CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
COLORADO RIVER BASIN REGION

ORDER R7-2013-0045

WASTE DISCHARGE REQUIREMENTS
FOR
HUDSON RANCH POWER II LLC, OWNER
HUDSON RANCH ENERGY SERVICES LLC, OPERATOR
HUDSON RANCH II GEOTHERMAL PROJECT AND POWER PLANT
Salton Sea Known Geothermal Resource Area (KGRA) - Imperial County

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

1. Hudson Ranch Power II LLC proposes to construct a 49.9 megawatt geothermal power plant (Project) and corresponding wellfield on land owned by Hudson Ranch Power II LLC within the KGRA, approximately 1.5 miles south-southwest of the town of Niland. The mailing address for Hudson Ranch Power II LLC is 321 South Waterman Ave, Suite 200, El Centro, CA 92243.

2. The Hudson Ranch II Geothermal Project and Power Plant will be operated by Hudson Ranch Energy Services LLC, located at 321 South Waterman Ave, Suite 200, El Centro, CA 92243.

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

4. These WDRs regulate the Project's 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 Hudson Ranch II Geothermal Project and Power Plant and the emergency brine pond are shown on the attached maps, Figures 1 & 2, and are made part of this Order by reference.

5. Hudson Ranch Power II LLC submitted a Report of Waste Discharge (ROWD) in February 2013 for construction and operation of the Hudson Ranch II Geothermal Project and Power Plant including waste disposal to the emergency brine pond.

   Definition of terms used in this Order:

   Facility – The entire parcel of property where the Hudson Ranch II Geothermal Project and Power Plant industrial operation or related geothermal industrial activities will be conducted.

   Waste Management Units (WMUs) – The area of land or the portions of the facility, where geothermal or related wastes will be 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 Regional Water Board Order means Hudson Ranch Power II LLC and Hudson Ranch Energy Services LLC.

6. **Regional Water Board Orders**

The Project wellfield is currently regulated under Regional Water Board Order R7-2012-0005.

7. **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 33-acre power plant site bounded on the north by McDonald Road, and on the east, west, and south by fallow farmland, as shown on Figure 3, which is made part of this Order by reference.

The power plant site will be located in the north half of Section 19, Township 11 South, Range 14 East (Assessor Parcel Number 020-010-009-000). The Brine Processing Facility (BPF) and the Turbine-Generator Facility (TGF) will be located within the power plant site.

8. **Brine Processing Facility (BPF)**

The BPF will include the brine and steam handling facilities, solids handling system, a brine pond, and a fresh water pond. 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 Turbine. Chemically stabilized brine will flow from the BPF into the solids handling system (clarifiers, thickener and associated facilities) where solids will be removed. Two booster and two main injection pumps will be used as necessary 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.

9. **Fluid Storage Basins**

Three fluid storage basins will be constructed on the Project site. These include the service (fresh) water pond, the storm water retention basin, and the brine pond. The following are descriptions of these proposed fluid storage basins 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 normally be obtained from the "O" lateral at existing gate 28, located north of the power plant site, with a backup connection to the "N" lateral, located south of the power plant site. Water will be transferred to the power plant site via pipeline to a service water storage pond 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 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 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.

The potable water system – consisting of a pre-treatment filter to remove suspended and colloidal particles, followed by direct treatment, will be used to treat canal water and provide a supply of drinking water, wash basin water, eyewash and safety shower equipment water, water for showers and toilets in crew change quarters, and sink water in the laboratory. Backwash from the pre-treatment filter, consisting of solids and water from the IID canal system, will be discharged either back into the service water pond or to the brine pond.

b. **Storm Water Retention Basin:** The Project site is fairly level. The proposed drainage design in general will flow toward the storm water retention pond located near the southern boundary of the Project area. Within the power plant site, buildings and equipment will be constructed on foundations with the overall site grading scheme designed to route surface storm water around and away from all equipment and buildings. The storm water drainage system will be 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 will be constructed in a manner that provides protection from a 100-year storm.

c. **Brine Pond:** A brine pond will be constructed within the power plant site. The brine pond will serve multiple purposes. During upset conditions, brine that overflows from the clarifiers and the thickener, and condensate from the steam vent tanks, will 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.

Water from hydroblasting pipe and other equipment to remove geothermal scale and other impurities will be discharged into the brine pond. The brine pond may also be used to 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. These liquids will be pumped to a thickener and then discharged into an injection well, or to the aerated brine injection well for subsurface injection.

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 five hours of brine that could be released during system startup or during upset conditions plus 2 feet of freeboard. The brine pond surface will be lined with a six-inch fiber reinforced concrete liner and a 60-mil HDPE primary liner separated by a 6-inch cushion of sand. The HDPE primary liner will be underlain with a 12-oz. nonwoven geotextile fabric (GEONET GEOCOMPOSITE) under which a secondary 60-mil HDPE liner will be located on top of a compacted subgrade. The proposed engineering details of the brine pond construction and the integrated leachate collection sump are shown on Figure 4, which is made part of this Order by reference.

10. **Development Wells:**

The Project proposes to drill up to four geothermal production wells and three geothermal brine injection wells to support the Project. Three production wells will be drilled on the 5-acre proposed production well site located immediately west of the power plant site, and one additional production well may be drilled on the power plant site, if needed. A total of three geothermal injection wells will be drilled on two 5-acre injection well sites located near the eastern boundary of the Project site. One additional aerated brine injection well will be drilled on the northern portion of the two injection well sites for the injection of cooling tower blowdown, condensate, and aerated brines. All production and injection wells will be operated in accordance with California Division of Oil, Gas and Geothermal Resources (CDOGGR) regulations.

