4.1 ALTERNATIVES

SES Solar Two, LLC (Solar Two or Applicant) is seeking regulatory approval from both the California Energy Commission (CEC) and the Bureau of Land Management (BLM) California Desert District. Consequently, this alternatives analysis was prepared to meet the requirements of California Environmental Quality Act (CEQA) and includes elements that will assist the BLM with preparation of an independent analysis required by the National Environmental Policy Act of 1969 (NEPA).

Solar Two proposes to construct and operate the Solar Two Project and its ancillary systems (Project). The Project is located approximately 14 miles west of El Centro, California, between Interstate 8 and Evan Hewes Highway. This region of Imperial County is primarily undeveloped desert land that lies to the west of the Westside Main Canal.

CEQA and NEPA both require an applicant to address the implications of taking "No Action" or the "No Project Alternative." The analysis provided in this section reflects existing environmental conditions at the Project Site and in the region, and serves as a basis for comparing the Project proposed by the Applicant with other project and site alternatives.

Title 20 of the California Code of Regulations (CCR) requires an applicant to consider:

> "the range of reasonable alternatives to the project, including the No Action Alternative, that would feasibly achieve most of the basic objectives of the project, but would avoid or substantially lessen any of the significant impacts of the project, and an evaluation of the comparative merits of the alternatives."

CEQA also requires consideration of:

> "a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant impacts of the project, and evaluate the comparative merits of the alternatives." (14 CCR 15126.6[a])

Thus, the focus of an alternatives analysis should be on those alternatives that:

> "could feasibly accomplish most of the basic objectives of the project and could avoid or substantially lessen one or more of the significant effects." (14 CCR 15126.6[c])

The CEQA Guidelines (14 CCR 15126.6[c]) further provide that, "among the factors that may be used to eliminate alternatives from detailed consideration in an Environmental Impact Report" are:

- failure to meet most of the basic Project objectives,
- infeasibility, and
- inability to avoid significant environmental impacts.

NEPA also requires the identification and analysis of a reasonable range of alternatives. Council on Environmental Quality NEPA Regulations (Title 40 of the Code of Federal Regulations 1502.14) state that:

> "reasonable alternatives include those that are practical or feasible from the technical and economic standpoint and using common sense, rather than simply desirable from the standpoint of the applicant." (Title 46 of the Code of Federal Regulation at 18.029, CEQ Forty Most Asked Questions, Question 2a)

An Environmental Impact Statement is required under NEPA if a significant impact is determined through the NEPA process. NEPA requires an Environmental Impact Statement to rigorously explore and objectively evaluate all reasonable alternatives that meet the purpose of and need for the proposed action, including those alternatives that are not within the jurisdiction of the lead agency. NEPA also requires a brief explanation of the reasons for eliminating an alternative from detailed study.

The BLM will be the lead federal agency for NEPA compliance for the Solar Two Project. The Federal Land Policy and Management Act (FLPMA) specifies the responsibilities of the BLM in preparing NEPA documents. As identified in Section 1765 of the FLPMA, the BLM's responsibility in granting a right-of-way (ROW) permit is to:

> "minimize damage to scenic and aesthetic values and fish and wildlife habitat and otherwise protect the environment…require compliance with State standards for public health and safety, environmental protection, and siting, construction, operation, and maintenance of [ROWs] … [and] … require location of the [ROW] along a route that will cause least damage to the environment, taking into consideration feasibility and other relevant factors."

San Diego Gas & Electric (SDG&E) selected the Project through a competitive solicitation to assist the company in meeting its legislatively mandated 20 percent goal for the California Renewable Portfolio Standard (RPS) Program. SDG&E used the best-fit and least-cost criteria.

The Applicant developed the criteria listed below to evaluate the suitability of alternative sites for solar power development.

- **Solarity:** The site needs to be located in an area with long hours of sunlight (low cloudiness). Ideally, insolation, the rate of delivery of direct solar radiation per unit of horizontal surface**,** levels would be at least 7 kilowatt-hours per square meter per day.
- **Topography:** The site needs to be relatively flat; site grade may be up to 5 percent.
- **Wind Speed:** Wind speed of more than 35 miles per hour less than 2 percent of the time.
- **Site Control:** The land has to be available for sale or use (e.g., lease or use of an ROW). If private land, the landowner must be willing to negotiate a long-term option agreement so that site control does not require a large capital investment until the license is obtained.
- **Proximity to Infrastructure:** The site needs to be located in close proximity to high-voltage California Independent System Operator (CAISO) transmission lines with adequate capacity. Ideally, the site should be located within 10 miles of existing transmission lines and should have an adequate water supply.

- **Accessibility:** The site should have ease of access; close proximity to access roads is preferred.
- **Environmental Sensitivity:** The site should have few or no environmentally sensitive areas (particularly biological and cultural resources) and should allow development with minimal environmental impacts.
- **Jurisdictional Issues:** The proposed use should be consistent with existing laws, ordinances, regulations, and standards (LORS).
- **Land Cost:** The site should be located on property currently available at a reasonable cost.

The Applicant has had several meetings with the CEC and the BLM and performed a substantial analysis to identify appropriate site locations. The alternative site locations discussed below were evaluated using the above criteria.

4.2 DETAILED CONSIDERATION OF ALTERNATIVES

This section describes the Project Site and the alternatives analyzed for the site. The No Action Alternative, or status quo alternative, described in Section 4.2.1, No Action Alternative, reflects existing conditions and serves as a basis for comparing and evaluating the other alternatives. A discussion of the "action" alternatives meeting the site location criteria that were considered for the Project is provided in Section 4.2.2, Alternate Engineering Alternative – 300-MW Alternative, and Section 4.2.3, Alternate Engineering Configurations – 900-MW Alternative. A discussion of the alternative site locations that were considered but rejected is provided in Section 4.3, Alternative Sites Considered But Rejected.

4.2.1 No Action Alternative

4.2.1.1 No Action Alternative Description

The Project will produce renewable electricity for SDG&E in particular, and the state of California, in general. As stated in Section 2.0, Project Objectives/Purpose and Need, the objective of the Solar Two Project is to provide clean, renewable, solar powered electricity and to assist both SDG&E and the State of California in meeting its legislatively mandated obligations under the RPS Program. A secondary objective is to assist both SDG&E and the state of California in reducing their greenhouse gas emissions. The Project will have environmental benefits relative to traditional fossil-fuel power plants. This characteristic supports both NEPA's requirement that agencies take a "hard look" at the environmental impacts of their decisions as well as the FLPMA requirement that the BLM consider multiple use policies that include siting renewable energy production on public lands.

In the event that the Project is not constructed, SDG&E and the State of California would have greater difficulty in achieving their objective of obtaining 20 percent of their power from renewable resources by 2010.

4.2.1.2 Environmental Impacts of the No Action Alternative

4.2.1.2.1 Air Quality

The No Action Alternative would not involve construction or operation of the Project. Therefore, the minor increases in emissions that would occur during construction and operation of the Project would not occur. It is possible that impacts from the No Action Alternative could result in greater fuel consumption and air pollution because new power plants would need to be brought into operation or electricity would need to be generated from older, less-efficient plants that have higher air emissions. Because solar energy is produced during periods of peak demand, much of the replacement power would be generated by plants that generate significantly greater criteria air emissions and greenhouse gas emissions.

4.2.1.2.2 Geologic Hazards and Resources

Under the No Action Alternative, no potential would exist for the Project infrastructure to be affected by the geological hazard of seismic shaking because the Project would not be constructed. Also, the minor potential impacts to geologic or mineral resources from construction-related activities (such as grading and excavating) would not occur.

4.2.1.2.3 Soils

The No Action Alternative would not involve construction or operation of the Project. However, the minor erosion and runoff that currently occurs would continue.

4.2.1.2.4 Water Resources

Under the No Action Alternative, no potential would exist for discharges from the Project to degrade water quality. Also, the Project would not use water from the Imperial Irrigation District (IID); thus, the district would lose revenue and existing customers would pay potentially higher user fees.

4.2.1.2.5 Biological Resources

Due to the fact that the No Action Alternative would not involve construction or operation of the Project, land disturbance that could have the potential to result in some loss or degradation of habitat would not occur.

4.2.1.2.6 Cultural Resources

Under the No Action Alternative, land disturbance that could have the potential to result in some loss or degradation of cultural resources would not occur.

4.2.1.2.7 Paleontological Resources

Under the No Action Alternative, no potential would exist for land disturbance associated with construction or operation of the Project to cause loss or degradation of paleontological or karst resources.

4.2.1.2.8 Land Use

Under the No Action Alternative, existing land uses on the Project Site would continue according to local, state, and federal land use plans for the area (refer to Section 5.9, Land Use, for a description of existing land use at the Project Site). Impacts associated with restricting use of the site for Project construction and operation would not occur. Existing land use plans would not require modification or amendment.

4.2.1.2.9 Socioeconomics

Under the No Action Alternative, the Project would not be built and therefore would not provide the anticipated increase in jobs or the potential increase in revenues to the local economy.

4.2.1.2.10 Traffic and Transportation

Under the No Action Alternative, no workers would travel to the Project Site for construction or operation of the Project. Therefore, the minor projected increases in traffic for the Project would not occur.

4.2.1.2.11 Noise

Under the No Action Alternative, no new noise would be generated from the Project because the Project would not be constructed or operated.

4.2.1.2.12 Visual Resources

Under the No Action Alternative, the Project would not be constructed or operated and the land would be maintained in its present state. Therefore, no change would occur in the viewshed.

4.2.1.2.13 Waste Management

Under the No Action Alternative, waste associated with construction or operation of the Project would not be generated.

4.2.1.2.14 Hazardous Materials Handling

Under the No Action Alternative, the Project would not be constructed and operated. Therefore, no hazardous materials handling would occur.

4.2.1.2.15 Public Health and Safety

Under the No Action Alternative, the potential impacts to public health and safety associated with construction and operation of the Project would not occur.

4.2.1.2.16 Worker Safety

Under the No Action Alternative, the Project would not be constructed and operated. Therefore, no workers would be employed by the Applicant and there would be no risk of injury to the workers.

4.2.2 Alternate Engineering Alternative – 300-MW Alternative

4.2.2.1 Description of the 300-MW Alternative

The 300-MW Alternative is essentially only Phase I of the 750-MW Project. This alternative would be constructed, as shown on Figure 1-2, Aerial Site Plan. The 300-MW Alternative would consist of up to 12,000 SunCatchers with a net generating capacity of approximately 300 megawatts (MW), and the SunCatchers would occupy approximately 2,600 acres of land. The 300-MW Alternative would transmit power to the grid through the SDG&E Imperial Valley Substation. The 300-MW Alternative would have ancillary features/infrastructure similar to those of the 750-MW Project, including a water supply pipeline, a transmission line, road access, operations facilities, and a substation. Some of these features would be smaller because the capacity of the 300-MW Alternative would be reduced and there would be no need to accommodate additional future generation. Construction techniques and schedule would be similar to the techniques and schedule described for Phase I of the 750-MW Project.

