation of effects. These may include, but are not limited to, ethnographic studies, inventory, testing, geomorphological studies, data recovery, curation, monitoring, treatment of damaged sites, and submission of reports (see ROW authorization policies, Section 2.2.2.1).

A.2.2.16.2 Site Characterization, Siting, and Design Construction

CR2-1 The use of previously disturbed lands, rather than pristine lands, shall be encouraged.

CR2-2 Project developers shall conduct a records search of published and unpublished literature for past cultural resource finds in the area; coordinate with researchers working locally in the area; and, depending on the extent of existing information, develop a survey design in coordination with the BLM and SHPO and complete a Class III cultural resources inventory. The inventory shall be conducted according to the standards set forth in the Secretary of Interior's *Standards and Guidelines for Archaeology and Historic Preservation* (48 FR 44716); BLM Handbook H-8110: *Guidelines for Identifying Cultural Resources*, and revised BLM Manual 8110; and applicable state-specific BLM or SHPO survey, site record, or reporting standards. All inventory data must be provided to the BLM in digitized format that meets the BLM accuracy standards, including shape files for surveyed areas.

CR2-3 When archaeological sites are unlikely to be exposed on the surface due to geological conditions, the BLM may require geomorphological testing to discover buried cultural deposits. Such techniques may include augering, trenching, or other discovery techniques needed to identify cultural deposits in a buried context.

CR2-4 A phased sampling strategy, beginning with a Class II inventory to assess various alternative development areas, is recommended prior to the selection of individual project locations. The Class II inventory shall meet the standards set forth in the Secretary of Interior's *Standards and Guidelines for Archaeology and Historic Preservation*, BLM Handbook H-8110, and revised BLM Manual 8110; and applicable state-specific BLM or SHPO survey, site record, or reporting standards.

CR2-5 If significant or National Register of Historic Places (NRHP)-eligible cultural resources are present at the site and would be adversely affected, or if areas with a high potential to contain additional cultural material have been identified, a formalized agreement will be required to address management and mitigation options in the form of various planning documents (e.g., Cultural Resources Management and Mitigation Plan (including specifications for data recovery), Historic Properties Treatment Plan, etc.). The agreement shall be developed in consultation with the SHPO, appropriate federally recognized Tribes, and any consulting parties. The agreement also shall identify measures to prevent potential looting/vandalism or erosion impacts and address the education of workers and the public to make them aware of the consequences of unauthorized collection of cultural resources on public land.

CR2-6 To protect historic properties, sacred sites, and portions of historic trails that are potentially eligible for listing on the NRHP from visual intrusion and to maintain the integrity of the historic cultural setting, the BLM could require that surface disturbance be restricted or prohibited within the viewshed of a historic property, sacred site, or trail segment for which eligibility is tied to the visual setting. These types of adverse effects will be minimized, avoided, or mitigated through the Section 106 consultation process.

CR2-7 In cases where there is a probability of encountering cultural resources during construction that could not be fully detected during a Class III inventory, cultural field monitors (appropriate for the resource anticipated) shall be employed to monitor ground-disturbing activities. Development of a monitoring plan as part of the Cultural Resources Management and Mitigation Plan is recommended.

A.2.2.16.3 Reclamation and Decommissioning

CR3-1 Any soil-disturbing reclamation and decommissioning activities will be confined to previously disturbed areas. Known historic properties will be avoided during these activities.

CR3-2 Any building or structure that will be demolished or substantially altered will be evaluated for its historic significance in consultation with the BLM and the SHPO. If structures are found to be eligible for listing on the NRHP they will be recorded to appropriate HABS/HAER standards before demolition or alteration.

CR3-3 Prior to reclamation activities, BLM may require an update to the Cultural Resources Management and Mitigation Plan addressing reclamation activities.

A.2.2.17 Design Features for Native American Concerns

The following design features were identified to avoid, reduce, and/or mitigate potential impacts in areas of Native American Concern from solar development identified and discussed in Sections 5.16.1 and 5.16.2 of the Draft and Final Solar PEIS.

