CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
COLORADO RIVER BASIN REGION

ORDER NO. R7-2008-0063

WASTE DISCHARGE REQUIREMENTS
FOR
HUDSON RANCH POWER I LLC, OWNER
HUDSON RANCH I GEOTHERMAL DEVELOPMENT PROJECT
PROPOSED GEOTHERMAL POWER PLANT
Salton Sea Known Geothermal Resource Area (KGRA) - Imperial County

The California Regional Water Quality Control Board, Colorado River Basin Region, finds that:

1. Hudson Ranch Power I LLC proposes to construct a 49.9 MW geothermal power plant (Project) on land owned by Magma Power Company within the Salton Sea Known Geothermal Resource area (KGRA), approximately three miles southwest of the town of Niland. The address for Hudson Ranch Power I LLC is 2602 McKinney Avenue, Suite 200, Dallas, Texas 75204. The address for Magma Power Company is 551 W. Main Street, Brawley, CA 92227.

2. The Hudson Ranch Geothermal Power Plant will be operated by an affiliate of Hudson Ranch Power I LLC's parent company, CHAR LLC, located at 2602 McKinney Avenue, Suite 200, Dallas, Texas 75204.

3. Currently geothermal wells are being drilled at various locations on the project property to provide geothermal brine to operate the plant. The mud sumps for these wells are regulated under separate Waste Discharge Requirements (WDRs).

4. This Board Order regulates the facilities emergency brine pond. The emergency brine pond is designated a Class II Surface Impoundment Waste Management Unit (WMU) and must meet the requirements of the California Code of Regulations (CCRs), Title 27, CCR §20200 et seq. The boundaries of the proposed Hudson Ranch I Geothermal Project Geothermal Power Plant and emergency brine pond are shown on the attached map (see Figures 1 & 2).

5. Hudson Ranch Power I LLC submitted a Report of Waste Discharge dated January 18, 2008 for the Hudson Ranch Geothermal Project Power Plant.

   Definition of terms used in this Board Order:

   Facility – The entire parcel of property where the proposed Hudson Ranch I Geothermal Power Plant industrial operation or related geothermal industrial activities are conducted.

   Waste Management Units (WMUs) – The area of land, or the portions of the facility where geothermal or related wastes are discharged and the emergency brine holding pond are WMUs.

   Discharger – The term Discharger means any person who discharges waste that could affect the quality of the waters of the State, and includes any person who owns the land, WMU or who is responsible for the operation of a WMU. Specifically, the terms "discharger" or "dischargers" in this Board Order means Magma Power Company and CHAR, LLC.

6. **Power Plant Site**

All the Project development facilities, with the exception of the production and residual brine injection wells and pipelines, will be located within an approximately 40-acre power plant site bounded on the north by McDonald road and the east, west and south by irrigated farmland (see Figure 3).

An approximately 20-acre area located immediately east of the power plant site will be used during site construction as a temporary construction equipment laydown area and construction parking area. The power plant site and temporary construction area are both located within a portion the same existing parcel (APN 020-010-26). However, this parcel will be subdivided creating a new parcel for the Project power plant facilities. The power plant site is located in the north half of the northwest quarter of Section 24, T11S, R13E; SBB&M. Both the Brine Processing Facility (BPF) and the Turbine-Generator Facility (TBF) will be located within the power plant site.

7. **Brine Processing Facility**

The BPF includes the geothermal production wells, brine and steam handling facilities, solids handling system, a brine pond, a fresh water pond and the injection wells. Geothermal fluid produced from the production wells will be delivered to the power plant site through above ground pipelines to the brine and steam handling facilities. The geothermal fluid will be flashed in the steam handling facilities (flash tanks, vent tanks and associated facilities) at successively lower pressures to produce high pressure (HP), standard pressure (SP), and low pressure (LP) steam that will be delivered to the TGF. Chemically stabilized separated brine will flow from the BPF into the solids handling system (clarifiers, thickener and associated facilities) where solids are removed. Two booster and two main injection pumps will be used to pump the spent brine from the secondary clarifier of the BPF to the injection wells via the above ground brine injection pipelines for subsurface injection.

8. **Fluid Storage Basins**

Three fluid storage basins will be constructed on the power plant site. These include the service water pond, the storm water retention basin, and the brine pond. The following are descriptions of the fluid storage basins that will be constructed on the power plant site and the fluids that may be discharged into or stored in the basins.

a. **Service Water Pond:** The source of external freshwater for the facility will be canal water made available under a supply contract with Imperial Irrigation District (IID). Water will be obtained from the "0" lateral at existing gate 32 located east of the power plant site. Water will be transferred to the power plant site via an approximately 750-foot-long freshwater pipeline or a lined ditch to a service water storage basin on the power plant site. The water will be used for dilution of geothermal brine, solids dewatering system, steam wash water, purged water for pump seals and the reverse osmosis (RO) potable water system and, at times, cooling water makeup. The Project is designed to minimize reliance on external sources of water supply for process needs as well by using condensed steam from the geothermal steam condensate to the greatest extent practical. Canal water will also serve as the source of water for maintenance purposes and water for the fire protection system. It will also be used to charge the cooling tower prior to startup.

The RO potable water system will be used to treat canal water and provide a supply of drinking water, wash basin water, eyewash equipment water, water for showers and toilets in crew change quarters, and sink water in the laboratory.

b. **Storm Water Retention Basin:** The Project site is fairly level. The proposed drainage design in general will flow from the northeast corner to the southwest corner of the power plant site toward the drainage detention pond. Within the power plant site, buildings and equipment will be constructed on foundations with the overall site grading scheme designed to route surface water around and away from all equipment and buildings. The power plant site will be graded to direct surface water runoff toward an earthen drainage pond designed for 100-year storm conditions. Storm water flows will be directed to the retention basin via ditches, swales, and culverts. Spill containment areas and sumps subject to spills of miscible chemicals would be drained to an enclosed oil/water separator and be collected in a waste oil tank for offsite recycling. Clean water from the oil/water separator would be injected into the aerated brine injection well. The storm water drainage system is sized to accommodate 3 inches of precipitation in a 24-hour period (100-year storm event) and to comply with applicable local codes and standards. Buildings and equipment are constructed in a manner that provides protection from such a 100-year storm. The storm water pond will be surrounded by a berm to prevent inundation from flooding which could occur in the southwest comer of the power plant site during a 100-year flood event. Water accumulated in the storm water detention pond will be allowed to evaporate, seep into the ground, or be pumped into the aerated brine injection well. Brine handling equipment will be contained in curbed concrete aprons, with drainage directed to the plant thickeners and subsequently to the aerated brine injection well or the main brine injection system.

c. **Brine Pond:** A brine pond will be constructed within the power plant site. The brine pond will serve multiple upset condition purposes. During such upset conditions, brine that overflows from the clarifiers and the thickener, and condensate from the steam vent tanks would be directed to this pond for temporary containment, after which this liquid will be processed through the thickener and delivered to the main injection pumps or pumped to the aerated brine injection well for subsurface injection.

Reject water from the reverse osmosis system will also be directed to the aerated plant injection well or the brine pond. The brine pond may also collect brine from the production wells when they are flow-tested after drilling and from the production wells when brine is initially introduced into the facility during startup. This liquid would be pumped to a thickener and then discharged into an injection well after startup is complete.

The brine pond will be constructed to meet Class II surface impoundment design requirements (Title 27, CCR, § 20200 et seq). The engineered brine pond will be a double-lined basin sized to accommodate up to three hours of brine that could be released during system upset conditions plus 2 feet of freeboard (see Figure 4). The brine pond will be lined with a concrete liner and a 40 mil HDPE liner separated by sand and a geotextile (GEONET) layer. The flexible membrane and any subsurface barrier must be underlain by 2 feet of compacted clay with a maximum hydraulic conductivity of 10^{-6} cm/sec and compacted to 90% modified proctor density for protection from physical damage. A leachate collection and removal system will be constructed between the two liners capable of removing up to two times the maximum daily volume of leachate from the basin and returning the leachate to the brine pond.

9. **Development Wells:**

The Project anticipates four geothermal production wells and three geothermal brine injection wells will be required to support the Project. If the four exploration wells proposed to be directionally drilled at the 3.4-acre, Well Site I are commercially successful, then they will become the geothermal production wells for the Project. Similarly, if the three exploration wells proposed to be directionally drilled at the 2.75-acre, Well Site 2 have suitable injection well characteristics, then they will become the residual brine injection wells for the Project. One additional injection well will be drilled within the power plant site for the injection of aerated brines. All production and injection wells will be operated in accordance with California Division of Oil, Gas and Geothermal Resources (CDOGGR) regulations.

10. **Well Site Production and Injection Equipment:**

Production wellhead dimensions are not expected to exceed a height of fifteen feet above the ground surface or four feet in diameter. The wellhead will consist of control valves and redundant isolation valves. The wellhead would be painted an appropriate color to blend with the area and minimize visibility.

No auxiliary equipment or motor control buildings are required at the Site 2 injection well site. Instead, injection pumps located at the power plant site would pump the geothermal injection fluid through the injection pipeline system, providing sufficient pressure to inject the polished geothermal brine back into the geothermal reservoir.

11. **Geothermal Pipeline Systems:**

Above ground pipelines will be constructed to interconnect the production and injection wells with the power plant site facilities.