The 300-MW Alternative would still provide renewable energy to SDG&E and help meet California's RPS goals. It would not have the same result as the 750-MW Project, and therefore would decrease the probability that California's RPS goal of obtaining 20 percent of electric generation from renewable sources by 2010 would be achieved. Compared with the 750-MW Project, the 300-MW Alternative would also not maximize as much of the solar resources available in the area. However, the 300-MW Alternative would occupy less land and would be less expensive to construct than the 750-MW Project.

This alternative would not need to rely on construction and operation of the Sunrise Powerlink transmission line but rather could rely on existing transmission capacity to provide power to SDG&E.

4.2.2.2 Environmental Impacts of the 300-MW Alternative

As the smaller 300-MW Alternative would not supply as much renewable energy as the 750-MW Project, California's ability to meet its obligations under the RPS Program would be diminished. Also, the Applicant's ability to assist SDG&E in meeting its goals would also be lessened. Although a smaller project would occupy less land, much of the infrastructure would still need to be developed. Finally, the 300-MW Alternative would not maximize the solar resources available in the area.

4.2.2.2.1 Air Quality

During the construction and operation phases of the 300-MW Alternative, air quality could be impacted by dust generated as a result of vehicle activity. However, these air emission impacts would be temporary and would be controlled by implementing mitigation measures, such as applying water and/or dust palliatives (soil binders) to access roads for dust control. It should be noted that this impact is not necessarily proportional to the overall size of the 300-MW Alterative during the construction phase, as the number of construction vehicles required would remain relatively constant.

Compared to the 750-MW Project, the overall generation of air emissions during construction of the 300-MW Alternative would be reduced because construction of the additional 450-MW solar field would not occur.

Minimal emissions would be generated during operation of the 300-MW Alternative. Light trucks would be used by maintenance and operations personnel, and periodic testing of emergency diesel generators and fire pumps would generate exhaust emissions. These emissions would be considered minor and would not require mitigation. No significant long-term cumulative impacts are anticipated during daily operations of the 300-MW Alternative.

4.2.2.2.2 Geological Hazards and Resources

Construction-related impacts to geologic or mineral resources from the 300-MW Alternative would primarily involve operations for grading and SunCatcher foundation support. Similar to the 750-MW Project, the 300-MW Alternative would also require excavation of storm water holding ponds and minor grading for building pads, utility trenches, and drainage of surface water flow. As discussed in Appendix E, Preliminary Geotechnical and Geologic Hazards Evaluation, the slopes and temporary construction slopes should be stable in the area. Development of the 300-MW Alternative would not be anticipated to result in potential impacts to geologic or mineral resources. Also, geologic conditions are not anticipated to affect construction.

Geologic resources are anticipated to be minimally affected as a result of the operation of the 300-MW Alternative. Potential impacts of geologic hazards on the 300-MW Alternative and its ancillary facilities would include seismic shaking. With implementation of mitigation measures, impacts to the operation of the 300-MW Alternative from geologic hazards are anticipated to be negligible.

The construction and operation of the linears associated with the 300-MW Alternative are also not anticipated to affect the geologic environment. Cumulative impacts to the geologic resources at the site for the 300-MW Alternative are considered to be negligible.

4.2.2.2.3 Soils

The direct impacts to soils from the construction of the 300-MW Alternative would include increased runoff and erosion from disturbance and removal of vegetation. The direct impacts during the construction and operation of the 300-MW Alternative would be minor and result in a negligible amount of erosion due to infrequent vehicular travel throughout the Project Site.

Potential cumulative impacts to soils as a result of the 300-MW Alternative, in combination with past, present, and future actions, would include erosion and sediment transportation from storm runoff during construction. However, these impacts are considered negligible, assuming adequate mitigation measures are employed.

4.2.2.2.4 Water Resources

Water resources in the area of the 300-MW Alternative include groundwater and ephemeral washes. Water would be brought on-site via pipeline from the Westside Main Canal and would be used for dust control and washing the mirrors on the SunCatchers. Some water would also be treated for drinking and sanitary purposes. Water used for washing, dust control, drinking, and

sanitary purposes would be demineralized, creating mineral waste. Potential impacts to water resources could occur from spills and leaks from equipment, discharges of wastewater from the demineralization process, and sanitary wastewater systems. Water usage for the 300-MW Alternative would be less than the 750-MW Project.

Best Management Practices (BMPs) to control spills and leaks of petroleum products from on-site vehicles would be implemented to reduce the potential for these materials to contaminate water resources within the vicinity of the 300-MW Alternative. Ephemeral wash crossings and foundations placed near ephemeral washes would be designed to accommodate 2-year minimum flood protection. Wastewater from the water treatment system would be collected and discharged to evaporation ponds, thereby eliminating potential for impacts that could occur if allowed to infiltrate to soil or to be discharged to surface water. Sanitary wastewater would be treated and discharged by a properly designed and maintained septic system with leach fields.

Impacts to water resources from the 300-MW Alternative would be the same as for Phase I of the 750-MW Project and would be considered minor. Cumulative impacts to water resources, resulting from past, present, and reasonably foreseeable future actions, including the 300-MW Alternative, are considered negligible with appropriate mitigation measures employed.

4.2.2.2.5 Biological Resources

The 300-MW Alternative would have the same impacts as Phase I of the 750-MW Project. The impacts for the 750-MW Project are described in detail in Section 5.6, Biological Resources, and would include disturbance of approximately 2,500 acres of creosote bush scrub. Although much of the vegetation would be left intact, some would need to be trimmed and some would be removed during construction for access roads and SunCatcher foundations. After construction, some of the cleared areas would be allowed to revegetate and the permanent impact would be reduced. Because the additional 450-MW area would not be built out, the 300-MW Alternative would have an approximately 3,500-acre smaller footprint, resulting in fewer impacts to biological resources than the 750-MW Project.

It should be noted that the 300-MW Alternative was specifically sited outside areas dedicated by the BLM as areas of biological concern, including designated Desert Wildlife Management Areas, and Areas of Critical Environmental Concern, in consultation with the United States Fish and Wildlife Service and California Department of Fish and Game. As discussed below, impacts to biological resources have the potential be adverse, but through siting and mitigation, are not anticipated to be considerable during construction and operation of the 300-MW Alternative.

Construction of the 300-MW Alternative would impact wildlife and could kill or injure certain species, especially burrowing animals living in areas that would be excavated. These animals might include special-status species like the flat-tailed horned lizard and the burrowing owl. These impacts would be mitigated by conducting surveys before construction activities and relocating animals in the immediate area. Without proper mitigation, other special-status species, such as the Le Conte’s thrasher, loggerhead shrike, and horned lark, could be displaced or could have nests, eggs, or young destroyed by movement of equipment and vehicles through nesting habitat. The potential for these impacts would be mitigated by avoiding clearing activities during the breeding and nesting season. Because the additional 450 MW of capacity would not be developed under the 300-MW Alternative, fewer individual animals would require mitigation impacts to be applied.

During operation of the 300-MW Alternative, brush along roadways and near SunCatchers would be trimmed as necessary to prevent interference with vehicle movement and operation of the SunCatchers. Wildlife would have an increased potential of being impacted by vehicle movements, though this would be mitigated through implementation of BMPs such as reduced speed limits and checking for animals before vehicle movement. The potential for noise that would stress or displace wildlife is considered low under this alternative, as is the potential for birds to collide with vertical appurtenances. Operation of the 300-MW Alternative would have a reduced impact on vegetation and wildlife because of the reduced area of the 300-MW Alternative compared to the 750-MW Project.

Past and present actions in the area could impact biological resources through disturbance, habitat degradation, habitat fragmentation, or potential mortality. These include residential and commercial development, off-highway vehicle (OHV) use, including unauthorized OHV movement on BLM-administered public lands, agricultural activities (including the use of pesticides), flight operations at Naval Air Facility (NAF) El Centro, California, and highway/roadway construction and runoff. Cumulative impacts on biological resources as a result of past, present, and reasonably foreseeable future actions, in combination with the 300-MW Alternative, would mainly result from loss of habitat, and habitat disturbance and degradation. Because the 300-MW Alternative, like the 750-MW Project, would avoid Desert Wildlife Management Areas and Areas of Critical Environmental Concern, cumulative impacts to biological resources are not anticipated.

4.2.2.2.6 Cultural Resources

The 300-MW Alternative would have the same impacts to cultural resources as Phase I of the 750-MW Project. The impacts for the 750-MW Project are described in detail in Section 5.7, Cultural Resources, and include potential disturbance of known or unknown cultural resources located in the approximately 6,500-acre 750-MW Project Site (i.e., at SunCatcher foundations, access roads, staging areas, etc.).

Because the additional 450-MW area would not be built out, the 300-MW Alternative would have an approximately 3,500-acre smaller footprint, resulting in fewer impacts to cultural resources than the 750-MW Project. Cultural analysis, cultural field surveys and mapping exercises identified a large number of cultural resources including, but not limited to, lithic surface finds concentrated in certain areas, the majority of which were located within the approximate easternmost third of the original 900-MW Alternative boundary. The 300-MW Alternative would emphasize proper protection and treatment of cultural finds within the 300-MW Alternative area, including the necessary recording and documentary work. Due to the reduced area of the 300-MW Alternative, there would be less impacts to cultural resources under this alternative than the 750-MW Project.

Past and present actions in the area that have impacted or could impact cultural resources through disturbance include residential and commercial development, OHV use, agricultural activities, flight operations at the NAF El Centro, California, and highway/roadway construction and runoff. Cumulative impacts on cultural resources as a result of past, present, and reasonably foreseeable future actions, in combination with the 300-MW Alternative, would primarily result from loss of cultural resources through ground disturbance and degradation; however, through the implementation of mitigation measures, considerable cumulative impacts are not anticipated.

4.2.2.2.7 Paleontological Resources

The potential impacts to paleontological resources for the 750-MW Project are described in detail in Section 5.8, Paleontological Resources, and include risk of potential disturbance of any known or unknown paleontological resources located in the approximate 6,500-acre 750-MW Project Site (i.e., at SunCatcher foundations, access roads, staging areas, etc.). Due to the fact that the additional 450-MW area would not be built out under the 300-MW Alternative, approximately 3,500 acres of land would not be developed and this would result in fewer impacts to paleontological resources compared to the 750-MW Project.

Past and present actions in the area that have impacted paleontological resources through disturbance include residential and commercial development, OHV use, agricultural activities, flight operations at NAF El Centro, and highway/roadway construction and runoff. Cumulative impacts on paleontological resources as a result of past, present, and reasonably foreseeable future actions, in combination with the 300-MW Alternative are not anticipated.

4.2.2.2.8 Land Use

Potential impacts to land use for the 300-MW Alternative would correspond directly to Phase I of the 750-MW Project. Impacts to land use for the 750-MW Project are described in detail in Section 5.9, Land Use, and include potential restriction of recreational OHV land uses in the approximate 6,500-acre fenced area of the 750-MW Project Site. Areas where the 300-MW Alternative would be constructed (i.e., SunCatcher foundations, access roads, staging areas, etc.) would preclude compatible uses for the life of the Alternative. Because the additional 450-MW solar field would not be developed, the 300-MW Alternative would have an approximate 3,500-acre smaller footprint, resulting in fewer impacts to land use than the 750-MW Project.

