SOIL AND WATER RESOURCES

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SUMMARY OF CONCLUSIONS

With the information provided to date, the Bureau of Land Management (BLM) and Energy Commission staff (hereafter jointly referred to as staff) have determined that construction, operation, and decommissioning of the proposed project could potentially impact soil and water resources. Where these potential impacts have been identified, staff has proposed mitigation measures to reduce identified impacts to levels that are less than significant. The mitigation measures, as well as specifications for laws, ordinances, regulations and standards (LORS) conformance, are included herein as conditions of certification. The conditions of certification referred to herein address the California Environmental Quality Act (CEQA) requirements for the Energy Commission's analysis and BLM's needs for a National Environmental Policy Act (NEPA) analysis. The project would conform with all applicable LORS. Staff's conclusions based on analysis of the information submitted to-date are as follows:

1. The proposed project would be located on an alluvial fan where flash flooding and mass erosion could impact the project. Project-related changes to the alluvial fan hydrology could result in impacts to adjacent land users and the Ivanpah playa. The applicant completed a hydrologic study and modeling of the alluvial fan. Based on this work and subsequent confirmatory and sensitivity modeling conducted by the BLM, scour analyses have been performed to support development of a project design that can withstand flash flood flows with minimal damage to site structures and heliostats. In addition, a Drainage, Erosion, and Sedimentation Control Plan (DESCP) has been developed to mitigate the potential storm water and sediment project-related impacts. However, the calculations and assumptions used to evaluate potential storm water and sedimentation impacts are imprecise and have limitations and uncertainties associated with them. Given the uncertainty associated with the calculations, the magnitude of potential impacts that could occur cannot be determined precisely. As discussed in the Biological Resources and Recreation sections, the potential effects associated with storm water and sedimentation impacts could adversely affect habitat for a threatened species (the desert tortoise), as well as recreational use of Ivanpah Playa. Should these impacts occur, they would likely be highly controversial. Based on these factors, the proposed project could result in impacts that would be significant with respect to CEQA significance criteria specified herein and NEPA significance criteria specified in 40 CFR 1508.27. Therefore, Condition of Certification **SOIL&WATER-5** has been developed that defines monitoring, inspection, and damage response requirements, as well as standards and procedures for re-considering the proposed storm water management approach if needed in the future.

2. The proposed project would use an air-cooled condenser for heat rejection and would recycle process wastewater from all plant equipment, including boilers and water treatment equipment, to the extent practicable. Recycling the wastewater would maximize reuse of process water and conserve freshwater. Use of this technology would substantially reduce water use and is consistent with water policy

and the constitutional requirement that State water resources be put to beneficial use to the fullest extent possible.

3. Impacts to groundwater supply and quality would be less than significant. In the Ivanpah Valley Groundwater Basin (IVGB), two substantial components of the basin's water balance are groundwater recharge through precipitation and groundwater loss through well pumping. Both precipitation and pumping in the basin will vary over the 50-year life of the proposed project. To ensure that the project's proposed use of groundwater does not significantly impact the beneficial uses and users of the groundwater in the basin, staff believes the applicant should be required to comply with San Bernardino County's Desert Groundwater Management Ordinance. The applicant would thus be required to develop a monitoring program and identify what changes are occurring in basin water levels. Staff believes the monitoring program should also be designed to incorporate data from monitoring of groundwater pumping related to the Primm Valley Golf Club's groundwater use. Substantial changes to groundwater levels caused by the proposed project and other pumping in the basin would be documented by this monitoring and reporting program in accordance with Condition of Certification **SOIL&WATER-6**.

Completion of staff's analysis of the proposed project is subject to the following:

- Satisfactory completion of the heliostat pole installation testing by the applicant to either confirm or update its current installation plans followed by further evaluation by staff of whether there would be any impacts related to the method of construction or failure of the heliostats due to storm water flows.

INTRODUCTION

This section of the Final Staff Assessment/Draft Environmental Impact Statement (FSA/DEIS) analyzes potential impacts to soil and water resources from the construction or operation of the Ivanpah Solar Electric Generating System (ISEGS) project. Where the potential of a significant impact is identified, staff has proposed mitigation to reduce the significance of the impact and, as appropriate, has recommended conditions of certification.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The following federal, state, and local environmental LORS have been established for the ISEGS project and similar facilities to ensure the best and appropriate use and management of both soil and water resources. Additionally, the requirements of these LORS are specifically intended to protect human health and the environment. The potential for project compliance with these LORS is a major component of staff's determination regarding the significance and acceptability of the ISEGS project with respect to the use and management of soil and water resources.

SOIL & WATER Table 1
Laws, Ordinances, Regulations, and Standards

Federal LORS	
Clean Water Act (33 U.S.C. Section 1257 et seq.)	The Clean Water Act (CWA) (33 USC § 1257 et seq.) requires states to set standards to protect water quality, which includes regulation of storm water and wastewater discharges during construction and operation of a facility. California established its regulations to comply with the CWA under the Porter-Cologne Water Quality Control Act of 1967. The CWA also establishes protection of navigable waters through Section 401. Section 401 certification through the Army Corps of Engineers and Regional Water Quality Control Board (RWQCB) is required if there are potential impacts to surface waters of the State and/or Waters of the United States, such as perennial and ephemeral drainages, streams, washes, ponds, pools, and wetlands. The Army Corps and RWQCB can require impacts to these waters to be quantified and mitigated.
Resource Conservation and Recovery Act, 40 CFR Part 260 et seq.	The Resource Conservation Recovery Act (RCRA) is a comprehensive body of regulations that give U.S. EPA the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also sets forth a framework for the management of non-hazardous solid wastes.
State LORS	
California Constitution, Article X, Section 2	This section requires that the water resources of the State be put to beneficial use to the fullest extent possible and states that the waste, unreasonable use or unreasonable method of use of water is prohibited.
The Porter-Cologne Water Quality Control Act of 1967, Water Code Sec 13000 et seq.	Requires the State Water Resources Control Board (SWRCB) and the nine RWQCBs to adopt water quality criteria to protect state waters. Those regulations require that the RWQCBs issue Waste Discharge Requirements specifying conditions for protection of water quality as applicable. Section 13000 also states that the State must be prepared to exercise its full power and jurisdiction to protect the quality of the waters of the State from degradation.
California Water Code Section 13050	Defines “waters of the State.”
California Water Code Section 13240, 13241, 13242, 13243, & Water Quality Control Plan for the Lahontan Region (Basin Plan)	The Basin Plan establishes water quality objectives that protect the beneficial uses of surface water and groundwater in the Region. The Basin Plan describes implementation plans and other control measures designed to ensure compliance with statewide plans and policies and provides comprehensive water quality planning. The following chapters are applicable to determining appropriate control measures and cleanup levels to protect beneficial uses and to meet the water quality objectives: Chapter 2, Present and Potential Beneficial Uses; Chapter 3, Water Quality Objectives, and the sections of Chapter 4, Implementation, entitled “Requirements for Site Investigation and Remediation,” “Cleanup Levels,” “Risk

	Assessment," "Stormwater Problems and Control Measures," Erosion and Sedimentation," "Solid and Liquid Waste Disposal to Land," and "Groundwater Protection and Management."
California Water Code Section 13260	Requires filing, with the appropriate RWQCB, a report of waste discharge that could affect the water quality of the state unless the requirement is waived pursuant to Water Code section 13269.
California Code of Regulations, Title 23, Division 3, Chapter 30	This chapter requires the submission of analytical test results and other monitoring information electronically over the internet to the SWRCB's Geotracker database.
State Water Resources Control Board General Permit CAS000002.	The SWRCB regulates storm water discharges associated with construction projects affecting areas greater than or equal to 1 acre to protect state waters. Under General Permit CAS000002, the SWRCB has issued a National Pollutant Discharge Elimination System (NPDES) General Permit for storm water discharges associated with construction activity. Projects can qualify under this permit if specific criteria are met and an acceptable Storm Water Pollution Prevention Plan (SWPPP) is prepared and implemented after notifying the SWRCB with a Notice of Intent.
State Water Resources Control Board 2003-003-DWQ	This general permit applies to the discharge of water to land that has a low threat to water quality. Categories of low threat discharges include piping hydrostatic test water.
California Code of Regulations, Title 22	Title 22, Division 4, Chapter 15 specifies Primary and Secondary Drinking Water Standards in terms of Maximum Contaminant Levels (MCLs). These MCLs include total dissolved solids (TDS) ranging from a recommended level of 500 milligrams per liter (mg/l), an upper level of 1,000 mg/l and a short term level of 1,500 mg/l. Other water quality MCLs are also specified, in addition to MCLS specified for heavy metals and chemical compounds.
California Code of Regulations, Title 23	Title 23, Division 3, Chapter 15 applies to waste discharges to land and requires the Regional Board issue Waste Discharge Requirements specifying conditions for protection of water quality as applicable.
Local LORS	
County of San Bernardino General Plan and Development Code	Grading in San Bernardino County is subject to terms and conditions of San Bernardino County's General Plan and Development Code. Because the proposed site is located on federal land, county regulations are not directly applicable to the project. However, once the project has been approved by BLM, BLM has the option to request assistance from San Bernardino County to determine and implement specific grading and soil erosion standards. If a county grading permit is required by the BLM, the grading plan would need to be completed in compliance with San Bernardino County's General Plan and Development Code.
California Safe Drinking Water Act and San Bernardino County Code Title 3, Division 3, Chapter 6, Public Water Supply Systems	Requires public water systems to obtain a Domestic Water Supply Permit. The California Safe Drinking Water Act requires public water systems to obtain a Domestic Water Supply Permit. Public water systems are defined as a system for the provision of water for human consumption through pipes or other constructed conveyances that has 15 or more service connections or regularly serves at least 25 individuals daily at least 60 days out the year. California Department of Public Health (CDPH) administers the Domestic Water Supply Permit program, and has delegated issuance of Domestic Water Supply Permits for smaller public water systems in San Bernardino County to the County. Under the San Bernardino County Code Title 3, 5.15-6 Division 3, Chapter 6,

	Public Water Supply Systems, the County Department of Environmental Services monitors and enforces all applicable laws and orders for public water systems with less than 200 service connections. The proposed project would likely be considered a non-transient, non-community water system.
San Bernardino County Title 3, Division 3, Chapter 6,Article 5, Desert Groundwater Management	To help protect water resources in unregulated portions of the desert while not precluding its use, the County adopted this article. This article requires a permit to locate, construct, operate, or maintain a new groundwater well within the unincorporated, unadjudicated desert region of San Bernardino County. California Environmental Quality Act (CEQA) compliance must be completed prior to issuance of a permit, and groundwater management, mitigation, and monitoring may be required as a condition of the permit. The ordinance states that it does not apply to "groundwater wells located on Federal lands unless otherwise specified by inter-agency agreement." The BLM and County entered into a Memorandum of understanding (MOU) that provides that the BLM will require conformance with this code for all projects proposing to use groundwater from beneath public lands.
San Bernardino County Development Code Section 82.13.080, Soil Erosion and Sediment Control Plans/Permits	Section 82.13.080 establishes regulations and procedures to control human existing and potential induced accelerated erosion. Elements of this ordinance include project planning, preparation of Soil Erosion and Sediment Control Plans, runoff control, land clearing, and winter operations.
San Bernardino County Ordinance Code, Title 3, Division 3, Chapter 8, Waste Management, Article 5, Liquid Waste Disposal	This ordinance requires the following compliance for all liquid waste disposal systems: (1) compliance with applicable portions of the Uniform Plumbing Code and the San Bernardino County Department of Environmental Health (DEHS) standards; (2) approval by the DEHS and building authority with jurisdiction over the system; or (3) for alternative systems, approval by the DEHS, the appropriate building official of this jurisdiction, and the appropriate California RWQCB.
San Bernardino County Ordinance Code, Title 6, Division 3, Chapter 3, Uniform Plumbing Code	This ordinance describes the installation and inspection requirements for locating disposal/leach fields and seepage pits.
State Policies and Guidance	
Integrated Energy Policy Report (Public Resources Code, Div. 15, Section 25300 et seq.)	In the 2003 Integrated Energy Policy Report (IEPR), consistent with SWRCB Policy 75-58 and the Warren-Alquist Act, the Energy Commission adopted a policy stating they will approve the use of fresh water for cooling purposes by power plants only where alternative water supply sources and alternative cooling technologies are shown to be "environmentally undesirable" or "economically unsound."
State Water Resources Control Board Res. No. 68-16	The "Antidegradation Policy" mandates that: 1) existing high quality waters of the State are maintained until it is demonstrated that any change in quality will be consistent with maximum benefit to the people of the State, will not unreasonable affect present and anticipated beneficial uses, and will not result in waste quality less than adopted policies; and 2) requires that any activity which produces or may produce a waste or increased volume or concentration of waste and which discharges or proposes to discharge to existing high quality waters, must meet WDRs which will result in the best practicable treatment or control of the discharge necessary to assure that: a) a pollution or nuisance will not occur and b) the highest water quality consistent with maximum benefit to the people of the State will be maintained.

State Water Resources Control Board Res. 75-58	The principal policy of the SWRCB that addresses the specific siting of energy facilities is the Water Quality Control Policy on the Use and Disposal of Inland Waters Used for Power Plant Cooling (adopted by the Board on June 19, 1976, by Resolution 75-58). This policy states that use of fresh inland waters should only be used for power plant cooling if other sources or other methods of cooling would be environmentally undesirable or economically unsound.
State Water Resources Control Board Res. No. 88-63	States that all groundwater and surface water of the State are considered to be suitable for municipal or domestic water supply with the exception of those waters that meet specified conditions.
State Water Resources Control Board Res. 2005-0006	Adopts the concept of sustainability as a core value for State Water Board programs and directs its incorporation in all future policies, guidelines, and regulatory actions.
State Water Resources Control Board Res. 2008-0030	Requires sustainable water resources management such as low impact development (LID) and climate change considerations, in all future policies, guidelines, and regulatory actions. Directs Regional Water Boards to "aggressively promote measures such as recycled water, conservation and LID Best Management Practices where appropriate and work with Dischargers to ensure proposed compliance documents include appropriate, sustainable water management strategies."
The California Safe Drinking Water and Toxic Enforcement Act	The California Health & Safety Code Section 25249.5 et seq. prohibits actions contaminating drinking water with chemicals known to cause cancer or possessing reproductive toxicity. The RWQCB administers the requirements of the Act.

SETTING

The ISEGS project would be located in the Ivanpah Valley in the eastern Mojave Desert in San Bernardino County, California, near the California/Nevada border (**Soil & Water Figure 1**). This part of the Mojave Desert is federal land administered by the BLM. Water resources in this area are extremely limited and vegetation sparse. Due to these limitations, there is a need for a higher degree of water use management and additional protection against accelerated soil erosion.

IVANPAH VALLEY

The proposed project would be developed on an alluvial fan in the Ivanpah Valley. The Ivanpah Valley extends across the California state line and into Nevada and is part of a larger hydrologic system that includes Jean Lake Valley (BSE2007a). Precipitation in the surrounding mountains provides the Ivanpah Valley with water. Surface water runoff of mountain precipitation flows through washes and discharges to and infiltrates into the alluvium-filled valley. The Ivanpah Valley is topographically closed. Excess surface flow drains to the Ivanpah, Roach, and Jean Dry Lakes where it evaporates and leaves behind a hard lakebed (desert playa). The Ivanpah playa is now a world-class landsailing location due to the topographic flatness of the playa and high winds that can develop in this area.

The Ivanpah Valley is approximately 560,000 acres in size. Jean and Primm are the largest communities in the valley. The ISEGS project would be located near Primm and the Primm Valley Golf Club, a 22-acre facility. The basin is bound by several mountains: the Clark Mountains, Ivanpah Mountains, McCullough Range, Spring Mountains, New

York Mountains, Sheep Mountain, and the Bird Spring Range. Several northwest-trending faults transect the basin: the State Line, Ivanpah, and Clark Mountain faults (DWR2003).

Groundwater from the IVGB is the primary natural water supply for the valley region. The groundwater occurs in the Quaternary alluvium of the basin, which has a maximum thickness of at least 8,000 feet (ENSR2007). Groundwater generally flows towards the northeast and may be impeded by the northwest trending faults (DWR2003). At the proposed project location, depth to groundwater appears to vary from approximately 215 to 715 feet below ground surface (bgs), with depth increasing upslope along the alluvial fan (Broadbent2002). Groundwater in the IVGB appears to be unconfined with several local semi-confined areas, such as in the vicinity of Jean Dry Lake (URS1990). Transmissivity of the IVGB aquifer, estimated from well tests, ranges from 2,300 to 100,000 gallons per day per foot (gpd/ft) (URS1990). Higher transmissivity values occur in the southern (California) portion of the basin (URS1990). On average, transmissivity across the IVGB appears to be on the order of 20,000 gpd/ft (URS1990). The storage capacity on the California side of the valley of the IVGB is estimated to be 3.09 million acre-feet (AF) (DWR2003). The storage capacity on the Nevada side of the basin has not been estimated.

Precipitation supplies water to the basin. There is no underflow water supply to the basin (Glancy1968). Recharge from precipitation occurs by infiltration of mountain runoff across the alluvial deposits and through ephemeral washes. Recharge from precipitation on the valley floor is minimal. Direct recharge from rainfall on the valley floor is substantially less than the potential rate of evapotranspiration and potential for soil moisture retention. When runoff or precipitation does reach the dry lakes, infiltration to groundwater is negligible and most of the water is removed by evaporation (Glancy1968). Groundwater discharge from the basin occurs mainly through pumping and underflow towards the Las Vegas Valley (Glancy1968).

The Ivanpah and Roach playas may seasonally contain surface water, but there are no perennial surface flows to these playas. During infrequent heavy rains, storm water eventually drains across the alluvial fans to the playas. Surface desiccation cracks are present in the Ivanpah playa, and large desiccation cracks may be located below the surface that cause sinkholes to develop (Broadbent2009). Seasonal springs are present along the base of the Clark Mountains, up slope and hydraulically upgradient from the proposed project site. These springs occur in areas of consolidated rock and are estimated to flow at a rate of no more than 5 gallons per minute (gpm). The discharge from the springs is inadequate to sustain surface flow for a substantial distance (Glancy1968).

The natural groundwater quality varies widely, but can be characterized as predominated by cations of sodium and calcium with a bicarbonate anion (DWR2003). Elevated concentrations of fluoride and sodium occur in parts of the basin (DWR2003). In the vicinity of the Ivanpah playa, the groundwater is saltier and characterized as sodium chloride (DWR2003). Total dissolved solids (TDS) in the IVGB range from 300 to 500 milligrams per liter (mg/l), and can be as high as 7,702 and 27,501 mg/l in the vicinity of Ivanpah playa and in the northern part of the basin (DWR2003). TDS at the

project site is estimated to be between 369 to 600 mg/l, based on water samples from Colosseum wells # 1 and #2 located near the proposed project site (Broadbent2002).

Molycorp Mine, operated by Molycorp Minerals LLC, is a lanthanide mining and milling operation. Molycorp Mine discharged wastewater through a pipeline to ‘old’ evaporation ponds in the Ivanpah playa between 1980 to 1987, and later discharged wastewater to ‘new’ evaporation ponds in the playa between 1988 to 1998 (RWQCB1998a). The RWQCB Cleanup and Abatement Order No. 6-98-20 requires abatement of a groundwater plume that developed beneath the old evaporation ponds. This plume contains TDS, nitrate, strontium, barium, and radium in concentrations above the California Maximum Contaminant Levels (MCLs) (RWQCB1998a). Nitrate levels above the MCLs are present in the groundwater beneath the new evaporation ponds (RWQCB1998b). Sediments at both ponds contain lanthanides and radionuclides (RWQCB1998b). Most of the non-natural contamination in the IVGB is the result of discharge to these ponds.

A wastewater treatment plant (WWTP) for the community of Primm, Nevada, is located approximately six miles northeast of the proposed project site on the Nevada side of the Ivanpah Valley. The plant processes wastewater from three casino properties, fast food outlets, a shopping mall, convenience stores, gas stations, a fire station, RV park, and an employee apartment complex (Nevada2008). The plant is capable of producing up to 1.0 million gallons per day (gpd) of secondary treated wastewater, but its actual operational discharge is about half this volume (NDEP2008). Up to 30,000 gpd of this wastewater is used as make up water at the Nevada Energy Bighorn power plant, approximately 1.8 miles northeast of the WWTP (BWPC2008; NDEP2009). The Nevada Energy plant is a 600-megawatt (MW) capacity, natural gas fired, combined-cycle facility (NDEP2009).

The beneficial uses of the surface water and groundwater in the Ivanpah Valley have been defined in the 2005 *Water Quality Control Plan for the Lahontan Region, North and South Basins* (the Basin Plan). The beneficial use designations for surface water and groundwater in the Ivanpah Valley are presented below in **Soil and Water Table 2**.

SOIL & WATER Table 2
RWQCB Basin Plan Beneficial Use Designation for the Ivanpah Valley

SURFACE WATER	
Beneficial Use Designation	**Description**
Groundwater Recharge	Beneficial uses of waters used for natural or artificial recharge of ground water for purposes of future extraction, maintenance of water quality, or halting of saltwater intrusion into freshwater aquifers.
Flood Peak Attenuation/Flood Water Storage	Beneficial uses of riparian wetlands in flood plain areas and other wetlands that receive natural surface drainage and buffer its passage to receiving waters.
Wildlife Habitat	Beneficial uses of waters that support wildlife habitats including, but not limited to, the preservation and enhancement of vegetation and prey species used by wildlife, such as waterfowl.
Municipal and Domestic Supply	Beneficial uses of waters used for community, military, or individual water supply systems including, but not limited to, drinking water supply.
Agricultural Supply	Beneficial uses of waters used for farming, horticulture, or ranching, including, but not limited to, irrigation, stock watering, and support of vegetation for range grazing.
Freshwater Replenishment	Beneficial uses of waters used for natural or artificial maintenance of surface water quantity or quality (e.g., salinity).
Water Quality Enhancement	Beneficial uses of waters that support natural enhancement or improvement of water quality in or downstream of a water body including, but not limited to, erosion control, filtration and purification of naturally occurring water pollutants, streambank stabilization, maintenance of channel integrity, and siltation control.
Rare, Threatened, or Endangered Species	Beneficial uses of waters that support habitat necessary for the survival and successful maintenance of plant or animal species established under state and/or federal law as rare, threatened or endangered.
Cold Freshwater Habitat	Beneficial uses of waters that support cold water ecosystems including, but not limited to, reservation and enhancement of aquatic habitats, vegetation, fish, and wildlife, including invertebrates.
Warm Freshwater Habitat.	Beneficial uses of waters that support warm water ecosystems including, but not limited to, preservation and enhancement of aquatic habitats, vegetation, fish, and wildlife, including invertebrates.
Inland Saline Water Habitat	Beneficial uses of waters that support inland saline water ecosystems including, but not limited to, preservation and enhancement of aquatic saline habitats, vegetation, fish, and wildlife, including invertebrates.
Water Contact Recreation	Beneficial uses of waters used for recreational activities involving body contact with water where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skin and scuba diving, surfing, white water activities, fishing, and use of natural hot springs.
Noncontact Water Recreation	Beneficial uses of waters used for recreational activities involving proximity to water, but not normally involving body contact with water where ingestion of water is reasonably possible. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tidepool and marine life study, hunting, sightseeing, and aesthetic enjoyment in conjunction with the above activities.
Commercial and Sportfishing	Beneficial uses of waters used for commercial or recreational collection of fish or other organisms including, but not limited to, uses involving organisms intended for human consumption.

