CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER R5-2013-0061

WASTE DISCHARGE REQUIREMENTS
FOR

EXXONMOBIL PRODUCTION COMPANY
FOR
POST-CLOSURE MAINTENANCE AND CORRECTIVE ACTION
HILL LEASE SURFACE IMPOUNDMENTS
SOUTH BELRIDGE OIL FIELD, KERN COUNTY

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

1. ExxonMobil Production Company (hereafter Discharger), a subsidiary of ExxonMobil Corporation organized under the laws of the State of New Jersey, owns and maintains the former Hill Lease (hereafter Lease) surface impoundments (facility) in the South Belridge Oil Field. The facility included four individual unlined pond cells on the Hill Lease in the NW1/4 of Section 19, T28S, R21E, MDB&M.

2. The Lease is approximately 480 acres in size and includes Assessor Parcel Number 085-210-10-2. The former impoundments covered approximately 17½ acres. The Lease is shown on Attachment A and the facility on Attachment B, which are attached to and made part of this Order.

3. Non-hazardous oilfield production wastewater from the Discharger's oil production wells and filter backwash water from the Discharger's water treatment plant, were discharged to the facility for disposal by evaporation and percolation. Disposal occurred from the 1950's until December 2006.

4. On 4 June 2004, the Central Valley Water Board adopted Waste Discharge Requirements (WDRs) Order No. R5-2004-0080 which included a Monitoring and Reporting Program and a time schedule for closure. The WDRs classified the facility as Class II surface impoundments in accordance with California Code of Regulations (CCR), title 27, section 20090(b).

5. On 23 June 2006, the Central Valley Water Board adopted Cease and Desist Order No. R5-2006-0064 extending the compliance dates to: (a) complete the treatment plant improvements and cease wastewater discharge to the impoundments; and, (b) submit a report describing the results and conclusions of the hydrogeologic investigation and including a groundwater corrective action plan.

6. The Discharger submitted a Closure Plan on 6 March 2008. In correspondence dated 15 May 2008, Central Valley Water Board staff concurred with the proposed closure plan and requested submittal of additional information. The Discharger submitted the additional information in correspondence dated 6 June 2008, 11 July 2008, and 24 December 2008.

7. On 13 August 2009, Cease and Desist Order No. R5-2006-0064 was rescinded by the Central Valley Water Board.

8. This Order describes requirements for post-closure maintenance and monitoring of the closed impoundments and a groundwater corrective action and monitoring program.

SITE DESCRIPTION

9. The South Belridge Oil Field is on the west side of the San Joaquin Valley, approximately 45 miles west-northwest of Bakersfield, in Kern County.

10. The field is on the Antelope Plain, an alluvial piedmont with coalescing alluvial fans from the Temblor Range to the west. The region slopes east towards the San Joaquin Valley.

11. The land on the Hill Lease is used exclusively for oil and gas production. Adjacent land to the north, south, and east is used for oil and gas production.

12. Adjacent land to the west is primarily used as a commercial oilfield disposal facility permitted by Kern County. Non-hazardous oilfield production wastewater is injected at the facility into Class II disposal wells permitted by the California Division of Oil, Gas, and Geothermal Resources (CDOGGR). Solids temporarily stockpiled on concrete drying pads at the facility are transported to permitted landfills.

13. The Lease 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.

14. The climate in the area is semi-arid, with hot, dry summers and cool winters. 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.

15. At the former impoundments, the 100-year, 24-hour precipitation event from Figure 43 in the *Precipitation Frequency Atlas of Western United States*, Volume XI-California published by the United States Department of Commerce, National Oceanic and Atmospheric Administration, is about 2.1 inches.

16. Federal Emergency Management Agency Flood Insurance Rate Map, Community Panel Number 06029C1675E, dated 26 September 2008, shows the north edge of the closed impoundments is within the 100-year floodplain.

17. The Lease is in the Kern County Basin Hydrologic Unit, Detailed Analysis Unit 259. The designated beneficial uses of the groundwater, as specified in the Basin Plan, are municipal and domestic supply (MUN), agricultural supply (AGR), and industrial service supply (IND).

18. No known Holocene faults traverse or are projected through the area. The nearest Holocene fault is the San Andreas Fault zone, located 22 miles southwest of the site.

SURFACE WATER AND GROUNDWATER CONDITIONS

19. *The Water Quality Control Plan for the Tulare Lake Basin*, *Second Edition*, revised January 2004, (Basin Plan), designates beneficial uses of the waters of the State and establishes water quality objectives and implementation plans and policies for all waters of the Basin.

20. An unnamed intermittent stream channel traverses the Lease immediately to the north of the facility and terminates approximately 1½ miles to the east in the vicinity of Highway 33. Natural flow in the channel occurs during infrequent storm events.

21. At the Lease and adjoining section to the north the stratigraphy consists of the following geologic units. The youngest unit is Alluvium consisting of alternating sand, silt, and clay. Within and at the base of the Alluvium is a sand layer designated as the 22K Sand. Above the 22K Sand is the Alluvial Clay. Below the 22K Sand is the Corcoran Clay Equivalent (CCE), which was unconformably deposited on the underlying Tulare Formation of Pleistocene age. The stratigraphy is shown on Attachment C, which is attached to and made part of this Order.

22. No drinking water wells are within one mile of the facility. The nearest water supply wells are in unincorporated Spicer City about 8½ miles east-northeast of the facility. The nearest agricultural supply well is about seven miles east-southeast of the facility.

23. Groundwater is present in the Tulare Formation, 22K Sand, and overlying Alluvium as shallow perched groundwater, and part of a regional aquifer system. The regional aquifer system is unconfined to semi-confined above the CCE, and confined below the CCE.

GROUNDWATER MONITORING

24. The groundwater monitoring program currently consists of nine monitoring wells constructed in the Alluvium and one well, MW-A, constructed in both the Alluvium and 22K Sand. Wells MW-1, MW-2, and MW-A were installed in 2002. Wells MW-4, MW-5, MW-7, MW-8, and MW-9 were installed in 2003. Wells MW-10 and MW-11 were installed in 2006. The well locations are shown on Attachment B.

25. The Discharger submitted information stating that in 2007 the groundwater flow direction in the Alluvium was to the northeast, at a gradient of 0.018 feet/foot or about 95 feet per mile. The Discharger submitted information stating that in 2012 the gradient decreased to 0.017 feet/foot or about 90 feet per mile.

26. The Discharger submitted information stating that in February 2007, two months after the discharge of wastewater to the former impoundments ceased, the groundwater elevation in monitoring well MW-1 was 493.13 feet above mean sea level (AMSL). The groundwater elevation in MW-1 has steadily decreased since 2007 to 474.49 feet AMSL in 2012, indicating the height of the wastewater mound beneath the former impoundments is decreasing.