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

Production wellheads will be approximately fifteen feet above the ground surface. The wellheads consist of control valves, redundant isolation valves and bracing struts.

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

12. **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 be located on the production well site located immediately west of the power plant site. The production pipelines will be constructed from alloy or alloy-lined pipe designed, constructed, tested and inspected pursuant to current industry standards for high temperature, high pressure piping. The diameter of the pipe will 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 will range up to 36 inches. The pipelines will 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 projected chemistry of the geothermal production fluid is provided in Table 1.

Table 1

Hudson Ranch II Project Produced Geothermal Brine Composition			
Brine Components	**Maximum (mg/kg)**	**Minimum (mg/kg)**	**Average (mg/kg)**
Na	57,100	55,450	56,275
K	18,312	17,700	18,006
Ca	32,600	26,955	29,778
Mg	49	36	43
Li	234	221	228
Sr	508	124	316
Ba	201	132	167
Metals:			
Fe	1,472	1,350	1,411
Mn	1,729	1,670	1,700
Zn	521	453	487
Pb	115	100	108
As	16.2	7.8	12
Cu	1	0.8	0.9
Complexes:			
SiO2	499	374	437
B	602	524	563
Anions:			
Cl	176,000	154,884	165,442
F	13.2	1.1	7.2
TDS	298,000	259,280	278,640

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

13. **Turbine Generator Facility (TGF)**

The TGF will include 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 will include a control building, warehouse, a fresh water pond, and other ancillary facilities. The TGF also includes a 230 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.

An emergency diesel generator will provide critical equipment power when the steam turbine generator is shutdown. A 800 kW emergency generator will also be installed to provide backup for plant control power. The diesel engines will meet California Air Resources Board (CARB) source emission limits.

14. **Heat Rejection and Non-Condensable Gas (NCG) Removal Systems**

The heat rejection system will be comprised of a shell-and-tube condenser, a counter flow 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 mixed with the cooling water, and both 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. These NCGs will be pressurized and vented to the hydrogen sulfide (H2S) abatement system. The projected composition of the NCG is summarized in Table 2.

Table 2

Hudson Ranch II Project Geothermal Gases in Produced Brine	
Noncondensable Gases	Nominal Concentrations (ppm)
Carbon Dioxide (CO2)	1,532.00
Hydrogen Sulfide (H2S)	13.00
Ammonia (NH3)	47.00
Methane (CH4)	1.90
Nitrogen (N2)	4.70
Hydrogen (H2)	0.13
Argon (Ar)	0.02
Benzene (C6H6)	0.04
Total	1,598.79

The H2S abatement system used to control the emission of the H2S in the vent gases will be a Biox® or equivalent process. The Biox® system consists of an oxidizing biocide in contact with the cooling tower circulating water which converts dissolved hydrogen sulfide to water-soluble sulfates. Biocide assisted oxidation also prevents secondary emissions of hydrogen sulfide from cooling towers that utilize steam condensate containing dissolved H2S for makeup water. The Biox® system is expected to remove at least 95 percent of the H2S in the non-condensable gases and at least 95 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 total less than 3.5 pounds per hour. Benzene emissions are expected to be less than 0.6 pounds per hour.

During normal operating conditions, the plant will be expected to generate less than 1 pound/hour of particulates as aerosols from the cooling tower. Particulate emissions from the cooling tower 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 eliminators. Blowdown from the cooling tower will ultimately be injected into the dedicated cooling tower blowdown/condensate/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 to the atmosphere. During these events, 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).

15. **Water Supply Source and Requirements**

The Project will require up to 1,200 acre-feet per year (afy) of additional (non-condensate) water when operating at full plant load.

The primary source of external freshwater for the facility will be irrigation water made available under a supply contract with the IID. Water will be obtained from the "O" lateral at existing gate 28, located north of the power plant site, with a backup connection to the “N” lateral, located south of the power plant site. Water will be transferred to the power plant site 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, the potable water system and, at times, cooling water makeup. The Project will be 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.

The state-approved potable water system will be installed 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. Backwash from the pre-treatment filter, consisting of solids and water from the IID canal system, will be discharged either back into the fresh water pond or to the brine pond.

16. **Spent Fluid and Wastewater Handling**

Spent brine from the secondary clarifiers will be injected directly into the primary injection wells to replenish the geothermal resource. Chemical characteristics of the processed brine are summarized in Table 3. Under overflow conditions, brine will be directed to the brine pond, after which it will 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 will also receive liquid from the emergency relief tanks. Under normal operation these fluids will be processed through the thickener and pumped into the main injection system. 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

Hudson Ranch II Project Post-Secondary Clarifier Geothermal Brine Composition			
Brine Components	**Maximum (mg/kg)**	**Minimum (mg/kg)**	**Average (mg/kg)**
Na	70,600	55,810	64,616
K	22,950	16,880	20,064
Ca	36,960	29,800	34,428
Mg	79.8	48.5	62.9
Li	328	211	260
Sr	752	463	538
Ba	246	194	213
Metals:			
Fe	1,770	1,400	1,589
Mn	1,870	1,550	1,687
Zn	681	558	610
Pb	168.0	48.2	133.1
As	23.9	6.6	16.0
Cu	37.2	0.9	6.8
Complexes:			
SiO2	329	138	165
B	N/A	N/A	N/A
Anions:			
Cl	189,610	154,430	175,466
F	41.8	35.0	38.5
TDS	324,000	283,000	299,055
pH @ 25 C	5.08	4.82	4.94

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

The sanitary drains will discharge to a sanitary waste holding tank which will initially digest the sewer effluent. Any sludge retained in the holding tank will be pumped out of the tank by licensed contractors as needed and transported to a sanitary water treatment plant. Liquid waste from the sanitary waste holding tank will be pumped to an on-site waste water treatment system and, following tertiary treatment, will be used as cooling tower makeup water or injected into the aerated brine injection well.

