

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER NO. R5-2007-0005

WASTE DISCHARGE REQUIREMENTS
FOR
CALIFORNIA DEPARTMENT OF CORRECTIONS AND REHABILITATION
FOR
OPERATION OF CLASS II SURFACE IMPOUNDMENTS
DEUEL VOCATIONAL INSTITUTION
SAN JOAQUIN COUNTY

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

1. The California Department of Corrections and Rehabilitation (hereafter Discharger) proposes to construct and operate a reverse osmosis water treatment plant at the Deuel Vocational Institution. The facility is located east of the City of Tracy in San Joaquin County in Section 20, T2S, R6E, MDB&M, as shown in Attachment A, which is incorporated herein and made part of this Order by reference.
2. The proposed facility will treat groundwater at the Deuel Vocational Institution (DVI) with a reverse osmosis plant, brine concentrator and four evaporation basins to be used for brine discharge. The treatment facility and the evaporation ponds are shown in Attachment B, which is incorporated herein and made part of this Order by reference. The facility is comprised of Assessor's Parcel Number 239-120-01.
3. The Discharger has submitted the Final Construction and Design Plans, the Groundwater Monitoring Well Installation Workplan, and the Groundwater Sampling and Analysis Plan, as required under Waste Discharge Requirements (WDR) Order No. R5-2006-0075.
4. The Discharger requested an extension for submittal of the Groundwater Monitoring Installation Report due to budgetary delays in awarding the construction contract. These revised WDRs allow additional time to submit that report, and continue to require the establishment of background water quality and water quality protection standards prior to any waste being discharged to the surface impoundments.
5. On 24 October 2005, the Discharger submitted a Report of Waste Discharge (RWD) for the brine evaporation basins. Revisions to the RWD were provided on 30 January 2006 and a final RWD was submitted on 11 April 2006. The information in the RWD has been used in writing these WDRs. The RWD contains the applicable information required in Title 27, California Code of Regulations (CCR), Chapter 4, Subchapter 3, Article 4.

6. This Order classifies the four brine evaporation basins as Class II surface impoundments in accordance with Title 27, CCR Section 20005, et seq. (Title 27).
7. The average brine flow to the surface impoundments will be 4 gallons per minute or approximately 5,600 gallons per day (gpd) resulting in about 2 million gallons of wastewater per year. The approximate area of each surface impoundment is 0.85 acres. The maximum capacity of each surface impoundment while maintaining the required two-foot freeboard is approximately 1.0 million gallons. The Discharger submitted a water balance demonstrating adequate capacity at a flow of 5,600 gpd.
8. During scheduled maintenance and emergency situations, the reverse osmosis plant may be operated while bypassing the brine concentrator. The un-concentrated brine will be directly discharged to the evaporation basins. After the maintenance or emergency ends, this water will be removed from the evaporation basins, treated by the reverse osmosis plant or brine concentrator, and the brine returned to the basins, thus maintaining the 5,600 gpd monthly average flow rate.

WASTE AND UNIT CLASSIFICATIONS

9. The wastewater consists of concentrated brine from the reverse osmosis water treatment plant. The brine waste characteristics were developed based on feed water quality, RO treatment removal, finished water quality goals and the resulting mass balance. The estimated concentrations are as follows:

Parameter	Concentration ¹	Units
Total Dissolved Solids	313,600	mg/L
Aluminum	7.56	mg/L
Iron	33.6	mg/L
Manganese	58.8	mg/L
Boron	84	mg/L
Calcium	33,600	mg/L
Magnesium	18,200	mg/L
Sodium	39,738	mg/L
Potassium	1,106	mg/L
Barium	21	mg/L
Strontium	1,092	mg/L
Sulfate	30,040	mg/L
Chloride	154,000	mg/L
Total Silica	6,440	mg/L

¹ These are estimated concentrations and the Discharger is required to monitor the waste brine once the treatment plant is operational. Once additional data is received, the waste characteristics may change and the Monitoring and Reporting Program may be revised.

10. Designated waste is defined in Title 27, Section 20210, as a nonhazardous waste which consists of, or contains pollutants which, under ambient environmental conditions at the waste management unit, could be released at concentrations in excess of applicable water quality standards, or which could cause degradation of waters of the state.
11. The discharge poses a significant threat to water quality. Therefore, the discharge is a designated waste and, as such, must be discharged to a Class II surface impoundment as required by Title 27.

SITE DESCRIPTION

12. The estimated hydraulic conductivity of the native soils underlying the surface impoundments is estimated at 1×10^{-7} cm/sec.
13. Segment Number 7 of the Great Valley Fault is the closest Holocene fault and is located approximately 9.1 miles southwest of the facility. The maximum moment magnitude seismic event along this fault is 6.7 on the Richter scale. The peak ground acceleration on rock at the site for the maximum credible earthquake is 0.29 g.
14. Land use within 1,000 feet of the facility is predominantly agriculture.
15. The facility receives an average of 9.94 inches of precipitation per year as measured at the Tracy Carbona Station. The mean pan evaporation is 97.41 inches per year as measured at the Tracy Pumping Plant.
16. The 1000-year, 24-hour precipitation event is estimated to be 9.97 inches, based on the Department of Water Resources' bulletin entitled *Rainfall Depth-Duration-Frequency for California*, revised November 1982, updated August 1986.
17. The waste management facility is within a 100-year flood plain based on the Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Map, Community-Panel Number 060299 0730 B. In order to mitigate potential washout of the surface impoundments in the event of a 100-year flood event, the ponds will be constructed within a 16-foot fill pad and the tops of the surface impoundment berms will be at an elevation 2-feet above the 100-year floodplain.

SURFACE AND GROUND WATER CONDITIONS

18. The *Water Quality Control Plan for Sacramento and San Joaquin River Basins, Fourth Edition* (hereafter Basin Plan), designates beneficial uses, establishes water

quality objectives, and contains implementation plans and policies for all waters of the Basin, and incorporates by reference plans and policies adopted by the State Water Resources Control Board (State Board). Pursuant to Section 13263(a) of the California Water Code, waste discharge requirements must implement the Basin Plan.

19. Surface drainage is toward the San Joaquin River in the Sacramento San Joaquin Delta Hydrologic Area (544.00).
20. The beneficial uses of the Sacramento- San Joaquin Delta are municipal and domestic supply; agricultural supply; industrial; industrial service supply, water contact recreation; non-contact water recreation; warm freshwater habitat; cold freshwater habitat; migration of aquatic organism; spawning, reproduction, and/or early development; wildlife habitat; and navigation.
21. The designated beneficial uses of the groundwater, as specified in the Basin Plan, are domestic and municipal supply, agricultural supply, industrial service supply and industrial process supply.
22. In May 2005, a geotechnical investigation was performed in the proposed location of the surface impoundments. Four borings were drilled and first groundwater ranged from 3.4 to 5.0 feet below the native ground surface (bgs).
23. The Discharger has not collected any shallow groundwater data. Prior to the discharge of waste to the surface impoundments, the Discharger is required to install groundwater monitoring wells and provide water quality protection standards that are based upon a minimum of one year of groundwater data collection.
24. There are 94 municipal, domestic, industrial, or agricultural groundwater supply wells within one mile of the site. The Discharger operates three groundwater supply wells, Well No. 4, Well No. 5 and Well No. 6. Well No. 4 (State ID No. 3910800-002) is drilled to 490 feet bgs, Well No. 5 (State ID No. 3910900-003) is drilled to 500 feet bgs and Well No. 6 (State ID No. 3910800-004) is drilled to 615 feet bgs.
25. Monitoring data gathered for the onsite supply wells indicates groundwater quality has total dissolved solids (TDS) concentrations ranging between 840 to 2200 mg/l.
26. The predicted direction of groundwater flow is toward the east to northeast.
27. The Discharger proposes to install a minimum of three groundwater monitoring wells. Once a true groundwater gradient for the shallow groundwater zone is determined, the Discharger may be required to install additional groundwater monitoring wells such that the detection monitoring system is in compliance with Title 27.