GROUNDWATER	
Municipal and Domestic Supply	Beneficial uses of waters used for community, military, or individual water supply systems including, but not limited to, drinking water supply.
Agricultural Supply	Beneficial uses of waters used for farming, horticulture, or ranching, including, but not limited to, irrigation, stock watering, and support of vegetation for range grazing.
Industrial Service Supply	Beneficial uses of waters used for industrial activities that do not depend primarily on water quality including, but not limited to, mining, cooling water supply, geothermal energy production, hydraulic conveyance, gravel washing, fire protection, and oil well repressurization.
Freshwater Replenishment	Beneficial uses of waters used for natural or artificial maintenance of surface water quantity or quality (e.g., salinity).

Source: RWQCB2005.

The Basin Plan gives equal priority to each beneficial use of the surface water and groundwater. Included in the definition of surface water are playas and ephemeral washes. As presented in the table above, the desert washes provide beneficial functions and values such as groundwater recharge, flood peak attenuation and floodwater storage, and wildlife habitat.

PROPOSED PROJECT DESCRIPTION

The ISEGS project would be a 400-MW capacity solar electric generating system that would be constructed in three phases. Ivanpah 1 and 2 would be constructed as 100-MW capacity power plants and each would consist of approximately 55,000 heliostats made of 110,000 mirrors, double mounted on poles concentrically aligned in rows around a centralized solar power tower (CH2ML2009d). Ivanpah 3 would be constructed as a 200-MW capacity power plant, and would consist of approximately 104,000 heliostats made of 208,000 mirrors, double mounted on poles concentrically aligned in rows around five separate solar power towers (CH2ML2009d). Each heliostat would be approximately 7.2 feet high and 10.5 feet wide and would be equipped with a separate tracking and aiming system (CH2ML2009d). A one-quarter inch diameter cable, strung between heliostats above the ground, would transmit information to and from each heliostat. Ungraded access pathways would be established between every other concentric row of heliostats (CH2ML2009d). Dirt roads would be graded diagonally through the heliostat rows.

Construction of the proposed power plants would involve approximately 4,073 acres (6.4 square miles): 914 acres for Ivanpah 1, 920.7 acres for Ivanpah 2, and 1,836 acres for Ivanpah 3 (CH2ML2009d). In addition, the administration building, warehouse, substation, gas tap and metering stations, groundwater production wells, access roads and re-routed trails, and linear facilities would require approximately 402 acres. Approximately 321 acres would be temporarily disturbed by linear facilities, road improvements, and the laydown area. The total area of permanent disturbance would be approximately 3,713 acres, including linear facilities (CH2ML2009d). An additional 38.9 acres would be encompassed by the existing transmission line corridor (CH2ML2009d).

A power block would be located at the approximate center of project phases Ivanpah 1, 2, and 3. The power blocks of Ivanpah 1 and 2 would consist of a centralized solar power tower and receiver boiler, Rankin-cycle stream turbine-generator, an air-cooled condenser, concrete holding basins, and other auxiliary equipment (CH2ML2009d). The Ivanpah 3 power block would consist of the same elements as would Ivanpah 1 and 2, except it would have five solar power towers with the power block located at the central power tower (CH2ML2009d). The administration building, warehouse, and substation would be located between Ivanpah 1 and 2 in the logistics area. In addition, each power block would have a backup diesel-fired engine to power auxiliary equipment such as the boiler recirculation pumps and firewater pumps in the event of an emergency or when power is unavailable. Each power plant would also include a small natural gas fired startup boiler to provide heated water for plant startup and during times of cloud cover. This system is designed to minimize water use by using an air-cooled condenser for condensation of steam. Water consumption would primarily be used for boiler make up water and washing the heliostat mirrors.

Storm Water Potential

The existing storm water flow across the proposed project is generally towards the east across an alluvial fan that has developed in conjunction with the uplift and erosion of the Clark Mountains. Storm water is conveyed across the fan as sheet flow and through numerous ephemeral wash channels, and can reach the Ivanpah playa during heavy rain events. During major storm events, the ephemeral washes can flow for periods of a few hours to 24-hours with the possibility of flash floods and mass wasting. The ephemeral washes on the alluvial fan have been determined to be non-jurisdictional features by the Army Corps of Engineers under Section 404 of the Clean Water Act (USACE2009) and are, therefore, waters of the State. For further discussion on the jurisdictional determination, please refer to the **Biological Resources** section.

A total of 1,973 ephemeral washes were mapped in the project area and were categorized by the applicant on the basis of width. A summary of this categorization is presented below in **Soil and Water Table 3**.

SOIL & WATER Table 3
Summary of Ephemeral Washes at the Proposed Project Site
(All Washes Classified as Waters of the State)

Wash Category and Width	Number of Ephemeral Washes Mapped						
	Ivanpah 1	Ivanpah 2	Ivanpah 3	Utility Corridor	Colosseum Road	Substation and Admin. Area	Total
Category 1 36 to 85 feet	0	3	4	1	0	0	8
Category 2 21 to 35 feet	0	4	7	1	0	0	12
Category 3 11 to 20 feet	10	22	32	8	9	13	94
Category 4 5 to 10 feet	95	130	171	16	11	36	459
Category 5 1 to 4 feet	397	292	449	29	36	197	1,400
						Total	**1,973**

Source: CH2ML2008s and CH2ML2009d.

The size of the washes appears to increase topographically upgradient, with the greatest number of washes occurring in Ivanpah 3, followed by Ivanpah 1, then Ivanpah 2. This indicates that the highest volume and velocity storm water flows occur in Ivanpah 3. However, not all of the washes appear to be active and storm water flow likely migrates from one wash to create a new wash over time. No other wetlands or water were identified at the proposed project site (CH2ML2009d).

The proposed project is located in Federal Emergency Management Agency (FEMA) Zone D, which is classified as areas with possible flood hazards. Although a flood hazard analysis has not yet been conducted by FEMA for this area, a hydrologic study and modeling have been completed by the applicant. This work indicates that the alluvial fan has both active and inactive areas that can be subject to intense storm water flows (WYA2009a; WYA2009g). Storm water flow across the active portion of the fan is controlled by runoff generated within the Clark Mountain sub-watersheds above the

alluvial fan and from runoff generated on the alluvial fan itself (WYA2009c). Fifteen sub-watersheds, totaling 13,900 acres, were estimated to be contributing to storm water flows that could affect the proposed project (WYA2009c).

Soil Erosion Potential

The Natural Resources Conservation Service classifies soils at the project sites as Arizo loamy sand and Popups sandy loam (NRCS2008). According to the Unified Soils Classification System (USCS), the soils are clayey, silty sands (SC-SM) and silty, sandy gravels (GM). The Arizo loamy sand is excessively well drained and the Popups sandy loam is well drained. Development activities, including compaction associated with vehicle access, grading (in limited areas), removal of vegetation, and modification of precipitation patterns would generally result in reducing soil infiltration rates, and increasing the volume and velocity of runoff associated with storm events. If used, soil binders would also tend to reduce the soil infiltration rate (UNLV2002).

To reduce the impact of these development activities on infiltration and runoff, the applicant proposes to implement low impact development (LID) methods (CH2ML2009d). The goal of LID is to maintain the function and value of the natural drainage system while minimizing the risk of accelerated soil erosion and increased storm water runoff. By using the naturally developed drainage features and patterns, LID designs can reduce storm water infrastructure construction and long-term maintenance costs. Towards this end, the applicant has proposed the following methods (CH2ML2009d):

Vegetation. During construction, existing vegetation and plant roots would be left in place to the extent possible and cut only as necessary to allow clear movement of the heliostats. Native plants would be allowed to grow so long as their growth did not interfere with the heliostat operation or maintenance. An herbicide would be used to eradicate noxious weeds and non-native species.

Grading. Natural drainage features would be maintained to the extent possible. Grading would be designed to maintain natural sheet flow as much as practicable. Fill required in the heliostat fields would be compacted to closely match existing compaction, infiltration, and permeability. Hydro-mulch and soil binding and weighting agents would be used to protect areas disturbed by grading.

Even with these LID methods employed, project development would likely have effects that result in reduced storm water infiltration and increased runoff. Although grading would be minimized to the extent necessary, the project would still cut, move, and reuse approximately 135,000 cubic yards of soil (CH2ML2009d) in a 170-acre area of Ivanpah 3. An additional 110,000 cubic yards would be cut and moved through the remainder of the project. To minimize these impacts, all soil cut would be reused onsite. In addition, the applicant estimated that approximately 412,600 cubic yards of vegetation would be cut, mulched, and used in erosion control. Vehicles used in the development of the site and ongoing operations after construction is complete would include: a skid mounted, 23,500 pound (lb) GT-25XP Gyro Trac for mowing vegetation; a 48,000 lb Caterpillar 550 Wheel Harvester modified to be a heliostat mirror washing vehicle that could pull a

500-gallon water tank; a 47,000 lb sonic heliostat pole installer; golf cart sized utility vehicles; and a 60,126 lb Grove 540E crane for heliostat mirror installation.

Roads and Pathways. Access roads would be graded to follow existing topography. Ungraded maintenance pathways would be used to maintain and wash the heliostats. Vehicles designed to minimize soil compaction would be used (i.e., high flotation tires or tracks). The vehicles conducting the heliostat washing would travel at less than 10 mph to minimize dust generation. For additional information on dust management, please refer to the **Air Quality** section.

Post Installation and Heliostat Construction. The applicant is currently designing and evaluating methods of post installation and heliostat construction. The results are not available for this analysis, but are expected to be submitted to staff at a later date. The design and construction are expected to be consistent with the goal of LID.

Project Water Supply

All water for the construction and operation of the power plants would be drawn from one of two wells located on the northwest corner of Ivanpah 1 (CH2ML2009d). One well would be used as the primary water supply with the other well used as a backup for redundancy. A monitoring well would be installed approximately 2,300 feet northeast of the project's wells to monitoring the project's potential impact to local groundwater levels (CH2ML2009d). Pumped water would be stored for each power block in a 250,000 gallon combined raw water and fire water tank (CH2ML2009d). Approximately 100,000 gallons of this water would be designated for potable and process water use (CH2ML2009d).

Potable Water

During project construction, potable (primarily drinking) water would be provided by construction contractors purchased from an offsite source (CH2ML2009d). The project construction workforce size would be 474 persons on average and 959 persons during peak construction times (BSE2007a). The applicant estimates that each construction worker would require about 1 to 2 gallons of water per day (gpd) for a total of about 1,000 to 2,000 gpd during peak construction (CH2ML2009a). This equates to maximum need of about 3.3 AF for the construction of Ivanpah 1 or 2 and 2.7 AF for the construction of Ivanpah 3.[1]

During plant operation, potable water would either be brought into the project from a delivery service or pumped from one of the onsite groundwater wells and filtered and purified to meet the project's workforce potable water needs (CH2ML2009d). The estimated annual potable water demand during plant operation would be approximately 3 AF for all three project phases.

[1] 3.3 AF is calculated as 2,000 gpd times 27 months times 20 workdays per month.
2.7 AF is calculated as 2,000 gpd times 22 months times 22 workdays per month.

Construction Water

Groundwater from onsite wells would also be used to meet the project's construction water demands. Construction of each phase of the proposed project is expected to take 24 months. **Soil & Water Table 4** below presents a summary of the water that would be used during all three phases of construction. Groundwater would be used daily for dust suppression and vehicle washing. During hydrostatic testing of the project piping, up to 47,000 gallons of water could be used (CH2MHL2008t). The used water from this testing would either be trucked to a wastewater treatment and disposal facility or allowed to percolate/evaporate onsite, pending analytical results of the used water. If discharged to land, discharge of this water would be subject to the requirements of the State Water Resources Control Board's general permit number 2003-003-DWQ.

SOIL & WATER Table 4
Estimated Daily and Annual Construction Water Demands

Project Phase	Average Daily Construction Water Demand (gallons)			Water Supply Source
Ivanpah 1	99,333			New Onsite Groundwater Wells
Ivanpah 2	99,333			
Ivanpah 3	194,000			

Source: CH2MHL2008t.
Note: An additional 47,000 gallons could be used for hydrostatic testing of the proposed project's piping and additional water could be required for mirror washing if one project phase is constructed while another is operational.

Construction of each phase of the project would occur sequentially Grading is expected to take approximately four to five months for Ivanpah 1 and the common area, three to four months for Ivanpah 2, and five months for Ivanpah 3 (Stewart2009).

Operations Water

The project also proposes to use groundwater during plant operations. A maximum consumptive use has been estimated at approximately 18 AFY for each of the 100-MW plants and 37.5 AFY for the 200-MW plant. **Soil & Water Table 5** below summarizes the volume of water the project proposes to use for all power plant process and potable water needs. The applicant estimated the combined maximum annual use to be 76.4 AFY, but rounded this number up to 100 AFY in the AFC and supplemental documents (BSE2007a; CH2MHLl2009a).

SOIL & WATER Table 5
Estimated Annual Operational Water Demands Project Water Sources and Use[1]

Water Use	Water Source	Approximate Daily Average (gpm)[2]	Approximate Annual (AF)[3]
Ivanpah 1 100-MW Heliostat Process & Washing	Groundwater Wells	12.5	18
Ivanpah 2 100-MW Heliostat Process & Washing	Groundwater Wells	12.5	18
Ivanpah 3 200-MW Heliostat Process & Washing	Groundwater Wells	23	37.5
Potable Water Service (for employee use)	Groundwater Wells	1.8	2.9
Total Plant Operational Water Demand (all 3 phases combined)		49.8	76.4

Source: BSE2007a.
Note: Based on 3,640 hours of operation per year (10 hours per day, 7 days per week).

In Data Response Set ID, the applicant doubled the number of mirrors on each heliostat and changed the mirror array fields from what was originally proposed in the AFC (CH2ML2008g). This change in design resulted in increasing the proposed mirror surface area by 61.4 percent. However, the applicant did not revise the estimated annual water use to address the need for additional mirror washing, and stated that 100 AFY would provide sufficient water. During workshops, the applicant proposed a more open-ended limit to the volume of water the project could use, such as one that uses a rolling average, but also stated that 100 AFY would provide a sufficient volume of water for the proposed project.

Groundwater and water from the oil/water separator would be passed through a deionizing treatment system and mixing bed before being stored in a boiler make up tank (BSE2007a). Water from the boiler makeup water storage tank would provide the high quality, de-ionized water with no additives for mirror washing and steam production. Approximately 16,000 gallons of water per night would be used for mirror washing. To minimize the amount of water use, a pressure washer or other method would be used. **Soil and Water Table 6** presented below shows the expected volume of wash water that would be used during each wash cycle.

SOIL & WATER Table 6
Estimated Volume of Mirror Wash Water Used
(based on 2.5 gallons of water used for each heliostat)

Location	Number of Heliostats	Plant Area (acres)	Wash Water Volume (gallons per wash-cycle)	Wash Water Volume (gallons per acre per wash-cycle)
Ivanpah 1	55,000	913.5	137,500	151
Ivanpah 2	55,000	920.7	137,500	149
Ivanpah 3	104,000	1,836.3	260,000	142

Sources: CH2ML2008b; BSE2009a; CH2ML2009d

A wash cycle is defined by the applicant as the 2-week interval during which each heliostat within an array would be washed one time (BSE2007a). The applicant estimates that 100 heliostats can be washed per hour with 4 trucks working 10 hours per night at about 0.4 mile per hour (mph) (CH2ML2008b). Due to the high evaporation rates and minimal amount of water used, the applicant estimated that the wash water would evaporate at or just below the ground surface. The expected physical and chemical composition of the water reaching the ground surface is presented below in **Soil and Water Table 7**.

SOIL & WATER Table 7
Expected Mirror Wash Water Quality

Parameter	Concentration
Hardness as $CaCO_3$	0.005 mg/l
Copper	0.01 mg/l
Iron	0.03 mg/l
Silica	0.3 mg/l
Conductivity	<1µS/cm
pH	8.5

Source: CH2MHLl2008b.
Note: mg/l = milligrams per liter; µS/cm = microsiemens per centimeter.

Wastewater

Sanitary

The applicant decided to forego the package sanitary treatment system originally proposed in the AFC for the installation of a septic tank and leach field treatment system (CH2ML2009f). The sanitary wastewater from the sinks, showers, and toilets would be processed onsite by the septic and leach field system located near the administration building (CH2ML2009f). This system would be installed in accordance with San Bernardino County and RWQCB LORS and Best Management Practices (BMPs).

Residual sludge would be removed by a disposal service. Portable toilets would be located at each power block area (CH2ML2009d). These toilets would be serviced regularly under contract by a waste management company (CH2ML2009d). No wastewater would be discharged offsite (CH2ML2009d).

Process

All process water from plant floor drains, hub drains, sumps, and piping would be reused to the extent practical (BSE2007a). The process water would be sent through an oil/water separator and then stored in a raw water and fire water tank for later treatment and use in the steam boiler. Boiler blowdown would be discharged to a flash tank to control the concentration buildup of solids and silica (CH2ML2009d).

Contaminated Soil and Groundwater

The 'old' and 'new' Molycorp Mine wastewater discharge ponds are between four to six miles away from the proposed project site, in the southern part of the Ivanpah playa. A groundwater plume associated with these ponds contains elevated TDS, nitrate, strontium, barium, and radium concentrations and is currently being remediated under a RWQCB Cleanup and Abatement Order (RWQCB1998a; RWQCB1998b). In addition, between one to two miles downgradient from the proposed project site is the Ivanpah playa beneath which groundwater TDS is elevated beyond California acceptable drinking water standards. Please refer to the **Public Health & Safety** and **Waste Management** section for additional soil and groundwater contamination information.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

This section provides an evaluation of the expected direct, indirect, and cumulative impacts to soil and water resources that would be caused by construction, operation, and maintenance of the project. Staff's analysis of potential impacts consists of a description of the potential effect, an analysis of the relevant facts, and application of the threshold criteria for significance to the facts. If mitigation is warranted, staff provides a summary of the applicant's proposed mitigation and a discussion of the adequacy of the proposed mitigation. If necessary, staff presents additional or alternative mitigation measures and refers to specific conditions of certification related to a potential impact and the required mitigation. Mitigation is designed to reduce the effects of potential significant project impacts to a level that is less than significant.

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

Impacts leading to soil erosion or depletion or degradation of water resources, including beneficial uses, are among those staff believes could be most potentially significant soil and water resource issues associated with the proposed project. The thresholds of significance for these issues are discussed below.

Soil Resources

Staff evaluated the potential impacts to soil resources including the effects of construction and operation activities that could result in erosion and downstream transportation of soils and the potential contamination of soils and groundwater. There

are extensive regulatory programs in effect that are designed to prevent or minimize these types of impacts. These programs are effective, and absent unusual circumstances, an applicant's ability to identify and implement BMPs to prevent erosion or contamination is sufficient to ensure that these impacts would be less than significant. In addition, soils would be protected by the development and implementation of grading plans and a DESCP.

Although these programs and BMPs are generally effective on most projects, Staff considers that the proposed project does constitute an unusual circumstance. The proposed project is of a very large scale compared to other projects constructed on active alluvial fans in the past. Although modeling and calculations can be used in an attempt to estimate future scenarios and provide a basis for structural design parameters, these methods are based on assumptions and projections that are imprecise and untested in this environment. Should these assumptions and calculations be inaccurate, the consequences of flash flood damage or modified sedimentation and erosion rates may be significant. Staff has proposed conditions of certification that would mitigate these potential impacts. The LORS and policies presented in **Soil & Water Table 1** were used to determine the threshold of significance of project impacts with respect to CEQA.

Water Resources

Staff evaluated the potential of the project's proposed water use to cause a substantial depletion or degradation of groundwater resources, including beneficial uses. Staff considered compliance with the LORS and policies presented in **Soil & Water Table 1** and whether there would be a significant California Environmental Quality Act (CEQA) impact. Compliance with LORS and policies includes the Energy Commission's and State Water Resources Control Board's policy against using freshwater for power plant cooling unless other sources or other methods of cooling would be environmentally undesirable or economically unsound.

To evaluate if significant CEQA impacts to soil or water resources would occur, the following criteria were used. Where a potentially significant impact was identified, staff or the applicant proposed mitigation to ensure the impacts would be less than significant.

- Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding or substantial erosion or siltation on or offsite?
- Would the project create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff?
- Would the project place within a 100-year flood hazard area structures which would impede or redirect flood flows?
- Would the project violate any water quality standards or waste discharge requirements?

- Would the project substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?
- Would the project contribute to any lowering of groundwater levels in the groundwater wells of other public or private water users?
- Would the project contribute to any lowering of the groundwater levels such that protected species or habitats are affected?
- Would the project cause substantial degradation to surface water or groundwater quality?

DIRECT/INDIRECT IMPACTS AND MITIGATION

The direct and indirect impact and mitigation discussion presented below is divided into a discussion of impacts related to construction and a discussion of impacts related to operation. For each potential impact evaluation, staff describes the potential effect and applies the threshold criteria for significance to the facts. If mitigation is warranted, staff provides a summary of the applicant's proposed mitigation and a discussion of the adequacy of the proposed mitigation. In the absence of an applicant-proposed mitigation or if mitigation proposed by the applicant is inadequate, staff mitigation measures are recommended. Staff also provides specific conditions of certification related to a potential impact.

PROPOSED PROJECT - CONSTRUCTION IMPACTS AND MITIGATION

Construction of the proposed project would include soil excavation, grading, installation of utility connections, and the use of groundwater. Groundwater use would primarily be for dust suppression and hydrostatic testing of the project's piping connections. Potential impacts to soils related to increased erosion or release of hazardous materials are possible during construction. Potential storm water impacts could result if increased runoff flow rates and volume discharge from the site were to increase flooding and sedimentation downstream. The Ivanpah playa could be impacted by the deposition or depravation of sediments. Water quality could be impacted by discharge of hazardous materials released during construction. Project water demand could affect the quantity of available groundwater. Potential construction related impacts to soil, storm water, and water quality or quantity, including the applicant's proposed mitigation measures and staff's proposed mitigation measures are discussed below.

Soil Erosion Potential by Water and Wind

Construction of each phase of the project is expected to take approximately 24 months to complete. The total earth movement would be substantial with approximately 135,000 cubic yards of soil to be cut, moved, and reused in a 170-acre area of Ivanpah 3 (CH2ML2009d) and an additional 110,000 cubic yards of soil cut and moved throughout the remainder of the project. In total, approximately 245,000 cubic yards of soil would be cut and moved and an additional 412,600 cubic yards of vegetation would be cut and mulched (BSE2007a; CH2ML2009d). The mulched vegetation would be reused for

erosion control. The earth and vegetation work would primarily be for construction of the powerblock, underground utilities, and roadways, with additional vegetation cutting in areas to be occupied by heliostats.

These construction activities can lead to adverse impacts to soil resources including increased soil erosion, soil compaction, loss of soil productivity, and disturbance of soils crucial for supporting vegetation and ephemeral water dependant habitats. Activities that expose and disturb the soil leave soil particles vulnerable to detachment by wind and water. Soil erosion results in the loss of topsoil and increased sediment deposition downstream. To minimize the effects of construction to the soil, the applicant has proposed the use of construction vehicle's designed to minimize their impact to the soil. Most of the proposed vehicles are heavy and low impact tires or tracks have been proposed to be used to minimize compaction of the soil that could be caused by these vehicles.

