

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER NO. R5-2014-0105

WASTE DISCHARGE REQUIREMENTS
FOR
AQUA CLEAR FARMS, INC. AND HATCH INVESTMENTS LIMITED PARTNERSHIP
AQUA CLEAR FARMS FACILITY
CLASS II SURFACE IMPOUNDMENTS
CONSTRUCTION, OPERATION, CLOSURE,
POST-CLOSURE MAINTENANCE, AND CORRECTIVE ACTION
SOLANO COUNTY

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

1. Aqua Clear Farms, Inc. (facility owner and operator) and Hatch Investments Limited Partnership (landowner), hereafter referred to jointly as “Discharger”, own and operate the Aqua Clear Farms facility (facility) about 15.5 miles south of Dixon, in Section 12, T4S, R1E, MDB&M, as shown in Attachment A, which is incorporated herein and made part of this Order by reference. The facility has several surface impoundments used for processing and disposal of drilling mud and drill cuttings primarily from drilling of natural gas wells. The surface impoundments or “basins” are regulated under authority given in Water Code section 13000 et seq.; California Code of Regulations, title 27 (“Title 27”), section 20005 et seq. The currently active basins are lined and provide Class II containment under Title 27. Annual drilling mud disposal rates at the site have recently ranged from about 150,000 barrels (1 barrel = 42 gallons) to 225,000 barrels during 2010 to 2012. Historical disposal rates have been as high as 630,000 barrels in 1985.
2. The facility is on a 160-acre property at Flannery Road and Highway 113. The existing and future facility area is approximately 110 acres of which about 60 acres has been constructed. The facility consists of several lined and unlined surface impoundments, some of which have been closed as landfills. The locations of the existing basins and approximate location of future basins 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 (APN) 48-010-100.
3. The facility was initially operated by J&J Disposal from 1970 to 1973 under Resolution 70-157 that provided waste discharge requirements (WDRs) for disposal of drilling mud directly to the ground surface. At that time, the property was owned by a Mr. Flannery. The site was purchased by the Discharger in 1973, and WDRs 74-500 were issued requiring drilling mud and rainfall to be retained onsite by dikes. The Discharger constructed Basins 1 through 5 to contain the drilling mud and contact rainfall onsite. Basin 1 was an “auxiliary pond” that was not used for waste disposal and was removed in 2012. Following the issuance of WDRs 81-028, Basins 6 through 10 were constructed

with 12-inch to 18-inch thick clay liners in 1982-83 prior to the 1984 regulations requiring liner systems then contained in Chapter 15 of Title 23 (now in Title 27 as of 1997). In 1992 and 1993, WDRs 92-013 and 93-013 were issued requiring retrofitting of some basins with liners meeting the requirements of Chapter 15 and closure of others as landfills. An approved 30 to 54-inch replaceable clay liner was installed in Basin 8 in 1993. Following the issuance of WDRs R5-2002-0120, Basins 2 through 5 were closed as landfills and Class II double liner systems consisting of synthetic and clay components were installed in Basins 9 and 10.

4. Current operations at the facility generally consist of discharge of wet drilling mud from tanker trucks directly into double-lined Class II surface impoundments. The drilling mud solids settle to the bottom of the impoundment, and the water or "top water" rests on top of the mud. During the dry season, the top water evaporates or is transferred to another lined Class II basin and the underlying wet mud is mechanically processed with low ground pressure equipment to dry it. Once the mud reaches 50% moisture content or less, it is either moved to another lined Class II basin to make room for more incoming wet drilling mud, or it is compacted in place. Basins with dried mud compacted in place or that accept dried mud from other basins will be closed, incrementally, as landfills once filled with mud to final grade with 4H:1V side slopes above the top of the impoundment berms.
5. Current onsite facilities include four closed basins (Basins 2-5), two active double-lined basins (Basins 9 and 10), one formerly active clay-only lined basin that is being clean closed (Basin 8), two inactive basins (Basins 6 and 7), a truck washout area, an office trailer, various groundwater monitoring and extraction wells, and an industrial water supply well. Soil for the soil layers in basin liners and covers is currently excavated from where future Basins 11 through 13 will be located and was previously excavated from a soil borrow area west of the site entrance.
6. On 14 February 2014, the Discharger submitted an amended Report of Waste Discharge (ROWD). The information in the ROWD has been used in revising these waste discharge requirements. The ROWD contains the applicable information required in Title 27. The ROWD, including revisions to the amended ROWD submitted after 14 February 2014, and supporting documents contain information related to this revision of the WDRs including:
 - a. Updating the Findings to provide information about changes and improvements made at the facility since 2002.
 - b. Providing an updated water balance for the Class II surface impoundments and new requirements for freeboard to ensure the impoundments have capacity for seasonal precipitation and the design storm required in Title 27.
 - c. Providing information and requirements for how some of the Class II surface impoundments will be managed during filling and be closed as landfills once they are filled with dried drilling mud. This Order is intended to provide enough flexibility for the Discharger to either close current and future double-lined basins as landfills if they are

filled with dried drilling mud, or to clean close them if they are only used for discharge and processing of wet drilling mud and/or discharge of leachate and are no longer needed.

- d. Providing requirements for managing contact storm water as impoundments to be closed as landfills are filled with dried drilling mud above the top of the impoundment berm. Such contact storm water will be routed either to areas of the basin that are below the minimum freeboard level or to an adjacent lined Class II basin.
- e. Providing information about closing the existing truck washout basin and replacing it with steel tanks and half rounds at the existing washout location, and equipment to washout trucks at the Class II basins (currently Basin 9 and Basin 10).
- f. Providing information about the 2013 replacement of most of the wells in the groundwater monitoring network for the facility and replacement/upgrade of the groundwater extraction wells at the northeast corner of the facility where corrective action is being conducted for groundwater impacts.
- g. Providing updated financial assurances cost estimates for closure, post-closure maintenance, and corrective action and updated mechanisms for funding of financial assurances.

7. The existing and future waste management units regulated by this Order are described as follows:

<u>Unit</u>	<u>Approx. Area</u>	<u>Liner/LCRS¹ Components²</u>	<u>Unit Classification & Status</u>
Basin 1	2 acres	Unlined. Never accepted waste.	Former auxiliary basin. Removed in 2012, therefore no longer exists as a basin and is no longer regulated.
Basins 2 through 5	20 acres (total)	Unlined, closed as landfills. See closure Findings for final cover components.	Unclassified, closed. Surface impoundments closed as landfills.
Basin 6	6 acres	12 inch clay liner. Never accepted waste.	Unclassified, inactive. Can be an active Class II surface impoundment if liner system required in this Order is installed.
Basin 7	4 acres	12 to 18 inch thick clay liner. Drilling mud has been removed. A double liner and LCRS may be installed that is the same as Basins 9 and 10.	Unclassified, inactive. Can be an active Class II surface impoundment if liner system required in this Order is installed.

Basin 8	4 acres	30 to 54 inch replaceable clay liner. After clean closure, a double liner and LCRS will be installed that is the same as Basins 9 and 10.	Class II surface impoundment, inactive. Liner moisture detected 2013, discharges ceased. Liner to be removed. Discharger plans to install the double liner required by this Order and return to service as an active Class II surface impoundment.
Basin 9	5 acres	Double liner and LCRS. Secondary liner is composite. See Findings under "Design of Waste Management Units" below for details.	Class II surface impoundment, active. Currently used for discharge and processing of wet drilling mud.
Basin 10	4 acres	Double liner and LCRS. Secondary liner is composite. See Findings under "Design of Waste Management Units" below for details.	Class II surface impoundment, active. Mainly used for discharge of dried drilling mud from Basins 8 and 9 after it is dried.
Future Basins 11 through 13	16 acres total	Same liner as Basins 9 & 10. To be built as they are needed.	Class II surface impoundments, future.

¹ LCRS – Leachate collection and removal system

² All liner systems are composite liner systems unless otherwise noted

8. On 7 June 2002, the Central Valley Water Board issued WDRs R5-2002-0120 in which specific waste management units at the facility were classified as a Class II units for the discharge of designated waste. This Order continues to classify specific waste management units as Class II units in accordance with Title 27, as noted in Finding 7 above. Since 2002, the Discharger has made the following improvements at the facility:
- a. Basins 2 through 5 that contain dried drilling mud have been closed as landfills with the final cover required by Order R5-2002-0120.
 - b. Drilling mud has been removed from Basins 7, 9, and 10 as required by previous Orders.
 - c. Basins 9 and 10 have been retrofitted with the double liner systems required by Order R5-2002-0120 that include an LCRS between the geomembrane layers of the liner providing full Class II containment, and include unsaturated zone monitoring systems.
 - d. The Discharger provided cost estimates and established a trust fund for financial assurances for closure, post-closure maintenance, and corrective action as required by Order R5-2002-0120, although those will now be updated as proposed and as required by this Order.