A.2.2.17.1 General

NA1-1 The BLM shall consult with Native American governments early in the planning process to identify issues and areas of concern regarding any proposed solar energy project. Such consultation is required by the NHPA and other authorities and is necessary to determine whether construction and

operation of the project are likely to disturb Tribally sensitive resources, impede access to culturally important locations, disrupt traditional cultural practices, affect movements of animals important to Tribes, or visually affect culturally important landscapes. It may be possible to negotiate a mutually acceptable means of minimizing adverse effects to resources important to Tribes. The process shall be documented in a Native American Consultation Plan that would address consultation during both planning and construction, and also any necessary monitoring/education during operations and decommissioning.

NA1-2 The significance of any Native American archaeological or other culturally important sites identified in archaeological inventories in project areas shall be determined and validated through consultation with appropriate Native American governments and cultural authorities. Appropriate mitigation steps, such as avoidance, removal, repatriation of Native American human remains and associated items of cultural patrimony, or curation, shall be determined during this consultation.

NA1-3 Visual intrusion on sacred areas shall be avoided to the extent practical through the selection of the solar facility location and solar technology. When avoidance is not possible, timely and meaningful consultation with the affected Tribe(s) shall be conducted to formulate a mutually acceptable plan to mitigate or reduce the adverse effect.

NA1-4 Tribal burial sites shall be avoided. An Unanticipated Burial Contingency Plan for encountering unanticipated burials and funerary goods during construction, maintenance, or operation of a solar facility shall be developed as part of a formalized agreement to address management and mitigation options for significant cultural resources in consultation with the appropriate Tribal governments and cultural authorities well in advance of any ground disturbances. The contingency plan shall include consultation with the lineal descendants or Tribal affiliates of the deceased, and human remains and objects of cultural patrimony shall be protected and repatriated according to NAGPRA statutory procedures and regulations.

NA1-5 Springs and other water sources that are or may be sacred or culturally important shall be avoided whenever possible. If it is necessary for construction, maintenance, or operational activities to take place in proximity to springs or other water sources, appropriate measures, such as the use of geotextiles or silt fencing, shall be taken to prevent silt from degrading water sources. The effectiveness of these mitigating barriers shall be monitored. Measures for preventing water depletion impacts on springs shall also be employed. Particular mitigations shall be determined in consultation with the appropriate Native American Tribe(s).

NA1-6 Culturally important plant species shall be avoided when possible. When it is not possible to avoid these plant resources, consultations shall be undertaken with the affected Tribe(s). If the species is available elsewhere on agency-managed lands, guaranteeing access may suffice. For rare or less common species, establishing (transplanting) an equal amount of the plant resource elsewhere on agency-managed land accessible to the affected Tribe may be acceptable.

NA1-7 Culturally important wildlife species and their habitats shall be avoided. When it is not possible to avoid these habitats, solar facilities shall be designed to minimize impacts on game trails, migration routes, and nesting and breeding areas of Tribally important species. Mitigation and monitoring procedures shall be developed in consultation with the affected Tribe(s).

NA1-8 Archaeological sites created by ancestral Native American populations shall be avoided whenever possible. However, when archaeological excavations are necessary, affiliated Tribe(s) shall be consulted, and the concerns of the affected descendant Native American population shall be taken into account when developing a data recovery strategy. Possible mitigations include scientific excavation; monitoring or participation in excavations by Tribal representatives; and repatriation or approved curation of artifacts.

NA1-9 Rock art (panels of petroglyphs and/or pictographs) shall be avoided whenever possible. These panels may be just one component of a larger sacred landscape, in which avoidance of all impacts may not be possible. Mitigation plans for eliminating or reducing (minimizing) potential impacts on rock art shall be formulated in consultation with the appropriate Tribal cultural authorities.

