5.15 Water Resources

5.15.1 Introduction

The Applicant proposes to develop a solar energy project called the Ivanpah Solar Electric Generating System (Ivanpah SEGS). It will be located in southern California's Mojave Desert, near the Nevada border, to the west of Ivanpah Dry Lake. The project will be located in San Bernardino County, California, on federal land managed by the Bureau of Land Management (BLM). It will be constructed in three phases: two 100-megawatt (MW) phases (known as Ivanpah 1 and 2) and a 200-MW phase (Ivanpah 3). The phasing is planned so that Ivanpah 1 (the southernmost site) will be constructed first, followed by Ivanpah 2 (the middle site), then Ivanpah 3 (the 200-MW plant on the north), though the order of construction may change. Each 100-MW site requires about 850 acres (or 1.3 square miles); the 200-MW site is about 1,660 acres (or about 2.6 square miles). The total area required for all three phases, including the Administration/Operations and Maintenance building and substation, is approximately 3,400 acres. The Applicant has applied for a right-of-way grant for the land from BLM. Although this is a phased project, it is being analyzed as if all phases are operational.

The heliostat (or mirror) fields focus solar energy on the power tower receivers near the center of each of the heliostat arrays (the 100-MW plants have three arrays and the 200-MW plant has four arrays). In each plant, one Rankine-cycle reheat steam turbine receives live steam from the solar boilers and reheat steam from one solar reheater—located in the power block at the top of its own tower. The solar field and power generation equipment are started each morning after sunrise and insolation build-up, and shut down in the evening when insolation drops below the level required to keep the turbine online.

Ivanpah 1, 2 and 3 will be interconnected to the Southern California Edison (SCE) grid through upgrades to SCE's 115-kilovolt (kV) line passing through the site on a northeast-southwest right-of-way. These upgrades will include the construction by SCE of a new 220/115-kV breaker-and-a-half substation between the Ivanpah 1 and 2 project sites. This new substation and the 220-kV upgrades will be for the benefit of Ivanpah and other Interconnection Customers in the region. The existing 115-kV transmission line from the El Dorado substation will be replaced with a double-circuit 220-kV overhead line that will be interconnected to the new substation. Power from Ivanpah 1, 2 and 3 will be transmitted at 115 kV to the new substation. SCE plans to add three new 115-kV lines to increase capacity to the existing El Dorado-Baker-Cool Water-Dunn Siding-Mountain Pass 115-kV line heading southwest. The timing of this upgrade depends upon the development of wind projects ahead in the queue, and is not affected by the Ivanpah SEGS project.

Each phase of the project includes a small package natural gas-fired start-up boiler to provide heat for plant start-up and during temporary cloud cover. The project's natural gas system will be connected to the Kern River Gas Transmission Line, which passes less than half a mile to the north of the project site. Raw water will be drawn daily from one of two onsite wells, located east of Ivanpah 2. Each well will have sufficient capacity to supply water for all three phases. Groundwater will go through a treatment system for use as boiler make-up water and to wash the heliostats. To save water in the site's desert environment, each plant will use a dry-cooling condenser. Water consumption is, therefore, minimal

(estimated at no more than 100 acre-feet/year [ac-ft/yr] for all three phases). Each phase includes a small onsite wastewater plant located in the power block that treats wastewater from domestic waste streams such as showers and toilets. A larger sewage package treatment plant will also be located at the Administration Building/Operations and Maintenance area, located between Ivanpah 1 and 2. Sewage sludge will be removed from the site by a sanitary service provider. No wastewater will be generated by the system, except for a small stream that will be treated and used for landscape irrigation. If necessary, a small filter/purification system will be used to provide potable water at the Administration Building.

This subsection presents the laws, ordinances, regulations, and standards (LORS) applicable to water resources, including water supply, describes the existing environment that may be affected, and identifies potential impacts on that environment. In addition, this subsection presents proposed mitigation measures. The agencies involved and agency contact names, as well as the permits required and the permit schedules, are also provided below. Waters of the U.S. including wetlands and jurisdictional washes are addressed in Section 5.2, Biological Resources.

5.15.2 Laws, Ordinances, Regulations, and Standards

Federal, state, and local LORS applicable to water resources and conformance are discussed in this section and summarized in Table 5.15-1.

TABLE 5.15-1
Laws, Ordinances, Regulations, and Standards Applicable to for Ivanpah SEGS Water Resources

LORS	Requirements/ Applicability	Administering Agency	AFC Section Explaining Conformance
Federal			
Federal Clean Water Act (CWA) of 1977 (as amended)	Prohibits discharge of pollutants to receiving waters unless the discharge is in compliance with an NPDES permit. Applies to all point-source discharges, including industrial wastewater and stormwater runoff, during both construction and operation.	Lahontan RWQCB	Section 5.15.2.1
Bureau of Land Management, pending	Regulations for construction on federal land.	Bureau of Land Management, Lands Department	Section 5.15.2.1
State			
Federal CWA (implemented by State of California)	Implements and enforces the federal NPDES permit program.	Lahontan RWQCB	Section 5.15.2.2
Porter-Cologne Water Quality Control Act	Establishes beneficial water uses for both surface and groundwaters.	Lahontan RWQCB	Section 5.15.2.2

TABLE 5.15-1
Laws, Ordinances, Regulations, and Standards Applicable to for Ivanpah SEGS Water Resources

LORS	Requirements/ Applicability	Administering Agency	AFC Section Explaining Conformance
California Water Code Section 13751	Requires completion report to be filed with the State for well construction, alternation, or destruction.	California Department of Water Resources	Section 5.15.2.2
California Code of Regulations, Title 22 Sections 60304 and 60301	Establishes quality standards for use of recycled water that would apply to the project's proposed use of recycled water for landscape irrigation.	California Department of Health Services	Section 5.15.2.2
California Code of Regulations, Title 22 Sections 64400.80 through 64445	Requires periodic monitoring of water quality for potable water wells.	California Department of Health Services	Section 5.15.2.2
SWRCB Resolution No. 75-58; California Water Code Sections 13550, 13551, and 461; CEC Policy	Discourages use of fresh water for power plant cooling purposes unless alternatives would cause an adverse environmental impact or be economically or otherwise infeasible.	SWRCB and CEC	Section 5.15.2.2
Local			
County of San Bernardino General Plan and Development Code	Grading would be subject to terms of the General Plan (San Bernardino County, 2007a) and the San Bernardino County Development Code.	County of San Bernardino	Section 5.15.2.3
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.	California Department of Health Services; delegated to the County of San Bernardino	Section 5.15.2.3
San Bernardino County Code Title 3, Division 3, Chapter 6, Desert Groundwater Management	Requires a permit to locate, construct, operate, or maintain a new groundwater well within the desert region of the county.	County of San Bernardino	Section 5.15.2.3

5.15.2.1 Federal LORS

5.15.2.1.1 Federal Clean Water Act of 1977 (as amended)

The CWA authorizes the U.S. Environmental Protection Agency (EPA) to regulate discharges of wastewater and stormwater into surface waters by issuing National Pollutant

Discharge Elimination System (NPDES) permits and setting pretreatment standards. In California, the State Water Resources Control Board (SWRCB), acting through its Regional Water Quality Control Boards (RWQCB), implements these permits consistent with a Memorandum of Understanding with the EPA. For this reason, relevant NPDES permits are discussed below under State LORS.

5.15.2.1.2 Bureau of Land Management Regulations

The BLM currently manages the land for the proposed Ivanpah SEGS site. Pending approval of the SF299 application, regulations pertaining to grading and soil erosion will be developed in the Conditions of Approval after a site-wide inspection has been performed by a certified professional soil scientist. These regulations may include implementation of Best Management Practices (BMPs) to prevent the discharge of pollutants (i.e., sediment) into waterways. Applicable BMPs will be incorporated into the Stormwater Pollution Prevention Plan (SWPPP).

5.15.2.2 State LORS

5.15.2.2.1 Federal Clean Water Act

As described above, the SWRCB, acting through its RWQCBs, implements the CWA permits consistent with a Memorandum of Understanding with the EPA. The relevant NPDES permits are discussed below.

Construction Stormwater NPDES Permit

The SWRCB implements regulations under the federal CWA requiring stormwater discharges associated with construction activity to be regulated by an NPDES permit (SWRCB, 1997). The SWRCB is the permitting authority in California and has adopted Order 99-08-DWQ, a statewide General Permit for Stormwater Discharges Associated with Construction Activity (General Construction Permit) that applies to projects resulting in one or more acres of soil disturbance (SWRCB, 1999). The proposed project would result in disturbance of more than one acre of soil; therefore, the project will need to comply with the General Construction Permit. This includes the preparation of a SWPPP that would specify site management activities to be implemented during site development. These management activities will include construction stormwater BMPs, dewatering runoff controls, and construction equipment decontamination. The Lahontan RWQCB requires that a Notice of Intent be filed prior to construction activities and that the SWPPP be maintained onsite during construction. A copy of the draft construction SWPPP is provided in Appendix 5.15A.

Industrial Stormwater NPDES Permit

The SWRCB also implements regulations under the federal CWA requiring stormwater discharges associated with specific industrial activities to be regulated by an NPDES permit (SWRCB, 1997). The SWRCB has issued Order 97-03-DWQ, a statewide General Permit and Waste Discharge Requirements (WDRs) for discharges of stormwater associated with industrial activities (such as the proposed project), excluding construction activities. To comply with Order 97-03-DWQ, the project would implement a SWPPP including good housekeeping practices and BMPs during project operation. The Lahontan RWQCB requires a Notice of Intent to be filed for industrial activities to be covered under the statewide General Permit. A copy of the draft operational SWPPP is provided in Appendix 5.15B.

5.15.2.2.2 Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act established the SWRCB and divided the state into nine regional basins, each with a RWQCB. The SWRCB is the primary state agency responsible for protecting the quality of the state's surface and groundwater supplies, and enforcing the CWA and state water quality laws and regulations. Administration is delegated to the nine RWQCBs; the Lahontan RWQCB regulates water quality in San Bernardino County.

The Porter-Cologne Water Quality Control Act authorizes the SWRCB to draft state policies regarding water quality. It requires that the SWRCB, or the appropriate RWQCB, adopt water quality control plans (or Basin Plans) for the protection of water quality. A Basin Plan contains the following:

- Beneficial uses of water to be protected
- Water quality objectives for the reasonable protection of the beneficial uses
- A program of implementation for achieving the water quality objectives

The Lahontan RWQCB adopted its most recent version of the Basin Plan in 1995 (Lahontan RWQCB, 1995).