- e. Basin 8 was taken out of service during 2013 since the single replaceable clay liner showed breakthrough at the pan lysimeter one foot above the bottom of the liner [which is expected for a replaceable clay liner per Title 27 section 20330(e)]. Basin 8 will be clean closed over the next two years and later will be retrofitted with a double liner system in accordance with this Order and brought back into service as a Class II surface impoundment.
 - f. Most of the groundwater monitoring wells were replaced with new wells during 2013 due to damage or deterioration of the old wells.
 - g. The groundwater extraction wells for the corrective action system that extracts groundwater from the northeast corner of the site (where previous practices of discharging drilling mud directly to the ground surface caused salt contamination of the perched shallow groundwater) have been replaced with larger diameter wells and new pumps to provide better extraction.
9. This Order implements the applicable regulations for discharges of solid waste to land through Prohibitions, Specifications, Provisions, and monitoring and reporting requirements. Prohibitions, Specifications, and Provisions are listed in Sections A through H of these WDRs below, and in the Standard Provisions and Reporting Requirements, dated November 2013 (SPRRs) which are attached hereto and made part of this Order. Monitoring and reporting requirements are included in the Monitoring and Reporting Program (MRP) R5-2014-0105 and in the SPRRs. In general, requirements that are either in regulation or otherwise apply to all facilities regulated under Title 27 are considered to be “standard” and are therefore in the SPRRs. Any site-specific changes to a requirement in the SPRRs are included in the applicable section (A through H) of these WDRs, and the requirement in the WDRs supersedes the requirement in the SPRRs.

WASTE CLASSIFICATION AND UNIT CLASSIFICATION

10. The Discharger proposes to continue to discharge designated waste to lined Class II surface impoundments at the facility. These classified wastes may be discharged only in accordance with Title 27.
11. Water Code section 13173 defines “Designated Waste” as either of the following:
- a. Hazardous waste that has been granted a variance from hazardous waste management requirements pursuant to Health and Safety Code section 25143.
 - b. Nonhazardous waste that consists of, or contains, pollutants that, under ambient environmental conditions at a waste management unit, could be released in concentrations exceeding applicable water quality objectives or that could reasonably be expected to affect beneficial uses of the waters of the state as contained in the appropriate state water quality control plan.

Designated waste can be discharged only at Class I waste management units, or at Class II waste management units which comply with Title 27 and have been approved by the regional board for containment of the particular kind of waste to be discharged.

12. The wastes the Discharger proposes to continue discharging are drilling mud and drill cuttings from natural gas wells and directional drilling. Most of the waste received at the facility is drilling mud from drilling of natural gas wells. Prior to drilling of a natural gas well, the drilling mud consists of bentonite clay mixed with water. The drilling mud is pumped down the drill string and returns to the surface through the borehole. Circulation of drilling mud cools and lubricates the drill bit, transports soil/rock (cuttings) to the surface, and maintains hydrostatic pressure to prevent collapse of the borehole. The drill string passes through ancient sedimentary formations that contain naturally-occurring chemical constituents and salts that are transported to the surface in the drilling mud. Testing conducted by the Discharger in 1990 and 1999 showed that dried drilling mud has hydraulic conductivity in the 10^{-7} to 10^{-8} centimeters per second (cm/s) range.
13. The incoming drilling mud has electrical conductivity averaging about 1,200 to 1,500 umhos/cm as measured during load checking, but the values measured in the processing basins increase due to evapoconcentration. The Discharger provides data in required semi-annual monitoring reports for liquid (or top water) samples collected from the basins. Recent data are shown in the table below. The first three samples shown are from Basin 8 and the last three are from Basin 10. The table also includes the California secondary maximum contaminant level (secondary MCL), the lowest applicable water quality objective (WQO) for groundwater for protection of drinking water beneficial use for domestic and municipal supply wells, and the background groundwater quality from background monitoring well 6A at the site.

Date	TDS (mg/L)	Electrical Conductivity (umhos/cm)	Chloride (mg/L)	Sulfate (mg/L)	TPH Diesel (mg/L)
11/17/2010	63,000	97,500	44,000	280	2.90
5/12/2011	33,000	62,000	26,000	190	11.00
11/21/2011	67,000	98,000	44,000	1,300	11.00
6/5/2012	110,000	140,000	77,000	5,200	0.14
5/22/2013	97,000	83,000	48,000	700	NA
12/3/2013	30,000	40,000	17,000	380	0.13
CA Secondary MCL	500	900	250	250 (U.S. Primary MCL is 500)	None
Lowest Applicable WQO	450 (Agricultural Goal)	700 (Agricultural Goal)	106 (Agricultural Goal)	250	0.056 (USEPA IRIS Ref Dose)
Site Background Groundwater Data (MW6A)	Typical range is 360 to 450	Typical range is 550 to 750	Typical range is 30 to 60	Typical range is 25 to 45	Non-Detect

14. The data indicate that the discharge consists of or contains pollutants that, under ambient environmental conditions at a waste management unit, could be released in concentrations exceeding applicable water quality objectives or that could reasonably be expected to affect beneficial uses of the waters of the state. Therefore, the discharge is a 'designated waste' and as such must be discharged to a Class II waste management unit as required by Title 27.
15. The Discharger proposed to continue to discharge leachate from the LCRS of the Class II surface impoundments back to the impoundment, or once filled with dried mud to the point where no further liquid discharge can occur, to another onsite Class II surface impoundment. Contact storm water from basins that are filled with dried drilling mud will be directed by channels to areas of the basin that are below the minimum freeboard level or to an adjacent Class II basin until final cover is installed. The liner systems of adjacent double-lined basins are designed to overlap such that such drainage is always fully contained. Drilling mud top water will also continue to be transferred between active Class II basins when necessary to maintain required freeboard levels. If Basin 6 (or a portion of the basin) is lined and becomes active, the Discharger may decide to use it only for leachate and top water discharge from the other basins, or may decide use it for processing and/or disposal of drilling mud as well.
16. During clean-closure of Basin 8, the Discharger proposes to remove and discharge the clay liner system and at least two feet of contaminated adjacent geologic materials to Basin 10 which is currently accepting dried drilling mud from Basins 8 and 9.
17. As part of drilling mud discharge activities, the incoming trucks will continue to be washed out prior to exiting the facility. Wash water will be discharged either directly to the active Class II basins, or to the truck washout area near the site entrance. Since the existing truck washout area is unlined, this Order requires the washout area to be clean closed by moving the drilling mud to one of the active Class II basins and to construct a new washout area with steel tanks and half rounds (as proposed in the ROWD) that are exempt from Title 27 under section 20090(i). This Order includes a time schedule for upgrading the truck washout area as proposed.

SITE DESCRIPTION

18. The site is located at the intersection of Highway 113 and Flannery Road near Highway 12 south of Dixon and west of Rio Vista. The site is surrounded by gently rolling hills, grasslands, and agricultural land. The undeveloped portion of the site property is natural grassland with topographic slopes ranging from less than 1% to approximately 10%. Site elevations range from 75 feet above mean sea level (ft-msl) to 130 ft-msl in a northeasterly to southwesterly direction.
19. Land uses within one mile of the facility are predominantly agricultural, grazing, and open space. There are no domestic wells within one mile of the facility. There are three stock

watering wells within one mile to the north of the site that are 100 to 200 feet deep. An industrial water supply well was drilled onsite in 1978 near the site entrance and is used for facility truck washout, water for dust control, and water for soil moisture conditioning during liner and final cover construction.

20. Site-specific lithologic information is available from several geologic and hydrogeologic studies that have been performed at the site. Lithologic logs from borings indicate that the typical material at the site is silt and clay, including inorganic silt and very fine sand or a combination of silty or clayey fine sands.
21. The measured hydraulic conductivity of the native soils underlying the waste management units ranges between 1.5×10^{-4} cm/s in the most permeable of the perched and isolated water-bearing zones to hydraulic conductivities in the 10^{-7} to 10^{-8} cm/s range for the more clayey soils.
22. The ROWD states that the nearest Holocene-era fault is the Green Valley Fault approximately 20 miles from the site, that the Hayward fault is approximately 35 miles from the site, and that the San Andreas Fault is approximately 50 miles from the site. The ROWD states and this Order requires that a stability analysis be included in the Final Closure Plan for the double-lined Class II surface impoundments for closure as landfills using the peak ground acceleration from the Maximum Credible Earthquake as required by Title 27.
23. The average annual precipitation at the facility is 16.55 inches based on the Rio Vista Station. The ROWD states that the mean pan evaporation is 60.49 inches per year multiple stations in the area after applying an evaporation coefficient of 0.80.
24. The 100-year wet season was calculated to be 27.34 inches based on data from the Western Regional Climate Center for the Rio Vista Station.
25. The 1,000-year, 24-hour precipitation event for the facility is estimated to be 6.43 inches, based on Precipitation Frequency Estimates for the Oakley Station.
26. The waste management facility is not within a 100-year flood plain.