The magnitude, extent, and duration of those impacts depends on several factors, including the exposure of the soils to water and wind, the soil types affected, and the method, duration, and time of year of construction activities. Prolonged periods of precipitation or high intensity and short duration runoff events coupled with earth disturbance activities can result in accelerated onsite erosion. In addition, high winds during grading and excavation activities can result in wind borne erosion leading to increased particulate emissions that adversely impact air quality. The implementation of appropriate erosion control measures would help conserve soil resources, protect downstream properties and resources, and protect air quality. Conditions of Certification in the **Air Quality** section provide mitigation that would prevent significant impacts from fugitive dust and soil erosion. Conditions of Certification **AQ-SC3** and **AQ-SC7** would limit vehicle speed to 10 miles per hour during project construction and require all unpaved roads and disturbed areas in the project and linear construction sites to be watered as frequently as necessary during grading and stabilized thereafter with a non-toxic soil stabilizer or soil weighting agent to comply with the dust mitigation objectives of Condition of Certification **AQ-SC4**. Condition of Certification **AQ-SC4** establishes performance standards for controlling fugitive dust and requirements for response should they be exceeded. The requirement to use soil weighting and bonding agents following grading would conserve freshwater by reducing the need for water as a means to control fugitive dust.

Soil losses would develop during construction and there would be ongoing soil loss after construction of the project. The linear utilities would result in soil disturbance by vehicles and other equipment during installation. Use of construction BMPs in these areas is expected to control soil loss during construction and to mitigate potential impacts to air and downstream properties and resources. Soil erosion and loss of soil due to project activities could be substantial and would need to be mitigated. The proposed erosion and sedimentation control measures include: preserving the existing vegetation to the extent possible; wetting or using soil binders or weighting agents active construction and laydown areas; controlling speed on unpaved surfaces; placing gravel in entrance ways; and use of straw bales, silt fences, and earthen berms to control runoff (BSE2007a; CH2ML2009c; CH2ML2009a). Staff recommends the development and implementation of a DESCP in accordance with Condition of Certification **SOIL&WATER-1** to ensure adequate BMPs are in place to mitigate potential erosion

and loss of soil. In addition, Condition of Certification **SOIL&WATER-2** would require the project owner to develop and implement a construction Storm Water Pollution Prevention Plan (SWPPP) and comply with the dredge and fill requirements in Appendix B, C, and D.

Project Water Supply

Potable water for the construction workforce would be supplied by construction contractors from an offsite source (CH2MHL2008t). Portable facilities would be used for sanitary needs and would operate without water. Construction water would be supplied by groundwater wells that would be drilled and constructed on site. The depth to groundwater at the project site is estimated to be between 215 to 715 feet bgs. Groundwater would not be encountered during grading activity. Staff recommends Condition of Certification **SOIL&WATER-3** to ensure that onsite groundwater wells would be constructed in accordance with state and local LORS.

The applicant estimates that daily water demand during construction would average 99,333 gpd for Ivanpah 1 and 2 and 194,000 gpd for Ivanpah 3 with up to an additional 47,000 gallons used during pipeline hydrostatic testing (CH2MHL2008t). The maximum water use for both construction and project operation would be 100 AFY. Condition of Certification **SOIL&WATER-4** would limit construction water use to 100 AFY, which is the proposed maximum water use for the project. This would ensure the applicants proposed water use is consistent with the volume of water use analyzed in the Proposed Project - Operation Impacts and Mitigation section below.

Wastewater

Improper handling or containment of construction wastewater could cause a broad dispersion of contaminants to soil or groundwater. Discharge of any non-hazardous construction-generated wastewater would require compliance with discharge regulations. Sources of wastewater would include equipment wash water and piping and vessel hydrostatic test water. Equipment wash water would be transported to an appropriate treatment facility. Hydrostatic test water would be reused to the extent possible and, pending analytical results of the water, would be discharged to land or trucked offsite to an appropriate treatment and disposal facility in accordance with the SWRCB Water Quality Order No. 2003-003-DWQ as a discharge to land with a low threat to groundwater and the requirements specified in Appendix B, C, and D.. Disposal requirements for the hydrostatic test water are still under review by the RWQCB. With the use of BMPs and compliance with LORS, staff concludes that there would be no significant impact from construction-generated wastewater.

PROPOSED PROJECT - OPERATION IMPACTS AND MITIGATION

Operation of the proposed project could lead to accelerated soil erosion and increased storm water runoff. The project's operation could also lead to potential water quality and water supply impacts. Soils may be potentially impacted through erosion or the release of hazardous materials used in the operation of the proposed project. Storm water runoff from the project could result in potential impacts if increased runoff flow rates and volumes discharged from the project increase erosion of the soil and increase downstream flooding. Water quality could be impacted by discharge of eroded

sediments from the project or discharge of hazardous materials released during operation. Water supply used for plant processes, heliostat mirror washing, and fire protection could lead to potential quantity or quality impacts to Ivanpah Valley groundwater resources. Potential impacts to water quality and water supply and the potential acceleration of soil erosion and increased storm water runoff related to the operation of the project, including the applicant's proposed mitigation measures and staff's proposed mitigation measures, are discussed below.

Soil Erosion and Storm Water Control

The proposed project would be located on an undeveloped alluvial fan. The storm water runoff either percolates into the soil of the alluvial fan or is conveyed through the alluvial fan wash channels or as sheet flow across the fan. Several project features would contribute to the potential for increased water erosion, including earth displacement, the long duration for construction, and changes to the properties of the soil. Construction of the proposed project would change natural drainages, remove natural vegetation and soil structure, and add impervious areas to the site, could cause an increase in storm water runoff.

Four different storm water control designs have been proposed by the applicant, each assuming a 24-hour, 100-year storm event. The first design proposed protecting the power blocks only with downgradient infiltration/evaporation basins. Under this design, all storm water flow on the upgradient side of the power blocks would be diverted around the power blocks to very large infiltration/evaporation basins on the downgradient side of the power blocks. This is a traditional design, suitable for most smaller projects. However, the proposed project would not have protected the heliostats during large storm events and may not have protected the power blocks during such large storm events. In addition, this design did not adequately address potential downstream impacts including natural sediment and surface water flows that maintain the Ivanpah playa.

The second and third designs proposed to capture and control all storm water that would enter the project on the upgradient side of the power blocks and heliostat fields. These designs would have involved the construction of very large storm water retention basins on the upgradient side of the Ivanpah 1, 2, and 3. The second design would have performed a dual function of releasing some storm water as sheet flow over the site, and diverting the remainder in channels around the site. The third design would have captured and released all storm water as sheet flow, with no diversion system. However, as staff were evaluating the specific details and potential impacts of these designs, the applicant proposed a complete re-evaluation of the design concept, and ultimately proposed a LID design. This fourth design involved minimizing storm water control and preserving the naturally developed storm water system to the extent practicable.

Under the fourth and final design, the principles of LID would be used to maintain natural drainage features and patterns to the extent feasible. Storm water and sediment flow would be managed in accordance with project-specific grading and drainage plans that were developed consistent with San Bernardino County, FEMA, and Clark County guidelines. The power blocks would be protected from storm water flows by

embankments, fill, and drainage channels that would divert flow around the power blocks (WYA2009g). The plans and guidelines would establish methods of when and how to control and manage storm water flow as it reaches, flows across, and then leaves the proposed project.

To support the final design parameters, the applicant conducted an onsite investigation of the hydrology of the project area and computer modeling of the storm flows and sedimentation rates. The potential storm water capture area for the project was determined by the applicant to be 21 square miles for Ivanpah 1, 6 square miles for Ivanpah 2, and 12 square miles for Ivanpah 3 (CH2MHL2008t). Runoff from these sub-watersheds was modeled by the applicant using the HEC-1 computer model developed by the Army Corps of Engineers (USACOE2009). Storm water flow across the alluvial fan was modeled using the Flo-2D computer model developed for FEMA (FEMA2009). Peak flows from these sub-watersheds was determined to range from 544 cubic feet per second (cfs) to 4,290 cfs. Flow velocities under the existing site conditions were found to be generally 3.5 feet per second (fps) or less. As might be expected, higher velocities were found to occur within the wash channels. Through the modeling, it was found that the flow velocities reduced as the flows translated into sheet flow or split into multiple channels on the alluvial fan (WYA2009c). Based on this analysis, the majority of storm water flow was found to occur in Ivanpah 1 and 3.

Storm water flow volume and velocity is affected by the surface infiltration rate and the roughness of the flow surface. Construction, operation, and decommissioning of the proposed project may modify the infiltration rate through several processes, including earthmoving, compaction, and use of dust suppressants. Although field vehicles modified with low impact tires or tracks have been proposed, it appears likely that even with the low impact tires or tracks, roads would develop over the life of the project that would affect storm water flow and its erosive capability. Mirror washing cycles would take two weeks to complete. An estimated mirror breakage rate of 0.1 mirrors per year is stated in the AFC, but it is likely much more (possibly in the thousands without mitigation and up to 50 with mitigation). The AFC states that broken mirrors would be replaced annually by one repair truck. However, the mirror repair activity would likely require several trucks. The AFC states that other repairs and security checks would be performed daily by one truck.

While the project is designed to minimize disturbance of vegetation during construction and operations, long-term response of vegetation to the site development is difficult to predict. Precipitation patterns would be modified and mirror wash water would change the soil water content and other characteristics. Mirrors would cover a large proportion of the land surface and, during precipitation events, would be placed in the flat horizontal position. Precipitation would run directly off the mirrors, and therefore, would not increase or substantially reduce the overall volume of precipitation reaching the ground surface. However, the precipitation runoff would concentrate at the edges of the mirrors, rather than being dispersed throughout the area. Likewise, the mirror wash water would likely concentrate along the drip line below the heliostats, cause minor erosion of the soil at the drip line, and promote non-native plant growth such as weeds. The applicant estimated that the physical and chemical makeup of the wash water would lead to only minor buildups of $CaCO_3$, copper, iron, and silica over the 50-year life of the project and that no wash water would flow offsite. Staff believes that the

combination of these effects would result in a less than significant modification of local hydrology when compared to the volume and velocity of storm water that flows from the Clark Mountains and onto the proposed project site.

Other long-term effects on vegetation would include soil compaction, shading of the sun beneath the heliostats, and changes to the soil structure by use of dust suppressants. Evaluation of the long-term impact of project development on vegetation is included within the Compliance Monitoring and Closure Plan. In general, any reduction in the amount of vegetation would tend to increase storm water runoff volumes, runoff velocities, and erosion rates. **Soil and Water Table 8** presented below summarizes the difference between pre-construction and post-construction for storm water runoff and peak discharge during a 100-year storm event as modeled by the applicant (WYA2009g).

SOIL & WATER Table 8
Change in Storm Water Runoff and Peak Flow Volume
Between Pre- and Post-Construction for a 100-Year Storm Event

Scenario	Runoff Volume (acre-feet)	Peak Discharge (cfs)
Pre-Construction	1,712	5,806
Post-Construction	1,722	5,817
Numerical Change	(1.68%)	(4.48%)

Source: WYA2009g.

As shown in the table above, the overall average change between the pre and post-project conditions in peak storm water flow was estimated by the applicant to increase 4.48 percent and the change in runoff volume was estimated to increase 1.68 percent. The greatest change modeled by the applicant occurred in the administration, area where extensive grading and compaction would be required, and where Ivanpah 3 adjoins Ivanpah 2 (WYA2009g). The overall change in storm water runoff and peak flow volume for a 100-year storm event is not significant. The change in volume and peak flow is a small percentage of the total storm water flow.

Water quality could also be impacted if the storm water drainage pattern concentrates runoff in areas that are not properly protected with BMPs and cause increased erosion and sediment discharge offsite and possibly into the Ivanpah playa. Conversely, if the storm water controls are too restrictive, there could be a reduction in the sediment supplied to the west side of the Ivanpah playa adjacent to Interstate 15. The applicant's analysis of the project's impact on sedimentation rates to the playa concluded that there would essentially be no net change in sediment transport and deposition due to construction of the proposed project (CH2ML2009d; CH2ML2009d).

The assumptions used in the applicant's modeling were reviewed by staff and modified in additional model runs performed by staff (AECOM2009a). To ensure that the modeling and calculations evaluated worst-case impacts associated with increased storm water flow volumes and velocities, conservative assumptions regarding soil

infiltration rates and roughness characteristics were made in the calculations. This included assumptions of extensive compaction associated with construction and complete denudation of vegetation due to shading and modified hydrology.

Staff's results are presented below in **Soil and Water Tables 9** and **10**. This analysis confirmed the applicant's conclusions regarding limited modification to storm water flow volumes, velocities, and downstream sedimentation rates. For a relatively frequent 10-year storm event, the total volume of storm water runoff would increase by about 1 percent with the peak discharge increasing approximately 3 percent due to construction and operation of the proposed project.

SOIL AND WATER RESOURCES Table 9
10 Year, 24-Hour Storm Event

Site Condition	Runoff Volume (acre-feet)	Peak Flow (cfs)	Maximum Velocity (feet per second)		Ivanpah 1 and 2 Potential Number of Heliostats Failing	Ivanpah 3 Potential Number of Heliostats Failing
			Flood Plain	Ephemeral Channel		
Pre-Construction	1,962	8,653	4.7	13.9		
Post-Construction	1,973	8,924	4.9	16.5	1,808	2,306
Numerical Difference	11 (1%)	271 (3%)	2 (4%)	11 (16%)		

Source: AECOM2009a.
Note: The 10-year storm event was not modeled by the applicant.

The results from the 100-year storm analysis are similar. This relatively minor increase in runoff volume can be attributed to the high volume of storm water that would be entering the project from the large catchment basins in the Clark Mountains. The volume of storm water runoff that would be generated at the project site is relatively small compared to the volume of storm water entering the site.

Staff's analysis also concurs with the conclusion that there would be no net sediment loss or gain. There would be no loss because the project design is intended to allow sediment to pass through the site in an uninterrupted manner, and would not include the construction of basins that would capture sediment. There would be no net sediment gain for two reasons: 1) the increase in storm water velocity on the proposed project site is not significant; and 2) the storm water entering the site from upstream areas is already saturated with sediment and has no ability to acquire more sediment. There would be no change in sedimentation or erosion downstream of the project site because the storm water flow volume and velocity leaving the site is not significantly changed.

SOIL AND WATER RESOURCES Table 10
100 Year, 24-Hour Storm Event

Site Condition	Runoff Volume (acre-feet)	Peak Flow (cfs)	Maximum Velocity (feet per second)		Ivanpah 1 and 2 Potential Number of Heliostats Failing	Ivanpah 3 Potential Number of Heliostats Failing
			Flood Plain	Ephemeral Channel		
Pre-Construction	4,242	18,939	7	14		
Post-Construction	4,637	19,204	9	25	13,889	18,172
Numerical Difference	395 (8.5%)	265 (1.4%)	2 (22%)	11 (44%)		
Post-Construction - Applicant Most Likely Case	---	---	5.9	26.6	3,934	4,260
Post-Construction - Applicant Worst Case	---	---	8.0	25.5	10,250	10,250

Source: AECOM2009a

In addition to development-related modification of storm water volumes, storm water velocities, and sedimentation rates, both the applicant and staff calculated the potential impact of storm water-related scour on constructed facilities, including the heliostat fields. The heliostat fields include a total of 428,000 mirrors mounted on 214,000 individual 6-inch diameter poles. Using the concept of low impact development, there would be no storm water diversion or detention systems to divert storm water away from the heliostat fields or to reduce the velocity of storm water as it enters the fields. Because the heliostats would be mounted on poles, which would be driven into unconsolidated sediments on the alluvial fan, general erosion, migration of channels, and local scour caused by storm water flows could remove sediment supporting individual poles and cause them to fall to the ground. Once on the ground during a storm event, the broken glass associated with the mirrors could further break and be transported downstream. Also, the heliostat structure itself and the associated wiring, could be transported downstream. Although the security fence located on the downstream side of the proposed project area could stop larger pieces from leaving the property, it would not stop small glass fragments. Also, the fence itself could be threatened by storm water flows and could not guarantee the onsite capture of all damaged materials.

To evaluate the potential for heliostat failure and downstream transport, staff conducted a local scour analysis of the potential impact of storm water velocities on individual heliostats (AECOM2009a). The analysis concluded that the scour from a 10-year storm could lead to the failure of more than 4,000 heliostats and more than 32,000 from a 100-year storm. The applicant has not conducted a direct calculation of the number of at-risk heliostats. However, staff has estimated the number of at-risk heliostats based on the

applicant's calculated storm water velocities, and the number could be more than 20,000 in a 100-year storm.

Up to six to nine feet of scour can occur at the project site. To test the potential effects of storm water flows and scour on the heliostats the applicant recently (August 2009) attempted to install and conduct load tests on heliostat poles. During this test, problems occurred where large rocks were encountered causing installation refusal and drilling equipment breakage and malfunction. The testing did not demonstrate poles could be installed at depths satisfactory to mitigate potential scour and failure. Satisfactory completion of heliostat pole installation testing by the applicant is necessary so staff can confirm the proposed method of installation is adequate to install the heliostats at a depth sufficient to mitigate failure and that there would be no impacts related to other methods of installation. Condition of Certification **SOIL&WATER-5** requires the heliostats to be reinforced to withstand up to six feet of scour. In addition, this condition requires the applicant to develop a Stormwater Damage Monitoring and Response Plan, which would include a plan to cleanup and mitigate failed heliostats. By requiring reinforcements of the heliostats, the estimated number of heliostat failures during a 10-year storm event would be reduced to approximately 10. During a 100-year event, this number would be reduced to approximately 50.

Provided the proposed method of installation is adequate to install poles at a depth sufficient to mitigate failure, staff believes the effects of erosion and storm water flow onto and off the proposed project can be mitigated through implementation of Conditions of Certification **SOIL&WATER-1**, **-2**, and **-5**. **SOIL&WATER-1** would require the project applicant to develop a DESCP to ensure protection of water quality and soil resources. **SOIL&WATER-2** would require the applicant to develop an Industrial SWPPP that meets the requirements specified in Appendix B, C, and D. Condition of Certification **SOIL&WATER-5** would require the applicant to develop a Storm Water Damage Monitoring and Response Plan to monitor the heliostats and mitigate potential impacts from heliostats damaged during storm events. In addition, as discussed in the **Recreation** section, Condition of Certification **SOIL&WATER-5** would require the project owner to establish a baseline and monitor for any changes in the surface texture and quality of the Ivanpah playa, Changes that could occur to the playa surface include a change in sedimentation or the introduction of man-made elements such as broken heliostat mirror shards.

Project Water Supply

The applicant has proposed to pump groundwater from one of two onsite wells for all potable water and plant operation needs. Staff has analyzed the project's proposed groundwater use to determine if it would cause substantial depletion or degradation of local or regional groundwater quality and supply. As discussed previously, the applicant doubled the proposed number of mirrors on each heliostat and changed the mirror array fields from what was originally proposed in the AFC. Although this change increased the total surface area of all the mirrors combined by approximately 61.4 percent, the applicant has stated that the project's water demand would not exceed 100 AFY (CH2ML2008g). The applicant has also stated during workshops that they would like to have the water supply metered on a five-year rolling average. Staff believes such an average is too uncertain in an environment where water supply is quite limited and

when project engineers can reasonably estimate the volume of water that would be required for the project's construction and operation. Computer modeling by the applicant of the potential impacts associated with the use of groundwater was based on an annual maximum use of 100 AFY.

Regional Groundwater Supply

In desert regions, estimation of groundwater recharge from precipitation is the controlling factor in estimating the balance of groundwater available for development in a given basin without causing significant impacts. **Soil and Water Table 11** presents a summary by various researchers of estimates of precipitation-derived recharge in the Ivanpah Valley. The estimates of recharge vary due to differences in the area calculated within which precipitation would occur and differences in calculations of how much precipitation translates into groundwater recharge.

SOIL & WATER Table 11
Groundwater Recharge Estimates

Researcher and Year	Estimated Groundwater Recharge (AFY)
Glancy 1968	1,607
Moore 1968	1,275
Geomega 2000	2,845
Donovan and Katzer 2000	5,800
ENSR 2008	2,806
Applicant AFC 2007	6,200
Energy Commission Staff 2009	5,223 to 6,538

Sources: AFC2007; ENSR2008.

The most recent recharge estimates were done by ENSR in 2008 and the Energy Commission staff in 2009. The ENSR recharge calculations differ from the applicant's because ENSR used the estimated areal extent of the Ivanpah Valley watershed that was developed by Glancy in 1968 and used the standard elevation limit of 5,000 feet above mean sea level (amsl) for precipitation in the Maxey-Eakin method. Both the applicant and Donovan/Katzer used a precipitation limit of 4,500 feet amsl. The applicant's watershed estimates were based on recent United States Geological Survey digital elevation maps, a more accurate way to define and measure the area of the watershed. Conducting our own Maxey-Eakin estimates of recharge, staff estimates recharge to be between 5,223 to 6,538 AFY. This range encompasses those of Donovan/Katzer and the applicant. Staff estimated annual groundwater recharge using the PRISM (PRISM2009) precipitation model data, a United States Department of Agriculture geospatial dataset, by using this model to estimate areas in various average annual precipitation zones to bracket the range of recharge for the basin.
Prior to development of water resources in the IVGB, a state of equilibrium was achieved in which the basin inflows (recharge from precipitation) equaled the outflows. Glancy (1968) indicates that, since groundwater levels are relatively deep in the IVGB, there is likely very little discharge or outflow due to evapotranspiration. Glancy also shows there are changes in groundwater levels between Ivanpah and Las Vegas Valley

and concludes that the predominant direction of flow is to the north from IVGB across a gap or boundary at the north end of Ivanpah Valley. Given the absence of evapotranspiration, and groundwater flow conditions between valleys, it appears the primary mechanism for outflow from IVGB is underflow to the north. These basin conditions suggest that since pre-historic time the IVGB has filled and water levels have increased to an elevation where underflow into the Las Vegas Valley has been established at a relatively steady rate. This rate of underflow can be considered to be in balance with the long-term volume of precipitation that becomes groundwater recharge in the IVGB. It can therefore be assumed that since the underflow constitutes all outflow, the inflow equals the outflow in the IVGB during prehistoric or pre-development conditions. Groundwater basin model simulations by ENSR (2007) also show that the effects on underflow due to current pumping in the basin would be minimal over a 200 year time period. This suggests that even with current and future project pumping the underflow can be assumed to be the same because the pumping is insignificant with respect to the time frame for response of the groundwater basin.

Using these relationships between inflow and outflow from the IVGB and staff's estimate of recharge in **Soil and Water Table 11**, staff developed the annual water balance for the IVGB shown below in **Soil and Water Table 12**. This water balance shows the annual sum of gains and losses within the groundwater basin based on pre-developed conditions, current pumping, and proposed future pumping in the IVGB based on no change in underflow.