5.15.2.2.3 California Water Code Section 13751

California Water Code Section 13751 requires that anyone who constructs, alters, or destroys a water well, cathodic protection well, groundwater monitoring well, or geothermal heat exchange well, file a well completion report with the Department of Water Resources. Reports must be filled within 60 days of well completion.

5.15.2.2.4 California Code of Regulations, Title 22 Sections 60304 and 60301

The California Department of Health Services standards for recycled water are referred to as "Title 22." These standards are incorporated in Section 60304 of the California Code of Regulations. Under these regulations, disinfected secondary-23 recycled water can be used as irrigation water for non-edible landscape irrigation where access is controlled such that the irrigated area is not used as if it were part of a park, playground, or schoolyard. The water must meet the requirements of Section 60301.225, disinfected secondary-23 recycled water. "Disinfected secondary-23 recycled water" means recycled water that has been oxidized and disinfected so that the median concentration of total coliform bacteria in the disinfected effluent does not exceed a most probable number (MPN) of 23 per 100 milliliters using the bacteriological results of the last 7 days for which analyses have been completed, and the number of total coliform bacteria does not exceed an MPN of 240 per 100 milliliters in more than one sample in any 30-day period.

5.15.2.2.5 California Code of Regulations, Title 22 Sections 64400.80 through 64445

This section of the California Water Code requires monitoring for potable water wells, defined as non-transient, noncommunity water systems (serving 25 people or more for more than 6 months). Regulated wells must be sampled for bacteriological quality once a month, and the results submitted to the State Department of Health Services (DHS). If no exceedances were found in the prior 12 months, the well operator may request a reduction in monitoring frequency to once a quarter. The well must also be monitored for inorganic chemicals annually and organic chemicals quarterly. The operator may apply for a monitoring waiver for organic chemicals if it can be documented that the chemical has not

been previously used, manufactured, transported, stored, or disposed of within the watershed or zone of influence and, therefore, that the source can be designated nonvulnerable. If previous use of the chemical locally is unknown or the chemical is known to have been used previously and the source cannot be designated nonvulnerable, the operator may still be eligible for a waiver based on a review related to susceptibility to contamination.

5.15.2.2.6 SWRCB Resolution No. 75-58; California Water Code Sections 13550, 13551, and 461; CEC Policy

SWRCB Resolution No. 75-58 provides statewide water quality principles for adoption of discharge requirements and implementation actions for power plants that depend upon inland waters for cooling. This policy also provides guidance in the planning of new power plants to encourage the use of wastewater for cooling, thus minimizing the use of potable water. In addition, California Water Code Sections 13550, 13551, and 461 encourage the conservation of potable water resources and the maximum reuse of wastewater to conserve potable water, particularly in areas where recycled water of adequate quality is available at a reasonable cost.

In the 2003 Integrated Energy Policy Report, the California Energy Commission adopted a policy requiring new power plants to use degraded or recycled water or air-cooled systems to reduce the amount of fresh water used for power plant cooling systems. Fresh water can only be used if alternative cooling methods would cause a significant adverse environmental impact or be economically or otherwise infeasible. Ivanpah SEGS is proposing to use a dry-cooled condenser and internal plant recycled water (i.e., water recycled within the plant itself) to the extent possible. No alternative water supply sources are available.

5.15.2.3 Local LORS

5.15.2.3.1 San Bernardino County 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, the grading plan would need to be in compliance with the General Plan (San Bernardino County, 2007a) and the San Bernardino County Development Code (San Bernardino County, 2007b). Consequently, county standards were taken into account during the preparation of site grading characteristics. More information regarding county grading requirements can be found in Section 5.11, Soils.

5.15.2.3.2 California Safe Drinking Water Act and San Bernardino County Code Title 3, Division 3, Chapter 6, Public Water Supply Systems

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. DHS 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,

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 nontransient, noncommunity water system.

5.15.2.3.3 San Bernardino County Code Title 3, Division 3, Chapter 6, Desert Groundwater Management

The County of San Bernardino requires a permit to locate, construct, operate, or maintain a new groundwater well within the unincorporated, unadjudicated, desert region of the county. CEQA compliance must be completed prior to issuance of a permit. However, the ordinance states that it does not apply to "groundwater wells located on Federal lands unless otherwise specified by inter-agency agreement" (San Bernardino County, 2002). As described above, once the project has been approved by BLM, BLM has the option to request assistance from the County to determine and implement specific standards and measures. At this time, BLM and the County may require that a groundwater well permit be obtained.

5.15.3 Affected Environment

5.15.3.1 Hydrologic Setting

5.15.3.1.1 Surface Water

Major surface water features within the Ivanpah Valley include Ivanpah Lake, Roach Lake, and numerous springs and ephemeral washes as shown on Figure 5.15-1 (all figures are at the end of this section). The Ivanpah Valley is a topographically closed basin and surface water drainage evaporates on Ivanpah Lake or Roach Lake. The Ivanpah Valley is part of a larger hydrologic system that includes both Ivanpah Valley and Jean Lake Valley. The portion of the valley in California is generally referred to as Ivanpah South, while the portion of the basin in Nevada is generally referred to as Ivanpah North.

The project site is located within the Ivanpah South portion of the valley. Ivanpah South includes the 35-square-mile Ivanpah Lake, several ephemeral waterways, and scattered springs along the mountain front. Overall surface drainage in Ivanpah South is towards Ivanpah Lake (DWR, 2004). Waterways in or near the project site include unnamed ephemeral washes (see Figure 5-15.2). These ephemeral washes typically flow only in response to storm events. There are no springs located on the project site.

No water quality data are available for the ephemeral washes located on or near the project site. These waterways are not listed on the 303(d) list of impaired waterbodies. The beneficial uses of Ivanpah Lake include the following: municipal and domestic supply; agricultural supply; groundwater recharge; water contact recreation; noncontact water recreation; warm freshwater habitat; cold freshwater habitat; inland saline water habitat; wildlife habitat; water quality enhancement; and flood peak attenuation/flood water storage (Lahontan RWQCB, 1995). The beneficial uses of "minor surface waters" in the Ivanpah watershed include the following: municipal and domestic supply; agricultural supply; groundwater recharge; water contact recreation; noncontact water recreation; commercial and sportfishing; warm freshwater habitat; cold freshwater habitat; and wildlife habitat (Lahontan RWQCB, 1995). The beneficial uses of "minor wetlands" including springs, seeps, emergent wetlands, and marshes in the Ivanpah watershed include the following: municipal and domestic supply; agricultural supply; groundwater recharge;

freshwater replenishment; water contact recreation; noncontact water recreation; warm freshwater habitat; cold freshwater habitat; wildlife habitat; water quality enhancement; and flood peak attenuation/flood water storage (Lahontan RWQCB, 1995).

5.15.3.1.2 Groundwater

The Ivanpah Valley is underlain by a large groundwater basin generally referred to as the Ivanpah Valley Groundwater Basin (see Figure 5.15-3). The groundwater basin trends north-south and includes areas in both California and Nevada. The Ivanpah Valley covers approximately 560,000 acres, or 875 square miles. Of this amount, 340,000 acres are in Ivanpah South; 220,000 acres are in Ivanpah North (including Jean Valley). A summary description of the Ivanpah Valley Groundwater Basin including Ivanpah South and Ivanpah North are provided below. See Appendix 5.15C for additional information.

Hydrogeologic Setting

The Ivanpah Groundwater Basin is bounded by the bedrock of the Bird Springs Range on the north; the Sheep Mountains, Lucy Grey Range, and New York Mountains on the east; and by the Spring Mountains, Clark Mountain Range, and Ivanpah Mountains on the west. A low topographic divides Ivanpah Valley and Shadow Valley to the south. The Basin is bounded by consolidated rock and composed of unconsolidated, alluvial deposits.

The consolidated rocks include carbonate, intrusive, and extrusive rock. The carbonate rocks are composed of limestone and dolomite to the northwestern and northeastern bounds of the Basin. The intrusive rocks are mostly granitic rocks and occur in the southwestern and southeastern bounds of the Basin. The extrusive rocks are mostly basaltic rocks that occur on the western boarder of Jean Lake Valley. The hydraulic properties of the rocks vary by rock type. The carbonic rock and carbonic-rock matrix are permeable and groundwater underflow can occur through these areas. The intrusive and extrusive rocks are poorly permeable and act as barriers to groundwater flow.

The unconsolidated deposits consist of alluvial and playa deposits of Pliocene to Holocene ages. The older Pliocene and early Pleistocene age alluvium is composed of gravel, sand, and silt with some boulders and clay. This unit underlies the valley-floor areas and is generally below the regional groundwater table (i.e., is saturated). This unit is the primary water-bearing unit and produces good yields for production wells. The younger alluvium is composed of gravel and sand with some silt and clay. It is generally above the regional groundwater table, but can contain perched groundwater. The playa deposits are composed of fine sand, silt, and clay and are generally above the regional groundwater table, but can contain perched groundwater. The thickness of the unconsolidated deposits in the valley is unknown but is believed to be around 8,000 feet thick and may be as much as 20,000 feet thick (ENSR Corporation, 2007). Alluvial deposits on the valley margins can range from 200 to 700 feet thick (ENSR Corporation, 2007). The total groundwater storage capacity of the Ivanpah South Basin is estimated to be about 3,090,000 acre-feet (DWR, 2004).

There is extensive faulting in the Ivanpah Valley. Some of these faults, including the Mesquite Thrust Fault, Roach Fault, and McCullough Fault have no or little impact on groundwater flows. The Keystone Thrust Fault, the Contact Thrust Fault, Ivanpah Fault, and Stateline Fault are believed to impede groundwater flows to some extent. The nearest fault, the Ivanpah Fault, is less than 2 miles from the project site.

Groundwater Flow and Gradient

Groundwater flow in the Ivanpah Groundwater Basin is generally towards the northeast. Within the Ivanpah South Basin, groundwater flow is generally toward the valley axis (Ivanpah Lake) and northward towards Roach Lake and the Las Vegas Valley. Figure 5.15-4 shows exiting (2005) groundwater levels in the basin. Under current conditions, groundwater altitudes range from about 4,200 feet at the southern end of the Ivanpah Valley to 2,460 feet at the California-Nevada state line, to less than 2,400 feet at the northern end of the valley. Pumping near Primm, the Primm golf course, and one of the Molycorp wastewater disposal facilities has produced small, but identifiable areas of groundwater decline. Within these localized areas, groundwater declines relative to pre-development conditions are about 40 feet near Primm and 20 feet near the Primm golf course.