NA1-10 Standard noise design features shall be employed when solar facilities would be located near sacred sites to minimize the impacts of noise on culturally significant areas.

NA1-11 Health and safety design features for the general public shall be employed when solar facilities are located near Native American traditional use areas in order to minimize potential health and safety impacts on Native Americans.

NA1-12 The BLM will require a Performance and Reclamation bond for all solar energy projects. This will ensure compliance with the terms and conditions of the ROW authorization. When establishing bond amounts and conditions, the BLM authorized officer will require coverage of all expenses tied to cultural resources identification, protection, and mitigation of effects. These may include, but are not limited to, costs for ethnographic studies, inventory, testing, geomorphological studies, data recovery, compensatory mitigation programs, curation, monitoring, treatment of damaged sites, and submission of reports (see ROW authorization policies, Section 2.2.2.1).

A.2.2.17.2 Site Characterization, Siting, and Design Construction

NA2-1 Prior to construction, training shall be provided to contractor personnel whose activities or responsibilities could affect resources of significance to Native Americans during construction.

NA2-2 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.2.2.17.3 Operations and Maintenance

NA3-1 Communication with affected federally recognized tribes will be maintained during the life of the project.

NA3-2 Facility personnel will be trained in their responsibilities to protect any known tribally important resources.

A.2.2.17.4 Reclamation and Decommissioning

NA4-1 Reclamation and decommissioning activities will be confined to previously disturbed areas and existing access roads.

NA4-2 To the extent practicable, reclamation activities will return the site to its pre-construction condition.

A.2.2.18 Design Features for Socioeconomic Impacts

The following design features were identified to avoid, reduce, and/or mitigate potential socioeconomic impacts from solar development identified and discussed in Sections 5.17.1 and 5.17.2 of the Draft and Final Solar PEIS.

A.2.2.18.1 General

S1-1 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.

S1-2 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.

S1-3 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 developers to enter into mitigation agreements with individual local jurisdictions and county agencies, as necessary, to address local issues. Also, project developers shall work with state, local, and Tribal agencies to develop community outreach programs that would help communities adjust to changes triggered by solar energy development. Such programs could include any of the following activities:

- Establishing vocational training programs for the local workforce to promote development of skills required by the solar energy industry.

- Developing instructional materials for use in area schools to educate the local communities on the solar energy industry.

- Supporting community health screenings.

- Providing financial support to local libraries for the development of information repositories on solar energy, including materials on the hazards and benefits of commercial development. Electronic repositories established by the operators could also be of great value.

A.2.2.18.2 Site Characterization, Siting, and Design Construction

S2-1 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.

A.2.2.19 Design Features for Environmental Justice Impacts

The following design features were identified to avoid, reduce, and/or mitigate potential environmental justice impacts from solar development identified and discussed in Sections 5.18.1 and 5.18.2 of the Draft and Final Solar PEIS.

A.2.2.19.1 General

EJ1-1 For projects that might cause environmental justice impacts, an Environmental Justice Plan shall be developed to mitigate the potential environmental, economic, cultural, and health impacts on low-income and minority populations.

EJ1-2 Focused public information campaigns shall be developed and implemented where applicable to provide technical and environmental health information directly to low-income and minority groups or to local agencies and representative groups. Key information would include the extent of any likely impact on air quality, drinking water supplies, subsistence resources, public services, and the relevant preventative measures that may be taken.

EJ1-3 Community health screenings shall be provided for low-income and minority groups where applicable.

EJ1-4 Financial support to local libraries in low-income and minority communities shall be provided for the development of information repositories on solar energy, including materials on the hazards and benefits of commercial development.

EJ1-5 Vocational training programs for the local low-income and minority workforce shall be established to promote development of skills required by the solar energy industry.

EJ1-6 Instructional materials shall be developed for use in area schools to educate the local communities on the solar energy industry.

EJ1-7 Key information shall 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

The following design features were identified to avoid, reduce, and/or mitigate potential transportation impacts from solar development identified and discussed in Sections 5.19.1 and 5.19.2 of the Draft and Final Solar PEIS.