Like the 750-MW Project, the 300-MW Alternative and other projects in the vicinity are not expected to result in considerable cumulative impacts to land use during the construction or operation phases. Existing projects within the study area can be characterized primarily as residential development (i.e., new single-family dwellings and mobile homes), and the industrial development of Plaster City. There are no other proposed projects in the 300-MW Alternative study area, and no newly permitted projects that would have a cumulative impact on the surrounding environment when considered in conjunction with the 300-MW Alternative. Therefore, cumulative impacts are anticipated to be negligible as a result of the construction, operation, maintenance, or long-term presence of the 300-MW Alternative.

4.2.2.2.9 Socioeconomics

The main socioeconomic impact to the area surrounding the 750-MW Project would result from the introduction of permanent jobs. The 300-MW Alternative is anticipated to have similar impacts as Phase I of the 750-MW Project. The smaller-sized 300-MW Alternative would provide less employment of part-time construction workers and full-time staff than the 750-MW Project. It is expected that the 300-MW Alternative would require fewer personnel during construction, similar to Phase I of the 750-MW Project, and fewer full-time staff than the 750-MW Project during the operation phase.

The 300-MW Alternative would not displace any current jobs or people, nor affect the surrounding agricultural enterprises. The increase in permanent employees is not expected to have any adverse impact on employment, housing, tax revenues, public services, or utilities. The

300-MW Alternative would benefit the local economy by introducing jobs and potentially raising tax revenues due to the economic activities of the construction and operation employees. These potential benefits would be less than those that would come as a result of the 750-MW Project. The 300-MW Alternative site is not located within any established community of Imperial County, and therefore, the 300-MW Alternative would not divide an established community.

Temporary impacts associated with noise and distraction caused by construction activities are not expected to cause an impact to nearby schools. Furthermore, the addition of a renewable energy installation to the region and the opportunity to observe the development of a large solar array may be of educational benefit to area students, and provide material for instruction and a field trip destination on completion of the 300-MW Alternative. Because Project employees will be drawn from locally available labor, it is not expected that the Alternative will cause any additions to high school enrollment.

Operation of the 300-MW Alternative would have a slightly less incremental and permanent benefit to the local economy, primarily through local expenditures for maintenance and equipment-related material purchases than the 750-MW Project. Total construction costs for the smaller 300-MW Alternative paid out as wages and salaries, including benefits, would be less than those expected for the 750-MW Project.

The 300-MW Alternative is expected to be allowed a 100 percent property tax exemption as part of the California Incentives for Renewables and Efficiency. This characteristic removes the potential for county and local property tax revenues to be derived from either the 750-MW Project or the 300-MW Alternative.

Construction and operation of the 300-MW Alternative will not lead to a considerable increase in the population of Ocotillo/Nomirage or surrounding planning areas. As a result, emergency and social services will not be negatively impacted. Since the 300-MW Alternative does not expect to add substantially to the local planning area population, Emergency Medical Services (EMS) and other emergency services within the Ocotillo/Nomirage area will not experience substantive change. It is assumed that EMS services within the populated centers in the region can accommodate the additional load of permanent employees.

The 300-MW Alternative site is located in a sparsely populated area of relatively low income within Imperial County. Lower incomes can be attributed to the lower wages originating in the agricultural activities of the area, and lack of other job opportunities. The operation of the 300-MW Alternative will not contain risk for adverse human health impacts to local populations outlined by Executive Order 12898, which requires the prevention of “disproportionately high or adverse human health impacts of its programs, policies, and activities on minority populations and low-income populations.” The 300-MW Alternative would not pollute and uses minimal hazardous materials in the construction phase. Thus, the 300-MW Alternative would not conflict with Executive Order 12898, and would not result in a disproportionately high adverse health effect to the surrounding community.

The 300-MW Alternative is not expected to result in considerable adverse cumulative impacts to socioeconomics during the construction and operation phases. In addition, the 300-MW Alternative is anticipated to have some positive cumulative impacts.

4.2.2.2.10 Traffic and Transportation

Modeling shows that there would not be considerable traffic impacts during construction or operation of the 750-MW Project. For the 300-MW Alternative, the construction traffic would be the same as for Phase I of the 750-MW Project. With the 300-MW Alternative, the additional 450-MW solar field would not be constructed and therefore the overall period of construction would be shorter. This shorter construction period would reduce the amount of time the local highways would see increased vehicle trips.

Operation of the 300-MW Alternative would employ fewer workers than the 750-MW Project, resulting in reduced vehicle trips. Modeling shows that the larger workforce for the 750-MW Project would not cause considerable traffic impacts; therefore, the impacts for the smaller 300-MW Alternative would also be considered negligible.

Based on available information for the 750-MW Project, the 300-MW Alternative's construction traffic would not coincide with known potential future projects. The contribution to cumulative traffic impacts during construction would not be cumulatively considerable. Therefore, the cumulative impacts of the 300-MW Alternative would be considered negligible. The result of the traffic analysis prepared for the 750-MW Project showed that the 750-MW Project operational traffic combined with future ambient traffic growth and the cumulative traffic generated by the proposed Desert Springs Resort would not be considerable, and the cumulative impacts of the 750-MW Project would therefore be considered negligible. Since the 300-MW Alternative would have decreased impacts to traffic and transportation during construction and operation, the cumulative impacts of the 300-MW Alternative would be less than those of the 750-MW Project.

4.2.2.2.11 Noise

Operation of the 300-MW Alternative would add noise to the ambient sound environment at a similar but slightly less level than the 750-MW Project. During construction, noise would result from construction equipment, but due to the lack of sensitive receptors and the daytime schedule for construction, no considerable impacts are anticipated. Noise would also be increased during operation of the 300-MW Alternative, but again would be considered negligible. The duration of construction noise and the size of the area experiencing increased noise during operation and construction are both less for the 300-MW Alternative than for the 750-MW Project. Hence, the 300-MW Alternative is anticipated to have fewer potential impacts resulting from noise.

The 750-MW Project is not expected to result in cumulative impacts related to noise during construction, concurrent construction and operation. Thus, the smaller, 300-MW Alternative is not anticipated to result in considerable cumulative impacts.

4.2.2.2.12 Visual Resources

The 300-MW Alternative would have the same impacts to visual resources as Phase I of the 750-MW Project. These impacts are described in detail in Section 5.13, Visual Resources, and include visual alteration of the existing landscape over the Project Site. Because the additional 450-MW solar field would not be developed, the 300-MW Alternative would have an approximately 3,500-acre smaller footprint, resulting in fewer potential impacts to visual resources than the 750-MW Project.

Cumulative impacts associated with the 300-MW Alternative would be decreased in magnitude from the 750-MW Project, because the smaller-sized alternative would have less additive impact when combined with surrounding projects. No substantial cumulative impacts to visual resources have been identified as a result of the construction, operation, maintenance, or long-term presence of the 750-MW Project and other projects in the area. Therefore, no cumulative impacts to visual resources would be expected to result from the smaller, 300-MW Alternative.

4.2.2.2.13 Waste Management

During construction, the 300-MW Alternative would generate waste materials such as wood, concrete, paper, plastic etc., that would be recycled, if feasible, or placed in a local landfill. This alternative would also generate a small amount of hazardous wastes that would be recycled or disposed of in accordance with all applicable regulations. The local landfills and treatment and disposal facilities have adequate capacity for the waste streams from the 750-MW Project and therefore would have capacity for the waste streams associated with the lesser 300-MW Alternative. During construction of the 300-MW Alternative, storm water runoff would be controlled to prevent violations of water quality standards by implementing the BMPs outlined in an approved Storm Water Pollution Prevention Plan.

The operation of the 300-MW Alternative would generate similar waste streams to those of the 750-MW Project in the long-term but in reduced quantities. Also, operation of the raw water demineralization water treatment plant would generate wastewater that would be allowed to evaporate and mineral waste collected for recycling or disposal. These waste streams are considered negligible. Operation of the septic system with leach fields would include appropriate maintenance, such as regular solids removal, and are not anticipated to be substantive. The 300-MW Alternative would have less potential impacts to waste management than the 750-MW Project due to the smaller amount of generated waste by both construction and operation.

When considering other past, present, and future projects within the region, the cumulative impacts from the 300-MW Alternative are expected to be negligible given the BMPs and proposed management measures that will reduce the potential for impacts from waste.

4.2.2.2.14 Hazardous Materials Handling

Small quantities of hazardous wastes would likely be generated over the course of construction of the 300-MW Alternative. These wastes include waste paint, spent construction solvents, waste cleaners, waste oil, oily rags, waste batteries, and spent welding materials. Hazardous wastes generated during construction and operation of the 300-MW Alternative would be handled and disposed of in accordance with applicable LORS and BMPs. Hazardous wastes would be either recycled or disposed of in a licensed Class I disposal facility, as appropriate. When managed and disposed of properly, these wastes are not anticipated to cause environmental or health and safety impacts. Most of the hazardous waste generated during construction can be recycled. The small quantities of hazardous waste that cannot be recycled are not expected to impact the capacity of the Class I landfills in California. The 300-MW Alternative would have less potential for impacts to hazardous materials than the 750-MW Project because the smaller size would mean a smaller amount of hazardous materials.

Cumulative impacts due to hazardous materials handling are not expected from future projects in combination with the 750-MW Project, or with the smaller 300-MW Alternative (based on land uses in the surrounding area and the limited amount and type of hazardous materials to be used as part of the Project).

4.2.2.2.15 Public Health and Safety

Impacts from the 300-MW Alternative would pose less of a hazard to public health and safety than under the 750-MW Project, primarily because construction of the 450-MW solar field would not be necessary under the 300-MW Alternative. The only toxic air contaminant emitted from the operation of the 750-MW Project is expected to be diesel particulate from the testing of the diesel emergency fire water pump and emergency generator engines. Thus, it is assumed that the toxic risk for the smaller 300-MW Alternative would either be the same or less than that of the 750-MW Project. Because only diesel particulate has long-term health risk thresholds, only cancer risk and the chronic non-cancer total hazard index (THI) were evaluated for the health risk assessment (HRA).

For the 750-MW Project, the estimated cancer risk at all locations is well below the public health and safety criterion of 10 in 1 million. Thus, it is concluded that the smaller 300-MW Alternative's emissions from the diesel emergency fire water pump and emergency generator engines will not pose a substantive cancer risk to any population that would potentially be exposed to these emissions.

The maximum chronic THI resulting from the 750-MW Project's emissions was estimated to be 0.00003. The estimated chronic THI is well below the criterion of 1. Thus, it is concluded that like the 750-MW Project, the smaller 300-MW Alternative will not pose a substantive non-cancer health risk to any population that would potentially be exposed to emissions from the diesel emergency fire water pump and emergency generator engines.

Sources of uncertainty in HRAs include emissions estimates, dispersion modeling, exposure characteristics, and extrapolation of toxicity data in animals for application to humans. The annual emission rates for particulate matter less than 2.5 microns in diameter for the emergency diesel engines were derived using vendor data assuming the anticipated testing schedule at a maximum load for the maximum number of annual operating hours requested in this application. The conservatism introduced at each step in the HRA to compensate for all of these sources of uncertainty is compounded in the predicted health risks; therefore, the actual risks resulting from exposure to emissions from the 750-MW Project are expected to be well below the values presented in this analysis.