Groundwater Discharge/Outflows

Groundwater discharge or outflows occur due to groundwater pumping and underflows to the Las Vegas Valley. The average pumping for the 6-year period of 1999 and 2005 in the Ivanpah Valley is summarized in Table 5.15-2 and was about 5,300 ac-ft/yr (ENSR Corporation, 2007). Over this period, the average groundwater pumping in Ivanpah North (the portion of the valley in Nevada) was 2,000 ac-ft/yr; the average groundwater pumping in Ivanpah South (the portion of the valley in California) was 3,300 ac-ft/yr. The Molycorp mine is not included in the summary information provided in Table 5.15-2 because the mine currently is not operating and only a small amount of water is being used. However, the mine is expected to restart operations within the next year. The long-term plan for the mine is to pump about 420 ac-ft/yr within the Ivanpah South Basin. (ENSR Corporation, 2000). The groundwater underflow into the Las Vegas Valley is estimated to be about 6,200 ac-ft/yr (see Appendix 5.15C). The principal production wells in the basin are shown in Figure 5.15-5.

TABLE 5.15-2
Groundwater Pumping and Water-Use Returns within the Ivanpah Valley, 1999-2005

Geographic Location	Pumping (ac-ft/yr)	Return (percent)	Return (ac-ft/yr)	Consumptive Use* (ac-ft/yr)
Ivanpah South				
Molycorp	0	0	0	0
Colosseum Mine	660	39	260	400
Primm Casinos	860	41	350	510
Golf Course	1,660	30	500	1,160
Calneva	1	0	0	1
Nipton	30	33	10	20
Desert	50	40	20	30
Total Ivanpah South	3,261	35 (Average)	1,140	2,121

TABLE 5.15-2
Groundwater Pumping and Water-Use Returns within the Ivanpah Valley, 1999-2005

Geographic Location	Pumping (ac-ft/yr)	Return (percent)	Return (ac-ft/yr)	Consumptive Use* (ac-ft/yr)
Ivanpah North				
Goodsprings	120	42	50	70
Jean	690	41	280	410
Primm Municipal	610	39	240	370
Mining Total	400	40	160	240
Industrial Total	150	40	60	90
Domestic, etc.	40	24	10	30
Jean Lake Valley	50	40	20	30
Total Ivanpah North	2,060	40 (Average)	820	1,240
Total	**5,321**	**37 (Average)**	**1,960**	**3,361**

* The consumptive use (or net pumping) is the pumping minus the water-use returns to the groundwater system.

Groundwater Recharge/Inflows

Groundwater recharge to the Ivanpah Groundwater Basin occurs from two main sources, precipitation on the mountains surrounding Ivanpah and Jean Lake valleys and return flows from water uses.

Groundwater recharge to the Ivanpah Groundwater Basin occurs primarily from precipitation on the mountains surrounding Ivanpah and Jean Lake valleys. Recharge from mountain runoff occurs by two primary mechanisms—deep infiltration into the mountain mass and streambed infiltration. For the carbonate terrains, deep infiltration into the mountain mass tends to be the dominant process; this deep infiltrated water eventually flows into the unconsolidated deposits on the valley margins. For the granitic and basaltic terrains, streambed infiltration tends to be the dominant process, with recharge occurring along the margins of the unconsolidated deposits. As part of the analysis conducted for this Application for Certification (AFC), groundwater recharge from mountain precipitation for the Ivanpah Valley was estimated to be 6,200 ac-ft/yr using the Maxey-Eakin method. Of this amount, 2,200 ac-ft/yr is recharged in Ivanpah North and 4,000 ac-ft/yr is recharged in Ivanpah South. The recharge analysis methodology is described in detail in Appendix 5.15C. Precipitation on the valley floor is not a source of groundwater recharge as this water is consumed by evaporation or evapotranspiration processes.

As described in more detail in Appendix 5.15C, estimates for groundwater recharge from precipitation in the Ivanpah Valley prepared by Glancy (1968) and ENSR Corporation (2007) are lower than the recharge amount estimated in this AFC. The differences in these estimates are primarily a result of different acreage values, different precipitation-altitude relationships, and slightly different recharge-precipitation relationships. In summary, Glancy used incorrect acreages for the Ivanpah Valley and a precipitation-altitude relationship that is not representative of the Ivanpah Valley. The ENSR Corporation

updated the precipitation-altitude relationship, but based their acreages on the incorrect acreages in Glancy. These differences are described in detail in Appendix 5.15C.

A portion of the pumped groundwater that is not exported from Ivanpah Valley or entirely consumed within the valley can return to the groundwater system. The returns are referred to as water-use returns. When landscaping or golf-course turf is irrigated, part of the applied water is consumed by evapotranspiration. However, part returns to the groundwater system by deep percolation, which is referred to as an irrigation return. When wastewater disposal occurs in infiltration ponds, part of the wastewater evaporates from the pond surface. However, part returns to the groundwater system again by deep percolation. The estimated irrigation and wastewater returns for the Ivanpah Basin are summarized in Table 5.15-2 (ENSR Corporation, 2007). The listed returns include 1,140 ac-ft/yr for the south Ivanpah Valley and 820 ac-ft/yr for north Ivanpah Valley, which represents about 40 percent of the pumpage. Table 5.15-2 does not list a water-use return for the Molycorp mine because the mine currently is not operating and when the mine reinitiates operations, all wastewater is expected to be evaporated in ponds located at the mine.

Groundwater Storage Changes

A change in groundwater levels corresponds to a change in groundwater storage. Groundwater levels have declined locally as much as 40 feet within Ivanpah Valley since 1953. Figure 5.15-6 shows contours of equal groundwater-level decline, which represent the decline of the groundwater table. The overall cumulative groundwater-storage change for the 53-year period of 1953 to 2005 is estimated to be 70,600 acre-feet, which corresponds to an average rate of storage change of 1,300 ac-ft/yr.

Groundwater Quality

The quality of the groundwater varies throughout the Ivanpah Basin, with high levels of fluoride and sodium seen in some portions of the basin (DWR, 2004). Groundwater quality at the project wells is assumed to be similar to that of two nearby wells currently serving the Primm golf course (see Figure 5.15-2 for the location of these wells). Quality for these two nearby wells is summarized in Table 5.15-3. Because the project wells would be located further west than the Primm golf course wells, away from the dry lake and associated playa deposits, water quality in the project wells is expected to be equal to or better than the water quality in the Primm golf course wells.

TABLE 5.15-3
Groundwater Quality Data for the Primm Golf Course Wells

	Units	Colosseum Well No. 1	Colosseum Well No. 2
Aggressiveness Index (Calc)		—	12.52
Alkalinity ($CaCO_3$)	mg/L	160	161
Arsenic (Total)	μg/L	1.4	3.7
Barium (Total)	μg/L	150	120
Calcium (Total)	mg/L	36	30
Chloride	mg/L	69	41
Chromium (Total)	μg/L	<5	3.7

TABLE 5.15-3
Groundwater Quality Data for the Primm Golf Course Wells

	Units	Colosseum Well No. 1	Colosseum Well No. 2
Color (A.P.H.A.)	Color Unit	—	<3
Copper	mg/L	<0.01	<0.01
Fluoride (Total)	mg/L	0.6	0.58
Iron (Total)	μg/L	<20	<20
Magnesium	mg/L	22	20
Nitrate (as N)	mg/L	2.3	1.9
Nitrite (as N)	mg/L	—	<0.2
Odor	TON	—	1
Potassium	mg/L	3	3
pH	Std Units	7.6	8.3
Radium 228	pCi/L	<1+/-0.74	<1+/-0.59
Selenium (Total)	μg/L	2.3	<5
Sodium	mg/L	59	57
Sulfate	mg/L	36	43
Total Alpha Particle	pCi/L	3.6+/-2.1	3.1+/-2.0
Total Beta Particle	pCi/L	3.1+/-1.5	3.1+/-1.5
Total Dissolved Solids (TDS)	mg/L	380	350
Uranium	μg/L	5	4.1
Volatile Organic Chemicals	μg/L	ND	ND

Source: County of San Bernardino Department of Public Health
Note: Data from samples taken in 1998, 2001, 2003, and 2005 depending on well and constituent. Data spans several years as there is not a complete data set for either well for either year.

— = Not Analyzed
μg/L = micrograms per liter
mg/L = milligrams per liter
ND = None Detected
pCi/L = picocuries per liter

The beneficial uses of Ivanpah Valley Groundwater Basin (South) include municipal and domestic supply; agricultural supply; industrial service supply; and freshwater replenishment (Lahontan RWQCB, 1995).

5.15.3.1.3 Flooding Potential

The project site is located in southern California's Mojave Desert, which is not mapped for flood hazards by the Federal Emergency Management Agency. During major storm events, flooding may occur in Ivanpah Lake and ephemeral washes can overflow for a period of a few hours to up to a 24-hour period.

5.15.3.2 Precipitation, Stormwater Runoff, and Drainage

5.15.3.2.1 Precipitation

Ivanpah Valley is a semi-arid, topographically closed basin. Average annual precipitation at the project site from 1971 to 2000 was 8.31 inches. The average monthly precipitation over this same period is shown in Table 5.15-4. Most of the precipitation in the project area falls during January through March and July through September. The rainfall for a 100-year 24-hour event is 3.28 inches, and 2.83 inches for a 6-hour event; a 10-year 24-hour event is 1.92 inches, and 1.60 inches for a 6-hour event. Rainfall/runoff calculations are provided in Appendix 5.15D.

TABLE 5.15-4
Average Monthly Rainfall near the Proposed Project Site (1971 to 2000)

Precipitation	Total	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average	8.31	0.97	1.14	1.07	0.33	0.23	0.08	0.97	1.13	0.72	0.51	0.47	0.69
Maximum	7.82	3.72	4.95	5.07	1.53	1.01	0.48	4.97	7.82	5.93	2.25	2.81	4.07
Minimum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Average monthly rainfall at Searchlight, Nevada approximately 30 miles from the project site.

5.15.3.2.2 Stormwater Runoff Prior to Construction

The Ivanpah SEGS project will be located on undeveloped land in the Ivanpah Valley. Stormwater runoff at the site is predominantly sheet flow from west to east, eventually discharging into Ivanpah Dry Lake. Stormwater runoff also flows in the ephemeral washes located on the project site, draining from west to east, eventually discharging into Ivanpah Dry Lake.