SOIL & WATER Table 12
Ivanpah Valley Groundwater Basin Balance

Basin Inflows and Outflows	Pre-Development Basin Balance	Post Development Basin Balance	
		Existing Conditions	Estimated Future Conditions
Inflows (AFY)			
Recharge from Precipitation[1]	5,223 to 6,538	5,223 to 6,538	5,223 to 6,538
Underflow and Surface Water	0	0	0
Total Inflow	5,223 to 6,538	5,223 to 6,538	5,223 to 6,538
Outflows (AFY)			
Groundwater Pumping[2]			
Reoperation of the MolyCorp Mine	0	0	400
ISEGS Proposed Project	0	0	100
FirstSolar Photovoltaic Power Plant[3]	0	0	30
Ivanpah Energy Center	0	0	15
Primm Outlet Mall New Fast-Food Restaurant	0	0	15
NextLight Silver State North and South Photovoltaic Power Project	0	0	14
Interstate 15 Improvements[4]	0	0	10
Southern Nevada Supplemental Airport	0	0	0
DesertXpress Rail Line	0	0	0
Temporary Caltrans Batch Plant	0	0	0
Mixed-Use Development (near Jean)	0	0	0
Las Vegas Valley Water District Pipeline	0	0	0
SCE Transmission Line Upgrades	0	0	0
Wind Energy Projects – Clipper Wind and PPM Wind	0	0	0
Primm Valley GolfClub[6]	0	1,741	1,741
Primm Municipal & Casinos	0	1,470	1,470
Colosseum & Other Mining	0	1,060	1,060
Community of Jean & Jean Lake Valley	0	740	740
Industrial Water Use	0	150	150
Community of Goodsprings	0	120	120
Community of Desert	0	50	50
Domestic Water Use	0	40	40
Community of Nipton	0	30	30
Community of Calnerva	0	1	1
Total Groundwater Pumping	*0*	*5,402*	*5,986*
Water-Use Returns[6]	0	-1,987	-2,147
Total Outflow	0	3,415	3,839
Basin Balance (AFY)	**5,223 to 6,538**	**1,808 to 3,123**	**1,384 to 2,699**

Source: BSE2007a; CH2MHLl2009a

Notes:
1. Recharge from precipitation is reported as a range developed by staff based on variability in elevation and precipitation rates.
2. All pumping volumes are from the AFC, except the pumping volume for the Primm Valley Golf Club. The pumping volumes in the AFC were based on the 2007 ENSR report (ENSR2007).
4. The water supply for the proposed airport would be pumped in from the Las Vegas Valley. Return flow from this water supply is not included in the water budget.
3. Assumes maximum estimated groundwater use.
5. Pumping data from the May 2009 Ground-Water Monitoring Ten-Year Report for the Primm Valley Golf Club.
6. ENSR (2008) assumed a 30 percent return flow from the Primm Valley Golf Club and 40 percent return flow from municipal gray water infiltration. All water use return from potential future facilities were excluded except for that for the MolyCorp Mine return flow, which was estimated at 40 percent.

Staff estimates in Table 12 show that groundwater recharge or inflow exceeds both the current and future pumping rates in the basin. They also show that even with current pumping, project pumping, and foreseeable future project pumping, there is still a net gain in recharge to the IVGB.

Although a net gain in recharge can be shown, staff also note there are areas in the IVGB where substantial declines in groundwater levels have been observed. The declines occur in areas where current and past pumping wells have been located in the basin consisting of primarily wells used for irrigation of the Primm Valley Golf Course and the Primm municipal and casino wells. Monitoring of the declines is currently required by the County of San Bernardino because of concern for potential basin impacts.

These declines and resulting basin storage losses can be expected given the relatively slow response time for the basin suggested in the ENSR (2007) 200 year model simulations. The magnitude of historical storage losses can be estimated by evaluating the areal extent of groundwater level declines, of up to 40 feet, that have been observed in the basin since 1953 (BSE2007a). To evaluate the declines, the applicant spatially averaged the extent and magnitude of the declines and used an assumed specific yield for the aquifer to estimate the change in basin storage for the 53-year period of record (1953 to 2005). Using this method they estimated a reduction in basin storage of 1,300 AFY (BSE2007a).

This reduction in basin storage and water levels could translate into basin-wide impacts. As water levels equilibrate and stabilize based on current and future pumping over time the local declines would spread and result in lowering of basin-wide water levels. In the case of IVGB, this equilibration time is largely a function of the time and duration of pumping, areal extent of the basin, aquifer characteristics, and nature of the boundary where underflow occurs. The quantification of basin wide water level declines that would occur is currently difficult to predict, however, because little is known about the boundary where underflow occurs. Staff believes that although the magnitude of long-term potential declines cannot be predicted, the ENSR 2007 modeling results and aquifer characteristics suggest the time for basin wide water levels to decline substantially can take centuries and potential impacts during the life of the project and reasonably foreseeable projects would not be significant.

Staff also evaluated potential impacts to other basins that receive a component of inflow from the IVGB such as Las Vegas Valley. The 200-year groundwater model simulations by ENSR (2007) showed the underflow to the Las Vegas Valley would only be reduced by 8 percent over the next 200-years based on current pumping. Project pumping and reasonably foreseeable project pumping would increase the total basin pumping by 11 percent. This is a minimal increase and would not substantially change the reduction in flow to Las Vegas Valley or other basin users. In summary, staff believes the project and cumulative pumping from existing and proposed projects would not substantially deplete groundwater supplies or interfere substantially with groundwater recharge. Further analysis of potential impacts from water level declines and local drawdown are discussed below.

Local Groundwater Supply

Analysis of potential changes in groundwater levels from project pumping was necessary in order to evaluate whether there would be any impacts to other groundwater wells. Drawdown or a decrease in groundwater levels due to groundwater pumping can result in significant impacts when the pumping results in lower groundwater levels in nearby wells. These impacts can be both short- and long-term. Interference or drawdown can result in increased pumping lifts and declines in well productivity. Mitigation of these impacts could require costly modifications including the cost of lowering pumps, the cost of deepening a well, and well redevelopment costs. Substantial increases in pumping lift can also cause substantial increases in energy costs.

The magnitude of groundwater drawdown impact is controlled by five factors: (1) the rate of pumping; (2) the duration of pumping; (3) the depth of the well screens (water-intake depth of well); (4) aquifer parameters; and (5) aquifer boundary conditions. Aquifer parameters, such as specific yield and hydraulic conductivity, are controlled by layering and thickness of the water bearing materials such as gravel, sand, silt, and clay. The composition and flow characteristics of an aquifer can vary widely.

To accurately determine the impact of pumping specific to the project, calculations of drawdown must be based on the aquifer conditions within the vicinity of the pumping wells. The applicant developed a two-dimensional groundwater-flow model that uses local aquifer conditions and the expected well construction configuration to evaluate the potential project-related pumping and recharge impacts. A summary of the parameters used in the model are presented below in **Soil & Water Table 13**.

SOIL & WATER Table 13
Groundwater Model Parameters and Corresponding Values

Parameter	Value
Horizontal Hydraulic Conductivity	2 feet per day
Vertical Hydraulic Conductivity	0.2 feet per day
Specific Storage	0.00001
Specific Yield	0.05
Aquifer Thickness	1,000 feet
Transmissivity	15,000 gallons per day per foot
Depth to Screen Top	300 feet
Depth to Screen Bottom	400 feet
Pumping Rate	100 AF per year

Source: BSE2007a.

Based on the results of this groundwater modeling, the project's groundwater pumping is expected to cause local groundwater levels to decline over the project's 50-year life (CH2ML2008g). The expected groundwater level declines due to the project's pumping are:

- 2.1 feet at 0.5 mile from the project pumping well;
- 1.4 feet at 1 mile from the project pumping well; and
- 0.8 feet at 2 miles from the project pumping well.

The nearest groundwater wells are the Colosseum wells (Nos. 1 and 2) used for the Primm Valley Golf Club, approximately one mile northeast of the proposed project wells (CH2ML2008g). A summary of the well construction details for these wells is presented below in **Soil and Water Table 14.** These wells penetrate primarily sands and gravels to a depth of 566 to 693 feet below ground surface. The wells are screened beginning at about 290 to 350 feet bgs and extend to roughly the total well depth. Groundwater levels in these wells occur at approximately 2,500 feet amsl (Broadbent2009). Based on what staff believes are reasonable aquifer parameters, the applicant's modeling results show that the groundwater levels in the Colosseum wells would decline by less than 2 feet over the 50-year life of the project (BSE2007a). This magnitude of drawdown is much less than the monthly and annual fluctuations in water levels due to pumping of the Primm Valley golf course wells. Staff believes the limited amount of drawdown over the life of the project, <0.04 feet/year, would not have a measurable impact on the yield of the Colosseum wells.

Staff notes that at Colosseum Well #1, water level measurements show the difference between the 10-year average groundwater elevation and the top of the screened interval in Colosseum well #1 is approximately 3.4 feet. Measurements in 2007/2008 suggest, the groundwater level in Colosseum well #1 may be below the top of the well screen, during some times of the year. Where drawdown lowers water levels below well screen elevations there is the potential for impacts due to incrustation and sedimentation of a well. Incrustation and sedimentation would result in increased maintenance costs and shortened life of the well and pump components. Because part of the well screen of Colosseum well #1 may already be exposed during current pumping, significant impacts may already be occurring. Staff believes the two-foot incremental drawdown from the project's proposed pumping over the 50-year life of the project would not likely significantly contribute to potential impacts already occurring at the Colosseum well.

Staff also evaluated whether drawdown from project pumping would contribute to exceedance of the significance elevations established for golf course pumping by the County of San Bernardino. The significance criteria or 'significance elevations' for groundwater levels established by San Bernardino County (County) for the Colosseum wells is presented in **Soil and Water Table 14** (Broadbent2009). These significance elevations were established by the County as a basis for determining whether there would be any impacts from pumping the Colosseum wells. For the pumping in the Colosseum wells, a significant impact occurs when groundwater levels in these wells reaches 2,487 and 2,493 feet amsl, respectively (Broadbent2009). Average groundwater elevations in the Colosseum wells #1 and #2 have been 2,507 and 2,513

feet amsl and recent groundwater levels were 2,503 and 2,507 feet amsl during 2007/2008 (Broadbent2009). Based on the 2007/2008 groundwater levels in the Colosseum wells, 16 feet of groundwater remained in Colosseum well #1 and 14 feet in well #2 before the significance criteria threshold would be reached.

Staff believes the estimated contribution of the project's proposed pumping over the 50-year life of the project to impacting operation of Colosseum Well# 1 and reaching or exceeding the 'significance elevations' is limited and should not contribute to significant impacts in the basin. Staff is concerned, however, that there may be substantial variability in the aquifer and the local drawdown estimated by the ENSR model may not be precise. To ensure there are no unanticipated changes in drawdown due to project pumping, staff believes the applicant should be required to develop a groundwater monitoring program similar to that required for the Colosseum wells used for the Primm Valley Golf Course. Condition of Certification **SOIL&WATER-6** would require the applicant to comply with the County of San Bernardino's Desert Groundwater Management Ordinance and implement a monitoring plan that would characterize baseline water levels in the project vicinity, characterize aquifer materials, integrate water level measurement with the existing monitoring network, and provide for analysis of the project effects on water levels in the area. Staff proposes to coordinate with the County of San Bernardino to evaluate golf course pumping impacts and the contribution of the proposed project pumping to determine what mitigation, if any, would be needed by the applicant.

SOIL & WATER Table 14
Well Construction Details

Well	Distance from the Proposed Project Wells (miles)	Total Well Depth (feet bgs)	Screen Interval (feet bgs)	Wellhead Elevation (feet amsl)	Groundwater Average Elevation (feet amsl)	Difference between average groundwater elevation and Top of Screen (feet)	Well Purpose
Colosseum #1	0.98	566	290-556	2,793.60	2,507	3.4	Golf Course - Primary
Colosseum #2	0.82	693	350-674	2,801.36	2,513	62	Golf Course - Primary
PVGC7	1.86	695	345-685	2,689.08	2,515	171	Golf Course - Backup
PVGC8	1.91	695	345-585	2,679.58	2,514	179	Golf Course - Backup
PVGC9	2.00	460	290-450	2,670.98	2,514	133	Monitoring
Stateline	2.03	300	---	---	2,521	---	---
Yates	3.04	120	---	---	2,520	---	---
M-8	4.68	---	125-230	---	---	---	Monitoring
M-13	1.13	750	530-750	---	---	---	Monitoring
M-14	1.29	300	190-300	---	---	---	Monitoring

Source: Broadbent2009.

Other wells in the vicinity of the proposed project would not be impacted by the project's use of groundwater. To provide a baseline and document groundwater levels changes related to the project's proposed use of groundwater, staff recommends Condition of Certification **SOIL&WATER-6**. This condition would require the project to monitor and document groundwater levels to establish a groundwater level baseline and to monitor groundwater level changes over time in conjunction with the ongoing groundwater monitoring at the Primm Valley Golf Club.

To ensure the proposed project does not consume more than 100 AFY and is consistent with the volume analyzed, staff proposes Condition of Certification **SOIL&WATER-4** to limit the amount of groundwater the project could use during operations to 100 AFY. Given the potential for shorter- or longer-term variability in the basin balance and localized drawdown impacts, staff believes the project should conduct groundwater monitoring in conjunction with the ongoing groundwater monitoring at the Primm Valley Golf Club, which monitors and reports the groundwater levels in the vicinity of the proposed project. As discussed above and below in the section on Groundwater Quality, Condition of Certification **SOIL&WATER-6** would require the project to develop a groundwater level monitoring and reporting plan and integration with the Primm Valley Golf Course's existing groundwater monitoring and reporting program.
The seeps and springs located in the Clark Mountain are ephemeral and located upgradient and over three miles away from the project's proposed pumping wells. The seeps and springs derive their water from precipitation further upgradient in the Clark Mountains and beyond the potential reach of any cone of depression that would result from the project's proposed groundwater pumping. No significant impact to the seeps or springs is expected.

Groundwater Quality

Water quality can be impacted by migration of low quality or contaminated water towards pumping wells and by sustained pumping of the groundwater basin. By providing a measure of water salinity, TDS is a primary indicator of the natural quality of groundwater and is a measure of acceptance for the use of groundwater as a drinking water source. Water with TDS concentrations greater than 2,000 mg/l is generally considered undrinkable. In California, the recommended Secondary MCL or 'Consumer Acceptance Contaminant Level' for TDS is 500 mg/l, and upper and short term ranges can be 1,000 and 1,500 mg/l, respectively. The TDS concentrations in the IVGB range from 300 to 27,501 mg/l (DWR2003).

TDS at the project site is estimated to be 369 to 600 mg/l (Broadbent2002). Past Molycorp Mining operations have resulted in elevated TDS, nitrate, strontium, barium, and radium levels in the groundwater at their discharge ponds in the Ivanpah lakebed (RWQCB1998a). The old and new Molycorp evaporation ponds are between 4 and 6 miles from the proposed project site (CH2ML2008a). Based on TDS measurements, Broadbent in 2002 found that pumping in the wells, used for the Primm Golf Course might induce the lower quality groundwater from the playa to move towards the pumping wells near the Ivanpah playa. In addition, sustained overdraft of a groundwater basin can lead to water quality impacts. This can occur due to encroachment of pumping on lower saline portions of an aquifer. Substantial declines in water level of an

unconfined aquifer can also induce flow from low quality perched groundwater zones or flows from more saline portions of the aquifer such as from beneath the Ivanpah playa.

The applicant conducted groundwater modeling analysis to determine if pumping from the project wells would affect the groundwater gradient and velocity at the old and new Molycorp evaporation ponds (CH2ML2008a). The modeling estimated a project pumping induced groundwater gradient of less than 0.00003 feet per foot (ft/ft) and induced velocity of less than 0.1 feet per year (ft/yr) at the old and new evaporation ponds (CH2ML2008a). The predicted changes to the groundwater gradient and velocity are negligible. Therefore, no significant impacts related to the Molycorp evaporation ponds are expected to occur to water quality or ongoing remediation efforts.

Staff understands that use of the wells at the Primm Valley Golf Club has been reduced due to intrusion of brackish water that was not suitable for landscape irrigation (Broadbent2002). The cause of the intrusion was believed to be due to pumping induced migration of saltier groundwater underlying the playa to the east. Groundwater modeling conducted by the applicant indicates that the combined effects of the Primm Valley Golf Club pumping and pumping at the proposed project site would only result in local changes to groundwater levels and minor changes to groundwater quality (CH2ML2009e). The parameters used in the model were the same as those presented in **Soil and Water Table 13** with the addition of 1,660 AFY of groundwater pumping at the Primm Valley Golf Club. A groundwater monitoring report for the Primm Valley Golf Club for the 10-year span of 1997 to 2007 indicates there have been no appreciable groundwater declines or increase in TDS as a result of increasing pumping at the Primm Valley Golf Club (Broadbent2009).

The numerous ephemeral washes that provide drainage to the Clark Mountains that cross the proposed project site are considered surface water in the RWQCB's Basin Plan (RWQCB2005). These washes provide beneficial functions and values for groundwater recharge, flood peak attenuation and floodwater storage, and wildlife habitat. Development of the project would impact the function and value of these washes as wildlife habitat (please refer to **Biological Resources** for more information). Other than wildlife habitat, all other beneficial uses of these washes would not be significantly impacted. The proposed project would be allowing nearly all of the storm water to flow through the site relatively unimpeded. Current modeling estimates that the proposed project would result in a change in peak flow of 1.4 percent and a change in runoff volume of 8.5 percent. Due to the volume of storm water flow onto the site from the Clark Mountains, changes to the soil that would occur due to compaction, removal of vegetation, and additions of impervious surface areas (increased runoff and decreased infiltration) would not significantly affect the volume or velocity of storm water runoff or rates of sedimentation.

As previously discussed, staff believes there would be no impacts to current groundwater users and that current and future pumping in the basin would not result in overdrafting of the groundwater basin such that the beneficial uses would be impacted. The quality of the water would not be significantly impacted by the project and the maximum drawdown would be 2.1 feet at a half mile from the projects pumping and 0.8 feet at 2 miles from the projects pumping. The wells closest to the proposed project wells are located approximately one mile to the northeast. These well would experience

a water level decline of less than 2 feet. Use of the groundwater would comply with existing LORS. Therefore, there would be no significant impact to any other beneficial use or users of the groundwater.

Wastewater

The applicant proposes two separate wastewater collection systems for the proposed project. The first system would collect all wastewater generated from operation of the plant equipment and recycle and reuse that water to the extent practicable (BSE2007a). A wastewater collection system would return water from all general plant drains back to the raw water storage tank. Water that may contain oil or grease would first be routed to an oil/water separator before going to the raw water storage tank. Staff proposes Condition of Certification **SOIL&WATER-7** to ensure that the collection and recycling of this wastewater would be managed in accordance with applicable BMP's and LORS.

The second system would collect and treat all sanitary wastewater from sinks, toilets, and other sanitary facilities. Because there are no sanitary sewer connections, the sanitary wastewater would be processed through a septic system and discharged to a leach field. Solids would be periodically removed by a professional service. The maximum average daily wastewater flow to the leach field is expected to be 700 gallons (CH2ML2009e). No significant water or soil related impacts are expected to occur due to wastewater if the project owner complies with proposed Conditions of Certification **SOIL&WATER-7** and **-8**. **SOIL&WATER-7** describes reuse and disposal requirements for wastewater and **SOIL&WATER-8** provides the requirements for the installation of the proposed septic tank and leach field.

Project Closure and Decommissioning Impacts and Mitigation

After the end of the project's useful life, it would be decommissioned as described in the applicant's Draft Closure, Revegetation, and Rehabilitation Plan (CH2ML2009q). The facility would be removed to a depth of three feet below grade, original contours restored, and the site revegetated. However, the removal of the existing facility could cause substantial disturbance to soil and water resources. The project closure would require many of the same resource protection plans as required for construction, and thus, staff concludes that the impacts to soil and water resources would be less than significant.

NO PROJECT / NO ACTION ALTERNATIVE

The No Project / No Action Alternative is a proposed action that would not be undertaken. Under this alternative, the BLM land on which the project is proposed would continue to be managed within BLM's framework of a program of multiple use and sustained yield, and the maintenance of environmental quality in conformance with applicable statutes, regulations, policy and land use plan.

The results of the No Project / No Action Alternative would be the following:

- The impacts of the proposed project would not occur. However, the land on which the project is proposed would become available to other uses that are consistent with BLM's land use plan, including another solar project.

- The benefits of the proposed project in reducing greenhouse gas emissions from gas-fired generation would not occur. Both State and Federal law support the increased use of renewable power generation.

If this project is not approved, renewable projects would likely be developed on this and other sites in the Mojave Desert, or in adjacent states, as developers strive to provide renewable power that complies with utility requirements and state/federal mandates. For example, there are three large solar projects proposed on BLM land in Nevada within a few miles of the proposed ISEGS site. In addition, as of August 2009 there were 66 applications for solar projects covering 611,692 acres pending with BLM in the California Desert District. The No Project/No Action Alternative would not cause any significant impacts to Soil and Water Resources.

CUMULATIVE IMPACTS AND MITIGATION

A project may result in a significant adverse cumulative impact where its effects are cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (California Code Regulation, Title 14, section 15130). National Environmental Policy Act (NEPA) states that cumulative effects can result from individually minor but collectively significant actions taking place over a period of time (40 CFR §1508.7). There is the potential for future development in the Ivanpah Valley area and throughout the southern California desert region. Cumulative impacts can occur if implementation of the proposed project could combine with those of other local or regional projects. The locations of existing and reasonably foreseeable developments in the Ivanpah Valley are presented in the **Cumulative Scenario** section of this document including **Cumulative Scenario Figure 3**.

<u>Storm Water and Sediment</u>. Construction and operation of the proposed project, including the grading, filling, and rerouting of ephemeral streams, would disturb approximately 4,100 acres of land and increase the transport of storm water and colloidal sediment to the Ivanpah playa. Smaller scale projects previously constructed in the project vicinity include the Union Pacific railroad track, a power transmission line, Interstate Highway 15, the Nevada Energy Bighorn power plant, Molycorp evaporation ponds, the Primm Valley Golf Club, and commercial development in Primm. Storm water and sediment transport impacts from these developments to the Ivanpah playa have been less than significant.

The construction and operation of reasonably foreseeable projects within the project vicinity that could result in increase storm water and sediment transport impacts are listed below in **Soil and Water Table 15**. However, all of these projects would be subject to existing LORS and would be designed to avoid, manage, and mitigate potential storm water and sediment impacts. Likewise, the proposed project has been designed to be in compliance with existing LORS and would use a storm water and sediment pass though design that would result in a minor increase of sediment downgradient of the proposed project. Therefore, staff believes that the construction and operation of the proposed ISEGS project would not result in a cumulative impact to

downgradient resources from erosion, storm water, or sediment aggradation or degradation.

Groundwater Consumption. A summary of reasonably foreseeable projects in the Ivanpah Valley and their potential water use is presented below in **Soil and Water Table 15**. These projects and cumulative impacts were analyzed in detail in the Regional Groundwater Supply section above.