GROUNDWATER DEGRADATION

27. The Discharger completed an Evaluation Monitoring Program (EMP) and determined that wastewater migrated from the impoundments and impacted groundwater in the Alluvium and the 22K Sand. Since 2010, groundwater in monitoring well MW-4 has shown increasing Total

Dissolved Solids (TDS), chloride, and boron concentrations (the constituents of concern, COCs) and an increasing enrichment of the heavier oxygen-18 and deuterium isotopes indicating wastewater is impacting groundwater in the Alluvium at MW-4.

28. Impacted groundwater is enriched with the isotopes of oxygen-18 and deuterium and has elevated concentrations of total alkalinity, specific electrical conductance (EC), TDS, sodium, chloride, and boron.

29. Groundwater monitoring wells were sampled from 2002 through 2012 with concentration ranges for the COCs as shown in Table 1:

TABLE 1

Well	Constituent	Analytical Result Range (mg/L)
MW-1	TDS	14,000 – 20,000
	Chloride	5,900 – 11,000
	Boron	35 – 60.3
MW-2	TDS	14,700 – 21,000
	Chloride	7,700 – 10,000
	Boron	8 – 50
MW-A	TDS	5,260 – 8,060
	Chloride	1,300 – 3,600
	Boron	1.9 – 3.9
MW-4	TDS	4,710 – 9,800
	Chloride	1,700 – 3,800
	Boron	4.2 – 13.6
MW-5	TDS	13,000 – 19,200
	Chloride	6,400 – 10,000
	Boron	33 – 68
MW-7	TDS	7,560 – 11,600
	Chloride	3,600 – 6,100
	Boron	27.5 – 50
MW-8	TDS	3,380 – 11,400
	Chloride	820 – 4,500
	Boron	2.4 – 4.69
MW-9	TDS	16,000 – 20,000
	Chloride	7,900 – 13,000
	Boron	39.6 – 61
MW-10	TDS	3,140 – 4,680

Sentinel Well	Chloride	680 – 940
	Boron	2.88 – 6.26
MW-11	TDS	2,820 – 4,160
Sentinel Well	Chloride	150 – 230
	Boron	3.09 – 4.39

30. The analytical results in Table 1 indicate groundwater in the Alluvium is impacted by wastewater from the impoundments in all wells except sentinel wells MW-10 and MW-11. Groundwater in the 22K Sand is impacted by wastewater from the impoundments in well MW-A.

31. The lateral extent of wastewater migration from the former impoundments in the Alluvium extends downgradient and to the northeast of monitoring well MW-4 (Attachment C). Wastewater beneath the former impoundments has migrated below the Alluvium and into the 22K Sand, but the lateral extent did not reach boring B-1 in 2002 (Attachment C).

CLOSURE

32. Between August 2009 and July 2011, the Discharger closed the impoundments with some residual waste remaining in place beneath an engineered cover soil. Closure activities included excavation of waste, confirmation soil sampling, construction of at least one foot of foundation backfill, a minimum one foot of soil as final cover, irrigation of cover soil with fresh water to leach mineral salts in the top 12-inches, and submittal of a Closure Certification Report.

33. The Closure Certification Report (Report), dated 21June 2012, contained all Construction Quality Assurance data. The Report included cover soil testing results demonstrating the effectiveness of irrigation to leach mineral salts in the top 12 inches of cover soil. The Report certified that the impoundments were closed in accordance with the approved closure plan and addendums.

34. In correspondence dated 28 January 2013, Central Valley Water Board staff determined the Discharger completed closure of the impoundments in accordance with the approved closure plan and addendums.

POST- CLOSURE MAINTENANCE AND MONITORING

35. The Report included a facility Post-Closure Maintenance and Monitoring Plan. Post-closure maintenance and monitoring activities proposed by the Discharger include: (a) an annual inspection of the condition of the cover soil prior to the rainy season but no later than 30 September; (b) mapping and repairing by 31 October of any depressions, cracks, erosion channels, or other visible damage; (d) annual monitoring of the moisture content in the cover soil to confirm the previous vadose zone model result; (e) annual monitoring of groundwater in 10 monitoring wells for the constituents listed in section 7.2.2.3 of the Plan; and (f) submittal of an annual report documenting the results of post-closure maintenance and monitoring activities.

36. In correspondence dated 5 March 2013, the Discharger proposed post-closure groundwater monitoring in six wells, MW-1, MW-4, MW-8, MW-9, MW-10 and MW-11. Central Valley Water Board staff concurs that post-closure groundwater monitoring can be conducted in the wells listed in section A.1 of the attached Monitoring and Reporting Program (MRP).

CORRECTIVE ACTION PROGRAM

37. The Discharger submitted a groundwater Corrective Action Plan in 2007. Two corrective action alternatives were proposed: no further action and monitored natural attenuation (MNA). The Corrective Action Plan evaluated the alternatives and selected MNA as the preferred alternative.

38. In correspondence dated 19 December 2009, Central Valley Water Board staff required the Discharger to submit an addendum to the groundwater Corrective Action Plan to evaluate groundwater containment/extraction and treatment as a third corrective action alternative.

39. In February 2010, the Discharger submitted an addendum to the Corrective Action Plan that evaluated groundwater containment/extraction and treatment and concluded that MNA remained the appropriate corrective action alternative.

40. In correspondence dated 18 March 2010, Central Valley Water Board staff concurred that MNA is the appropriate corrective action alternative because: (a) the discharge of wastewater to the ponds had ceased; (b) the COCs concentrations in groundwater appeared stable; (c) corrective action alternatives other than MNA are not economically feasible; and, (d) MNA would achieve the long-term goal of limiting the extent and concentration of the COCs in groundwater. The correspondence also stated that the Discharger needed to continue monitoring groundwater until Central Valley Water Board staff determines the COCs have decreased to background concentrations or that background concentrations cannot be technologically or economically achieved.

41. Until 2010, groundwater monitoring data indicated the downgradient extent of the COCs exhibited consistent concentrations; however, recent data indicates an increase in the COCs, and the downgradient extent of the COCs no longer appears stable. The WDRs require the Discharger to submit a work plan to further delineate the extent and stability of the COCs in groundwater, and to submit an updated groundwater corrective action plan to determine whether MNA is still an appropriate corrective action. If MNA is no longer appropriate, the Discharger will need to consider additional corrective action measures.

42. The Discharger is required to collect and analyze groundwater samples annually for those constituents listed in Table I in the MRP.

CEQA AND OTHER REGULATORY CONSIDERATIONS

43. The action to adopt waste discharge requirements for this existing facility is exempt from the provisions of the California Environmental Quality Act (CEQA), Public Resources Code, section 21000, et seq., and the CEQA guidelines, in accordance with Title 14, section 15301.