5.15.3.2.3 Storm Runoff after Construction

Solar field development will maintain sheet flow where possible, with water exiting the site in existing natural contours and flows. To protect the power block and tower areas from floods, a western diversion ditch will be provided to channel storm runoff around each area before discharging as sheet flow. The power block area for each phase will be graded with moderate slopes to direct runoff and diverted stormwater to an infiltration/evaporation area before overflowing through native stone rip-rap to reinstate natural sheet flow conditions. Relatively small rock filters and local diversion berms through the solar fields will discourage water from concentrating to maintain sheet flow. The diversion ditches and infiltration/evaporation areas will be designed to pass flow from a 100-year storm event to prevent damage to the power block and tower areas. West of the Ivanpah 2 power block area, the streambed and associated stream flows may need to be routed north of the power block area to protect against flooding during high flow events. The re-routed stream bed will be routed north of the power block and merge with the original streambed east of the power block, prior to leaving the project site.

Paved access roads will be protected from floods via ditches, culverts, and local fords with reinforced concrete shoulders. Overall the project is being designed to maintain, to the extent possible, the existing sheet flow patterns on the site.

5.15.3.3 Water Supply, Use, and Wastewater Discharges and Disposal

5.15.3.3.1 Water Supply

Raw water will be drawn daily from one of two onsite groundwater wells, located east of Ivanpah 2 (refer to Figure 5.15-2). Each well will have sufficient capacity to supply water for all three phases. Water consumption is minimal and is estimated at a total of 100 ac-ft/yr for all three phases.

5.15.3.3.2 Water Use[1]

As described above, the three phases of the project are expected to collectively use up to 100 ac-ft/yr for potable and process water needs. Recycled water from onsite potable water uses will be used for landscape irrigation.

Each phase includes a 250,000-gallon raw water and fire water tank that is anticipated to be filled each night. Approximately 150,000 gallons of the raw water and fire water tank will be reserved for fire suppression, with the remainder of the tank (100,000 gallons) serving as a reserve for plant operations. For each 100-MW plant, approximately 2.6 cubic meters per hour (m^3/hr) or 11.5 gallons per minute (gpm) would be used for plant operations. Of this amount, 0.1 m^3/hr or 0.4 gpm would be delivered to the drinking water purifier for potable water purposes. The remaining 2.5 m^3/hr or 11 gpm is delivered to the de-ionization treatment plant and stored in the de-ionized water tank after treatment. Water from the de-ionized water tank is used for steam boiler operations during the day, with about 60 cubic meters (16,000 gallons or 0.05 acre-feet) obtained daily from boiler blowdown streams and used each night to wash the heliostats. Approximately 6.0 m^3/hr or 26.4 gpm would be needed from the de-ionized water tank when the steam boilers are in operation. A water balance diagram for the 100-MW plants is shown in Figure 2.2-5, with quantities for the 200-MW plant being approximately doubled. A more detailed description of water use, including water treatment, is provided in Section 2.2.7, Project Description. The description above is for 10 hours of nominal plant operation per day. Actual use will be somewhat higher during summer months and significantly lower in winter. Water use during the first and second year of construction at each phase will be slightly higher because additional water would be needed for dust control activities. Assuming 0.05 feet of water will be required to control dust, then approximately 41.7 million gallons of water or about 128 acre-feet will be required during the 15-month grading period for all three phases (approximately 5 months per phase).

Water is therefore “lost” only through two primary mechanisms: use of treated wastewater for landscaping (0.1 m^3/hr or 0.4 gpm), and use of boiler blowdown water to wash the heliostats (up to 60 cubic meters or 16,000 gallons each night). The de-ionization treatment plant does not have onsite reject streams.

5.15.3.3.3 Wastewater Discharges and Disposal

Wastewater generated at the project site will be from two sources: heliostat wash water and wastewater plant effluent.

[1] Water use information is for the 100-MW phases (Ivanpah 1 and 2). Water use values are double these amounts for the 200-MW phase (Ivanpah 3).

- Heliostat washing will require up to 60 cubic meters (16,000 gallons) of boiler blowdown water each night. Heliostat wash water will not be collected for disposal—it is expected that the wash water will evaporate at or near the ground surface.
- Each phase includes a small wastewater treatment system ("package plant") for potable waste streams such as showers and toilets. The package plant will generate two waste streams: treated wastewater and sewage sludge. Treated wastewater from potable streams will be used for landscape irrigation. Sewage sludge will be removed from the site by a sanitary service provider.

5.15.4 Environmental Analysis

Significance criteria are derived from the CEQA Appendix G checklist. The project is considered to have a potentially significant effect if it would:

- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or offsite or in flooding on- or offsite.
- Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.
- Violate any water quality standards or waste discharge requirements or otherwise substantially degrade water quality.
- 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).
- Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map.
- Place within a 100-year flood hazard area structures that would impede or redirect flood flows.
- Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam.
- Cause inundation by seiche, tsunami, or mudflow.

5.15.4.1 Construction Impacts

5.15.4.1.1 Drainage

During construction, portions of the project site, including portions along the ephemeral washes on the site, will be graded. Grading is not intended to level the site, but rather to prepare the site for installation of the heliostats and ease future maintenance activities (washing the heliostats). As such, the existing depressions for the drainages will remain and natural drainage waters are expected to continue to occupy these ephemeral washes. West of the Ivanpah 2 power block area, the streambed and associated stream flows may need to

be routed north of the power block area to protect against flooding during high flow events. The re-routed stream bed will be routed north of the power block and merge with the original streambed east of the power block, prior to leaving the project site. Site grading and development, including the rerouting of the streambed and associated flows in the area of the Ivanpah 2 power block, would maintain the overall drainage patterns on site and impacts to existing drainage patterns during construction are less than significant.

5.15.4.1.2 Water Quality

Water quality impacts are anticipated to be related to short-term construction activity and consist primarily of an increased potential for erosion. Additionally, stormwater runoff during construction activities could result in the transport of construction-related contaminants, such as oils and lubricants from equipment or from the improper storage and use of materials. Following approved grading and drainage plans, adhering to proper material handling procedures, and complying with the construction SWPPP will ensure that construction-related water quality impacts are less than significant. The construction SWPPP will require stormwater BMPs, dewatering runoff controls, and construction equipment decontamination. A copy of the Notice of Intent to comply with the NPDES General Construction Permit and a draft construction SWPPP are provided in Appendix 5.15A.

Through compliance with the General Construction Permit, all potential pollutants generated during construction will be sufficiently mitigated such that the beneficial uses of downstream receiving waters will be protected and water quality standards will not be violated. Therefore, water quality impacts are less than significant.

5.15.4.2 Operational Impacts

5.15.4.2.1 Drainage

The project site is currently undeveloped with no impervious surfaces. Development of the project would result in impervious surfaces for the area of the power block, power tower, and related facilities. Once developed, the project would result in 38.2 acres of impervious surfaces, which comprises 1.14 percent of the project site. Solar field development will maintain unobstructed sheet flow, with water exiting the site in existing natural contours and flows. Relatively small rock filters and local diversion berms through the heliostat fields may be installed as required to discourage water from concentrating and maintain sheet flow. To protect the power block and tower areas from floods, a western diversion ditch will be constructed to channel storm runoff around each power block and power tower area before discharging as sheet flow. The power block area for each phase will be graded with moderate slopes to direct runoff and diverted stormwater to an infiltration/evaporation area before overflowing through native stone rip-rap to reinstate natural sheet flow conditions. The diversion ditches and infiltration/evaporation areas will be designed to pass flow from a 100-year storm event to prevent damage to the power block and tower areas. West of the Ivanpah 2 power block area, the streambed and associated stream flows may need to be routed north of the power block area to protect the power block from flooding during high flow events. The re-routed stream bed will be routed north of the power block and merge with the original streambed east of the power block, prior to leaving the project site. Paved access roads will be protected from floods via ditches and local fords with reinforced concrete shoulders.

Overall, the project is being designed to maintain, to the extent possible, the existing drainage and sheet flow patterns on the site. The increase in the amount of impervious surface and the routing of flows around the power block, and through ditches and local fords is not expected to significantly change the amount or timing of runoff from the project site. It is also not expected to change the overall drainage pattern of the site in a manner that would result in substantial erosion, siltation, or flooding on- or offsite. Impacts to drainage patterns are less than significant.

5.15.4.2.2 Water Quality

Operation of the project has the potential to impact water quality primarily through improper storage and use of materials. Adhering to proper material storage and handling procedures and complying with the industrial SWPPP will ensure that operational impacts to water resources are less than significant. The industrial SWPPP will require a suite of good housekeeping requirements including steps to identify and mitigate pollutants and conditions of concern. BMPs will be selected to address material loading and storage areas, spill and leak prevention, waste handling, and employee training. Inspections, monitoring, and sampling also will be conducted per the permit requirements. A copy of the Notice of Intent to comply with the NPDES General Industrial Permit and a draft industrial SWPPP are provided in Appendix 5.15B.

Through compliance with the General Industrial Permit, all potential pollutants generated during the industrial phase will be sufficiently mitigated such that the beneficial uses of downstream receiving waters and groundwater will be protected and water quality standards will not be violated. Therefore, surface water and groundwater quality impacts during the operations phase will be less than significant.

5.15.4.2.3 Waste Discharge Requirements

As described above, each phase includes a small package sewage system for potable water and a small stream of the wastewater will be treated for irrigation. This irrigation water will meet the Title 22 recycled water standards for irrigation of non-edible landscapes, as described in Section 5.15.2.2. Impacts to surface water and groundwater quality will be less than significant.

Each phase will also include the use of boiler blowdown water for heliostat washing. Water used for this process will be of high quality, with traces of phosphate used for pH control in concentrations of about 0.1 parts per million. A pressure washer or other method will be used to wash the heliostats minimizing the amount of water used, and no water would run offsite as a result of these washing activities. Due to the high evaporation rates in the area and the minimal amount of water used, it is likely that wash water will evaporate at or just below the ground surface. Impacts to surface water and groundwater quality will be less than significant.

5.15.4.2.4 Groundwater

The proposed project includes the installation of two groundwater wells east of Ivanpah 2 (see Figure 5.15-2). Each well will have sufficient capacity to supply water for all three phases. Water consumption for all three phases is estimated at less than 100 ac-ft/yr. This level of pumping is expected to continue for the 50-year life of the project. All pumped water will be consumptively used and no groundwater return flows are expected.

The project's groundwater pumping will result in minor groundwater level declines over time. The expected declines at distances of 0.5, 1, and 2 miles from the production well over the 50-year life of the project are shown in Figure 5.15-7. The declines after 50 years are expected to be 2.1 feet at 0.5 mile from the well, 1.4 feet at 1 mile, and 0.8 feet at 2 miles. See Appendix 5.15C for more information on these declines and the analysis method used to determine the declines. The Primm golf course Colosseum Well No. 1 and No. 2 are the closest wells to the project site. These wells are located approximately 0.5 mile from the nearest proposed project well (see Figure 5.15-2).

