

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER NO. R5-2006-0072

WASTE DISCHARGE REQUIREMENTS
FOR
AERA ENERGY LLC
SOUTH WASTEWATER DISPOSAL FACILITY
SOUTH BELBRIDGE OIL FIELD, KERN COUNTY

The California Regional Water Quality Control Board, Central Valley Region (hereafter Central Valley Water Board) finds that:

1. Aera Energy LLC, a California limited liability company, (Discharger) owns and operates crude oil production wells, oil and produced water treatment plants, and wastewater disposal facilities in the South Belridge Oil Field.
2. The South Wastewater Disposal Facility (Facility) is located at the end of an approximately 6,300 foot long ditch which conveys wastewater from the Discharger's Dehydration Plant and Water Softening Plant to 18 unlined surface impoundments. The wastewater discharged at the Facility includes: (a) oil field produced water from the Dehydration Plant; (b) backwash water from treatment filters at the Water Softening Plant; and, (c) softener regeneration wastewater from ion exchange units at the Water Softening Plant.
3. This Order implements the *Water Quality Control Plan for the Tulare Lake Basin, Second Edition - 1995* (Basin Plan), which designates beneficial uses, establishes water quality objectives, and contains implementation plans and policies for all waters of the Basin.
4. The discharges are subject to the requirements of Title 27, California Code of Regulations, Section 20090(b) et seq (Title 27), and are currently regulated by Waste Discharge Requirements (WDRs), Resolution No. 68-268. The WDRs are outdated and are being updated to reflect Basin Plan policy, current regulations, and new site-specific technical information.

LOCATION AND DESCRIPTION

5. The South Belridge Oil Field is on the west side of the San Joaquin Valley, approximately 35 miles west of the city of Bakersfield and nine miles south of Lost Hills, in Kern County as shown on Attachment A, which is attached to and made part of this Order.
6. The unlined impoundments are in Section 1 and the NE¼ of Section 12, T29S, R21E, MDB&M (Assessor Parcel Numbers 098-113-04-6; 098-113-06-1; 098-113-11-1; and, 098-113-13-7). The Dehydration Plant and Water Softening Plant are located in the SE¼, SW¼, Section 2, T29S, R21E, MDB&M. The impoundments, ditch, Dehydration Plant, and Water Softening Plant are shown on Attachment B, which is attached to and made part of this Order.
7. The impoundments, which have a surface area of approximately 80 acres, are used for the disposal of wastewater by evaporation and percolation. The Discharger has reported that approximately 18,245,000 barrels of wastewater were discharged to the Facility during 2004.

8. The impoundments are unlined and do not meet the prescriptive construction criteria for Class II surface impoundments as specified in Title 27, Section 20005, et seq.
9. To the east of the impoundments, the land in Sections 1 and 12 is covered with predominantly native grass and shrub vegetation. The adjacent sections to the north and east of Section 1 currently contain irrigated crops. To the west, land use consists of oil and gas production.
10. The South Belridge Oil Field lies on the Antelope Plain, an alluvial piedmont consisting of coalescing alluvial fans from the Temblor Range to the west. The region slopes to the east towards the San Joaquin Valley.
11. The site is in the South Valley Floor Hydrologic Unit, Antelope Plain Hydrologic Area (No. 558.60), as depicted on interagency hydrogeologic maps, prepared by the Department of Water Resources in August 1986.
12. The climate in the area is semi-arid, with hot, dry summers and cool winters. Available weather data through 1997 from a monitoring station at South Belridge indicates the average annual precipitation is 5.96 inches. The annual Class A pan evaporation rate is approximately 108 inches at Lost Hills.
13. The 100-year and 1000-year, 24-hour precipitation events calculated by the California Department of Water Resources (DWR) are 2.53 inches and 3.32 inches, respectively, for the South Belridge monitoring station based on data through 1997.
14. An unnamed intermittent stream channel immediately to the south of the southernmost impoundment terminates approximately 2 miles to the northeast near Seventh Standard Road. A second unnamed intermittent stream channel traverses between the impoundments and terminates approximately 1.5 miles to the northeast. The intermittent stream channels are shown on Attachment B, which is attached to and made part of this Order. Natural flow in the channels occurs during infrequent high precipitation storm events. The unnamed stream channel is defined as West Side Streams in the Basin Plan.
15. Federal Emergency Management Agency Flood Insurance Rate Map, Community Panel No. 060075 0675 B, dated 26 September 1986, shows the southernmost impoundment is adjacent to the 100-year floodplain of the unnamed intermittent stream channel.
16. Table II-I in the Basin Plan designates West Side Streams as having beneficial uses that include: agricultural supply; industrial service and process supply; water contact and non-contact water recreation; warm freshwater habitat; wildlife habitat; rare and endangered species habitat; and groundwater recharge. Some beneficial uses may not be applicable to a body of water.
17. The California Aqueduct and Belridge Water Storage District's 500 North Canal are approximately 2.6 and 1.2 miles northeast of the impoundments, respectively.

HYDROGEOLOGIC INFORMATION

18. The Discharger has conducted a hydrogeologic investigation to delineate the geology and evaluate groundwater conditions in the area east of the South Belridge Oil Field. Predecessor companies to the Discharger have installed 67 groundwater monitoring wells between 1984 and 1992. Currently, 47 groundwater monitoring wells are sampled by the Discharger. An adjacent property owner has installed five groundwater monitoring wells and eight water supply wells. The DWR installed two groundwater monitoring wells. Attachment C, which is attached to and made part of this Order, shows the locations of all groundwater monitoring and water supply wells in the area east of the South Belridge Oil Field with the wells near the impoundments highlighted.
19. The youngest sediments are Holocene Alluvium, which consists of a heterogeneous sequence of alternating sand, silt, and clay. Underlying the Alluvium is the Late Pleistocene Upper Tulare Formation, which also consists of alternating sand, silt, and clay.
20. Reports submitted by the Discharger describe how the stratigraphically lowest sand layer in the Alluvium is laterally continuous and has been designated as the 22K Sand. Underlying the 22K Sand is the Corcoran Clay Equivalent (CCE), which likely correlates with the Corcoran Clay identified further to the east. Unconformably underlying the CCE are Upper Tulare sediments. Attachment D, which is attached to and made part of this Order, shows the stratigraphy.
21. Three stratigraphic intervals have been identified by the Discharger as aquifer zones containing water-bearing layers. Discontinuous water-bearing sand layers separated by clay layers within the Alluvium have been collectively designated as the unconfined Aquifer I. Underlying Aquifer I is a discontinuous clay aquitard. Below this aquitard is the 22K Sand which is water-bearing and is designated as the semi-confined 22K Aquifer. Underlying the 22K Aquifer is a regionally contiguous aquitard, the CCE. Below the CCE in the upper Tulare sediments is a thick sequence of relatively continuous, permeable water-bearing sand layers separated by clay layers collectively designated as the confined Aquifer II. Attachment D shows the three aquifer zones.
22. Hydrogeologic information indicates that the geology beneath and to the northeast of the Facility does not preclude wastewater from migrating downgradient to the northeast.
23. Oil and wastewater is produced from the Belridge Diatomite and the Tulare Formation. The shallowest production is in the Tulare Formation at a depth of approximately 300 feet.
24. The Discharger operates 46 Class II injection disposal wells permitted by the California Division of Oil, Gas, and Geothermal Resources to inject wastewater into the Tulare Formation. The wells are in Sections 20 and 21, T28S, R21E and Section 11, T29S, R21E, MDB&M. During August 2005, the Discharger reported 2,851,016 barrels of wastewater were injected into 16 disposal wells.
25. No known Holocene faults traverse or are projected through the South Belridge area. The nearest known Holocene fault is the San Andres Fault zone, located 15 miles southwest of the site.

WASTEWATER CHARACTERISTICS AND CLASSIFICATION

26. Wastewater in the impoundments is sampled and analyzed by the Discharger each quarter and the results reported semi-annually. On 26 May 2005, wastewater samples were collected from the inlet impoundment, a middle impoundment, and from the terminal impoundment. A state certified laboratory analyzed the samples and the Discharger reported the following results in the *Semi-Annual Monitoring Report January - June 2005*:

| <u>Impoundment</u> | <u>EC</u> µmhos/cm | <u>TDS</u> mg/L | <u>chloride</u> mg/L | <u>boron</u> mg/L |
|--------------------|-----------------------|--------------------|-------------------------|----------------------|
| Inlet | 20,000 | 12,000 | 5,600 | 91 |
| Middle | 23,000 | 13,000 | 6,800 | 90 |
| Terminal | 25,000 | 13,000 | 6,800 | 98 |

27. Non-hazardous waste that contains pollutants that, under ambient environmental conditions at a waste management unit, could be released in concentrations exceeding applicable water quality objectives or that could reasonably be expected to affect beneficial uses of the waters of the state is defined in California Water Code, §13173 (b) as “Designated Waste.”
28. The Discharger conducted a feasibility study of disposal alternatives, and decided to implement: (a) wastewater recycling; and, (b) wastewater disposal to Class II disposal wells permitted by the California Division of Oil, Gas, and Geothermal Resources.
29. The Discharger, in correspondence dated 3 August 2005, committed to permanently cease wastewater discharges to land for purposes of disposal and close the ditch and surface impoundments in accordance with the time schedule contained in this Order.

BASIN PLAN INFORMATION

30. The Basin Plan contains maximum numerical salinity limits for the disposal of oil field production wastewater in unlined impoundments overlying groundwater with existing and future probable beneficial uses. The maximum concentration limits are: electrical conductivity at 25° C, 1,000 µmhos/cm; chloride, 200 mg/L; and, boron, 1 mg/L.
31. Table II-2 in the Basin Plan lists the beneficial uses of groundwater. The facility is in the Kern County Basin Hydrologic Unit and the 259 Detailed Analysis Unit (DAU), which has the following beneficial uses of groundwater: municipal and domestic supply (MUN), agricultural supply (AGR), and industrial service supply (IND). Due to the size of the DAU, the listed uses may not exist throughout the DAU. The Basin Plan defines MUN as uses of water for community, military, or individual water supply systems, including, but not limited to, drinking water supply. The Basin Plan defines AGR as uses of water for farming, horticulture, or ranching, including, but not limited to, irrigation, stock watering, or support of vegetation for range grazing. The Basin Plan defines IND as uses of water for industrial activities that do not depend primarily on water quality, including, but not limited to, mining, cooling water supply, hydraulic conveyance, gravel washing, fire protection, or oil well repressurization.
32. The Basin Plan allows the Central Valley Water Board to consider criteria for exceptions to beneficial uses of groundwater. One of the exception criteria for both the MUN and AGR beneficial

use designations is: “The aquifer is regulated as a geothermal energy producing source or has been exempted administratively pursuant to 40 CFR, Section 146.4 for the purpose of underground injection of fluids associated with the production of hydrocarbon or geothermal energy...” An exception criteria for just the MUN designation is: “The total dissolved solids (TDS) must exceed 3,000 mg/L (or an electrical conductivity exceeding 5,000 μ mhos/cm) and the aquifer cannot be reasonably expected to supply a public water system.”