44. California Water Code section 13267(b)(1) states that: "*In conducting an investigation specified in subdivision (a), the regional 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… shall furnish, under penalty of perjury, technical or monitoring program reports which the regional 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 the reports. In requiring those reports, the regional 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."

45. This Order implements:

    a. *The Water Quality Control Plan for the Tulare Lake Basin, Second Edition (Revised 2004)*; and,

    b. The performance goals in Title 27 for the closure and post-closure of Class II surface impoundments.

46. Based on site conditions, the threat and complexity of the discharge, the facility is determined to be classified 3B as defined below:

    a. Category 3 threat to water quality, defined as: "Those discharges of waste that could degrade water quality without violating water quality objectives, or could cause a minor impairment of designated beneficial uses as compared with Category 1 and Category 2."

    b. Category B complexity, defined as: "Any discharger not included in Category A that has physical, chemical, or biological treatment system, or any Class 2 or Class 3 waste management units."

47. Technical reports required by this Order and the attached MRP, are necessary to ensure compliance with the WDRs. The Discharger owns the facility that is subject to this Order.

PROCEDURAL REQUIREMENTS

48. All local agencies with jurisdiction to regulate land use, solid waste disposal, air pollution, and to protect public health have approved the use of this site for the discharges of waste to land stated herein prior to closure.

49. The Central Valley Water Board notified the Discharger, and interested agencies and persons of its intent to prescribe WDRs for the facility, and has provided them with an opportunity for a public hearing and an opportunity to submit their written views and recommendations.

50. The Central Valley Water Board, in a public meeting, heard and considered all comments pertaining to the proposed WDRs.

IT IS HEREBY ORDERED, pursuant to the California Water Code sections 13263 and 13267, that Order No. R5-2004-0080 is rescinded, and that ExxonMobil Production Company, its agents, successors, and assigns, in order to meet the provisions of Division 7 of the California Water Code and the regulations adopted thereunder, shall comply with the following:

A. PROHIBITIONS

1. The discharge to land of any type of solid or liquid waste at this facility is prohibited.

B. FACILITY SPECIFICATIONS

1. The Discharger shall immediately notify the Central Valley Water Board of any flooding, unauthorized discharge of waste, or other change in site conditions which could impair the integrity of the cover at the facility.

2. The Discharger shall maintain in good working order any monitoring device installed to achieve compliance with this Order.

C. POSTCLOSURE MAINTENANCE AND MONITORING SPECIFICATIONS

1. The facility shall be maintained during post-closure to prevent a pollution or nuisance as defined by the Water Code, section 13050.

2. The closure cover shall be maintained to prevent ponding and minimize erosion. Excessive animal burrows and other defects that could compromise the integrity of the cover shall be repaired.

3. Precipitation and drainage control systems shall be maintained to accommodate the anticipated peak flow volume of surface runoff from the 100-year, 24-hour precipitation event.

4. 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.

5. The Discharger shall monitor the final cover soil in accordance with the post closure maintenance and monitoring plan in the Closure Certification Report and Monitoring and Reporting Program (MRP) R5-2013-0061.

D. CORRECTIVE ACTION PROGRAM SPECIFICATIONS

1. The Discharger shall comply with the Corrective Action Program provisions of Title 27 for groundwater monitoring in accordance with MRP R5-2013-0061.

2. The Discharger shall collect and analyze groundwater samples from the corrective action monitoring wells and submit the analytical data in accordance with the sampling and reporting frequency in MRP R5-2013-0061.

3. The Discharger shall provide Central Valley Water Board staff a minimum of **five days** notification prior to commencing any field activities related to the installation, repair, or abandonment of monitoring wells or the collection of samples associated with the Corrective Action Program.

4. The samples collected from all monitoring wells for a given reporting period shall be taken **within a span not to exceed 30 days**, unless the Executive Officer approves a longer time period, and shall be taken in a manner that ensures sample independence to the greatest extent feasible.

5. Specific methods of collection and analysis must be identified. Sample collection, storage, and analysis shall be performed according to the most recent version of United States Environmental Protection Agency (USEPA) Methods and/or Standard Methods, such as the latest editions, as applicable, of: (1) *Test Methods for Evaluating Solid Waste* (SW-846 latest edition), and (2) *Methods for Chemical Analysis of Water and Wastes* and in accordance with an approved revised Sampling and Analysis Plan.

6. If methods other than USEPA approved methods or Standard Methods are used, the methodology shall be submitted for review by Central Valley Water Board staff prior to use.

7. The methods of analysis and the detection limits used must be appropriate for the expected concentrations. For the monitoring of any constituent or parameter that is found in concentrations which produce more than 90 percent non-numerical determinations (i.e., "trace" or "ND") in data for that medium, the analytical method having the lowest method detection limit (MDL) shall be selected from among those methods which would provide valid results considering any matrix effects or interferences.

E. PROVISIONS

1. The Discharger shall comply with the attached MRP R5-2013-0061, 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 for Discharges Regulated by Title 27 Industrial Facilities* (Standard Provisions) dated September 2003, 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. **By 2 August 2013**, the Discharger shall submit for review and approval by Central Valley Water Board staff a *Facility Post-Closure Maintenance and Monitoring Plan* that is consistent with the requirements of this Order and contains a Cover Integrity Monitoring and Maintenance Program and Cover Moisture Monitoring Program. The Plan shall be implemented for a minimum period of 30 years or until it can be determined that the waste no longer poses a threat to the environment, whichever is greater.

4. **By 2 August 2013**, the Discharger shall submit for review and approval by Central Valley Water Board staff a revised *Sampling and Analysis Plan* and a *Water Quality Monitoring Plan* (WQMP) that are consistent with the requirements of this Order.

a) The WQMP shall propose additional characterization of groundwater in the Alluvium immediately above the Alluvial Clay downgradient from sentinel well MW-4. Additional sentinel well(s) shall become part of the MRP.

b) The WQMP shall propose non-statistical and/or statistical data analysis method(s) to evaluate the groundwater monitoring data and assess the current corrective action plan.

5. **Within one year** following completion of the additional groundwater characterization as proposed in the approved WQMP, the Discharger shall submit an updated Groundwater Corrective Action Plan that determines whether monitored natural attenuation continues to be the appropriate corrective action, or proposes additional corrective action measures and a time schedule.

6. **Within one year** following completion of the additional groundwater characterization as proposed in the approved WQMP, the Discharger shall propose a concentration limit for each of the COCs. The concentration limits shall be proposed in accordance with section 20400 of Title 27.

7. **Within 60 days** after a determination by Central Valley Water Board staff that monitored natural attenuation is not an appropriate corrective action measure, the Discharger shall submit a report proposing modifications to the MRP and the Corrective Action Program.