WASTE MANAGEMENT DESIGN

28. The Discharger proposes an engineered alternative to the prescriptive liner requirements of Title 27 for the Class II surface impoundments. The engineered alternative consists of the following from the top down:
- a. A primary 60-mil thick high density polyethylene (HDPE) geomembrane.
 - b. A geonet drainage layer, as a leachate collection and removal system (LCRS).
 - c. A secondary 60-mil thick HDPE geomembrane in lieu of the clay liner.
 - d. A geonet drainage layer as a vadose zone monitoring system.
 - e. A tertiary 60-mil thick HDPE geomembrane.
29. Side slope liners are proposed to be constructed of the same materials and in the same sequence and manner as the bottom liner system. The liner subgrade will be prepared in an appropriate manner using accepted engineering and construction methods so as to provide a surface that is smooth and free from rocks, sticks, and other debris that could damage or otherwise limit the performance of the geomembrane, and certified in accordance with this Order and the approved CQA Plan.
30. The ponds will be constructed with an inboard slope of 3 to 4:1 and outboard slopes of 2:1. The berm width at the crest will be approximately 20 feet. To protect the liners, a soil layer approximately 2 to 4 foot thick will be placed over the liner system.
31. The depth to shallow groundwater ranges from 3.4 to 5.0 feet bgs, measured during the geotechnical study performed in May 2005. Title 27, CCR Section 20240(c) requires a minimum separation of five feet between waste and the highest anticipated groundwater elevation. To mitigate the five foot separation requirement, the Discharger has proposed to construct the surface impoundments within 16 feet of fill, with the bottom elevation of each surface impoundment five feet above natural grade.
32. Each surface impoundment will have a geonet LCRS blanket across the entire area of each base. Prior to construction the Discharger is required to submit additional design information for the LCRS sump design and a fail safe mechanism that will assure that the sumps will not overflow with leachate.
33. The Discharger proposes to install a pan lysimeter (geonet blanket) under the entire area of the base of each surface impoundment that will serve as an engineered alternative to the prescriptive unsaturated zone monitoring system requirements of Title 27, CCR Section 20415(d).
34. Title 27 CCR Section 20080(b) allows the Regional Board to consider the approval of an engineered alternative to the prescriptive standard. In order to approve an engineered alternative, the Discharger must demonstrate that the prescriptive design

is unreasonably and unnecessarily burdensome and will cost substantially more than an alternative which will meet the criteria contained in Title 27 CCR Section 20080(b), or would be impractical and would not promote attainment of applicable performance standards. The Discharger must also demonstrate that the proposed engineered alternative liner system is consistent with the performance goal addressed by the particular prescriptive standard, and provides protection against water quality impairment equivalent to the prescriptive standard in accordance with Title 27 CCR Section 20080(b)(2). For this facility, the Discharger was not required to repeat the engineered alternative demonstration, which had been made for other facilities. There are no significant differences in the characteristics of already approved engineered alternative liners and the liner system proposed for the Deuel Vocational Institution.

35. Section 13360(a)(1) of the California Water Code allows the Regional Board to specify the design, type of construction, and/or particular manner in which compliance must be met in waste discharge requirement orders for the discharge of waste at solid waste disposal facilities.
36. Construction may proceed only after all applicable construction quality assurance plans have been approved.

CEQA AND OTHER CONSIDERATIONS

37. The State of California Department of Corrections and Rehabilitation certified the final Negative Declaration for the reverse osmosis plant and evaporation basins on 4 May 2005 and filed a Notice of Determination on 5 May 2005 in accordance with the California Environmental Quality Act (Public Resources Code Section 21000 et seq.) and CEQA guidelines (Title 14 CCR Section 15000 et seq.).
38. This order implements:
- a. *The Water Quality Control Plan for the Sacramento River and San Joaquin River Basins, Fourth Edition*; and
 - b. The prescriptive standards and performance goals of Chapters 1 through 7, Subdivision 1, Division 2, Title 27, of the California Code of Regulations, effective 18 July 1997, and subsequent revisions.
39. Section 13267(b) of California Water Code provides 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 discharging, or who proposed to discharge within its region, or any citizen or domiciliary, or political agency or entity of this state who had discharged, discharges, or is suspected of discharging, or who proposed to discharge waste outside of its region that could affect the quality of the waters of the state within its region shall furnish, under penalty of

perjury, technical or monitoring program reports which the board requires. The burden, including costs of these reports, shall bear a reasonable relationship to the need for the reports and the benefits to be obtained from the reports. The monitoring and reporting program required by this Order and the attached "Monitoring and Reporting Program No. R5-2007-0005" are necessary to assure compliance with these waste discharge requirements. The Discharger owns and operates the facility that discharges the waste subject to this Order.

PROCEDURAL REQUIREMENTS

40. 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.
41. The Regional Board notified the Discharger and interested agencies and persons of its intent to prescribe waste discharge requirements for this discharge, and has provided them with an opportunity for a public hearing and an opportunity to submit their written views and recommendations.
42. The Regional Board, in a public meeting, heard and considered all comments pertaining to the discharge.

IT IS HEREBY ORDERED that Order No. R5-2006-0075 is rescinded and pursuant to Sections 13263 and 13267 of the California Water Code, that the California Department of Corrections and Rehabilitation, 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 of 'hazardous waste' is prohibited. For the purposes of this Order, the term 'hazardous waste' is as defined in Title 23, California Code of Regulations, Section 2510 et seq.
2. The discharge of solid or liquid waste or leachate to surface waters, surface water drainage courses, or groundwater is prohibited.
3. The discharge of wastes outside of a waste management unit or portions of a waste management unit specifically designed for their containment is prohibited.
4. Discharge of waste to any Class II surface impoundment is prohibited until the following tasks are completed and approved by Regional Board staff:

- a. Installation of a background groundwater monitoring system.
- b. Establishment of background groundwater quality through at least one year of monitoring (a minimum of 8 samples is required to develop statistical values for inorganic monitoring parameters).
- c. Submittal of a Water Quality Protection Standard Report.
- d. Submittal of a plan for a groundwater quality monitoring system.

- e. Installation of an approved groundwater quality monitoring system.
- f. Establishment of Financial Assurance funds for corrective action, unit closure and post-closure maintenance.

B. DISCHARGE SPECIFICATIONS

General Specifications

1. Wastes shall only be discharged into, and shall be confined to, the waste management units (WMUs) specifically designed for their containment.
2. Prior to the discharge of waste to a WMU, all wells within 500 feet the WMUs shall have sanitary seals or shall be properly abandoned. A record of the sealing and/or abandonment of such wells shall be sent to the Regional Board and to the State Department of Water Resources.