The production wellheads will all be located on the Site I well site located approximately 150 feet north of McDonald Road and across the road from the power plant site. An approximately 200-foot above ground pipeline will be constructed via a pipeline crossing beneath McDonald Road to interconnect the production wells with the brine and steam handling facilities. The production pipelines would be constructed from alloy or alloy-lined pipe designed, constructed, tested and inspected pursuant to current industry standards for high temperature, high pressure piping. They would be nearly identical to the pipelines currently used to move geothermal production fluids to the existing Salton Sea KGRA geothermal power plants. The diameter of the pipe would vary depending on the type and amount of geothermal fluid to be conveyed. Once covered with about two inches of insulation and a protective metal sheath (appropriately colored to blend with the area), the overall outside diameter of the finished pipe would range from 12 to 30 inches. The pipelines would be constructed near ground level (averaging about one foot off the ground) on pipeline supports installed approximately every 20 to 40 feet along the pipeline routes.

The brine injection pipeline would be a cement-lined carbon steel pipeline. Each injection well would be remotely monitored for pressure, temperature, and flow rate.

12. **Turbine Generator Facility**

The TGF includes a 49.9 MW (net) condensing turbine/generator set, a gas removal and emission abatement system, and a heat rejection system (i.e., condenser and cooling tower). Common facilities within the TGF area include a control building, warehouse, a service water pond, and other ancillary facilities. The TGF also includes a 92 kV switchyard and several power distribution centers.

The turbine generator system will consist of a condensing turbine generator set with three steam entry pressures (HP, SP and LP). The turbine will be directly coupled to a totally enclosed water and air-cooled (TEWAC) synchronous-type generator. The turbine-generator unit will be fully equipped with all the necessary auxiliary systems for turbine control and speed protection, lubricating oil, gland sealing, generator excitation, and cooling. The projected chemistry of the geothermal production fluid is provided in Table 1.

Table 1

mg/kg	Maximum	Minimum	Average	Design
Na	42,000	65,227	53,609	55,000
K	11,908	20,328	16,547	17,000
Ca	19,115	33,300	27,232	27,000
Mg	8.0	183	49	50
Li	125	267	199	200
Sr	364	700	475	500
Ba	93	358	214	200
Metals:				
Fe	1,200	3,833	1,788	1,700
Mn	682	1,833	1,349	1,300
Zn	371	790	499	500
Pb	67	216	97	100
As	9.4	16	12	12
Cu	2.0	8.0	4.5	5
Complexes:				
SiO_2	334	659	454	450
B	124	470	364	350
Anions:				
Cl	127,000	176,000	153,587	155,000
F	2.6	31	23	25
SO_4	41	210	86	85
TDS	211,281	305,000	258,587	260,000
Enthalpy (Btu/lb)	354	465	395	400
Reservoir Temp (°F)	512	617	559	550
Source: Thermochem, Inc. 2006				

Two 100% redundant Emergency Diesel Generators will also be installed to provide black start capability and site power when the steam turbine generator is shutdown. A 400 kW emergency generator will be installed to provide backup for plant control power. The diesel generators will meet California Air Resources Board (CARB) source emission limits. The generators are expected to operate less than 600 hours per year.

13. **Heat Rejection and Non-Condensable Gas Removal Systems**

The heat rejection system will be comprised of a shell-and-tube type condenser, a counterflow cooling tower, and a non-condensable gas (NCG) removal system. Steam from the turbine will be condensed in the condenser. Condensate from the condenser will be transferred to the cooling tower, cooled and returned to the condenser. Gases that accumulate in the condenser will be evacuated by the NCG removal system. NCG will be pressurized and vented to a hydrogen sulfide (H2S) abatement system. The projected composition of the NCG expected to be produced in the geothermal fluid is summarized in Table 2.

Table 2

Hudson Ranch Expected Non-Condensable Gases Composition

Non-Condensable Gases	Nominal Case mg/kg	Design Case mg/kg
Carbon Dioxide (CO_2)	3,000	4,000
Hydrogen Sulfide (H_sS)	14	19
Ammonia (NH_3)	500	600
Methane (CH_4)	3.6	5.0
Nitrogen (N_2)	3.1	5.0
Hydrogen (H_2)	0.23	0.50
Argon (Ar)	0.03	0.03
Benzene (C_6H_6)	0.05	0.10
Total	**3,521**	**4,630**
* Based on the Leathers and Elmore geothermal project area production wells.		

The H2S abatement system used to control the H2S emissions in the vent gases will be a Biox process. The Biox system consists of using an oxidizing biocide in contact with the cooling tower circulating water to convert dissolved hydrogen sulfide to water-soluble sulfates. Biocide assisted oxidation prevents secondary emissions of hydrogen sulfide from cooling towers that utilize steam condensate for makeup water. The process will also be utilized to control primary hydrogen sulfide vent gas emissions by bubbling the off gas into the tower catch basin. The Biox system is expected to remove at least 95 percent of the H2S in the non-condensable gases and at least 98 percent of the H2S in the portion of the condensate used as cooling tower makeup water. When all of the condensate is used (during the high temperature summer months), H2S emissions from both sources are expected to total less than 3.5 pounds per hour. Benzene emissions are expected to be less than 0.5 pounds per hour.

A potential source of particulate emissions from the Project is the cooling tower. During normal operating conditions, the plant is projected to generate less than I lb/hr of particulates. Particulate emissions from the cooling towers will be minimized by maintaining a low total dissolved solids (TDS) concentration in the circulating water and by controlling cooling tower drift losses to not more than 0.0006 percent of the total circulation rate using high efficiency drift eleminators. Blowdown from the cooling tower will ultimately be injected into the dedicated aerated brine injection well.

During plant start-up, a plant trip or load rejection steam to the turbine will be diverted to a rock muffler for venting as is currently being done at the existing geothermal power plants in the Salton Sea KGRA. During this time, H2S and other NCG will be released to the atmosphere.

A combination of best available control technology, management practices, and process monitoring equipment will be used to minimize the air emissions from the power plant facilities. Permits to construct and operate the facility will be obtained from the Imperial County Air Pollution Control District (ICAPCD).

14. **Water Supply Source and Requirements**

The Project will require up to 650 acre-feet per year (afy) of additional (non-condensate) water when operating at full plant load. Average annual supply requirements will vary, depending on the capacity factor of the overall facility.

The source of external freshwater for the facility will be canal water made available under a supply contract with the IID. Water will be obtained from the "O" lateral at existing gate 32 located east of the power plant site. Water will be transferred to the power plant site via an approximately 750-foot-long freshwater pipeline. The freshwater will be conveyed via pipeline to a water storage basin on the power plant site. The water will be used for dilution of geothermal brine, solids dewatering system, steam wash water, purged water for pump seals and the reverse osmosis (RO) potable water system and, at times, cooling water makeup. The Project is designed to minimize reliance on external sources of water supply for process needs as well by using condensed steam from the geothermal steam condensate to the greatest extent practical. Canal water will also serve as the source of water for maintenance purposes and firewater for the fire protection system. It will be used to charge the cooling tower prior to startup.

The RO potable water system will be used to treat canal water and provide a supply of drinking water, wash basin water, eyewash equipment water, water for showers and toilets in crew change quarters, and sink water in the sample laboratory.

15. **Spent Fluid and Wastewater Handling**

Spent brine from the secondary clarifiers will be injected directly into the injection wells to replenish the geothermal resource. Chemical characteristics of the process brine are summarized in Table 3. Under overflow conditions, brine would be directed to the brine pond, after which it would be Processed through the thickener and delivered to the main injection system or injected into the dedicated aerated brine injection well. This dedicated injection well could also receive liquid from the thickener, which collects filter press filtrate, and liquid from the bermed areas around the plant equipment. The brine pond also receives liquid from the emergency relief tanks. Under normal operation these fluids will be processed through the thickener and pumped into the main injection system. The reject water from the RO system will be pumped into the aerated brine injection well. Spent geothermal brine will be injected into the subsurface geothermal reservoir via the primary injection wells. The spent fluids from the brine pond will also be injected into the subsurface geothermal reservoir via either the dedicated aerated brine injection well, or processed through the thickener and then delivered to the main injection system. All subsurface fluid injection will conform to California Division of Oil, Gas and Geothermal Resources requirements.

Table 3

Projected Chemical Characteristics of the Polished Injection Brine Fluid

Constituent	Cooling Tower Blowdown	Clarifier	Brine Pond
	Mg/L as Ions*		
Lithium	0.067	228.5	253.3
Beryllium	0.000	0.01	0.01
Ammonium	376.573	451.1	500.0
Sodium	18.077	61,369.2	68,024.0
Magnesium	0.014	48.9	53.3
Aluminum	0.000	0.3	0.3
Potassium	4.606	15,637.1	17,333.3
Calcium	8.858	30,073.4	33,333.3
Chromium	0.000	0.004	0.004
Manganese	0.354	1,202.8	1,333.3
Iron	0.425	1,443.4	1,600.0
Nickel	0.000	0.02	0.03
Copper	0.001	4.8	5.3
Zinc	0.115	390.9	433.3
Rubidium	0.025	84.2	93.3
Strontium	0.159	541.3	600.0
Silver	0.000	0.3	0.3
Cadmium	0.000	1.5	1.7
Antimony	0.000	1.0	1.1
Cesium	0.004	15.0	16.7
Barium	0.064	216.5	240.0
Mercury	0.055	0.0001	0.004
Lead	0.028	96.2	106.7
Bicarbonate	0.025	88.6	93.3
Nitrate	0.000	0.01	0.0
Fluoride	0.007	24.1	26.7
Sulfate	699.590	127.5	133.3
Chloride	47.032	168,400.5	186,666.7
Arsenic	0.004	13.2	14.7
Selenium	0.000	0.006	0.007
Bromine	0.032	108.3	120
Iodine	0.004	12.0	13.3

To keep the dissolved solids concentration of the circulating water in the cooling towers at acceptable levels, a stream of circulating water blowdown will be injected from the cooling towers into the dedicated aerated brine injection well.