33. Where the Central Valley Water Board finds that one of the exception criteria apply, it may remove the designation for the particular water body through a formal Basin Plan amendment, which includes a public hearing. The exception becomes effective upon approval by the State Water Resources Control Board (hereafter State Water Board) and Office of Administrative Law. Table II-2 in the Basin Plan lists those beneficial use exceptions that have been considered by the Central Valley Water Board. The Central Valley Water Board has not considered a request or amended the Basin Plan to allow an exception to the beneficial uses of groundwater for this location.

GROUNDWATER INFORMATION

34. The Discharger owns and operates 35 industrial supply wells in Sections 20, 21, 27, 28, 34, and 35 of T28S, R21E, MDB&M, approximately one to five miles northwest of the impoundments. The wells supply approximately 420,000 barrels per day of groundwater for use by the Discharger for waterflood injection. The groundwater has concentrations that average about 14,667 mg/L for TDS, 8,700 mg/L for chloride, and 45 mg/L for boron.
35. The Discharger owns and operates two groundwater wells near Spicer City and in Section 10, T28S, R22E, MDB&M, approximately six miles northeast of the impoundments. The wells are a facility supply source for non-drinking water.
36. Monitoring wells 36Q1 and 36Q2; 36K1 and 36K2; 31Q1 and 31Q2; 31G1 and 31G2; 5B1 and 5B2; and, 12R1 and 12R2 (Attachment C) were constructed during 1985 and 1986 by a predecessor company to the Discharger as nested two-inch diameter wells installed in one large diameter borehole. All wells are on property owned by adjacent landowners. Each nested well pair have well screens installed at different depths with a clay seal placed in the borehole between the two wells' screens. Wells 36Q2, 31Q1, 31G1, 31G2, 5B1, 5B2, and 12R1 were not sampled in August 2003 because the wells could not be found or a groundwater sample could not be obtained.
37. Monitoring well 36K1 is to the northeast of the impoundments (Attachment C) and has a screen and gravel pack intervals in Aquifer I. Water samples collected by the Discharger during August 2003 had the following concentrations: TDS, 5,400 mg/L; chloride, 1,400 mg/L; boron, 10 mg/L; and sulfate, 1,400 mg/L. The concentrations indicate that groundwater in Aquifer I is impacted by wastewater migrating from the impoundments. Impacted groundwater extends to the northeast of the impoundments for at least one mile to monitoring well 36K1 (Attachment D).
38. Monitoring wells 31Q1, 5B1, and 33N2S are to the northeast of the impoundments (Attachment C) and have screen and gravel pack intervals in Aquifer I. Well 33N2S was installed by the California Department of Water Resources in 1969. Water samples collected from the wells by the Discharger

or predecessor companies on the dates shown were analyzed by a state certified laboratory and the following concentrations were reported in mg/L:

| <u>Well</u> | <u>Sample Date</u> | <u>TDS</u> | <u>chloride</u> | <u>boron</u> | <u>sulfate</u> |
|-------------|--------------------|------------|-----------------|--------------|----------------|
| 31Q1 | August 2003 | 3,600 | 810 | 10 | 1,300 |
| 5B1 | August 1994 | 3,436 | 632 | 8 | 1,570 |
| 33N2S | October 1987 | 4,305 | 433 | 8.8 | 2,420 |

The results indicate that beginning at well 31Q1, which is approximately 1.45 miles northeast of the impoundments, and extending northeast to wells 5B1 and 33N2S, groundwater in Aquifer I has not been impacted by wastewater migrating from the impoundments (Attachment D).

39. Monitoring wells 36K2, 31G2, and 31Q2 are to the northeast of the impoundments (Attachment C) and have screen and gravel pack intervals in the 22K Aquifer. Water samples collected from the wells by the Discharger or a predecessor company on the dates shown were analyzed by a state certified laboratory and the following concentrations were reported in mg/L:

| <u>Well</u> | <u>Sample Date</u> | <u>TDS</u> | <u>chloride</u> | <u>boron</u> | <u>sulfate</u> |
|-------------|--------------------|------------|-----------------|--------------|----------------|
| 36K2 | August 2003 | 17,000 | 5,600 | 32 | 1,700 |
| 31G2 | June 1998 | 12,700 | 9,390 | 23.9 | 1,750 |
| 31Q2 | August 2003 | 5,400 | 1,600 | 11 | 1,100 |

The results indicate that wastewater migrating from the impoundments has impacted the 22K Aquifer at wells 31Q2 and 36K2, and to well 31G2, 1.65 miles downgradient from the impoundments (Attachment D).

40. Monitoring well MW-2B, installed by an adjacent landowner in 2003, is to the east of the impoundments (Attachment C), and has a screen and gravel pack interval in the 22K Aquifer. Water samples collected by the Discharger in August 2004 were analyzed by a state certified laboratory and the following concentrations were reported: TDS, 16,000 mg/L; chloride, 7,000 mg/L; boron, 68 mg/L; and sulfate, 1,700 mg/L. The results indicate that the 22K Aquifer is impacted at MW-2B by wastewater migrating from the impoundments.
41. Monitoring well 5B2 is to the northeast of the impoundments (Attachment C) and has a screen and gravel pack interval in the 22K Aquifer and lowermost part of Aquifer I. Water samples collected by a predecessor company to the Discharger in August 1994 were analyzed by a state certified laboratory and the following concentrations were reported: TDS, 2,600 mg/L; chloride, 585 mg/L; boron, 8.2 mg/L; and sulfate, 1,020 mg/L. The results from well 5B2, which is approximately 2.1 miles northeast of the impoundments, indicate that in 1994 the 22K Aquifer was not impacted by wastewater migrating from the impoundments (Attachment D).
42. Monitoring wells 12R2 and 36Q2 (Attachment C) have screen and gravel pack intervals in Aquifer II. Water samples collected by the Discharger from well 12R2 in August 2003 were analyzed by a state certified laboratory and the following concentrations were reported: TDS, 2,700 mg/L; chloride,

540 mg/L; boron, 9.8 mg/L; and sulfate, 870 mg/L. Water samples collected by a predecessor to the Discharger from well 36Q2 in August 1994 were analyzed by a state certified laboratory and the following concentrations were reported: TDS, 2,300 mg/L; chloride, 680 mg/L; boron, 7.3 mg/L; and sulfate, 805 mg/L. The results from well 36Q2, which is approximately 1.45 miles northeast of the impoundments, indicate that in 1994 Aquifer II was not impacted by wastewater from the impoundments (Attachment D).

43. Monitoring well MW-2A, installed by an adjacent landowner in 2003, is to the east of the impoundments (Attachment C), and is completed in Aquifer II. The geophysical log indicates that within the well screen and gravel pack interval, Aquifer II is dry. Water samples could not be collected during August 2004.
44. Water supply wells WW-1, WW-2, WW-3, WW-4, WW-5, WW-6, WW-7, and WW-9 are to the southeast and east of the impoundments (Attachment C), have screen intervals in Aquifer II, and have gravel pack intervals that extend up through the 22K Aquifer and Aquifer I to a depth of 50 feet. The wells are owned by an adjacent landowner and were installed in 2003 and 2004. Water samples collected from the wells by the owner in August 2004 were analyzed by a state certified laboratory and the following concentrations were reported in mg/L:

| <u>Well</u> | <u>TDS</u> | <u>chloride</u> | <u>boron</u> | <u>sulfate</u> |
|-------------|------------|-----------------|--------------|----------------|
| WW-1 | 2,900 | 770 | 12 | 930 |
| WW-2 | 2,700 | 550 | 9.7 | 910 |
| WW-3 | 5,800 | 1,700 | 19 | 1,600 |
| WW-4 | 4,200 | 1,200 | 15 | 1,200 |
| WW-5 | 13,000 | 6,000 | 65 | 1,500 |
| WW-6 | 3,700 | 1,300 | 15 | 880 |
| WW-7 | 3,000 | 940 | 13 | 830 |
| WW-9 | 11,000 | 4,400 | 38 | 1,300 |

45. The Discharger has not delineated the lateral extent of groundwater impacts due to wastewater from the impoundments. In accordance with the time schedule contained in this Order, the Discharger must complete an investigation to determine the lateral extent of wastewater impacts on groundwater in Aquifer I and the 22K Aquifer. Following completion of the investigation, a plan is to be submitted to implement a Corrective Action Program in accordance with Title 27, California Code of Regulations, Section 20430.

CEQA AND OTHER LEGAL REFERENCES

46. The action to adopt WDRs for existing facilities is exempt from the provisions of the California Environmental Quality Act (Public Resources Code Section 21000, et seq.), in accordance with Title 14, California Code of Regulations, Section 15301.
47. This Order requires the Discharger to submit technical reports as authorized under Section 13267(b)(1) of the California Water Code, which states in part:

“In conducting an investigation specified in subdivision (a), the Central Valley Water Board may require that any person who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge waste within its region, or any citizen or domiciliary, or political agency or entity of this state who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge, waste outside of its region that could affect the quality of waters within its region shall furnish, under penalty of perjury, technical or monitoring program reports which the Central Valley Water Board requires. The burden, including costs, of these reports shall bear a reasonable relationship to the need for the report and the benefits to be obtained from it. In requiring those reports, the Central Valley Water Board shall provide the person with a written explanation with regard to the need for the reports, and shall identify the evidence that supports requiring that person to provide the reports.”

