

**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
COLORADO RIVER BASIN REGION**

**ORDER NO. 00-085**

**WASTE DISCHARGE REQUIREMENTS  
FOR  
ORMESA GEOTHERMAL, FACILITY OWNER  
ESI ORMESA IH RESOURCE, LLC, WELL FIELD OWNER  
U.S. DEPARTMENT OF THE INTERIOR, BUREAU OF LAND MANAGEMENT, LAND OWNER  
FPL ENERGY, AGENT FOR FACILITY OWNER  
FPL ENERGY OPERATING SERVICES, INC., OPERATOR  
EAST MESA GEOTHERMAL PROJECTS  
PLANT EAST MESA (PEM) UNIT 4 – 10MW (GROSS) GEOTHERMAL BINARY POWER PLANT  
GEOTHERMAL WELL FIELD AND CONTAINMENT BASINS/MUD PITS  
South of Holtville - Imperial County**

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

1. Ormesa Geothermal, Facility Owner, and ESI Ormesa IH Resource, LLC, Well Field Owner, 700 Universe Blvd, Juno Beach, Florida 33408-0420, U.S. Department of the Interior, Bureau of Land Management, Land Owner, 1661 South 4<sup>th</sup> Street, El Centro, California 92243, and FPL Energy Operating Services, Inc., Operator, 3300 East Evan Hewes Highway, Holtville, California 92250 (hereinafter collectively referred to as the discharger), submitted a Report of Waste Discharge (ROWD) to the California Regional Water Quality Control Board, Colorado River Basin Region (Regional Board) dated November 15, 1999 for the Geothermal Well Field and Containment Basins/Mud Pits of the Plant East Mesa (PEM) Unit 4.
2. PEM Unit 4 is a nominal 10 megawatt modular binary geothermal power plant and associated well field located in the East Mesa Known Geothermal Resource Area (KGRA).
3. The binary geothermal power plant consists of a closed loop system, which includes vaporization, power generation, and condensing cycles. Geothermal fluid at high temperature from the KGRA flows through a tube-type heat exchanger that contains preheated isopentane. The isopentane vapor generated at the heat exchanger flows through the turbine propellers spinning the electrical generator shaft and thereby generating electricity. The isopentane vapor from the turbine flows back to the condenser (shell-tube heat exchanger) to start the cycle again. The plant consists of twelve interconnected power systems as shown in Attachment B.
4. PEM Unit 4 is located approximately seven miles south of the town of Holtville on a portion of Federal Geothermal Lease No. CA-6218, which includes Section 1, T16S, R16E, SBB&M and Section 6, T16S, R17E, SBB&M, Imperial County, California.
5. The PEM Unit 4 Well Field consists of production and injection wells as shown in Attachment A and listed in the Monitoring and Reporting Program No. 00-085 and revisions thereto. Production and injection wells may be utilized interchangeably by the discharger. Wells may be added or removed from the PEM Unit 4 well field at the discharger's discretion, with notice to the Regional Board Executive Officer for incorporation into the Monitoring and Reporting Program No. 00-085.

6. Each well has an automatic wellhead control valve that controls the flow from the wells. The flow from the production wells and to the injection wells, power generation rate and control systems are controlled from the Production Island Control Room (Process Control Room). Also, each production well is equipped with an oil lubrication system, cooling system for the motor bearings and pump seals, tube-type system for downhole pressure monitoring, geothermal fluid containment basin/mud pit, transformer and electrical system, and geothermal fluid pipeline.
7. The injection of the used brine is accomplished by pumping to five of the six injection wells as shown on Attachment A and B. A wellhead pressure of approximately 350-pound per square inch gage (PSIG) is required for injection of the fluids to depths ranging from 1,900 to 4,000 feet below ground surface (bgs). Injection well sites typically include the well, wellhead system, pipelines, and a geothermal fluid containment basin/mud pit.
8. Geothermal fluid is temporarily discharged to the containment basins/mud pits which consist of earthen-bermed surface impoundment basins lined with six inches of compacted clay with a maximum hydraulic permeability of  $1 \times 10^{-6}$  centimeters per second (cm/sec). The containment basins/mud pits are used for the temporary discharge of geothermal fluids and reservoir sands generated during well testing and cleaning. The containment basins/mud pits have an average capacity of 225,000 gallons, and are located next to the injection and production wells.
9. Geothermal fluid is left to evaporate in the containment basins/mud pits or is removed and discharged by subsurface injection into the geothermal reservoir.
10. The containment basins/mud pits are constructed next to each well during the construction time of a new well, and used only for temporary discharges of drilling and cutting mud. The containment basins/mud pits are constructed of intermixed sandy and silty clay soil and are lined with clay of  $1 \times 10^{-6}$  cm/sec hydraulic permeability. Following well development, the containment basins/mud pits are utilized periodically for well maintenance purposes.
11. The solid waste from the containment basins/mud pits are analyzed and discharged according to the resulting analyses to either a Class I or Class II landfill, or to a facility acceptable to the Regional Board Executive Officer.
12. The discharger adds chemical additives for process control purposes to the cooling tower water and the geothermal brine. The chemicals that are added to the cooling tower waters are for microbiocide control and pH adjustment, and the chemicals that are added to the geothermal brine are for scale and corrosion inhibition.
13. Definition of terms used in this Board Order:
  - a. Facility – The entire parcel of property where PEM Unit 4 industrial operations or related geothermal industrial activities are conducted.
  - b. Waste Management Units (WMUs) – The areas of lands, or the portions of the facility, where geothermal or related wastes are discharged. The term includes containment basins/mud pits, injection wells, etc. and ancillary features for precipitation and drainage control and monitoring appurtenances.