Protection From Storm Events

3. Waste management units shall be designed, constructed and operated to prevent inundation or washout due to flooding events with a 100-year return period.
4. 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.
5. 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 site.

Class II Surface Impoundment

6. The monthly average flow to the Class II Surface Impoundments shall not exceed 5,600 gpd.

7. Both the bottom liner and side slope liners of the Class II surface impoundments shall be constructed in accordance with the following engineered alternative that is comprised, in ascending order, of the following:
 - a. A primary 60-mil thick high density polyethylene (HDPE) geomembrane.
 - b. A geonet drainage layer, as a leachate collection and removal system (LCRS).
 - c. A secondary 60-mil thick HDPE geomembrane in lieu of the clay liner.
 - d. A geonet drainage layer as a vadose zone monitoring system.
 - e. A tertiary 60-mil thick HDPE geomembrane.
8. The Discharger may propose changes to the liner system design prior to construction, provided that approved components are not eliminated, the engineering properties of the components are not substantially reduced, and the proposed liner system results in the protection of water quality equal to or greater than the design prescribed by Title 27 and this Order. The proposed changes may be made following approval by the Executive Officer. Substantive changes to the design require reevaluation as an engineered alternative and approval by the Regional Board.
9. The unsaturated zone monitoring system shall be capable of measuring both saturated and unsaturated flows that may occur as a result of a release from the WMU.
10. Each surface impoundment and related containment structures shall be constructed and maintained to prevent inundation, erosion, slope failure, washout, and overtopping under 1,000-year, 24-hour precipitation conditions, and shall be designed to contain the 100-year annual wet season precipitation without using the required two feet of freeboard.
11. Materials used to construct liners shall have appropriate physical and chemical properties to ensure containment of discharged wastes over the operating life, closure, and post-closure maintenance period of the surface impoundments.
12. Materials used to construct the LCRSs shall have appropriate physical and chemical properties to ensure the required transmission of leachate over the life of the surface impoundments and the post-closure maintenance period.
13. Each LCRS shall be designed, constructed, and maintained to collect twice the anticipated daily volume of leachate generated by each surface impoundment and to prevent the buildup of hydraulic head on the underlying liner at any time. The depth of the fluid in any LCRS sump shall be kept at the minimum needed for safe pump operation.

14. Any direct-line discharge to a surface impoundment shall have fail-safe equipment or operating procedures to prevent overfilling.
15. The surface impoundment(s) shall be designed, constructed and maintained to prevent scouring and/or erosion of the liners and other containment features at points of discharge to the impoundments and by wave action at the water line.
16. Leachate removed from a surface impoundment's primary LCRS shall be discharged to the impoundment from which it originated.
17. Leachate generation by each waste containment unit LCRS shall not exceed 85% of the design capacity of (a) the LCRS, or (b) the sump pump. If leachate generation exceeds this value and/or if the depth of the fluid in an LCRS exceeds the minimum needed for safe pump operation, then the Discharger shall immediately cease the discharge of waste, excluding leachate, to the waste management unit and shall notify the Regional Board in writing within **seven days**. Notification shall include a timetable for a remedial action to repair the containment structures or other action necessary to reduce leachate production.
18. If leachate is detected in the vadose zone monitoring system of a surface impoundment (indicating a leak in the containment structures) the Discharger shall:
 - a. Immediately cease discharge of waste, excluding leachate to the surface impoundment, until the leaks can be found and repaired.
 - b. Verbally notify the Regional Board that the containment structures have failed within 72 hours.
 - c. Submit written notification of the release to the Regional Board within seven days, the notification should include a time schedule to repair the containment structures.
 - d. The discharge of wastes to the surface impoundment shall not resume until the Regional Board has determined that repairs to the liners are complete and there is no further threat to water quality.
19. Solids that accumulate in the surface impoundments shall be periodically removed to maintain minimum freeboard requirements and to maintain sufficient capacity for surface impoundment leachate and for the discharge of wastes. Prior to removal of these solids, sufficient samples shall be taken for their characterization and classification pursuant to Article 2, Subchapter 2, Chapter 3, Division 2 of Title 27. The rationale for the sampling protocol used, the results of this sampling, and a rationale for classification of the solids shall be submitted to Regional Board staff

for review. Before any disposal of this sediment, the Discharger must obtain concurrence on the disposal method from Regional Board staff.

20. Construction shall proceed only after all applicable construction quality assurance plans have been approved.

Class II Surface Impoundment Closure

21. The closure of each surface impoundment shall be under the direct supervision of a California registered civil engineer or certified engineering geologist.
22. At closure of each surface impoundment, all residual wastes, including liquids, sludges, precipitates, settled solids, liner materials, and adjacent natural geologic materials contaminated by wastes, shall be completely removed and discharged to a waste management unit approved by Regional Board staff. If after reasonable attempts, the Discharger demonstrates the removal of all remaining contamination is infeasible, the surface impoundment shall be closed as a landfill.

C. RECEIVING WATER LIMITATIONS

Water Quality Protection Standards

The concentrations of Constituents of Concern in waters passing through the Points of Compliance shall not exceed the Concentration Limits established pursuant to Monitoring and Reporting Program No. R5-2007-0005, which is attached to and made part of this Order.

D. FINANCIAL ASSURANCE

1. The Discharger shall, by **30 April of each year**, submit for review and approval, plans with detailed cost estimates and a demonstration of assurances of financial responsibility for initiating and completing corrective action for all known or reasonably foreseeable releases from the waste management unit. The Discharger shall provide the assurances of financial responsibility to the Regional Board as required by Title 27 CCR, Division 2, Subdivision 1, Chapter 6. The assurances of financial responsibility shall provide that funds for corrective action shall be available to the Regional Board upon the 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. The financial assurance fund for corrective action shall be established **prior to discharging waste to the surface impoundment.**

2. The Discharger shall, by **30 April of each year**, submit for review and approval, plans with detailed cost estimates and a demonstration of assurances of financial responsibility to ensure closure and post-closure maintenance of each waste management unit in accordance with its approved closure and post-closure maintenance plans. The Discharger shall provide the assurances of financial responsibility to the Regional Board as required by Title 27 CCR, Division 2, Subdivision 1, Chapter 6. The assurances of financial responsibility shall provide that funds for corrective action shall be available to the Regional Board upon the 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. The financial assurance fund for closure and post-closure maintenance shall be established **prior to discharging waste to the surface impoundment**.