SURFACE WATER AND GROUNDWATER CONDITIONS

27. 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.
28. Surface drainage from approximately 90% of the facility area drains to a culvert under Highway 113 near the northeast corner of the site that flows to "Big Ditch", a tributary to Lindsay and Cache Sloughs which flow into the Sacramento River within the Sacramento-San Joaquin Delta. Other areas of the site drain to a soil borrow area that is located to the west of the site entrance.

29. The beneficial uses of the Sacramento-San Joaquin Delta, as designated in the Basin Plan, are: municipal and domestic supply; agricultural supply; industrial service supply; industrial process supply; water contact and non-contact water recreation; warm freshwater habitat; cold fresh water habitat; migration of aquatic organisms; spawning, reproduction, and/or early development; wildlife habitat; and navigation.
30. Monitoring well and site investigation boring lithologic logs indicate that perched and confined groundwater exists at the site in the more permeable sand, silty sand, clayey silt or clayey sand layers that interfinger with the predominant plastic and non-plastic clays. These more permeable layers are generally about a foot or less in thickness, are generally of very limited extent, are not continuous across the site, and do not yield significant amounts of groundwater. Current groundwater extraction wells that are screened within the perched groundwater at the northeast corner of the site yield between 15 and 40 gallons per day (gpd). Therefore, the perched groundwater beneath the site does not meet the definition of an aquifer¹ as defined in the Basin Plan. The first known aquifer underlying the site is in the Tehama Formation that resides approximately 200 feet below surface grade.
31. In many cases, the perched groundwater exists in confined more permeable layers that may be considerably deeper than the groundwater elevations measured in the monitoring wells since the groundwater rises up the well casing from the more permeable layers to a potentiometric surface. Therefore, the groundwater contours from water level measurements in the wells generally represent a potentiometric surface, not the actual elevation of groundwater beneath the basins. For instance, the potentiometric water elevation in well 8R typically ranges from about 86 ft-msl to 95 ft-msl. However, during the boring for well 8R, the first (minor) source of groundwater was encountered at elevation 74 ft-msl, and the primary source of groundwater was encountered at elevation 60 ft-msl. These saturated zones are considerably deeper than the potentiometric water surface measured in the well. The two saturated zones encountered in well 8R are also approximately 18 feet and 32 feet below the Basin 9 sump elevation (respectively) and even further below the Basin 10 sump elevation. For wells 11R and 12R that are also close to Basins 9 and 10, no saturated zones or free water was encountered during drilling of the boreholes that were drilled to a depth of 67 ft-msl, and it takes three days for enough water to collect in these wells to allow sampling after the wells are purged.
32. Monitoring data indicate background groundwater quality for first encountered groundwater (at background well 6A) has electrical conductivity generally ranging between 550 to 750 umhos/cm, with total dissolved solids (TDS) generally ranging between 360 and 450 milligrams per liter (mg/L).

¹ In defining an aquifer, the Basin Plan states on page I-1.00 "Where ground water occurs in a saturated geologic unit that contains sufficient permeability and thickness to yield significant quantities of water to wells or springs, it can be defined as an aquifer." Further, in reference to what is considered "significant quantities of water", the Basin Plan states on page II-3.00 "The water source does not provide sufficient water to supply a single well capable of producing an average, sustained yield of 200 gallons per day."

33. The direction of groundwater flow is generally toward the northeast based on water level measurements of the potentiometric surface. The average potentiometric groundwater gradient during 2013 was approximately 0.017 feet per foot.
34. The designated beneficial uses of the groundwater, as specified in the Basin Plan, are domestic and municipal water supply, agricultural supply, industrial service supply, and industrial process supply. The Basin Plan also maintains that for planning and regulatory purposes, the term "groundwater" includes all subsurface waters that occur in fully saturated zones whether or not they meet the definition of an aquifer.

GROUNDWATER, UNSATURATED ZONE, AND SURFACE WATER MONITORING

35. The Discharger voluntarily submitted a proposed modification to the groundwater monitoring network in December 2011. Many of the monitoring wells were 25 to 30 years old, had questionable surface seals, and were not screened at intervals that were best for detection monitoring, evaluation monitoring, and/or corrective action. A work plan and addendums were requested and submitted during 2012 for additional information about well abandonment, installation, re-purposing of wells, and extraction well design. The work plan/addendums were approved in October 2012, and field work was completed in March 2013.
36. The current groundwater monitoring network for the Class II surface impoundments consists of background monitoring well 6A, and detection or corrective action monitoring wells 2R, 3R, 7A, 8R, 10R, 11R, 12R, EMP-5, EMP-6, HA-3, HA-7, and HA1R, as shown on Attachment C. The list of monitoring wells and their monitoring designations is included in the attached MRP R5-2014-0105.
37. The Discharger's detection monitoring program for groundwater at the facility satisfies the requirements contained in Title 27. Additional monitoring wells will be required as part of any new Class II surface impoundment installation at the site if the existing monitoring well network is inadequate for detection monitoring for the new basin(s).
38. The unsaturated zone monitoring system for the active Class II surface impoundments consists of suction lysimeters/gypsum moisture blocks LYS-B9 for Basin 9 and LYS-B10 for Basin 10, as shown on Attachment C. Basin 8 is no longer in service and will be clean closed, so the lysimeters for Basin 8 shown on Attachment C are no longer monitored and will be taken out as part of the clean closure. Additional lysimeters will be installed as part of any new Class II surface impoundment installation at the site.
39. The Discharger collected baseline soil pore water samples from the suction lysimeters for Basins 9 and 10 for later comparison with monitoring results. For both basins, the baseline values for electrical conductivity were about 11,000 umhos/cm. The baseline values are elevated relative to expected values for background soil conditions due to previous drilling mud disposal in the basins in the 1980s prior to construction of the double liners. The Discharger will compare future samples with the baseline values along with

tracking changes in soil moisture (in kilopascals of water tension) from the gypsum moisture blocks for determining if there is a new release to the unsaturated zone.

40. The Discharger's detection monitoring program for the unsaturated zone satisfies the requirements contained in Title 27.
41. The Discharger monitors surface water runoff from the site at surface water monitoring point SW-1 just prior to a culvert that is located at the intersection of Flannery Road and Highway 113, as shown on Attachment C. The MRP requires two samples per year for the same list of constituents that are monitored for groundwater. The facility also has coverage under the general Industrial Storm Water Permit.
42. The Discharger submitted a 1 November 1998 Water Quality Protection Standard (WQPS) report entitled *Ground Water Constituents of Concern Delineation Assessment Report* proposing statistical data analysis methods to calculate concentration limits for each monitored constituent in accordance with Title 27. The WQPS report proposed to use Interwell data analysis to calculate tolerance limits for the monitored constituents. The WQPS and approved data evaluation methods are included in MRP R5-2014-0105.

GROUNDWATER DEGRADATION AND CORRECTIVE ACTION

43. Shallow groundwater at the site has been impacted with salt constituents from historical drilling mud disposal practices, particularly when wet drilling mud was discharged directly to the ground surface in the early 1970s, to unlined basins Basins 2 through 5 later in the 1970s, and to Basins 7 through 10 with 18-inch thick clay liners in the 1980s as was allowed by the WDRs and the regulations at the time. High salinity was discovered in shallow groundwater in the early 1980s after installation of monitoring wells 2 through 6. Elevated constituents include TDS, chloride, sulfate, sodium, and other inorganics. Additional wells were installed in 1983 through 1985 including monitoring wells 7 through 10, and additional clustered wells at varying depths. Several investigations have been conducted at the site since the 1990s that have included additional monitoring wells, extraction wells, borings, test pits, waste characterization. As stated in previous Findings, most of these monitoring wells were replaced during 2013. As of December 2013, the total dissolved solids concentrations (in milligrams per liter) in groundwater in the current monitoring wells were as follows:

Date	2R	3R	6A	7A	8R	10R	11R	12R	EMP-5	EMP-6	HA1R	HA-3	HA-7
12/3/2013	5,600	22,000	380	2,700	3,200	11,000	5,100	7,400	920	1,800	12,000	2,500	530

44. In 1992 and 1993, the Central Valley Water Board issued WDRs requiring corrective action for groundwater impacts and for Basin 8 to be lined in accordance with regulations that are now contained in Title 27. Cease and desist orders were issued in 1995 and 1998 requiring specific basins to have liquid removed, be closed, and/or be cleaned out. Requirements to closed Basins 2 through 5 were also placed in the previous WDRs

R5-2002-0120. Basin 8 was lined in 1993 and used for drilling mud discharge and processing until the replaceable clay liner showed breakthrough to the leachate detection system pan lysimeter in the liner in 2013. Drilling mud was removed from Basins 7, 9, and 10 as required, and Basins 9 and 10 have since been retrofitted with double liners. Between 2003 and 2011, Basins 2 through 5 were closed with the final cover approved in WDRs R5-2002-0120.