48. The technical reports required by this Order and the attached “Monitoring and Reporting Program No. R5-2006-____” are necessary to assure compliance with these WDRs. The Discharger operates the facility that discharges the waste subject to this Order.
49. The Discharger is not required to obtain coverage under a National Pollutant Discharge Elimination System (NPDES) general industrial stormwater permit, provided the facility has not experienced a reportable spill since 19 November 1987. It is the responsibility of the Discharger to comply with United States Environmental Protection Agency federal stormwater regulations (40 CFR Parts 122, 123, and 124) should the facility not qualify for exemption.
50. This Order imposes significant new and more stringent requirements compared to those in WDRs, Resolution No. 68-268. This Order is consistent with the antidegradation provisions of State Water Board Resolution 68-16. Provided the Discharger complies with the Order, discharges in the future should not cause adverse impacts on groundwater.

PROCEDURAL REQUIREMENTS

51. The Central Valley Water Board has notified the Discharger, interested agencies, and persons of its intent to prescribe WDRs for this discharge and has provided them with an opportunity to submit their written views and recommendations.
52. The Central Valley Water Board, in a public meeting, heard and considered all comments pertaining to this proposed Order.
53. Any person adversely affected by this action of the Central Valley Water Board may petition the State Water Board to review the action. The petition must be received by the State Water Board within 30 days of the date of issuance of this Order. Copies of the law and regulations applicable to filing petitions are available at http://www.waterboards.ca.gov/water_laws and will be provided upon request.

IT IS HEREBY ORDERED, that Resolution No. 68-268 be rescinded, and that pursuant to Sections 13263 and 13267 of the California Water Code, Aera Energy LLC, its agents, successors, and assigns, in

order to meet the provisions of Division 7 of the California Water Code and plans, policies, and regulations adopted thereunder, shall comply with the following:

A. PROHIBITIONS

1. The acceptance, treatment, or discharge of “hazardous waste” is prohibited. For purposes of this Order, the term “hazardous waste” is as defined in Title 23, California Code of Regulations, §2510, et seq.
2. The discharge of waste to land other than wastewater associated with the production of petroleum hydrocarbons described in Finding No. 2 is prohibited.
3. Discharges of waste to surface water or surface water drainage courses are prohibited.
4. After the impoundments are closed, the temporary discharge of wastewater to any impoundment(s) retained for use during an upset or emergency condition is prohibited without having a Spill Prevention Control and Countermeasures (SPCC) Plan previously approved by the Executive Officer. The uses of an impoundment during an upset or emergency condition must be described in the SPCC Plan. Any impoundment(s) used for emergency containment must have been constructed in accordance with the applicable criteria in the Department of Water Resources - Division of Dam Safety publication entitled *Guidelines for the Design and Construction of Small Embankment Dams*.

B. SPECIFICATIONS

1. Wastewater discharged to unlined surface impoundments that do not meet the prescriptive construction criteria for classified waste management units as specified in Title 27 and overlying groundwater with existing and future probable beneficial uses shall not exceed the following limits prescribed in the Basin Plan: electrical conductivity at 25° C, 1,000 µmhos/cm; chloride, 200 mg/L; and, boron, 1 mg/L.
2. In order to comply with Specification B.1, the Discharger shall implement its disposal alternatives and closure plans for the surface impoundments described in Finding No. 2 and Finding No. 6 in accordance with the time schedule contained in Provision C.12 of this Order.
3. The impoundment berms shall be maintained to prevent seepage or leakage caused by erosion, slope failure, or animal burrowing.
4. Wastewater production shall be controlled to the extent necessary to maintain consistent compliance with the terms of this Order.
5. The impoundments shall have sufficient freeboard to prevent overtopping as a result of successive precipitation events, high velocity winds, or seismic shaking. In no case shall there be less than two feet (measured vertically) of freeboard.
6. Precipitation and drainage control systems shall be designed, constructed, and maintained to accommodate the anticipated volume of precipitation and peak flows from surface runoff under 100-year, 24-hour precipitation conditions. Annually, prior to the anticipated rainy season, any

necessary erosion control measures shall be implemented, and any necessary construction, maintenance, or repairs of precipitation and drainage control facilities shall be completed to prevent erosion or flooding of the impoundments.

7. The impoundments shall either be free of oil or effectively netted to preclude entry of wildlife in accordance with Title 14, California Code of Regulations, §1770 (b) (3).
8. Public contact with wastewater shall be precluded through such means as fences, signs, or other acceptable alternatives.
9. The Discharger shall operate and maintain the impoundments in a manner that prevents liquids, precipitates, and sludges from concentrating to hazardous levels.

C. PROVISIONS

1. The Discharger shall comply with the attached Monitoring and Reporting Program No. _____, which is part of this Order, and any revisions thereto as ordered by the Executive Officer.
2. The Discharger shall comply with those applicable sections of the "*Standard Provisions and Reporting Requirements for Waste Discharge Requirements*" (Standard Provisions) dated August 1997, which are attached to, and by reference, a part of this Order. To the extent that the Standard Provisions are inconsistent with any terms, conditions, or requirements in this Order, this Order shall govern.
3. In the event of any change in control or ownership of the wastewater disposal facility, then the Discharger shall notify the succeeding owner or operator of the existence of this Order by letter, a copy of which shall also be forwarded to this office, at least 14 days in advance of the change in control or ownership.
4. To assume ownership or operation of the wastewater disposal facility under this Order, the succeeding owner or operator must apply in writing to the Central Valley Water Board requesting transfer of the Order within 14 days of assuming ownership or operation of the facility. The request must contain the requesting entity's full legal name, the State of incorporation if a corporation, the name, address, and telephone number of the persons responsible for contact with the Central Valley Water Board, and a statement that the new owner or operator assumes full responsibility for compliance with this Order. Failure to submit the request shall be considered a discharge without requirements, which is a violation of the California Water Code. Transfer of this Order to a succeeding owner or operator shall be approved or disapproved by the Central Valley Water Board.
5. The Discharger shall maintain a copy of this Order and make it available at all times to facility operating personnel, who shall be familiar with its contents, and to regulatory agency personnel upon request.
6. The Discharger shall immediately notify Central Valley Water Board staff of any flooding, equipment failure, slope failure, or other change in site conditions, which could impair the integrity of waste containment facilities or precipitation and drainage control structures.

7. The Central Valley Water Board will review this Order periodically and will revise these requirements when necessary.
8. Technical and monitoring reports specified in this Order and additional technical reports and plans that may be required as directed by the Executive Officer as provided for in the California Water Code, Section 13267 are to be prepared by or under the direction of and signed and certified by the appropriate registered professional licensed by the State of California. A licensed professional may be a Registered Geologist, Registered Civil Engineer, Certified Engineering Geologist, or Certified Hydrogeologist.
9. The Discharger shall demonstrate financial responsibility for initiating and completing corrective action of all known or reasonably foreseeable releases, and shall submit a report of financial assurance by **April 30th of each year** for Executive Officer review and approval. The assurances of financial responsibility shall name the Central Valley Water Board as beneficiary and shall provide that funds for corrective action shall be available to the Central Valley Water Board upon issuance of any order under California Water Code, Division 7, Chapter 5. The Discharger shall adjust the cost annually to account for inflation and any changes in facility design, construction, or operation.
10. The Discharger shall demonstrate financial responsibility for closure and post-closure maintenance, and shall submit a report of financial responsibility by **April 30th of each year** for Executive Officer review and approval. The assurances of financial responsibility shall name the Central Valley Water Board as beneficiary and shall provide that funds for closure and post-closure maintenance shall be available to the Central Valley Water Board upon issuance of any order under California Water Code, Division 7, Chapter 5. The Discharger shall adjust the cost annually to account for inflation and any changes in facility design, construction, or operation.
11. This Order does not authorize violation of any federal, state, or local laws or regulations.

COMPLIANCE SCHEDULE

12. The Discharger, whose wastewater effluent exceeds the limitations stated in Specification B.1, shall implement a wastewater disposal program consistent with current state regulations and policy. The wastewater disposal program shall include the following tasks to be completed by the compliance dates:

| Task & Description | Compliance Date |
|--|----------------------------|
| <p><u>Compliance Plan</u> The Discharger shall submit a detailed compliance plan and time schedule describing how compliance will be achieved with this Order.</p> | <p>30 June 2006</p> |

| | |
|---|--------------------------------|
| <p><u>Groundwater Investigation Work Plan</u> The Discharger shall submit a detailed work plan and time schedule to determine the lateral impact of wastewater on groundwater.</p> | <p>31 July 2006</p> |
| <p><u>Cease Wastewater Discharge</u> The Discharger shall cease the discharge of wastewater to the facility in accordance with the Compliance Plan.</p> | <p>2 January 2007</p> |
| <p><u>Closure Plan</u> The Discharger shall submit a closure plan in accordance with Title 27, California Code of Regulations, Section 21400. The plan shall include a Report of Waste Discharge.</p> | <p>29 June 2007</p> |
| <p><u>Complete Groundwater Investigation</u> The Discharger shall complete an investigation to determine the lateral impact of wastewater on groundwater.</p> | <p>2 September 2008</p> |
| <p><u>Corrective Action Plan</u> The Discharger shall submit a Corrective Action Plan.</p> | <p>31 December 2008</p> |

The Discharger shall, where appropriate, submit quarterly reports describing progress towards achieving compliance with each task, and shall report any delay in the implementation of any required task, describing in detail the reasons for such delay.

AERA ENERGY LLC

SOUTH WASTEWATER DISPOSAL FACILITY

SOUTH BELRIDGE OIL FIELD, KERN COUNTY

I, PAMELA C. CREEDON, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Central Valley Region on 23 June 2006

original signed by

PAMELA C. CREEDON, Executive Officer

DLW: 5/30/06

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER NO. R5-2006-____

WASTE DISCHARGE REQUIREMENTS
FOR
AERA ENERGY LLC
SOUTH WASTEWATER DISPOSAL FACILITY
SOUTH BELBRIDGE OIL FIELD, KERN COUNTY

The California Regional Water Quality Control Board, Central Valley Region (hereafter Central Valley Water Board) finds that:

1. Aera Energy LLC, a California limited liability company, (Discharger) owns and operates crude oil production wells, oil and produced water treatment plants, and wastewater disposal facilities in the South Belridge Oil Field.
2. The South Wastewater Disposal Facility (Facility) is located at the end of an approximately 6,300 foot long ditch which conveys wastewater from the Discharger's Dehydration Plant and Water Softening Plant to 18 unlined surface impoundments. The wastewater discharged at the Facility includes: (a) oil field produced water from the Dehydration Plant; (b) backwash water from treatment filters at the Water Softening Plant; and, (c) softener regeneration wastewater from ion exchange units at the Water Softening Plant.
3. This Order implements the *Water Quality Control Plan for the Tulare Lake Basin, Second Edition - 1995* (Basin Plan), which designates beneficial uses, establishes water quality objectives, and contains implementation plans and policies for all waters of the Basin.
4. The discharges are subject to the requirements of Title 27, California Code of Regulations, Section 20090(b) et seq (Title 27), and are currently regulated by Waste Discharge Requirements (WDRs), Resolution No. 68-268. The WDRs are outdated and are being updated to reflect Basin Plan policy, current regulations, and new site-specific technical information.