The National Ambient Air Quality Standards (NAAQS) and California Ambient Air Quality Standards (CAAQS) specify allowable levels of specific air pollutants that should not be exceeded to protect public health. The results presented in Section 5.2, Air Quality, show that the larger 750-MW Project will not cause or contribute to exceedances of any CAAQS or NAAQS. Thus, like the 750-MW Project, the smaller 300-MW Alternative is not anticipated to have adverse health impacts from criteria pollutant (nitrogen dioxide, carbon monoxide, sulfur dioxide, and particulate matter less than 10 microns in diameter (PM_{10}) emissions generated from the alternative's diesel emergency fire water pump and emergency generator engines.

No other new potential sources of toxic air contaminants (associated with recently received construction permits that are not yet operational, or that are currently in the permitting process,

or that can be expected to do so in the near future) are known for projects within 6 miles of the 750-MW Project; thus, no additional cumulative impacts would be anticipated for the 750-MW Project or the 300-MW Alternative.

4.2.2.2.16 Worker Safety

No environmental consequences related to worker safety or unavoidable adverse impacts to worker safety are anticipated from the 750-MW Project. Since measures to ensure worker safety would be the same under the 300-MW Alternative as they are under the 750-MW Project, no environmental consequences or unavoidable adverse impacts to worker safety are anticipated from the 300-MW Alternative.

Construction, operation, and maintenance activities may expose workers to the hazards identified in Section 5.17, Worker Safety. Exposure to these hazards can be minimized through adherence to appropriate engineering design criteria and administrative controls, use of applicable personal protective equipment, and compliance with all applicable health and safety LORS. The programs, regulations, and preventive measures intended to control the potential worker health and safety impacts associated with these hazards are described in Section 5.17. This section describes a comprehensive health, safety, and fire prevention program, and an accident/injury prevention program intended to ensure healthful and safe operations at the 750-MW Project Site. These programs would apply equally to the 750-MW Project or the 300-MW Alternative.

4.2.3 Alternate Engineering Configurations – 900-MW Alternative

4.2.3.1 Description of the 900-MW Alternative

The 900-MW Alternative was the original proposed Applicant Project. During the environmental review process conducted by the Applicant, the 750-MW Project later became the preferred Project to help avoid potential significant environmental impacts (specifically to cultural resources), as described below. The 900-MW Alternative was to be constructed on approximately 7,600 acres of land (see Figure 4-1, 900-MW Alternative). The 900-MW Alternative was proposed to be built in two phases. Phase I of the 900-MW Alternative would essentially correspond with both the 300-MW Alternative described earlier and Phase I of the 750-MW Project. Phase II of the 900-MW Alternative would expand Phase I of the 750-MW Project with an additional 600 MW of generating capacity. In total, approximately 36,000 SunCatchers would be required for the 900-MW Alternative.

Negotiations between SDG&E and the Applicant regarding the Power Purchase Agreement, including discussions related to the physical limitations of the Southwest Powerlink transmission line, took place while development of the initial Phase I for 300 MW of capacity was occurring. From a System Impact Study and an Interconnection Facilities Study that SDG&E and CAISO completed, it was determined that the existing SDG&E 500-kilovolt Southwest Powerlink transmission line from the Imperial Valley Substation had sufficient capacity to accept the 300-MW output from Phase I. SDG&E and CAISO also completed a System Impact Study for Phase II which looked at adding 600 MW of additional capacity to the original Phase I of 300 MW of capacity. The Phase II study indicated that SDG&E and CAISO would require additional transmission line capacity from the Imperial Valley Substation. SDG&E and CAISO agreed that the total capacity could increase from 300 MW by adding an additional 600 MW in

Phase II, for a total capacity of 900 MW. However, full expansion of Phase II to 900 MW would be dependent on expansion of the Sunrise Powerlink transmission line (or other comparable transmission), including an additional 500-kilovolt transmission line, from the SDG&E Imperial Valley Substation to SDG&E's service territory.

In addition to the potential transmission reliance issue, the 900-MW Alternative would have the stronger potential to result in environmental impacts, especially to cultural resources. These impacts are further described below.

4.2.3.2 Environmental Impacts

4.2.3.2.1 Air Quality

During the construction and operation phases of the 900-MW Alternative, air emissions could be impacted by dust generated as a result of vehicle activity. However, these air emission impacts would be temporary and would be controlled by enacting mitigation measures, such as applying water and/or dust palliatives (soil binders) to access roads for dust control. Construction and operation of the 900-MW Alternative would have similar air quality impacts as the 750-MW Project.

Emissions generated during operation of the 900-MW Alternative would relate to the use of light trucks used by operation and maintenance personnel. Periodic testing of emergency diesel generators and fire pumps would also generate minor exhaust emissions. These emissions would be considered minor and would not require mitigation. Cumulative impacts would not be anticipated in the long term during daily operations of the 900-MW Alternative.

4.2.3.2.2 Geological Hazards and Resources

Construction-related impacts to the geologic or mineral resources from the 900-MW Alternative would be similar to those under the 750-MW Project, but over a more extensive area. Impacts would primarily result from operations for excavation and grading of roads, utility trenches, and SunCatcher foundation support. As discussed in Appendix E, Preliminary Geotechnical and Geologic Hazards Evaluation, the slopes and temporary construction slopes should be stable in the 900-MW Alternative Project area. The 900-MW Alternative site development and construction and operation of the linears associated with the 900-MW Alternative would not be anticipated to result in adverse impacts to geologic or mineral resources. Geologic conditions are not anticipated to adversely impact the construction of the 900-MW Alternative or associated linears. With implementation of the mitigation measures, any potential impacts to the 900-MW Alternative construction by the geologic environment would be considered negligible.

The potential impacts of geologic hazards on the 900-MW Alternative and its ancillary facilities could include seismic shaking. With implementation of mitigation measures, cumulative impacts to the geologic resources at the Project Site from the 900-MW Alternative are considered to be negligible.

4.2.3.2.3 Soils

The direct impacts to soils from the construction of the 900-MW Alternative would include increased runoff and erosion from disturbance and removal of vegetation. The direct impacts during the operation of the 900-MW Alternative would be minor and result in a negligible amount of erosion due to infrequent vehicular travel throughout the Project Site. The 900-MW Alternative would have increased impacts to soils relative to the 750-MW Project because the larger site size would result in more disturbance and removal of vegetation.

Potential cumulative impacts to soils as a result of the 900-MW Alternative, in combination with past, present, and future actions, will include erosion and sediment transportation from storm runoff during construction. However, these impacts are considered negligible, assuming future projects employ adequate mitigation measures.

4.2.3.2.4 Water Resources

Water resources in the area of the 900-MW Alternative include groundwater and ephemeral washes. Water usage for the 900-MW Alternative would be more than that required for the 750-MW Project. Water would be brought on-site via pipeline from the Westside Main Canal and would be used primarily for dust control and washing the mirrors on the SunCatchers. Some water would also be treated for drinking and sanitary purposes. Water used for washing, dust control, drinking, and sanitary purposes would be demineralized, creating mineral waste. Potential impacts to water resources could occur from spills and leaks from equipment, discharges of wastewater from the demineralization process, and sanitary wastewater systems.

Similar to the 750-MW Project, BMPs would be implemented to control spills and leaks of petroleum products from on-site vehicles to reduce the potential for these materials to contaminate water resources within the vicinity of the 900-MW Alternative. Impacts to water resources from the 900-MW Alternative would be more than under the 750-MW Project but would still be considered relatively minor because of the implementation of these practices.

Cumulative impacts to water resources from past, present, and reasonably foreseeable future actions, including this 900-MW Alternative, are expected to be negligible.

4.2.3.2.5 Biological Resources

The 900-MW Alternative would have similar impacts as the 750-MW Project, but over a more extensive area. The impacts for the 750-MW Project are described in detail in Section 5.6, Biological Resources. Although much of the vegetation would be left intact, some would need to be trimmed and some would be removed during construction for access roads and SunCatcher foundations. After construction, some of the cleared areas would be allowed to revegetate so the permanent impact would be reduced. Because the 900-MW Alternative would have a larger footprint than the 750-MW Project, greater impacts to biological resources would be anticipated.

Construction activities could have the potential to impact wildlife and kill or injure certain species, especially burrowing animals living in areas that would be excavated. These could include special-status species such as the flat-tailed horned lizard and the burrowing owl. These impacts would be mitigated by conducting surveys before construction activities and relocating animals found in the immediate area. Without proper mitigation, other special-status species, such as the Le Conte's thrasher, loggerhead shrike, and horned lark, could be displaced or could have nests, eggs, and young destroyed by movement of equipment and vehicles through the

nesting habitat. The potential for these impacts would be mitigated by avoiding clearing activities during the breeding and nesting season. Because the 900-MW Alternative would require an increased amount of land for development, more individual animals would have the potential to be impacted by the 900-MW Alternative than the 750-MW Project.

During operation of the 900-MW Alternative, brush along roadways and near SunCatchers would be trimmed as necessary to prevent interference with vehicle movement and operation of the SunCatchers. Without mitigation, wildlife would have an increased potential of being killed or injured by vehicle movements. This impact would be mitigated through implementation of BMPs, such as reduced speed limits and checking for animals before vehicle movement. The potential for noise to stress or displace wildlife is considered low, as is the potential for birds to collide with vertical appurtenances. Operation of the 900-MW Alternative would have an increased impact on vegetation and wildlife relative to the 750-MW Project because of its increased area.

Past and present actions in the area that have impacted biological resources through disturbance, habitat degradation, habitat fragmentation, or potential mortality include residential and commercial development, OHV use, agricultural activities (including the use of pesticides), flight operations at NAF El Centro, and highway/roadway construction and runoff. Although the site size is larger, the 900-MW Alternative, like the 750-MW Project, avoids land designated as sensitive habitat by the BLM and other agencies. In addition, mitigation measures are proposed for the 900-MW Alternative. Thus, cumulative impacts on biological resources as a result of past, present, and reasonably foreseeable future actions, including the 900-MW Alternative, are not anticipated to be substantive.

4.2.3.2.6 Cultural Resources

As mentioned previously, the 900-MW Alternative was the original preferred Project for the Applicant. Cultural analysis, cultural field surveys, and mapping exercises identified a large number of cultural resources including, but not limited to, lithic surface finds concentrated in certain areas, the majority of which were located within the approximate easternmost third of the 900-MW Alternative site boundary. Proper protection and treatment of the large number of cultural finds within this portion of the 900-MW Alternative would have been necessary and the potential for Project delays was likely. More importantly, there was a strong potential for significant impacts to occur to cultural resources in this area with the construction, operation, and maintenance of the 900-MW Alternative. To help avoid these potential cultural resource impacts, the Applicant, in consultation with the BLM, moved forward to exclude this easternmost area from the 900-MW Alternative boundary. Subsequently, the 750-MW Project Site was developed.

Cultural impacts associated with the 750-MW Project are described in detail in Section 5.7, Cultural Resources, and include measures to avoid potential destruction or disturbance of known or unknown cultural resources located in the 750-MW Project Site (i.e., at SunCatcher foundations, access roads, staging areas, etc.).