45. An Evaluation Monitoring Program report was submitted in 1998, and a Corrective Action Program (CAP) was submitted in 1999. The CAP was approved in WDRs R5-2002-0120 and previously consisted of groundwater extraction from wells 3, 3B, HA-1A, and P-5 that were located at the northeast corner of the facility. The wells produced very little water due to the construction of the wells and the limited nature of the higher permeability layers of perched groundwater in which they were screened. During 2013, in accordance with an approved work plan, the Discharger replaced the two inch diameter extraction wells with larger four inch diameter wells and installed upgraded pumps to improve flow rates. The current CAP now consists of groundwater extraction from the new four inch diameter wells that include 3R, 10R, and HA1R. Groundwater extraction rates with the new wells are higher than the old wells, but are still relatively low (0.01 to 0.03 gallons per minute per well) due to the limited nature of the zones in which the perched groundwater resides. Extracted groundwater is routed to the active double-lined Class II surface impoundments.
46. On 27 December 2013, Central Valley Water Board staff issued a letter to the Discharger requesting additional work to further investigate the extent of impacted groundwater and to expand the groundwater extraction network. The letter included dates through December 2014 by which the Discharger was/is to submit reports presenting the results of investigations, proposing improvements, and documenting the work. On 16 April 2014, The Discharger submitted a proposed alternate compliance time schedule which would establish a date of 1 July 2015 to complete field investigations, design of proposed improvements, and reporting and documentation of the work. In accordance with the proposed time schedule, the Discharger submitted a work plan on 15 May 2014 for Central Valley Water Board staff review and approval describing the field investigation and subsequent reporting. The additional work is ongoing and any needed improvements will depend on results of the investigation and discussions with Central Valley Water Board staff on what additional corrective action measures are needed to capture impacted groundwater more effectively. This Order includes a time schedule for the Discharger to submit a report documenting completion of this work pursuant to the Discharger's approved proposals to improve the effectiveness of the CAP.

DESIGN OF WASTE MANAGEMENT UNITS

Liner System

47. Water Code section 13360(a)(1) allows the Central Valley Water Board to specify the design, type of construction, and/or particular manner in which compliance must be met in

waste discharge requirements or orders for the discharge of waste at solid waste disposal facilities.

48. As approved in previous WDRs R5-2002-0120, and as installed in Basin 9 and 10, the Discharger continues to propose a double liner system for future Class II surface impoundments consisting of, from top to bottom:

- a. A primary 60-mil High Density Polyethylene (HDPE) geomembrane.
- b. A geonet LCRS drainage layer.
- c. A secondary 60-mil HDPE geomembrane.
- d. A one-foot thick compacted soil layer with maximum hydraulic conductivity of 5×10^{-7} cm/s.

The one foot low hydraulic conductivity soil layer is not as thick as the prescriptive two foot thick layer in Title 27; however, an additional geomembrane is immediately above the clay layer that is not specifically required by Title 27. This constitutes an engineered alternative liner system (see Findings 51 through 53 below). The combination of the geomembrane and low hydraulic conductivity soil constitute a composite secondary liner that is less permeable than the prescriptive soil liner would be by itself.

49. A two-foot soil operations layer has been/will be installed above the liner system using the onsite fine-grained soils that includes an orange geotextile at the midpoint of the layer to warn the operator if drilling mud processing equipment is nearing the liner system.

50. The LCRS of each double lined basin drains to a sump where leachate is pumped back into the basin. The LCRS is designed with capacity for at least twice the maximum anticipated daily volume of leachate. To date, there has been no measureable leachate flow to the LCRS sump in Basin 9 which may be due in part to the low hydraulic conductivity of the drilling mud in the basins preventing significant hydraulic head on the primary liner. Some leachate was initially detected in the Basin 10 sump and was removed. The basin has since been filled with several feet of dried drilling mud that will remain in place as it continues to be filled for closure as a landfill.

51. The Central Valley Water Board approved the double liner system for future Class II surface impoundments in previous WDRs R5-2002-0120, which is an engineered alternative to the prescriptive liner in Title 27. Title 27 section 20080(b) allows the Central Valley Water Board to consider the approval of an engineered alternative to the prescriptive standard. In order to approve an engineered alternative in accordance with Title 27 section 20080(c)(1) or (2), 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 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(s) provides protection against water quality impairment equivalent to the prescriptive standard in accordance with Title 27 section 20080(b)(2) of Title 27 and that any proposed engineered alternative is consistent with the performance goal in accordance with Title 27 sections 20240, 20250, and 20310.

52. The engineered alternative liner system has been and will be designed, constructed, and operated to prevent migration of wastes from the Unit to adjacent natural geologic materials, groundwater, or surface water during disposal operations, closure, and the postclosure maintenance period in accordance with the criteria set forth in Title 27 for Class II waste management units.
53. The Discharger adequately demonstrated that construction of the liner prescriptive standard for the Class II surface impoundment as described in Title 27 would be unreasonable and unnecessarily burdensome when compared to the proposed engineered alternative design because the alternative affords equivalent of better protection, and the soil component of the liner costs significantly less to construct. The Discharger has demonstrated that the proposed engineered alternative is consistent with the performance goals of the containment structures for a Class II waste management unit affords equivalent or superior protection against water quality impairment than is required by Title 27. This Order continues to approve and require the proposed engineered alternative liner system for Basins 9, 10, and any future Class II surface impoundments at the site.

Water Balance and Freeboard

54. Title 27 section 20375(a) requires Class II surface impoundments to have capacity for seasonal precipitation, a 1,000-year 24-hour design storm event, and to maintain at least two feet of freeboard at all times. The 1,000-year, 24-hour storm event for the site is 6.43 inches, and is referred to hereafter as the "design storm". For Title 27-required seasonal precipitation, the Discharger has been required to use the 100-year wet season distributed monthly to prevent overflow of the impoundment or less than two feet of freeboard during a reasonable worst-case scenario wet season. The 100-year wet season for the site is 27.34 inches.
55. The Discharger submitted a water balance for the surface impoundments that is included in the ROWD. Based on the water balance in the ROWD, the Discharger reports that the surface impoundments will have sufficient capacity to maintain more than two feet of freeboard and the required additional volume for the design storm event during the height of the 100-year wet season. The ROWD contains a table (Table 4 in the ROWD) for the water balance showing that the maximum amount of rainwater that would accumulate in the impoundments would be 1.26 feet during the month of March. A summary of the water balance table is as follows:

Month	100-Year Wet Season (Inches)	Evaporation (Inches)	Cumulative Rainwater in Impoundment (Feet)
July	0.00	9.3	-0.86
August	0.00	8.3	-1.55
September	0.00	6.3	-2.08
October	0.94	4.3	-2.36
November	0.84	2.0	-2.46
December	8.82	1.0	0.65
January	5.54	1.0	1.03
February	4.00	1.5	1.24
March	3.09	2.9	1.26
April	3.43	4.4	1.18
May	0.68	7.3	0.63
June	0.00	8.6	-0.09
Total	27.34	56.9	---

56. This Order requires Class II surface impoundments to have capacity for the amount of precipitation resulting from a 100-year frequency wet season and a 1,000-year 24-hour frequency storm event (design storm). Freeboard is the vertical distance between the lowest elevation of a surface impoundment berm and the water surface. The Class II surface impoundments must maintain a minimum freeboard of at least 2.5 feet at all times, except in the event of a storm equal to or exceeding the design storm event in which case at least 2.0 feet of freeboard must be maintained. Freeboard shall be returned to at least 2.5 feet within 14 days after the occurrence of a design storm event. The extra 0.5 feet of freeboard (2.0 feet plus 0.5 feet) is required so that the impoundments always have additional capacity for the design storm. Any “top water”, rainfall, or contact storm water runoff, which is present in a Class II surface impoundment in violation of minimum freeboard requirements must be immediately removed from the surface impoundment to another active Class II surface impoundment with available freeboard. Freeboard requirements do not apply to the drilling mud solids that are discharged above the 2.5 freeboard level as the impoundments are readied to be closed as a landfill. Dried drilling mud may continue to be placed in surface impoundments above the 2.5 freeboard level as long as the moisture holding capacity of the waste is not exceeded (i.e., liquid is not free draining; Section 20200(d) of Title 27).