A.2.2.20.1 General

T1-1 Incorporation of site access into the local and regional road network must be done under the supervision of local, county, state, and federal agencies with jurisdiction over relevant matters such as road maintenance and repair, road improvements, requirements for and construction of new roads if necessary, and traffic management. Dependent on the agencies with jurisdiction and the actual site location and existing roads and traffic patterns, approval of any site access proposal could require traffic studies, analyses of existing and proposed new roads to physically handle the added wear and tear from increased construction commuter and truck traffic, and possibly other environmental studies.

A.2.2.20.2 Site Characterization, Siting, and Design Construction

T2-1 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.

T2-2 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.

T2-3 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

The following design features were identified to avoid, reduce, and/or mitigate potential hazardous materials and waste impacts from solar development identified and discussed in Sections 5.20.1 and 5.20.2 of the Draft and Final Solar PEIS.

A.2.2.21.1 General

HMW1-1 A Hazardous Materials and Waste Management Plan shall address the selection, transport, storage, and use of all hazardous materials needed for construction, operation, and decommissioning of the facility for local emergency response and public safety authorities and for the designated BLM land manager, and it shall address the characterization, on-site storage, recycling, and disposal of all resulting wastes.[5] The plan shall, at a minimum, include the following: facility identification; comprehensive hazardous materials inventory; Material Safety Data Sheets (MSDSs) for each type of hazardous material; emergency contacts and mutual aid agreements, if any; site map showing all hazardous materials and waste storage and use locations; copies of spill and emergency response plans (see below), and hazardous materials-related elements of a decommissioning/closure plan.

HMW1-2 A Construction and Operation Waste Management Plan shall identify the waste streams that are expected to be generated at the site and address hazardous waste determination procedures, waste storage locations, waste-specific management and disposal requirements, inspection procedures, and waste minimization procedures. The plan shall address all solid and liquid wastes that may be generated at the site in compliance with the CWA requirements to obtain the project's NPDES permit.

HMW1-3 A Fire Management and Protection Plan shall be developed to implement measures to minimize the potential for fires associated with substances used and stored at the site. The flammability of the specific HTF used at the facility shall be considered.

HMW1-4 If pesticides/herbicides are to be used on the site, a Nuisance Animal and Pest Control Plan and an Integrated Vegetation Management Plan shall be developed to ensure that applications will be conducted within the framework of BLM policies and will entail the use of only EPA-registered pesticides/herbicides that are nonpersistent and immobile and approved by the BLM land manager.

HMW1-5 A comprehensive Spill Prevention and Emergency Response Plan shall be developed for the facility, and it shall meet the following criteria. It will be written, periodically updated, and made available to the entire workforce; contain procedures for timely notification of appropriate authorities, including the designated BLM land manager; provide spill/emergency contingency planning for each type of hazardous material present, including the abatement or stabilizing of the release, recovery of the spilled product, and remediation of the impacted environmental media; be supported by the

[5] 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.

strategic deployment of appropriate spill response materials and equipment, including personal protective equipment (PPE) for individuals with spill or emergency response assignments; provide for prompt response to spills and timely delivery of recovered spill materials and contaminated environmental media to appropriately permitted off-site treatment or disposal facilities; formally assign spill and emergency response duties to specified individuals; provide general awareness training to remaining facility personnel; and provide for written documentation of each event, including root cause analysis, description of corrective actions taken, and characterization of the resulting environmental or health and safety impacts.

HM1-6 All site characterization, construction, operation, and decommissioning activities shall be conducted in compliance with applicable federal and state laws and regulations, including the Toxic Substances Control Act of 1976, as amended (15 USC 2601, et seq.). In addition, any release of toxic substances (leaks, spills, etc.) in excess of the reportable quantity established by 40 CFR Part 117 shall be reported as required by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, Section 102b. A copy of any report required or requested by any federal agency or state government as a result of a reportable release or spill of any toxic substances shall be furnished to the authorized officer concurrent with the filing of the reports to the involved federal agency or state government. In addition, the United States shall be indemnified against any liability arising from the release of any hazardous substance or hazardous waste on the facility or associated with facility activities.