LOCATION AND DESCRIPTION

5. The South Belridge Oil Field is on the west side of the San Joaquin Valley, approximately 35 miles west of the city of Bakersfield and nine miles south of Lost Hills, in Kern County as shown on Attachment A, which is attached to and made part of this Order.
6. The unlined impoundments are in Section 1 and the NE¼ of Section 12, T29S, R21E, MDB&M (Assessor Parcel Numbers 098-113-04-6; 098-113-06-1; 098-113-11-1; and, 098-113-13-7). The Dehydration Plant and Water Softening Plant are located in the SE¼, SW¼, Section 2, T29S, R21E, MDB&M. The impoundments, ditch, Dehydration Plant, and Water Softening Plant are shown on Attachment B, which is attached to and made part of this Order.
7. The impoundments, which have a surface area of approximately 80 acres, are used for the disposal of wastewater by evaporation and percolation. The Discharger has reported that approximately 18,245,000 barrels of wastewater were discharged to the Facility during 2004.

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8. The impoundments are unlined and do not meet the prescriptive construction criteria for Class II surface impoundments as specified in Title 27, Section 20005, et seq.
9. To the east of the impoundments, the land in Sections 1 and 12 is covered with predominantly native grass and shrub vegetation. The adjacent sections to the north and east of Section 1 currently contain irrigated crops. To the west, land use consists of oil and gas production.
10. The South Belridge Oil Field lies on the Antelope Plain, an alluvial piedmont consisting of coalescing alluvial fans from the Temblor Range to the west. The region slopes to the east towards the San Joaquin Valley.
11. The site is in the South Valley Floor Hydrologic Unit, Antelope Plain Hydrologic Area (No. 558.60), as depicted on interagency hydrogeologic maps, prepared by the Department of Water Resources in August 1986.
12. The climate in the area is semi-arid, with hot, dry summers and cool winters. Available weather data through 1997 from a monitoring station at South Belridge indicates the average annual precipitation is 5.96 inches. The annual Class A pan evaporation rate is approximately 108 inches at Lost Hills.
13. The 100-year and 1000-year, 24-hour precipitation events calculated by the California Department of Water Resources (DWR) are 2.53 inches and 3.32 inches, respectively, for the South Belridge monitoring station based on data through 1997.
14. An unnamed intermittent stream channel immediately to the south of the southernmost impoundment terminates approximately 2 miles to the northeast near Seventh Standard Road. A second unnamed intermittent stream channel traverses between the impoundments and terminates approximately 1.5 miles to the northeast. The intermittent stream channels are shown on Attachment B, which is attached to and made part of this Order. Natural flow in the channels occurs during infrequent high precipitation storm events. The unnamed stream channel is defined as West Side Streams in the Basin Plan.
15. Federal Emergency Management Agency Flood Insurance Rate Map, Community Panel No. 060075 0675 B, dated 26 September 1986, shows the southernmost impoundment is adjacent to the 100-year floodplain of the unnamed intermittent stream channel.
16. Table II-I in the Basin Plan designates West Side Streams as having beneficial uses that include: agricultural supply; industrial service and process supply; water contact and non-contact water recreation; warm freshwater habitat; wildlife habitat; rare and endangered species habitat; and groundwater recharge. Some beneficial uses may not be applicable to a body of water.
17. The California Aqueduct and Belridge Water Storage District's 500 North Canal are approximately 2.6 and 1.2 miles northeast of the impoundments, respectively.

HYDROGEOLOGIC INFORMATION

18. The Discharger has conducted a hydrogeologic investigation to delineate the geology and evaluate groundwater conditions in the area east of the South Belridge Oil Field. Predecessor companies to the Discharger have installed 67 groundwater monitoring wells between 1984 and 1992. Currently, 47 groundwater monitoring wells are sampled by the Discharger. An adjacent property owner has installed five groundwater monitoring wells and eight water supply wells. The DWR installed two groundwater monitoring wells. Attachment C, which is attached to and made part of this Order, shows the locations of all groundwater monitoring and water supply wells in the area east of the South Belridge Oil Field with the wells near the impoundments highlighted.
19. The youngest sediments are Holocene Alluvium, which consists of a heterogeneous sequence of alternating sand, silt, and clay. Underlying the Alluvium is the Late Pleistocene Upper Tulare Formation, which also consists of alternating sand, silt, and clay.
20. Reports submitted by the Discharger describe how the stratigraphically lowest sand layer in the Alluvium is laterally continuous and has been designated as the 22K Sand. Underlying the 22K Sand is the Corcoran Clay Equivalent (CCE), which likely correlates with the Corcoran Clay identified further to the east. Unconformably underlying the CCE are Upper Tulare sediments. Attachment D, which is attached to and made part of this Order, shows the stratigraphy.
21. Three stratigraphic intervals have been identified by the Discharger as aquifer zones containing water-bearing layers. Discontinuous water-bearing sand layers separated by clay layers within the Alluvium have been collectively designated as the unconfined Aquifer I. Underlying Aquifer I is a discontinuous clay aquitard. Below this aquitard is the 22K Sand which is water-bearing and is designated as the semi-confined 22K Aquifer. Underlying the 22K Aquifer is a regionally contiguous aquitard, the CCE. Below the CCE in the upper Tulare sediments is a thick sequence of relatively continuous, permeable water-bearing sand layers separated by clay layers collectively designated as the confined Aquifer II. Attachment D shows the three aquifer zones.
22. Hydrogeologic information indicates that the geology beneath and to the northeast of the Facility does not preclude wastewater from migrating downgradient to the northeast.
23. Oil and wastewater is produced from the Belridge Diatomite and the Tulare Formation. The shallowest production is in the Tulare Formation at a depth of approximately 300 feet.
24. The Discharger operates 46 Class II injection disposal wells permitted by the California Division of Oil, Gas, and Geothermal Resources to inject wastewater into the Tulare Formation. The wells are in Sections 20 and 21, T28S, R21E and Section 11, T29S, R21E, MDB&M. During August 2005, the Discharger reported 2,851,016 barrels of wastewater were injected into 16 disposal wells.
25. No known Holocene faults traverse or are projected through the South Belridge area. The nearest known Holocene fault is the San Andres Fault zone, located 15 miles southwest of the site.

WASTEWATER CHARACTERISTICS AND CLASSIFICATION

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26. Wastewater in the impoundments is sampled and analyzed by the Discharger each quarter and the results reported semi-annually. On 26 May 2005, wastewater samples were collected from the inlet impoundment, a middle impoundment, and from the terminal impoundment. A state certified laboratory analyzed the samples and the Discharger reported the following results in the *Semi-Annual Monitoring Report January - June 2005*:

| <u>Impoundment</u> | <u>EC</u> µmhos/cm | <u>TDS</u> mg/L | <u>chloride</u> mg/L | <u>boron</u> mg/L |
|--------------------|-----------------------|--------------------|-------------------------|----------------------|
| Inlet | 20,000 | 12,000 | 5,600 | 91 |
| Middle | 23,000 | 13,000 | 6,800 | 90 |
| Terminal | 25,000 | 13,000 | 6,800 | 98 |

27. Non-hazardous waste that contains pollutants that, under ambient environmental conditions at a waste management unit, could be released in concentrations exceeding applicable water quality objectives or that could reasonably be expected to affect beneficial uses of the waters of the state is defined in California Water Code, §13173 (b) as “Designated Waste.”
28. The Discharger conducted a feasibility study of disposal alternatives, and decided to implement: (a) wastewater recycling; and, (b) wastewater disposal to Class II disposal wells permitted by the California Division of Oil, Gas, and Geothermal Resources.
29. The Discharger, in correspondence dated 3 August 2005, committed to permanently cease wastewater discharges to land for purposes of disposal and close the ditch and surface impoundments in accordance with the time schedule contained in this Order.

BASIN PLAN INFORMATION

30. The Basin Plan contains maximum numerical salinity limits for the disposal of oil field production wastewater in unlined impoundments overlying groundwater with existing and future probable beneficial uses. The maximum concentration limits are: electrical conductivity at 25° C, 1,000 µmhos/cm; chloride, 200 mg/L; and, boron, 1 mg/L.
31. Table II-2 in the Basin Plan lists the beneficial uses of groundwater. The facility is in the Kern County Basin Hydrologic Unit and the 259 Detailed Analysis Unit (DAU), which has the following beneficial uses of groundwater: municipal and domestic supply (MUN), agricultural supply (AGR), and industrial service supply (IND). Due to the size of the DAU, the listed uses may not exist throughout the DAU. The Basin Plan defines MUN as uses of water for community, military, or individual water supply systems, including, but not limited to, drinking water supply. The Basin Plan defines AGR as uses of water for farming, horticulture, or ranching, including, but not limited to, irrigation, stock watering, or support of vegetation for range grazing. The Basin Plan defines IND as uses of water for industrial activities that do not depend primarily on water quality, including, but not limited to, mining, cooling water supply, hydraulic conveyance, gravel washing, fire protection, or oil well repressurization.
32. The Basin Plan allows the Central Valley Water Board to consider criteria for exceptions to beneficial uses of groundwater. One of the exception criteria for both the MUN and AGR beneficial

use designations is: “The aquifer is regulated as a geothermal energy producing source or has been exempted administratively pursuant to 40 CFR, Section 146.4 for the purpose of underground injection of fluids associated with the production of hydrocarbon or geothermal energy...” An exception criteria for just the MUN designation is: “The total dissolved solids (TDS) must exceed 3,000 mg/L (or an electrical conductivity exceeding 5,000 μ mhos/cm) and the aquifer cannot be reasonably expected to supply a public water system.”