The proposed pumping also will alter the groundwater budget. Table 5.15-5 lists the future inflows, outflows, and groundwater storage changes that would occur because of the Ivanpah SEGs project. Because the project life is short with respect to the response time for the groundwater system, the groundwater underflow from Ivanpah Valley to Las Vegas Valley will not be measurably impacted by the project. A 200-year simulation made by ENSR Corporation (2007) indicates that the long-term continuation of the current pumping will have only a minimal impact on the underflow to the Las Vegas Valley. Because the project would result in only a minor increase in the current groundwater pumping in the Ivanpah Valley and based on the results of this 200-year simulation, the underflows to the Las Vegas Valley with the implementation of the project were determined to be the same as for current conditions (6,200 ac-ft/yr).

TABLE 5.15-5
Groundwater Budget for Ivanpah Valley with Implementation of the Project

Budget Component	Geographic Area		
	North	South	Total
Inflows			
Precipitation recharge	2,200	4,000	6,200
Project returns	NA	0	0
Molycorp returns	NA	0	0
Other water-use returns	1,100	800	1,900
Total	3,300	4,800	8,100
Outflows			
Project pumping	NA	100	100
Molycorp pumping	NA	400	400
Other pumping	2,000	2,300	4,300
Underflow to Las Vegas Valley	6,200	NA	6,200
Total	8,200	2,800	11,000
Storage Change			**-2,900**

See Appendix 5.15C for additional information.
All values in ac-ft/yr
NA = Not applicable

Groundwater is available within the Ivanpah South Basin to supply the proposed project. Within the Ivanpah South Basin, the precipitation recharge and water-use returns exceed the current and expected future pumping (including the Ivanpah SEGS project and resumed operations at the Molycorp Mine). Within the Ivanpah South Basin, the recharge is 4,000 ac-ft/yr and the current water-use returns are 800 ac-ft/yr, for a total inflow to the basin of 4,800 ac-ft/yr. Current pumping in the Ivanpah South Basin is 2,300 ac-ft/yr and future pumping is estimated to be 2,800 ac-ft/yr including the Ivahpah SEGS project and resumed operations at the Molycorp Mine. Overall inflows to the Ivanpah South Basin are expected to exceed future pumping by 2,000 ac-ft/yr. The project would not substantially deplete groundwater supplies such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level. Impacts to groundwater are less than significant.

Within Ivanpah North Basin, the precipitation recharge and water-use returns also exceed the current and expected future pumping. The recharge is 2,200 ac-ft/yr, and the current water-use returns are 1,100 ac-ft/yr, for a total inflow to the basin of 3,300 ac-ft/yr. Current pumping in the Ivanpah North Basin is 2,000 ac-ft/yr, and the recharge is 2,200 ac-ft/yr. Overall inflows to the Ivanpah North Basin exceed pumping by 1,300 ac-ft/yr. Although inflows exceed pumping in the Ivanpah North Basin, underflow to the Las Vegas Valley results in an overall net groundwater loss in the Ivanpah North Basin. As described above, a 200-year simulation made by ENSR Corporation (2007) indicates that the long-term continuation of the current pumping will have only minimal impact on the underflow. Because the project life is short with respect to the response time for the groundwater system and because of the small amount of water used by the project, the groundwater underflow from Ivanpah Valley to Las Vegas Valley will not be measurably impacted by the project.

As described above, groundwater recharge to the Ivanpah Groundwater Basin occurs from precipitation on the mountains surrounding Ivanpah and Jean Lake valleys and return flows from water uses. Once developed, the project would result in 38.2 acres of impervious surfaces, which comprises 1.14 percent of the project site. Solar field development will maintain unobstructed sheet flow, with water exiting the site in existing natural contours and flows. Therefore, the project would not interfere substantially with groundwater recharge and impacts are less than significant.

Because the project will use only a small amount of water, the project is unlikely to affect groundwater quality. No changes in the existing physical or chemical conditions of groundwater resources are expected as a result of the project and no impacts would occur.

5.15.4.2.5 Flooding Potential

The project is not located in a flood hazard zone, as defined by the Federal Emergency Management Agency, indicating that it is likely in a minimal hazard area. The project would not expose people or structures to significant risk of loss, injury, or death resulting from a levee or dam failure because there are no levees or dams in the project vicinity. Similarly, the project is not located near the Pacific Ocean, a large water body, or on steep slopes and any potential inundation from seiche, tsunami, or mudflow is remote.

5.15.5 Cumulative Effects

A cumulative effect refers to a proposed project's incremental effect together with other closely related past, present, and reasonably foreseeable future projects whose impacts may compound or increase the incremental effect of the proposed project (Pub. Resources Code § 21083; Cal. Code Regs., Title 14, §§ 15064(h), 15065(c), 15130, and 15355). Cumulative projects are described in Section 5.6.7 and include the Desert Xpress Rail Line, improvements to Interstate 15, Las Vegas Valley Water District Pipeline, Southern Nevada Supplemental Airport (Ivanpah Valley Airport), and Table Mountain Wind Generating Facility. Although environmental analyses for most of these projects have not been completed at the time of preparation of this Application for Certification, standard mitigation measures exist to reduce impacts to water resources to a less-than-significant level, and it is anticipated that impacts to water resources from the cumulative projects, if any, would be mitigated to a less than significant level. The project is unlikely, therefore, to have impacts that would combine cumulatively with other closely related past, present, and reasonably foreseeable future projects.

Cumulative impacts to water resources could occur through stormwater runoff impacts to surface waters or through the use of groundwater. The project will not cause or contribute to cumulative impacts on surface water resources. Good engineering practices and BMPs will be used in the project design and operation. Stormwater discharge will adhere to a SWPPP and to state water quality standards. No significant impacts to surface water quality are expected during construction or operation of the project. Drainage volumes and peak flow rates from the site will be similar to existing conditions. Additionally, it is expected that the cumulative projects would employ good engineering practices and comply with all applicable federal, state, and local surface water LORS, including stormwater management. The project is unlikely, therefore, to have impacts to surface waters that would combine cumulatively with other closely related past, present, and reasonably foreseeable future projects.

The Las Vegas Valley Water District Pipeline project has the potential to result in a net benefit to groundwater resources in the Ivanpah Valley. The use of imported water at future facilities would result in additional return flows to the groundwater basin. These return flows would increase the amount of water in storage and potentially offset current and future groundwater extraction. The Southern Nevada Supplemental Airport (Ivanpah Valley Airport) project would use imported water from the Las Vegas Valley Water District Pipeline project, and thus, would either not affect or result in a benefit to groundwater resources by providing additional return flows. The Desert Xpress Rail Line, improvements to Interstate 15, and the Table Mountain Wind Energy Facility may require water for construction activities, but are not likely to result in a long-term groundwater supply needs or impacts to groundwater. All of the cumulative projects would be located on the valley floor or occupy only small areas along the mountain fronts and are not expected to affect overall groundwater recharge in the Ivanpah Valley. It is anticipated that the cumulative projects would comply with all applicable federal, state, and local LORS with regard to stormwater management and waste discharge requirements, and impacts to groundwater quality that could result from the recharge of potentially contaminated waters would be mitigated or avoided. Because the project would result in less than significant impacts to groundwater resources, and because the cumulative projects are likely to result in less than

significant impacts or potential benefits to groundwater resources, the project is unlikely to have impacts that would combine cumulatively with other closely related past, present, and reasonably foreseeable future projects.

The analysis of the project's effects on the groundwater budget in the Ivanpah Valley took into account the current and anticipated future groundwater pumping. Table 5.15-5 lists the current and future inflows, outflows, and storage changes including the Ivahpah SEGS project and other groundwater pumping in the Ivanpah Valley, including resumed operations at the Molycorp Mine. The project, in combination with other pumping in the Ivanpah South Basin, is not expected to result in impacts to groundwater. Inflows to the basin are estimated to be 4,800 ac-ft/yr and future pumping is estimated to be 2,800 ac-ft/yr with the project and resumed operations at the Molycorp Mine. Overall inflows to the Ivanpah South Basin are expected to exceed future pumping by 2,000 ac-ft/yr. As described above, a 200-year simulation made by ENSR Corporation (2007) indicates that the long-term continuation of the current pumping will have only minimal impact on the underflow. The project, in combination with other groundwater pumping, is not expected to result in substantial changes to the amount of groundwater underflow from Ivanpah Valley to Las Vegas Valley. Cumulative groundwater impacts are less than significant.

5.15.6 Mitigation Measures

This section presents mitigation measures proposed to reduce impacts to water resources. The mitigation measures proposed are prescribed by stormwater and erosion control management programs mandated under the NPDES permitting system. These programs have been in place for a number of years and the prescribed measures have proven effective. Under the General NPDES Permits for Construction and Industrial Stormwater, for example, various specific measures are prescribed, and a program of monitoring is required. Compliance with these programs should ensure that all residual impacts associated with the proposed project are mitigated to a less than significant level.

- Implement BMPs designed to minimize soil erosion and sediment transport during construction. Implement and maintain appropriate erosion and sediment controls for all areas prone to erosion in accordance with the draft construction SWPPP included in Appendix 5.15A. Implement and maintain BMPs for material management in accordance with the draft construction SWPPP.
- Conduct operations at the plant site in accordance with the statewide General Industrial Permit, a draft of which is provided in Appendix 5.15B. Implement a suite of good housekeeping requirements including steps to identify and mitigate pollutants and conditions of concern. Select BMPs to address material loading and storage areas, spill and leak prevention, waste handling, and employee training. Conduct inspections, monitoring, and sampling per the permit requirements.

5.15.7 Involved Agencies and Agency Contacts

Agencies and agency contacts for water resources are listed in Table 5.15-6.