SOIL & WATER Table 15
Large-Scale Projects under Development or Reasonably Foreseeable in the Ivanpah Valley

Potential New Groundwater Users	Estimated Water Use	
	During Construction	During Operation
Desert Xpress Rail Line A proposed high-speed rail from Victorville to Las Vegas.	Unknown (limited duration)	Negligible
Interstate 15 Improvements Includes: (1) a proposed point-of-entry inspection station near the California-Nevada border; (2) a 12-mile-long northbound truck descending lane and pavement rehabilitation; and (3) re-grading of median slopes.	Unknown (limited duration)	<10 AFY
Temporary Caltrans Batch Plant The batch plant would be used during widening of the I-15 Highway.	Negligible	Negligible
Mixed-Use Development (near Jean) Demolition of the Nevada Landing Casino and redevelopment of this and adjoining land as a 166-acre master-planned community of affordable housing, commercial businesses, shops, and a new-hotel casino. This development is contingent on the construction of the new Ivanpah Valley Airport.	Unknown (limited duration)	Unknown
Ivanpah Energy Center A 500-MW, air-cooled, gas-turbine, combined-cycle power plant. Although the facility would be using up to 50 AFY of water, this water would be recycled water from the WWTP.	Unknown (limited duration)	15 AFY from an Undisclosed Groundwater Source 35 AFY from Recycled Water
Las Vegas Valley Water District Pipeline Proposed construction and operation of a water supply pipeline from the existing 2420 Zone Bermuda Reservoir (located in southern Las Vegas) to Jean, Primm, the Southern Nevada Correctional Center, and the proposed Ivanpah Valley Airport.	Unknown (limited duration)	Negligible The use of imported surface water in the Ivanpah Basin would result in additional discharges of wastewater. At least a portion of this wastewater would likely infiltrate to the groundwater basin, increasing groundwater recharge in the basin.
Southern Nevada Supplemental Airport (Ivanpah Valley Airport) The proposed airport is anticipated to use water supplied by the Las Vegas Valley Water District pipeline for both construction and operation activities	None	None
Wind Energy Projects – Clipper Wind and PPM Wind	Unknown (limited duration)	Negligible
SCE Transmission Line Upgrades	Unknown (limited duration)	Negligible

Reoperation of the Molycorp Mine	Negligible	400 AFY
NextLight Silver State North and South Photovoltaic Power Plant (250-MW)	Unknown (limited duration)	Estimated 14 AFY
FirstSolar Photovoltaic Power Plant	Unknown (limited duration)	Estimated 6 to 30 AFY
Primm Outlet Mall New Fast-Food Restaurant To be located adjacent to the Primm Outlet Mall	Negligible	Estimated at 15 AFY

Sources: BSE2007a; BLM.

Water supply uses during construction of Ivanpah 1, 2, and 3 would be limited in duration and quantity. The applicant estimates that the annual average water demand during construction of Ivanpah 1 and 2 would be 111 AFY, and 217 AFY for Ivanpah 3, with up to an additional 47,000 gallons used for hydrostatic testing of the projects piping. Each power plant is estimated to take 24 months to complete.

During operation, the project would use groundwater for potable and plant processes at the rate of approximately 100 AFY. Over the next 50 years, the use of groundwater in the IVGB is expected to increase. However, the project's groundwater use would contribute only 1.8 percent to the existing and only 1.7 percent of the reasonable foreseeable cumulative pumping volume in the IVGB. Staff believes the project's proposed contribution to the cumulative groundwater pumping in the IVGB is not significant. Information provided in **Soil and Water Table 15** further supports staff's conclusion that the project's groundwater use would not result in a cumulative impact. The reasonably foreseeable groundwater use in the IVGB as presented in **Soil and Water Table 15** may increase nominally by 450 to 470 AFY. With this nominal increase, water use in the IVGB would not exceed the estimated annual recharge, and therefore, would not result in significant long-term impacts. For further analysis of potential cumulative impacts, see the section on Regional Groundwater Supply above.

COMPLIANCE WITH LORS

CLEAN WATER ACT

Staff has determined that the proposed project would satisfy the requirements of the RWQCB with the adoption of the following Conditions of Certification: 1) Development of the DESCP in accordance with **SOIL&WATER-1**; 2) Development of a Storm Water Damage Monitoring and Response Plan in accordance with **SOIL&WATER-5**; and 3) Compliance with wastewater discharge requirements in accordance with **SOIL&WATER-2** and as specified in Appendix B, C, and D. In addition, the applicant would be required to comply with California Department of Fish and Game's Streambed Alteration Agreement requirements in accordance with Condition of Certification **BIO-20**.

SWRCB RESOLUTION 75-58, ENERGY COMMISSION'S 2003 INTEGRATED ENERGY POLICY REPORT, AND THE WARREN-ALQUIST ACT

The California Energy Commission, under legislative mandate specified in the *2003 Integrated Energy Policy Report (IEPR)*, would approve the use of fresh water for cooling purposes by power plants it licenses only where alternative water supply sources and alternative cooling technologies are shown to be environmentally undesirable or economically unsound. SWRCB Resolution 75-78 states that fresh inland waters should only be used for power plant cooling if other sources or other methods of cooling would be environmentally undesirable or economically unsound. . The Warren-Alquist Act promotes all feasible means of water conservation. Each of the proposed power plants include a steam turbine using an air-cooled condenser, which achieves maximum water conservation associated with cooling. Therefore, the proposed project complies with the requirements of SWRCB Resolution 75-78, the Energy Commission's 2003 Integrated Energy Policy Report (IEPR), and the Warren-Alquist Act.

PUBLIC RESOURCES CODE, SECTIONS 25300 THROUGH 25302

Through compliance with Conditions of Certification **SOIL&WATER-4**, information required by staff to conduct assessments and forecasts of potable and industrial water consumption by power plants is achieved.

SAN BERNARDINO COUNTY ORDINANCE 3872 (CODE TITLE 3, DIVISION 3, CHAPTER 6, ARTICLE 5)

To help protect groundwater resources in San Bernardino County, the County enacted Ordinance 3872. This ordinance requires a permit to locate, construct, operate, or maintain a new groundwater well within the unincorporated, unadjudicated desert region of San Bernardino County. CEQA compliance must also be completed prior to issuance of a permit. The article does not apply to "groundwater wells located on Federal lands unless otherwise specified by inter-agency agreement." The BLM and County entered into a MOU that provides that the BLM will require conformance with Article 5 for all projects proposing to use groundwater from beneath public lands. The MOU provides that the County and BLM will work cooperatively together to ensure conformance with applicable LORs by project developers on BLM land. As part of meeting the requirements of the County's permitting process, the County may require the project owner to prepare a groundwater monitoring plan in accordance with the County's "*Guidelines for Preparation of a Groundwater Monitoring Plan*" dated January 1998. Condition of Certification **SOIL&WATER-6** would require the project owner to ensure that all onsite groundwater wells would be installed in accordance with the County of San Bernardino requirements and to submit a well construction packet to the County for comment and written evaluation. The project owner would also be required to submit well completion reports to the DWR in accordance with the DWR well completion reporting requirements.

NOTEWORTHY PUBLIC BENEFITS

Staff has not identified any noteworthy public benefits of the proposed project that are associated with soil and water resources.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

The agency and public comments that were received relating to soil and water resources and have been incorporated into this FSA section. A summary of those comments is presented below.

Lahontan Regional Water Quality Control Board
October 18, 2007 and October 25, 2007

Comment: The RWQCB identified site-specific and general RWQCB requirements for the proposed project and outlined the RWQCB's requirements for the project's proposed discharge of secondarily treated water for landscape irrigation.

> Response: These requirements have not been included because the applicant no longer proposes to use treated wastewater for landscape irrigation.

County of San Bernardino
October 25, 2007

Comment: The County of San Bernardino asked the Energy Commission to consider the groundwater quality and quantity impacts related to the proposed project.

> Response: Potential impacts to groundwater quality and quantity have been discussed in detail in this document. Staff has proposed Condition of Certification **Soil and Water-6**, which requires the applicant to develop a monitoring program to evaluate groundwater basin changes and integrate the program with the County's existing program for monitoring of groundwater extractions at the Primm Valley Golf Course. Please refer to the Project Water Supply sections for both project construction and operations for additional information.

Jenny Wilder
January 14, 2009

Comment: This comment concerned the proposed project's potential impact to groundwater volume and levels: "I am concerned about the use of the ground water for the ISEGS. The area is desert, where rain water is typically measured in inches, not feet ... How much ground water is available and how long is it expected to last without recharging? What will be the impact on the natural resources with a reduction in the ground table? Will the wells be metered? Bright Source must be held fully accountable for all the negative impacts to this beautiful area."

> Response: Groundwater is a resource that is available for development so long as its use is lawful and does not cause significant impacts to the environment. Staff estimated the volume of basin recharge and current and future outflows as shown in

Soil and Water Table 15. This table shows the average annual recharge in the basin exceeds estimated outflows, indicating that in average years, the basin volume of storage would increase and there would be no basin impacts. Staff has also proposed Condition of Certification **SOIL&WATER-4**, which would require the project's operational groundwater use be metered and limited to 100 AFY for construction and operation of the proposed project. As discussed in the text above, the project's proposed groundwater use would be in compliance with existing LORS and conditions developed to identify and mitigate potential impacts.

Defenders of Wildlife
January 23, 2009

Comment: This comment concerned the potential impact of the proposed project's groundwater use to ephemeral seeps and springs located in the Clark Mountains. These ephemeral seeps and springs are used by bighorn sheep as a seasonal water supply.

Response: The seeps and springs located in the Clark Mountain are ephemeral and located upgradient and over three miles away from the project's proposed pumping wells. The seeps and springs derive their water from precipitation further upgradient in the Clark Mountains and beyond the potential reach of any cone of depression that would result from the project's proposed groundwater pumping. No significant impact to the seeps or springs is expected.

In the **Biological Resources** section of this document, staff has concluded that construction and operation of the ISEGS project could reduce foraging opportunities for bighorn on the alluvial fan. Implementation of staff's proposed Condition of Certification **BIO-19** would compensate for the project's contributions to cumulative impacts to bighorn sheep by creation of a new water source in the eastern part of the Clark Mountain range or in the State Line Hills, outside of designated wilderness. This artificial water source would attract bighorn sheep and expand foraging opportunities in the lower elevations of the mountains to replace areas of the alluvial fan lost to ISEGS facilities and the zone of disturbance on the north. This water source would also serve to attract the bighorn during seasonal movements and keep them in the mountainous portion of the wildlife corridor.

The Wilderness Society and Natural Resources Defense Council
January 23, 2009

Comment: Wilderness Society and Natural Resources Defense Council support the inclusions of conditions of certification to ensure that BMPs are in place to mitigate soil wind and water erosion. Their comment also expressed the need for analysis of the construction potable water supply and potential impact of the project's groundwater pumping could have to the potential migration of brackish groundwater from beneath the Ivanpah playa.

Response: The construction potable (primarily drinking) water supply would be purchased and brought onto the project site by construction contractors. The primary water supply used during construction for initial dust control and compaction would be groundwater from the two onsite wells. The potential migration of the brackish

groundwater from beneath the Ivanpah playa has been modeled by the applicant. Staff asked the applicant to further analyze the potential for brackish groundwater migration and associated impacts. The additional groundwater modeling by the applicant included the combined effect of groundwater pumping for the proposed project in combination with groundwater pumping for the Primm Valley Golf Club. The modeling showed that there would be no significant impact as a result of this pumping. Water quality monitoring from 1997 to 2007 also shows there has been little change in water quality due to current groundwater pumping. Staff concurs with the applicant's analysis. Please refer to the Groundwater Quality section for more information.

Craig Deutsche
January 21, 2009

Comment: This comment states that trying to complete a staff assessment without all of the data seems unsupportable.

Response: Staff has now acquired most of the information needed to produce this FSA/DEIS. Outstanding information needed by staff is itemized in the Conclusions section.

Basin and Range Watch
January 31, 2009

Comment: Would the use of herbicides create a risk of impact to the groundwater?

Response: Herbicides would be used in accordance with a Weed Management Plan developed for the proposed project and BLM-approved standards and would be in accordance with **Biological Resources** Condition of Certification **BIO-13**. These plans are designed to mitigate any potential impacts. The risk of impact to the groundwater would not be significant.

Comment: Would recycled sanitary wastewater used in landscape irrigation seep into groundwater and pollute desert tortoise habitat?

Response: The sanitary wastewater system has been changed by the applicant from a package treatment plant to a septic tank and leach field system. This system would be constructed in accordance with existing LORS and would not significantly impact desert tortoise habitat. Please see the **Biological Resources** section for further analysis of potential impacts to desert tortoise habitat.

Comment: Would there be any toxins or pollutants in the evaporation ponds at each of the projects three phases (Ivanpah 1, 2, and 3) that possibly may harm birds or wildlife and will these evaporation ponds have liners?

Response: The concrete holding basins would only be used on a temporary or emergency basis. Wastewater would not normally be discharged to these basins. Events that could trigger use of the basin include: temporarily holding of hydrostatic test water and emergency outfall from one of the plant processes. Any water discharged to the basins would be treated as appropriate and reused, or disposed of

as required by applicable regulations. Please refer to the **Biological Resources** and **Waste Management** sections for more information.

Comment: Has the applicant provided a sedimentation analysis to the Energy Commission?

Response: In May 2009, the applicant completed a storm water runoff and sediment transport report and docketed this report in May 19, 2009 as part of Data Response, Set 2I (CH2ML2009d).

Comment: How will large floods be managed and would hazardous waste be released across desert tortoise habitat?

Response: Storm water management design would allow most of the storm water to follow the existing naturally developed storm water drainage. Storm water flow would be diverted around the power blocks and administration building area. Hazardous waste generated during construction and plant operations would be properly transported, handled, contained and disposed in accordance with BMPs developed for the proposed project and project specific conditions of certification in the **Hazardous Waste** and **Waste Management** sections, and in compliance with LORS.

Comment: Will this amount of water use combined with other projects in Ivanpah Valley such as the Primm Golf Course negatively impact groundwater resources used by desert plants, succulents, animals, nearby springs?

Response: The project's proposed groundwater use, when combined with other groundwater uses in the Ivanpah Valley, would not cause a significant impact to desert plants, succulents, animals, or nearby springs. As discussed above, the mountain springs would be unaffected by the project's use of groundwater. Please refer to the Local Groundwater Supply and Cumulative Impacts and Mitigation section for more information.

Comment: Ivanpah Valley is already overdrafted from groundwater pumping. How does this justify pumping even more water in an arid region?

Response: Staff analysis of the groundwater basin balance indicates the current and future annual water use does not exceed average annual groundwater recharge (please see **Soil and Water Table 12** and **15**). Water level declines that have been observed appear to be due to drawdown around existing wells. These declines do not necessarily suggest that there is a net loss in basin storage. The project's proposed groundwater use would comply with conditions of certification and existing LORS. The project's use of groundwater individually or cumulatively would not significantly impact the quantity of groundwater in the Ivanpah Valley. To ensure there are no impacts, staff has recommended Conditions of Certification **SOIL&WATER-3**, **-4**, and **-6**. Please refer to the Cumulative Impacts and Mitigation section for more information.

Comment: How will herbicide spraying be controlled so that toxins do not blow into adjacent deserts or accumulate in dust that blows into desert habitats nearby during windstorms.

Response: Herbicides would be used in accordance with a Weed Management Plan as would be developed according to **Biological Resources** Condition of Certification **BIO-13** for the proposed project and in accordance with BLM-approved standards. This plan considers potential for wind dispersion and addresses these types of potential impacts.

Lynn Davis
February 4, 2009

Comment: The comment concerns accelerated water loss when California needs a sustainable, long-range water conservation strategy.

Response: The proposed project's water use has been analyzed for both local and cumulative water quality and water quantity impacts. No significant impacts to the water quantity and quality are expected to occur. Please refer to the Cumulative Impacts and Mitigation section for more information. Further, the applicant proposes to use dry cooling for each of the three power plants, which does not require water as would an evaporative cooling process. The proposed water use is consistent with water conservation policies of the SWRCB and Energy Commission, and other applicable LORS.

CONCLUSIONS

With the information provided to date, staff have determined that construction, operation, and decommissioning of the proposed project could potentially impact soil and water resources. Where these potential impacts have been identified, staff has proposed mitigation measures to reduce identified impacts to levels that are less than significant. The mitigation measures, as well as specifications for LORS conformance, are included herein as conditions of certification. Conditions of Certification referred to herein serve the purpose of both the Energy Commission's Conditions of Certification for purposes of the CEQA and BLM's Mitigation Measures for purposes of the NEPA. With these mitigation measures implemented, the project would conform with all applicable LORS. Staff's conclusions based on analysis of the information submitted to-date are as follows:

1. The proposed project would be located on an alluvial fan where flash flooding and mass erosion could impact the project. Project-related changes to the alluvial fan hydrology could result in impacts to adjacent land users and the Ivanpah playa. The applicant completed a hydrologic study and modeling of the alluvial fan. Based on this work and subsequent confirmatory and sensitivity modeling conducted by the BLM, scour analyses have been performed to support development of a project design that can withstand flash flood flows with minimal damage to site structures and heliostats. In addition, a DESCP has been developed to mitigate the potential storm water and sediment project-related impacts. However, the calculations and assumptions used to evaluate potential storm water and sedimentation impacts are

imprecise and have limitations and uncertainties associated with them. Given the uncertainty associated with the calculations, the magnitude of potential impacts that could occur cannot be determined precisely. As discussed in the Biological Resources and Recreation sections, the potential effects associated with storm water and sedimentation impacts could adversely affect habitat for a threatened species (the desert tortoise), as well as recreational use of Ivanpah Playa. Should these impacts occur, they would likely be highly controversial. Based on these factors, the proposed project could result in impacts that would be significant respect to CEQA significance criteria specified herein and NEPA significance criteria specified in 40 CFR 1508.27 Therefore, Condition of Certification **SOIL&WATER-5** has been developed that defines monitoring, inspection, and damage response requirements, as well as standards and procedures for re-considering the proposed storm water management approach if needed in the future.

2. The proposed project would use an air-cooled condenser for heat rejection and would recycle process wastewater from all plant equipment, including boilers and water treatment equipment, to the extent practicable. Recycling the wastewater would maximize reuse of process water and conserve freshwater. Use of this technology would substantially reduce water use and is consistent with water policy and the constitutional requirement that State water resources be put to beneficial use to the fullest extent possible.

3. Impacts to groundwater supply and quality would be less than significant. In the Ivanpah Valley Groundwater Basin, two substantial components of the basin's water balance are groundwater recharge through precipitation and groundwater loss through well pumping. Both precipitation and pumping in the basin will vary over the 50-year life of the proposed project. To ensure that the project's proposed use of groundwater does not significantly impact the beneficial uses and users of the groundwater in the basin, staff believes the project should become part of the existing groundwater monitoring and reporting program developed by San Bernardino County for the Primm Valley Golf Club. Substantial changes to groundwater levels caused by the proposed project would be documented by this monitoring and reporting program in accordance with Condition of Certification **SOIL&WATER-6**.

Completion of staff's analysis of the proposed project is subject to the following:

- Satisfactory completion of the heliostat pole installation testing by the applicant to either confirm or update its current installation plans followed by further evaluation by staff of whether there would be any impacts related to the method of construction or failure of the heliostats due to storm water flows.

MITIGATION MEASURES/PROPOSED CONDITIONS OF CERTIFICATION

DRAINAGE EROSION AND SEDIMENTATION CONTROL PLAN

SOIL & WATER-1: Prior to site mobilization, the project owner shall obtain both BLM's Authorized Officer and the CPM's approval for a site specific DESCP that

ensures protection of water quality and soil resources of the project site and all linear facilities for both the construction and operation phases of the project. This plan shall address appropriate methods and actions, both temporary and permanent, for the protection of water quality and soil resources, demonstrate no increase in off-site flooding potential, and identify all monitoring and maintenance activities. The project owner shall complete all necessary engineering plans, reports, and documents necessary for both BLM's Authorized Officer and the CMP to conduct a review of the proposed project and provide a written evaluation as to whether the proposed grading, drainage improvements, and flood management activities comply with all requirements presented herein. The plan shall be consistent with the grading and drainage plan as required by Condition of Certification **CIVIL-1** and shall contain the following elements:

Vicinity Map: A map shall be provided indicating the location of all project elements with depictions of all major geographic features to include watercourses, washes, irrigation and drainage canals, major utilities, and sensitive areas.

Site Delineation: The site and all project elements shall be delineated showing boundary lines of all construction areas and the location of all existing and proposed structures, underground utilities, roads, and drainage facilities. Adjacent property owners shall be identified on the plan maps. All maps shall be presented at a legible scale

Drainage: The DESCP shall include the following elements:

a. Topography. Topography for offsite areas are required to define the existing upstream tributary areas to the site and downstream to provide enough definition to map the existing storm water flow and flood hazard. Spot elevations shall be required where relatively flat conditions exist.

b. Proposed Grade. Proposed grade contours shall be shown at a scale appropriate for delineation of onsite ephemeral washes, drainage ditches, and tie-ins to the existing topography.

c. Hydrology. Existing and proposed hydrologic calculations for onsite areas and offsite areas that drain to the site; include maps showing the drainage area boundaries and sizes in acres, topography and typical overland flow directions, and show all existing, interim, and proposed drainage infrastructure and their intended direction of flow.

d. Hydraulics. Provide hydraulic calculations to support the selection and sizing of the onsite drainage network, diversion facilities and BMPs.

Watercourses and Critical Areas: The DESCP shall show the location of all onsite and nearby watercourses including washes, irrigation and drainage canals, and drainage ditches, and shall indicate the proximity of those features to the construction site. Maps shall identify high hazard flood prone areas.

Clearing and Grading: The plan shall provide a delineation of all areas to be cleared of vegetation, areas to be preserved, and areas where vegetation would be cut to allow clear movement of the heliostats. The plan shall provide elevations, slopes, locations, and extent of all proposed grading as shown by contours, cross-sections, cut/fill depths or other means. The locations of any disposal areas, fills, or other special features shall also be shown. Existing and proposed topography tying in proposed contours with existing topography shall be illustrated. The DESCP shall include a statement of the quantities of material excavated at the site, whether such excavations or fill is temporary or permanent, and the amount of such material to be imported or exported or a statement explaining that there would be no clearing and/or grading conducted for each element of the project. Areas of no disturbance shall be properly identified and delineated on the plan maps.

Soil Wind and Water Erosion Control: The plan shall address exposed soil treatments to be used during construction and operation of the proposed project for both road and non-road surfaces including specifically identifying all chemical based dust palliatives, soil bonding, and weighting agents appropriate for use at the proposed project site that would not cause adverse effects to vegetation; BMPs shall include measures designed to prevent wind and water erosion including application of chemical dust palliatives after rough grading to limit water use. All dust palliatives, soil binders, and weighting agents shall be approved by both BLM's Authorized Officer and the CPM prior to use.

Project Schedule: The DESCP shall identify on the topographic site map the location of the site-specific BMPs to be employed during each phase of construction (initial grading, project element construction, and final grading/stabilization). Separate BMP implementation schedules shall be provided for each project element for each phase of construction.

Best Management Practices: The DESCP shall show the location, timing, and maintenance schedule of all erosion- and sediment-control BMPs to be used prior to initial grading, during project element excavation and construction, during final grading/stabilization, and after construction. BMPs shall include measures designed to control dust and stabilize construction access roads and entrances. The maintenance schedule shall include post-construction maintenance of treatment-control BMPs applied to disturbed areas following construction.

Erosion Control Drawings: The erosion-control drawings and narrative shall be designed, stamped and sealed by a professional engineer or erosion-control specialist.

Agency Comments: The DESCP shall include copies of recommendations, conditions, and provisions from the County of San Bernardino, California Department of Fish and Game (CDFG), and Lahontan Regional Water Quality Control Board (RWQCB).

Monitoring Plan: Monitoring activities shall include routine measurement of the volume of accumulated sediment in the onsite drainage ditches, and

storm water diversions and the requirements specified in Appendix B, C, and D.