Rain and storm water drainage will be collected in the storm water retention pond on the facility site. The retention pond will be designed to hold the drainage from a 24-hour, 100-year storm event. Water accumulated in the storm water retention pond will be allowed to evaporate, seep into the ground, or be pumped into the aerated brine injection well.

17. **Wastes**

This WDR only regulates the site's brine pond, which is classified as a Class II Surface Impoundment under Title 27. Other hazardous and nonhazardous wastes generated at the site are listed in the ROWD and repeated in this WDR for informational purposes only.

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

Table 4

Waste Stream	Typical Waste Classification	Handling
Representative 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 oil	Recyclable Hazardous	Recycle
Oil absorbent materials	Nonhazardous	Waste disposal facility or laundry
Oily rags	Nonhazardous	Waste disposal facility or laundry
Spent batteries; lead acid	Hazardous Recyclable	Recycle
Spent batteries; alkaline type	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 Cuttings and Mud	Nonhazardous	Waste disposal facility
Representative Power Plant Operating Waste Streams:		
Filter-cake of brine solids from dewatering process	Non-hazardous[1]	Recycle for beneficial use or 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	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

1 Waste will be sampled and characterized before being transported to an offsite waste disposal facility authorized to accept the wastes.
2 Note that the injected effluents are not considered wastes. They will be injected to provide necessary geothermal reservoir pressure maintenance.

18. **Geothermal Wastes**

The Department of Toxic Substances Control (DTSC), which regulates hazardous waste in California, has provided a waiver to geothermal power plants, which classifies geothermal brine as nonhazardous. Excess geothermal brine generated at the site is injected back into the reservoir and is regulated by CDOGGR. However, before being injected back into the reservoir, some of the suspended solids must be removed from the brine to prevent clogging of the injection well.

These suspended solids are extracted from the brine after it leaves the steam separators; the geothermal resource fluid is 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 filter system. Approximately 25 tons per day of solids will be removed by the vacuum filter system.

Based on the proposed design of the facility, it is expected that 95 percent of the filter press cake will be characterized as non-hazardous. Liquids from the vacuum filter system will be routed to a thickener for additional solids removal. Slurry discharged from the thickener will be discharged to the filtration system. Overflow from the thickener, substantially free of suspended solids, will be routed to the main injection system. The filter cake from the vacuum filter system may be further dried to 90 percent by weight solids in an air drying process.

Filter cake storage, sampling and disposal is regulated by DTSC. The Facility's California Environmental Protection Agency ID number issued by DTSC is CAL000387757. 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 per DTSC guidelines. Test results will be provided to the appropriate disposal facility for additional testing and classification. All filter cake removed from the site will be shipped, under manifest, to the accepting disposal facility.

19. **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 will be properly abandoned.

The geothermal wells will 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 will not move across into different aquifers. The well head (and any other equipment) will 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 will prepare and implement a Site Abandonment Plan in conformance with Regional Water Quality Control Board, Colorado River Region, Imperial County and CDOGGR requirements. The Plan will describe the proposed abandonment of the brine pond, monitoring wells, equipment dismantling and site restoration program in conformance with State and County requirements. Typically, above-ground equipment will be dismantled and removed from the site. Some below ground facilities may be abandoned in place. Above ground structures such as the office and warehouse may be left in place if approved by the County. The surface of the site will then be restored to conform to approximate pre-Project land uses.

A closure/post-closure maintenance plan, including financial assurance, is also required prior to the abandonment of the brine pond and onsite monitoring wells. The closure/post-closure maintenance plan must be submitted to CalRecycle prior to any abandonment activities for approval.

20. **Surface Water Resources**

The three principal surface water bodies at the north end of the Imperial Valley are the Salton Sea, the Alamo River and the New River. The proposed power plant site will be located approximately two miles from the current location of the Salton Sea coastline. The nearest section of the Alamo River to the power plant site will be approximately 1.9 miles west-southwest. This section of the Alamo River flows to the northwest through a levee system and empties into the Salton Sea about four miles west of the power plant site. The nearest sections of the New River will be about 7.8 miles south of the power plant site.

The Salton Sea water surface elevation was measured to be about 232 feet below mean sea level (MSL) in November 2012 (United States Geological Survey-USGS), and is projected to be about 235 feet below MSL by 2018 due to existing and pending water transfers (USGS). 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 irrigation inflow 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 "O" Lateral will be the primary source of service water for power plant operations. McDonald Road is aligned east-west immediately north of the "O" Lateral, and the "O" Drain is immediately north of and parallel to McDonald Road. The "O" Lateral empties into the "O" Drain just north of the Hudson Ranch I power plant site about one mile west of the proposed Hudson Ranch II power plant site and 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 the "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 and into the Salton Sea.

FEMA flood hazard maps indicate that the entire Hudson Ranch II Geothermal Project Area is within FEMA Zone X flood hazard area with minimal potential for flooding.

21. **Ground Water Resources**

The USGS undertook a comprehensive study of the water resources of both the Upper and Lower Colorado River 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.

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.

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

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.

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).

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 now that the eastern section of the canal is lined.

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.

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).

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) have estimated this value to be about 1,000 acre-feet a year. The IID estimate of 1,000 acre-feet a year (AFY) has been adopted as a reasonable estimate of historical groundwater discharge to the Salton Sea from the Imperial Valley. It was developed using 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.

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).

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).

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.

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 than 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.

The main source of groundwater recharge to the shallow aquifer system, and likely to a lesser extent to 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 and into the Salton Sea.