Past and present actions in the area that have impacted cultural resources through disturbance include residential and commercial development, OHV use, agricultural activities, flight operations at NAF El Centro, and highway/roadway construction and runoff. Cumulative impacts on cultural resources as a result of past, present, and reasonably foreseeable future actions, in combination with the 900-MW Alternative, have the potential to result in significant cumulative impacts.

4.2.3.2.7 Paleontological Resources

The 900-MW Alternative would have similar impacts as the 750-MW Project, but over a more extensive surface area. The impacts associated with the 750-MW Project are described in detail in Section 5.8, Paleontological Resources, and include potential disturbance of any known or unknown paleontological resources located in the 750-MW Project Site (i.e., at SunCatcher foundations, access roads, staging areas, etc.).

Past and present actions in the area that have impacted paleontological resources through disturbance include residential and commercial development, OHV use, agricultural activities, flight operations at NAF El Centro, and highway/roadway construction and runoff. Cumulative impacts on paleontological resources as a result of past, present, and reasonably foreseeable future actions, in combination with the 900-MW Alternative, would mainly result from loss of paleontological resources through ground disturbance and degradation. However, through proper implementation of mitigation measures, cumulative impacts to paleontological resources would not be anticipated.

4.2.3.2.8 Land Use

The 900-MW Alternative would have similar impacts as those described for the 750-MW Project, but over a more extensive surface area. The impacts associated with the 750-MW Project are described in detail in Section 5.9, Land Use, and include potential restriction of recreational OHV land uses in the approximate 6,500-acre fenced 750-MW Project Site. Areas where Project facilities would be constructed (i.e., SunCatcher foundations, access roads, staging areas, etc.) would preclude compatible uses for the life of the 900-MW Alternative. Because the 900-MW Alternative would have an approximately 1,000-acre larger footprint, it would result in more impacts to land use than the 750-MW Project.

Like the 750-MW Project, the 900-MW Alternative and other projects in the vicinity are not expected to result in cumulative impacts to land use during the construction or operation phases. Existing projects within the study area can be characterized primarily as residential development (i.e., new single-family dwellings and mobile homes), and the industrial development of Plaster City. Proposed projects in the study area would not be considered to have a substantial cumulative impact on the surrounding environment when considered in conjunction with the 900-MW Alternative. Therefore, cumulative impacts are not anticipated as a result of the construction, operation, maintenance, or long-term presence of the 900-MW Alternative and other projects in the area.

4.2.3.2.9 Socioeconomics

The main socioeconomic impact to the area surrounding the 900-MW Alternative would result from the introduction of permanent jobs. The 900-MW Alternative is anticipated to have similar

impacts as the 750-MW Project, but of a slightly increased magnitude, given the larger-sized Project area (which would provide more employment of part-time construction workers and full-time staff). It is expected that the 900-MW Alternative would require more personnel during the construction phase than the 750-MW Project, and more full-time staff than the 750-MW Project.

The 900-MW Alternative would not displace any current jobs or people, nor affect the surrounding agricultural enterprises. The increase in permanent employees is not expected to have an adverse impact on employment, housing, tax revenues, public services, or utilities. The 900-MW Alternative would benefit the local economy by introducing jobs and potentially raising tax revenues due to the economic activities of the construction and operations employees. The 900-MW Alternative site is not located within any established communities of Imperial County, and therefore would not divide an established community.

Temporary impacts associated with noise and distraction caused by construction activities are not expected to cause an impact to nearby schools. Furthermore, the addition of a renewable energy installation to the region and the opportunity to observe the development of a large solar array may be of educational benefit to area students, and provide material for instruction and a field trip destination on completion of the 900-MW Alternative. Because employees for the 900-MW Alternative would be drawn from locally available labor, it is not expected that this Alternative would cause any additions to high school enrollment.

Operation of the 900-MW Alternative will have a slightly increased additional incremental and permanent benefit to the local economy, primarily through local expenditures for maintenance and equipment-related material purchases. In addition, total construction costs for the larger 900-MW Alternative paid out as wages and salaries, including benefits, would be increased over those expected for the 750-MW Project.

The 900-MW Alternative is expected to be allowed a 100 percent property tax exemption as part of the California Incentives for Renewables and Efficiency. This characteristic removes the potential for county and local property tax revenues to be derived from either the 750-MW Project or the 900-MW Alternative.

Construction and operation of the 900-MW Alternative will not lead to a substantive increase in the population of Ocotillo/Nomirage or surrounding planning areas. As a result, emergency and social services will not be negatively impacted. Since the 900-MW Alternative, like the 750-MW Project, does not expect to add substantially to the local planning area population, EMS and other emergency services within the Ocotillo/Nomirage area will not experience substantive change. It is assumed that EMS services within the populated centers within the region can accommodate the additional load of permanent employees.

The 900-MW Alternative site is located in a sparsely populated area of relatively low income within Imperial County. Lower incomes can be attributed to the lower wages originating in the agricultural activities of the area and the lack of other job opportunities. The operation of the 900-MW Alternative would not contain risk for adverse human health impacts to local populations outlined by Executive Order 12898, which requires the prevention of "disproportionately high or adverse human health impacts of its programs, policies, and activities on minority populations and low-income populations." The 900-MW Alternative would not pollute, and would use minimal hazardous materials in the construction phase. The 900-MW Alternative would not conflict with Executive Order 12898, and would not result in a disproportionately high adverse health effect to the surrounding community.

The 900-MW Alternative is not expected to result in adverse cumulative impacts to socioeconomics during the construction and operation phases. In addition, the 900-MW Alternative is anticipated to have some positive cumulative impacts.

4.2.3.2.10 Traffic and Transportation

Modeling shows that there would not be considerable traffic impacts during construction or operation of the 750-MW Project. For the 900-MW Alternative, the construction traffic would be similar to the 750-MW Project, but would occur over a longer period of construction. This longer construction period associated with the 900-MW Alternative would increase the amount of time the local highways would experience increased vehicle trips.

Operation of the 900-MW Alternative would employ more workers than the 750-MW Project, resulting in increased vehicle trips. Modeling shows that the workforce for the 750-MW Project would not cause substantive traffic impacts; therefore, potential impacts are not expected for the slight increase of vehicle trips associated with the 900-MW Alternative. Overall, the 900-MW Alternative would have similar or slightly increased impacts to traffic and transportation during construction and operation compared to the 750-MW Project.

Based on available information for the 750-MW Project, the 900-MW Alternative's construction traffic would not coincide with known potential future projects. The contribution to cumulative traffic impacts during construction would not be cumulatively considerable, and cumulative impacts of the proposed 900-MW Alternative would therefore be considered negligible. The result of the traffic analysis prepared for the 750-MW Project were reviewed to help make a determination relative to the 900-MW Alternative. Operational traffic combined with future ambient traffic growth and the cumulative traffic generated by proposed Desert Springs Resort would not be cumulatively considerable, and cumulative impacts of the 900-MW Alternative would therefore be considered negligible. Based on the above findings, it is anticipated that the 900-MW Alternative would not result in cumulative construction and operational Project impacts.

4.2.3.2.11 Noise

Construction and operation of the 900-MW Alternative would add noise to the ambient sound environment at a similar but increased level as the 750-MW Project. During construction, this additional noise would result from construction equipment, but due to the lack of sensitive receptors and the daytime schedule for construction, impacts are not anticipated. Noise would also be increased during operation of the 900-MW Alternative, but is anticipated to be negligible. The duration of noise and the size of the area experiencing increased noise during operation and construction would both be increased as compared to the 750-MW Project. Hence, the 900-MW Alternative is anticipated to have slightly more impacts resulting from noise than the 750-MW Project and the 300-MW Alternative. With mitigation in place, these impacts are considered negligible.

Cumulative impacts to noise from past, present, and reasonably foreseeable future actions, in combination with the 900-MW Alternative, are not anticipated.

4.2.3.2.12 Visual Resources

The 900-MW Alternative would have similar and slightly increased impacts to visual resources than the 750-MW Project, but over an increased area. The impacts associated with the 750-MW Project are described in detail in Section 5.13, Visual Resources, and include visual alteration of the existing landscape over the Project Site. The 900-MW Alternative would have an approximately 1,000-acre larger footprint than the 750-MW Project, resulting in increased impacts to visual resources.

Cumulative impacts associated with the 900-MW Alternative would be increased in magnitude from the 750-MW Project, because the larger-sized alternative would have slightly more additive impact when combined with surrounding projects. Substantial cumulative impacts to visual resources have not been identified as a result of the construction, operation, maintenance, or long-term presence of the 750-MW Project, and as such, none are assumed for the 900-MW Alternative. Therefore, cumulative impacts to visual resources from the 900-MW Alternative are anticipated to be negligible.

4.2.3.2.13 Waste Management

During construction, the 900-MW Alternative would generate waste materials such as wood, concrete, paper, plastic, etc., that would be recycled, if feasible, or placed in a local landfill. The 900-MW Alternative would also generate a small amount of hazardous wastes that would be recycled or disposed of in accordance with all applicable regulations. The local landfills and treatment and disposal facilities have adequate capacity for these waste streams from the larger 900-MW Alternative area; therefore, impacts are not anticipated for the 900-MW Alternative. During construction of the 900-MW Alternative, storm water runoff would be controlled to prevent violations of water quality standards by implementing the BMPs outlined in an approved Storm Water Pollution Prevention Plan.

The operation of the 900-MW Alternative would generate similar waste streams to those of the 750-MW Project in the long term but in slightly increased quantities. Also, operation of the raw water demineralization plant would generate wastewater that would be allowed to evaporate and mineral waste would be collected for recycling or disposal. These waste streams are considered negligible. Operation of the septic system with leach fields would include appropriate maintenance, such as regular solids removal, and is not anticipated to be a substantive impact.

When considering other past, present, and future projects within the region, the cumulative impacts from the 900-MW Alternative are not expected to be substantive given the BMPs and proposed management measures that will reduce the potential for impacts from waste.

4.2.3.2.14 Hazardous Materials Handling

Similar to the 750-MW Project, small quantities of hazardous wastes would likely be generated over the course of construction of the 900-MW Alternative. These wastes might include waste paint, spent construction solvents, waste cleaners, waste oil, oily rags, waste batteries, and spent welding materials. Hazardous wastes generated during construction and operation of the 900-MW Alternative would be handled and disposed of in accordance with applicable LORS and BMPs. Hazardous wastes would be either recycled or disposed of in a licensed Class I disposal facility, as appropriate. When managed and disposed of properly, these wastes are not

anticipated to cause environmental or health and safety impacts. Most of the hazardous waste generated during construction can be recycled. The small quantities of hazardous waste that cannot be recycled are not expected to impact the capacity of the Class I landfills in California.

Cumulative impacts due to hazardous materials handling are not expected from future projects in combination with the 750-MW Project or the slightly larger 900-MW Alternative (based on land uses in the surrounding area and the limited amount and type of hazardous materials to be used).