Verification: The DESCP shall be consistent with the grading and drainage plan as required by Condition of Certification **CIVIL-1**, and relevant portions of the DESCP shall clearly show approval by the chief building official (CBO). In addition, the project owner shall do all of the following:

a. No later than ninety (90) days prior to start of site mobilization, the project owner shall submit a copy of the DESCP to the County of San Bernardino, the RWQCB, the BLM's authorized officer, and CMP for review and comment. Both BLM's Authorized Officer and the CPM shall consider comments received from San Bernardino County and RWQCB.

b. During construction, the project owner shall provide an analysis in the monthly compliance report on the effectiveness of the drainage-, erosion- and sediment-control measures and the results of monitoring and maintenance activities.

c. Once operational, the project owner shall provide in the annual compliance report information on the results of storm water BMP monitoring and maintenance activities.

d. Provide BLM's Authorized Officer and the CPM with two (2) copies each of all monitoring or other reports required for compliance with San Bernardino County, CDFG, and RWQCB.

WASTE DISCHARGE REQUIREMENTS

SOIL&WATER-2: The project owner shall comply with the requirements specified in Appendix B, C, and D for dredge and fill, wastewater, and storm water discharges associated with construction and industrial activity. The project owner shall develop, obtain both BLM's Authorized Officer and CPM approval of, and implement a construction Storm Water Pollution Prevention Plan (SWPPP) for the construction of the project and an Industrial SWPPP for operation of the project.

Verification: At least sixty (60) days prior to construction, the project owner shall submit to both BLM's Authorized Officer and the CPM a copy of the construction SWPPP for construction of the project for review and approval. **Verification**: At least sixty (60) days prior to commercial operation, the project owner shall submit to both BLM's Authorized Officer and the CPM a copy of the Industrial SWPPP for operation of the project for review and approval prior to commercial operation. The project owner shall retain a copy on site. The project owner shall submit copies to both BLM's Authorized Officer and the CPM of all correspondence between the project owner and the RWQCB regarding the WDRs for discharge of storm water associated with construction and industrial activity within ten (10) days of its receipt or submittal. Copies of correspondence shall include the Notice of Intent sent by the project owner to the SWRCB.

PROJECT GROUNDWATER WELLS

SOIL&WATER-3: Pre-Well Installation. The project owner shall construct and operate up to two onsite groundwater wells that produce water from the IVGB. The project owner shall ensure that the wells are completed in accordance with all applicable state and local water well construction permits and requirements. Prior to initiation of well construction activities, the project owner shall submit a well construction packet to the County of San Bernardino, in accordance with the County of San Bernardino Code Title 2, Division 3, Chapter 6, Article 5, containing all documentation, plans, and fees normally required for the county's well permit, with copies to both BLM's Authorized Officer and the CPM. The project shall not construct a well or extract and use groundwater until the County of San Bernardino provides a written concurrence that the proposed well construction and operation activities would comply with all applicable county well requirements, and both BLM's Authorized Officer and the CPM provides approval to construct and operate the well.

Post-Well Installation. The project owner shall provide documentation to both BLM's Authorized Officer and the CPM that the well has been properly completed. In accordance with California's Water Code section 13754, the driller of the well shall submit to the DWR a Well Completion Report for each well installed. The project owner shall ensure the Well Completion reports are submitted. The project owner shall ensure compliance with all county water well standards and requirements for the life of the wells and shall provide BLM's Authorized Officer and the CPM with two (2) copies each of all monitoring or other reports required for compliance with the County of San Bernardino water well standards and operation requirements, as well as any changes made to the operation of the well.

Verification: The project owner shall do all of the following:

1. No later than sixty (60) days prior to the construction of the onsite groundwater wells, the project owner shall submit to both BLM's Authorized Officer and the CPM a copy of the water well construction packet submitted to the County of San Bernardino.

2. No later than thirty (30) days prior to the construction of the onsite water supply wells, the project owner shall submit a copy of written concurrence received from the County of San Bernardino that the proposed well construction activities comply with all county well requirements and meet the requirements established by the county's water well permit program.

3. No later than sixty (60) days after installation of each well at the project site, the project owner shall ensure that the well driller submits a Well Completion Report to the DWR with a copy provided to both BLM's Authorized Officer and the CPM. The project owner shall submit to the CPM together with the Well Completion Report a copy of well drilling logs, water quality analyses, and any inspection reports.

4. During well construction and for the operational life of the well, the project owner shall submit two (2) copies each to BLM's Authorized Officer and the CPM of any

proposed well construction or operation permit changes within ten (10) days of submittal to or receipt from the County of San Bernardino.

5. No later than fifteen (15) days after completion of the onsite water supply wells, the project owner shall submit documentation to BLM's Authorized Officer, the CPM, and the RWQCB that well drilling activities were conducted in compliance with Title 23, California Code of Regulations, Chapter 15, Discharges of Hazardous Wastes to Land, (23 CCR, sections 2510 et seq.) requirements and that any onsite drilling sumps used for project drilling activities were removed in compliance with 23 CCR section 2511(c).

CONSTRUCTION AND OPERATIONS WATER USE

SOIL&WATER-4: The project owner proposes to construct and operate the project in phases, beginning with Ivanpah 1, then Ivanpah 2, and ending with Ivanpah 3. The proposed project's use of groundwater during each year of construction shall not exceed more than the following:

A. 200 AFY during the construction of either Ivanpah 1 or 2; and
250 AFY for all construction and operations activities shall not exceed 100 acre-feet per year. Prior to the use of groundwater for construction, the project owner shall install and maintain metering devices as part of the water supply and distribution system to document project water use and to monitor and record in gallons per day the total volume(s) of water supplied to the project from this water source. The metering devices shall be operational for the life of the project.

Verification: Beginning six (6) months after the start of construction, the project owner shall prepare a semi-annual summary of amount of water used for construction purposes. The summary shall include the monthly range and monthly average of daily water usage in gallons per day.

At least sixty (60) days prior to the start of construction of the proposed project, the project owner shall submit to both BLM's Authorized Officer and the CPM a copy of evidence that metering devices have been installed and are operational.

The project owner shall prepare an annual summary, which will include daily usage, monthly range and monthly average of daily water usage in gallons per day, and total water used on a monthly and annual basis in acre-feet. For years subsequent to the initial year of operation, the annual summary will also include the yearly range and yearly average water use by source. For calculating the total water use, the term "year" will correspond to the date established for the annual compliance report submittal.

STORM WATER DAMAGE MONITORING AND RESPONSE PLAN

SOIL&WATER-5: The project owner shall ensure that all heliostats are designed to withstand storm water scour of up to 6.5 feet or greater as estimated by a Pylon Insertion Depth and Heliostat Stability Report to be completed by the applicant. The project owner shall also develop a Storm Water Damage Monitoring and Response Plan to evaluate potential impacts from storm water, including heliostats that fail due to storm water flow or otherwise break

and scatter mirror debris on to the ground surface. The Storm Water Damage Monitoring and Response Plan shall include the following elements:

- Detailed maps showing the installed location of all heliostats within each project phase.
- Each heliostat should be identified by a unique ID number marked to show initial ground surface at its base, and the depth of the pylon below ground.
- Minimum Depth Stability Threshold to be maintained of pylons to meet long-term stability for applicable wind, water and debris loading effects;
- Above and below ground construction details of a typical installed heliostat.
- BMPs to be employed to minimize the potential impact of broken mirrors to soil resources.
- Methods and response time of mirror cleanup and measures that may be used to mitigate further impact to soil resources from broken mirror fragments.
- Monitoring, documenting, and restoring the Ivanpah playa surface when impacted by sedimentation or broken mirror shards.

Monitor and Inspect Periodically, Before First Seasonal and After Every Storm Event:

- Security and Tortoise Exclusion Fence: Inspect for damage and buildup of sediment or debris
- Heliostats within Drainages or subject to drainage overflow: Inspect for tilting, mirror damage, depth of scour compared to pylon depth below ground and the Minimum Depth Stability Threshold, collapse, and downstream transport.
- Drainage Channels: Inspect for substantial migration or changes in depth, and transport of broken glass.
- Constructed Diversion Channels: Inspect for scour and structural integrity issues caused by erosion, and for sediment and debris buildup.
- Ivanpah Playa Surface: Inspect for changes in the surface texture and quality from sediment buildup, erosion, or broken glass.

Short-Term Incident-Based Response:

- Security and Tortoise Exclusion Fence: repair damage, and remove built-up of sediment and debris.
- Heliostats: Remove broken glass, damaged structure, and wiring from the ground, and for pylons no longer meeting the Minimum Depth Stability Threshold, either replace/reinforce or remove the mirrors to avoid exposure for broken glass.
- Drainage Channels: no short-term response necessary unless changes indicate risk to facility structures.

- Constructed Diversion Channels: repair damage, maintain erosion control measures and remove built-up sediment and debris.

Long-Term Design-Based Response:

- Propose operation/BMP modifications to address ongoing issues. Include proposed changes to monitoring and response procedures, frequency, or standards.
- Replace/reinforce pylons no longer meeting the Minimum Depth Stability Threshold or remove the mirrors to avoid exposure for broken glass.
- Propose design modifications to address ongoing issues. This may include construction of active storm water management diversion channels and/or detention ponds.

Inspection, short-term incident response, and long-term design-based response may include activities both inside and outside of the approved right-of-way. For activities outside of the approved right-of-way, the applicant will notify BLM and acquire environmental review and approval before field activities begin.

Verification: At least sixty (60) days prior to commercial operation, the project owner shall submit to both BLM's Authorized Officer and the CPM a copy of the Storm Water Damage Monitoring and Response Plan for review and approval prior to commercial operation. The project owner shall retain a copy of this plan onsite at the power plant at all times. The project owner shall prepare an annual summary of the number of heliostats failed, cause of the failure, and cleanup and mitigation performed for each failed heliostat.

GROUNDWATER LEVEL MONITORING AND REPORTING PLAN

SOIL&WATER-6: The project owner shall submit a Groundwater Level Monitoring and Reporting Plan to San Bernardino County for review and both BLM's Authorized Officer and the CPM for review and approval in accordance with the County of San Bernardino Code Title 2, Division 3, Chapter 6, Article 5 (Desert Groundwater Management Ordinance). The Groundwater Level Monitoring and Reporting Plan shall provide detailed methodology for monitoring background and site groundwater levels. Monitoring shall include pre-construction, construction, and project operation water use. The primary objective for the monitoring is to establish pre-construction and project related groundwater level trends that can be quantitatively compared against observed and simulated trends near the project pumping well and near potentially impacted existing wells.

Prior to project construction, monitoring shall commence to establish pre-construction base-line conditions and shall incorporate the existing monitoring and reporting data collected for the Primm Valley Golf Club. The monitoring network shall be designed to incorporate the ongoing monitoring and reporting program established for the Primm Valley Golf Course. The

monitoring plan and network may make use of existing wells in the basin that would satisfy the requirements for the monitoring program.

Verification: The project owner shall complete the following:

1. At least six (6) months prior to construction, a Groundwater Level Monitoring and Reporting Plan shall be submitted to the County of San Bernardino for review and comment, and a copy of the County's comments and the plan shall be submitted to both BLM's Authorized Officer and the CPM for review and approval. The plan shall include a scaled map showing the site and vicinity, existing well locations, and proposed monitoring locations (both existing wells and new monitoring wells proposed for construction). The map shall also include relevant natural and man-made features (existing and proposed as part of this project). The plan also shall provide: (1) well construction information and borehole lithology for each existing well proposed for use as a monitoring well; (2) description of proposed drilling and well installation methods; (3) proposed monitoring well design; and, (4) schedule for completion of the work.

2. At least four (4) months prior to construction, a Well Monitoring Installation and Groundwater Level Network Report shall be submitted to both BLM's Authorized Officer and the CPM. The report shall include a scaled map showing the final monitoring well network. It shall document the drilling methods employed, provide individual well construction as-builds, borehole lithology recorded from the drill cuttings, well development, and well survey results. The well survey shall measure the location and elevation of the top of the well casing and reference point for all water level measurements, and shall include the coordinate system and datum for the survey measurements. Additionally, the report shall describe the water level monitoring equipment employed in the wells and document their deployment and use.

3. As part of the monitoring well network development, all newly constructed monitoring wells shall be permitted and constructed consistent with San Bernardino County and State specifications.

4. At least three (3) months prior to project construction, all water level monitoring data shall be provided to both BLM's Authorized Officer and the CPM. The data transmittal shall include an assessment of pre-project water level trends, a summary of available climatic information (monthly average temperature and rainfall records from the nearest weather station), and a comparison and assessment of water level data relative to the assumptions and spatial trends simulated by the applicant's groundwater model.

5. After project construction and during project operations, the project owner shall submit the monitoring data annually to both BLM's Authorized Office and the CPM. The summary shall document water level monitoring methods, the water level data, water level plots, and a comparison between pre- and post-project start-up water level trends. The report shall also include a summary of actual water use conditions, monthly climatic information (temperature and rainfall), and a comparison and assessment of water level data relative to the assumptions and spatial trends simulated by the applicant's groundwater model.

WASTEWATER COLLECTION SYSTEM REQUIREMENTS

SOIL&WATER-7: The project owner shall recycle and reuse all process wastewater streams to the extent practicable. Prior to transport and disposal of any facility operation wastewaters that are not suitable for treatment and reuse onsite, the project owner shall test and classify the stored wastewater to determine proper management and disposal requirements. The project manager shall ensure that the wastewater is transported and disposed of in accordance with the wastewater's characteristics and classification and all applicable LORS (including any CCR Title 22 Hazardous Waste and Title 23 Waste Discharges to Land requirements).

Verification: Prior to transport and disposal of any facility operation wastewaters that are not suitable for treatment and reuse onsite, the project owner shall test and classify the stored wastewater to determine proper management and disposal requirements. The project manager shall ensure that the wastewater is transported and disposed of in accordance with the wastewater's characteristics and classification and all applicable LORS (including any CCR Title 22 Hazardous Waste and Title 23 Waste Discharges to Land requirements).

SEPTIC SYSTEM AND LEACH FIELD REQUIREMENTS

SOIL&WATER-8: Prior to the start of construction, the project owner shall comply with the County of San Bernardino and Appendix B, C, and D requirements for the construction and operation of the project's proposed sanitary waste septic system and leach field. Project construction shall not proceed until documentation equivalent to the County's required wastewater treatment system permits are issued by the County and approved by both BLM's Authorized Officer and the CPM. The project owner shall remain in compliance with the County requirements for the life of the project.

Verification: The project owner will submit all necessary information and the appropriate fee to the County of San Bernardino to ensure that the project has complied with the County's and Appendix B, C, and D sanitary waste disposal facilities requirements. A written assessment prepared by the County of San Bernardino of the project's compliance with these requirements must be provided to the CPM sixty (60) days prior to the start of operation.

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SOIL AND WATER RESOURCES - Appendix A

Acronyms Used in the Soil and Water Resources Section

amsl	above mean sea level	IEPR	Integrated Energy Policy Report
AF	acre-feet	ISEGS	Ivanpah Solar Electric Generating System
AFY	acre-feet per year	IVGB	Ivanpah Valley Groundwater Basin
BLM	Bureau of Land Management	lbs	pounds
bgs	below ground surface	LID	Low Impact Development
BMP	Best Management Practices	LORS	laws, ordinances, regulations, and standards
CDPH	California Department of Public Health	MCL	maximum contaminant level
CEQA	California Environmental Quality Act	mg/l	milligrams per liter
cfs	cubic feet per second	mph	miles per hour
CPM	Compliance Project Manager	MOU	Memorandum of Understanding
DESCP	Drainage, Erosion, and Sediment Control Plan	MW	megawatt
DTSC	Department of Toxic Substances Control	NEPA	National Environmental Policy Act
DWR	Department of Water Resources	NPDES	National Pollutant Discharge Elimination System
ESA	Environmental Site Assessment	RCRA	Resource Conservation and Recovery Act
FEMA	Federal Emergency Management Agency	REC	Recognized Environmental Condition
ft/day	feet per day	ROC	Record of Conversation
fps	feet per second	RWQCB	Regional Water Quality Control Board
FSA	Final Staff Assessment	SWPPP	Storm Water Pollution Prevention Plan
ft/ft	feet per foot	SWRCB	State Water Resources Control Board
ft/yr	feet per year	TDS	total dissolved solids
gpd	gallons per day	µS/cm	microsiemens per centimeter
gpd/ft	gallons per day per foot	USCS	Unified Soil Classification System
gpm	gallons per minute	WWTP	wastewater treatment plant

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SOIL AND WATER RESOURCES - Appendix B

FACTS FOR WASTEWATER DISCHARGE

1. Reason for Action and Regulatory Authority

   The applicant filed an Application for Certification (AFC) with the California Energy Commission (Energy Commission) on August 31, 2007. The AFC proposed the construction and operation of the Ivanpah Solar Electric Generating System (ISEGS) project in the Ivanpah Valley in San Bernardino County, California. In conjunction with ISEGS project construction, the applicant proposes to discharge wastes, dredged, and/or fill material to State waters. Additionally, construction and operation of the ISEGS project would have the potential to impact water quality via storm water runoff.

   Under the Warren-Alquist Act, and Governor's Executive Order S-14-08, the Energy Commission has the authority to streamline permitting for renewable energy generation facilities. The Lahontan Regional Water Quality Control Board (Lahontan RWQCB) requirements for this project would be issued to the applicant through the Energy Commission's certification process.

   In a May 28, 2009 letter, the U.S. Army Corps of Engineers determined that the drainages on the site are not waters of the United States (U.S.). However, the drainages affected by the Project are waters of the State, as defined by California Water Code (Water Code) section 13050, and are subject to State requirements in accordance with Water Code section 13260 and to the Water Quality Control Plan for the Lahontan Region (Basin Plan). All actions impacting or potentially impacting these drainages, including dredge and fill activities and construction and industrial activities, would be regulated through these requirements, which would be incorporated in the Energy Commission's certification process.

2. Waste Discharge Requirements History

   The ISEGS project would be a new facility. There are no previous Lahontan RWQCB actions for the ISEGS project or location. The *Facts, Requirements,* and *Surface Water Monitoring and Reporting Program* for waste discharge address storm water, dredge and fill, and groundwater requirements for the proposed ISEGS project are presented herein.

3. Climate

   The Mojave Desert has a typical desert climate, i.e., extreme daily temperature changes, low annual precipitation, strong seasonal winds, and mostly clear skies. The annual highest temperature in the Mojave Desert exceeds 100 degrees Fahrenheit. Winter temperatures are more moderate, with mean maximum temperatures in the 60s and lows in the 30s. For the period of 1971 to 2000, the average annual precipitation in the vicinity of the ISEGS project ranged from 5 to 7 inches. Most of the precipitation occurs between December and March. However, occasional heavy precipitation occurs in the summer due to thunderstorms.

4. Site Geology

   a. Setting

      The ISEGS project would be located in the Basin and Range Geomorphic Province, which is characterized by an extensional tectonic regime, i.e., block-faulted mountain ranges separated by down-dropped, sediment filled basins. The proposed project site is on the western flank of the Ivanpah Valley in the eastern Mojave Desert. Ivanpah Valley is an elongate, internally draining, structural basin, which extends north into Las Vegas Valley. The ISEGS project would be situated on the mid portion of a bajada (a broad apron of coalesced alluvial fans) on the east side of the Clark Mountains.

   b. Faulting and Seismicity

      The active northwest-trending State Line, Ivanpah, and Clark Mountain faults transect the Ivanpah Valley.

   c. Soils

      The proposed ISEGS project surface is covered by coarse-grained, gravelly soils that are characterized by the Natural Resource Conservation Service as well drained to excessively well drained with negligible to medium runoff potential.

5. Groundwater

   The Ivanpah Valley is underlain by the Ivanpah Valley Groundwater Basin (Department of Water Resources Basin No. 6-30). The north-south trending basin extends into Nevada and includes Jean Lake Valley at its northern extent. It is bounded by bedrock mountains, which have shed the detritus that forms the unconsolidated alluvial deposits of the basin. These deposits appear to extend to depths of 8,000 feet or more near the axis of the basin.

   Groundwater in the basin appears to be largely unconfined. In the vicinity of the ISEGS project, the depth to groundwater ranges from approximately 200 to 700 feet below ground surface. The shallower depth to groundwater occurs in the topographically lowest portion of the proposed ISEGS project, near Ivanpah Lake. In the western portion of the proposed ISEGS project area, which is topographically higher on the bajada, the depth to groundwater is the greatest. The groundwater flow direction is generally east toward Ivanpah Lake.

   Groundwater quality in the groundwater basin is generally good, although total dissolved solids (TDS) can be high in some areas. TDS at the ISEGS project site is estimated to be between 300 to 600 milligrams per liter (mg/L). TDS levels increase in the proximity of Ivanpah Lake.

   The applicant plans to install two groundwater wells and to use the wells to supply water during construction and operation. The ISEGS project would use a dry-cooling technology to avoid the use of water for power plant cooling.

6. Surface Water and Storm Water

Ivanpah Valley is an arid, internally draining basin. In the southern portion of the valley, surface water flow is toward Ivanpah Lake, a predominately dry lakebed. Numerous ephemeral channels (i.e., washes) drain from the Clark Mountains, across the bajada surface where the ISEGS project would be located, and terminate at Ivanpah Lake. The ephemeral washes are characterized by natural processes that, to varying degrees, support native desert wash vegetation and provide wildlife habitat.

Surface water drainage at the proposed ISEGS project area is a complex network of interconnected or anastomosing channels. The channels represent ephemeral washes that only flow when storm events generate runoff from the Clark Mountains. During such events, the proposed ISEGS project site can be subject to flash flooding and mass erosion. A hydrologic study and modeling performed by the applicant and the U. S. Bureau of Land Management (BLM) found that the 100-year flood event would inundate most of the proposed ISEGS project area through canalized and sheet flows, and would be primarily erosive in nature.

7. Land Uses and Existing Site Conditions

The proposed ISEGS project site and adjacent areas are federal lands managed by the BLM's California Desert District and are used for low intensity livestock grazing. The Primm Valley Golf Club is approximately 0.5 miles east of the proposed ISEGS project area.

The 4,073-acre ISEGS project consists of a relatively undisturbed Mojave creosote bush scrub environment, which supports a diversity of plant communities and a high diversity of wildlife, including the Federal and State Endangered desert tortoise.

8. Description of Dredge and Fill Impacts to State Waters

The ISEGS project involves the proposed discharge of structural materials and/or earthen wastes (fill) as described in Table 1.