8. **Within 120 days** after approval by Central Valley Water Board staff of the Discharger's proposed modifications to the MRP and the Corrective Action Program, the Discharger shall implement the approved modifications.

9. **By 2 December 2013**, the Discharger shall submit financial assurance mechanism(s) containing estimates for costs for post-closure maintenance and monitoring. The Discharger shall conduct an annual review of the estimates and submit a report for Executive Officer review and approval by 31 January of each year. The Discharger shall adjust the cost annually to account for inflation and any changes in the facility, etc. The document shall describe the financial assurances in the form of an irrevocable fund or other mechanism(s) that the Discharger has created, with the Central Valley Water Board named as the beneficiary, to ensure that funds are available for the post-closure maintenance and the corrective action and other monitoring of the closed facility.

10. The Discharger shall comply with all notice and reporting requirements of the State Department of Water Resources with regard to the construction, alteration, destruction, or decommissioning of all monitoring wells as required by Water Code sections 13750 through 13755.

11. In the event of any change in control or ownership of the facility, 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.

12. To assume ownership or operation of the 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. The request must comply with the signatory requirements of this Order. Failure to submit the request shall be considered a discharge without requirements, which is a violation of the Water Code. Transfer of this Order to a succeeding owner or operator shall be approved or disapproved by the Central Valley Water Board.

13. 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.

14. The Central Valley Water Board will review this Order periodically and will revise these requirements when necessary.

15. The Discharger may be required to submit technical reports as directed by the Executive Officer as provided for in Water Code section 13267.

16. Technical reports and plans are to be prepared by or under the direction of and signed and certified by the appropriate registered professional, which may be a Registered Geologist, Registered Civil Engineer, Certified Engineering Geologist, or Certified Hydrogeologist. All registered professionals must be licensed by the State of California.

17. This Order does not authorize violation of any federal, state, or local laws or regulations.

If, in the opinion of the Executive Officer, the Discharger fails to comply with the provisions of this Order, the Executive Officer may refer this matter to the Attorney General for judicial enforcement, may issue a complaint for administrative civil liability, or may take other enforcement actions. Failure to comply with this Order may result in the assessment of Administrative Civil Liability of up to $10,000 per violation, per day, depending on the violation, pursuant to the Water Code, including sections 13268, 13350 and 13385. The Central Valley Water Board reserves its right to take any enforcement actions authorized by law.

Any person aggrieved by this action of the Central Valley Water Board may petition the State Water Resources Control Board (State Water Board) to review the action in accordance with Water Code section 13320 and CCR, Title 23, sections 2050 and following. The State Water Board must receive the petition by 5:00 p.m., 30 days after the date of this Order, except that if the thirtieth day following the date of the Order falls on a Saturday, Sunday, or state holiday, the petition must be received by the State Water Board by 5:00 p.m. on the next business day. Copies of the laws and regulations applicable to the filing of a petition are available at: http://www.waterboards.ca.gov/public_notices/petitions/water_quality.

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 Central Valley Regional Water Quality Control Board on 31 May 2013.

Original signed by:

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PAMELA C. CREEDON, Executive Officer

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM R5-2013-0061
FOR
EXXONMOBIL PRODUCTION COMPANY
FOR
POST-CLOSURE MAINTENANCE AND CORRECTIVE ACTION
HILL LEASE SURFACE IMPOUNDMENTS
SOUTH BELRIDGE OIL FIELD, KERN COUNTY

This monitoring and reporting program (MRP) is issued pursuant to California Water Code section 13267 and incorporates requirements for groundwater monitoring and reporting; facility monitoring, maintenance, and reporting; and financial assurances reporting contained in California Code of Regulations, Title 27, section 20005, et seq. (hereafter Title 27), Waste Discharge Requirements (WDRs) Order R5-2013-0061, and the *Standard Provisions and Reporting Requirements* (Standard Provisions) dated September 2003. Compliance with this MRP is ordered by the WDRs and ExxonMobil Production Company (hereafter Discharger) shall not implement any changes to this MRP unless a revised MRP is issued by the Central Valley Regional Water Quality Board (Central Valley Water Board) or the Executive Officer. Failure to comply with this MRP or with the Standard Provisions constitutes noncompliance with the WDRs and with the Water Code, which can result in the imposition of civil monetary liability.

A. MONITORING

The Discharger shall comply with the corrective action monitoring program provisions for groundwater in accordance with Provisions E.1 through E.9 of WDRs Order R5-2013- 0061. All monitoring shall be conducted in accordance with a revised Sampling and Analysis Plan containing quality assurance/quality control standards acceptable to the Executive Officer.

Groundwater monitoring wells established for the corrective action program shall constitute the monitoring points for the groundwater Water Quality Protection Standard. All groundwater monitoring wells shall be sampled and analyzed annually for the monitoring constituents as indicated and listed in Table I.

Method detection limits and practical quantitation limits shall be reported.

The Discharger may use alternative analytical test methods, including new United States Environmental Protection Agency approved methods, provided the methods have method detection limits equal to or lower than the analytical methods specified in this MRP, are with the approval of the Executive Officer, and are incorporated into the revised Sampling and Analysis Plan.

The monitoring program of this MRP includes:

1. Groundwater

The Discharger shall operate and maintain a groundwater corrective action monitoring system that complies with the applicable provisions of §20415 and

§20420 of Title 27 in accordance with a Corrective Action Program approved by the Executive Officer.

The groundwater monitoring network shall consist of the following:

Well	Status
MW-1	Corrective Action
MW-4	Corrective Action
MW-8	Corrective Action
MW-9	Corrective Action
MW-10	Corrective Action
MW-11	Corrective Action

Groundwater samples shall be collected from the above wells and any additional wells added as part of the approved groundwater monitoring system. Samples shall be collected and analyzed in accordance with the methods specified in Table I. The Discharger shall collect, preserve, and transport groundwater samples in accordance with the approved revised Sampling and Analysis Plan.

The Discharger shall measure groundwater elevations in each well, determine the groundwater flow direction, estimate groundwater flow rate, and report the results annually. Hydrographs of each well shall be submitted annually showing the elevation of groundwater with respect to the elevations of the top and bottom of the screened interval and the elevation of the pump intake.

Appropriate constituents shall be evaluated with regards to the cation/anion balance and the results shall be graphically presented using a Stiff diagram, a Piper graph, or a Schoeller plot.

For each reporting period, the isotopic composition for oxygen and deuterium shall be evaluated. The isotopic results shall be graphically presented along with historical isotopic data.

2. Corrective Action

The Discharger shall operate and maintain a groundwater corrective action monitoring system for the purpose of monitoring the nature and extent of the release and the progress of corrective action.