E. PROVISIONS

1. The Discharger shall comply with the Standard Provisions and Reporting Requirements, dated September 2003, which are hereby incorporated into this Order. The Standard Provisions and Reporting Requirements contain important provisions and requirements with which the Discharger must comply. A violation of any of the Standard Provisions and Reporting Requirements is a violation of these waste discharge requirements.
2. The Discharger shall comply with Monitoring and Reporting Program No. R5-2007-0005, which is attached to and made part of this Order. This compliance includes, but is not limited to, maintenance of waste containment facilities and precipitation and drainage controls and monitoring groundwater, the unsaturated zone, and surface waters throughout the active life of the waste management units and the post-closure maintenance period. A violation of Monitoring and Reporting Program No. R5-2007-0005 is a violation of these waste discharge requirements.
3. The Discharger shall maintain legible records of the volume and type of waste discharged to the surface impoundments and the manner and location of the discharge. Such records shall be maintained at the facility until the beginning of the post-closure maintenance period. These records shall be available for review by representatives of the Board and of the State Water Board, copies of these records shall be sent to the Regional Board.
4. The Discharger shall provide proof to the Regional Board **within sixty days after completing final closure** that the deed to the surface impoundment facility property, or some other instrument that is normally examined during title search,

has been modified to include, in perpetuity, a notation to any potential purchaser of the property stating that:

- a. The parcel has been used for disposal of liquid wastes.
 - b. Land use options for the parcel are restricted in accordance with the post-closure land uses set forth in the post-closure plan and in WDRs for the surface impoundment.
 - c. In the event that the Discharger defaults on carrying out either the post-closure maintenance plan or any corrective action needed to address a release, then the responsibility for carrying out such work falls to the property owner.
5. The Regional Board will review this Order periodically and may revise requirements when necessary.
 6. In the event of any change in ownership of this waste management facility, the Discharger shall notify the succeeding owner or operator in writing of the existence of this Order. A copy of that notification shall be sent to the Regional Board.
 7. The following reports shall be submitted pursuant to Section 13267 of the California Water Code and shall be prepared by a registered professional:
 - a. A *Groundwater Monitoring Installation Report* shall be submitted **16 months** before waste can be discharged to the surface impoundments. This report shall include all items listed in Section 2 of Attachment C, Monitoring Well Workplan and Monitoring Well Installation Report Requirements.
 - b. At least **45 days** prior to discharging waste into the surface impoundments, the Discharger shall submit a background groundwater characterization report and a Water Quality Protection Standard (WQPS) report. The WQPS report shall include all the items outlined in Section B of MRP Order No. R5-2007-0005.
 - c. Within **60 days** after completing construction of the waste management units, a final Construction Quality Assurance Plan shall be submitted. The Plan shall be in accordance with Title 27 CCR Section 20324 and shall demonstrate that the surface impoundments were constructed in accordance with the approved construction plans.
 - d. Within **60 days** after completing construction of the waste management units, the Discharger shall submit the professionally surveyed bottom elevations of the constructed surface impoundments.

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OPERATION OF CLASS II SURFACE IMPOUNDMENTS
DEUEL VOCATIONAL INSTITUTION
SAN JOAQUIN COUNTY

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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 25 January 2007.

PAMELA C. CREEDON, Executive Officer

MLB: 10/20/2006

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM NO. R5-2007-0005
FOR
CALIFORNIA DEPARTMENT OF CORRECTIONS AND REHABILITATION
FOR
OPERATION OF CLASS II SURFACE IMPOUNDMENTS
DEUEL VOCATIONAL INSTITUTION
SAN JOAQUIN COUNTY

Compliance with this Monitoring and Reporting Program, and with the companion Standard Provisions and Reporting Requirements, is ordered by Waste Discharge Requirements Order No. R5-2007-0005. Failure to comply with this Program, or with the Standard Provisions and Reporting Requirements dated September 2003, constitutes noncompliance with the WDRs and with the Water Code, which can result in the imposition of civil monetary liability.

A. REPORTING

The Discharger shall report monitoring data and information as required in this Monitoring and Reporting Program and as required in the Standard Provisions and Reporting Requirements. Reports which do not comply with the required format will be **REJECTED** and the Discharger shall be deemed to be in noncompliance with the WDRs. 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 discernible. The data shall be summarized in such a manner so as to illustrate clearly the compliance with waste discharge requirements or the lack thereof. Historical and current monitoring data shall be graphed at least once annually. Graphs for the same constituent shall be plotted at the same scale to facilitate visual comparison of monitoring data. A short discussion of the monitoring results, including notations of any water quality violations shall precede the tabular summaries. Data shall also be submitted in a digital format.

Method detection limits and practical quantitation limits shall be reported. All peaks shall be reported, including those which cannot be quantified and/or specifically identified. Field and laboratory tests shall be reported in the quarterly monitoring reports. The results of any monitoring done more frequently than required at the locations specified herein shall be reported to the Regional Board.

B. REQUIRED MONITORING REPORTS AND SUBMITTAL DATES

1. Semiannual Groundwater, Vadose Zone and Leachate Monitoring Reports

Each Semiannual monitoring report shall include all water quality data and observation collected during the reporting period and submitted per the **Reporting Due Dates** in Section B.6. of this Monitoring and Reporting Program.

At a minimum, the sampling and data collection in Tables 1 through 4 of this Monitoring and Reporting Program, Standard Provisions and Reporting Requirements (2003), and Waste Discharge Requirements shall be reported.

2. Annual Monitoring Summary Report

The Discharger shall submit an Annual Monitoring Summary Report to the Board covering the previous monitoring year. The annual report shall contain the information specified in Standard Provisions and Reporting Requirements (2003), Section VIII.B of the "*Reports to be Filed with the Board.*"

3. Facility Monitoring Report

Annually, prior to the anticipated rainy season, but no later than **30 September**, the Discharger shall conduct an inspection of the facility. The inspection shall assess damage to the drainage control system, groundwater monitoring equipment (including wells, etc.), and shall include the Standard Observations contained in Section XII.S of Standard Provisions and Reporting Requirements (2003).

4. Response to a Release

If the Discharger determines that there is significant statistical evidence of a release (i.e. the initial statistical comparison or non-statistical comparison indicates, for any Constituent of Concern or Monitoring Parameter, that a release is tentatively identified), the Discharger shall immediately notify the Board verbally as to the Monitoring Point(s) and constituent(s) or parameter(s) involved, shall provide written notification by certified mail within seven days of such determination and implement Response to Release section of the Standard Provisions and Reporting Requirements (2003).

5. Water Quality Protection Standard Report

Any proposed changes in a statistical method or concentration limits for a constituent of concern or monitoring parameter a Water Quality Protection Standard Report shall be submitted and include the information required in Section C.1. of this Monitoring Reporting Program. Any changes to Water Quality Protection Standards shall be approved by the Executive Officer in a Revised Monitoring and Reporting Program.

6. Submittal Dates

Semiannual Groundwater, Unsaturated Zone and Leachate Monitoring Reports

Reporting Type	Sampling Frequency and Data Reported	Reporting Period	Report Date Due
Semiannually	Daily, Weekly, Monthly, Quarterly and Semiannually	1 January – 30 June 1 July – 31 December	31 July 31 January

Annual Monitoring Summary Report	31 January
Facility Monitoring Report	15 November
Response to a Release	as necessary
Water Quality Protection Standard Report	as required in Order No.

C. WATER QUALITY PROTECTION STANDARD AND COMPLIANCE PERIOD

1. Water Quality Protection Standard Report

Prior to discharging waste to the Class II surface impoundments, the Discharger shall submit a Water Quality Protection Standard (WQPS) Report for review and approval. The WQPS Report shall include limits for all the parameters listed on Table I.

For each waste management unit (Unit), the WQPS shall consist of all constituents of concern (Title 27 Section 20395), the concentration limit for each constituent of concern (Title 27 Section 20400), the point of compliance (Title 27 Section 20405), and all water quality monitoring points (Title 27 Section 20164) for each monitored medium.

The water quality protection standard for naturally occurring waste constituents consists of the constituents of concern, the concentration limits, and the point of compliance and all monitoring points.