SOIL AND WATER RESOURCES APPENDIX B - TABLE 1
Dredge and Fill Impacts to Waters of the State*

		Linear Impacts[4] (feet):	Impact Area (acres)	Fill Volume (cubic yards)	Dredge Volume (cubic yards)
30-foot-wide asphalt roads (including 3-foot shoulder)	Amount	11,639	---	---	---
	Temporary[1]		0.995	0	0
	Long-term[2]		0.5	806	806
	Permanent[3]		1.346	2,172	2,172
24-foot-wide asphalt roads	Amount	4,433	---	---	---
	Temporary		0.13	0	0
	Long-term		0.31	500	500
	Permanent		0.059	95	95
15-foot-wide dirt roads	Amount	2,022	---	---	---
	Temporary		0	0	0
	Long-term		0.192	0	0
	Permanent		0	0	0
12-foot-wide dirt roads	Amount	16,171	---	---	---
	Temporary		0.154	0	0
	Long-term		2.19	0	0
	Permanent		0.113	0	0
12-foot-wide rerouted trails	Amount	1,194	---	---	---
	Temporary		0	0	0
	Long-term		0.061	0	0
	Permanent		0.188	0	0
12-foot-wide gravel road	Amount	487	---	---	---
	Temporary		0	0	0
	Long-term		0	0	0
	Permanent		0.028	0	0
10-foot-wide heliostat maintenance paths	Amount	154,800	---	---	---
	Temporary		0	0	0
	Long-term		21.57	0	0
	Permanent		0	0	0
10-foot-wide heliostat arrays	Amount	158,285	---	---	---
	Temporary		21.8	0	0
	Long-term		0.031	0	0
	Permanent		0	0	0
Natural gas line corridor	Amount	7,380	---	---	---
	Temporary		0.939	0	0
	Long-term		0	0	0
	Permanent		0	0	0
Gas and water utility lines	Amount	1,126	---	---	---
	Temporary		0.215	2,828	2,828
	Long-term		0.19	0	0
	Permanent		0	0	0

SOIL AND WATER RESOURCES APPENDIX B - TABLE 1
Dredge and Fill Impacts to Waters of the State*

		Linear Impacts[4] (feet):	Impact Area (acres)	Fill Volume (cubic yards)	Dredge Volume (cubic yards)
Metering sets	Amount	80	---	---	---
	Temporary		0	0	0
	Long-term		0.005	0	0
	Permanent		0	0	0
Power blocks, diversion channels and berms	Amount	17,177	---	---	---
	Temporary		0	0	0
	Long-term		1.284	1,419	503
	Permanent		0.15	75	289
Gen-tie lines and towers	Amount	0	---	---	---
	Temporary		0	0	0
	Long-term		0	0	0
	Permanent		0	0	0
Administration/Maintenance Building	Amount	3,618	---	---	---
	Temporary		0	0	0
	Long-term		0.444	666	0
	Permanent		0	0	0
Substation	Amount	4,670	---	---	---
	Temporary		0	0	0
	Long-term		0	0	0
	Permanent		0.572	845	0
Construction laydown, staging and stockpiling	Amount		---	---	---
	Temporary		2.674	0	0
	Long-term		0	0	0
	Permanent		0	0	0
Perimeter fence installation	Amount	0	---	---	---
	Temporary		76	0	0
	Long-term		0	0	0
	Permanent		0	0	0
TOTAL DREDGE AND FILL IMPACTS	**Amount**	**383,082**			
	Temporary		**26.91**	**2,828**	**2,828**
	Long-term		**26.78**	**3,391**	**1,809**
	Permanent		**2.46**	**3,187**	**2,556**

NOTES:

*Table 1 is based on Ivanpah Solar Electric Generating System's Data Response to Energy Commission, Set 1P, *Beneficial Use and Dredge/Fill Analyses for Waters of the State,* September 9, 2009

[1] Temporary impacts are associated with construction activities, and these areas would be restored upon completion c construction.

[2] Long-term impacts would continue for the duration of ISEGS project operations, which is estimated at approximately 50 years. At ISEGS project decommissioning, these areas would be rehabilitated and revegetated.

[3] Permanent impacts are associated with roads and structures that would remain following ISEGS project closure.

[4] Note that linear distances are likely overestimated since there is redundancy among values for temporary, long-term, and permanent impacts.

9. Mitigation Plan

See Condition of Certification **Biology-20** for a description of the compensation requirements for impacts to waters of the State.

10. Storm Water Discharges

The existing slope and drainage of the proposed ISEGS project site have not been previously modified from their natural state. Topographically, the proposed site is relatively uniform and slopes down to the east at a gradient of approximately 5 percent. Grading would be minimized to the extent feasible (i.e., restricted to the three power blocks, support area, and areas with higher topographic relief in the northern portion of the proposed site). Outside of those specified areas, existing conditions would be largely maintained during construction and operation.

The *Requirements* contained in Attachment 3 regulate construction-related and industrial-related waste discharges in storm water runoff and other discharges that would be associated with ISEGS project. The requirements also direct the applicant to maintain pre-development infiltration, surface retention, and recharge rates in order to minimize post-development impacts to offsite water bodies and underlying groundwater. The applicant would be required to avoid adverse effects of altering the hydrologic characteristics (i.e., avoid hydromodification) of the ISEGS project area by site design and construction practices.

a. *Construction Storm Water Management*
The ISEGS project would be divided into three power-generating phases, referred to as Ivanpah 1, 2, and 3. The project phases would be built sequentially and the applicant estimates that construction would be ongoing for a total of 24 months for each phase. Under the Storm Water Pollution Prevention Plan (SWPPP) and Drainage, Erosion, and Sediment Control Plan (DESCP), site grading would be minimized and most storm water would be allowed to flow unimpeded across the site in existing channels and as sheet flow. The applicant would implement Best Management Practices (BMPs) as described in the SWPPP and DESCP to prevent water quality impacts during construction.

b. *Post-Construction Storm Water Management*
Impacts to the onsite ephemeral washes would be minimized through the implementation of a low impact development approach (i.e., measures that maintain or mimic pre-development hydrology) as described in the DESCP. Storm water diversion structures would only be constructed around the substation and the three power blocks. The applicant proposes to manage storm water, erosion, and sedimentation at the completed ISEGS project through a comprehensive system of source controls, treatment BMPs, and site design. The final storm water management system must replicate pre-development hydrographs for the 2-year through the 10-year, 24-hour storm events. At a minimum, the applicant would adhere to detention and retention requirements of State Water Resources Control Board's *Waste Discharge Requirements for Discharges of Storm Water Runoff Associated with Construction Activity, General Permit No CAS00002*; *Waste Discharge Requirements For Discharges of Storm Water Associated With Industrial Activities, General Permit No. CAS00001*; and all subsequent revisions and amendments to these general permits.

11. Wastewater Discharges

Wastewater generated by ISEGS project operation would be from three sources: wastewater generated after the piping and vessel hydrostatic testing, wastewater generated from washing the heliostats and, domestic waste discharged to onsite septic systems. The hydrostatic test water would either be trucked to a licensed treatment facility or disposed to land under a low threat to groundwater waiver in accordance with SWRCB Water Quality Order 2003-003-DWQ. The excess heliostat wash water would drain to the ground surface beneath the heliostats where it would evaporate. The septic systems would be sited and designed in accordance to the Basin Plan and San Bernardino County requirements.

12. Receiving Waters

The receiving waters are the "minor surface waters of the Ivanpah Hydrologic Area" (Hydrologic Subunit 612.00) and groundwaters of the Ivanpah Groundwater Basin (Department of Water Resources No. 6-30).

13. Basin Plan

The Lahontan RWQCB adopted the Basin Plan, which became effective on March 31, 1995. The *Requirements* and *Surface Water Monitoring and Reporting Program*, Attachments 2 and 3, respectively, implement the Basin Plan.

14. Beneficial Uses - Surface Waters

The Basin Plan designates beneficial uses for surface waters in each watershed of the Lahontan Region. The beneficial uses listed for minor surface waters of the Ivanpah Hydrologic Area include:

a. municipal and domestic water supply (MUN),

b. agricultural supply (AGR),

c. groundwater recharge (GWR),

d. water contact recreation (REC-1),

e. non-contact water recreation (REC-2),

f. commercial and sportsfishing (COMM),

g. warm freshwater habitat (WARM),

h. wildlife habitat (WILD).

15. Beneficial Uses - Groundwaters

The Basin Plan designates beneficial uses for groundwaters in each watershed of the Lahontan Region. Beneficial uses of groundwaters of the Ivanpah Groundwater Basin include:

a. municipal and domestic water supply (MUN),

b. agricultural supply (AGR),

c. industrial surface supply (IND),

d. freshwater replenishment (FRSH).

16. Non-Degradation

The State Water Board established California's antidegradation policy in State Water Board Resolution No. 68-16 (*Statement of Policy with Respect to Maintaining High Quality of Waters in California*). Resolution No. 68-16 requires that existing quality of waters be maintained unless degradation is justified based on specific findings or facts. The Basin Plan implements and incorporates by reference State antidegradation policies.

17. Other Considerations and Requirements for Discharge

Pursuant to Water Code section 13241, the *Facts, Requirements*, and *Surface Water Monitoring and Reporting Program* take into consideration:

a. *Past, present, and probable future beneficial uses of water*.
These requirements identify past, present, and probable future beneficial uses of water as described in Facts Nos. 14 and 15. The proposed discharge would not adversely affect present or probable future beneficial uses of the receiving waters.

b. *Environmental characteristics of the hydrologic unit and the groundwater basin under consideration, including the quality of water available thereto*.

Facts Nos. 3 through 7 describe the environmental characteristics and quality of waters in the hydrologic unit and groundwater basin.

c. *Water quality conditions that could reasonably be achieved through the coordinated control of all factors that affect water quality in the area.*
These requirements would not result in changes to groundwater quality. Adverse effects to surface water quality would be minimized.

d. *Economic considerations*.
The Energy Commission's certification authorizes the applicant to implement closure and post-closure maintenance actions at the ISEGS project as proposed by the applicant. These requirements accept the applicant's proposed actions as meeting the best practicable control method for protecting water quality from impacts from the ISEGS project.

e. *The need for developing housing in the region*.
The applicant is not responsible for developing housing in the region.

f. *The need to develop and use recycled water*.
The water requirements for the ISEGS project would be minimized by the incorporation of dry-cooling technology. Additionally, there are no feasible sources of recycled water in the vicinity of the proposed ISEGS project.

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SOIL AND WATER RESOURCES - Appendix C

REQUIREMENTS FOR WASTEWATER DISCHARGE

I. DISCHARGE SPECIFICATIONS

A. Storm Water Discharges

Waste in discharges of storm water must be reduced or prevented to achieve the best practicable treatment level using controls, structures, and management practices. The applicant shall comply with all requirements (with the exception of purely administrative requirements, e.g., filing a Notice of Intent) contained in State Water Resources Control Board's (SWRCB) *Waste Discharge Requirements For Discharges of Storm Water Runoff Associated With Construction Activity, General Permit No. CAS00002*; *Waste Discharge Requirements For Discharges of Storm Water Associated With Industrial Activities, General Permit No. CAS00001*; and all subsequent revisions and amendments.

These requirements do not preclude the applicant from requirements imposed by municipalities, counties, drainage districts, and other local agencies regarding discharges of storm water to separate storm sewer systems or other water, conveyances, and water bodies under their jurisdiction.

B. Receiving Water Limitations

Receiving water limitations are narrative and numerical water quality objectives contained in the Water Quality Control Plan for the Lahontan Region (Basin Plan). As such, the objectives are required to be met.

1. <u>Surface Water Objectives</u>

   The discharge of waste to surface waters shall not cause or contribute to a violation of the following water quality objectives for waters of the Ivanpah Hydrologic Unit (No. 612.00).

   a. *Ammonia*

      Ammonia concentrations shall not exceed the values listed in Tables 3-1 through 3-4 of the Basin Plan for the corresponding conditions in these tables. Tables 3-1 through 3-4 of the Basin Plan are incorporated into these requirements by reference.

   b. *Bacteria, Coliform*

      i. Waters shall not contain concentrations of coliform organisms attributable to anthropogenic sources, including human and livestock wastes.

      ii. The fecal coliform concentration during any 30-day period shall not exceed a log mean of 20/100 milliliter (ml) nor shall more than 10 percent of all samples collected during any 30-day period exceed 40/100 ml. The log mean shall ideally be based on a minimum of not

less than five samples collected as evenly spaced as practicable during any 30-day period. However, a log mean concentration exceeding 20/100 ml, or one sample exceeding 40/100 ml, for any 30-day period shall indicate violation of this objective even if fewer than five samples were collected.

c. *Biostimulatory Substances*

Waters shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect the water for beneficial uses.

d. *Chemical Constituents*

i. Waters designated as MUN (municipal and domestic supply) shall not contain concentrations of chemical constituents in excess of the primary or secondary maximum contaminant levels (MCL) based upon drinking water standards specified in provisions of the California Code of Regulations (CCR), Title 22, Division 4, Chapter 15, hereby incorporated by reference into these requirements. This incorporation-by-reference is prospective including future changes to the incorporated provisions as the changes take effect.

ii. Waters shall not contain concentrations of chemical constituents in amounts that adversely affect the water for beneficial uses.

e. *Chlorine, Total Residual*

For the protection of aquatic life, total chlorine residual shall not exceed either a median value of 0.002 milligrams/liter (mg/L) or a maximum value of 0.003 mg/L. Median values shall be based on daily measurements taken within any six-month period.

f. *Color*

Waters shall be free of coloration that causes nuisance or adversely affects the water for beneficial uses.

g. *Dissolved Oxygen*

i. The dissolved oxygen concentration as percent saturation shall not be depressed by more than 10 percent, nor shall the minimum dissolved oxygen concentration be less than 80 percent of saturation.

ii. For waters with the beneficial uses of COLD (cold freshwater habitat) or WARM (warm freshwater habitat), the minimum dissolved oxygen

concentration shall not be less than that specified in Table 3-6 of the Basin Plan. Table 3-6 of the Basin Plan is incorporated herein by reference.

h. *Floating Materials*

i. Waters shall not contain floating material, including solids, liquids, foams, and scum, in concentrations that cause nuisance or adversely affect the water for beneficial uses.

ii. The concentrations of floating material shall not be altered to the extent that such alterations are discernible at the 10 percent significance level.

i. *Oil and Grease*

i. Waters shall not contain oils, greases, waxes or other materials in concentrations that result in a visible film or coating on the surface of the water or on objects in the water, that cause nuisance, or that otherwise adversely affect the water for beneficial uses.

ii. The concentration of oils, greases, or other film or coat generating substances shall not be altered.

j. *Pesticides*

i. For the purposes of these requirements, pesticides are defined to include insecticides, herbicides, rodenticides, fungicides, pesticides and all other economic poisons. An economic poison is any substance intended to prevent, repel, destroy, or mitigate the damage from insects, rodents, predatory animals, bacteria, fungi, or weeds capable of infesting or harming vegetation, humans, or animals (California Agriculture Code 12753).

ii. Pesticide concentrations, individually or collectively, shall not exceed the lowest detectable levels, using the most recent detection procedures available. There shall not be an increase in pesticide concentrations found in bottom sediments. There shall be no detectable increase in bioaccumulation of pesticides in aquatic life.

iii. Waters designated as MUN shall not contain concentrations of pesticides or herbicides in excess of the limiting concentrations set forth in the CCR, Title 22, Division 4, Chapter 15. This incorporation-by-reference is prospective including future changes to the incorporated provisions as the changes take effect.

k. *pH*

In fresh waters with designated beneficial use of COLD or WARM, changes in normal ambient pH levels shall not exceed 0.5 pH units.

l. *Radioactivity*

i. Radionuclides shall not be present in concentrations that are deleterious to human, plant, animal, or aquatic life nor which result in the accumulation of radionuclides in the food web to an extent that presents a hazard to human, plant, animal, or aquatic life.

ii. Waters designated as MUN shall not contain concentrations of radionuclides in excess of the limits specified by the more restrictive of the CCR Title 22 Division 4, Article 5 sections 64441 et seq. This incorporation-by-reference is prospective including future changes to the incorporated provisions as the changes take effect.

m. *Sediment*

The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect the water for beneficial uses.

n. *Settleable Materials*

Waters shall not contain substances in concentrations that result in deposition of material that causes nuisance or that adversely affects the water for beneficial uses. The concentration of settleable materials shall not be raised by more than 0.1 milliliters/liter.

o. *Suspended Materials*

i. Waters shall not contain suspended materials in concentrations that cause nuisance or that adversely affect the water for beneficial uses.

ii. The concentration of total suspended materials shall not be altered to the extent that such alterations are discernible at the 10 percent significance level.

p. *Taste and Odor*

Waters shall not contain taste or odor-producing substances in concentrations that impart undesirable tastes or odors to fish or other edible products of aquatic origin, that cause nuisance, or that adversely affect the water for beneficial uses. The taste and odor shall not be altered.

q. *Temperature*

i. The natural receiving water temperature of all waters shall not be altered unless it can be demonstrated to the satisfaction of the Bureau of Land Management's (BLM's) Authorized Officer and Compliance Project Manager (CPM) that such an alteration in temperature does not adversely affect the water for beneficial uses.

ii. For waters designated COLD, the temperature shall not be altered. For waters designated WARM, water temperature shall not be altered

by more than 5 degrees Fahrenheit above or below the natural temperature.

r. *Toxicity*

i. All waters shall be maintained free of toxic substances in concentrations that are toxic to, or that produce detrimental physiological responses in human, plant, animal, or aquatic life.

ii. The survival of aquatic life in surface waters subjected to a waste discharge, or other controllable water quality factors, shall not be less than that for the same water body in areas unaffected by the waste discharge, or when necessary, for other control water that is consistent with the requirements for "experimental water" as defined in the most recent edition of *Standard Methods for the Examination of Water and Wastewater* (American Public Health Association, et al.).

s. *Turbidity*

Waters shall be free of changes in turbidity that cause nuisance or adversely affect the water for beneficial uses. Increases in turbidity shall not exceed natural levels by more than 10 percent.

2. <u>Groundwater Objectives</u>

The discharge of waste to groundwaters shall not cause, or contribute to, a violation of the following water quality objectives for waters of the Ivanpah Groundwater Basin (Department of Water Resources No. 6-30).

a. Bacteria, Coliform

In groundwaters designated as MUN, the median concentration of coliform organisms over any seven-day period shall be less than 1.1/100 ml.

b. Chemical Constituents

i. Groundwaters designated as MUN shall not contain concentrations of chemical constituents in excess of the primary or secondary MCLs based upon drinking water standards specified in provisions of the CCR, Title 22, Division 4, Chapter 15, hereby incorporated by reference into these requirements. This incorporation-by-reference is prospective including future changes to the incorporated provisions as the changes take effect.

ii. Groundwaters shall not contain concentrations of chemical constituents in amounts that adversely affect the water for beneficial uses.

c. Radioactivity

Groundwaters designated as MUN shall not contain concentrations of radionuclides in excess of the limits specified by the more restrictive of the

CCR Title 22 Division 4, Article 5 sections 64441 et seq. This incorporation-by-reference is prospective including future changes to the incorporated provisions as the changes take effect.

d. Taste and Odor

Waters shall not contain taste or odor-producing substances in concentrations that cause nuisance or that adversely affect beneficial uses. For groundwaters designated MUN, at a minimum, concentrations shall not exceed adopted secondary MCLs based upon drinking water standards specified in provisions of the CCR, Title 22, Division 4, Chapter 15, hereby incorporated by reference into these requirements. This incorporation-by-reference is prospective including future changes to the incorporated provisions as the changes take effect.

II. PROHIBITIONS AND REQUIREMENTS

The discharge of wastes and fill associated with the ISEGS project must not violate the following waste discharge prohibitions. These waste discharge prohibitions do not apply to discharges of storm water when wastes in the discharge are controlled through the application of management practices or other means and the discharge does not cause a violation of water quality objectives. The Energy Commission expects that control measures would be implemented in an iterative manner as needed to meet applicable receiving water quality objectives.

A. REGIONWIDE PROHIBITIONS

1. The discharge of waste[(i)] that causes violation of any narrative water quality objective contained in the Basin Plan, including the Nondegradation Objective, is prohibited.

2. The discharge of waste that causes a violation of any numeric water quality objective contained in the Basin Plan is prohibited.

3. Where any numeric or narrative water quality objective contained in the Basin Plan is already being violated, the discharge of waste that causes further degradation or pollution is prohibited.

4. The discharge of untreated sewage, garbage, or other solid wastes into surface waters of the Lahontan Region is prohibited. (For the purposes of this prohibition, “untreated sewage” is that which exceeds secondary treatment standards of the Federal Water Pollution Control Act, which are incorporated in the Basin Plan in section 4.4 under “Surface Water Disposal of Sewage Effluent.”)

Definitions:

(i) “Waste” is defined to include any waste or deleterious material including, but not limited to, waste earthen materials (such as soil, silt, sand, clay, rock, or other organic or mineral material) and any other waste as defined in the California Water Code § 13050(d).

5. For municipal[ii] and industrial[iii] discharges:

   a. The discharge, bypass, or diversion of raw or partially treated sewage, sludge, grease, or oils to surface waters is prohibited.

   b. The discharge of wastewater except to the designated disposal site (as defined and in accordance with California Water Code [Water Code] section 13000 et seq.) is prohibited.

   c. The discharge of industrial process wastes[iv] to surface waters designated for the Municipal and Domestic Supply (MUN) beneficial use is prohibited. The discharge of industrial process wastes to surface waters not designated for the MUN use may be permitted if such discharges comply with the *General Discharge Limitations* in section 4.7 of the Basin Plan and if appropriate findings under State and federal anti-degradation regulations can be made.

   Prohibitions 5(b) and 5(c) do not apply to industrial storm water. For control measures applicable to industrial storm water, see section 4.3 of the Basin Plan, entitled "Stormwater Runoff, Erosion, and Sedimentation," specifically the requirements, which mandate the use of best available technology economically available (BAT) and best conventional pollution control technology (BCT) to reduce pollutants, and any more stringent controls necessary to meet water quality standards. Compliance with the requirements of a variety of laws and regulations for the control of hazardous materials and hazardous wastes may help to reduce potential storm water pollutants. Such programs include State and local laws to control toxic air pollutants, hazardous material storage and emergency response planning, the workers' right-to-know program, and hazardous waste source reduction and management review.

   Prohibitions 5(b) and 5(c) do not apply to surface water disposal of treated groundwater. For control measures applicable to surface water disposal of treated ground water, see Lahontan Regional Water Quality Board Order No. R6T-2004-0025.

[ii] "Municipal waste" is defined in section 4.4 of the Basin Plan.

[iii] "Industry" is defined in section 4.7 of the Basin Plan.

[iv] "Industrial process wastes" are wastes produced by industrial activities that result from one or more actions, operations, or treatments which modify raw material(s) and that may (1) add to or create within the effluent, waste, or receiving water a constituent or constituents not present prior to processing, or (2) alter water temperature and/or the concentration(s) of one or more naturally occurring constituents within the effluent, waste or receiving water. Certain non-storm water discharges may occur at industrial facilities that are not considered to be industrial process wastes for the purposes of Prohibition 5(c). Examples include: fire hydrant flushing, atmospheric condensates from refrigeration and air conditioning systems, and landscape watering.

B. ISEGS Project Discharge Prohibitions

1. Activities and waste discharges associated with the ISEGS project must not cause or threaten to cause a nuisance or pollution as defined in Water Code section 13050.

2. The discharge, including discharges of fill material, must be limited to that described in the applicant's final *Drainage, Erosion*, *and Sediment Control Plan*.

3. The discharge or deposition of any wastes into channels, surface water, or any place where it would be discharged or deposited where it would be eventually transported to surface waters, including the 100-year floodplain, must not contain or consist of any substance in concentrations toxic to animal or plant life.

4. The discharge or deposition of any wastes into channels, surface water, or any place where it would be discharged or deposited where it would be eventually transported to surface waters, including the 100-year floodplain, must not contain or consist of oil or other floating materials from any activity in quantities sufficient to cause deleterious bottom deposits, turbidity, or discoloration in surface waters.

5. The discharge of waste, as defined in the Water Code that causes violation of any narrative water quality objective contained in the Basin Plan is prohibited.