TABLE 5.15-6
Agency Contacts for Ivanpah SEGS Water Resources

Issue	Agency	Contact
To comply with NPDES permit requirements, a Notice of Intent must be filed prior to construction activities. A construction SWPPP also must be prepared.	Lahontan RWQCB	Mike Plaziak, Acting Office Supervisor Lahontan RWQCB 14440 Civic Drive, Suite 200 Victorville, CA 92932 (760) 241-7404 mplaziak@waterboards.ca.gov
To comply with NPDES permit requirements, a Notice of Intent must be filed prior to operational activities. An operational SWPPP also must be prepared.	Lahontan RWQCB	Mike Plaziak, Acting Office Supervisor Lahontan RWQCB 14440 Civic Drive, Suite 200 Victorville, CA 92932 (760) 241-7404 mplaziak@waterboards.ca.gov
Grading of County land for construction purposes (if BLM requests assistance from the County to determine and implement specific grading and soil erosion standards)	County of San Bernardino	Joe Trujillo, County Engineer San Bernardino County Land Use Services Department, Building Safety Division 385 N. Arrowhead, 2nd Floor San Bernardino, CA 92415-0160 (909) 387-4246 jtrujillo@lusd.sanbercounty.gov
Providing a domestic water supply source in compliance with the California Safe Drinking Water Act	County of San Bernardino, Environmental Health Services	Mike Farrell Registered Environmental Health Specialist County of San Bernardino, Environmental Health Services 385 N. Arrowhead, 2nd Floor San Bernardino, CA 92415-0160 (909) 387-4666 mfarrell@dph.sbcounty.gov
Comply with county Code regarding desert groundwater management	County of San Bernardino, Environmental Health Services	Mike Farrell Registered Environmental Health Specialist County of San Bernardino, Environmental Health Services 385 N. Arrowhead, 2nd Floor San Bernardino, CA 92415-0160 (909) 387-4666 mfarrell@dph.sbcounty.gov

5.15.8 Permit Requirements and Permit Schedule

Agency contacts and required permits are listed in Table 5.15-7.

TABLE 5.15-7
Permits and Permit Schedule Ivanpah SEGS Water Resources

Permit	Agency Contact	Schedule
Statewide General Permit for Construction Activities	Mike Plaziak, Acting Office Supervisor Lahontan RWQCB 14440 Civic Drive, Suite 200 Victorville, CA 92932 (760) 241-7404 mplaziak@waterboards.ca.gov	One day to submit the Notice of Intent. SWPPP must be onsite prior to commencement of construction activities.
Statewide General Permit for Industrial Activities	Mike Plaziak, Acting Office Supervisor Lahontan RWQCB 14440 Civic Drive, Suite 200 Victorville, CA 92932 (760) 241-7404 mplaziak@waterboards.ca.gov	One day to submit the Notice of Intent. SWPPP must be onsite prior to commencement of operational activities.
County Grading Permit	Joe Trujillo, County Engineer San Bernardino County Land Use Services Department, Building Safety Division 385 N. Arrowhead, 2nd Floor San Bernardino, CA 92415-0160 (909) 387-4246 jtrujillo@lusd.sanbercounty.gov	Estimated 6 months from submittal of complete application
Domestic Water Supply Permit	Mike Farrell Registered Environmental Health Specialist County of San Bernardino, Environmental Health Services 385 N. Arrowhead, 2nd Floor San Bernardino, CA 92415-0160 (909) 387-4666 mfarrell@dph.sbcounty.gov	Estimated 3 months from submittal of complete application
County Groundwater Well Permit	Mike Farrell Registered Environmental Health Specialist County of San Bernardino, Environmental Health Services 385 N. Arrowhead, 2nd Floor San Bernardino, CA 92415-0160 (909) 387-4666 mfarrell@dph.sbcounty.gov	Submit application for well permit as least 30 days prior to well installation

5.15.9 References

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Lahontan RWQCB (Lahontan Regional Water Quality Control Board). 1995. Water Quality Control Plan for the Lahontan Region.

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San Bernardino County. 2007b. San Bernardino County Development Code. Adopted March 2007. Effective April 2007.

San Bernardino County. 2002. San Bernardino County Code Title 3, Division 3, Chapter 6, Desert Groundwater Management.

SWRCB (State Water Resources Control Board). 1997. Waste Discharge Requirements for Discharges of Storm Water Runoff Associated with Industrial Activities excluding Construction Activities, General Permit No. CAS000001. Adopted April 17.

SWRCB (State Water Resources Control Board). 1999. Waste Discharge Requirements for Discharges of Storm Water Runoff Associated with Construction Activity, General Permit No. CAS000002. Adopted August 19.

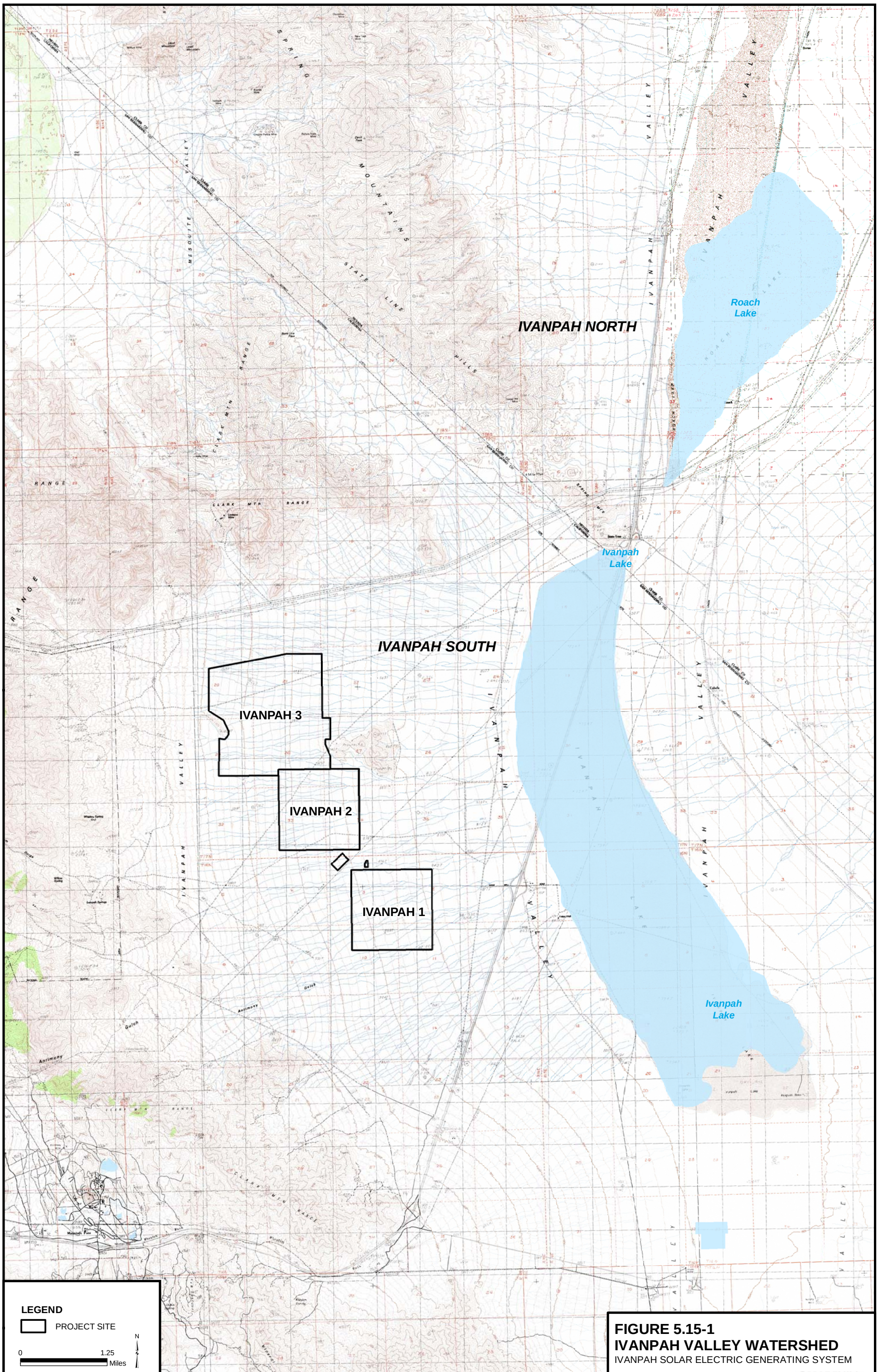

FIGURE 5.15-1
IVANPAH VALLEY WATERSHED
IVANPAH SOLAR ELECTRIC GENERATING SYSTEM

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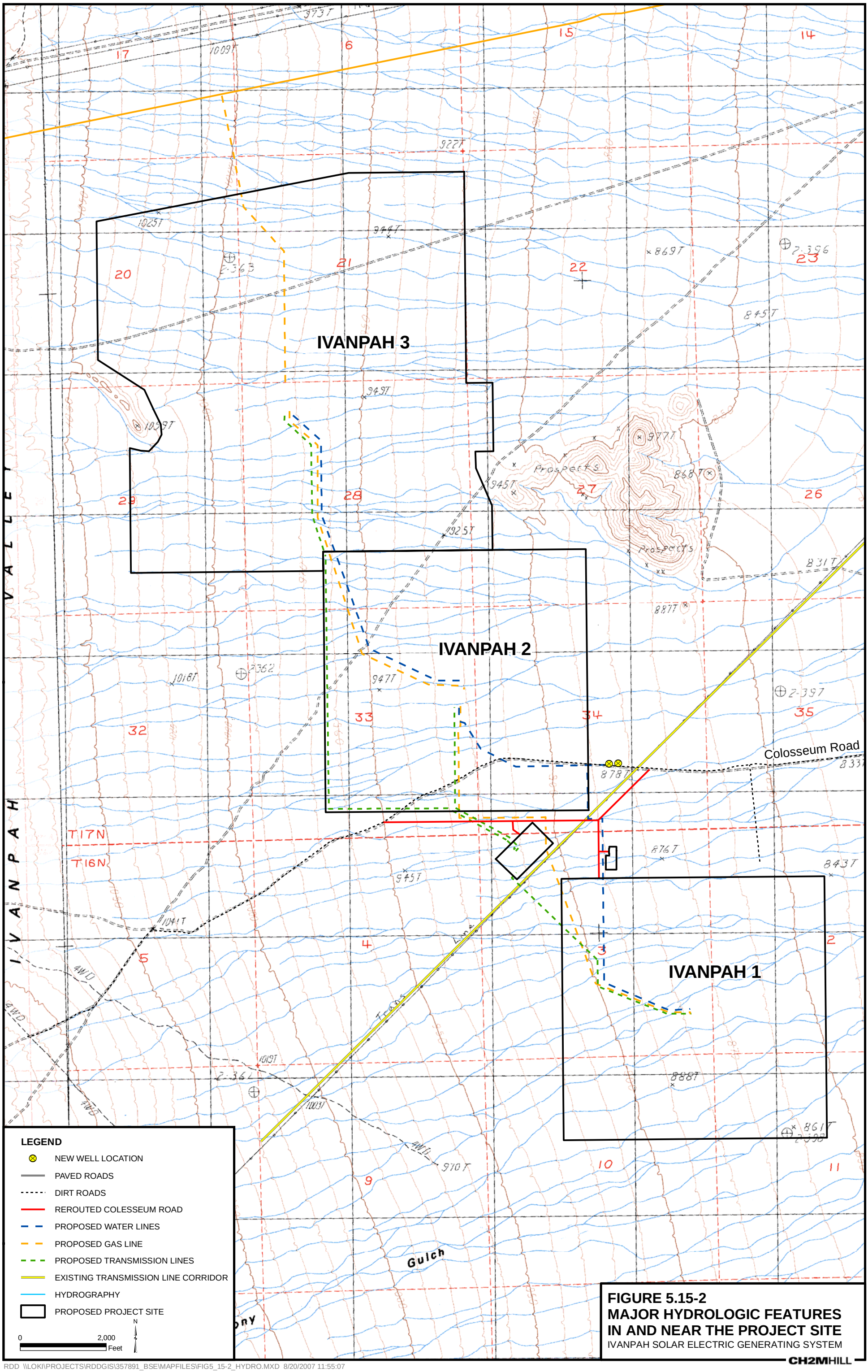