In January 2011, percolation tests were performed on the proposed HR2 power plant site (Landmark 2011). Groundwater was encountered at a depth of 10.0 feet below ground surface. Groundwater quality sampling has not occurred on the HR2 plant site, but groundwater quality beneath the HR2 plant site is presumed to be similar to that encountered beneath the HR1 plant site. HR2 groundwater monitoring wells will be constructed on the HR2 plant site during plant site construction.

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 1,000 acre-feet per year.

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.

Geothermal fluids in this portion of the Salton Sea KGRA contain approximately 25% (by weight) dissolved solids. These fluids may be classified as hazardous in accordance with the criteria listed in Section 66699, Title 22 of the California Code of Regulations (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 pursuant to Health & Safety Code Section 25143.1, subdivision (a). The brine pond design and construction is adequate for the geothermal fluids and related materials discharged into it, considering the toxicity, persistence, degradability, solubility, and other biological, chemical, and physical properties of the wastes.

22. The Water Quality Control Plan for the Regional Water Board (Basin Plan), which was adopted on November 17, 1993, and amended on November 16, 2012, designates the beneficial uses of groundwater and surface water in this Region.

    The beneficial uses of groundwater in the Imperial Hydrological Unit are:

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

    The beneficial uses of nearby surface waters are as follows:

    <u>Imperial Valley Drains</u>
    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 proposed 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. There are no domestic wells within 500 feet of the facility or well field property boundaries of the Hudson Ranch II Geothermal Project and Power Plant.

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. **CEQA:** The County of Imperial, acting as the Lead Agency under the California Environmental Quality Act (CEQA) (Public Resources Code Section 21000 et seq.), prepared an Initial Study/Environmental Impact Report (EIR) #2010101065, for the proposed Project. On October 22, 2012, prior to approving the Project, the Imperial County Board of Supervisors certified that: (1) the Initial Study/EIR prepared for the proposed Project was completed in compliance with CEQA; (2) the Initial Study/EIR was presented to the Imperial County Planning Commission; (3) that decision-making body reviewed and considered the information contained in the Initial Study/EIR prior to approving the Project; and (4) the Initial Study/EIR reflected the County's independent judgment and analysis. In October 2012, after approving the Project, the County timely filed a Notice of Determination of its decision to certify the EIR for the Project after concluding, based on its CEQA review, that the Project would not have a significant

effect on the environment. As a Responsible Agency under CEQA, the Regional Water Board has considered the Initial Study/EIR and the potential impacts to water quality identified and addressed by the County of Imperial. The Regional Water Board has concluded that compliance with these WDRs will prevent any significant adverse impacts to water quality.

25. The monitoring and reporting requirements in Monitoring and Reporting Program R7-2013-0045, and the requirement to monitor the installed groundwater monitoring wells, is necessary to determine compliance with these WDRs, and to determine the facility's impacts, if any, on receiving water. The State's electronic database, GeoTracker Information Systems, facilitates the submittal and review of monitoring and reporting.

26. The Regional Water 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.

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

28. It is the policy of the State of California that every human being has the right to safe, clean affordable, and accessible water adequate for human consumption, cooking, and sanitary purposes. This Order promotes that policy by requiring the Dischargers to meet maximum contaminant levels designed to protect human health and ensure that water is safe for domestic use.

IT IS HEREBY ORDERED, that in order to meet the provision contained in Division 7 of the California Water Code (CWC) and regulations 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 Section 13050, subdivisions (l) and (m), respectively, of Division 7 of the CWC.

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

3. At least thirty (30) days prior to introduction of a new waste stream into the brine pond, the Discharger shall request approval from the Regional Water Board's Executive Officer.

4. Waste material shall be confined or discharged to the brine 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 Water 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 areas, 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 Water Board's Executive Officer for review and approval before the proposed change in operations or modification of the designated areas 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 Water 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 Water 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 Water 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 Water 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 into metal tanks, the brine pond, or containers approved by the Regional Water 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 once 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, which 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 shall be managed and maintained to ensure its 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 (90) days prior to the cessation of discharge operations at the facility, the Discharger shall submit a work plan, subject to approval of the Regional Water 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 twenty (120) days following work plan 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 work plan, 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 Water 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. The Discharger shall submit to this Regional Water Board and to the California Department of Resources Recycling and Recovery (CalRecycle) evidence of Financial Assurance for Closure and Post Closure, pursuant to Title 27. The post-closure period shall be at least 30 years from date of closure. However, the post-closure maintenance period shall extend as long as the waste poses a threat to water quality.

26. Within 180 days of the adoption of this Board Order, the Discharger shall submit to the Regional Water Board, pursuant to Section 20380(b) of Title 27, assurances of financial responsibility acceptable to the Regional Water Board's Executive Officer for initiating and completing corrective action for all known or reasonably foreseeable releases from the brine pond.

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

28. The Discharger shall use the constituents listed in Monitoring and Reporting Program No. R7-2013-0045 and revisions thereto, as "Monitoring Parameters".

29. The Discharger shall implement the attached Monitoring and Reporting Program No. R7-2013-0045 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 brine pond.

30. The Discharger shall follow the Water Quality Protection Standard (WQPS) for detection monitoring established by the Regional Water Board. The following are parts of WQPS as established by the Regional Water 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 Program No. R7-2013-0045 and revisions thereto.

    b. Concentration Limits – The concentration limit for each monitoring parameter and constituent 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 Regional Water Board's Executive Officer.

31. 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.

32. 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 implement and maintain 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 are to be stored in chemical storage facilities appropriately designed for their individual characteristics. Bulk chemicals stored outdoors will be stored 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 aerated brine injection well or the other geothermal brine injection wells. 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 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 recycled 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 waste disposal facilities authorized to accept these wastes.