6. The discharge of waste that causes violation of any numeric water quality objective contained in the Basin Plan is prohibited.

7. Where any numeric or narrative water quality objective contained in the Basin Plan is already being violated, the discharge of waste that causes further degradation or pollution (as defined in Water Code section 13050) is prohibited.

8. The discharge of septic tank pumpings (septage) or chemical toilet wastes to other than a sewage treatment plant or a waste hauler is prohibited.

C. Requirements

1. The applicant shall develop a final Storm Water Pollution Prevention Program (SWPPP) that is consistent with the requirements of State Water Board's *General Permit No. CAS00001* and *General Permit No. CAS00002*. This SWPPP, or any future revision to this SWPPP, shall be implemented after approval by the BLM's Authorized Officer and CPM.

2. The applicant must, at all times, maintain appropriate types and sufficient quantities of material on site to contain any spill or inadvertent release of materials that may cause a condition of pollution or nuisance if the materials reach waters of the State.

3. Discharges of wastewater generated by the ISEGS project's operations are not allowed to be released to the offsite environment.

4. The applicant must permit BLM's Authorized Officer and CPM or its authorized representative upon presentation of credentials:

   a. Entry onto ISEGS project premises;

   b. Access to copy any record required to be kept under the terms and conditions of the Final Staff Assessment (FSA);

   c. Inspection of any treatment equipment, monitoring equipment, or monitoring method required by the FSA;

   d. Sampling of any discharge or surface water covered by the FSA.

5. The applicant must immediately notify the BLM's Authorized Officer and CPM by telephone whenever an adverse condition occurs as a result of this discharge. Such a condition includes, but is not limited to, a violation of the conditions of the FSA, a significant spill of petroleum products or toxic chemicals, or damage to control facilities that would cause noncompliance. A written notification of the adverse condition must be provided to the BLM's Authorized Officer and CPM within two weeks of occurrence. The written notification must identify the adverse condition, describe the actions necessary to remedy the condition, and specify a timetable, subject to any modifications by BLM's Authorized Officer and CPM, for the remedial actions.

6. The applicant must comply with the *Surface Water Monitoring and Reporting Program* Attachment 3.

III PROVISIONS

A. Special Provisions for Fill Impacts to State Waters

1. Detailed final grading plans must be provided to the BLM's Authorized Officer and CPM a minimum of 90 days prior to commencement of construction activities.

2. Construction equipment must be clean and free from oil, grease, and loose metal material and must be removed from service if necessary to protect water quality.

3. Restoration of temporary disturbances and temporary discharges of fill to waters of the State must be achieved immediately following completion of work in an area of the temporary impacts. Restoration must include implementing measures to fully restore conditions to support all beneficial uses for the water body temporarily impacted in the shortest feasible time. Restoration must include, but is not limited to, grading to pre-project contours and revegetation with native species. The applicant must implement Best

Management Practices (BMPs) to control erosion and runoff from areas associated with temporary fills.

4. Mitigation for 29.2 acres of permanent and long-term impacts must be proposed prior to initiation of construction and approved by the BLM's Authorized Officer and CPM.

5. No debris, cement, concrete (or wash water there from), oil, or petroleum products must be allowed to enter into or be placed where it may be washed from the ISEGS project site by rainfall or runoff into waters of the State. When operations are completed, any excess material must be removed from the ISEGS project work area and any areas adjacent to the work area where such material may be transported into waters of the State.

6. No equipment may be operated in areas of flowing or standing water; no fueling, cleaning, or maintenance of vehicles or equipment must take place within any areas where a discharge to ephemeral channels or other waters of the State may occur; construction materials and heavy equipment must be stored outside of the channel perimeter of the waters of the State. When work within the boundaries of waters of the State is necessary, the entire stream flow must be diverted around the work area, temporarily, as needed to control waste discharge.

7. The applicant must immediately notify the BLM's Authorized Officer and CPM by telephone whenever an adverse condition occurs as a result of this discharge. Such a condition includes, but is not limited to, a violation of these conditions of certification, a significant spill of petroleum products or toxic chemicals, or damage to control facilities that would cause noncompliance. A written notification of the adverse condition must be provided to the BLM's Authorized Officer and CPM within two weeks of the occurrence. The written notification must identify the adverse condition, describe the actions necessary to remedy the condition, and specify a timetable subject to any modifications by BLM's Authorized Officer and CPM for the remedial actions.

B. Special Provisions for Storm Water

1. The applicant must ensure that storm water discharges and non-storm water discharges do not cause or contribute to an exceedance of any applicable water quality standards.

2. Industrial storm water discharges must use best available technology economically available (BAT) and best conventional pollution control technology (BCT) to reduce pollutants, and any more stringent controls necessary to meet water quality standards.

3. Post-construction storm water flows (volume and velocity) emanating from the ISEGS project site must not exceed two (2) percent of the volume and five (5) percent of the peak velocity discharge of the predevelopment levels. Runoff from newly constructed impervious areas that is greater than predevelopment

levels must be treated and detained to predevelopment runoff levels. Methods such as *low impact development* may be used to achieve this requirement (see State Board Resolution No. 2008-0030).

4. The applicant must implement BMPs to prevent or reduce the discharge of wastes associated with water contacting construction materials or equipment.

5. The applicant must provide effective cover, mulch, fiber blankets, or other erosion control for soils disturbed by construction activities.

6. The applicant must provide BMPs for erosion stabilization for all areas of disturbed soil regardless of time of year, including erosion from rainfall, non-storm water runoff, and wind.

7. The applicant must stabilize to prevent erosion all finished slopes, open space, utility backfill, and graded or filled lots within two weeks from when excavation or grading activity has been completed.

8. The applicant must control runon from offsite areas, route flows away from disturbed areas in a manner that does not cause onsite or offsite erosion, and provide controls to minimize runon and problems from storm water flows to the ISEGS project area from offsite areas.

9. The applicant must, at all times, maintain effective perimeter controls (i.e., control around the ISEGS project area and all areas where there could be erosion or sediment discharges from the site), and stabilize all construction entrances/exits sufficiently to control erosion and soil or sediment discharges from the site.

10. The applicant must properly install and effectively maintain all BMPs for storm drain inlets and perimeter controls, runoff control BMPs, and stabilized entrances/exits.

11. The applicant must ensure that construction activity traffic to and from the ISEGS project is limited to entrances and exits that employ effective controls to prevent offsite tracking of soil.

12. The applicant must ensure that all storm drain inlets, perimeter controls, runoff control BMPs, and pollutant controls at entrances and exits are maintained and protected from activities that could reduce their effectiveness.

13. The applicant must comply with the following source control requirements:

    a. Maintain vegetative cover to the extent possible by developing the ISEGS project in a way that reduces the amount of soil exposed to erosion at any time.

    b. Inspect and remove accumulated deposits of soil at all inlets to the storm drain system at frequent intervals during rainy periods.

c. Provide buffer strips and/or vegetation protection fencing between the active construction area and any water bodies.

d. Provide “good housekeeping” measures for construction materials, waste management, vehicle storage and maintenance, and landscape materials at all times including, but not limited to, the list of required measures in Attachment 2 of the *Surface Water Monitoring and Reporting Program*, (Attachment 3), which is made a part of these requirements.

14. The applicant must maintain, in perpetuity, post-construction control and treatment measures for storm water, or must identify in writing to the BLM’s Authorized Officer and CPM, the entity that is legally responsible for maintaining the post-construction controls at the ISEGS project site.

15. The applicant shall have in place adequate emergency response plans in order to clean up any spill or release of any waste at the ISEGS project site.

SOIL AND WATER RESOURCES - Appendix D

SURFACE WATER MONITORING AND REPORTING PROGRAM FOR WASTEWATER DISCHARGE

I. MONITORING

A. General Requirements

1. The applicant must comply with the "General Provisions for Monitoring and Reporting," which is attached to and made part of this Monitoring and Reporting Program (Attachment A).

2. In addition to General Provision 1 of Attachment A, the following provisions apply to sampling and analysis under this program:

   a. Quality assurance/quality control (QA/QC) procedures must be followed and a QA/QC plan must be included in the Sampling and Analysis Plan (SAP) that is provided to the California Energy Commission (Energy Commission). The SAP may be part of the Storm Water Pollution Prevention Program (SWPPP).

   b. The applicant may conduct their own field analysis of pH and turbidity if the applicant has sufficient capability (qualified and trained employees, properly calibrated and maintained field instruments, etc.) to adequately perform the field analysis.

   c. All monitoring instruments and equipment (including an applicant's own field instruments for measuring pH and turbidity) must be calibrated and maintained in accordance with manufacturer's specifications to ensure accurate measurements.

   d. With the exception of field analyses conducted by the applicant for pH and turbidity, all analyses must be sent to and conducted at a laboratory certified for such analysis by the California Department of Public Health.

3. The applicant must comply with the "Good Housekeeping Best Management Practices," which is attached to and made part of this Monitoring and Reporting Program (Attachment B).

B. Construction Site Storm Event Water Monitoring

The applicant must monitor site precipitation continuously and keep a record of storm events that produce more than 0.5 inch of precipitation at the site. During storms and/or within one business day after each 0.5 inch of precipitation from a storm event, the applicant must visually observe and document observations of storm water discharges from the site. For visual observations, the applicant must look for and document the presence or absence of floating and suspended materials, a sheen on the surface, discolorations, turbidity, odors, and source(s) of any observed pollutants.

The applicant must visually observe and document observations of the discharge of stored or contained storm water that is discharged subsequent to a storm

event. The applicant is only required to visually observe such discharges if they occur during daylight hours. Stored or contained storm water that will likely discharge after operating hours due to anticipated precipitation must be observed prior to the discharge to determine whether controls and best management practices (BMPs) are in place and functioning as required.

For the purposes of these requirements, a “potential storm event” is defined as any storm event with a 30 percent or greater chance of precipitation as predicted by the National Weather Service’s nearest weather station for the local climate zone. Forty-eight (48) hours prior to each potential storm event, the applicant must visually observe and implement appropriate corrective action for:

1. all storm water drainage areas, to identify any spills, leaks, or uncontrolled pollutant sources,

2. all BMPs (see Attachment 3B), to identify whether they have been properly installed and maintained, and

3. any storm water storage and containment areas, to detect leaks and ensure maintenance of adequate freeboard.

   Within one business day after each storm event that produces precipitation of 0.5 inch or more, the applicant must conduct a post-storm event inspection to:

   a. identify whether BMPs were adequately designed, implemented, and effective,

   b. identify if and where additional BMPs are needed, and where BMPs are in need of maintenance.

   Within one business day after the initial 0.5 inch of precipitation from a storm event, and every 1 inch thereafter, the applicant must collect and analyze samples of storm water discharged from any detention basins. If no discharge occurs from a basin, no sample is required, but the absence of discharge must be documented.

   Storm water sampling and analyses must be performed in accordance with the following requirements:

   a. The applicant must analyze the samples for pH and turbidity.

   b. The applicant is not required to physically collect samples or conduct visual observations during dangerous weather conditions or outside of scheduled site operation hours.

   The applicant must perform sampling of storm water discharges from all drainage areas associated with construction activity. The storm water discharge collected and observed must represent the worst quality storm water discharge in each drainage area based on visual observation of the water and upstream conditions. For example, if there has been concrete work recently in an area, or drywall scrap is exposed to the rain, a pH sample must

be taken of drainage from the relevant work area. Similarly, if muddy water is flowing through some parts of a silt fence, samples must be taken of the muddy water even if most water flowing through the fence is clear.

C. Construction Site Monitoring

1. On a daily basis, the applicant must inspect all public and private paved roads serving the ISEGS project and daily remove, by vacuuming or sweeping, visible accumulations of sediment or other construction activity-related materials that are deposited on the roads. All inspections under this provision must be documented in writing.

2. The applicant must ensure that inspections and observations at locations where runoff may discharge from the ISEGS project site are performed weekly, and at least once each 24-hour period during extended storm events, to identify any problems and/or BMPs that:

   a. need maintenance to operate effectively,

   b. have failed, or

   c. are inadequate to achieve effective control.

3. The applicant must visually observe construction areas and each drainage area for the presence of (or indication of prior) non-storm water discharges and their sources to ensure that all BMPs are in place and effective.

   a. One visual observation must be conducted quarterly in each of the following periods: January through March, April through June, July through September, and October through December. Visual observations are only required during daylight hours (sunrise to sunset).

   b. Visual observations must document evidence of any non-storm water discharge, pollutant characteristics (floating and suspended material, sheen, discoloration, turbidity, odor, etc.), and source. The applicant must maintain onsite records indicating the personnel performing the visual observation, the dates and approximate time each drainage area and non-storm water discharge was observed, and the response taken to eliminate non-storm water discharges and to reduce or prevent pollutants from contacting non-storm water discharges.

4. The applicant must monitor and report runon from surrounding areas that may contribute to exceedances or excursions from requirements (violations).

D. Post-Construction Monitoring

On a semi-annual basis, the applicant must inspect and document inspections of post-construction treatment controls at the ISEGS project. Maintenance must be provided to address any controls that are not in compliance with requirements.

E. Receiving Water Monitoring

1. Receiving water sampling must be conducted at the sample locations designated in the final SWPPP.

2. Twice monthly and at no less than 10-day intervals from November through May of each year, the applicant must sample the ISEGS project's receiving waters with grab samples. The samples must be analyzed, at a minimum, for the following constituents:

   a. Turbidity,

   b. Temperature,

   c. Dissolved Oxygen,

   d. Suspended Solids,

   e. Total Dissolved Solids, and

   f. pH.

   If no water is present (documented by photographs), no sampling is required.

3. The applicant must also sample the receiving waters for the above parameter(s) when discharge from any detention basin occurs.

II. REPORTING

A. Required Program Reports

1. The applicant must develop and implement a final SWPPP, as described in II.B, below, and provide the final SWPPP to the Bureau of Land Management's (BLM's) Authorized Officer and CPM 90 days prior to commencement of construction activities. The SWPPP must include receiving water monitoring locations as required above.

2. The applicant must provide a Sampling and Analysis Plan (SAP) as referenced in I.A, above, to the BLM's Authorized Officer and CPM 90 days prior to commencement of construction activities. The SAP may be part of the SWPPP as described under I.A.2.

B. Storm Water Pollution Prevention Program

1. The final SWPPP must be developed and implemented to address the following objectives:

   a. To demonstrate that the site is in compliance with these requirements (*Requirements* in Attachment 2 and this *Monitoring and Reporting Program*). To determine whether immediate corrective actions, additional BMP implementation, or SWPPP revisions are necessary to reduce pollutants and wastes in storm water discharges and non-storm water discharges; and

b. To determine whether BMPs included in the SWPPP are effective in preventing or reducing pollutants in storm water discharges.

2. The applicant must develop a final SWPPP that includes all monitoring procedures and instruction, location maps, forms, and checklists as required in these requirements and this MRP.

C. Storm Water Pollution Prevention Plan Annual Report

1. The applicant must prepare and provide an annual report no later than January 30 of each year.

2. The Annual Report must include a summary and evaluation of all sampling and analysis results, original laboratory reports, a summary of all corrective actions taken during the compliance year, and identification of any recommended compliance activities or corrective actions that were not implemented.

3. The Annual Report must include all records and reports of visual observations and sample collection exceptions, the analytical method, method reporting unit, and method detection limit of each analytical parameter.

D. Records

1. The applicant must maintain records on site of all visual observations, personnel performing the observations, observation dates, weather condition, locations observed, and corrective actions taken in response to the observations.

2. All inspections and observations pursuant to Section I.C. above must be documented in writing and must include:

   a. Inspector's name, title, and signature.

   b. Inspection date and date the inspection report was written.

   c. Weather information: estimate of beginning of storm event, duration of event, time elapsed since last storm, and approximate amount of rainfall (inches).

   d. A list and description of BMPs evaluated and any deficiencies noted. If there are no deficiencies, the report must indicate (under penalty of perjury) that the ISEGS project is in compliance with these discharge requirements.

   e. Report the presence of noticeable odors or any visible sheen on the surface of any discharges.

   f. Corrective actions required, including any changes necessary to comply with requirements, and implementation dates for completing corrective actions.

g. Photographs taken during the inspection.

3. Records of all storm water monitoring information and copies of all reports (including Annual Reports) required by these requirements must be retained for a period of at least three years from the date of the sample, measurement, report, or application. This period may be extended when requested by the BLM's Authorized Officer and CPM. Records must be retained on site while construction is ongoing. The records must include:

   a. The date, place, time of project inspections, sampling, visual observation, and/or measurement, including precipitation;

   b. The individual(s) who performed the project inspections, sampling, visual observations, and/or measurement;

   c. The date and approximate time of analyses;

   d. The individual(s) and company who performed the analyses;

   e. A summary of all analytical results from the last five years, the method detection limits and reporting units, and the analytical techniques or methods used;

   f. QA/QC records and results;

   g. Non-storm water discharge inspections and visual observations and storm water discharge visual observation records; and

   h. Visual observation and sample collection exception records.

ATTACHMENT A

GENERAL PROVISIONS
FOR
MONITORING AND REPORTING

1. Sampling And Analysis

   a. All analyses shall be performed in accordance with the current edition(s) of the following documents:

      i. Standard Methods for the Examination of Water and Wastewater, American Public Health Association, et al.

      ii. Methods for Chemical Analysis of Water and Wastes, USEPA

   b. All analyses shall be performed in a laboratory certified to perform such analyses by the California Department of Public Health or a laboratory approved by the BLM's Authorized Officer and CPM. Specific methods of analysis must be identified on each laboratory report.

   c. Any modifications to the above methods to eliminate known interferences shall be reported with the sample results. The methods used shall also be reported. If methods other than the methods listed above are used, the exact methodology must be submitted for review and must be approved by the BLM's Authorized Officer and CPM prior to use.

   d. The applicant shall establish chain-of-custody procedures to insure that specific individuals are responsible for sample integrity from commencement of sample collection through delivery to an approved laboratory. Sample collection, storage, and analysis shall be conducted in accordance with an approved SAP. The most recent version of the approved SAP shall be kept at the ISEGS project.

   e. The applicant shall calibrate and perform maintenance procedures on all monitoring instruments and equipment to ensure accuracy of measurements, or shall insure that both activities will be conducted.

   f. A grab sample is defined as an individual sample collected in fewer than 15 minutes.

   g. A composite sample is defined as a combination of no fewer than eight individual samples obtained over the specified sampling period at equal intervals. The volume of each individual sample shall be proportional to the discharge flow rate at the time of sampling. The sampling period shall equal the discharge period, or 24 hours, whichever period is shorter.

2. Operational Requirements

   h. *Sample Results*

      The applicant shall maintain all sampling and analytical results including: strip charts; date, exact place, and time of sampling; date analyses were performed;

sample collector's name; analyst's name; analytical techniques used; and results of all analyses. Such records shall be retained for a minimum of three years. This period of retention shall be extended during the course of any unresolved litigation regarding this discharge, or when requested by the BLM's Authorized Officer and CPM.

i. *Operational Log*

An operation and maintenance log shall be maintained at the ISEGS project. All monitoring and reporting data shall be recorded in a permanent log book.

3. <u>Reporting</u>

j. For every item where the requirements are not met, the applicant shall submit a statement of the actions undertaken or proposed which will bring the discharge into full compliance with requirements at the earliest time, and shall submit a timetable for correction.

k. All sampling and analytical results shall be made available to the BLM's Authorized Officer and CPM upon request. Results shall be retained for a minimum of three years. This period of retention shall be extended during the course of any unresolved litigation regarding this discharge, or when requested by the BLM's Authorized Officer and CPM.

l. The applicant shall provide a brief summary of any operational problems and maintenance activities to the BLM's Authorized Officer and CPM with each monitoring report. Any modifications or additions to, or any major maintenance conducted on, or any major problems occurring to the wastewater conveyance system, treatment facilities, or disposal facilities shall be included in this summary.

m. Monitoring reports shall be signed by:

iii. In the case of a corporation, by a principal executive officer at least of the level of vice-president or his duly authorized representative, if such representative is responsible for the overall operation of the ISEGS project from which the discharge originates;

iv. In the case of a partnership, by a general partner;

v. In the case of a sole proprietorship, by the proprietor; or

vi. In the case of a municipal, state or other public project, by either a principal executive officer, ranking elected official, or other duly authorized employee.

n. Monitoring reports are to include the name and telephone number of an individual who can answer questions about the report.

ATTACHMENT B

GOOD HOUSEKEEPING BEST MANAGEMENT PRACTICES

1. Good housekeeping measures for construction materials include:
   a. Maintaining an inventory of the products used and/or expected to be used and the end products that are produced and/or expected to be produced.
   b. Covering and berming loose stockpiled construction materials (e.g. soil, spoils, aggregate, fly-ash, stucco, hydrated lime, etc.).
   c. Storing chemicals in watertight containers or in a bermed storage shed (completely enclosed) with appropriate secondary containment.
   d. Minimizing contact of construction materials with precipitation.
   e. Implementing BMPs to reduce or prevent the offsite tracking of loose construction and landscape materials.
2. Good housekeeping measures for waste management include:
   a. Preventing disposal of any rinse/wash waters or materials into the storm drain system.
   b. Berming sanitation facilities (e.g. Porta Potties) and preventing them from being kept within the curb and gutter or on sidewalks or adjacent to a storm drain.
   c. Cleaning or replacing sanitation facilities and inspecting them regularly for leaks and spills.
   d. Covering waste disposal containers when they are not in use and preventing them from overflowing.
   e. Berming and securely protecting stockpiled waste material from wind and rain at all times unless actively being used where a spill or spills would enter surface drainage systems.
   f. Implementing procedures to deal with hazardous and non-hazardous spills.
   g. Preparing and implementing a spill response and implementation plan prior to commencement of construction activities, including:
      i. Locations of onsite equipment and materials for cleanup of spills and leaks.
      ii. Procedures to follow in the event of spill or leak that includes immediate cleanup.
      iii. Locations and procedures of disposing of waste materials.
      iv. Identification of and training for spill response personnel.

h. Lining and berming of concrete washout areas so there is no leakage or overflow into the underlying soil or the surrounding areas. Washout areas must be positioned away from drain inlets and waterways and be clearly labeled.

3. Good housekeeping measures for vehicle storage and maintenance include:

   a. Not allowing oil, grease, or fuel to leak in to the soil.

   b. Placing all equipment or vehicles to be fueled, maintained and/or stored in a designated area fitted with appropriate BMPs.

   c. Cleaning leaks immediately and disposing of leaked materials and sorbents properly.

   d. Fixing leaks immediately or removing equipment for service.

4. To assess the potential pollutant sources and identify all areas of the site where good housekeeping or additional BMPs are necessary to reduce or prevent pollutants in storm water discharges and non-storm water discharges, the applicant must assess and report on the following:

   a. The quantity, physical characteristic (liquid, powder, solid, etc.), and locations of each potential pollutant source handled, produced, stored, recycled, or disposed of at the site.

   b. The degree to which pollutants associated with those materials may be exposed to and mobilized by contact with storm water.

   c. The direct and indirect pathways that pollutants may be exposed to storm water discharges and non-storm water discharges. This must include an assessment of past spills or leaks, non-storm water discharges, and discharges from adjoining areas.

   d. Sampling, visual observation, and inspection records.

   e. Effectiveness of existing BMPs to reduce or prevent pollutants in storm water discharges and non-storm water discharges.