The sanitary drains will discharge to a septic tank. Wastewater from the septic tank will be pumped out regularly. Rain and storm drainage will be collected in the drainage water detention pond on the northwest comer of the facility location. The drainage pond will be designed for a 24-hour, 100-year storm event. Water accumulated in the storm water detention pond will be allowed to evaporate, seep into the ground, or be pumped into the aerated brine injection well.

16. **Solid Wastes**

The construction and operation of the facility will generate both non-hazardous and hazardous wastes (see Table 4).

Table 4

Waste Stream	Wastes Classification	Treatment
Projected Drilling and Construction Waste Streams:		
Scrap wood, steel, glass, plastic, paper, calcium silicate insulation, mineral wood insulation	Nonhazardous	Waste disposal facility
Empty hazardous material containers drums	Recyclable Hazardous	Recondition or recycle
Used and waste lube oil during steam Turbine Lube Oil Flushes	Recyclable Hazardous	Recycle
Oil absorbent materials turbine lube oil flushes and normal construction	Nonhazardous	Waste disposal facility or laundry
Oily rags generated during normal construction activities lube oil flushes	Nonhazardous	Waste disposal facility or laundry
Spent batteries; lead acid	Hazardous Recyclable	Recycle
Spent batteries; alkaline type, Sizes AAA, AA, C and D	Hazardous	Waste disposal facility
Sanitary Waste-Portable Chemical Toilets and Construction Office Holding Tanks	Sanitary	Pumped by licensed contractors and transported to sanitary water treatment plant
Drilling Waste	Nonhazardous	Waste disposal facility
Projected Power Plant Operating Waste Stream		
Waste Stream	**Waste Classification**	**Treatment**
Filter-cake of brine solids from dewatering process	Non-hazardous[1]	Waste disposal facility
Used hydraulic fluids, oils, grease, oily filters	Recyclable Hazardous	Recycle
Spent batteries; lead acid	Recyclable Hazardous	Recycle
Laboratory Waste	Hazardous[1]	Waste disposal facility
Used oil from oil/water separator	Recyclable Hazardous	Recycle
Oily rags	Non-hazardous	Laundry
Cooling Tower Blowdown	Non-hazardous	Aerated brine injection well
Clarifier Effluent	Non-hazardous	Aerated brine injection well
Brine Pond	Non-hazardous	Aerated brine injection well
Brine Pond Solids	Hazardous[1]	Waste disposal facility
Scale and Cleaning Solvents	Hazardous[1]	Waste disposal facility

17. **Non-Hazardous Wastes**

Inert solid waste from construction activities may include lumber, excess concrete, metal, glass scrap, and empty nonhazardous containers. Management of these wastes will be the responsibility of the construction contractor(s). Typical management practices required for non-hazardous waste management include recycling when possible, proper storage of waste and debris to prevent wind dispersion, and weekly pickup and disposal of wastes to local Class III landfills. The total amount of solid waste to be generated by construction activities has been estimated to be similar to that generated for normal commercial construction.

The primary source of solid waste will be the precipitated solids from the geothermal resource fluid. After leaving the steam separators, the geothermal resource fluid will be treated through clarifiers where some of the silica, iron, and manganese contained in the brine will be removed. Following this separation process, the solids slurry discharging from the bottom of the clarifiers will be directed to a vacuum filtration system. Approximately 25 tons per day of solids would be removed from the vacuum filter system. Based on the proposed design of the facility, it is expected that the Project can achieve a goal of generating 95 percent of the filter press cake that will be characterized as non-hazardous. Liquids from the filtration system will be routed to a thickener system for additional solids removal. Slurry discharged from the thickener will also be discharged to the filtration system. Overflow from the thickener system, substantially free of suspended solids, will be routed to the main injection system. The filter cake from the vacuum belt filter system will be further dried to 90% by weight solids in an air drying process. The air will be heated by atmospheric steam from the dilution water beater.

Under normal operations, the filter cake will be recycled for beneficial use. The Project has approached several end users including cement kiln operators, IID and Imperial County Public Works. Before any filter cake material is removed from the plant site, it will be sampled and laboratory tested. Only when test results demonstrate the material is non-hazardous will it be recycled for beneficial use. Otherwise, it will be delivered to a landfill authorized to accept the waste for proper disposal.

Office waste and general refuse will be removed by a local sanitation service.

18. **Abandonment**

The projected life of the Project is a nominal 30 years. At the end of the useful life of the Project, equipment and facilities would be properly abandoned.

The geothermal wells would be abandoned in conformance with the well abandonment requirements of the CDOGGR. Abandonment of a geothermal well involves plugging the well bore with clean drilling mud and cement sufficient to ensure that fluids would not move across into different aquifers. The well head (and any other equipment) would be removed, the casing cut off at least six feet below ground surface, and the well site reclaimed.

At the end of power plant operations, the Project would prepare and implement a Site Abandonment Plan in conformance with Imperial County and CDOGGR requirements. The Plan would describe the proposed equipment dismantling and site restoration program in conformance with the wishes of the respective landowners/lessors and requirements in effect at the time of abandonment. Typically, above-ground equipment would be dismantled and removed from the site. Some below ground facilities may be abandoned in place. The surface of the site would then be restored to conform to approximate pre-Project land uses.

19. **Surface Water Resources**

The three principal surface water bodies at the north end of the Imperial Valley include the Salton Sea, the Alamo River and the New River. The proposed power plant site will be located approximately 0.67 miles from the edge of the Salton Sea coastline. The nearest section of the Alamo River to the power plant site is approximately 0.63 miles southwest. This section of the Alamo River flows to the northwest through a levee system and empties into the Salton Sea bout 2.45 miles west of the power plant site. The nearest sections of the New River are about 8 miles south of the power plant site.

The Salton Sea water surface elevation was provisionally estimated by the USGS, as of January 1, 2005, to be 228.7 feet below mean sea level (DWR and CDFG 2006). This is several feet higher than the 232 feet below mean sea level reported for the Salton Sea in 1968 (Loeltz et al 1975). Flow into the Salton Sea is primarily irrigation drainage water via surface water flows and ground water percolation. Storm water runoff also contributes to the Salton Sea during the rainy season. Levels of the Salton Sea increase during periods of peak irrigation water usage, but overall the level of the Salton Sea is decreasing, in part as a result diminished flow stemming from the Colorado River Quantification Settlement Agreement.

The Alamo and New Rivers are both perennial rivers with headwaters in Mexico. Both the Alamo and New Rivers convey predominantly agricultural irrigation drainage and some treated wastewaters. The New River also receives a considerable portion of untreated wastewater flows from Mexicali, Mexico.

Irrigation water for the portion of the Imperial Valley near the Project area is imported from the Colorado River through the All American Canal and the East Highline Canal. A series of Imperial Irrigation District (IID) irrigation laterals (canals) and drains flow from east to west in the Project vicinity to the Salton Sea. The "0" Lateral terminates near the northeast comer of the power plant site and will be the source of service water for power plant operations. McDonald Road is aligned east-west immediately north of the "0" Lateral, and the "0" Drain is immediately north of and parallel to McDonald Road. The "0" Lateral empties into the "0" Drain just north of the power plant site across McDonald Road. The "N" Drain lies about one-quarter mile south and down-gradient of the proposed project facilities. The east-west "N" Drain is located immediately north and parallel to Schrimpf Road. Schrimpf Road is immediately north of "N" Lateral. The "N" Lateral empties into the "N" Drain west of Davis Road, and the "N" Drain empties into the Alamo River about 0.85 miles west of Davis Road. The Alamo River flows west into the Salton Sea. All of the IID drains in the vicinity of the Project area drain toward the Salton Sea.

FEMA flood hazard maps suggest that a 100-year flood event (Zone A) could result in flooding of the southwestern comer of the power plant site. However, as discussed above, the Salton Sea has been receding in recent years and is projected to continue receding; thereby further diminishing the small potential for a flood event in the Project area. A Floodplain Development Permit for the Project will be obtained from the Imperial County Floodplain Administrator in conformance with FEMA and County requirements. The remaining portions of the power plant site (including the subject brine pond) and Project area are within a FEMA Zone C flood hazard area with minimal potential for flooding.

20. **Ground Water Resources**

a. The U.S. Geological Survey (USGS) undertook a comprehensive study of the water resources of both the Upper and Lower Colorado River region in the 1950s and 1960s. The often cited geohydrologic reconnaissance survey of the Imperial Valley conducted by Loeltz et al (1975) is one of a series of reports resulting from those USGS studies and is the classic assessment of ground water resources in the area. No substantive change in the geohydrologic conditions of the Imperial Valley ground water resource has subsequently occurred.

b. The Salton Sea is located within the Colorado River Hydrologic Region, as defined by the California Department of Water Resources (DWR 2003). The Project area is located in the Imperial Valley Basin, one of seven groundwater basins in the hydrologic region located adjacent to the Salton Sea.

c. The following discussion of regional groundwater hydrology within the Imperial Valley Basin was extracted from the recent Salton Sea Ecosystem Recovery Programmatic EIR (DWR and CDFG 2006).

d. The Imperial Valley Basin is located south of the Salton Sea and is at the southernmost part of the Colorado Desert (sic) Hydrologic Region. The basin is bounded on the east by the Sand Hills and on the west by the impermeable rocks of the Fish Creek and Coyote Mountains. The basin extends from the Mexicali Valley to the Salton Sea (DWR, 2003). Imperial County is responsible for groundwater management in the Imperial Valley.