33. Where the Central Valley Water Board finds that one of the exception criteria apply, it may remove the designation for the particular water body through a formal Basin Plan amendment, which includes a public hearing. The exception becomes effective upon approval by the State Water Resources Control Board (hereafter State Water Board) and Office of Administrative Law. Table II-2 in the Basin Plan lists those beneficial use exceptions that have been considered by the Central Valley Water Board. The Central Valley Water Board has not considered a request or amended the Basin Plan to allow an exception to the beneficial uses of groundwater for this location.

GROUNDWATER INFORMATION

34. The Discharger owns and operates 35 industrial supply wells in Sections 20, 21, 27, 28, 34, and 35 of T28S, R21E, MDB&M, approximately one to five miles northwest of the impoundments. The wells supply approximately 420,000 barrels per day of groundwater for use by the Discharger for waterflood injection. The groundwater has concentrations that average about 14,667 mg/L for TDS, 8,700 mg/L for chloride, and 45 mg/L for boron.
35. The Discharger owns and operates two groundwater wells near Spicer City and in Section 10, T28S, R22E, MDB&M, approximately six miles northeast of the impoundments. The wells are a facility supply source for non-drinking water.
36. Monitoring wells 36Q1 and 36Q2; 36K1 and 36K2; 31Q1 and 31Q2; 31G1 and 31G2; 5B1 and 5B2; and, 12R1 and 12R2 (Attachment C) were constructed during 1985 and 1986 by a predecessor company to the Discharger as nested two-inch diameter wells installed in one large diameter borehole. All wells are on property owned by adjacent landowners. Each nested well pair have well screens installed at different depths with a clay seal placed in the borehole between the two wells' screens. Wells 36Q2, 31Q1, 31G1, 31G2, 5B1, 5B2, and 12R1 were not sampled in August 2003 because the wells could not be found or a groundwater sample could not be obtained.
37. Monitoring well 36K1 is to the northeast of the impoundments (Attachment C) and has a screen and gravel pack intervals in Aquifer I. Water samples collected by the Discharger during August 2003 had the following concentrations: TDS, 5,400 mg/L; chloride, 1,400 mg/L; boron, 10 mg/L; and sulfate, 1,400 mg/L. The concentrations indicate that groundwater in Aquifer I is impacted by wastewater migrating from the impoundments. Impacted groundwater extends to the northeast of the impoundments for at least one mile to monitoring well 36K1 (Attachment D).
38. Monitoring wells 31Q1, 5B1, and 33N2S are to the northeast of the impoundments (Attachment C) and have screen and gravel pack intervals in Aquifer I. Well 33N2S was installed by the California Department of Water Resources in 1969. Water samples collected from the wells by the Discharger

or predecessor companies on the dates shown were analyzed by a state certified laboratory and the following concentrations were reported in mg/L:

| <u>Well</u> | <u>Sample Date</u> | <u>TDS</u> | <u>chloride</u> | <u>boron</u> | <u>sulfate</u> |
|-------------|--------------------|------------|-----------------|--------------|----------------|
| 31Q1 | August 2003 | 3,600 | 810 | 10 | 1,300 |
| 5B1 | August 1994 | 3,436 | 632 | 8 | 1,570 |
| 33N2S | October 1987 | 4,305 | 433 | 8.8 | 2,420 |

The results indicate that beginning at well 31Q1, which is approximately 1.45 miles northeast of the impoundments, and extending northeast to wells 5B1 and 33N2S, groundwater in Aquifer I has not been impacted by wastewater migrating from the impoundments (Attachment D).

39. Monitoring wells 36K2, 31G2, and 31Q2 are to the northeast of the impoundments (Attachment C) and have screen and gravel pack intervals in the 22K Aquifer. Water samples collected from the wells by the Discharger or a predecessor company on the dates shown were analyzed by a state certified laboratory and the following concentrations were reported in mg/L:

| <u>Well</u> | <u>Sample Date</u> | <u>TDS</u> | <u>chloride</u> | <u>boron</u> | <u>sulfate</u> |
|-------------|--------------------|------------|-----------------|--------------|----------------|
| 36K2 | August 2003 | 17,000 | 5,600 | 32 | 1,700 |
| 31G2 | June 1998 | 12,700 | 9,390 | 23.9 | 1,750 |
| 31Q2 | August 2003 | 5,400 | 1,600 | 11 | 1,100 |

The results indicate that wastewater migrating from the impoundments has impacted the 22K Aquifer at wells 31Q2 and 36K2, and to well 31G2, 1.65 miles downgradient from the impoundments (Attachment D).

40. Monitoring well MW-2B, installed by an adjacent landowner in 2003, is to the east of the impoundments (Attachment C), and has a screen and gravel pack interval in the 22K Aquifer. Water samples collected by the Discharger in August 2004 were analyzed by a state certified laboratory and the following concentrations were reported: TDS, 16,000 mg/L; chloride, 7,000 mg/L; boron, 68 mg/L; and sulfate, 1,700 mg/L. The results indicate that the 22K Aquifer is impacted at MW-2B by wastewater migrating from the impoundments.
41. Monitoring well 5B2 is to the northeast of the impoundments (Attachment C) and has a screen and gravel pack interval in the 22K Aquifer and lowermost part of Aquifer I. Water samples collected by a predecessor company to the Discharger in August 1994 were analyzed by a state certified laboratory and the following concentrations were reported: TDS, 2,600 mg/L; chloride, 585 mg/L; boron, 8.2 mg/L; and sulfate, 1,020 mg/L. The results from well 5B2, which is approximately 2.1 miles northeast of the impoundments, indicate that in 1994 the 22K Aquifer was not impacted by wastewater migrating from the impoundments (Attachment D).
42. Monitoring wells 12R2 and 36Q2 (Attachment C) have screen and gravel pack intervals in Aquifer II. Water samples collected by the Discharger from well 12R2 in August 2003 were analyzed by a state certified laboratory and the following concentrations were reported: TDS, 2,700 mg/L; chloride,

540 mg/L; boron, 9.8 mg/L; and sulfate, 870 mg/L. Water samples collected by a predecessor to the Discharger from well 36Q2 in August 1994 were analyzed by a state certified laboratory and the following concentrations were reported: TDS, 2,300 mg/L; chloride, 680 mg/L; boron, 7.3 mg/L; and sulfate, 805 mg/L. The results from well 36Q2, which is approximately 1.45 miles northeast of the impoundments, indicate that in 1994 Aquifer II was not impacted by wastewater from the impoundments (Attachment D).

43. Monitoring well MW-2A, installed by an adjacent landowner in 2003, is to the east of the impoundments (Attachment C), and is completed in Aquifer II. The geophysical log indicates that within the well screen and gravel pack interval, Aquifer II is dry. Water samples could not be collected during August 2004.
44. Water supply wells WW-1, WW-2, WW-3, WW-4, WW-5, WW-6, WW-7, and WW-9 are to the southeast and east of the impoundments (Attachment C), have screen intervals in Aquifer II, and have gravel pack intervals that extend up through the 22K Aquifer and Aquifer I to a depth of 50 feet. The wells are owned by an adjacent landowner and were installed in 2003 and 2004. Water samples collected from the wells by the owner in August 2004 were analyzed by a state certified laboratory and the following concentrations were reported in mg/L:

| <u>Well</u> | <u>TDS</u> | <u>chloride</u> | <u>boron</u> | <u>sulfate</u> |
|-------------|------------|-----------------|--------------|----------------|
| WW-1 | 2,900 | 770 | 12 | 930 |
| WW-2 | 2,700 | 550 | 9.7 | 910 |
| WW-3 | 5,800 | 1,700 | 19 | 1,600 |
| WW-4 | 4,200 | 1,200 | 15 | 1,200 |
| WW-5 | 13,000 | 6,000 | 65 | 1,500 |
| WW-6 | 3,700 | 1,300 | 15 | 880 |
| WW-7 | 3,000 | 940 | 13 | 830 |
| WW-9 | 11,000 | 4,400 | 38 | 1,300 |

45. The Discharger has not delineated the lateral extent of groundwater impacts due to wastewater from the impoundments. In accordance with the time schedule contained in this Order, the Discharger must complete an investigation to determine the lateral extent of wastewater impacts on groundwater in Aquifer I and the 22K Aquifer. Following completion of the investigation, a plan is to be submitted to implement a Corrective Action Program in accordance with Title 27, California Code of Regulations, Section 20430.

CEQA AND OTHER LEGAL REFERENCES

46. The action to adopt WDRs for existing facilities is exempt from the provisions of the California Environmental Quality Act (Public Resources Code Section 21000, et seq.), in accordance with Title 14, California Code of Regulations, Section 15301.
47. This Order requires the Discharger to submit technical reports as authorized under Section 13267(b)(1) of the California Water Code, which states in part:

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“In conducting an investigation specified in subdivision (a), the Central Valley Water Board may require that any person who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge waste within its region, or any citizen or domiciliary, or political agency or entity of this state who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge, waste outside of its region that could affect the quality of waters within its region shall furnish, under penalty of perjury, technical or monitoring program reports which the Central Valley Water Board requires. The burden, including costs, of these reports shall bear a reasonable relationship to the need for the report and the benefits to be obtained from it. In requiring those reports, the Central Valley Water Board shall provide the person with a written explanation with regard to the need for the reports, and shall identify the evidence that supports requiring that person to provide the reports.”

48. The technical reports required by this Order and the attached “Monitoring and Reporting Program No. R5-2006-____” are necessary to assure compliance with these WDRs. The Discharger operates the facility that discharges the waste subject to this Order.
49. The Discharger is not required to obtain coverage under a National Pollutant Discharge Elimination System (NPDES) general industrial stormwater permit, provided the facility has not experienced a reportable spill since 19 November 1987. It is the responsibility of the Discharger to comply with United States Environmental Protection Agency federal stormwater regulations (40 CFR Parts 122, 123, and 124) should the facility not qualify for exemption.
50. This Order imposes significant new and more stringent requirements compared to those in WDRs, Resolution No. 68-268. This Order is consistent with the antidegradation provisions of State Water Board Resolution 68-16. Provided the Discharger complies with the Order, discharges in the future should not cause adverse impacts on groundwater.