4.2.3.2.15 Public Health and Safety

Impacts from the 900-MW Alternative would pose slightly more of a hazard to public health and safety than under the 750-MW Project, primarily because of the increased construction required for the larger 900-MW Alternative. The only toxic air contaminant emitted from the operation of the 750-MW Project is expected to be diesel particulate from the testing of the diesel emergency fire water pump and emergency generator engines. Thus, it is assumed that the toxic risk for the slightly larger 900-MW Alternative would either be the same as or slightly increased over the 750-MW Project. Because only diesel particulate has long-term health risk thresholds, only cancer risk and the chronic non-cancer THI were evaluated as HRAs. For the 750-MW Project, the estimated cancer risk at all locations is well below the criterion of 10 in 1 million. Thus, it is concluded that the emissions from the diesel emergency fire water pump and emergency generator engines for the slightly larger 900-MW Alternative will not pose a substantive cancer risk to any population that would potentially be exposed to these emissions.

The maximum chronic THI resulting from the 750-MW Project's emissions was estimated to be 0.00003. The estimated chronic THI is well below the criterion of 1. Thus, it is concluded that like the 750-MW Project, the slightly larger 900-MW Alternative would not pose a substantive non-cancer health risk to any population that would potentially be exposed to these emissions from the diesel emergency fire water pump and emergency generator engines.

Sources of uncertainty in HRAs include emissions estimates, dispersion modeling, exposure characteristics, and extrapolation of toxicity data in animals for application to humans. The annual PM_{10} emission rates for the emergency diesel engines were derived using vendor data assuming the anticipated testing schedule at a maximum load for the maximum number of annual operating hours requested in this application. The conservatism introduced at each step in the HRA to compensate for all of these sources of uncertainty is compounded in the predicted health risks; therefore, the actual risks resulting from exposure to emissions from the 750-MW Project are expected to be well below the values presented in this analysis.

The NAAQS and CAAQS specify allowable levels of specific air pollutants that should not be exceeded to protect the public health. The results presented in Section 5.2, Air Quality, show that the 750-MW Project area will not cause or contribute to exceedances of any CAAQS or NAAQS. Thus, like the 750-MW Project, the slightly larger 900-MW Alternative is not anticipated to have adverse health impacts from the criteria pollutant (nitrogen dioxide, carbon monoxide, sulfur dioxide, and PM_{10}) emissions generated from the diesel emergency fire water pump and emergency generator engines.

No other new potential sources of toxic air contaminants (associated with recently received construction permits that are not yet operational, or that are currently in the permitting process, or that can be expected to do so in the near future) are known for projects within 6 miles of the 750-MW Project (or the 900-MW Alternative); thus, no additional cumulative impacts would be anticipated for the 900-MW Alternative.

4.2.3.2.16 Worker Safety

No environmental consequences related to worker safety or unavoidable adverse impacts to worker safety are anticipated from the 750-MW Project. Since measures to ensure worker safety would be the same under the 900-MW Alternative as they are under the 750-MW Project, no environmental consequences or unavoidable adverse impacts to worker safety are anticipated from the 900-MW Alternative.

Construction, operation, and maintenance activities may expose workers to the hazards identified in Section 5.17, Worker Safety. Exposure to these hazards can be minimized through adherence to appropriate engineering design criteria and administrative controls, use of applicable personal protective equipment, and compliance with all applicable health and safety LORS. The programs, regulations, and preventive measures intended to control the potential worker health and safety impacts associated with these hazards are described in Section 5.17. This section describes a comprehensive health, safety, and fire prevention program, and an accident/injury prevention program intended to ensure healthful and safe operations at the 750-MW Project Site. These programs would apply equally to the 750-MW Project or the 900-MW Alternative.

4.3 ALTERNATIVE SITES CONSIDERED BUT REJECTED

Three potential alternative Project sites and several alternative forms of energy generation were not carried forward for detailed analysis because they were not considered feasible. It is unlikely that they would avoid or substantially reduce environmental impacts compared to the Project location and they would fail to satisfy most of the Project's basic objectives for reasons summarized in the following subsections.

4.3.1 Screening Criteria

Three alternative Project sites were screened for the Project (see Figure 4-2, Alternative Sites Considered but Rejected). Input was obtained as the Project was developed through discussions with the CEC, the CAISO, and the BLM for each alternative site. The solar intensity threshold was the most important consideration when evaluating potential sites, which helped identify those areas within California that had the greatest potential to efficiently generate solar power. Other site screening factors included proximity to essential infrastructure (e.g., an electric transmission system), proximity to available water, sufficient land area (needed to accommodate a minimum number of acres of solar generation), minimal to no federal or state land ownership restrictions, flat topography with preferred slope and aspect ratios, and a lack of or minimal impacts on environmentally sensitive areas. These screening criteria were used to evaluate all potential alternative sites.

4.3.2 Alternative Sites

Three alternative site locations were considered but not carried forward for further analysis. These alternative locations are as listed here.

- **Alternative Site #1 (Site AS1):** Location is northwest of Fish Creek Wilderness and southeast of Ocotillo Wells, California.
- **Alternative Site #2 (Site AS2):** Location is southeast of Site AS1.
- **Alternative Site #3 (Site AS3):** Location is due west of Westmorland, California.

These sites are further discussed below.

4.3.2.1 Screening for Site AS1

The first alternative site reviewed (Site AS1) is located southeast of Ocotillo Wells (Figure 4-2, Alternative Sites Considered but Rejected), in Township 12, Range 9 East, Sections 31, 32, Township 13 South, Range 9 East, Sections 3, 4, 5, 7, 8, 9, 10, 14, 15, 16, 17, and 23, near the Fish Creek Wilderness Area and due south off of California State Highway 78. The following screening criteria were used in the evaluation: (1) site suitability (solarity, size, and grade), (2) site control, (3) proximity to infrastructure, (4) environmental sensitivity, (5) jurisdictional issues, and (6) economic viability. Short- and long-term water resource availability (seventh criterion) was also considered before an operational decision was made about the site. During the brief high-level data review for the site, the majority of data showed that Site AS1 was acceptable. After a more detailed desktop review was conducted, several siting criteria began to fall out, as discussed below.

The first screening criterion (site suitability) addresses two of the Project objectives:

- to construct a utility-scale solar site with a capacity of approximately 1,000 MW, and
- to locate the site in an area of high solarity with ground slopes of 5 percent or less.

Although Site AS1 did satisfy the first objective, it failed to meet the second.

In some areas, the ground slope of this site was found to exceed 5 percent. The third screening criterion (proximity to infrastructure) was also problematic. Site AS1 was located at a great distance from main roadways. Also, the site lacked an adequate water supply (seventh criterion). Thus, the site was determined to be marginal when attempting to meet these criteria. Furthermore, the availability of groundwater at Site AS1 was uncertain. Other Project screening criteria included avoiding a site that was adjacent to a highly pristine or biologically sensitive area (e.g., the Fish Creek Wilderness Area) (fourth criterion) and locating the Project on a site where it would have the least impact to sensitive biological resources (fourth criterion). The primary fatal flaw for the site was its location within the United States Department of Defense “no-fly,” “no-build” area (fifth criterion), according to information issued by the United States Department of Defense. Once this prohibition was realized, this site was dropped from further consideration.

4.3.2.2 Screening for Site AS2

The second alternative site reviewed (Site AS2) is located southeast of Ocotillo Wells and the San Felipe Substation (Figure 4-2, Alternative Sites Considered but Rejected), in Township 13 South, Range 9 East Sections 13, 24 and Range 10 East 7, 8, 13, 17, 18, 19, 20, 29, and 30, bordering the Union Pacific Railroad to the south and due southeast of Site AS1. Similar to Site AS1, the following screening criteria were used in the evaluation of Site AS2: (1) site suitability (solarity, size and grade), (2) site control, (3) proximity to infrastructure, (4) environmental sensitivity, (5) jurisdictional issues, and (6) economic viability. Short- and long-term water resource availability (seventh criterion) was also considered before an operational decision was made about the site. During the brief high-level data review for the site, the majority of data showed that Site AS2 was acceptable. After a more detailed desktop review was conducted, several siting criteria began to fall out, as discussed below.

The first screening criterion (site suitability) addresses two of the Project objectives:

- to construct a utility-scale solar site with a capacity of approximately 1,000 MW, and
- to locate the site in an area of high solarity with ground slopes of 5 percent or less.

Although Site AS2 did satisfy the first objective, it failed to satisfy the second.

In some areas, the ground slope of this site was found to exceed 5 percent. The third screening criterion (proximity to infrastructure) was also reviewed. Site AS2 was located a great distance from main roadways. Also, the site lacked an adequate water supply (seventh criterion), and the availability of groundwater at Site AS2 is uncertain. Thus, Site AS2 was determined to be marginal when attempting to meet these Project criteria. Other screening criteria included avoiding a site that is adjacent to a highly pristine or biologically sensitive area (e.g., the Fish Creek Wilderness Area) (fourth criterion). As with Site AS1, it was determined that Site AS2 was also within the United States Department of Defense “no-fly,” “no-build” area (fifth criterion). Therefore, the site was dropped from further consideration.

4.3.2.3 Screening for Site AS3

The third alternative site reviewed (Site AS3) is located due west of Westmorland, California, west of the proposed Sunrise Powerlink transmission line and due southwest of the Salton Sea (Figure 4-2, Alternative Sites Considered but Rejected). Specifically, Site AS3 is located in Township 13 South Range 12 East Sections 5, 6, 7, 8, 9, 15, 17, 2, 21, and 22. As with Site AS1 and Site AS2, the following screening criteria were used in the evaluation: (1) site suitability (e.g., solarity, size and grade), (2) site control, (3) proximity to infrastructure, (4) environmental sensitivity, (5) jurisdictional issues, and (6) economic viability. Short- and long-term water resource availability (seventh criterion) was also considered before an operational decision was made about the site. During the brief high-level data review for the site, the majority of data showed that Site AS3 was acceptable. After a more detailed review was conducted, several siting criteria began to fall out, as discussed below.

The first screening criterion (site suitability) addresses two of the Project objectives:

- to construct a utility-scale solar site with a capacity of approximately 1,000 MW, and
- to locate the site in an area of high solarity with ground slopes of 5 percent or less.

Although Site AS3 did satisfy the first objective, it failed to meet the second.

In some areas, the ground slope of this site was found to exceed 5 percent. The third and seventh screening criteria (proximity to infrastructure and water availability) were also reviewed. Although Site AS3 is located only a short distance from a state highway, the site lacks an adequate water supply and the availability of groundwater was uncertain; thus, the site was considered to be marginal when attempting to meet the objectives of the Project. Other Project screening criteria include avoiding a site that was adjacent to a highly pristine or biologically sensitive area (e.g., a wilderness area) (fourth criterion). The main fatal flaw for this site was that it did not meet the third criterion (proximity to infrastructure). The site would have required off-road access, additional transmission capabilities, and extensive off-site transmission lines. For these reasons, Site AS3 was dropped from consideration.

4.4 COMPARISON OF ALTERNATIVE TECHNOLOGIES

Renewable energy effectively uses natural resources (such as sunlight, wind, rain, tides, and geothermal heat) which are naturally replenished. Renewable energy technologies include solar power, wind power, hydroelectricity/micro-hydroelectricity, biomass, and bio-fuels (for transportation).