HMW1-7 Pollution prevention opportunities shall be identified and implemented, including material substitution of less hazardous alternatives, recycling, and waste minimization.

HMW1-8 Systems containing hazardous materials shall be designed and operated in a manner that limits the potential for their release; measures shall include construction of compatible materials in safe condition (as verified by periodic inspections); provision of secondary containment features (to the extent practical); installation of sensors or other devices to monitor system integrity; installation of strategically placed valves to isolate damaged portions and limit the amount of hazardous materials in jeopardy of release; and use of robust inspection and repair procedures.

HMW1-9 Dedicated areas with secondary containment shall be established for off-loading hazardous materials transport vehicles.

HMW1-10 To the greatest extent practical and by considering the remoteness of a given facility, “just-in-time” ordering procedures shall be employed that are designed to limit the amounts of hazardous materials present on the site to

quantities minimally necessary to support continued operations. Excess hazardous materials shall receive prompt disposition.

HMW1-11 Written procedures for the storage, use, and transportation of each type of hazardous material present shall be provided, including all vehicle and equipment fuels.

HMW1-12 Authorized users for each type of hazardous material shall be identified.

HMW1-13 Procedures shall be established for fuel storage and dispensing, including shutting off vehicle (equipment) engines; using only authorized hoses, pumps, and other equipment in working order; maintaining appropriate fire and spill response materials at equipment fueling stations; providing emergency shutoffs for fuel pumps; ensuring that fueling stations are paved; ensuring that both aboveground fuel tanks and fueling both have adequate secondary containment; prohibiting smoking, welding, or open flames in fuel storage and dispensing areas; equipping the area with fire suppression devices, as appropriate; conducting routine inspections of fuel storage and dispensing areas; requiring prompt recovery and remediation of all spills; and providing for the prompt removal of all fuel and fuel tanks used to support construction vehicles and equipment at the completion of facility construction and decommissioning phases.

HMW1-14 All vehicles and equipment shall be in proper working condition to ensure that there is no potential for leaks of motor oil, antifreeze, hydraulic fluid, grease, or other hazardous materials.

HMW1-15 Written procedures shall be established for inspecting hazardous materials and waste storage areas and for plant systems containing hazardous materials; identified deficiencies and their resolution shall be documented.

HMW1-16 Schedules shall be established for the regular removal of wastes (including sanitary wastewater generated in temporary, portable sanitary facilities) for delivery by licensed haulers to appropriate off-site treatment or disposal facilities.

A.2.2.21.2 Site Characterization, Siting, and Design Construction

HMW2-1 Project developers shall survey project sites for unexploded ordnance, especially if projects are within 20 mi (32 km) of a current DoD installation or formally used defense site.

HMW2-2 Refueling areas shall be located away from surface water locations and drainages and on paved surfaces; features shall be added to direct spilled

materials to sumps or safe storage areas where they can be subsequently recovered.

HMW2-3 Hazardous materials and waste storage areas or facilities shall be formally designated and access to them restricted to authorized personnel. Construction debris, especially treated wood, shall not be disposed of or stored in areas where it could come in contact with aquatic habitats.

HMW2-4 Design requirements shall be established for hazardous materials and waste storage areas that are consistent with accepted industry practices as well as applicable federal, state, and local regulations and that include, at a minimum, (1) containers constructed of compatible materials, properly labeled, and in good condition; (2) secondary containment features for liquid hazardous materials and wastes; (3) physical separation of incompatible chemicals; and (4) fire-fighting capabilities when warranted.

A.2.2.21.3 Operations and Maintenance

HMW3-1 Hazardous materials and waste storage areas or facilities shall be formally designated and access to them restricted to authorized personnel.