The WQPS Report shall:

- a. Identify all distinct bodies of surface and ground water that could be affected in the event of a release from a Unit or portion of a Unit. This list shall include at least the uppermost aquifer and any permanent or ephemeral zones of perched groundwater underlying the facility.
- b. Include a map showing the monitoring points and background monitoring points for the surface water monitoring program, groundwater monitoring program, and the unsaturated zone monitoring program. The map shall include the point of compliance in accordance with §20405 of Title 27.
- c. Evaluate the perennial direction(s) of groundwater movement within the uppermost groundwater zone(s).

The WQPS Report shall be certified by a California-registered civil engineer or geologist as meeting the requirements of Title 27. If subsequent sampling of the background monitoring point(s) indicates significant water quality changes due to either seasonal fluctuations or other reasons unrelated to waste management activities at the site, the Discharger may request modification of the water quality protection standard.

2. Constituents of Concern (COC)

The COCs include all the waste constituents, their reaction products, and hazardous constituents that are reasonably expected to be in or derived from waste contained in the Unit.

a. Monitoring Parameters

Monitoring parameters are COCs that are the waste constituents, reaction products, hazardous constituents, and physical parameters that provide a reliable indication of a release from a Unit. The monitoring parameters for all Units are those listed in Tables 1 through 4 for the specified monitored medium.

3. Concentration Limits

For a naturally occurring COCs, the concentration limit for each shall be determined as follows:

- a. By calculation in accordance with a statistical method pursuant to §20415 of Title 27(e)(8), or
- b. By an alternate statistical method meeting the requirements of §20415(e)(8)(E) of Title 27.

4. Point of Compliance

The point of compliance for the WQPS at each Unit is a vertical surface located at the hydraulically downgradient limit of the Unit that extends through the uppermost aquifer underlying the Unit.

5. Compliance Period

The compliance period for each Unit shall be the number of years equal to the active life of the Unit plus the closure period. The compliance period is the minimum period during which the Discharger shall conduct a water quality monitoring program subsequent to a release from the Unit. The compliance period shall begin anew each time the Discharger initiates an evaluation monitoring program.

D. MONITORING

The Discharger shall comply with the monitoring program provisions of Title 27 for groundwater, surface water, and the unsaturated zone, in accordance with Monitoring Specifications in Standard Provisions and Reporting Requirements (2003). Detection monitoring for a new facility or a new Unit shall be installed, operational, and one year of monitoring data collected **prior to** the discharge of wastes. A minimum of eight samples should be used to develop background concentrations for monitoring parameters. All monitoring shall be conducted in accordance with a Sample Collection and Analysis Plan, which includes quality assurance/quality control standards, that is acceptable to the Executive Officer.

All point of compliance monitoring wells established for the detection monitoring program shall constitute the monitoring points for the groundwater Water Quality Protection Standard. All detection monitoring program groundwater monitoring wells, unsaturated zone monitoring devices, leachate, and surface water monitoring points shall be sampled and analyzed for monitoring parameters and constituents of concern as indicated and listed in Tables 1 through 4.

Method detection limits and practical quantitation limits shall be reported. All peaks shall be reported, including those which cannot be quantified and/or specifically identified. Metals shall be analyzed in accordance with the methods listed in Table II.

The Discharger may, upon approval, use alternative analytical test methods, including new USEPA approved methods, provided the methods have method detection limits equal to or lower than the analytical methods specified in this Monitoring and Reporting Program.

1. Surface Impoundments

Surface impoundment samples shall be collected in a convenient location at least 50 feet from the influent structure. Liquids in the surface impoundments shall be monitored/sampled for the parameters as listed in Table 1.

Table 1 - Surface Impoundment Monitoring		
<u>Field Parameter</u>	<u>Units</u>	<u>Frequency</u>
Flow Rate	gallons per month	Monthly
Remaining Capacity	gallons	Monthly
Freeboard	±0.1	Weekly
Temperature	°C	Quarterly
Specific Conductance	µmhos/cm	Quarterly
pH	pH number	Quarterly
<u>Monitoring Parameters</u>		
Total Dissolved Solids	mg/L	Quarterly
Chloride	mg/L	Quarterly
Carbonate	mg/L	Quarterly
Bicarbonate	mg/L	Quarterly
Nitrate – Nitrogen	mg/L	Quarterly
Sulfate	mg/L	Quarterly
Calcium	mg/L	Quarterly
Magnesium	mg/L	Quarterly
Potassium	mg/L	Quarterly
Sodium	mg/l	Quarterly
Iron	mg/L	Quarterly
Barium	mg/L	Quarterly
Strontium	mg/L	Quarterly
Aluminum	mg/L	Quarterly
Manganese	mg/L	Quarterly
Boron	mg/L	Quarterly
Volatile Organic Compounds (USEPA Method 8260B, see Table I)	ug/L	Annually

2. Groundwater

The Discharger shall operate and maintain a groundwater monitoring system that complies with the applicable provisions of §20415 of Title 27 in accordance with a Monitoring Program approved by the Executive Officer. The Discharger shall collect, preserve, and transport groundwater samples in accordance with the approved Sample Collection and Analysis Plan.

The Discharger shall determine the groundwater flow rate and direction in the uppermost aquifer and in any zones of perched water and in any additional zone of saturation monitored pursuant to this Monitoring and Reporting Program, and report the results semiannually, including the times of highest and lowest elevations of the water levels in the wells.

Hydrographs of each well shall be submitted 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. Hydrographs of each well shall be prepared quarterly and submitted annually.

Groundwater samples shall be collected from the point-of-compliance wells, background wells, and any additional wells added as part of the approved groundwater monitoring system. Samples shall be collected and analyzed for the monitoring parameters in accordance with the methods and frequency specified in Table 2.

The monitoring parameters shall also be evaluated each reporting period with regards to the cation/anion balance, and the results shall be graphically presented using a Stiff diagram, a Piper graph, or a Schueller plot.

Table 2 - Groundwater Monitoring		
<u>Field Parameter</u>	<u>Units</u>	<u>Frequency</u>
Groundwater Elevation	±0.01 ft., MSL	Quarterly
Temperature	°C	Semiannually
Specific Conductance	µmhos/cm	Semiannually
pH	pH number	Semiannually
<u>Monitoring Parameters</u>		
Total Dissolved Solids	mg/L	Semiannually
Chloride	mg/L	Semiannually
Carbonate	mg/L	Semiannually
Bicarbonate	mg/L	Semiannually
Nitrate – Nitrogen	mg/L	Semiannually
Sulfate	mg/L	Semiannually
Calcium	mg/L	Semiannually
Magnesium	mg/L	Semiannually
Potassium	mg/L	Semiannually
Sodium	mg/L	Semiannually
Iron	mg/L	Semiannually
Barium	mg/L	Semiannually
Strontium	mg/L	Semiannually
Aluminum	mg/L	Semiannually
Manganese	mg/L	Semiannually
Boron	mg/L	Semiannually
Volatile Organic Compounds (USEPA Method 8260B, see Table I)	mg/L	Semiannually
	ug/L	Annually

3. Unsaturated Zone Monitoring

The Discharger shall operate and maintain an unsaturated zone detection monitoring system that complies with the applicable provisions of §20415 of Title 27 in accordance with a monitoring plan approved by the Executive Officer. The Discharger shall collect, preserve, and transport samples in accordance with the quality assurance/quality control standards contained in the approved Sample Collection and Analysis Plan.