e. Deep exploration boreholes have shown that most of the Imperial Valley Basin is underlain by thick, water-saturated lacustrine and playa deposits overlying older sediments. Perched groundwater exists over much of the basin and is recharged by seepage from irrigated lands and drains (IID and Reclamation, 2002b). The basin has two major aquifers separated by a semi-permeable aquitard (silt and clay lenses) that averages 60 feet thick and reaches a maximum thickness of 280 feet. Average thickness of the upper aquifer is 200 feet with a maximum thickness of 450 feet. The lower aquifer averages 380 feet thick with a maximum thickness of 1,500 feet (DWR, 2003). Studies have indicated that the hydraulic connection is poor between the water within the deeper deposits and that within the upper part of the aquifer (IID and Reclamation, 2002b). Well yields in this area are limited (Loeltz et al., 1975).

f. The general direction of groundwater movement in the Imperial Valley Basin is from the Colorado River towards the Salton Sea. However, in the southern portion of the basin, a substantial amount of groundwater flows into the Alamo River and, to a lesser extent, the New River (USGS, 2004). Seepage from the All-American Canal and other canals has caused formation of localized perched groundwater. Between the early 1940s and 1960, groundwater levels rose more than 40 feet along the All-American Canal. Seepage from the canal is expected to decrease substantially when the canal is lined.

g. Tile drains have been installed by IID to convey shallow groundwater away from the root zone of crops (IID and Reclamation, 2002b). Most of the shallow groundwater, leaching water, or excess irrigation water flows into the drains and New and Alamo rivers. Groundwater levels remained relatively stable within the majority of the basin between 1970 and 1990 because of a constant rate of discharge from canals and subsurface agricultural drains.

h. The San Andreas and Algodones faults do not appear to impede or control groundwater movement, based on review of groundwater levels in the 1960s (Salton Sea Authority, 1999).

i. As described ... Hely et al. (1966) estimated the groundwater discharge to the Salton Sea to be less than 2,000 acre-feet a year and IID and Reclamation (2002a) has estimated this value to be about 1,000 acre-feet a year. The IID estimate of 1,000 acre-feet a year has been adopted as a reasonable estimate of historical groundwater discharge to the Salton Sea from the Imperial Valley. It was developed in a method that was consistent with the hydrological assumptions used in the Draft Programmatic Environmental Impact Report (PEIR) and it represents a period of time after the groundwater elevation became stable in the 1970s.

j. Groundwater quality varies extensively in the Imperial Valley Basin. Total dissolved solids, a measure of salinity, ranged from 498 to 7,280 mg/L when measured by DWR in 2003. High concentrations of fluoride have also been reported by IID and Reclamation, (2002b).

k. Due to the low yield and poor water quality, few production wells have been drilled in the Imperial Valley. Most of the wells in the Imperial Valley are domestic wells. Total production from these wells is estimated to be a few thousand acre-feet a year (Salton Sea Authority, 1999).

l. Extremely deep groundwater has been developed along the southern Salton Sea shoreline for geothermal resources. These wells access non-potable groundwater from several thousand feet below ground surface.

m. The amount of usable near-surface groundwater in the central Imperial Valley is unknown, but this resource has not been significantly exploited because of low well yields and poor chemical quality. The upper 500 feet of fine-grained deposits in the central portion of the Imperial Valley are estimated to have a transmissivity of less then 10,000 gallons per day. Even lower permeabilities are estimated to occur at greater depths (Westec 1981), and low vertical permeability inhibits mixing of waters from different depths such as between the shallow aquifer system and underlying deeper groundwater that includes the geothermal resources.

n. The main source of groundwater recharge to the shallow aquifer system, and likely to a lesser extent the deeper aquifer, is imported Colorado River water that seeps from canals and is applied as irrigation water to cultivated areas. Shallow groundwater, ranging in depths from about 5 to 20 feet, is drained by an extensive network of ditches and drains in agricultural areas and also discharges into the Alamo and New Rivers that drain toward the Salton Sea.

o. In April 2007, a sample of near-surface (9-15 feet below ground surface) groundwater was collected from a piezometer hole site located approximately 800 feet northwest of the proposed brine pond. The laboratory analysis of the sample indicates a sulfate-rich groundwater with a high total dissolved solids concentration of approximately 95,000 mg/L (see Tables 5 through 8)

p. The shallow groundwater gradient beneath the proposed Project area appears to mimic that of the overlying surface topography, and is reported to generally flow toward the axis of the Imperial Valley, and then northward to the Salton Sea (Westec 1981). At depths of between 100 and 200 feet, the average groundwater gradient has been estimated at about 28 feet per mile toward the west near Niland and about 9 feet per mile toward the northeast near Calipatria. The main source of ground water recharge in both of these areas is suspected to be seepage from the East Highline and Coachella Canals. Historical records of water wells completed at relatively shallow depths of about 100 to 150 feet are reported to indicate an upward vertical movement of groundwater near the Salton Sea (Westec 1981). This condition is consistent with discharge of groundwater from these depths toward the Salton Sea. Groundwater discharge from the Imperial Valley into the Salton Sea has been estimated to be about 2,000 afy (U.S. Department of Interior and Resource Agency for California 1974).

q. The amount of water in the deep aquifer has been estimated at 1.1 billion to 3 billion acre-feet, and the total recoverable water has been estimated to be about 20 percent of the total amount of water in storage. The deep aquifer is recharged with about 400,000 acre-feet of water per year. Some of the deepest groundwater in this aquifer system is believed to be moderately altered residual ocean water. Above this may be relatively fresh residual water of low to moderate salinity from prehistoric lakes that had filled the Salton Trough. Water in the upper portion of the deep aquifer is high temperature and locally of high salinity.

r. As a new Class II Surface Impoundment, no specific Design Storm requirements apply to the Brine Pond However, due to the Brine Pond potentially being in a special flood hazard area, the Imperial County Floodplain Administrator may require a flood berm around the pond up to the -220 ft elevation.

s. Geothermal fluids in this portion of the Salton Sea KGRA contain approximately 25% (by weight) dissolvable solids. These fluids may be classified as hazardous in accordance with the criteria listed in Section 66699, Title 22 of the CCRs. However, the geothermal fluids are not required to be managed as hazardous waste under Title 22 because they are exempt from regulation as hazardous waste by Health & Safety Code Section 25143.1, Subdivision (a). The brine pond and LDS are adequate for the geothermal fluids, considering the toxicity, persistence, degradability, solubility, and other biological, chemical and physical properties of the wastes.

21. The Water Quality Control Plan for the Colorado River Basin Region of California (Basin Plan) was adopted on November 17, 1993, and designates the beneficial uses of ground and surface water in this Region.

The beneficial uses of ground water in the Imperial Hydrological Unit are:

a. Municipal Supply (MUN)
b. Industrial Supply (IND)

The beneficial uses of nearby surface waters are as follows:

Imperial Valley Drains

a. Freshwater Replenishment
b. Water Contact Recreation (RECI)
c. Noncontact Water Recreation (RECII)
d. Warm Freshwater Habitat (WARM)
e. Wildlife Habitat (WILD)
f. Preservation of Rare, Threatened, or Endangered Species (RARE).

Alamo River

a. Fresh Water Replenishment (FRSH)
b. Water Contact Recreation (RECI)
c. Noncontact Water Recreation (RECII)
d. Warm Freshwater Habitat (WARM)
e. Wildlife Habitat (WILD)
f. Hydropower Generation (POW)
g. Preservation of Rare, Threatened, or Endangered Species (RARE)

Salton Sea

a. Aquaculture (AQUA)
b. Industrial Service Supply (IND)
c. Water Contact Recreation (RECI)
d. Noncontact Water Recreation (RECII)
e. Warm Water Habitat (WARM)
f. Wildlife Habitat (WILD)
g. Preservation of Rare, Threatened, or Endangered Species (RARE)

22. The facility is located in a desert environment, in the northern portion of Imperial Valley. The desert climate is characterized by hot summers and mild winters. Normal annual precipitation in the area is 2.5 to 3.0 inches and normal annual surface evaporation is approximately 100 inches.

23. Monitoring Parameters: Based on the chemical characteristics of the projected discharges to the brine pond from the flashed Salton Sea geothermal brine and potential clarifier overflow discharge, the following list of monitoring parameters is proposed. These specific parameters are selected because they provide the best distinction between the chloride-rich brine and the sulfate-rich groundwater in the Project area that can be used to differentiate a potential brine pond release from other influences that could change the chemical composition of the groundwater.

Cations: Barium, Boron, Calcium, Magnesium, Manganese, Iron, Lead, Potassium, Sodium, Strontium, and Zinc;

Anions: Ammonium, Bicarbonates, Chloride and Sulfate; and

Other: Total Dissolved Solids, Specific Conductivity, and pH.

24. In accordance with Section 15301, Chapter 3, Title 14 of the CCRs, the issuance of these WDRs, which govern the operation of an existing facility involving negligible or no expansion of use beyond that previously existing, is exempt from the provisions of the California Environmental Quality Act (CEQA) (Public Resources Code, Section 21000 et. seq.)

25. There are no domestic wells within 500 feet of the facility or well field described in Findings 1 through 4 above.

    Federal regulations for storm water discharges were promulgated by the U.S. Environmental Protection Agency (40 CFR Parts 122, 123, and 124). The regulation require specific categories of facilities which discharge storm water associated with industrial activity to obtain NPDES permits and to implement Best Conventional Pollutant Technology (BCPT) to reduce or eliminate industrial storm water pollution. Per the February 23, 1993 State Water Resources Control Board memorandum, Geothermal Power Plants are excluded from the regulations pertaining to storm water pollution.

26. The State Water Resources Control Board adopted Order No. 97-03-DWQ (General Permit No. CAS000001) specifying WDRs for discharges of storm water associated with industrial activities, excluding construction activities, and requiring submittal of a Notice of Intent (NOI) by industries to be covered under the Permit. Per the February 23, 1993 State Water Resources Control Board memorandum, Geothermal Power Plants are excluded from the regulations pertaining to storm water pollution.