57. This Order implements wet season freeboard requirements in accordance with the water balance by requiring Class II surface impoundments to have at least 3.75 feet of freeboard by 1 November of each year. This amount of freeboard is necessary to accommodate cumulative rainwater from a 100-year wet season (shown in the table in Finding 55) while maintaining a minimum of 2.5 feet of freeboard during the entire wet season. Impoundments with 3.75 feet of freeboard or less cannot accept wet drilling mud

between 1 November and 30 April. The Discharger is required, by the MRP, to submit by 1 October of each year, an annual Impoundments Operation Plan that must identify the surface impoundments scheduled for accepting drilling mud/fluid and the available capacity for the upcoming 12-month period, as well as information about transfer of drilling mud and top water between surface impoundments such that the 2.5 foot freeboard requirement will not be violated.

LCRS Action Leakage Rate

58. This Order includes an Action Leakage Rate (ALR) for the Class II surface impoundment LCRS. The ALR is the maximum flow rate through the primary liner to the LCRS beyond which the Discharger is required to take actions such as inspection and repair the primary liner system. As proposed by the Discharger in the ROWD, the ALR is based on the recommendations in the 1992 USEPA guidance document *Action Leakage Rate for Leak Detection Systems*. The guidance recommends that ALR for lined surface impoundments be set at no more than 1,000 gallons per acre per day. Using this recommendation, the calculated ALR for Basin 9 is 5,000 gpd for the 5-acre impoundment, and the ALR for Basin 10 is 4,000 gpd for the 4-acre impoundment. This Order requires actions to inspect and repair leaks in the primary liner or take other actions to mitigate the exceedance if the ALR for an impoundment is exceeded. This Order also requires new lined Class II surface impoundments to have an ALR calculated based on this procedure as part of their design.

SURFACE IMPOUNDMENT CLOSURE

59. The Discharger included an updated Preliminary Closure Plan (PCP) for the surface impoundments in the ROWD. The Discharger proposes to close some of the double-lined Class II surface impoundments as landfills after they have been filled with dried drilling mud pursuant to Title 27 section 21400(b)(2)(A), and to clean close others pursuant to Title 27 section 21400(b)(1). This Order does not require clean closure of the surface impoundments being filled with dried drilling mud due to the waste being a solid after the water is evaporated. The PCP proposes to prepare, and this Order requires, that a final closure plan be submitted and approved prior to commencing closure activities for impoundments that are closed as landfills. Closure of Class II surface impoundments as landfills does not change the classification of the surface impoundments to a landfill. Surface impoundments closed as landfills must be closed pursuant to landfill closure requirements in Title 27 section 21090 and the surface impoundments must meet the applicable siting and construction standards in Title 27 sections 20240 through 20310. Closure as a landfill further requires that the moisture content of residual wastes, including sludges, does not exceed the moisture holding capacity of the waste either before or after closure. This Order includes requirements to address the applicable standards for closure of the surface impoundments as landfills.

60. The Discharger proposes the same engineered alternative final cover for closure of double-lined Class II surface impoundments as landfills that was approved for basins

closed as landfills by previous WDRs R5-2002-0120 and installed when Basins 2 through 5 were closed as landfills. This Order additionally requires that the one-foot compacted soil layer have maximum hydraulic conductivity of 1×10^{-6} cm/s. The approved final cover consists of, from top to bottom, the following:

- a. A one-foot erosion-resistant soil layer containing no waste and covered with grass vegetation.
- b. A geocomposite drainage layer to drain rainwater that percolates through the erosion-resistant soil layer laterally to the edge of (and away from) the unit.
- c. A one-foot soil layer compacted to a minimum 90 percent of maximum relative dry density and has maximum hydraulic conductivity of 1×10^{-6} cm/s in accordance with Title 27 section 21090(a)(2).
- d. A two foot thick high-compaction foundation layer that may contain dried drilling mud.

61. The Discharger proposes, and this Order requires, that Class II surface impoundments closed as landfills have external side slopes with maximum steepness of 4H:1V and that the top deck have a minimum 3% slope for drainage. The ROWD states that Discharger has performed testing of the mechanical properties of dried drilling mud (including triaxial shear testing) that indicate a factor of safety of greater than 1.5 can be achieved at an even steeper slope of 3H:1V.

62. The Discharger conducted computer modeling (using the HELP model) that indicates approximately 4 percent of rainfall would percolate through the proposed engineered alternative final cover compared with 14 percent for a Title 27 prescriptive standard final cover. The Discharger assumed a hydraulic conductivity of 1×10^{-6} cm/s for modeling of the clay layer for both the engineered alternative and prescriptive final covers. These modeling results indicate that the proposed engineered alternative design for the final cover will minimize percolation of water into the waste at least as well as the prescriptive standard design prescribed in Title 27 and indicates that the proposed design meets the performance standard for final covers in Title 27. The approval of this final cover also takes into account the fact that the dried drilling mud contains low hydraulic conductivity bentonite clay and that moisture that percolates through the final cover system will be absorbed by the bentonite and also be significantly impeded from percolating through the waste to the LCRS.

63. Basin 8 that has a replaceable clay-only liner will be clean-closed. After the Basin 8 top water is evaporated and/or transferred to Basin 9, the dried drilling mud, clay liner, and the top two feet of adjacent geologic materials will be removed and discharged to Basin 10. This Order includes a two-year time schedule for completion of clean closure of Basin 8. At least two more years are needed due to the large amount of unprocessed drilling mud (30,000 cubic yards) remaining in the basin and to allow time to evaporate or transfer top water and dry the mud during the summer months prior to discharging dried

mud to Basin 10. There is no immediate threat to groundwater from the drilling mud in Basin 8 since the pan lysimeter that detected breakthrough is located one foot above the bottom of the clay liner as required by Title 27. When needed, the Discharger plans to install a new double liner system in Basin 8 and use it for discharge and processing of wet drilling mud. At some point in the future, Basin 8 will either be clean closed again, or be closed as a landfill if used for discharge of dried drilling mud from other future double-lined basins (such as Basin 7 if it is lined, or future Basins 11, 12, and 13).

64. Basin 9 is currently being used for discharge and processing of wet drilling mud. In the future, Basin 9 will accept dried drilling mud from future double lined basins and be closed, incrementally, as a landfill. Basin 10 is currently being filled with dried drilling mud and will be closed, incrementally, as a landfill once final grades for each closure area of the basin are reached. Final grade of highest point for Basin 10 will be approximately +150 ft-msl, plus an amount to achieve at least 3% grade, as shown on Figure 25 in the amended ROWD. The liner systems for Basins 9 and 10 were designed to overlap in anticipation of the basins sharing a continuous final cover after dried drilling mud is placed to fill the area between them. The cover will be installed in two or more phases (partial final closure) as final slopes will be reached in Basin 10 prior to final slopes being reached in Basin 9. Final grade of highest point for Basin 9 will be approximately +155 ft-msl. A partial Final Closure/Post-closure Maintenance Plan is required to be submitted at least 180 days prior to initiating partial final closure activities.
65. The Discharger may also plan to extend the dried drilling mud filling the areas between Basin 9/Basin 8 and Basin 8/Basin 7 in the future by overlapping those liner systems when they are constructed. These WDRs are intended to allow flexibility for how the basins will be operated, designed, and closed pending approval of basin designs by Central Valley Water Board staff so long as the operation, liner system design, and final cover design comply with the requirements of this Order.

POST-CLOSURE MAINTENANCE OF IMPOUNDMENTS CLOSED AS LANDFILLS

66. The Discharger submitted a Preliminary Post-Closure Maintenance Plan (PPCMP) as part of the February 2014 ROWD. The PPCMP includes plans for inspecting, maintaining, and repairing the final cover for Class II surface impoundment that are closed as landfills. This Order requires the Discharger to conduct post-closure maintenance for all units closed as landfills in accordance with the PPCMP and/or any future plan approved by Central Valley Water Board staff that is in compliance with this Order.
67. The Discharger is required to inspect and identify problems with the final covers of surface impoundments closed as landfill including areas that require replanting of vegetation, areas with erosion, areas lacking free drainage, and to repair the cover.
68. Throughout the post-closure maintenance period, the Discharger is required to maintain the structural integrity and effectiveness of all containment structures, continue to operate the LCRS as long as leachate is generated and detected, maintain the monitoring

systems, and prevent erosion and related damage of the final cover due to drainage pursuant to Title 27 section 21090(c).