Corrective Action monitoring data analysis shall include the following:

a. Nature and Extent

1) Comparisons of the constituents of concern (COCs), which include total dissolved solids, chloride, and boron.
2) Graphical plot of stable oxygen and deuterium isotope results, historical isotope data from the wells and the facility along with the meteoric water line.

b. Effectiveness of Corrective Action

1) Preparation of time series plots for the COCs.
2) Trend analysis for the COCs and stable oxygen and deuterium isotopes.
3) The need for additional corrective action measures and/or monitoring wells.

The results of the above analysis and a narrative discussion, to include an assessment of the effectiveness of monitored natural attenuation as the corrective action measure, shall be in each annual corrective action monitoring report, as specified under reporting Section B.

3. Facility Monitoring

a. Cover Integrity Monitoring and Maintenance

The Discharger shall conduct annual cover-integrity monitoring and maintenance in accordance with a Cover Integrity Monitoring and Maintenance Program included in the *Facility Post-Closure Maintenance and Monitoring Plan* approved by the Executive Officer.

b. Cover Soil Moisture

The Discharger shall conduct annual cover soil moisture monitoring at depths of 12 to 18 inches and at about three feet at the same cover soil moisture monitoring location in accordance with a Cover Moisture Monitoring Program included in the *Facility Post-Closure Maintenance and Monitoring Plan* approved by the Executive Officer.

c. Major Storm Events

The Discharger shall inspect the facility for damage **within 7 days** following a storm yielding one inch or more of precipitation within 24 hours. Necessary repairs shall be completed **within 30 days** of the inspection. Surface areas where ponding or stormwater is observed shall be corrected by backfilling with compacted clean soil to achieve proper slope and drainage. Ponding problems shall be corrected **within 60 days** of the inspection. The Discharger shall submit a report describing the damage and subsequent repairs **within 45 days** of completion of the repairs, including photographs of the problems and the repairs.

B. REPORTING

The Discharger shall submit the following reports in accordance with the required schedule:

Reporting Schedule

	Report	Due
1.	Groundwater Monitoring Report (Section A.1)	**Annually**
2.	Corrective Action Monitoring Report (Section A.2)	**Annually**
3.	Cover Integrity Monitoring and Maintenance Report (Section A.3.a)	**Annually**
4.	Cover Soil Moisture Monitoring Report (Section A.3.b)	**Annually**
5.	Major Storm Event Reporting (Section A.3.c)	**As necessary**
6.	Financial Assurances Review Report (See Provision E.9 of the WDRs)	**Annually**

Reporting Requirements

The Discharger shall submit monitoring reports **annually** with the data and information as required in this Monitoring and Reporting Program and as required in WDRs Order R5-2013-0061 and the Standard Provisions.

Monitoring reports requiring engineering or geologic analysis shall be prepared by a registered professional, as required by the California Business and Professions Code.

1. Monitoring Data

In reporting the monitoring data required by this program, the Discharger shall arrange the data in tabular form so that the date, the constituents, the concentrations, and the units are readily discernable. The data shall be summarized in such a manner so as to illustrate clearly the compliance with waste discharge requirements or the lack thereof. Data shall also be submitted in a digital format acceptable to the Executive Officer. The Discharger shall enter all monitoring data and monitoring reports into the online Geotracker database as required by Division 3 of Title 27.

2. Compliance Evaluation Summary

Each monitoring report shall include a compliance evaluation summary. The summary shall contain for each monitoring point addressed by the report, a description of:

a. The time of water level measurement;

b. The type of pump - or other device - used for purging and the elevation of the pump intake relative to the elevation of the screened interval;

c. The method of purging (the pumping rate; the equipment and methods used to monitor field pH, temperature, and specific electrical conductance (EC) during purging; the calibration of the field equipment; results of the pH, temperature, EC, and turbidity testing; and the method of disposing of the purge water) to remove all portions of the water that was in the well bore while the sample was being taken;

d. The type of pump or other device used for sampling, if different than the pump or device used for purging;

e. A map or aerial photograph showing the locations of monitoring wells;

f. A description and graphical presentation of the gradient and direction of groundwater flow;

g. Cumulative tabulated monitoring data for all monitoring wells and constituents for groundwater. Concentrations below the laboratory reporting limit shall not be reported as "ND" unless the reporting limit is also given in the table. Otherwise they shall be reported "<" the reporting limit (e.g., <0.10). Units shall be as required in Table I unless specific justification is given to report in other units. Refer to the Standard Provisions Section IX B. Sampling and Analytical Methods for requirements regarding MDLs and PQLs.

h. Laboratory statements of results of all analyses evaluating compliance with requirements; and,

i. A statement that the sampling procedure was conducted in accordance with an approved Sampling and Analysis Plan.

3. Reporting Schedule

Monitoring reports shall be submitted to the Central Valley Water Board in accordance with the following schedule for the calendar period in which monitoring occurred and observations were made.

Monitoring Frequency	Reporting Frequency	Reporting Periods End	Report Date Due
Annually	Annually	30 September	31 October

C. WATER QUALITY PROTECTION STANDARD

1. Water Quality Protection Standard

The water quality protection standard shall consist of the COCs, the stable isotopes of oxygen and deuterium, and all groundwater monitoring wells.

2. Water Quality Monitoring Plan

A *Water Quality Monitoring Plan* (WQMP) shall be submitted for review and approval by Central Valley Water Board staff. The WQMP shall propose additional characterization of groundwater downgradient from monitoring well MW-4. Additional sentinel well(s) shall become part of the MRP.

3. Monitoring Constituents

The monitoring constituents include those constituents in groundwater that are reasonably expected to be from wastewater historically discharged at the facility. The monitoring constituents are listed in Table I. The Discharger shall monitor these constituents annually, or more frequently as required, in accordance with the Corrective Action Program.

4. Other Constituents

Other constituents include those constituents in groundwater that are reasonably expected to be from wastewater historically discharged at the facility. Other constituents are listed in Table I. The Discharger shall monitor these constituents biennially (every other year), or more frequently as required, in accordance with the Corrective Action Program.

5. Stable Isotopes

The Discharger shall monitor groundwater for the stable isotopes of concern listed in Table I, oxygen and deuterium. The levels of the oxygen and deuterium isotopes in groundwater shall be evaluated and compared graphically with the levels previously measured in wastewater previously in the impoundments and in groundwater. The Discharger shall monitor the stable isotopes annually, or more frequently as required, in accordance with the Corrective Action Program.