PROCEDURAL REQUIREMENTS

51. The Central Valley Water Board has notified the Discharger, interested agencies, and persons of its intent to prescribe WDRs for this discharge and has provided them with an opportunity to submit their written views and recommendations.
52. The Central Valley Water Board, in a public meeting, heard and considered all comments pertaining to this proposed Order.
53. Any person adversely affected by this action of the Central Valley Water Board may petition the State Water Board to review the action. The petition must be received by the State Water Board within 30 days of the date of issuance of this Order. Copies of the law and regulations applicable to filing petitions are available at http://www.waterboards.ca.gov/water_laws and will be provided upon request.

IT IS HEREBY ORDERED, that Resolution No. 68-268 be rescinded, and that pursuant to Sections 13263 and 13267 of the California Water Code, Aera Energy LLC, its agents, successors, and assigns, in

order to meet the provisions of Division 7 of the California Water Code and plans, policies, and regulations adopted thereunder, shall comply with the following:

A. PROHIBITIONS

1. The acceptance, treatment, or discharge of “hazardous waste” is prohibited. For purposes of this Order, the term “hazardous waste” is as defined in Title 23, California Code of Regulations, §2510, et seq.
2. The discharge of waste to land other than wastewater associated with the production of petroleum hydrocarbons described in Finding No. 2 is prohibited.
3. Discharges of waste to surface water or surface water drainage courses are prohibited.
4. After the impoundments are closed, the temporary discharge of wastewater to any impoundment(s) retained for use during an upset or emergency condition is prohibited without having a Spill Prevention Control and Countermeasures (SPCC) Plan previously approved by the Executive Officer. The uses of an impoundment during an upset or emergency condition must be described in the SPCC Plan. Any impoundment(s) used for emergency containment must have been constructed in accordance with the applicable criteria in the Department of Water Resources - Division of Dam Safety publication entitled *Guidelines for the Design and Construction of Small Embankment Dams*.

B. SPECIFICATIONS

1. Wastewater discharged to unlined surface impoundments that do not meet the prescriptive construction criteria for classified waste management units as specified in Title 27 and overlying groundwater with existing and future probable beneficial uses shall not exceed the following limits prescribed in the Basin Plan: electrical conductivity at 25° C, 1,000 µmhos/cm; chloride, 200 mg/L; and, boron, 1 mg/L.
2. In order to comply with Specification B.1, the Discharger shall implement its disposal alternatives and closure plans for the surface impoundments described in Finding No. 2 and Finding No. 6 in accordance with the time schedule contained in Provision C.12 of this Order.
3. The impoundment berms shall be maintained to prevent seepage or leakage caused by erosion, slope failure, or animal burrowing.
4. Wastewater production shall be controlled to the extent necessary to maintain consistent compliance with the terms of this Order.
5. The impoundments shall have sufficient freeboard to prevent overtopping as a result of successive precipitation events, high velocity winds, or seismic shaking. In no case shall there be less than two feet (measured vertically) of freeboard.
6. Precipitation and drainage control systems shall be designed, constructed, and maintained to accommodate the anticipated volume of precipitation and peak flows from surface runoff under 100-year, 24-hour precipitation conditions. Annually, prior to the anticipated rainy season, any

necessary erosion control measures shall be implemented, and any necessary construction, maintenance, or repairs of precipitation and drainage control facilities shall be completed to prevent erosion or flooding of the impoundments.

7. The impoundments shall either be free of oil or effectively netted to preclude entry of wildlife in accordance with Title 14, California Code of Regulations, §1770 (b) (3).
8. Public contact with wastewater shall be precluded through such means as fences, signs, or other acceptable alternatives.
9. The Discharger shall operate and maintain the impoundments in a manner that prevents liquids, precipitates, and sludges from concentrating to hazardous levels.

C. PROVISIONS

1. The Discharger shall comply with the attached Monitoring and Reporting Program No. _____, which is part of this Order, and any revisions thereto as ordered by the Executive Officer.
2. The Discharger shall comply with those applicable sections of the "*Standard Provisions and Reporting Requirements for Waste Discharge Requirements*" (Standard Provisions) dated August 1997, which are attached to, and by reference, a part of this Order. To the extent that the Standard Provisions are inconsistent with any terms, conditions, or requirements in this Order, this Order shall govern.
3. In the event of any change in control or ownership of the wastewater disposal facility, then the Discharger shall notify the succeeding owner or operator of the existence of this Order by letter, a copy of which shall also be forwarded to this office, at least 14 days in advance of the change in control or ownership.
4. To assume ownership or operation of the wastewater disposal facility under this Order, the succeeding owner or operator must apply in writing to the Central Valley Water Board requesting transfer of the Order within 14 days of assuming ownership or operation of the facility. The request must contain the requesting entity's full legal name, the State of incorporation if a corporation, the name, address, and telephone number of the persons responsible for contact with the Central Valley Water Board, and a statement that the new owner or operator assumes full responsibility for compliance with this Order. Failure to submit the request shall be considered a discharge without requirements, which is a violation of the California Water Code. Transfer of this Order to a succeeding owner or operator shall be approved or disapproved by the Central Valley Water Board.
5. The Discharger shall maintain a copy of this Order and make it available at all times to facility operating personnel, who shall be familiar with its contents, and to regulatory agency personnel upon request.
6. The Discharger shall immediately notify Central Valley Water Board staff of any flooding, equipment failure, slope failure, or other change in site conditions, which could impair the integrity of waste containment facilities or precipitation and drainage control structures.

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7. The Central Valley Water Board will review this Order periodically and will revise these requirements when necessary.
8. Technical and monitoring reports specified in this Order and additional technical reports and plans that may be required as directed by the Executive Officer as provided for in the California Water Code, Section 13267 are to be prepared by or under the direction of and signed and certified by the appropriate registered professional licensed by the State of California. A licensed professional may be a Registered Geologist, Registered Civil Engineer, Certified Engineering Geologist, or Certified Hydrogeologist.
9. The Discharger shall demonstrate financial responsibility for initiating and completing corrective action of all known or reasonably foreseeable releases, and shall submit a report of financial assurance by **April 30th of each year** for Executive Officer review and approval. The assurances of financial responsibility shall name the Central Valley Water Board as beneficiary and shall provide that funds for corrective action shall be available to the Central Valley Water Board upon issuance of any order under California Water Code, Division 7, Chapter 5. The Discharger shall adjust the cost annually to account for inflation and any changes in facility design, construction, or operation.
10. The Discharger shall demonstrate financial responsibility for closure and post-closure maintenance, and shall submit a report of financial responsibility by **April 30th of each year** for Executive Officer review and approval. The assurances of financial responsibility shall name the Central Valley Water Board as beneficiary and shall provide that funds for closure and post-closure maintenance shall be available to the Central Valley Water Board upon issuance of any order under California Water Code, Division 7, Chapter 5. The Discharger shall adjust the cost annually to account for inflation and any changes in facility design, construction, or operation.
11. This Order does not authorize violation of any federal, state, or local laws or regulations.

COMPLIANCE SCHEDULE

12. The Discharger, whose wastewater effluent exceeds the limitations stated in Specification B.1, shall implement a wastewater disposal program consistent with current state regulations and policy. The wastewater disposal program shall include the following tasks to be completed by the compliance dates:

| Task & Description | Compliance Date |
|--|----------------------------|
| <p><u>Compliance Plan</u> The Discharger shall submit a detailed compliance plan and time schedule describing how compliance will be achieved with this Order.</p> | <p>30 June 2006</p> |

| | |
|---|--------------------------------|
| <p><u>Groundwater Investigation Work Plan</u> The Discharger shall submit a detailed work plan and time schedule to determine the lateral impact of wastewater on groundwater.</p> | <p>31 July 2006</p> |
| <p><u>Cease Wastewater Discharge</u> The Discharger shall cease the discharge of wastewater to the facility in accordance with the Compliance Plan.</p> | <p>2 January 2007</p> |
| <p><u>Closure Plan</u> The Discharger shall submit a closure plan in accordance with Title 27, California Code of Regulations, Section 21400. The plan shall include a Report of Waste Discharge.</p> | <p>29 June 2007</p> |
| <p><u>Complete Groundwater Investigation</u> The Discharger shall complete an investigation to determine the lateral impact of wastewater on groundwater.</p> | <p>2 September 2008</p> |
| <p><u>Corrective Action Plan</u> The Discharger shall submit a Corrective Action Plan.</p> | <p>31 December 2008</p> |

The Discharger shall, where appropriate, submit quarterly reports describing progress towards achieving compliance with each task, and shall report any delay in the implementation of any required task, describing in detail the reasons for such delay.

AERA ENERGY LLC
SOUTH WASTEWATER DISPOSAL FACILITY
SOUTH BELRIDGE OIL FIELD, KERN COUNTY

I, PAMELA C. CREEDON, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Central Valley Region on _____ 2006.

PAMELA C. CREEDON, Executive Officer

DLW: 5/30/06

INFORMATION SHEET

ORDER NO. _____
AERA ENERGY LLC
SOUTH WASTEWATER DISPOSAL FACILITY
SOUTH BELBRIDGE OIL FIELD, KERN COUNTY

Aera Energy LLC (hereafter Discharger) owns and operates the South wastewater disposal facility in the South Belridge Oil Field. The facility consists of surface impoundments that receive oil field produced water, backwash water from treatment filters at the Water Softening Plant, and softener regeneration wastewater from ion exchange units at the Water Softening Plant. The impoundments, which have a surface area of approximately 80 acres, are used for the disposal of wastewater by evaporation and percolation. Approximately 18,245,000 barrels of wastewater were discharged to the impoundments during 2004. The impoundments are unlined and do not meet the prescriptive construction criteria for surface impoundments as specified in Title 27. The wastewater disposal operation is currently regulated by Waste Discharge Requirements (WDRs), Resolution No. 68-268. The WDRs are outdated and are being updated to reflect Basin Plan policy and current State regulations.

The facility lies on Quaternary age lithologic units, which include the Alluvium and the Tulare Formation. Alluvium contains sand, silty sand, silt, and clay beds. At the base of the Alluvium is a sand bed known as the 22K Sand and an underlying silt and clay bed known as the Corcoran Clay Equivalent (CCE). The CCE is the lateral equivalent of the Corcoran Clay. The Tulare Formation is comprised of interbedded clay, silt, and sand.