Unsaturated zone samples shall be collected from the monitoring devices and background monitoring devices of the approved unsaturated zone monitoring system. The collected samples shall be analyzed for the listed constituents in accordance with the methods and frequency specified in Table 3. All monitoring

parameters shall be graphed so as to show historical trends at each monitoring point.

The pan lysimeter shall be checked monthly for liquid and monitoring shall also include the total volume of liquid removed from the system. Unsaturated zone monitoring reports shall be included with the corresponding semiannual groundwater monitoring and shall include an evaluation of potential impacts of the facility on the unsaturated zone and compliance with the Water Quality Protection Standard.

Table 3- Unsaturated Zone Monitoring		
<u>Field Parameter</u>	<u>Units</u>	<u>Frequency</u>
Flow rate	gallons/month	Monthly
Temperature	°C	Semiannually
Specific Conductance	µmhos/cm	Semiannually
pH	pH number	Semiannually
<u>Monitoring Parameters</u>		
Total Dissolved Solids	mg/L	Semiannually
Chloride	mg/L	Semiannually
Carbonate	mg/L	Semiannually
Bicarbonate	mg/L	Semiannually
Nitrate – Nitrogen	mg/L	Semiannually
Sulfate	mg/L	Semiannually
Calcium	mg/L	Semiannually
Magnesium	mg/L	Semiannually
Potassium	mg/L	Semiannually
Sodium	mg/L	Semiannually
Iron	mg/L	Semiannually
Barium	mg/L	Semiannually
Strontium	mg/L	Semiannually
Aluminum	mg/L	Semiannually
Manganese	mg/L	Semiannually
Boron	mg/L	Semiannually
Volatile Organic Compounds USEPA Method 8260B, see Table I)	ug/L	Annually

4. Leachate Monitoring

The LCRS sump shall be inspected quarterly for leachate. Upon detection of leachate in a previously dry LCRS, the Discharger shall immediately collect a grab sample of the leachate and shall continue to collect grab samples of the leachate at the following frequencies thereafter. The LCRS shall be sampled and analyzed for the following:

Table 4 – LCRS Sampling		
<u>Field Parameter</u>	<u>Units</u>	<u>Frequency</u>
Flow rate	gallons/month	Monthly
Temperature	°C	Semiannually
Specific Conductance	µmhos/cm	Semiannually
pH	pH number	Semiannually
<u>Monitoring Parameters</u>		
Total Dissolved Solids	mg/L	Semiannually
Chloride	mg/L	Semiannually
Carbonate	mg/L	Semiannually
Bicarbonate	mg/L	Semiannually
Nitrate – Nitrogen	mg/L	Semiannually
Sulfate	mg/L	Semiannually
Calcium	mg/L	Semiannually
Magnesium	mg/L	Semiannually
Potassium	mg/L	Semiannually
Sodium	mg/L	Semiannually
Iron	mg/L	Semiannually
Barium	mg/L	Semiannually
Strontium	mg/L	Semiannually
Aluminum	mg/L	Semiannually
Manganese	mg/L	Semiannually
Boron	mg/L	Semiannually
Volatile Organic Compounds (USEPA Method 8260B, see Table I)	ug/L	Annually

5. Facility Monitoring

a. Facility Inspection

Annually, prior to the anticipated rainy season, but no later than **30 September**, the Discharger shall conduct an inspection of the facility. The inspection shall assess damage to the drainage control system, groundwater monitoring equipment (including wells, etc.), and shall include the Standard Observations contained in section F.4.f. of Standard Provisions and Reporting Requirements. Any necessary construction, maintenance, or repairs shall be completed by **31 October**. By **15 November** of each year, the Discharger shall submit an annual report describing the results of the inspection and the repair measures implemented, including photographs of the problem and the repairs.

b. Storm Events

The Discharger shall inspect all precipitation, diversion, and drainage facilities for damage **within 7 days** following *major storm events*. Necessary repairs shall be completed **within 30 days** of the inspection. The Discharger shall report any damage and subsequent repairs within 45 days of completion of the repairs. The report shall include photographs before and after the repairs.

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

Ordered by: _____
PAMELA C. CREEDON, Executive Officer

25 January 2007
(Date)

Attachments: Tables I and II

TABLE I
MONITORING PARAMETERS FOR DETECTION MONITORING

Surrogates for Metallic Constituents:

Analyte	USEPA Test Method
pH	9040/9045
Total Dissolved Solids	160.1
Electrical Conductivity	120.1
Chloride	300.0
Sulfate	300.0
Nitrate Nitrogen	300.0

Constituents included in VOC:

USEPA Method 8260B

Acetone
 Acrylonitrile
 Benzene
 Bromochloromethane
 Bromodichloromethane
 Bromoform (Tribromomethane)
 Carbon disulfide
 Carbon tetrachloride
 Chlorobenzene
 Chloroethane (Ethyl chloride)
 Chloroform (Trichloromethane)
 Dibromochloromethane (Chlorodibromomethane)
 1,2-Dibromo-3-chloropropane (DBCP)
 1,2-Dibromoethane (Ethylene dibromide; EDB)
 o-Dichlorobenzene (1,2-Dichlorobenzene)
 m-Dichlorobenzene (1,3-Dichlorobenzene)
 p-Dichlorobenzene (1,4-Dichlorobenzene)
 trans-1,4-Dichloro-2-butene
 Dichlorodifluoromethane (CFC-12; Freon F-12)
 1,1-Dichloroethane (Ethylidene chloride)
 1,2-Dichloroethane (Ethylene dichloride)
 1,1-Dichloroethylene (1,1 -Dichloroethene; Vinylidene chloride)
 cis-1,2-Dichloroethylene (cis- 1,2-Dichloroethene)
 trans-1,2-Dichloroethylene (trans-1,2-Dichloroethene)
 1,2-Dichloropropane (Propylene dichloride)
 cis-1,3-Dichloropropene
 trans-1,3-Dichloropropene
 Di-isopropylether (DIPE)
 Ethanol
 Ethyltertiary butyl ether
 Ethylbenzene
 2-Hexanone (Methyl butyl ketone)
 Hexachlorobutadiene
 Hexachloroethane
 Methyl bromide (Bromomethene)
 Methyl chloride (Chloromethane)

TABLE I
MONITORING PARAMETERS FOR DETECTION MONITORING

Continued

USEPA Method 8260B-Continued

Methylene bromide (Dibromomethane)
 Methylene chloride (Dichloromethane)
 Methyl ethyl ketone (MEK; 2-Butanone)
 Methyl iodide (Iodomethane)
 Methyl t-butyl ether
 4-Methyl-2-pentanone (Methyl isobutylketone)
 Naphthalene
 Styrene
 Tertiary amyl methyl ether
 Tertiary butyl alcohol
 1,1,1,2-Tetrachloroethane
 1,1,2,2-Tetrachloroethane
 Tetrachloroethylene (Tetrachloroethene; Perchloroethylene)
 Toluene
 1,2,4-Trichlorobenzene
 1,1,1-Trichloroethane (Methylchloroform)
 1,1,2-Trichloroethane
 Trichloroethylene (Trichloroethene)
 Trichlorofluoromethane (Freon 11)
 1,2,3-Trichloropropane
 Vinyl acetate
 Vinyl chloride
 Xylenes