27. The monitoring and reporting requirements in Monitoring and Reporting Program No. R7-2008-0063, and the requirement to install groundwater monitoring wells, are necessary to determine compliance with these WDRs, and to determine the facility's impacts, if any, on receiving water.

28. The Board has notified the Discharger and all known interested agencies and persons of its intent to update WDRs for said discharge and has provided them with an opportunity for a public meeting and an opportunity to submit comments.

29. The Board, in a public meeting, heard and considered all comments pertaining to this discharge.

IT IS HEREBY ORDERED, that in order to meet the provision contained in Division 7 of the California Water Code (CWC) and regulation adopted thereunder, the Dischargers shall comply with the following:

A. Specifications

1. The treatment or disposal of wastes at this facility shall not cause pollution or nuisance as defined in Sections 13050 of Division 7 of the CWC.

2. The Discharger will maintain the onsite wells in good working order at all times. Well maintenance may include periodic well re-development to remove sediments.

3. Thirty days prior to introduction of a new waste stream into the holding pond, the Discharger must receive approval from the Regional Board's Executive Officer.

4. Waste material shall be confined or discharged to the holding pond.

5. Prior to drilling a new production well or conversion of a production well to an injection well at the facility, the Discharger shall notify, in writing, the Regional Board's Executive Officer of the proposed change.

6. Containment of waste shall be limited to the areas designated for such activities. Any revision or modification of the designated waste containment area, or any proposed change in operation at the facility that changes the nature and constituents of the waste produced must be submitted in writing to the Regional Board's Executive Officer for review and approval before the proposed change in operations or modification of the designated area is implemented.

7. Any substantial increase or change in the annual average volume of material to be discharged under this order at the site must be submitted in writing to the Regional Board's Executive Officer for review and approval.

8. If any portion of the brine pond is to be closed, the Discharger shall notify the Regional Board's Executive Officer at least 180 days prior to beginning any partial or final closure activities.

9. Fluids and/or materials discharged to and/or contained in the brine pond shall not overflow the pond.

10. Prior to the use of new chemicals for the purposes of adjustment or control of microbes, pH, scale, and corrosion of the cooling tower water and geothermal brine, the Discharger shall notify the Regional Board's Executive Officer in writing.

11. For the liquids in the brine pond, a minimum freeboard of two (2) feet shall be maintained at all times.

12. Fluids discharged by subsurface injection shall be injected below the fracture pressure of the receiving aquifer and of the confining layer immediately above the receiving aquifer.

13. Final disposal of residual waste from cleanup of the brine pond shall be accomplished to the satisfaction of the Regional Board's Executive Officer upon abandonment or closure of operations.

14. The brine pond shall be designed, constructed, operated, and maintained to prevent inundation or washout due to floods having a predicted frequency of once in 100 years.

15. Geothermal well clean out fluid, test and production fluid, production and injection well startups and cleanouts shall be discharged in metal tanks, or containers approved by the Regional Board's Executive Officer to receive this discharge. Mud sumps may not be used to store well cleanout or production fluids after initial well drilling and development.

16. Within one year after completion of a new geothermal well, the mud sump used to contain fluids during drilling and well development must be properly abandoned.

17. Prior to removal of solid material that has accumulated in the concrete cooling tower basins, an analysis of the material must be conducted and the material must be disposed of in a manner consistent with that analysis and applicable laws and regulations.

18. Conveyance systems throughout the plant area shall be cleaned out at least every 90 days to prevent the buildup of solids or when activity at the site creates the potential for release of solid materials from the conveyance systems.

19. Pipe maintenance and de-scaling activities that include hydroblasting and/or sandblasting shall be performed within a designated area that minimizes the potential for release to the environment. Waste generated as a result of these activities shall be disposed of in accordance with applicable laws and regulations. Water from the hydroblasting process shall be conveyed to the brine pond for injection into the geothermal resource.

20. Public contact with wastes containing geothermal fluids shall be precluded through such means as fences, signs, or other acceptable alternatives.

21. The brine pond and shall be managed and maintained to ensure their effectiveness, in particular,

    a. Implementation of erosion control measures shall assure that small coves and irregularities are not created.

    b. The clay liner beneath the brine pond shall be appropriately maintained to ensure its proper function.

    c. Solid material shall be removed from the brine pond in a manner that minimizes the likelihood of damage to the liner.

22. Ninety days prior to the cessation of discharge operations at the facility, the Discharger shall submit a workplan, subject to approval of the Regional Board's Executive Officer, for assessing the extent, if any, of contamination of natural geological materials and waters of the Imperial Hydrological Unit by the waste. One hundred and twenty days following workplan approval, the Discharger shall submit a technical report presenting results of the contamination assessment. A California Registered Civil Engineer or Certified Engineering Geologist must prepare the workplan, contamination assessment, and engineering report.

23. Upon ceasing operation at the facility, all waste, all natural geologic material contaminated by waste, and all surplus or unprocessed material shall be removed from the site and disposed of in accordance with applicable laws and regulations.

24. The Discharger shall establish an irrevocable bond for closure in an amount acceptable to the Regional Board's Executive Officer or provide other means to ensure financial security for closure if closure is needed at the discharging site. The closure fund shall be established (or evidence of an existing closure fund shall be provided) within six (6) months of the adoption of this Order.

25. Surface drainage from tributary areas or subsurface sources, shall not contact or percolate through the waste discharged at this site.

26. The Discharger shall use the constituents listed in Monitoring and Reporting Program No. R7-2008-0063 and revisions thereto, as "Monitoring Parameters".

27. The Discharger shall implement the attached Monitoring and Reporting Programs No. R7-2008-0063 and revisions thereto, in order to detect, at the earliest opportunity, any unauthorized discharge of waste constituents from the facility, or any impairment of beneficial uses associated with (caused by) discharges of waste to the holding pond.

28. The Discharger shall follow the Water Quality Protection Standard (WQPS) for detection monitoring established by the Regional Board. The following are parts of WQPS as established by the Regional Board's Executive Officer:

    a. The Discharger shall test for the monitoring parameters and the Constituents of Concern (COCs) listed in the Monitoring and Reporting R7-2008-0063 and revisions thereto.

    b. Concentration Limits – The concentration limit for each monitoring parameter and constituents of concern for each monitoring point (as stated in the Detection Monitoring Program), shall be its background valued as obtained during that reporting period.

    c. All current, revised, and/or proposed monitoring points must be approved by the Region Board's Executive Officer.

29. Water used for the process and site maintenance shall be limited to the amount necessary in the process, for dust control, and for plant cleanup and maintenance.

30. The Discharger shall not cause or permit the release of pollutants, or waste constituents, in a manner which could cause or contribute to a condition of contamination, nuisance, or pollution to occur.

31. The Discharger must develop and implement a Hazardous Materials Business Plan (HMBP), which will include, at a minimum, procedures for:

    - Hazardous materials handling, use, and storage;
    - Emergency response;
    - Spill control and prevention;
    - Employee training; and
    - Reporting and record keeping.

32. Hazardous materials expected to be used during construction include: unleaded gasoline, diesel fuel, oil, lubricants (i.e., motor oil, transmission fluid, and hydraulic fluid), solvents, adhesives, and paint materials. There are no feasible alternatives to these materials for construction or operation of construction vehicles and equipment, or for painting and caulking buildings and equipment.

33. The construction contractor will be responsible for assuring that the use, storage and handling of these materials will comply with applicable federal, state, and local LORS, including licensing, personnel training, accumulation limits, reporting requirements, and recordkeeping.

34. During power plant operations, chemicals will be stored in chemical storage facilities appropriately designed for their individual characteristics. Bulk chemicals will be stored outdoors on impervious surfaces in aboveground storage tanks with secondary containment. Secondary containment areas for bulk storage tanks will not have drains.

Any chemical spills in these areas will be removed with portable equipment and reused or disposed of properly. Other chemicals will be stored and used in their delivery containers.

35. A portable storage trailer may be on site for storage of maintenance lube oils, chemicals, paints, and other construction materials, as needed. Drains from chemical storage and feed areas that use portable vessels will be directed to the brine pond and discharged together with other plant wastewater to the dedicated injection well. All drains and vent piping for volatile chemicals will be trapped and isolated from other drains to eliminate noxious vapors. The storage, containment, handling, and use of these chemicals will be managed in accordance with applicable laws, ordinances, regulations, and standards.

36. Small quantities of hazardous wastes will be generated over the course of construction. These may include filter cake waste, paint, spent solvents, and spent welding materials. During normal operations, less than five percent of the filter cake is projected to be characterized as hazardous because of elevated concentrations of heavy metals. Some hazardous wastes will be recycled, including used oils from equipment maintenance, and oil-contaminated materials such as spent oil filters, rags, or other cleanup materials. Used oil must be recycled, and oil or heavy metal contaminated materials (e.g., filters) requiring disposal must be disposed of in a Class I waste disposal facility. Scale from pipe and equipment cleaning operations, and solids from the brine pond, will be disposed of in a similar manner.

37. All hazardous wastes generated during facility construction and operation must be handled and disposed of in accordance with applicable laws, ordinances, regulations, and standards. Any hazardous wastes generated during construction must be collected in hazardous waste accumulation containers near the point of generation and moved daily to the contractor's 90-day hazardous waste storage area located on site. The accumulated waste must subsequently be delivered to an authorized waste management facility. Hazardous wastes must be either recycled or managed and disposed of properly in a licensed Class I waste disposal facility authorized to accept the waste.

38. **Monitoring Program**

The Project must monitor the brine pond in conformance with applicable CCR Title 27 requirements for Class II surface impoundment waste management units.