The Discharger has conducted an investigation to determine the hydrogeology and lateral and vertical extent of wastewater migration in the subsurface. The Discharger or predecessor companies have installed 67 groundwater monitoring wells to the east of the South Belridge Oil Field. Three stratigraphic intervals have been identified by the Discharger as aquifer zones containing water-bearing layers. The shallowest aquifer is designated as the unconfined Aquifer I, which consists of discontinuous water-bearing sands separated by clays. Below a discontinuous clay aquitard at the base of Aquifer I is the 22K Sand, which is water-bearing and is designated as the semi-confined 22K Aquifer. Underlying the 22K Aquifer, is the CCE. Unconformably underlying the CCE are water-bearing zones in the Tulare Formation collectively designated as the confined Aquifer II.

Groundwater in Aquifer I is impacted by wastewater migrating from the impoundments for at least one mile to monitoring well 36K1, which was sampled by the Discharger in 2003 and had the following salinity concentrations: total dissolved solids (TDS), 5,800 mg/L; chloride, 1,400 mg/L; and, boron, 10 mg/L. Groundwater in the 22K Aquifer is impacted by wastewater migrating from the impoundments for at least 1.65 miles to monitoring well 31Q2, which was sampled by the Discharger in 2003 and had the following salinity concentrations: TDS, 5,400 mg/L; chloride, 1,600 mg/L; and, boron, 11 mg/L. Groundwater in Aquifer II is not impacted by wastewater from the impoundments at monitoring well 36Q2, which was sampled by a predecessor company to the Discharger in 1994 and had the following salinity concentrations: TDS, 2,300 mg/L; chloride, 680 mg/L; and boron, 7.3 mg/L.

The Discharger has not delineated the lateral extent of groundwater impacted by wastewater migrating from the impoundments. In accordance with the time schedule contained in the Order, the Discharger must complete an investigation to determine the lateral extent of wastewater impacts on groundwater in Aquifer I and the 22K Aquifer; and, after completion of the investigation, submit a plan to implement a Corrective Action Program in accordance with Title 27.

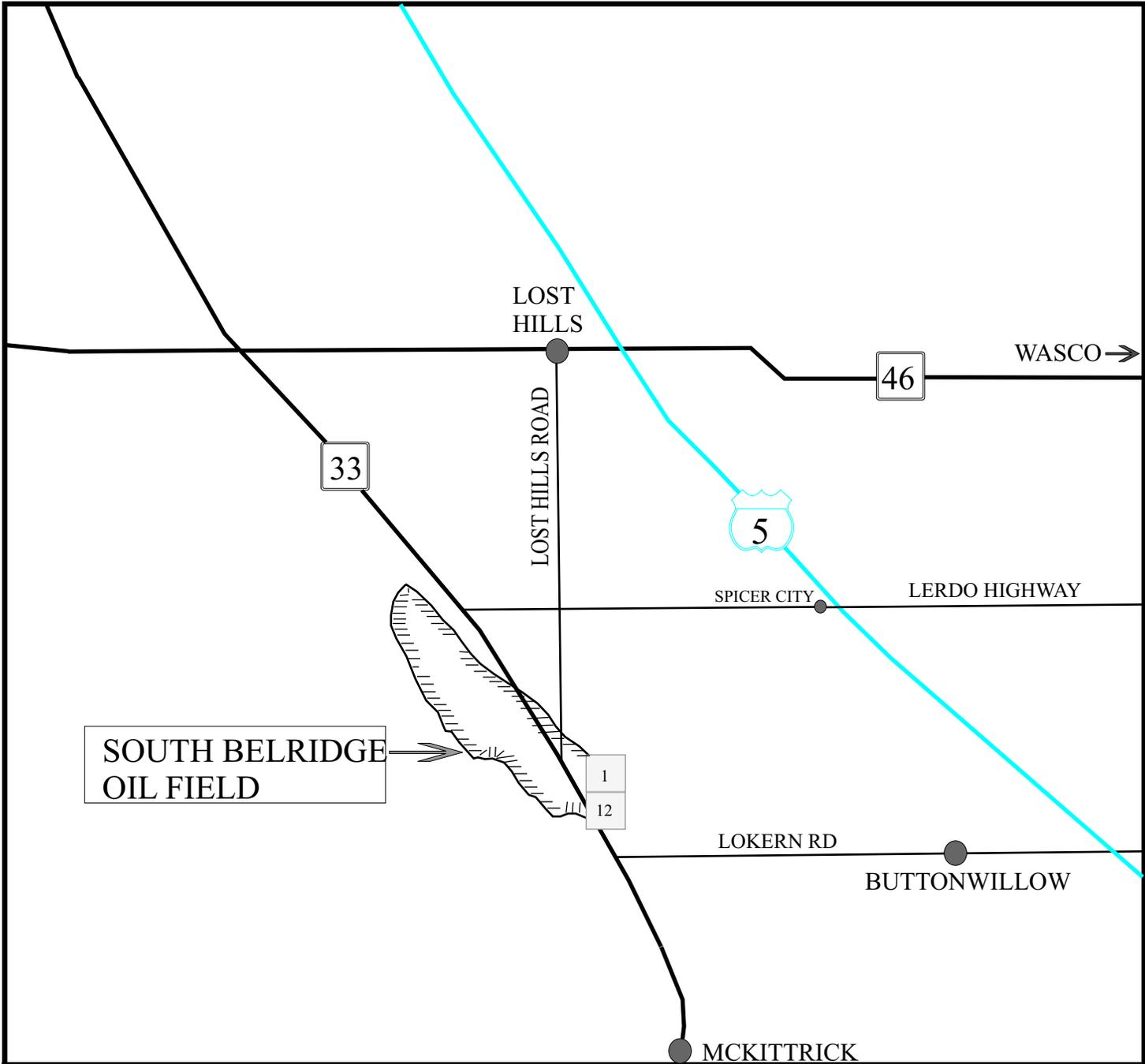
The beneficial uses of groundwater in the area are designated by the Basin Plan as municipal and domestic supply, agricultural supply, and industrial service supply. There are no municipal or domestic supply wells in the area.

Wastewater in the impoundments is sampled and analyzed by the Discharger each quarter and the results reported semi-annually. The Discharger collected wastewater samples from the inlet impoundment, a middle impoundment, and the terminal impoundment during May 2005. The samples had the following salinity concentration ranges: EC, 20,000 - 25,000 $\mu\text{mhos/cm}$; TDS, 12,000 - 13,000 mg/L; chloride, 5,600 - 6,800 mg/L; and boron, 90 - 98 mg/L. The wastewater is classified as designated waste, and the discharge is subject to the requirements of Title 27 for discharges of waste to land. The wastewater has salinity concentrations that exceed maximum numerical salinity limits prescribed in the Basin Plan for oilfield discharges.

The Discharger has submitted a letter of commitment to permanently cease the discharge of wastewater to the impoundments in accordance with the Compliance Schedule. The Order contains a Compliance Schedule requiring the Discharger to cease the discharge of wastewater to unlined impoundments and close the impoundments.

The action to adopt WDRs for existing facilities is exempt from the provisions of the California Environmental Quality Act (Public Resources Code Section 21000, et seq.), in accordance with Title 14, California Code of Regulations, Section 15301.

DLW:12/12/05



Waste Discharge Requirements For
Aera Energy LLC
South Wastewater Disposal Facility
South Belridge Oil Field
Kern County

Order Number R5-2006-____

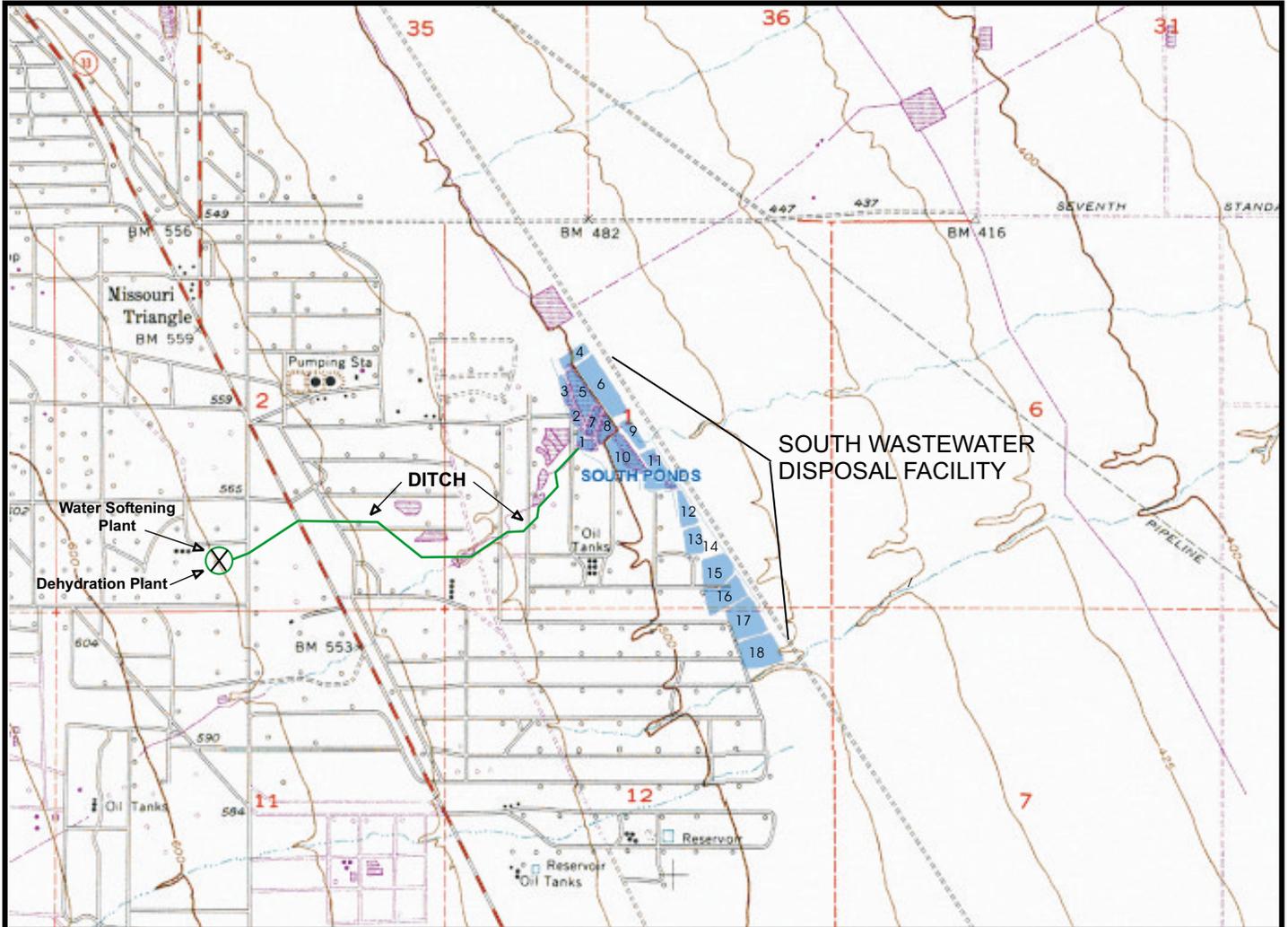
LOCATION MAP



Not to Scale

Sections 1 & 12, T29S, R21E, MDB&M
 Belridge 7.5 Minute USGS Quadrangle

Attachment A



**Waste Discharge Requirements For
Aera Energy LLC
South Wastewater Disposal Facility
South Belridge Oil Field
Kern County**