69. Post-closure maintenance is required to be conducted for a minimum period of **30 years** or until the waste no longer poses a threat to environmental quality, whichever is greater pursuant to Title 27 section 21180(a) and Title 27 section 21900(a).

FINANCIAL ASSURANCES

70. **For Closure:** The PCP includes an itemized cost estimate for third party costs to close the surface impoundments. The total of the estimate for closure of Basins 9 and 10 is **\$947,504** in 2014 dollars. The total estimate for the first phase of the Basin 10 partial closure is \$152,090. These cost estimates are approved by the adoption of these WDRs. Pursuant to Title 27 section 22207(a), this Order requires the Discharger to establish and maintain financial assurances for closure of the Class II surface impoundments in accordance with the approved cost estimates naming the Central Valley Water Board as the beneficiary. This Order requires the amount of the minimum annual deposit into the closure fund to be in accordance with Title 27 section 22225(a)(2)(B) such that each closure phase is fully funded by the time the last shipment of dried drilling mud has been discharged to the area to receive partial final closure. According to the amended ROWD, current calculations show the required annual deposit to be \$25,348 such that the first phase of the Basin 10 partial final closure is funded by the time that phase is ready to be closed; however, this amount may change annually depending on the new calculation. This Order also requires annual adjustments to account for inflation by 1 June of each year.
71. **For Post-Closure Maintenance:** The PCP includes an itemized cost estimate for third party costs for post-closure maintenance of the current closed and active surface impoundments to be closed as landfills (Basins 2-5, 9, and 10), and includes costs for monitoring and reporting for groundwater, surface water, and leachate for the entire site. The estimated annual post-closure cost is \$11,260 per year in 2014 dollars, of which \$2,500 is for final cover maintenance and repair and \$8,760 is for groundwater, surface water, and leachate monitoring and reporting. Title 27 section 22211 requires a multiplier of 30 to account for 30 years of post-closure maintenance, bringing the required amount to $\$11,260 \times 30 = \mathbf{\$337,800}$. This cost estimate is approved by the adoption of these WDRs. Pursuant to Title 27 sections 22211 and 22212(a), this Order requires the Discharger to establish and maintain financial assurances for post-closure of the surface impoundments in accordance with the approved cost estimate naming the Central Valley Water Board as the beneficiary. This Order requires the amount of the minimum annual deposit into the post-closure fund to be in accordance with Title 27 section 22225(a)(2)(B). According to the amended ROWD, current calculations show the required annual deposit to be \$11,260; however, this amount may change annually depending on the new calculation. This Order also requires annual adjustments to account for inflation by 1 June of each year.

72. **For Corrective Action:** On 21 May 2014, the Discharger submitted an updated cost estimate for corrective action of **\$64,800** in 2014 dollars. The cost estimate is based on ten years of operation and maintenance (O&M) for the existing extraction wells, installation and O&M for two new extraction wells, and a 20% contingency. This cost estimate is approved by the adoption of these WDRs. Pursuant to Title 27 section 22222, this Order requires the Discharger to establish financial assurances for corrective action in accordance with the approved cost estimate naming the Central Valley Water Board as the beneficiary. As proposed in the amended ROWD, this Order requires an initial deposit of \$32,400 by 1 June 2015, and minimum annual deposits into the corrective action fund in accordance with Title 27 section 22226 such that it is fully funded by 1 June 2020. This Order also requires annual adjustments to account for inflation by 1 June of each year.

CEQA AND OTHER CONSIDERATIONS

73. A draft environmental impact report (EIR) dated June 1991 was issued for the project that included all proposed basins (including area of the future Basins 11 through 13). Solano County certified a final EIR for the project on 12 December 1991 in accordance with the California Environmental Quality Act, (Public Resources Code Section 21000, et seq.), and the State Guidelines. Solano County issued a revised Use Permit in February 1992, and minor revisions to the permit were made in 1993 and 2010.

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

75. This order implements:

- a. *The Water Quality Control Plan for the Sacramento River and San Joaquin River Basins, Fourth Edition.*
- b. The prescriptive standards and performance goals of California Code of Regulations, title 27, section 20005 et seq., effective 18 July 1997, and subsequent revisions.

76. Based on the threat and complexity of the discharge, the facility is determined to be classified 2-B as defined below:

- a. Category 2 threat to water quality, defined as, "Those discharges of waste that could impair the designated beneficial uses of the receiving water, cause short-term violations of water quality objectives, cause secondary drinking water standards to be violated, or cause a nuisance."
- b. Category B complexity, defined as, "Any discharger not included in Category A that has physical, chemical, or biological treatment systems (except for septic systems with subsurface disposal), or any Class 2 or Class 3 waste management units."

77. Water Code section 13267(b) 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 having discharge or discharging, or who proposes to discharge waste within its region, or any citizen or domiciliary, or political agency or entity of this state who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge waste outside of its region that could affect the quality of 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..."
78. The technical reports required by this Order and the attached "Monitoring and Reporting Program No. R5-2014-0105" 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

79. 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.
80. The Central Valley Water 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.
81. The Central Valley Water Board, in a public meeting, heard and considered all comments pertaining to the discharge.
82. Any person aggrieved by this action of the Central Valley Water Board may petition the State Water Board to review the action in accordance with Water Code section 13320 and California Code of Regulations, title 23, sections 2050 and following. The State Water Board must receive the petition by 5:00 p.m., 30 days after the date that this Order becomes final, except that if the thirtieth day following the date that this Order becomes final 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 law and regulations applicable to filing petitions may be found on the Internet at:

http://www.waterboards.ca.gov/public_notices/petitions/water_quality

or will be provided upon request.

IT IS HEREBY ORDERED, pursuant to California Water Code sections 13263 and 13267, that Order No. R5-2002-0120 is rescinded except for purposes of enforcement, and that Aqua Clear Farms, Inc. and Hatch Investments Limited Partnership, their 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 California Code of Regulations, Title 23, section 2510 et seq.
2. The discharge of solid waste or liquid waste 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. The discharge of any waste to the former Basin 1 area is prohibited.
5. The discharge of any additional waste to Basins 6, 7, or 8 is prohibited unless and until they are retrofitted with liner systems meeting the requirements of this Order and the final construction report is approved in writing by Central Valley Water Board staff.
6. The discharge of asbestos-containing waste is prohibited.
7. The discharge of production water, produced water, or any wastewater that is not part of drilling mud (other than site groundwater, truck washout water, or contact storm water runoff from drilling mud solids) is prohibited.
8. The Discharger shall comply with all Standard Prohibitions listed in Section C of the Standard Provisions and Reporting Requirements dated November 2013 (SPRRs).
9. The discharge of truck wash water directly to land is prohibited after **15 October 2015**.

B. DISCHARGE SPECIFICATIONS

1. The discharge shall not cause a condition of pollution or nuisance as defined by the Water Code section 13050.
2. The Discharger shall only discharge waste types as described in the Findings of this Order under "Waste Classification and Unit Classification".

3. The Discharger shall comply with all Standard Discharge Specifications listed in Section D of the SPRRs dated November 2013.

C. FACILITY SPECIFICATIONS

1. Annually, prior to the anticipated rainy season but no later than **1 November**, any necessary construction, maintenance, or repairs of precipitation and drainage control facilities shall be completed and reported in compliance with MRP R5-2014-0105.
2. The Discharger shall maintain a minimum **2.5 feet** of freeboard, as measured from the water surface to the lowest point of the basin levee, in the active Class II surface impoundments at all times. However, in the occurrence of precipitation within 24 hours equal to or exceeding the 1,000-year, 24-hour event as defined in this Order, at least 2.0 feet of freeboard shall be maintained. The Discharger shall not discharge wet drilling mud or leachate to a Class II surface impoundment with freeboard of 2.5 feet or less. Any water, rainfall, or contact storm water runoff that is present in a Class II surface impoundment in violation of the minimum freeboard requirement must be immediately removed from the surface impoundment to another active Class II surface impoundment with available freeboard or to an offsite permitted facility. Freeboard requirements do not apply to the dried drilling mud solids that are discharged above the 2.5 freeboard level as the impoundments are readied to be closed as a landfill. Dried drilling mud may continue to be placed in surface impoundments above the 2.5 freeboard level as long as the moisture holding capacity of the waste is not exceeded (i.e., liquid is not free draining; Section 20200(d) of Title 27).
3. The Discharger shall ensure, on or before **1 November** of each year, that freeboard in each active Class II surface impoundment is at least **3.75 feet**, as measured from the water surface² to the lowest point of the basin levee, in order to accommodate seasonal precipitation. Impoundments with 3.75 feet of freeboard or less shall not accept wet drilling mud between **1 November** and **30 April** of each year. Water may be transferred from one active double-lined Class II surface impoundment to another to maintain required freeboard in all basins.
4. When dried drilling mud fills a surface impoundment to within 2.5 feet (year round) or 3.75 feet (1 November to 30 April) of the berm over the entire area of the impoundment, the impoundment shall no longer accept wet drilling mud waste, top water from other basins, or leachate. Leachate from the basin LCRS shall be discharged to another Class II basin with freeboard capacity. Dried drilling mud may continue to be placed in the impoundment as long as the moisture holding capacity of

² If there is no water in the impoundment at the time of the measurement, the measurement shall be taken to the lowest elevation of the drilling mud solids unless the impoundment is filled with dried drilling mud above the berms in all areas of the impoundment (excluding drainage channels at the edges of the impoundment).

the waste is not exceeded (i.e., liquid is not free draining)³. Any “top water”, rainfall, or contact storm water must be immediately removed from the impoundment and placed in an active Class II surface impoundment with a freeboard exceeding the required freeboard level.