FIGURE 5.15-2
MAJOR HYDROLOGIC FEATURES IN AND NEAR THE PROJECT SITE
IVANPAH SOLAR ELECTRIC GENERATING SYSTEM

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RDD \\LOKI\PROJECTS\RDDGIS\357891_BSE\MAPFILES\FIG5_15-2_HYDRO.MXD 8/20/2007 11:55:07

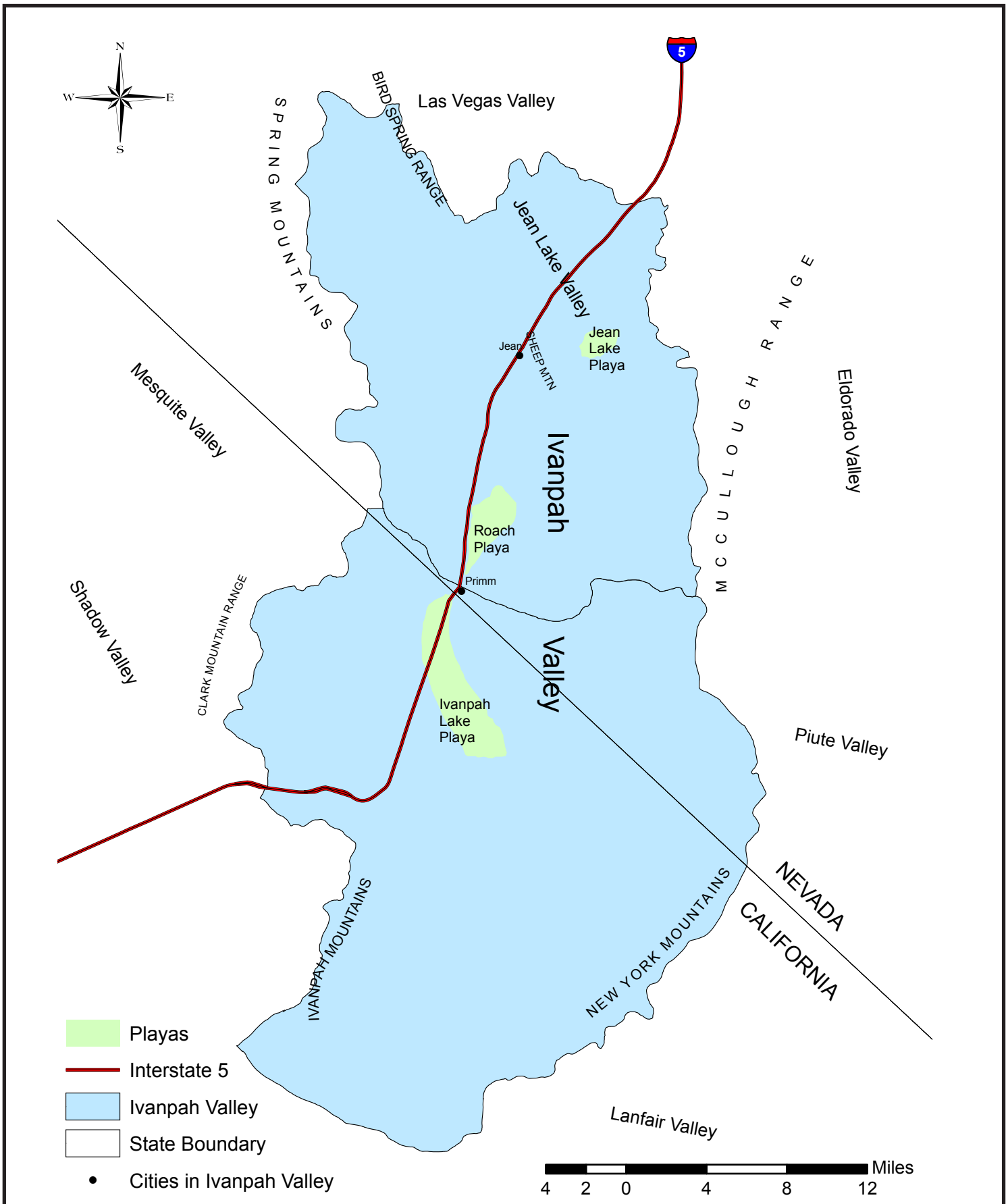


FIGURE 5.15-3
IVANPAH VALLEY GROUNDWATER BASIN
IVANPAH SOLAR ELECTRIC GENERATING SYSTEM

Source: Durbin, 2007

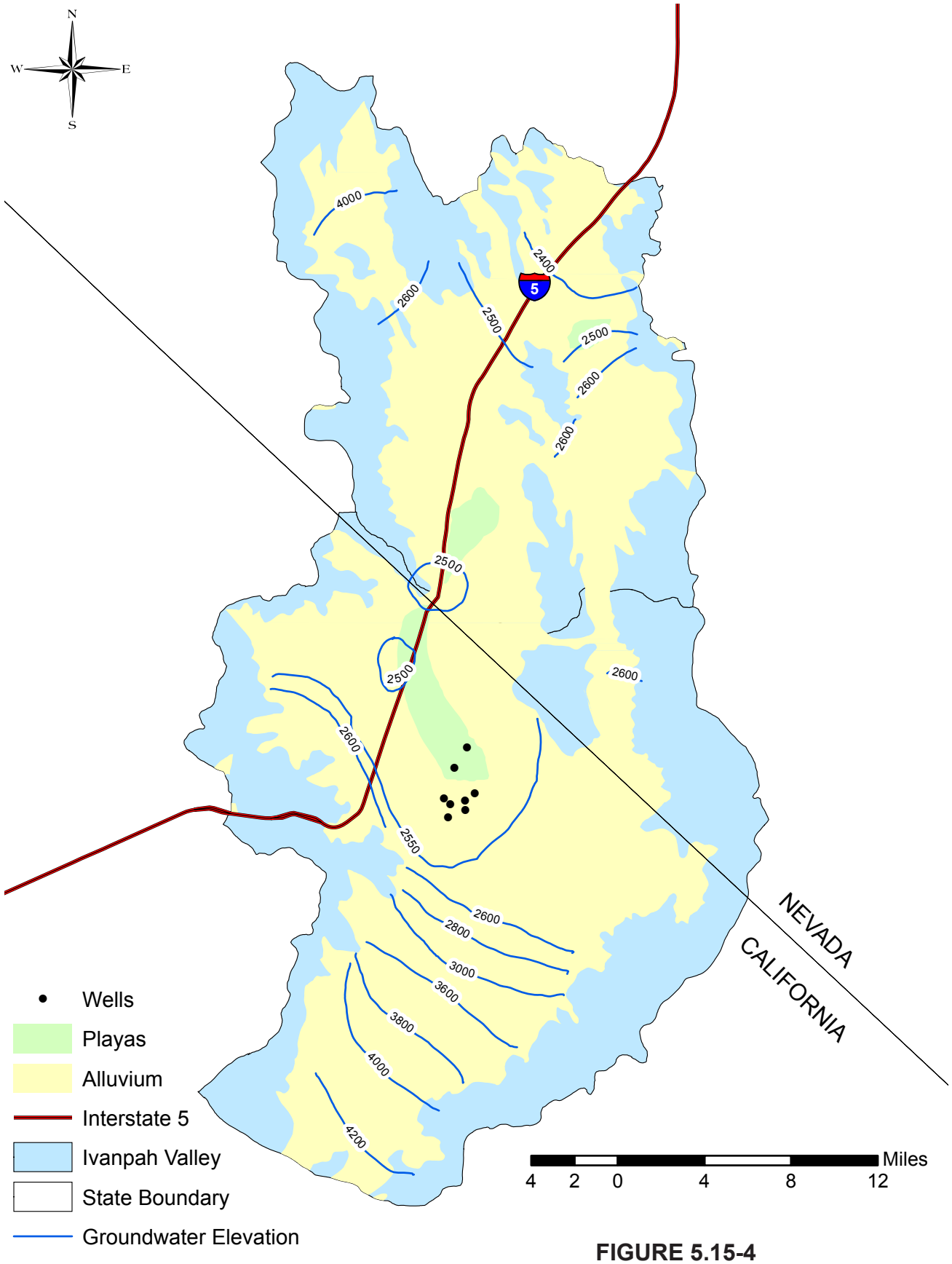


FIGURE 5.15-4
EXITING (2005) GROUNDWATER LEVELS IN THE IVANPAH GROUNDWATER BASIN
IVANPAH SOLAR ELECTRIC GENERATING SYSTEM