A. Detection Monitoring Program:

The leachate collection and removal system must be used to provide preliminary detection monitoring of leaks through the top liner of the double-lined brine pond. Physical evidence of brine beneath the upper concrete liner shall be interpreted as a warning that containment of the brine pond contents may be compromised.

Groundwater monitoring wells must be constructed adjacent to and both up gradient and down gradient of the brine pond to provide background and detection monitoring for any potential release from the brine pond containment. The Point of Compliance to be used for the detection monitoring must be the uppermost shallow groundwater beneath the brine pond. The groundwater monitoring wells must be constructed in conformance with Title 27 CCR Section 20415 requirements. The monitoring wells must be designed to meet the background and detection monitoring requirements in conformance with Title 27 CCR Section 20415(b)(1)(B) as applicable, including:

1. Providing a sufficient number of monitoring points to yield ground water samples from the uppermost aquifer that represent the quality of ground water passing the Point of Compliance and to allow for the detection of a release from the brine pond;

2. Providing a sufficient number of monitoring points installed at locations and depths to yield ground water samples from the upper most aquifer to provide the best assurance of the earliest possible detection of a release from the brine pond;

3. Providing a sufficient number of monitoring points and background monitoring points installed at appropriate locations and depths to yield ground water samples from portions of the zone of saturation not monitored to provide the best assurance of the earliest possible detection of a release from the brine pond;

4. Providing a sufficient number of monitoring points and background monitoring points installed at appropriate locations and depths to yield ground water samples from zones of perched water to provide the best assurance of the earliest possible detection of a release from the brine pond; and

5. Selecting monitoring point locations and depths that include the zone(s) of highest hydraulic conductivity in the ground water body monitored.

The detection monitoring wells shall be constructed to meet the well performance standards set forth in Title 27 CCR Section 20415(b)(4), as applicable, including:

(A) All monitoring wells shall be cased and constructed in a manner that maintains the integrity of the monitoring well bore hole and prevents the bore hole from acting as a conduit for contaminant transport.

(B) The sampling interval of each monitoring well shall be appropriately screened and fitted with an appropriate filter pack to enable collection of representative ground water samples.

(C) For each monitoring well, the annular space (i.e., the space between the bore hole and well casing) above and below the sampling interval shall be appropriately sealed to prevent entry of contaminants from the ground surface, entry of contaminants from the unsaturated zone, cross contamination between portions of the zone of saturation, and contamination of samples.

(D) All monitoring wells shall be adequately developed to enable collection of representative ground water samples.

The monitoring program must also meet the general requirements set forth in Title 27 CCR Section 20415(e), which require that all monitoring systems be designed and certified by a registered geologist or a registered civil engineer. The applicable general requirements set forth for boring logs, quality assurance/quality control, sampling and analytical methods used, background sampling, data analysis, and other reporting as applicable will be implemented.

B. Proposed Sampling Program

Baseline samples of the groundwater must be collected from each of the monitoring wells and analyzed prior to discharging geothermal fluid to the brine pond. The groundwater must be initially sampled for each of the proposed monitoring parameters listed in the attached Monitoring and Reporting Program No. R7-2008-0063 and any additional Constituents of Concern (COC) identified by the RWQCB.

The facility is not allowed to discharge, treat, or compost the following wastes:

Municipal solid waste;

Sludge (including sewage sludge, water treatment sludge, and industrial sludge);

Septage;

Liquid waste. Unless specifically approved by this Board Order or by the Regional Board's Executive Officer;

Oily and greasy liquid waste, unless specifically approved by this Board Order or by the Regional Board's Executive Officer; or

Hot, burning waste materials or ash.

Any hazardous waste generated or stored at the facility will be contained and disposed in a manner that complies with federal and state regulations.

C. Prohibitions

1. The discharge or deposit of solid geothermal waste to the brine pond as a final form of disposal is prohibited, unless authorized by the Regional Board's Executive Officer.

2. The Discharger is prohibited from discharging, treating or composting at this site the following wastes:

   a. Municipal solid waste;

   b. Sludge (including sewage sludge, water treatment sludge, and industrial sludge);

   c. Septage;

   d. Liquid waste, unless specifically approved by this Order or by the Regional Board's Executive Officer;

   e. Oily and greasy liquid waste; unless specifically approved by this Order or by the Regional Board's Executive Officer;

   f. Hot, burning waste materials or ash.

3. The Discharger shall not cause degradation of any groundwater aquifer or water supply.

4. The discharge of waste to land not owned or controlled by the Discharger is prohibited.

5. Use of geothermal fluids or cooling tower liquids on access roads, well pads, or other developed project locations for dust control is prohibited.

6. The discharge of hazardous or designated wastes to other than a waste management unit authorized to receive such waste is prohibited.

7. Permanent (longer than one year) disposal or storage of geothermal waste in on-site temporary mud sumps is prohibited, unless authorized by the Regional Board's Executive Officer.

8. Geothermal fluids or any fluids in the brine pond or shall not enter any canal, drainage, or drains (including subsurface drainage systems) which could provide flow to the Salton Sea.

9. The Discharger shall appropriately dispose of any materials, including fluids and sediments removed from the brine pond.

10. The Discharger shall neither cause nor contribute to the contamination or pollution of ground water via the release of waste constituents in either liquid or gaseous phase.

11. Direct or indirect discharge of any waste to any surface water or surface drainage courses is prohibited.

12. The Discharger shall not cause the concentration of any Constituent of Concern or Monitoring Parameter to exceed its respective background value in any monitored medium at any Monitoring Point assigned for Detection Monitoring pursuant to Monitoring and Reporting Program No. R7-2008-0063.

D. Provisions

1. The Discharger shall comply with Monitoring and Reporting Program No. R7-2008-0063 and future revisions thereto, as specified by the Regional Board's Executive Officer.

2. Unless otherwise approved by Regional Board's Executive Officer, all analyses shall be conducted at a laboratory certified for such analyses by the California Department of Public Health. All analyses shall be conducted in accordance with the latest edition of "Guideline Establishing Test Procedures for Analysis of Pollutants", promulgated by the United States Environmental Protection Agency.

3. The laboratory shall use detection limits less than or equal to Environmental Protection Agency (EPA) Action Level/Maximum Contaminate Levels (MCLs) or California Department of Public Health (CDPH) Notification Level/MCL for all samples analyzed. The lowest concentration, whether EPA or CDPH, of the two agencies must be used for the analysis.

4. Prior to any change in ownership of this operation, the Discharger shall transmit a copy of the Board Order to the succeeding owner/operator, and forward a copy of the transmittal letter to the Regional Board.

5. Prior to any modification in this facility that would result in material change in the quality or quantity of discharge, or any material change in the location of discharge, the Discharger shall report all pertinent information in writing to the Regional Board's Executive Officer and obtain revised requirements before any modification is implemented.

6. All permanent containment structures and erosion and drainage control systems shall be certified by a California Registered Civil Engineer or Certified Engineering Geologist as meeting the prescriptive standards and performance goals.

7. The Discharger shall ensure that all site-operating personnel are familiar with the content of this Board Order, and shall maintain a copy of this Board Order at the site.

8. The Board Order does not authorize violation of any federal, state, or local laws or regulations.

9. The Discharger shall allow the Regional Board, or an authorized representative, upon presentation of credential and other documents as may be required by law, to:

   a. Enter upon the premises regulated by this Board Order, or the place where records must be kept under the conditions of the Board Order;

   b. Have access to and copy, at reasonable times, any records that shall be kept under the condition of this Board Order;

   c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Board Order; and

   d. Sample or monitor at reasonable times, for the purpose of assuring compliance with this Board Order or as otherwise authorized by the CWC of Regulation, any substances or parameters at this location.

10. The Discharger shall comply with all of the conditions of this Board Order. Any noncompliance with this Board Order constitutes a violation of the Porter-Cologne Water Quality Act and is grounds for enforcement action.

11. The Discharger shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) that are installed or used by the Discharger to achieve compliance with this Board Order. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures.

12. This Board Order does not convey any property rights of any sort or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state, or local laws or regulations.

13. The Discharger shall comply with the following:

    a. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.

    b. The Discharger shall retain records of all monitoring information, copies of all reports required by the Board Order, and records of all data used to complete the application for this Board Order, for a period of at least five (5) years from the date of the sample, measurement, report or application. This period may be extended by request of the Regional Board's Executive Officer at any time.

    c. Records of monitoring information shall include:

        1. The date, exact places, and time of sampling or measurements.
        2. The individual(s) who performed the sampling or measurements.
        3. The date(s) analyses were performed.
        4. The individual(s) responsible for reviewing the analyses.
        5. The results of such analyses.

    d. Monitoring must be conducted according to test procedures described in the Monitoring and Reporting Program, unless other test procedures have been specified in this Board Order or approved by the Regional Board's Executive Officer.

14. All monitoring systems shall be readily accessible for sampling and inspection.

15. The Discharger is the responsible party for the WDRs, and the monitoring and reporting program for the facility. The Discharger shall comply with all conditions of these WDRs. Violations may result in enforcement actions, including Regional Boards Orders or court orders, requiring corrective action or imposing civil monetary liability or in modification or revocation of these WDRs by the Regional Board.

16. The Discharger shall furnish, under penalty of perjury, technical monitoring program reports, and such reports shall be submitted in accordance with the specifications prepared by the Regional Board's Executive Officer. Such specifications are subject to periodic revisions as may be warranted.

17. The Discharger may be required to submit technical reports as directed by the Regional Board's Executive Officer.

18. The procedure for preparing samples for the analyses shall be consistent with the Monitoring and Reporting Program No. R7-2008-0063 and any revisions thereto. The Monitoring Reports shall be certified to be true and correct, and signed, under penalty of perjury, by an authorized official of the company and signed by a California Professional Engineer or Professional Geologist.