5. The Discharger shall **immediately** notify Central Valley Water Board staff by telephone and email and **immediately** take measures to regain surface impoundment capacity in the event that freeboard levels are not in compliance with Facility Specification C.2 or C.3, above.
6. The Discharger shall record onsite rainfall to track the magnitude of storm events and shall record surface impoundment freeboard levels in accordance with the attached MRP R5-2014-0105.
7. Leachate removed from a surface impoundment’s primary LCRS shall be discharged to the impoundment from which it originated, or to another active Class II surface impoundment.
8. The depth of the fluid in any LCRS sump shall be kept at the minimum needed for safe pump operation without excessive pump cycling that could damage the pump.
9. Contact storm water runoff from basins that are filled with drilling mud above the grade of the berms shall be directed either back into the basin if required freeboard exists or to an adjacent double-lined Class II surface impoundment. Storm water from areas with interim cover (if installed) or final cover can be directed to the site’s storm water drainage system.
10. The **Action Leakage Rate** (ALR) for double-lined Class II surface impoundments shall be calculated as their approximate area in acres times 1,000 gpd. Any new Class II surface impoundment shall have a calculated ALR by this method as part of its design. The ALR for Basin 9 is 5,000 gpd or 150,000 gallons over a 30-day period. The ALR for Basin 10 is 4,000 gpd or 120,000 gallons over a 30-day period. If leachate generation in the LCRS of a Class II surface impoundment exceeds its ALR, the Discharger shall:
 - a. **Immediately** notify Central Valley Water Board staff by telephone and email.
 - b. Submit written notification within **seven days** that includes a time schedule to locate and repair leak(s) in the liner system or take other actions to mitigate the exceedance.
 - c. If repairs or other actions do not result in a leakage rate less than the required ALR, the Discharger shall submit written notification within **seven days** that includes a

³ Section 20200(d) of Title 27

time schedule for replacement of the upper liner of the surface impoundment or other action necessary to reduce leachate production below the ALR.

- d. Complete repairs, other actions, or liner replacement in accordance with the approved time schedule under “b” and/or “c”, above.

11. Leachate volumes pumped from the LCRS sumps of all double-lined Class II surface impoundments shall be measured, recorded, and reported in the semi-annual monitoring reports, as required by the MRP, in order to track leakage rates.

12. If monitoring of the suction lysimeter and/or gypsum moisture block unsaturated zone monitoring system for a Class II surface impoundment indicates a leak in the containment structures, the Discharger shall:

- a. **Immediately** notify Central Valley Water Board staff by telephone and email that the containment structures may have failed.
- b. **Immediately** conduct resampling of the suction lysimeter and test the liquid in accordance with the unsaturated zone monitoring requirements in MRP R5-2014-0105.
- c. **Within seven days**, submit the resampling results and if re-sampling confirms the release, submit written notification of the release to Central Valley Water Board staff including a time schedule to repair the containment structures or take other actions to mitigate the leak.
- d. Complete repairs of the containment structures or other actions in accordance with the approved time schedule.

13. The Discharger shall comply with all Standard Facility Specifications listed in Section E of the SPRRs dated November 2013.

D. DESIGN AND CONSTRUCTION SPECIFICATIONS

1. Containment structures and precipitation and drainage control systems shall be constructed and maintained to prevent, to the greatest extent possible, inundation, erosion, slope failure, and washout under 1,000-year, 24-hour precipitation conditions.
2. Waste management units shall be designed, constructed and operated to prevent inundation or washout due to flooding events with a 100-year return period.
3. Materials used to construct liners shall have appropriate physical and chemical properties to ensure containment of discharged wastes over their operating life.
4. Materials used to construct 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.

5. LCRSs 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 LCRS pump shall be capable of removing this volume of leachate and/or 150% of the Action Leakage Rate flow, whichever is greater.
6. The Discharger shall submit a design report including plans, specifications, and a construction quality assurance plan for review and approval **90 days** prior to constructing any new lined waste management unit or closure of waste management units.
7. The Discharger shall submit a final report documenting construction of any newly lined waste management unit for review and approval at least **60 days** prior to discharging wastes to the waste management unit. The final report shall include the results of an electrical leak location survey (unless such a survey is infeasible without adding water to the LCRS layer) and documentation of any repairs.

Class II Surface Impoundment Design

8. New Class II surface impoundment liner systems shall consist of, from the top down;
 - a. A primary 60-mil High Density Polyethylene (HDPE) geomembrane.
 - b. A geonet LCRS drainage layer.
 - c. A secondary 60-mil HDPE geomembrane.
 - d. A one-foot thick compacted soil layer with maximum hydraulic conductivity of 5×10^{-7} cm/s.
9. Double-lined Class II surface impoundments that will require equipment to work inside of them for processing of drilling mud shall have a two foot soil operations layer with a colored (e.g., orange, yellow) geotextile at the midway point. The operations layer soil shall be fine-grained and contain no rocks that could puncture the primary liner. Any operations layer soil or geotextile encountered during drilling mud processing shall be replaced such that the thickness of the operations layer and position of the geotextile is maintained.
10. Double-lined Class II surface impoundments shall have an LCRS sump to collect and return leachate to the impoundment that leaks through the primary liner.
11. Double-lined Class II surface impoundments shall be equipped with an access to the LCRS drainage layer for required annual testing of the LCRS per the SPRRs.

12. New or retrofitted Class II surface impoundments shall have at least one downgradient groundwater monitoring well as part of their design. The well shall be installed and sampled prior to acceptance of waste in the impoundment and shall be monitored in accordance with groundwater detection monitoring requirements in the MRP.
13. Double-lined Class II surface impoundments shall have an unsaturated zone monitoring system beneath the sump area of the impoundment.
14. Active double-lined Class II surface impoundments shall have permanent markings on the liner, or a permanent freeboard gauge so that the freeboard can be observed and recorded at any time. The markings or gauge shall have increments no greater than 6-inches.
15. The Discharger shall include as part of design, the financial assurance requirements for new or retrofitted Class II surface impoundments in Financial Assurance Specification F.4.
16. The Discharger shall comply with all Standard Construction Specifications listed in Section F of the SPRRs dated November 2013.
17. The Discharger shall comply with all Storm Water Provisions listed in Section L of the SPRRs dated November 2013.

E. CLOSURE AND POST-CLOSURE MAINTENANCE SPECIFICATIONS

1. At closure of the Class II surface impoundments, the Discharger shall either clean close the impoundment pursuant to Title 27 section 21400(b)(1), or close the impoundment as a landfill pursuant to Title 27 section 21400(b)(2)(A). Closure shall be conducted as required by this Order, as proposed in the Preliminary Closure Plan and Final Closure Plan approved by Central Valley Water Board staff.
2. Clean closure of Class II surface impoundments shall consist of removing all water, drilling mud, liner materials, and adjacent natural geologic materials contaminated by wastes. Drilling mud, soil liner materials, and contaminated natural geologic materials may be discharged to a Class II surface impoundment that is accepting dried drilling mud. Geotextiles shall either be recycled or discharged to an offsite permitted landfill facility. The area shall be backfilled to approximate surrounding natural grade and graded to drain.
3. The approved final cover for Class II surface impoundments closed as a landfill shall consist of, from top to bottom, the following:
 - a. A one-foot erosion-resistant soil layer containing no waste and covered with grass vegetation. The type of grass vegetation shall be proposed in the closure plan.