D. OTHER REQUIREMENTS

1. Transmittal Letter

A transmittal letter explaining the essential points shall accompany each report. At a minimum, the transmittal letter shall identify any violations found since the last report was submitted, and if the violations were corrected. If no violations have **occurred** since the last submittal, this shall be stated in the transmittal letter. The transmittal letter shall also state that a discussion of any violations found since the last report was submitted, and a description of the actions taken or planned for correcting those violations, including any references to previously submitted time schedules, is contained in the accompanying report.

The transmittal letter shall contain a statement by the Discharger, or the Discharger's authorized agent, under penalty of perjury, that to the best of the signer's knowledge the report is true, accurate, and complete.

The Discharger shall implement the above monitoring program on the effective date of this Program.

Original signed by:

Ordered by _____
PAMELA C. CREEDON, Executive Officer

31 May 2013
_____
Date

TABLE I

GROUNDWATER MONITORING

	Units[2]	Method[1]
Field Parameters / Measurement		
Groundwater Elevation	Ft. & hundredths, M.S.L.	
Temperature	°C	
Specific Electrical Conductance	µmhos/cm	
pH	pH units	
Monitored Constituents		
Total Dissolved Solids (TDS)	mg/L	EPA 160.1
Specific Electrical Conductance (EC)	µmhos/cm	EPA 120.1
Chloride	mg/L	EPA 300.0
Boron, dissolved	mg/L	EPA 6010B
Other Constituents		
Standard Minerals		
Total Alkalinity, dissolved	mg/L	SM 2320B
Carbonate Alkalinity, dissolved	mg/L	SM 2320B
Bicarbonate Alkalinity, dissolved	mg/L	SM 2320B
Sulfate, dissolved	mg/L	EPA 300.0
Nitrate as Nitrogen, dissolved	mg/L	EPA 300.0
Calcium, dissolved	mg/L	EPA 6010B
Magnesium, dissolved	mg/L	EPA 6010B
Sodium, dissolved	mg/L	EPA 6010B
Potassium, dissolved	mg/L	EPA 6010B
Aromatic Hydrocarbons		
Benzene	µg/L	EPA 8260B
Toluene	µg/L	EPA 8260B
Ethylbenzene	µg/L	EPA 8260B
Xylenes (m,p-xylenes and o-xylene)	µg/L	EPA 8260B
Stable Isotopes		
Oxygen	$^{o}/_{oo}$	CF-IRMS
Deuterium	$^{o}/_{oo}$	CF-IRMS

1. EPA = US Environmental Protection Agency; SM = Standard Method; CF-IRMS = Continuous Flow Isotope Ratio Mass Spectrometry
2. M.S.L. = mean sea level; °C = degrees centigrade; µmhos/cm = micromhos per centimeter; mg/L = milligrams per liter; µg/L = micrograms per liter; $^{o}/_{oo}$ = molecules per thousand, or "per mil"

INFORMATION SHEET

WASTE DISCHARGE REQUIREMENTS ORDER R5-2013-0061
EXXONMOBIL PRODUCTION COMPANY
POST-CLOSURE MAINTENANCE AND CORRECTIVE ACTION
HILL LEASE SURFACE IMPOUNDMENTS
SOUTH BELRIDGE OIL FIELD, KERN COUNTY

ExxonMobil Production Company (Discharger) owns and maintains a former oil field produced water disposal facility contained four unlined surface impoundments in the South Belridge Oil Field. The former impoundments cover 17½ acres and received the Discharger's non-hazardous oil field produced water and treatment backwash water (wastewater) for disposal by evaporation and percolation. Disposal of wastewater occurred from the 1950s until December 2006.

On 4 June 2004, the Central Valley Water Board adopted Waste Discharge Requirements (WDRs) Order No. R5-2004-0080. The proposed WDRs would classify the facility as Class II surface impoundments in accordance with California Code of Regulations, Title 27, section 20090(b). The WDRs included a Monitoring and Reporting Program and a time schedule to close the facility.

On 23 June 2006, the Central Valley Water Board adopted Cease and Desist Order No. R5-2006-0064 extending the compliance dates in the WDRs to: (a) complete the treatment plant improvements and cease wastewater discharge to the impoundments; and (b) submit a report describing the results and conclusions of a hydrogeologic investigation and including a groundwater corrective action plan.

From August 2009 to July 2011, the Discharger closed the facility with some residual waste remaining in place beneath an engineered cover soil. Closure activities included excavation of waste and significantly impacted soil, confirmation soil sampling to determine that waste and significantly impacted soil were excavated, construction of a one-foot foundation, a minimum one-foot of clean soil as final cover, and submittal of a Closure Certification Report. The Report certified, and Central Valley Water Board staff concurred that the facility was closed in accordance with the approved closure plan and addendums. The facility was closed and capped in accordance with Title 27, eliminating additional sources of groundwater contamination.

The Central Valley Water Board is proposing new WDRs that describe requirements for post-closure maintenance and monitoring of the closed facility, groundwater monitoring and reporting, and an updated groundwater corrective action program.