19. All monitoring shall be done as described in Title 27 of the CCRs.

I, Robert Perdue, Executive Officer, do hereby certify the foregoing is a full, true and correct copy of an Order adopted by the California Regional Water Quality Control Board, Colorado River Basin Region, on September 17, 2008.

ROBERT PERDUE
Executive Officer

Figure 1

Proposed Hudson Ranch Geothermal Power Plant

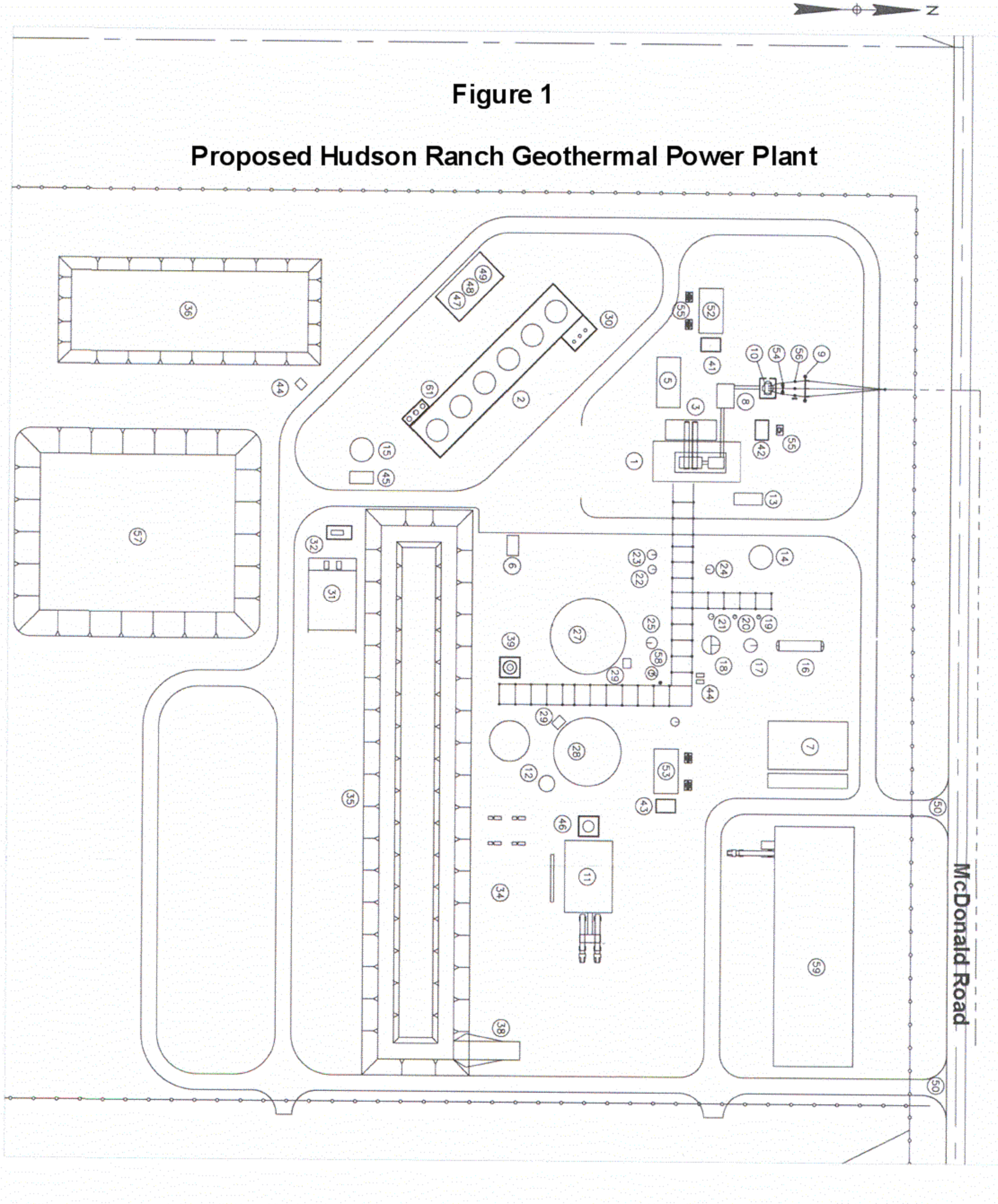
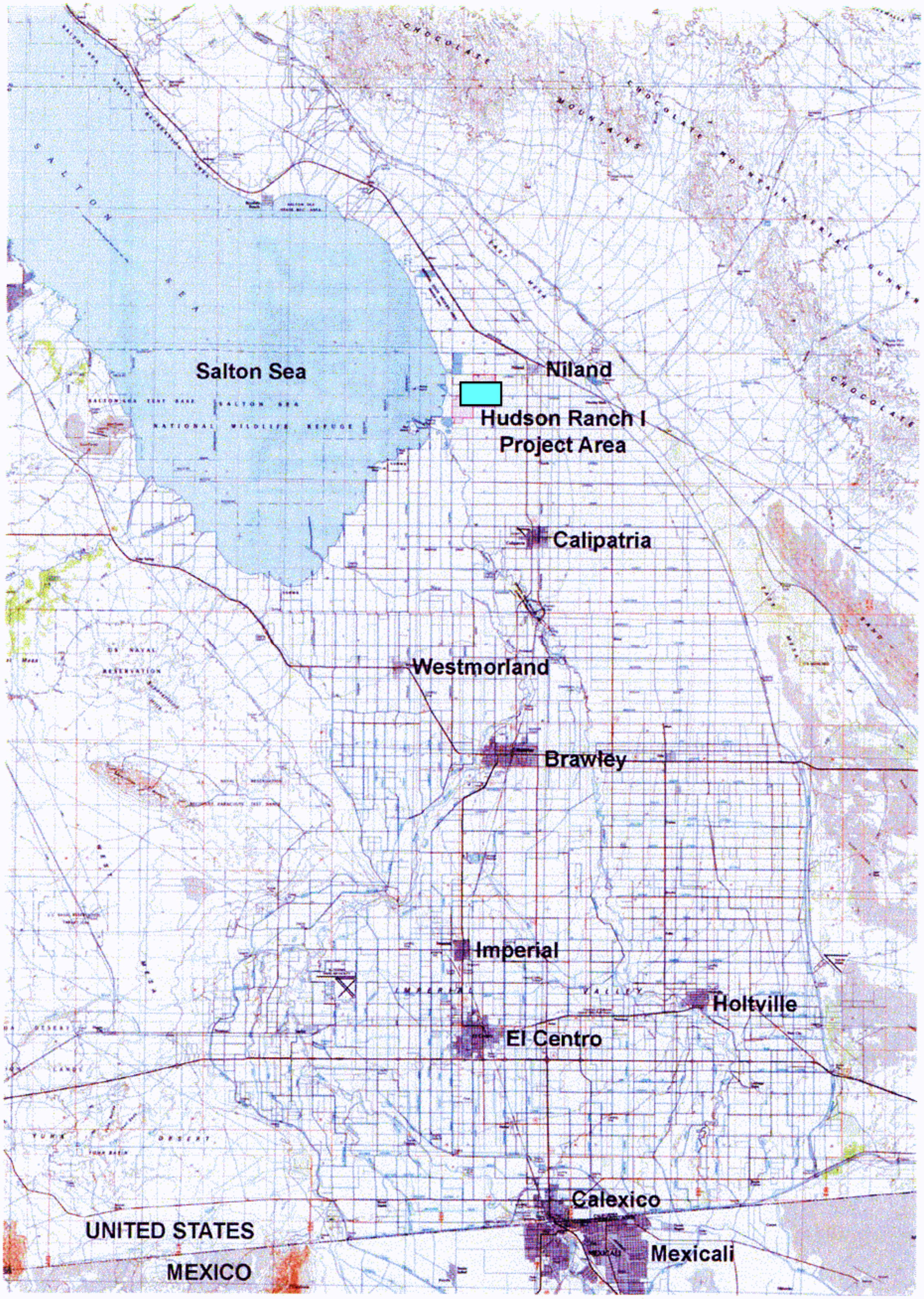


Figure 2

POWER PLANT SITE PLAN LEGEND:

1. STEAM TURBINE/GENERATOR
2. COOLING TOWER
3. SURFACE CONDENSER
4. N/A
5. NCG REMOVAL SYSTEM
6. ROCK MUFFLER
7. CONTROL BUILDING
8. PDC 101
9. 92 KV IID TAKE OFF STRUCTURE
10. TRANSFORMER 92 KV–13.2 KV
11. VACUUM BELT FILTER SYSTEM
12. THICKENER
13. LUBE OIL SKID
14. PURGE WATER STORAGE TANK
15. FIRE WATER TANK
16. HIGH PRESSURE SEPARATOR
17. STANDARD PRESSURE CRYSTALLIZER
18. LOW PRESSURE CRYSTALLIZER
19. HIGH PRESSURE SCRUBBER
20. STANDARD PRESSURE SCRUBBER
21. LOW PRESSURE SCRUBBER
22. HIGH PRESSURE DEMISTER
23. STANDARD PRESSURE DEMISTER
24. LOW PRESSURE DEMISTER
25. PROCESS ATMOS. FLASH TANK
26. N/A
27. PRIMARY CLARIFIER
28. SECONDARY CLARIFIER
29. CLARIFIER UNDERFLOW, PRIMARY & SECONDARY SEED RECYCLE PUMPS
30. CIRC. WATER PUMPS
31. HYDRO–BLAST PAD
32. AERATED BRINE INJECTION PUMPS
33. N/A
34. BRINE BOOSTER, INTERMEDIATE & MAIN BRINE INJECTION PUMPS
35. BRINE POND
36. WATER POND
~~37. EMERGENCY RELIEF TANK~~
38. TRUCK WASH DOWN
39. PRODUCTION TEST UNIT
40. N/A
41. 4160 V. TRANSFORMER
42. 480 V. DIESEL GEN., BLACK START (1.5 MW)
43. 4160 V. DIESEL GENERATOR (1.5 MW)
44. DILUTION WATER PUMPS
45. FIRE WATER PUMP HOUSE
46. HCL TANK
47. CHEMICAL TANKS – TOWERS
48. CHEMICAL TANKS – FLOCCULANT
49. CHEMICAL/OIL STORAGE PAD
50. PLANT ACCESS POINT
51. CANAL WATER SUPPLY IID GATE 31, 'P' LATERAL
52. PDC 102
53. PDC 103
54. CIRCUIT SWITCHER
55. 480 V. TRANSFORMER
56. PT/CT
57. STORM WATER RETENTION BASIN
58. DILUTION WATER HEATER
59. WAREHOUSE 100'x300' (FUTURE)
60.
61. COOLING TOWER CHEMICAL STORAGE