TABLE II
TEST METHODS FOR METALS

<u>Analyte</u>	<u>USEPA Method</u>
Aluminum	6010B
Barium	6010B
Boron	6010B
Calcium	6010B
Iron	6010B
Magnesium	6010B
Manganese	6010B
Potassium	6010B
Sodium	6010B
Strontium	6010B

INFORMATION SHEET

ORDER NO. R5-2007-0005
CALIFORNIA DEPARTMENT OF CORRECTIONS AND REHABILITATION
FOR OPERATION OF CLASS II SURFACE IMPOUNDMENTS
DEUEL VOCATIONAL INSTITUTION
SAN JOAQUIN COUNTY

On 23 June 2006, the Regional Board adopted Waste Discharge Requirements (WDRs) Order No. R5-2006-0075 for the State Department of Corrections and Rehabilitation (Discharger) to allow construction and operation of a proposed reverse osmosis (RO) water treatment plant at the Deuel Vocational Institution (DVI). Construction of the RO plant was proposed in response to exceedances of the NPDES permit conditions. The Discharger has requested a change in the due date of the *Groundwater Monitoring Installation Report* required in WDRs Order No. R5-2006-0075. This change will not affect the protection of water quality and these revised WDRs continue to require that background concentrations and water quality protection standards be established before waste is placed in the Class II surface impoundments.

DVI is located east of the City of Tracy in San Joaquin County in Section 20, T2S, R6E, MDB&M. Because of the high concentration of total dissolved solids (TDS) in the supply wells, treated wastewater from the wastewater treatment plant continually exceeded the NPDES permit limits. In addition, the supply water exceeded drinking water standards set forth by the California Department of Health Services (DHS). The Regional Board adopted Cease and Desist Order (CDO) No. R5-2003-0066 to address the TDS exceedances.

The Discharger proposed to construct a RO groundwater treatment plant that would comply with the CDO adopted by the Regional Board and meet the DHS's drinking water standards. Groundwater from the onsite supply wells will be treated via RO. The waste from the reverse osmosis plant will be reduced in a brine concentrator and discharged to four lined evaporation basins. WDRs Order No. R5-2006-0075 classified the four brine evaporation basins as Class II surface impoundments in accordance with Title 27, CCR Section 20005, et seq. (Title 27), and this revised order continues that classification.

The concentrated brine from the reverse osmosis water treatment plant is a designated waste. The brine waste characteristics were developed based on feed water quality, RO treatment removal, finished water quality goals and the resulting mass balance. The brine characteristics are as follows:

INFORMATION SHEET, ORDER NO. R5-2007-0005
CALIFORNIA DEPARTMENT OF CORRECTIONS AND REHABILITATION
OPERATION OF CLASS II SURFACE IMPOUNDMENTS
DEUEL VOCATIONAL INSTITUTION
SAN JOAQUIN COUNTY

-2-

Parameter	Concentration	Units
Total Dissolved Solids	313,600	mg/L
Aluminum	7.56	mg/L
Iron	33.6	mg/L
Manganese	58.8	mg/L
Boron	84	mg/L
Calcium	33,600	mg/L
Magnesium	18,200	mg/L
Sodium	39,738	mg/L
Potassium	1,106	mg/L
Barium	21	mg/L
Strontium	1,092	mg/L
Sulfate	30,040	mg/L
Chloride	154,000	mg/L
Total Silica	6,440	mg/L

These are estimated concentrations and the Discharger is required to monitor the waste brine once the treatment plant is constructed and operating. Once additional data is received, the waste characteristics may change and the Monitoring and Reporting Program may be revised.

Monitoring data gathered for the onsite supply wells indicates that deeper groundwater has TDS concentrations ranging between 840 to 2200 mg/l. The predicted direction of groundwater flow is toward the east to northeast.

Background shallow groundwater characterization is unknown. Prior to discharge to the surface impoundments, the Discharger shall, at a minimum, perform groundwater monitoring for one year and submit a Water Quality Protection Standard Report.

The Discharger proposes to install a minimum of three groundwater monitoring wells. Once a true groundwater gradient for the shallow groundwater zone is determined, the Discharger may be required to install additional groundwater monitoring wells such that the detection monitoring system is in compliance with Title 27.

The depth to shallow groundwater ranges from 3.4 to 5.0 feet below grade surface, measured during the geotechnical study performed in May 2005. Title 27, CCR Section 20240(c) requires a minimum separation of five foot between waste and the highest anticipated groundwater elevation. To mitigate the five foot separation requirement, the Discharger has proposed to construct the surface impoundments

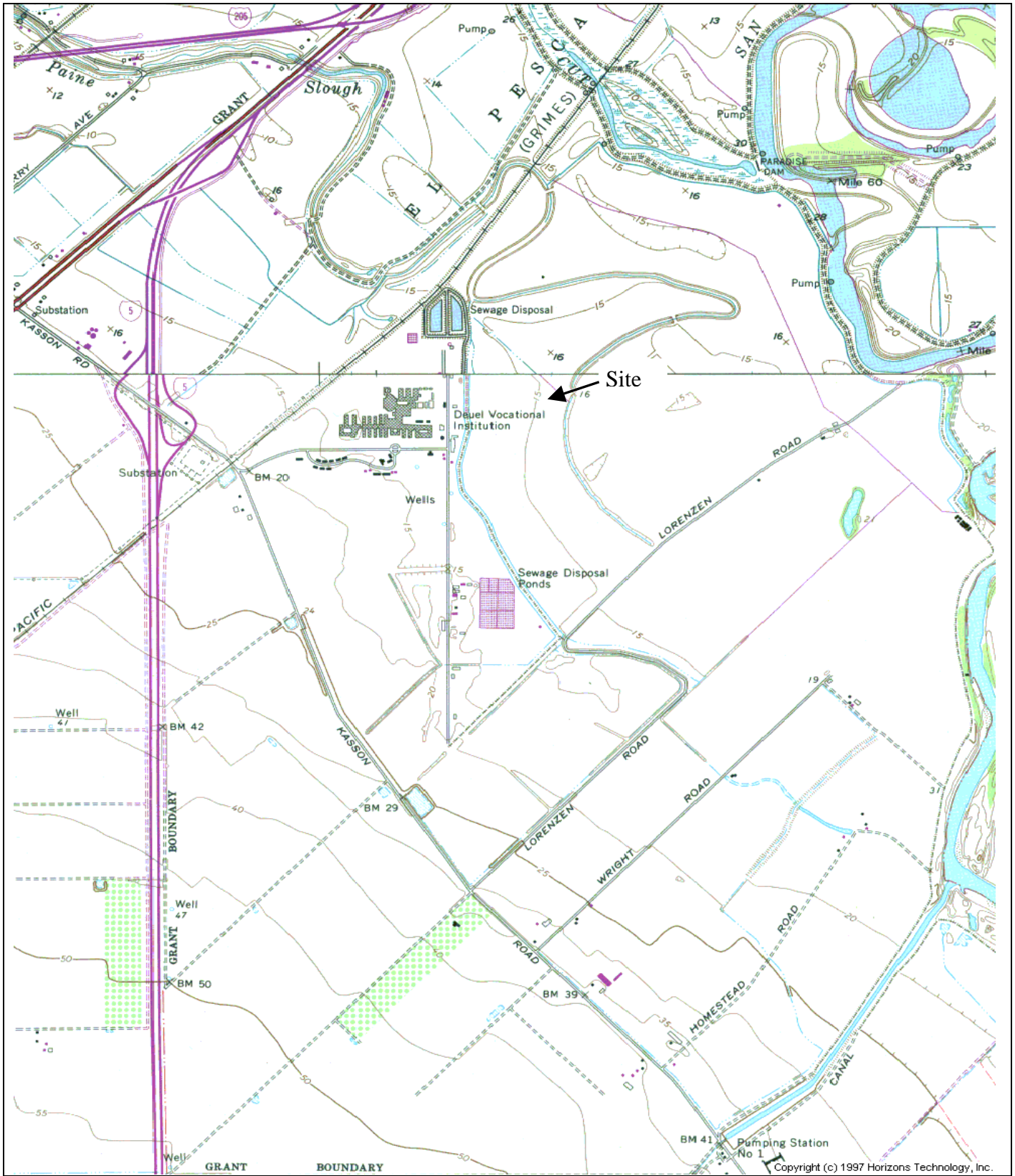
within a 16-foot fill pad, with the bottom elevation of each surface impoundment five feet above natural grade.