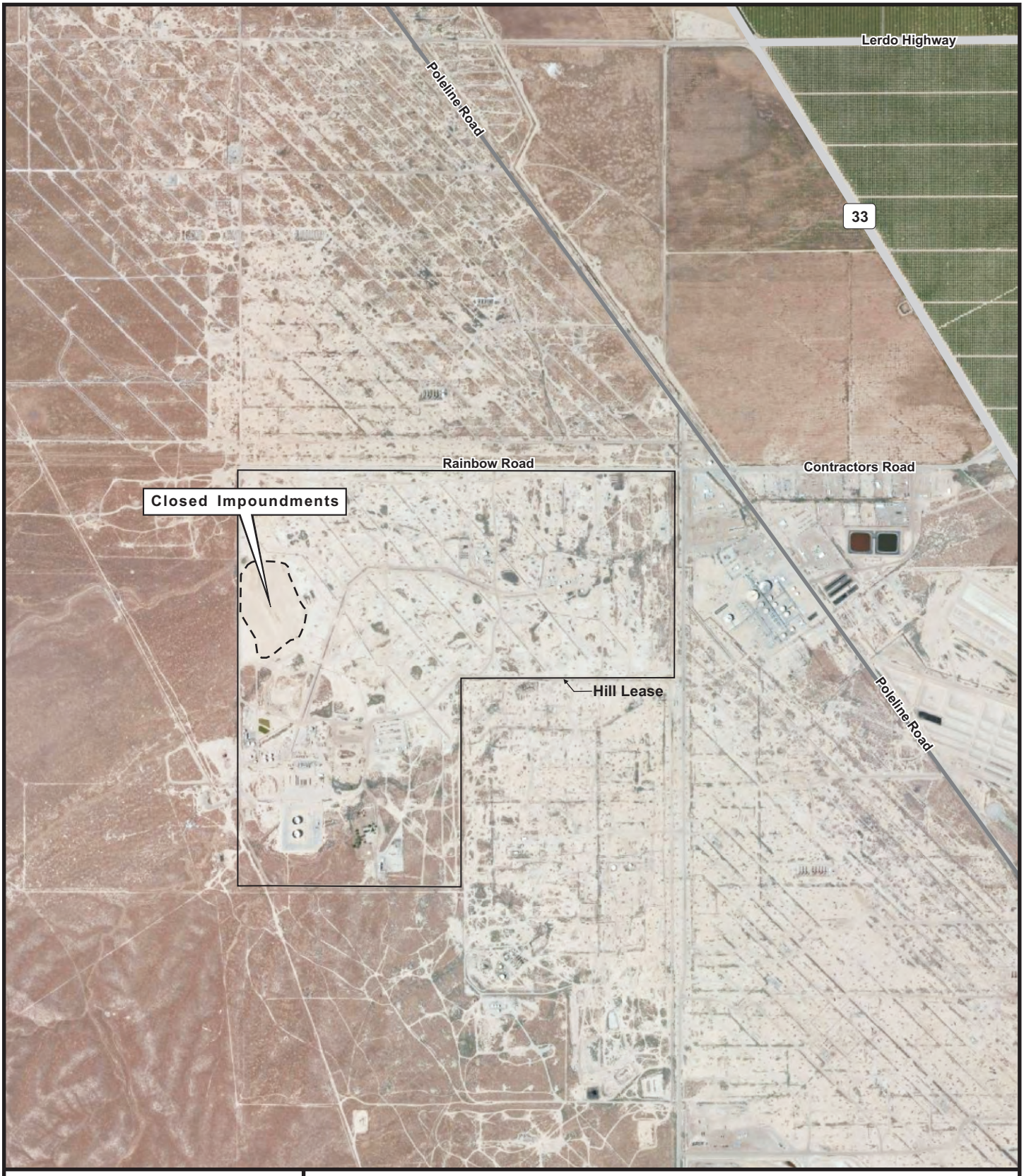
The Discharger conducted a hydrogeologic investigation and determined that the stratigraphy consists of three geologic units: (1) Alluvium; (2) 22K Sand; (3) and the Corcoran Clay Equivalent. Groundwater impacted by wastewater from the facility is present in the Alluvium and 22K Sand. Wastewater impacts in groundwater extend furthest downgradient in the Alluvium to monitoring well MW-4, a distance exceeding 4,000 feet from the facility. Groundwater monitoring is currently conducted in 10 wells.

The beneficial uses of groundwater beneath the area, as designated by Table II-2 in the Basin Plan, are municipal and domestic supply, agricultural supply, and industrial service supply. There are no municipal or domestic supply wells in the area. The nearest municipal supply wells are in unincorporated Spicer City about 8½ miles east-

northeast of the former impoundments. The nearest agricultural supply well is about seven miles east-southeast of the former impoundments.

The Discharger submitted a groundwater corrective action plan, which considered corrective action alternatives, and proposed to monitor the natural attenuation of the constituents of concern (total dissolved solids, chloride, and boron), in groundwater monitoring wells. Monitored natural attenuation (MNA) was determined to be the appropriate corrective action. Closure of the former impoundments will result in greater protection for human health, the environment, and water quality.

Until 2010, groundwater monitoring data indicated the downgradient extent of the constituents of concern (COCs) exhibited consistent concentrations; however, recent data indicates an increase in the COCs in well MW-4. The WDRs require the Discharger to submit a work plan to further delineate the extent of the COCs in groundwater, and to submit an updated groundwater corrective action plan to determine whether MNA is still an appropriate corrective action. If MNA is no longer appropriate, the Discharger will need to consider additional corrective action measures.



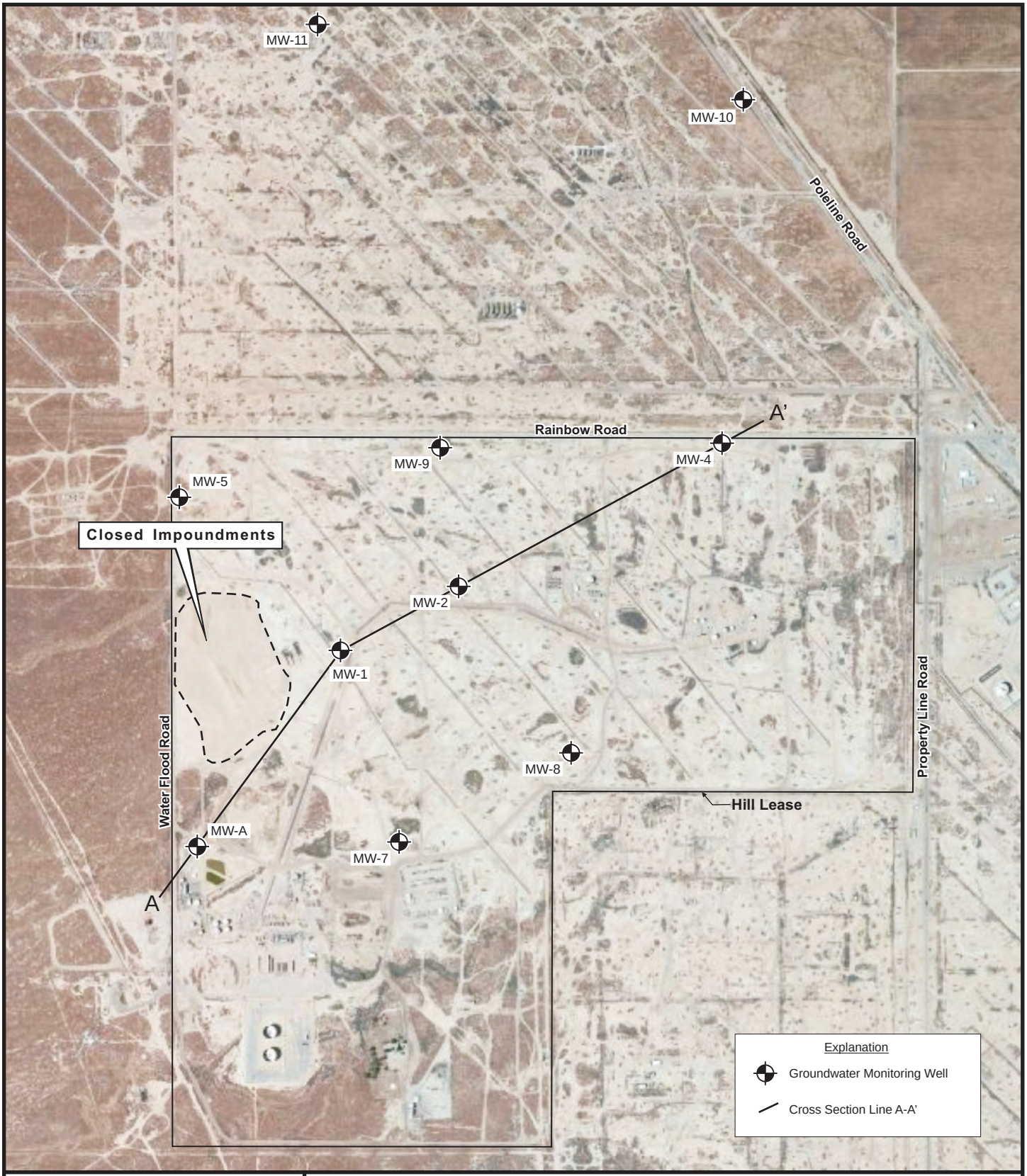
Map Source:
ESRI's ArcGIS Online Premium Services
Section 19, T28S, R21E, MDB&M