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 primary 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. Sampling Program

Baseline samples of the groundwater must be collected for four consecutive quarters 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. R7-2013-0045 and any additional Constituents of Concern (COC) identified by the RWQCB.

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 Water 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 Water Board's Executive Officer;

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

8. Geothermal fluids or any fluids in the brine pond 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. R7-2013-0045.

D. Provisions

1. The Discharger shall comply with Monitoring and Reporting Program No. R7-2013-0045 and future revisions thereto, as specified by the I Regional Water Board's Executive Officer.

2. Unless otherwise approved by the Regional Water Board's Executive Officer, all analyses shall be conducted at a laboratory certified for such analyses by the California Department of Public Health (CDPH). 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 commonly achievable detection limits that are meaningful for water quality protection and specific to the US Environmental Protection Agency (EPA) methodology directed for each constituent analysis. The detection limit must be less than the lowest value of the EPA or California Department of Public Health (CDPH) Maximum Contaminant Levels (MCLs).

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

5. Prior to any modification in this facility that will 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 Water 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 Order, and shall maintain a copy of this Order at the site.

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

9. The Discharger shall allow the Regional Water 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 Order, or the place where records must be kept under the conditions of the Order;

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

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

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

10. The Discharger shall comply with all of the conditions of this Order. Any noncompliance with this 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 Order. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures.

12. This 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 Order, and records of all data used to complete the application for this 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 Water 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 Order or approved by the Regional Water 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 Water Boards Orders or court orders, requiring corrective action or imposing civil monetary liability or in modification or revocation of these WDRs by the Regional Water 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 Water 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 Water Board's Executive Officer.

18. The procedure for preparing samples for the analyses shall be consistent with the Monitoring and Reporting Program No. R7-2013-0045 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 by a California Professional Engineer or Professional Geologist.

19. All monitoring shall be done in accordance with the monitoring requirements prescribed in Title 27 of the CCRs.

20. The Discharger shall submit information requested by the Regional Water Board's Executive Officer and the self-monitoring reports electronically over the Internet to the State Water Board's GeoTracker database. Electronic submission of reports containing soil, vapor or groundwater data are required for subsurface investigation and remediation at sites in the leaking Underground Storage Tank (UST); Spills, Leaks, Investigation and Cleanup (SLIC); Department of Defense (DOD); and Land Disposal Programs, according to Chapter 30, Division 3, Title 23 of the California Code of Regulations.

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 19, 2013.