In 2007, about 20 percent of global final energy consumption came from renewables, with 15 percent coming from traditional biomass uses, such as wood-burning. Hydropower was the next largest renewable source, providing 3 percent, followed by hot water/heating, which contributed 1.3 percent. Modern technologies, such as geothermal, wind, solar, and ocean energy, together provided about 0.8 percent of final energy consumption. The technical potential for the use of renewable energy is very large, exceeding all other readily available sources.

Several other alternative renewable technologies would meet the Project objectives (as described in Section 2.0, Project Objectives/Purpose and Need). However, since the Applicant has patented a solar thermal technology that is proven, reliable, and effective, these other technologies were considered but rejected. For informational purposes only, these other technologies are briefly described below.

4.4.1 Other Solar Thermal Technologies

Several other solar thermal technologies are currently being developed and/or refined. As background**,** solar thermal projects are defined as “the process of concentrating sunlight on a relatively small area to create the high temperature necessary to vaporize water or other liquids to drive a turbine (or other engine) for generation of electric power” (CEC Glossary 2003). These projects include technologies such as solar trough, solar power tower, and compact linear Fresnel reflectors.

4.4.2 Solar Photovoltaic Technology

In general, photovoltaic technologies are a more familiar solar technology than solar thermal technologies. Photovoltaic technology differs from solar thermal in that photovoltaic technology converts light directly into electricity (CEC Glossary 2003). Although photovoltaic technology is more widely known (e.g., most rooftop solar panels are photovoltaic), this technology is not commonly associated with large utility-scale electric generation.

4.4.3 Integrated Gasification Combined Cycle

Integrated gasification combined cycle (IGCC) technology gasifies applications that burn coal or petroleum coke in a gas turbine cycle. The coal gasification equipment is located at the same site as the power generating equipment (a combustion turbine, a heat recovery steam generator, and a steam turbine). IGCC does not have adequate commercial operating experience, and its cost-effectiveness consistently varies. IGCC would also require either the importation of coal by truck and/or rail to the Project area from outside California or the importation of coke from petroleum refineries. Additional issues include increased traffic levels and on-site coal/coke storage. Also, the control of coal dust from coal that is in storage is a large capital cost. Although IGCC can result in lower emissions than a conventional coal-fired power plant, an IGCC plant would still have substantially more pollutant emissions (both criteria and greenhouse gas emissions) than a gas-fired combined-cycle plant. Also, IGCC would not provide renewable energy.

4.4.3.1 Coal or Other Solid Fuel Conventional Furnace/Boiler – Steam Turbine

With this technology, coal, petroleum coke, or other solid fuels are burned in a boiler, creating steam that is used in a steam turbine generator. The steam is condensed and returned to the boiler. Efficiencies would be in the range of 35 to 40 percent, which is comparable to that of a gas-fired boiler/steam turbine unit. This technology would require either the importation of coal by rail and/or truck from outside the state or the importation of coke from in-state petroleum refineries. This technology would result in increased traffic and would also require on-site coal/coke storage. In addition, this technology would produce more emissions (both criteria and greenhouse gas emissions) than a natural gas-fueled facility of equivalent size, require a larger site, and be more costly to build and operate. Finally, this technology would not provide renewable energy.

These technologies are commercially available and could be implemented. However, because of their relatively low efficiency, these technologies, when implemented, result in the emission of a greater quantity of air pollutants per kilowatt-hour generated than solar power. Use of these fuel sources does not meet the Project objectives as a renewable power source.

4.4.3.2 Fluidized-Bed Combustion

Fluidized-bed combustion burns coal or other solid fuels in a hot bed of limestone-containing inert material that is kept suspended or fluidized by a hot air stream. Water coils in the furnace create steam, which drives a steam turbine generator. Fluidized-bed technologies (atmospheric and pressurized) have efficiencies in the range of 35 to 45 percent. Pressurized fluidized-bed technology is not commercially available on the scale of the Project. As with other solid-fuel

technologies, fluidized-bed technology would require either the importation of coal from outside the state or the importation of coke from in-state petroleum refineries; this technology would also require a larger site and produce higher air emission levels of both criteria and non-criteria pollutants, such as carbon monoxide. In addition, this technology would not produce renewable energy.

4.4.3.3 Nuclear

California law prohibits the construction of new nuclear plants until the scientific and engineering feasibility of disposing of high-level radioactive waste has been demonstrated. To date, the CEC has been unable to make a finding of disposal feasibility, as required by law for this alternative to be viable in California.

4.4.3.4 Geothermal

Geothermal was eliminated from further consideration because the Applicant's technology is not geothermal, and because the cost-effective application of geothermal technology requires more expensive means and longer lead times for permitting and equipment design than required for solar technology.

4.4.3.5 Biomass

Biomass fuels, such as wood wastes, were eliminated from further consideration because they are not available in the immediate Project area in sufficient quantities to make them a practical alternative fuel. Also, potential issues include problems with logistics, tipping fees, and control of quality and quantity of municipal solid waste created. In addition, biomass facilities can produce considerable air emissions.

4.4.3.6 Wind

Wind energy involves the use of wind power to drive a rotor or propeller, which in turn drives a generator. Wind energy equipment is relatively tall and has potentially substantial visual impacts. Only a limited number of sites have sufficient wind available for energy generation purposes. The Project area is not identified as an important wind energy resource area in the Renewable Energy Atlas of the West (Nielsen et al. 2006).

4.4.3.7 Hydroelectric

Hydroelectric was eliminated from further consideration because the resources for water movement within Imperial County are all controlled. Water has become a controlled commodity within the Imperial County and the IID. IID operates the only controlled water canals within the area.

4.5 ALTERNATIVE LINEAR ROUTES

No alternative access road alignment or transmission line ROW alternatives are proposed at this time. The only alternative route for the water supply pipeline is the use of a BLM ROW immediately south of the proposed route.

4.6 WATER SUPPLY

The expected average daily raw water consumption for Project construction is approximately 43 million U.S. gallons, or 132 acre-feet per year. Under normal operation with dish mirror cleaning, dust control, and potable water usage, the amount will be approximately 14 million U.S. gallons, or 43 acre-feet per year. The design of the Project minimizes water use and maximizes the recovery of process potable water. If possible, wastewater discharge will be routed to the on-site raw water storage tank for reuse.

Alternative water supplies considered but rejected are discussed in detail in Section 5.5, Water Resources. The following water supply alternatives are considered viable water supply alternatives to be considered for the Project. A brief discussion of each is included below. See also Section 5.5 for more information.

Viable water supply alternatives are as follows:

- **Groundwater Aquifer:** DWR Bulletin 118 indicates that the Coyote Wells groundwater aquifer, which the Project Site chiefly overlies, is in an overdraft situation. For this reason, the use of groundwater from the Coyote Wells aquifer was not considered for the primary water supply source for the Project.
- **Water from a Secondary Service Provider:** Obtaining water from one of two water service providers in the area besides IID (the Ocotillo Mutual Water Company or the Coyote Valley Mutual Water Company) is also a viable alternative.
- **Trucking Water:** This option is considered a short-term supply option if the main supply source is interrupted. See Section 4.5, Alternative Linear Routes, for more information on this option.

The preferred water supply source is surface water canals in the area of the Project Site. The closest and most economical supply source is the IID Westside Main Canal.

Surface water delivery by IID is deemed to be feasible for use at the Project, because this alternative would be able to provide sufficient volume and quality, this alternative satisfies California Water Policy, and this alternative is safe and reliable.

4.6.1 Existing Surface Water from Imperial Irrigation District

This alternative is a viable water supply option for the Project. IID will distribute water to the Project (see Appendix U, Imperial Irrigation District Water Letter). A key screening factor in the selection of the Project Site was its proximity to available IID canal water. Untreated raw water for the Project will be obtained from IID by means of a water supply pipeline that will be installed and a pumping station to be located on IID property. The proposed on-site pipeline is expected to meet 100 percent of the water needs of the Project. Based on evaluation of past water demand in the vicinity of the Project, the Project's water demand is not anticipated to

cause any adverse water supply issues regarding groundwater. Project on-site storage capability will be sufficient to accommodate two days of full load operation and normal maintenance on the water delivery and treatment equipment.

4.6.2 Trucking Water to the Project Site from Surrounding Areas

Trucking water to the Project Site from the surrounding area is both a short-term water supply alternative and an emergency backup option for supplying water to the Project. Under this short-term alternative, the water would be driven 14 miles to the Project Site (from El Centro, California). During normal Project operations under this alternative, three to five 12,000-gallon tanker trucks per day would be sufficient to sustain daily average and daily maximum requirements for operations. However, it is not anticipated that this alternative would be viable for long-term Project operation. To continuously haul water to the Project Site for the life of the Project would be costly and increase the potential for environmental impacts (e.g., increase the traffic and air quality emissions related to the truck trips).

4.7 DEMINERALIZER WATER TREATMENT FACILITY

Although counter-current regenerated ion exchange demineralizer plants have been widely available since the 1960s, the past decade has seen the introduction of a new generation of demineralizer designs in North America and Europe. A variety of systems are available with minor differences in design, but all of these systems tend to share a number of common features. These include:

- counter-flow (i.e., counter-current) regeneration,
- packed resin beds (i.e., no freeboard),
- fine/uniform particle resins,
- short resin beds, and
- shorter operating cycles.

The major advantages claimed for this technology are lower regenerate chemical consumption, higher demineralized water purity, and smaller equipment. The varieties of products within the industry have sparked renewed interest in ion exchange demineralization. The improved performance has reversed or slowed the industry-wide trend toward the use of reverse osmosis in lieu of ion exchange. As knowledge of health issues increases and detection methods improve, we learn that our drinking water has “new” impurities. Ion exchange is a well understood process that can remove contaminants and is reliable, selective, and economical.

The Project will have an ion exchange facility installed at the Main Services Complex. This system will produce all of the potable water required for on-site usage. Enough water for 2 full days of demineralized water usage will be stored on-site at all times.

The entire Project will be served by a septic wastewater management system and other individual drain disposal systems. No wastewater treatment plants are located in the area of the Project, so Project wastewater cannot be sent for treatment. Thus, the proposed sanitary system will consist of a buried 1,000-gallon septic tank and dual leach field for all sanitary wastes, including toilets, sinks, and showers. Storm water will be collected on-site and directed to swales and detention areas for percolation into the ground. No other alternative wastewater treatment methods would be practical for the Project Site, and other treatment methods would have an increased potential for environmental impacts.

4.8 HYDROGEN GAS MANAGEMENT ALTERNATIVES

The Stirling Engine is a closed-loop hydrogen gas managed system. During normal operations, the dish will direct the focus of the sun into the engine aperture, which will create the heat mass balance required for normal operations. During normal operations, an on-sun condition means that the dish system is focused on the sun and the hydrogen gas is in circulation.

In addition to the single k-bottle hydrogen gas management option described for the Project (see Section 3.0, Project Description and Location), two other hydrogen gas management system methods could be used. These two methods are described below.