SCALE IN FEET
0 1,000 2,000

LOCATION MAP

ORDER R5-2013-0061
WASTE DISCHARGE REQUIREMENTS
FOR
EXXONMOBIL PRODUCTION COMPANY
FOR
POST-CLOSURE MAINTENANCE AND CORRECTIVE ACTION
HILL LEASE SURFACE IMPOUNDMENTS
SOUTH BELRIDGE OIL FIELD, KERN COUNTY

ATTACHMENT A



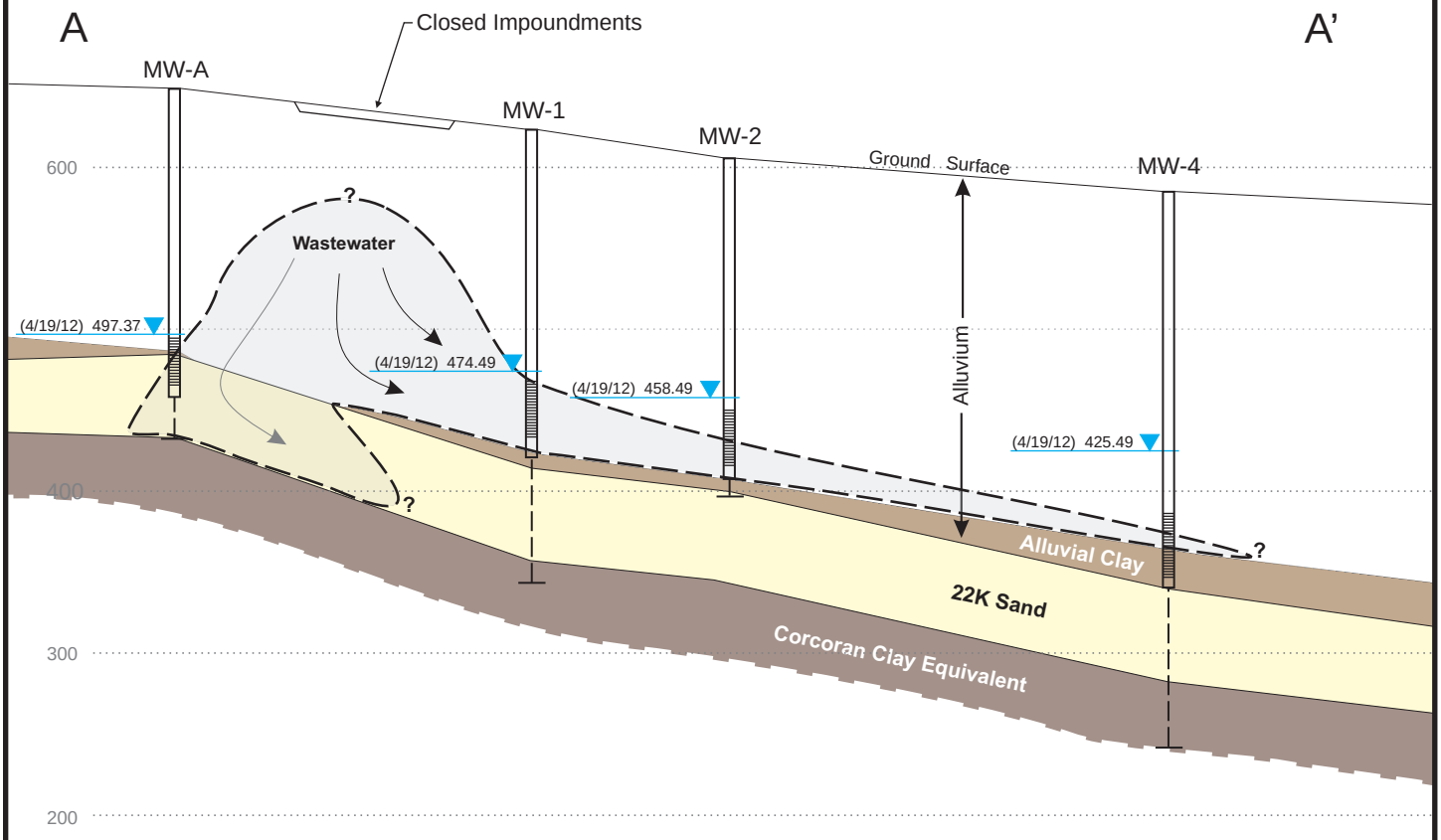
Map Source:
ESRI's ArcGIS Online Premium Services
Section 19, T28S, R21E, MDB&M

SCALE IN FEET
0 500 1,000

SITE MAP

ORDER R5-2013-0061
WASTE DISCHARGE REQUIREMENTS
FOR
EXXONMOBIL PRODUCTION COMPANY
FOR
POST-CLOSURE MAINTENANCE AND CORRECTIVE ACTION
HILL LEASE SURFACE IMPOUNDMENTS
SOUTH BELRIDGE OIL FIELD, KERN COUNTY

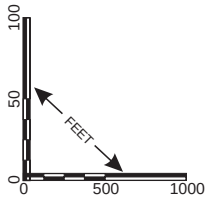
ATTACHMENT B



Explanation

- Wastewater in Soil and Groundwater from ExxonMobil's Impoundments
- Groundwater Elevation (Units: feet above mean sea level)
- Groundwater Monitoring Well with Screened Interval (dashed lines)
- Soil Boring

SCALES IN FEET



VERTICAL EXAGERATION 10:1

CROSS SECTION

ORDER R5-2013-0061
WASTE DISCHARGE REQUIREMENTS
FOR
EXXONMOBIL PRODUCTION COMPANY
FOR
POST-CLOSURE MAINTENANCE AND CORRECTIVE ACTION
HILL LEASE SURFACE IMPOUNDMENTS
SOUTH BELRIDGE OIL FIELD, KERN COUNTY

ATTACHMENT C