A.2.2.21.4 Reclamation and Decommissioning

HMW4-1 During facility decommissioning, the following shall occur: Emergency response capabilities shall be maintained throughout the decommissioning period as long as hazardous materials and wastes remain on-site, and emergency response planning shall be extended to any temporary material and equipment storage areas that may have been established. Temporary waste storage areas shall be properly designated, designed, and equipped. Hazardous materials removed from systems shall be properly containerized and characterized, and recycling options shall be identified and pursued. Off-site transportation of recovered hazardous materials and wastes resulting from decommissioning activities shall be conducted by authorized carriers. All hazardous materials and waste shall be removed from on-site storage and management areas (including surface impoundments), and the areas shall be surveyed for contamination and remediated as necessary.

A.2.2.22 Design Features to Ensure Health and Safety

The following design features were identified to avoid, reduce, and/or mitigate potential health and safety impacts from solar development identified and discussed in Sections 5.21.1 and 5.22.2 of the Draft and Final Solar PEIS.

A.2.2.22.1 General

HS1-1 All site characterization, construction, operation, and decommissioning activities shall be conducted in compliance with applicable federal and state occupational safety and health standards (e.g., the Occupational Health and Safety Administration's [OSHA's] Occupational Health and Safety Standards, 29 CFR Parts 1910 and 1926, respectively).

HS1-2 A safety assessment shall be conducted to describe potential safety issues and the means that would be taken to mitigate them, covering issues such as site access; construction; safe work practices; glare exposure from mirrors, heliostats, and/or power towers; security; heavy equipment transportation; traffic management; emergency procedures; and fire control.

HS1-3 A health and safety program shall be developed to protect workers during site characterization, construction, operation, and decommissioning of a solar energy project. The program shall identify all applicable federal and state occupational safety standards and establish safe work practices addressing all hazards, including requirements for developing the following plans: general injury prevention; PPE requirements and training; respiratory protection; hearing conservation; electrical safety; hazardous materials safety and communication; housekeeping and material handling; confined space entry; hand and portable power tool use; gas-filled equipment use; and rescue response and emergency medical support, including on-site first aid capability.

HS1-4 In addition, the health and safety program shall address OSHA standard practices for the safe use of explosives and blasting agents (e.g., if used to construct foundations for power tower facilities); measures for reducing occupational electric and magnetic field (EMF) exposures; the establishment of fire safety evacuation procedures; and required safety performance standards (e.g., electrical system standards and lighting protection standards). The program shall include training requirements for applicable tasks for workers and establish procedures for providing required training to all workers. Documentation of training and a mechanism for reporting serious accidents to appropriate agencies shall be established.

HS1-5 A health risk assessment shall evaluate potential cancer and noncancer risks to workers from exposure to facility emission sources during construction and operations. If potential risks are found to exceed applicable threshold levels, measures shall be taken to decrease emissions from the source.

HS1-6 In the event of an accidental release of hazardous substances to the environment, project developers shall document the event, including a root cause analysis, a description of appropriate corrective actions taken, and a characterization of the resulting environmental or health and safety impacts.

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

HS1-7 The project health and safety program shall address protection of public health and safety during site characterization, construction, operation, and decommissioning for a solar energy project. The program shall establish a safety zone or setback for solar facilities and associated transmission lines from residences and occupied buildings, roads, ROWs, and other public access areas that is sufficient to prevent accidents resulting from various hazards during all phases of development. It shall identify requirements for temporary fencing around staging areas, storage yards, and excavations during construction or decommissioning activities. It shall also identify measures to be taken during the operations phase to limit public access to facilities (e.g., equipment with access doors shall be locked to limit public access, and permanent fencing with slats shall be installed around electrical substations).