The Discharger proposes an engineered alternative to the prescriptive liner requirements of Title 27 for the Class II surface impoundments. The engineered alternative consists of the following from the top down:

- a. A primary 60-mil thick high density polyethylene (HDPE) geomembrane.
- b. A geonet drainage layer, as a leachate collection and removal system (LCRS).
- c. A secondary 60-mil thick HDPE geomembrane in lieu of the clay liner.
- d. A geonet drainage layer as a vadose zone monitoring system.
- e. A tertiary 60-mil thick HDPE geomembrane.

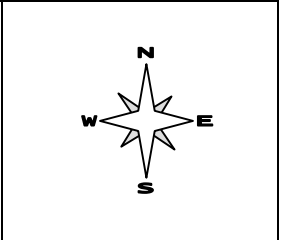
The waste management facility is within a 100-year flood plain based on the Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Map, Community-Panel Number 060299 0730 B. In order to mitigate potential washout of the surface impoundments in the event of a 100-year flood event, the ponds will be constructed within a 16-foot fill pad and the berms will be constructed two-feet above the 100-year flood elevation.

Surface drainage is toward the San Joaquin River.



Drawing Reference:
U.S.G.S Lathrop
TOPOGRAPHIC MAP
7.5 MINUTE QUAD

SITE LOCATION MAP
California Department of Corrections
Deuel Vocational Institution
San Joaquin County



ATTACHMENT C

MONITORING WELL WORKPLAN AND MONITORING WELL
INSTALLATION REPORT REQUIREMENTS
CALIFORNIA DEPARTMENT OF CORRECTIONS AND REHABILITATION
DEUEL VOCATIONAL INSTITUTION
SAN JOAQUIN COUNTY, ORDER NO. R5-2007-0005

Prior to installation of groundwater monitoring wells, the Discharger shall submit a workplan containing, at a minimum, the information listed in Section 1, below. Wells may be installed after staff approve the workplan. Upon installation of the monitoring wells, the Discharger shall submit a well installation report, which includes the information contained in Section 2, below. All workplans and report must be prepared under the direction of, and signed by, a registered geologist or civil engineer licensed by the State of California.

SECTION 1 - Monitoring Well Installation Workplan

A. General Information:

- Purpose of well installation project
- Copies of County Well Construction Permits (to be submitted after workplan review)
- Monitoring well locations and rationale
- Survey details
- Equipment decontamination procedures
- Health and safety plan
- Topographic map showing any existing wells, proposed wells, waste handling facilities, utilities, and other major physical and man-made features.

B. Drilling Details:

- Describe drilling technique
- Sampling intervals, and logging methods

C. Monitoring Well Design:

- Casing diameter and centralizer spacing (if needed)
- Borehole diameter
- Depth of surface seal
- Well construction materials
- Diagram of proposed well construction details
- Type of well cap, bottom cap either screw on or secured with stainless steel screws
- Size of perforations and rationale
- Grain size of sand pack and rationale
- Thickness and position of bentonite seal and sand pack
- Depth of well, length and position of perforated interval

D. Well Development:

- Method of development to be used
- Method of determining when development is complete
- Parameters to be monitored during development
- Method of development water storage and disposal

E. Well Survey:

- Identify the Licensed Land Surveyor or Civil Engineer that will perform the survey

Describe what well features will be surveyed (i.e. top of casing, horizontal and vertical coordinates, etc.)

Vertical accuracy shall be to at least 0.01 foot

F. Well Sampling:

Minimum time after development before sampling (48 hours)

Well purging method and amount of purge water

Sample containers, collection method, and preservation method

Table describing sample volumes, sample containers, preservation agents, and hold times

QA/QC procedures

G. Water Level Measurement:

The elevation reference point at each monitoring well shall be within 0.01 foot.

Ground surface elevation at each monitoring well shall be within 0.01 foot.

Method and time of water level measurement shall be specified.

H. Proposed time schedule for work.

SECTION 2 – Groundwater Sampling and Analysis Plan

A. General Information:

Site Location

Monitoring well locations

Monitoring well construction details including elevation, well depth, casing material and size, and screen interval

Equipment decontamination procedures

Health and safety plan

Topographic map showing any existing wells, proposed wells, waste handling facilities, utilities, and other major physical and man-made features.

B. Water Level Measurement:

Ground surface elevation at each monitoring well shall be within 0.01 foot.

Method and time of water level measurement shall be specified

Water level in well shall be allowed to equilibrate prior to measuring the depth to water

C. Well Sampling:

Well purging method and amount of purge water, purge water storage

Sample containers, collection method, and preservation method

Table describing sample volumes, sample containers, preservation agents, and hold times

Identification of analytical laboratory

Chain of custody procedures

QA/QC procedures

D. Proposed time schedule for work.

SECTION 3 - Monitoring Well Installation Report

A. Well Construction:

- Number and depth of wells drilled
- Date(s) wells drilled and completed
- Description of drilling and construction
- Scaled map of facility site features including monitoring wells, buildings, storage ponds, waste piles, etc.

A well construction diagram for each well must be included in the report, and must contain

the following details:

- Drilling Contractor and driller name
- Depth of open hole (same as total depth drilled if no caving occurs)
- Method and materials of grouting excess borehole
- Footage of hole collapsed
- Length of slotted casing installed
- Depth of bottom of casing
- Depth to top of sand pack
- Thickness of sand pack
- Depth to top of bentonite seal
- Thickness of bentonite seal
- Thickness of concrete grout
- Boring diameter
- Casing diameter
- Casing material
- Size of perforations
- Well elevation at top of casing
- Stabilized depth to groundwater
- Date of water level measurement
- Monitoring well number
- Date drilled
- Location

B. Well Development:

- Date(s) of development of each well
- Method of development
- Volume of water purged from well
- How well development completion was determined
- Method of effluent disposal

Field notes from well development should be included in report.

C. Well Survey:

- Identify the coordinate system or reference points
- Survey the well casing with the cap removed (horizontal and vertical coordinates)
- Registered Engineer or Licensed Surveyor's report and field notes in appendix
- Describe the measuring points (i.e. ground surface, top of casing, etc.)
- Tabular survey data