Source: Durbin, 2007

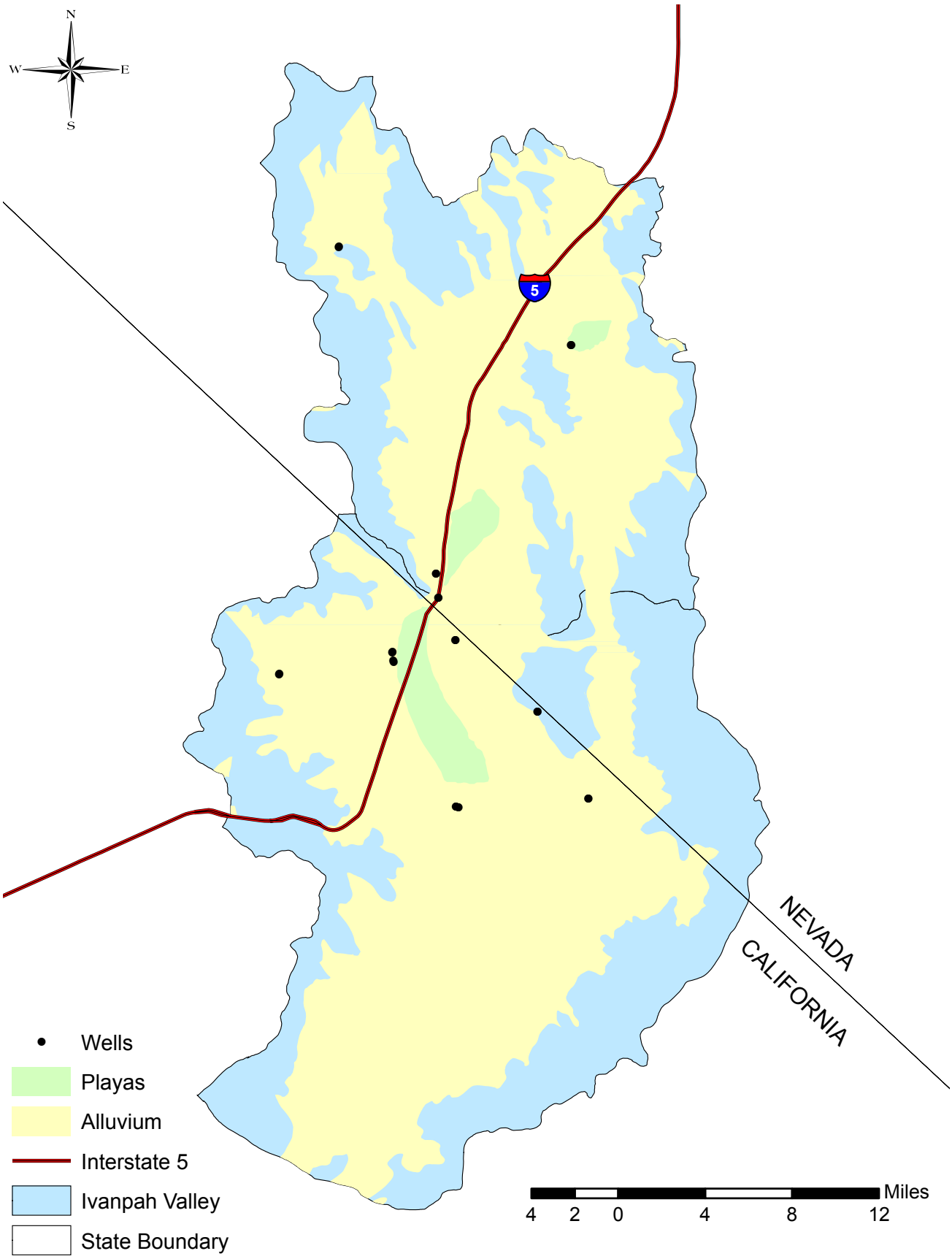
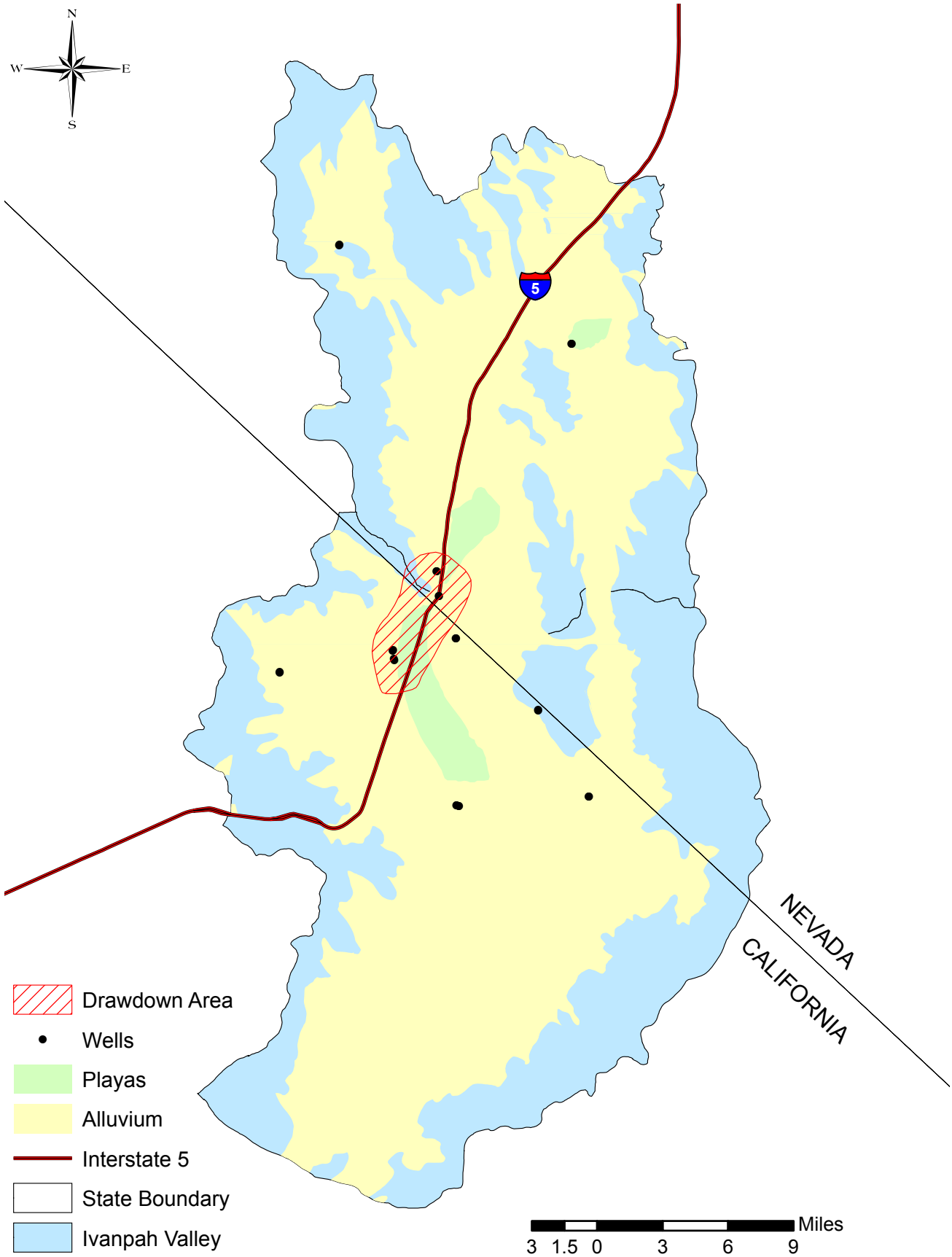


FIGURE 5.15-5
PRINCIPAL PRODUCTION WELLS IN THE IVANPAH GROUNDWATER BASIN
IVANPAH SOLAR ELECTRIC GENERATING SYSTEM

Source: Durbin, 2007



Source: Durbin, 2007

FIGURE 5.15-6
AREA OF DRAWDOWN
IVANPAH SOLAR ELECTRIC GENERATING SYSTEM

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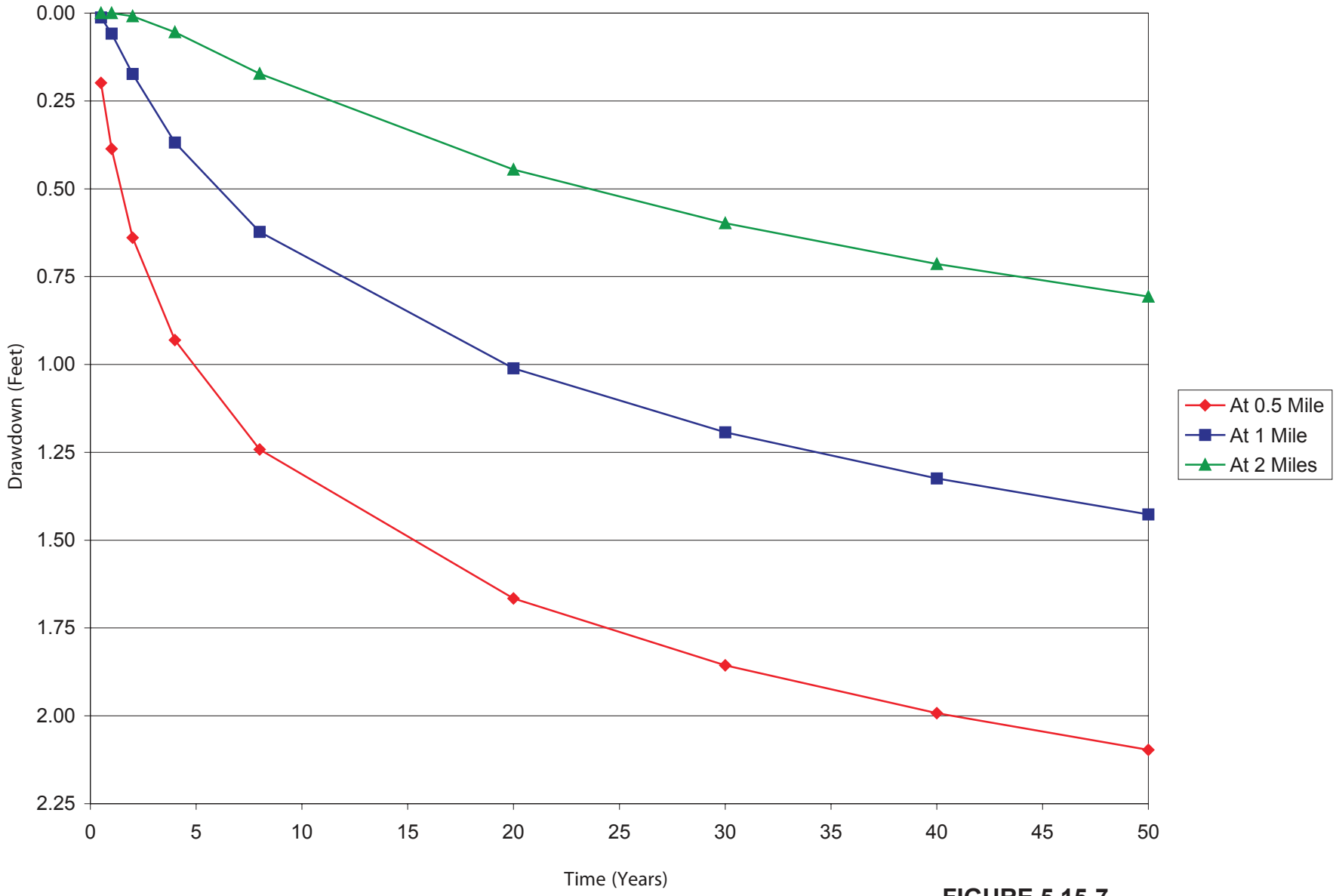

Source: Durbin, 2007

FIGURE 5.15-7
LONG-TERM PROJECT-RELATED GROUNDWATER LEVEL DECLINES
IVANPAH SOLAR ELECTRIC GENERATING SYSTEM

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