Order Number R5-2006-_____

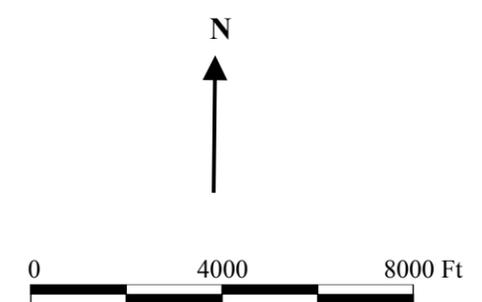
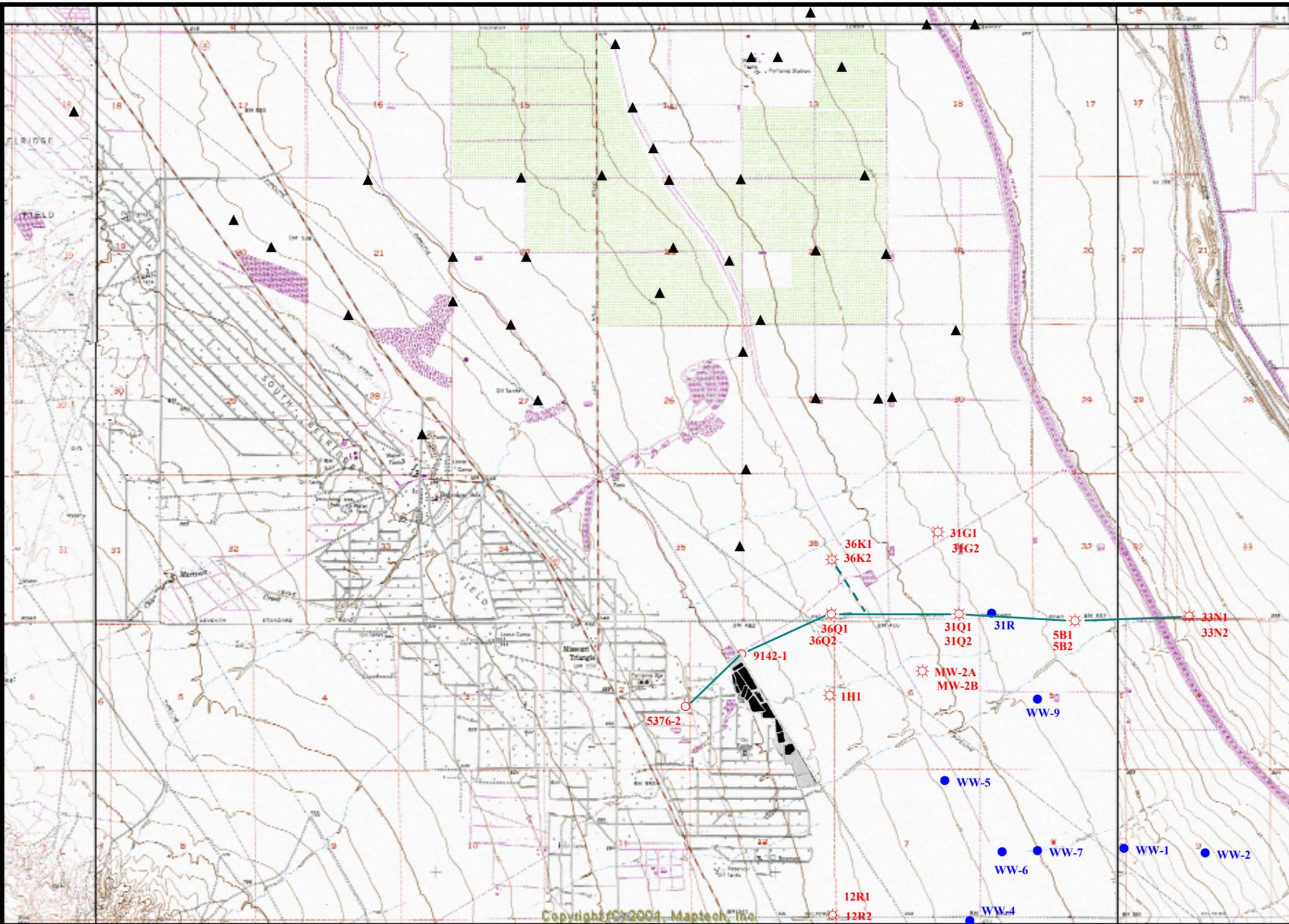
VICINITY MAP



1" = 2,350'

Sections 1 & 12, T29S, R21E, MDB&M
Belridge 7.5 Minute USGS Quadrangle

Attachment B



LEGEND

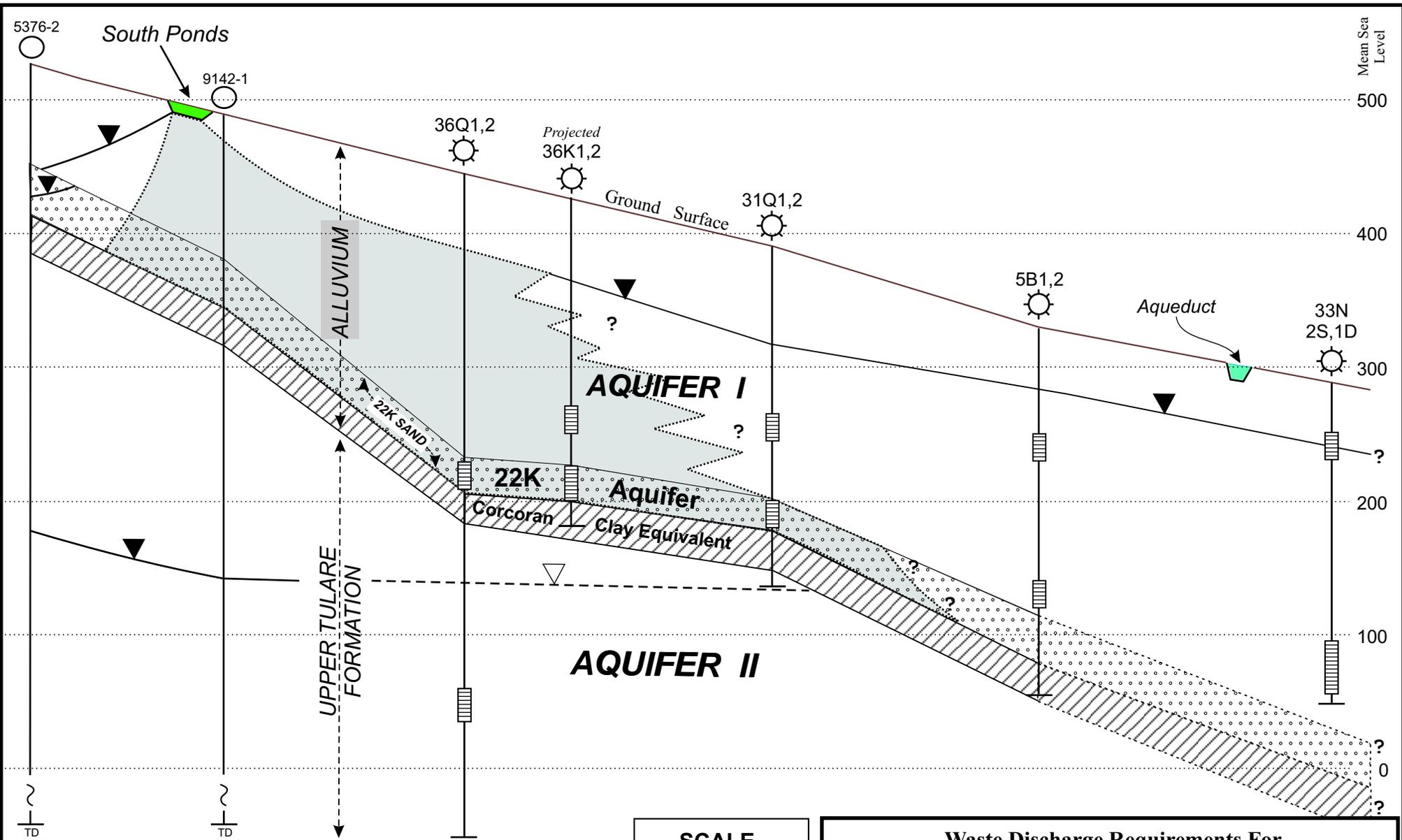
- ☀ Location with groundwater monitoring well(s)
- Location of plugged and abandoned wells
- ▲ Location of other groundwater monitoring well(s) or boring
- Water supply well
- Line of cross-section (Attachment D)

**Waste Discharge Requirements For
Aera Energy LLC
South Wastewater Disposal Facility
South Belridge Oil Field, Kern County**

Order Number R5-2006-____

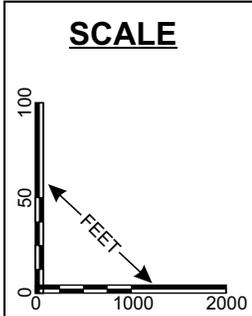
WELL LOCATION MAP – South Belridge Area

Attachment C



LEGEND

| | | | |
|--|-------------------------|--|---|
| | Nested Monitoring Wells | | Plugged and Abandoned Wells |
| | Screened Intervals | | Groundwater Surfaces |
| | | | Approximate extent of wastewater impacted groundwater |



**Waste Discharge Requirements For
Aera Energy LLC
South Wastewater Disposal Facility
South Belridge Oil Field
Kern County**

Order No. R5-2006-_____

CROSS-SECTION **Attachment D**