- c. Discharger – 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, waste management unit or who is responsible for the operation of a waste management unit.
14. The site geology in the vicinity of the WMUs is comprised of aeolian sands with minor interbedded clays and silts between the surface to a depth of approximately 600 ft. Below this are lacustrine claystones and siltstones which are generally impermeable, with thicknesses of 1,200 to 1,500 feet, capping the sandstone geothermal reservoir.
  15. The discharger indicates that the depth to ground water ranges from 17 to 27 feet below the ground surface (bgs).
  16. 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 waters in this Region.
  17. The beneficial uses of ground water in the Imperial Hydrological Unit , are:
    - a. Municipal Supply (MUN)
    - b. Industrial Supply (IND)
  18. Federal regulations for storm water discharges were promulgated by the U. S. Environmental Protection Agency on November 16, 1990 (40 CFR Parts 122, 123, and 124). The regulations require that 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.
  19. The State Water Resources Control Board adopted Order No. 97-03-DWQ (General Permit No. CAS000001), specifying waste discharge requirements for discharges of storm water associated with industrial activities, excluding construction activities, and requiring submittal of a Notice of Intent by industries to be covered under the Permit.
  20. The land surface within the boundaries of the site is predominantly flat. The elevation at the site is 30 to 45 feet above sea level. At approximately 1.75 miles west of PEM Unit 4, the East Highline Canal flows by gravity from north to south at the site boundary. Makeup water for the cooling tower is pumped from this canal. Alternatively the plant may utilize sweetwater (groundwater) for cooling tower makeup. Sweetwater wells SW-1 and SW-3 located in the PEM Unit 3 well field may be utilized for this purpose.
  21. The cooling tower at the facility uses an average of 1,500 gallons per minute (gpm) of makeup water. The Imperial Irrigation District provides the process water (untreated canal water) from the East Highline Canal. Blowdown water from the cooling tower is injected at the 6-1 geothermal injection well.
  22. The facility is located in a desert environment, seven miles southeast of Holtville, in the southeastern portion of Imperial County. Normal annual precipitation in this area is 2.5 to 3.0 inches and normal annual surface evaporation is approximately 99 inches.
  23. The facility became subject to Waste Discharge Requirements (WDRs) under Board Order No. 89-071 in September 20, 1989. This WDR is being updated to comply with Section 13263 of the California Water Code and to incorporate the applicable provisions of Title 27 of the California Code of Regulations.

24. The Board has notified the discharger and all known interested agencies and persons of its intent to update waste discharge requirements for this discharge and has provided them with an opportunity for a public meeting and an opportunity to submit comments.
25. The Board in a public meeting heard and considered all comments pertaining to this discharge.
26. The PEM Unit 4 geothermal facility is not allowed to discharge, treat or compost 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 Board Order or by the California Regional Water Quality Control Board's (CRWQCB) Executive Officer;
  - e. Oily and greasy liquid waste, unless specifically approved by this Board Order or by the California Regional Water Quality Control Board's (CRWQCB) Executive Officer;
  - f. Hot, burning waste materials or ash;
  - g. Hazardous and designated waste, ash, or other wastes determined by the CRWQCB to pose a potential threat to water quality.
27. Any hazardous waste materials generated or stored at the facility will be stored and disposed in a manner compliant with federal and state regulations.
28. In accordance with Section 15301, Chapter 3, Title 14 of the California Code of Regulations, the issuance of these Waste Discharge Requirements, 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.).
29. The jurisdiction of the Regional Board is limited to regulating the impact of water quality and the beneficial uses of water by the discharge of wastes. These Waste Discharge Requirements, Order No. 00-085, are limited to matters within the Regional Boards' jurisdiction.