ROBERT PERDUE
Executive Officer

Figure 1

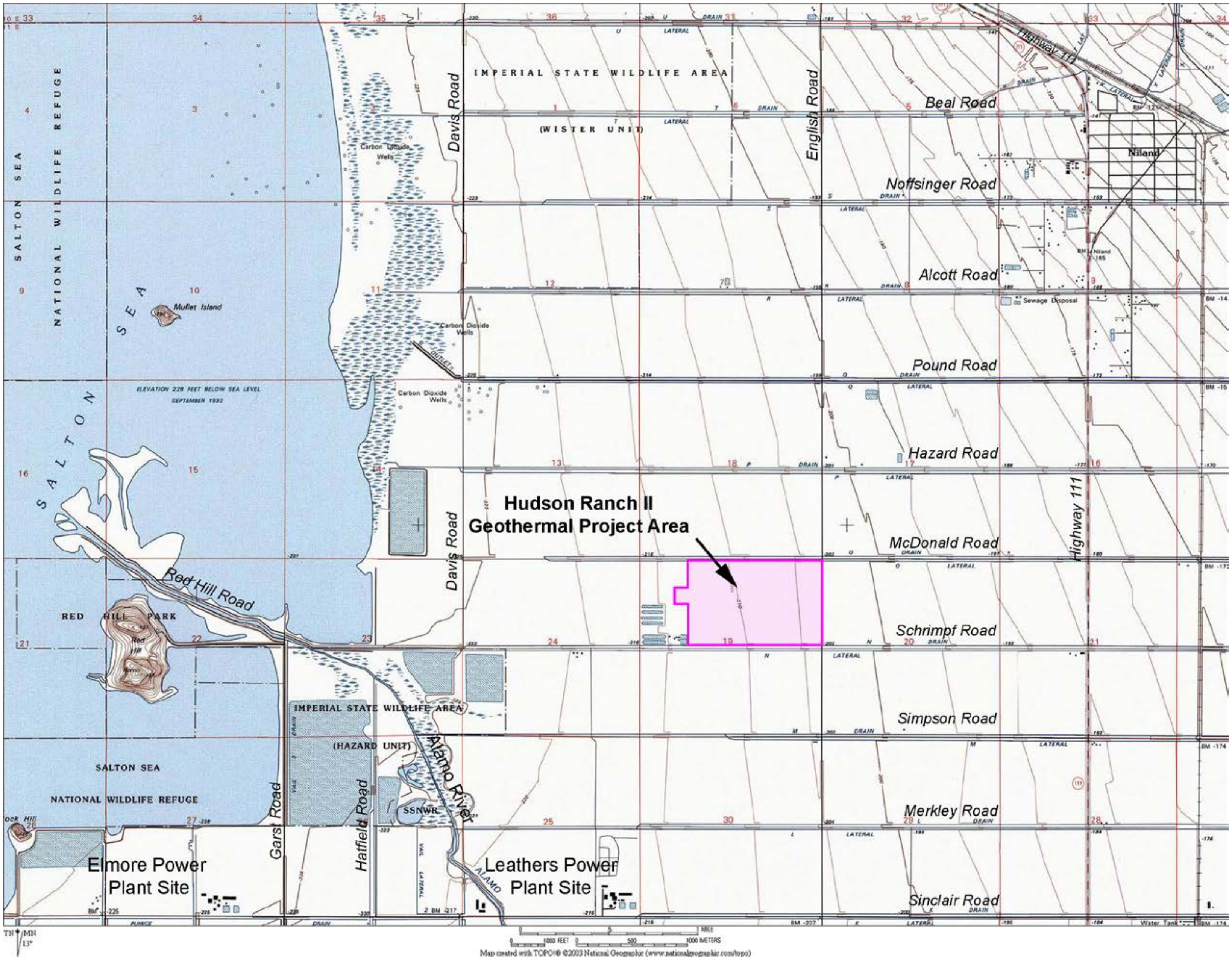

IMPERIAL STATE WILDLIFE AREA
(WISTER UNIT)
Davis Road
English Road
Beal Road
Highway 111
Niland
Noffsinger Road
Alcott Road
Pound Road
Hazard Road
McDonald Road
Schrimpf Road
Simpson Road
Merkley Road
Sinclair Road
Hudson Ranch II
Geothermal Project Area
SALTON SEA
NATIONAL WILDLIFE REFUGE
Mullet Island
Carbon Dioxide Wells
ELEVATION 228 FEET BELOW SEA LEVEL
SEPTEMBER 1992
Red Hill Road
RED HILL PARK
IMPERIAL STATE WILDLIFE AREA
(HAZARD UNIT)
Alamo River
Garst Road
Hatfield Road
SSNWR
Elmore Power
Plant Site
Leathers Power
Plant Site
Sewage Disposal
Water Tank
Map created with TOPO!® ©2003 National Geographic (www.nationalgeographic.com/topo)