4.8.1 Hydrogen Gas Management System Alternative 1

Hydrogen gas management system Alternative 1 would be segmented into a single, low-pressure stainless steel line for supplying high-pressure hydrogen compressor for the engine. This compressor automatically would feed hydrogen to the continuously small and decreasing volume of hydrogen within the Stirling cycle process. The hydrogen feed system would consist of a grouping of approximately 360 dishes that would have a hydrogen feed system centrally located within the dish group. The tubing would be a centralized main hydrogen feed header with buried tubing lateral that connects to each dish. There would be 83 centralized hydrogen tube bundle storage tanks that would have an adequate amount of hydrogen feed for 90 to 120 days.

4.8.2 Hydrogen Gas Management System Alternative 2

Hydrogen gas management system Alternative 2 would segment the hydrogen stainless tubing into a high-pressure and a low-pressure feed and discharge to the engine. By allowing high- and low-pressure hydrogen tubing feed and discharge to the engine, numerous and very expensive hydrogen engine cycle components could be removed from the hydrogen gas management system. The high- and low-pressure system is still being developed and is one of the best means of controlling hydrogen usage and inventory control.

4.9 REFERENCES

CEC (California Energy Commission). 1995. 1994 Biennial Electricity Report (ER94), P300-95-002. November.

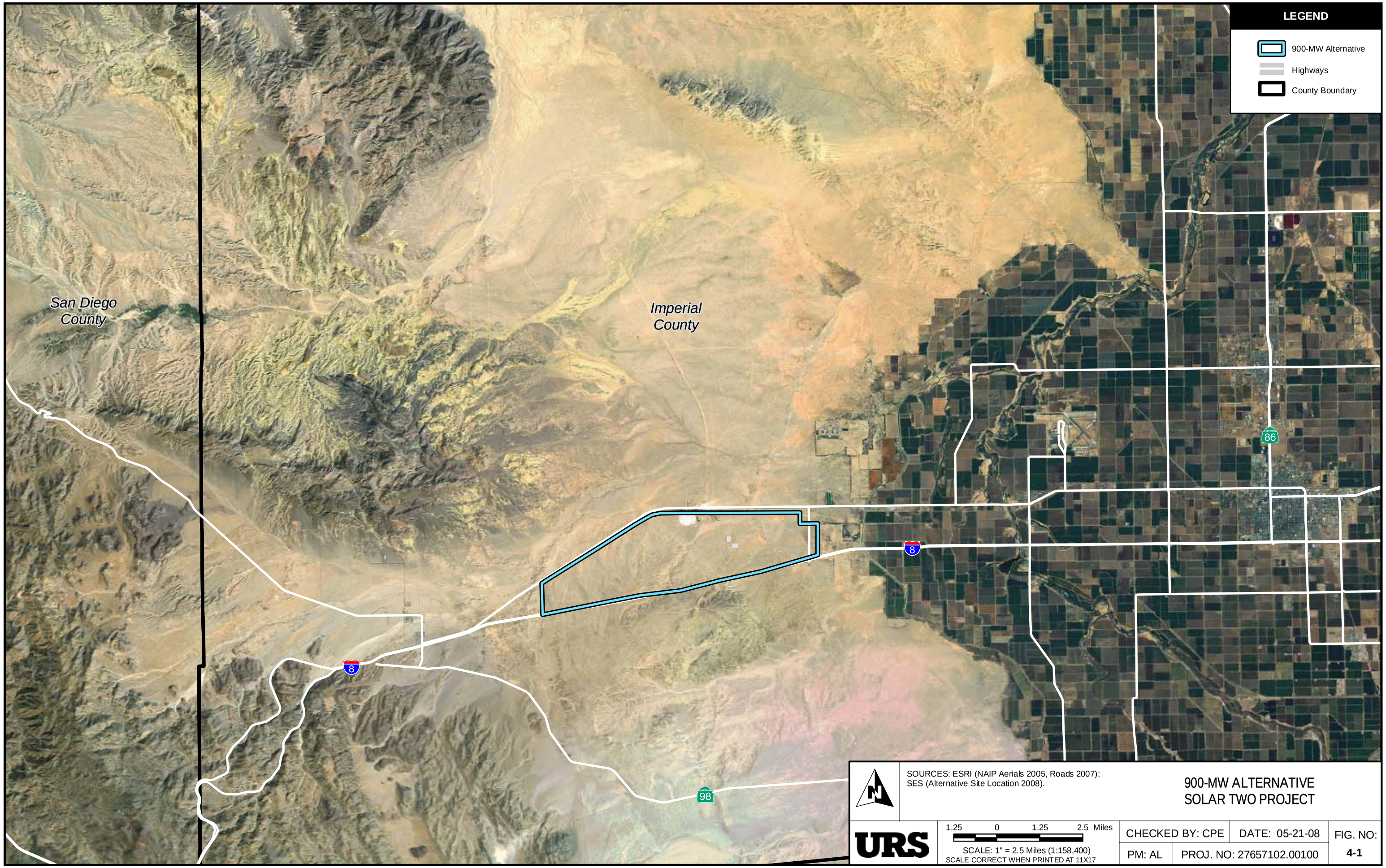
CEC (California Energy Commission) Glossary. 2003. http://www.energy.ca.gov/glossary/glossary-p.html.

Nielsen, Innis, Pollock, Rhoads-Weaver, Shutak and Northwest Sustainable Energy for Economic Development. 2006. Renewable Energy Atlas of the West.

UROPACK Data Brochure. 2001. Available at: http://www.purolite.com/Upload/HTMLEditor/Puropack%20Case%20History.pdf.

Adequacy Issue:	Adequate		Inadequate		DATA ADEQUACY WORKSHEET	Revision No.	0	Date	
Technical Area:	**Alternatives**			Project:	Solar Two Project		Technical Staff:		
Project Manager:				Docket:			Technical Senior:		

SITING REGULATIONS	INFORMATION	AFC SECTION NUMBER	ADEQUATE YES OR NO	INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS
Appendix B (b) (1) (D)	A description of how the site and related facilities were selected and the consideration given to engineering constraints, site geology, environmental impacts, water, waste and fuel constraints, electric transmission constraints, and any other factors considered by the applicant.	Sections 4.1 through 4.6		
Appendix B (f) (1)	A discussion of the range of reasonable alternatives to the Project, or to the location of the Project, including the No Project Alternative, which would feasibly attain most of the basic objectives of the Project but would avoid or substantially lessen any of the significant effects of the Project, and an evaluation of the comparative merits of the alternatives. In accordance with Public Resources Code section 25540.6(b), a discussion of the applicant's site selection criteria, any alternative sites considered for the Project, and the reasons why the applicant chose the proposed site.	Section 4.1 Section 4.2 Section 4.3 Section 4.5 Figure 4-2		
Appendix B (f) (2)	An evaluation of the comparative engineering, economic, and environmental merits of the alternatives discussed in subsection (f)(1).	Section 4.2.3.2 Section 4.3 Section 4.4 Section 4.5 Section 4.8		



SOURCES: ESRI (NAIP Aerials 2005, Roads 2007); SES (Alternative Site Location 2008).

900-MW ALTERNATIVE
SOLAR TWO PROJECT

URS

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SCALE: 1" = 2.5 Miles (1:158,400)
SCALE CORRECT WHEN PRINTED AT 11X17

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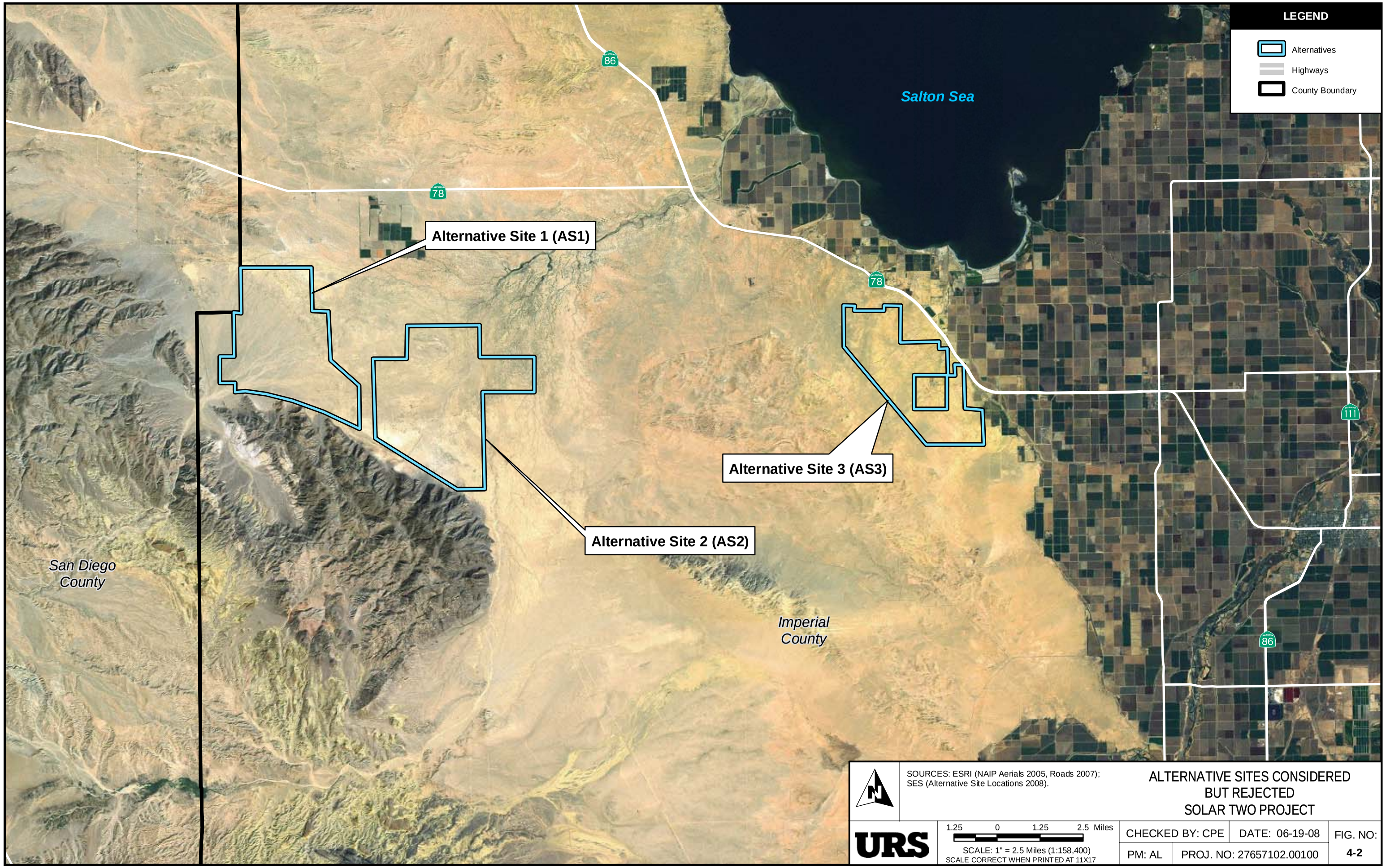

SOURCES: ESRI (NAIP Aerials 2005, Roads 2007); SES (Alternative Site Locations 2008).

ALTERNATIVE SITES CONSIDERED BUT REJECTED
SOLAR TWO PROJECT

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