IT IS HEREBY ORDERED, that Board Order No. 89-071 is rescinded, and in order to meet the provisions contained in Division 7 of the California Water Code and regulations adopted thereunder, the discharger shall comply with the following:

**A. Specifications**

1. The treatment or disposal of wastes at this facility shall not cause pollution as defined in Sections 13050 of Division 7 of the California Water Code.
2. Waste material shall be confined or discharged to the waste management facility as defined in Findings No. 4, 5, 7, 8, 9 and in the attached site map.
3. Prior to construction of a new production well or switching 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.

4. Storage of waste shall be limited to the areas designated for such activities. Any revision or modification of the designated area, or any proposed change in operation at the facility, must be submitted in writing to the Regional Board's Executive Officer of the Board for review and approval before the proposed change in operations or modification of the designated area is implemented.
5. Any increase or change in the annual average volume of material to be discharged at the site must be submitted in writing to the Regional Board's Executive Officer for review and approval.
6. If any portion of the containment basin/mud pit 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.
7. Fluids and/or materials discharged to and/or stored in containment basins/mud pits shall not overflow the basins.
8. 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 submit to the Regional Board's Executive Officer a written request for approval. Substitution of chemicals with equivalent properties will be allowed with written notification by the discharger to the Executive Officer.
9. A minimum freeboard of two (2) feet shall be maintained at all times in each containment basin/mud pit.
10. 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.
11. Final disposal of residual wastes and cleanup of all containment basins/mud pits shall be accomplished to the satisfaction of the Regional Board's Executive Officer upon abandonment or closure of operations.
12. All containment basins/mud pits shall be designed, constructed, operated, and maintained to prevent inundation or washout due to floods having a predicted frequency of once in 100 years.
13. Geothermal clean out fluid, test and production fluid and sand separators, production and injection well startups and clean outs shall be discharged into containment basins/mud pits or containers approved by the Regional Board's Executive Officer to receive this discharge.
14. Following well completion, the respective containment basins/mud pits shall have all drilling mud and cuttings tested and disposed of in a manner acceptable to the Regional Board's Executive Officer.
15. Solids that accumulate in the concrete cooling tower basins, and containment basins/mud pits must be analyzed and appropriately disposed.
16. Public contact with wastes containing geothermal fluids at the facility shall be precluded through such means as fence, signs, or other acceptable alternatives.
17. The discharge shall not cause degradation of any water supply.

18. 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. 120 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.
19. Upon ceasing operations 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 a manner approved by the Regional Board's Executive Officer.
20. 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 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 months of the adoption of this Order.
21. Surface drainage from tributary areas or subsurface sources, shall not contact or percolate through the waste discharged at this site.
22. The interior surfaces of the WMU shall be graded and maintained to promote conveyance of runoff and precipitation from the facility to the WMU.
23. If the chemical analysis of any liquid collected in the containment basins/mud pits exceeds designated or hazardous level criteria, this must be removed from the containment basins/mud pits and be appropriately disposed.
24. The discharger shall use the constituents listed in Monitoring and Reporting Program No. 00-085 and revisions thereto, as "Monitoring Parameters".
25. The discharger shall implement the attached Monitoring and Reporting Program No.00-085 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 WMU.
26. The discharger shall follow the Water Quality Protection Standard (WQPS) for detection monitoring established by the Regional Board. The following are four 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 (COC) listed in the Monitoring and Reporting Program No. 00-085 and revisions thereto for:
  - 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 value as obtained during that reporting period.
  - c. Monitoring points of compliance are the monitoring approved points, and any revised Monitoring and Reporting Program approved by the Regional Board's Executive Officer.

- d. Compliance period - The duration of the compliance period for this WMU is 5 years. Each time the Standard is not met (i.e. releases discovered), the facility begins a compliance period on the date the Regional Board's Executive Officer directs the discharger to begin an Evaluation Monitoring Program. If the discharger's Corrective Action Program (CAP) has not achieved compliance with the standard by the scheduled end of the Compliance Period, the Compliance Period is automatically extended until the facility has been in continuous compliance for at least three consecutive years.
27. The discharger shall remove and relocate any unacceptable wastes that were brought or discharged at this site in violation of these requirements.
28. The WMU shall be protected from any washout or erosion, and from any inundation, which could occur as a result of floods having a predicted frequency of once in 100 years.
29. The discharger shall not cause the release of pollutants, or waste constituents in a manner, which could cause a condition of contamination, or pollution to occur.