Figure 2

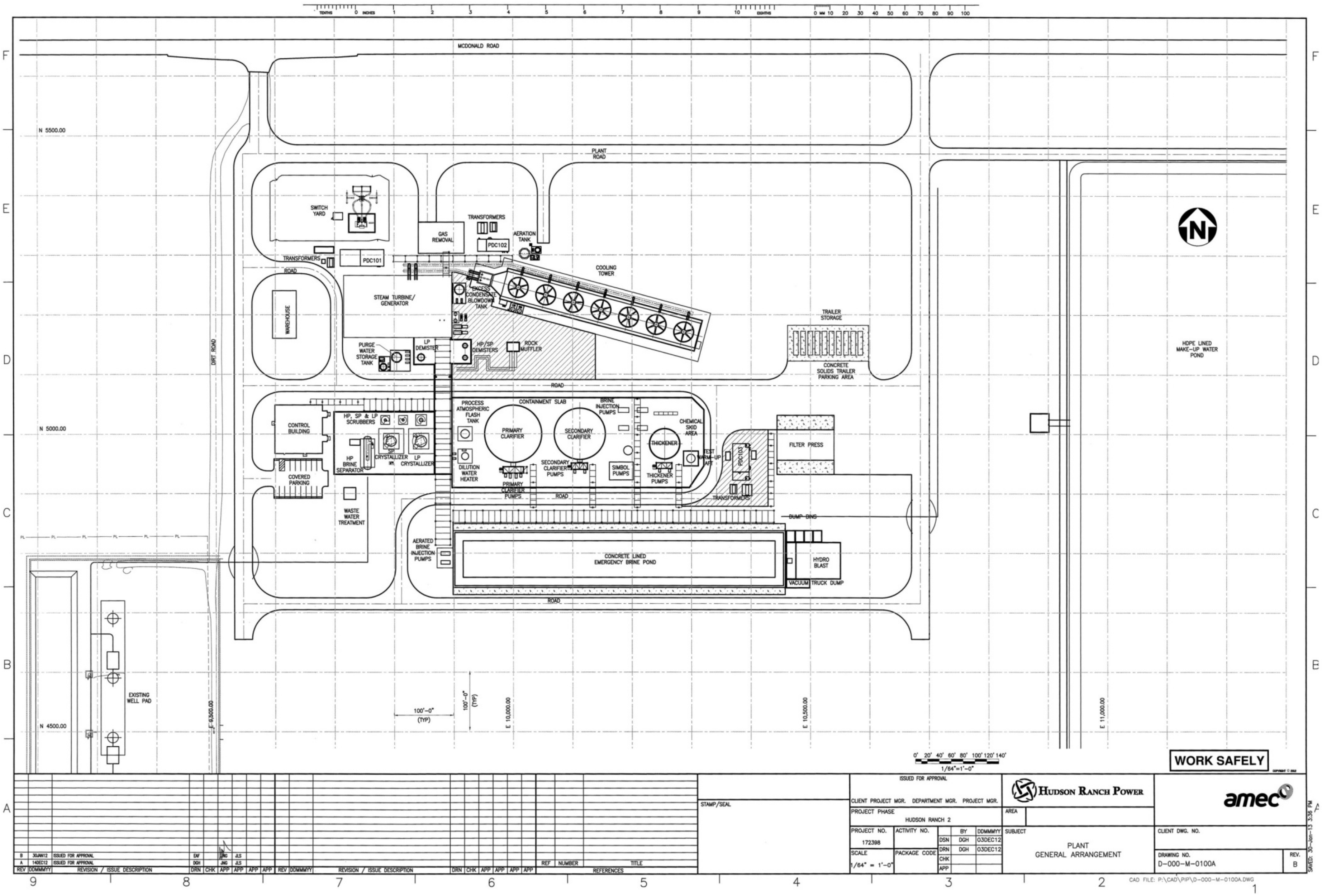

MCDONALD ROAD
PLANT ROAD
SWITCH YARD
TRANSFORMERS
GAS REMOVAL
AERATION TANK
PDC101
PDC102
COOLING TOWER
STEAM TURBINE/ GENERATOR
WAREHOUSE
EXCESS CONDENSATE BLOWDOWN TANK
PURGE WATER STORAGE TANK
LP DEMISTER
HP/SP DEMISTERS
ROCK MUFFLER
TRAILER STORAGE
CONCRETE SOLIDS TRAILER PARKING AREA
HDPE LINED MAKE-UP WATER POND
DIRT ROAD
ROAD
CONTROL BUILDING
HP, SP & LP SCRUBBERS
PROCESS ATMOSPHERIC FLASH TANK
CONTAINMENT SLAB
BRINE INJECTION PUMPS
PRIMARY CLARIFIER
SECONDARY CLARIFIER
CHEMICAL SKID AREA
THICKENER
FILTER PRESS
HP BRINE SEPARATOR
CRYSTALLIZER
LP CRYSTALLIZER
DILUTION WATER HEATER
SECONDARY CLARIFIER PUMPS
SIMBOL PUMPS
THICKENER PUMPS
PRIMARY CLARIFIER PUMPS
TEST WARM-UP AFT
PDC103
TRANSFORMERS
COVERED PARKING
WASTE WATER TREATMENT
DUMP BINS
AERATED BRINE INJECTION PUMPS
CONCRETE LINED EMERGENCY BRINE POND
HYDRO BLAST
VACUUM TRUCK DUMP
EXISTING WELL PAD
N 5500.00
N 5000.00
N 4500.00
E 9,500.00
E 10,000.00
E 10,500.00
E 11,000.00
100'-0" (TYP)
WORK SAFELY
ISSUED FOR APPROVAL
HUDSON RANCH POWER
amec
CLIENT PROJECT MGR. DEPARTMENT MGR. PROJECT MGR.
PROJECT PHASE
HUDSON RANCH 2
PROJECT NO. 172398
ACTIVITY NO.
SCALE 1/64" = 1'-0"
PACKAGE CODE
DSN DGH 03DEC12
DRN DGH 03DEC12
SUBJECT
PLANT GENERAL ARRANGEMENT
CLIENT DWG. NO.
DRAWING NO. D-000-M-0100A
REV. B
STAMP/SEAL
B 30JAN12 ISSUED FOR APPROVAL
A 14DEC12 ISSUED FOR APPROVAL
REV DDMMMYY REVISION / ISSUE DESCRIPTION
REF NUMBER TITLE
REFERENCES
CAD FILE: P:\CAD\PIP\D-000-M-0100A.DWG