Figure 3



Location Map Hudson Ranch I Geothermal Project Area

Figure 4

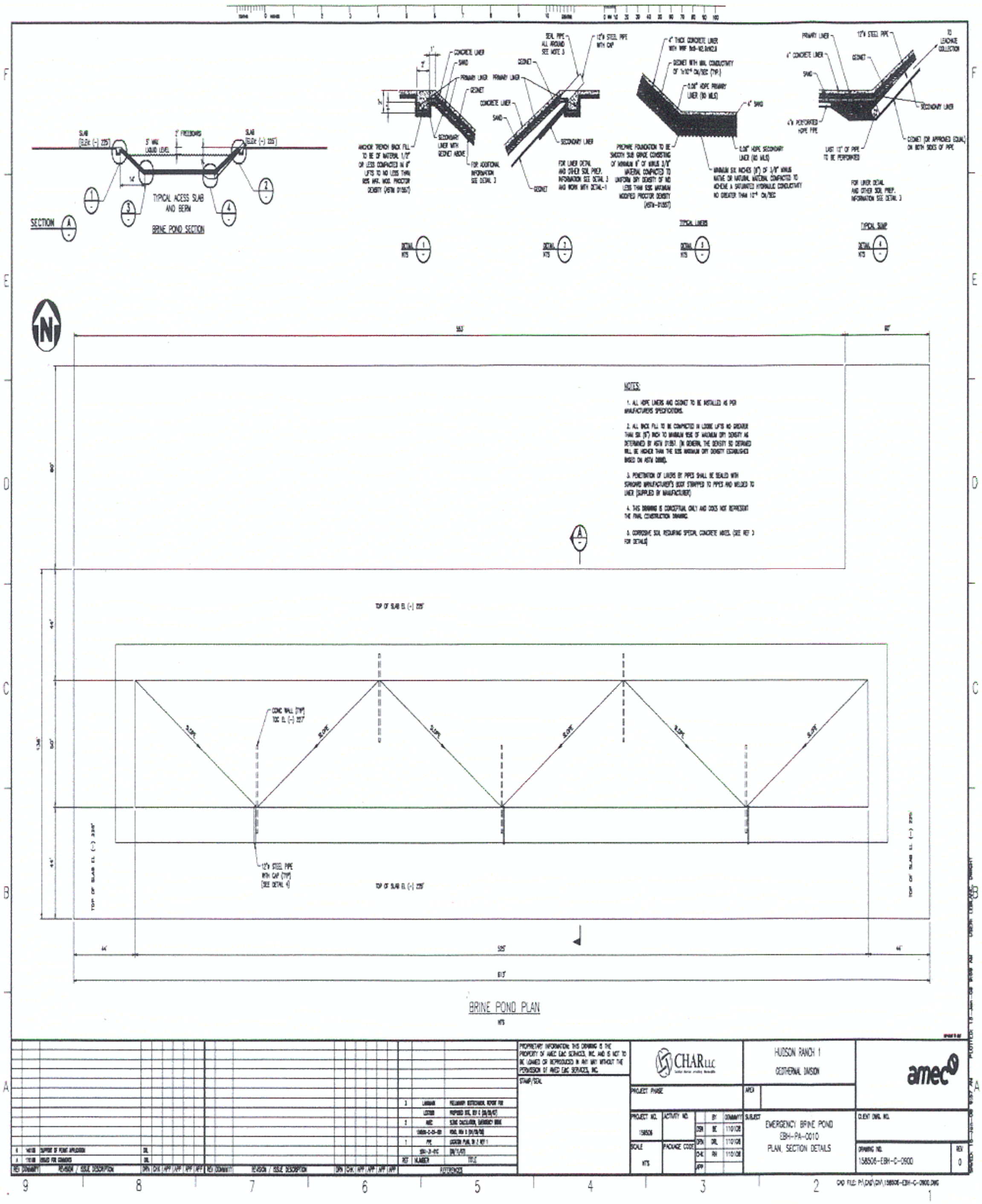

BRINE POND PLAN
BRINE POND SECTION
TYPICAL ACESS SLAB AND BERM
SECTION
NOTES:
TYPICAL LINERS
TYPICAL SUMP
HUDSON RANCH 1
GEOTHERMAL DIVISION
EMERGENCY BRINE POND
EBH-PA-0010
PLAN, SECTION DETAILS
158506-EBH-C-0900
CHAR LLC
amec

Table 5

ATS

LABORATORIES

Lab no: 7676 Reported: 5-3-07

Landmark Cons. Received: 4-10-07

Water

No Mark

	Results	Units	DLR	Method
Oil/Grerase	2.0	mg/l	NA	EPA1664
Silica	15.3	mg/l	NA	SM4500-SID,E
Boron	6.25	mg/l	NA	3120B
Lithium	6.21	mg/l	NA	3120B
Total Petroleum Hydrocarbons				
Gas	ND	mg/l	0.1	8015B
Diesel	ND	mg/l	0.5	8015B
Motor Oil	0.5	mg/l	NA	8015B

Analysis by D Tek Analytical, copy of report enclosed

Linda L Webster

Linda L. Webster, Lab supervisor

104 S. 8th Street, Brawley, Ca. 92227 (760) 344-2532 FAX (760) 344-3459

ATS LABORATORIES

Table 6

ATS LABORATORIES

Lab no: 7676

Reported: 5-3-07

Landmark Cons.

Received: 4-10-07

Sample: Water

ID: No Mark

	Results	Units	DLR	Method
Antimony	ND	ug/l	10	6010B
Arsenic	ND	ug/l	2	6010B
Barium	0.22	mg/l	NA	6010B
Beryllium	ND	ug/l	10	6010B
Cadmium	ND	ug/l	5	6010B
Chromium	ND	ug/l	10	6010B
Cobalt	0.02	mg/l	NA	6010B
Copper	27	ug/l	NA	6010B
Lead	ND	ug/l	5	6010B
Molybdenum	ND	mg/l	0.5	6010B
Nickel	ND	ug/l	5	6010B
Selenium	ND	ug/l	4	6010B
Silver	ND	ug/l	10	6010B
Thallium	ND	ug/l	1	6010B
Vanadium	0.04	mg/l	NA	6010B
Zinc	51	ug/l	NA	6010B
Mercury	ND	ug/l	0.2	7471A

Analysis by D Tek Analytical, copy of report enclosed.

Linda L Webster

Linda L. Webster, Lab supervisor

104 S. 8TH ST., BRAWLEY, CA. 92227 (760) 344-2532 FAX (760)344-3459

Table 7

ATS LABORATORIES

Lab no: 7676
Client: Landmark Cons
Sample: Water
Identification: No Mark

Reported: 5-3-07
Received: 4-10-07

	RESULTS	UNITS	DLR	METHOD
Arsenic	ND	Ug/l/l	2	SM3113B
Barium	0.22	Mg/l	NA	3120B
Cadmium	ND	Ug/l	5	3113B
Chromium	ND	Ug/l	10	3120B
Lead	ND	Ug/l	5	3113B
Mercury	ND	Ug/l	0.02	3112B/245.1
Selenium	ND	Ug/l	4	SM3113B
Silver	ND	Ug/l	10	3113B
Aluminum	NA	Mg/l	0.05	3120B

Portion of analysis by D Tek Analytical copy of, report enclosed

Linda L. Webster, Lab supervisor

Table 8

ATS LABORATORIES

Lab no: 7676

Reported: 5-3-07

Client: Landmark Cons.

Received: 4-10-07

Sample: Water

Identification: No Mark

	RESULTS	UNITS	DLR	METHOD
Calcium	3785	Mg/l	1	3500CaD
Magnesium	5400	Mg/l	0.05	3111B
Sodium	14000	Mg/l	0.05	3111B
Potassium	255	Mg/l	1.5	3111B
Bicarbonates	405	Mg/l	1	2320B
Sulfate	61000	Mg/l	1	4500SO4D
Chloride	277	Mg/l	1	4500CLB
Nitrate	NA	Mg/l	0.5	4500NO3E
Nitrite	NA	Mg/l	0.5	4500N02B
MBAS	NA	Mg/l	0.01	5540C
Iron	NA	Mg/l	0.010	3120B
Fluoride	NA	Mg/l	0.05	4500FC
Copper	27	ug/l	0.004	3113B
Manganese	6.61	Mg/l	0.01	3120B
Zinc	51	Mg/l	0.05	3120B
pH	7.16	Units	NA	4500HB
Specific conductivity	140,100	Umhos/cm	10	2510B
Total dissolved solids	95,032	Mg/l	1	4500C
Total Hardness	4000	Mg/l	1	2340
Turbidity	NA	NTU	0.05	2130B
Odor	AN	Units	1	2150A
Color	NA	Units	5	2120B

Page 1

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