#### B. Prohibitions

1. PEM Unit 4 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 California Regional Water Quality Control Board's (CRWQCB) Executive Officer;
  - e. Oily and greasy liquid waste; unless specifically approved by this Order or by the California Regional Water Quality Control Board's (CRWQCB) Executive Officer;
  - f. Hot, burning waste materials or ash;
  - g. Hazardous and designated waste, ash, or other wastes determined by the CRWQCB to pose a potential threat to water quality.
2. The discharge or deposit of hazardous, designated waste (as defined in Title 27), and other wastes determined by the CRWQCB to pose a potential threat to water quality at this site is prohibited.
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 (1) year) disposal or storage of geothermal waste in on-site temporary containment basins/mud pits is prohibited, unless authorized by the Regional Board's Executive Officer.

8. Temporary discharge and/or storage of geothermal fluids or any fluids for longer than one (1) year, other than into containment basins/mud pits having a lining permeability of  $1 \times 10^{-6}$  cm/sec, or less, is prohibited, and the fluids contained therein shall not penetrate through the lining during the containment period.
9. Geothermal fluids or any fluids in the containment basins/mud pits shall not enter any canal, drainage, or drains (including subsurface drainage systems) which could provide flow to the Salton Sea, except as allowed under an appropriate National Pollutant Discharge Elimination System (NPDES) permit.
10. Any materials, including fluids and sediments removed from the containment basins/mud pits shall be disposed of appropriately by the discharger.
11. 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.
12. Direct discharge of any waste to any surface water or surface drainage courses is prohibited.
13. 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. 00-085 and revisions thereto.

#### C. Provisions

1. The discharger shall comply with "Monitoring and Reporting Program No. 00-085 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 Health Services. All analyses shall be conducted in accordance with the latest edition of "Guidelines for Establishing Test Procedures for Analysis of Pollutants", promulgated by the United States Environmental Protection Agency.
3. Prior to any change in ownership or management of this operation, the discharger shall transmit a copy of this Board Order to the succeeding owner/operator, and forward a copy of the transmittal letter to the Regional Board.
4. Prior to any modifications in this facility, which 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 and obtain revised requirements before any modifications are implemented.
5. If vegetation is used for erosion control purposes at the containment features, it shall not impair the integrity of the WMU. If irrigation of vegetation is used at the WMU, it shall be managed to assure that there is no increase in the production of runoff.
6. All containment structures and erosion and drainage control systems shall be designed and constructed under direct supervision of a California Registered Civil Engineer or Certified Engineering Geologist, and shall be certified by the individual 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. This 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 credentials 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 this Board Order;
  - b. Have access to and copy, at reasonable times, any records that shall be kept under the conditions 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 California Water Code of Regulations, 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 Control 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, including all calibration and maintenance records and any all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this Board Order, and records of all data used to complete the application for this Board Order, for a period of at least 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 responsible individual(s) who performed the sampling or measurements.
    - 3. The date(s) analyses were performed.
    - 4. The responsible individual(s) who performed 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.
- 14. All monitoring systems shall be readily accessible for sampling and inspection.
  
  - 15. The discharger is the responsible party for the waste discharge requirements, and the monitoring and reporting program for the facility. The discharger shall comply with all conditions of these waste discharge requirements. Violations may result in enforcement actions, including Regional Board Orders or court orders, requiring corrective action or imposing civil monetary liability or in modification or revocation of these waste discharge requirements 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 discharger shall neither cause nor contribute to the contamination or pollution of ground water via the release of waste constituent in either liquid or gaseous phase.
  
  - 19. The discharger shall not cause any increase in the concentration of waste constituents in soil pore gas, soil-pore liquid, soil or other geological material outside the WMU if such waste constituents could migrate to waters of the State in either the liquid or the gaseous phase, and cause conditions of contamination or pollution.
  
  - 20. The procedure for preparing samples for the analyses shall be consistent with the Monitoring and Reporting Program No. 00-085 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.
  
  - 21. If applicable, the discharger shall submit a Notice of Intent (NOI) to the State Water Resources Control Board to be covered under the Statewide General NPDES Permit for Storm Water Discharges Associated with Industrial Activities, Order No. 97-03-DWQ, NPDES No. CAS000001.

22. All monitoring shall be done as described in Title 27 of the California Code of Regulations.

I, Philip A. Gruenberg, 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 June 28, 2000.

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Executive Officer

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June 28, 2000  
Date