Figure 3

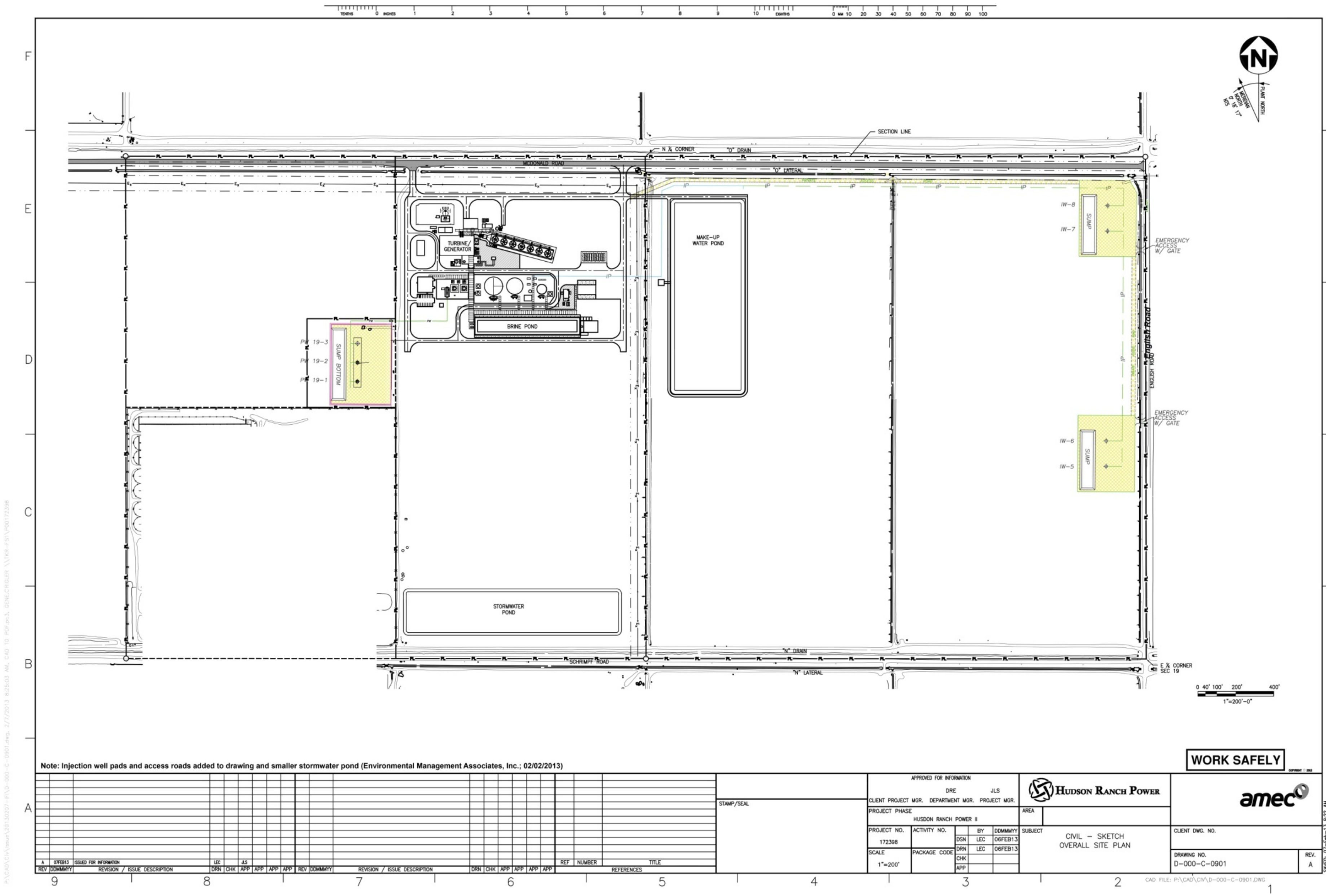
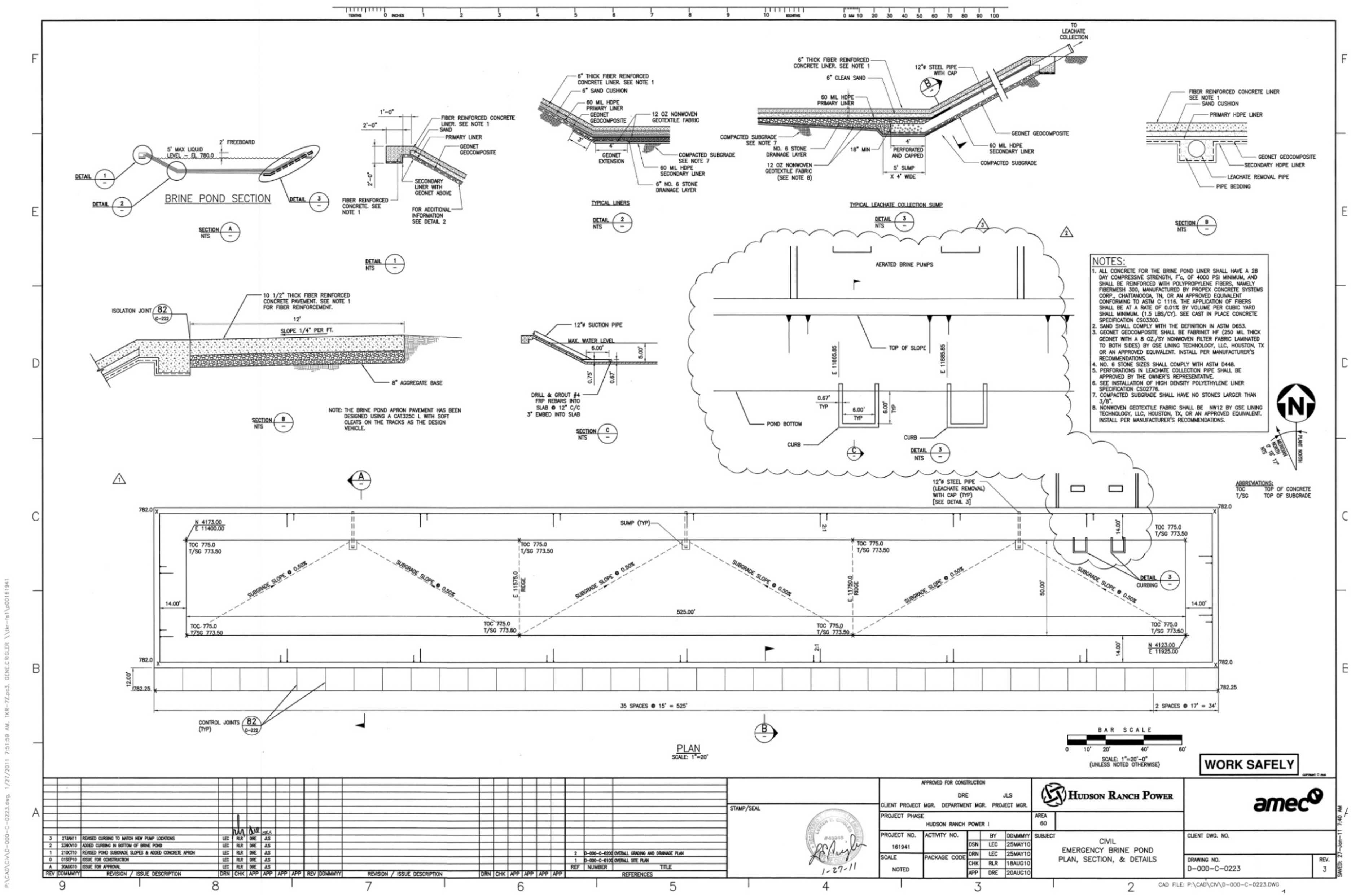

SECTION LINE
N ¼ CORNER
"O" DRAIN
"O" LATERAL
MAKE-UP WATER POND
TURBINE/ GENERATOR
BRINE POND
STORMWATER POND
SUMP BOTTOM
EMERGENCY ACCESS W/ GATE
English Road
"N" DRAIN
"N" LATERAL
E ¼ CORNER SEC 19
1"=200'-0"
Note: Injection well pads and access roads added to drawing and smaller stormwater pond (Environmental Management Associates, Inc.; 02/02/2013)
WORK SAFELY
HUDSON RANCH POWER
amec
HUSDON RANCH POWER II
172398
1"=200'
CIVIL – SKETCH OVERALL SITE PLAN
D-000-C-0901

Figure 4


BRINE POND SECTION
TYPICAL LINERS
TYPICAL LEACHATE COLLECTION SUMP
AERATED BRINE PUMPS
NOTES:
PLAN
SCALE: 1"=20'
WORK SAFELY
HUDSON RANCH POWER
amec
CIVIL
EMERGENCY BRINE POND
PLAN, SECTION, & DETAILS
D-000-C-0223