HS1-8 A Traffic Management Plan shall be prepared for the site access roads to control hazards that could result from increased truck traffic (most likely during construction or decommissioning), to ensure that traffic flow would not be adversely affected and that specific issues of concern (e.g., the locations of school bus routes and stops) are identified and addressed. This plan shall incorporate measures, such as informational signs, flaggers (when equipment may result in blocked throughways), and traffic cones to identify any necessary changes in temporary lane configurations. The plan shall be developed in coordination with local planning authorities.

HS1-9 Solar facilities shall be sited and designed properly to eliminate glint and glare effects on roadway users, nearby residences, commercial areas, or other highly sensitive viewing locations or to reduce it to the lowest achievable levels (see similar design feature under Section A.2.2.13). Regardless of the solar technology proposed, a Glint and Glare Assessment, Mitigation, and Monitoring Plan must accurately assess and quantify potential glint and glare effects and determine potential health, safety, and visual impacts associated with glint and glare effects. The assessment shall be conducted by qualified individuals using appropriate and commonly accepted software and procedures. The assessment results must be made available to BLM in advance of project approval. If the project design is changed during the siting and design process such that substantial changes to glint and glare effects may occur, glint and glare effects shall be recalculated, and the results shall be made available to BLM. If any potential for exposure at levels that could cause retinal damage is identified, measures to eliminate the exposure shall be implemented (e.g., slatted fencing to shield views from outside the facility). The Plan shall also set up a system for logging, investigating, and responding to complaints regarding glare.

HS1-10 A health risk assessment shall evaluate potential cancer and noncancer risks to the general public from exposure to facility emission sources during construction and operations. If potential risks are found to exceed applicable threshold levels, measures shall be taken to decrease emissions from the source.

HS1-11 Proper signage and/or engineered barriers (e.g., fencing) shall be used to limit access to electrically energized equipment and conductors in order to prevent access to electrical hazards by unauthorized individuals or wildlife.

HS1-12 Operators shall develop a Fire Management and Protection Plan to implement measures to minimize the potential for a human-caused fire and to respond to human-caused or natural-caused fires.

HS1-13 Project developers shall work with appropriate agencies (e.g., the U.S. Department of Energy [DOE] and Transportation Security Administration [TSA]) to address critical infrastructure and key resource vulnerabilities at solar facilities in order to minimize and plan for potential risks from natural events, sabotage, and terrorism.

A.2.2.22.2 Site Characterization, Siting, and Design Construction

HS2-1 Electrical systems shall be designed to meet all applicable safety standards (e.g., National Electrical Code [NEC]) and comply with the interconnection requirements of the transmission system operator.

HS2-2 For the mitigation of explosive hazards, workers shall be required to comply with the OSHA standard (29 CFR 1910.109) for the safe use of explosives and blasting agents.

HS2-3 Because of the high global warming potential of sulfur hexafluoride (SF_6), the use of alternative dielectric fluids that do not have a high global warming potential shall be required.

HS2-4 If operation of the solar facility and associated transmission lines and substations is expected to cause potential adverse impacts on nearby residences and occupied buildings from noise, sun reflection, or EMF, recommendations for addressing these concerns shall be incorporated into the project design (e.g., establishing a sufficient setback from transmission lines).

HS2-5 The project shall be planned to comply with FAA regulations, including lighting requirements, and to avoid potential safety issues associated with proximity to airports, military bases or training areas, or landing strips.

A.2.2.22.3 Operations and Maintenance

HS3-1 Measures shall be considered to reduce occupational EMF exposures, such as backing electrical generators with iron to block the EMF, shutting down generators when work is being done near them, and otherwise limiting exposure time and proximity while generators are running.

A.2.2.23 Reference

USFWS (U.S. Fish and Wildlife Service), 2008, *Finding of No Significant Impact, Implementation of a Desert Tortoise Recovery Plan Task: Reduce Common Raven Predation on the Desert Tortoise*, March 14. Available at http://www.dmg.gov/documents/FONSI_Reduce_Common_Raven_Pred_on_the_DT_USFWS_040208.pdf. Accessed March 27, 2012.