- b. A geocomposite drainage layer to drain rainwater that percolates through the erosion-resistant soil layer laterally to the edge of (and away from) the unit.
 - c. A one-foot soil layer compacted to a minimum 90 percent of maximum relative dry density and with maximum hydraulic conductivity of 1×10^{-6} cm/s.
 - d. A two foot thick foundation layer compacted to a minimum 90 percent of maximum relative dry density that may contain dried drilling mud.
4. Class II surface impoundments closed as landfills shall have external side slopes with maximum steepness of 4H:1V and the top deck shall have a minimum 3% slope for drainage.
 5. Prior to closure of surface impoundments to be closed as landfills, the Discharger shall submit a Final Closure and Post-Closure Maintenance Plan prepared by a California-registered civil engineer or certified engineering geologist, and that contains all applicable information required in Title 27 section 21769. The plan shall include any closure/post-closure elements proposed in the 14 February 2014 ROWD (including a stability analysis for the closed unit), and shall meet the requirements of this Order.
 6. During the closure and post-closure maintenance period, the Discharger shall conduct routine maintenance of final covers and areas with interim cover; continue to operate the LCRS; maintain the precipitation and drainage control facilities; maintain the groundwater and unsaturated zone monitoring facilities; and operate/maintain any facilities associated with corrective action.
 7. The Discharger shall, in a timely manner, repair any areas of the final cover that have been damaged by erosion, cracking, settlement, subsidence or any other causes that could allow ponding of surface water or percolation of surface water into the wastes.
 8. Prior to and during the rainy season, the Discharger shall perform any and all necessary reseeding of the interim and final cover to maintain adequate vegetation.
 9. The Discharger shall perform all post-closure maintenance activities specified in the facility's Final Closure and Post-Closure Maintenance Plan that are not specifically referred to in this Order.
 10. Post-closure maintenance shall be conducted for a minimum period of **30 years** or until the waste no longer poses a threat to environmental quality, whichever is greater pursuant to Title 27 section 21180(a) and Title 27 section 21900(a).
 11. The Discharger shall comply with all Closure and Post-Closure Maintenance Specifications listed in Section F of the SPRRs dated November 2013.

F. FINANCIAL ASSURANCE

1. **For Closure:** Pursuant to Title 27 section 22207, the Discharger shall submit an annual report by **1 June** of each year showing that it has provided the required minimum annual deposit for financial assurance for closure into a fund naming the Central Valley Water Board as beneficiary to ensure closure of the Class II surface impoundments in accordance with the approved cost estimates in the amended ROWD. The deposit shall be added to the closure financial assurance funds already in place. The financial assurances mechanism or fund shall be one that is listed in Title 27 Section 22228 for which the Discharger is eligible. The minimum annual deposit into the closure fund shall be in accordance with Title 27 section 22225(a)(2)(B) such that each closure phase is fully funded by the time the last shipment of dried drilling mud has been discharged to the area to receive partial final closure, plus inflation adjustments required in F.5., below.
2. **For Post-Closure Maintenance:** Pursuant to Title 27 sections 22211 and 22212, the Discharger shall submit an annual report by **1 June** of each year showing that it has provided the required minimum annual deposit for financial assurance for post-closure maintenance into a fund naming the Central Valley Water Board as beneficiary to ensure post-closure maintenance of the Class II surface impoundments in accordance with the approved cost estimates in the amended ROWD. The deposit shall be added to the post-closure financial assurance funds already in place. The financial assurances mechanism or fund shall be one that is listed in Title 27 Section 22228 for which the Discharger is eligible. The minimum annual deposit into the post-closure maintenance fund shall be in accordance with Title 27 section 22225(a)(2)(B), plus inflation adjustments required in F.5., below.
3. **For Corrective Action:** Pursuant to Title 27 Section 22222, the Discharger shall submit an annual report by **1 June** of each year showing that it has provided the required minimum annual deposit for financial assurance for corrective action into a fund naming the Central Valley Water Board as beneficiary to address a known or reasonably foreseeable release from the Class II surface impoundments in accordance with the approved cost estimate in the amended ROWD. As proposed in the amended ROWD, the Discharger shall provide an initial deposit of \$32,400 by **1 June 2015**, and minimum annual deposits by 1 June of each year into the corrective action fund in accordance with Title 27 section 22226 such that it is fully funded by **1 June 2020**. The financial assurances mechanism shall be one listed in Title 27 Section 22228 for which the Discharger is eligible. The Discharger shall also provide the annual inflation adjustments required in F.5., below.
4. The closure and post-closure financial assurances shall be updated to account for any new or retrofitted Class II surface impoundments. Proposed closure and post-closure cost estimates for any new or retrofit surface impoundments shall be submitted as part of updated Closure and Post-closure Maintenance Plans which shall be submitted together with design documents for that impoundment, including a proposed payment schedule for mechanisms requiring funding. The closure and post-closure cost

estimates and funding mechanisms shall be established by a date in accordance with a payment schedule approved as part of the review and approval of the design documents.

5. By **1 June of each year**, the Discharger shall submit an annual report to the Central Valley Water Board that reports the balance of the closure, post-closure maintenance, and corrective action funds or the amounts of the Guarantees and the adjustments to account for inflation in accordance with Title 27 Section 22236. The report shall also show that the Discharger has funded the financial assurance mechanisms in accordance with the required minimum annual deposits for establishing closure, post-closure maintenance, and corrective action financial assurances. The report shall include the methodology used for calculating the minimum deposits in accordance with the required sections of Title 27 referenced in the above Financial Assurances specifications, and shall include documentation of the information required under Title 27 section 22225(a)(1) that is used in the calculations. The annual report shall be a single report that provides the required financial assurances information pursuant to Financial Assurance specifications F.1 through F.3, above.
6. The Discharger shall comply with all Standard Financial Assurance Specifications listed in Section H of the SPRRs dated November 2013.

G. MONITORING SPECIFICATIONS

1. The Discharger shall comply with the detection monitoring program provisions of Title 27 for groundwater, surface water, and the unsaturated zone, and in accordance with Monitoring and Reporting Program (MRP) No. R5-2014-0105, and the Standard Monitoring Specifications listed in Section I of the SPRRs dated November 2013.
2. The Discharger shall, for any waste management unit in a corrective action monitoring program, comply with the corrective action monitoring program provisions of Title 27, MRP R5-2014-0105, and the Standard Monitoring Specifications listed in Section I of SPRRs dated November 2013.
3. The Discharger shall comply with the Water Quality Protection Standard as specified in this Order, MRP R5-2014-0105, and the SPRRs dated November 2013.
4. The concentrations of the constituents of concern in waters passing the Point of Compliance (defined pursuant to Title 27, section 20164 as a vertical surface located at the hydraulically downgradient limit of the waste management unit that extends through the uppermost aquifer underlying the unit) shall not exceed the concentration limits established pursuant to MRP R5-2014-0105.
5. For each monitoring event, the Discharger shall determine whether the waste management unit is in compliance with the Water Quality Protection Standard using procedures specified in MRP R5-2014-0105 and the Standard Monitoring Specifications in Section I of the SPRRs dated November 2013.

6. The Discharger shall comply with all Standard Monitoring Specifications and Response to a Release specifications listed in Sections I and J of the SPRRs dated November 2013.

H. PROVISIONS

1. The Discharger shall comply with the Standard Provisions and Reporting Requirements, dated November 2013, which are attached hereto and made part of this Order by reference. 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. Pursuant to Water Code section 13267, the Discharger shall comply with MRP R5-2014-0105, 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 any applicable post-closure maintenance period. A violation of MRP R5-2014-0105 is a violation of these waste discharge requirements.
3. The Discharger shall maintain a copy of this Order at the facility and make it available at all times to facility operating personnel, who shall be familiar with its contents, and to regulatory agency personnel.
4. 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 Central Valley Water Board and of the State Water Resources Control Board, copies of these records shall be sent to the Central Valley Water Board upon request.
5. The Discharger shall comply with all applicable provisions of Title 27 that are not specifically referred to in this Order.
6. The Discharger shall, in a timely manner, remove and relocate any wastes discharged at this facility in violation of this Order and of the California Water Code.
7. The Discharger shall immediately notify the Central Valley Water Board of any flooding, equipment failure, slope failure, or other change in site conditions which could impair the integrity of waste or leachate containment facilities or precipitation and drainage control structures.

8. In the event of any change in control or ownership of the facility or disposal areas, the Discharger must notify the succeeding owner or operator of the existence of this Order by letter, a copy of which shall be immediately forwarded to this office. To assume operation as Discharger under this Order, the succeeding owner or operator must apply in writing to the Executive Officer requesting transfer of the Order. The request must contain the requesting entity's full legal name, the state of incorporation if a corporation, the name and address and telephone number of the persons responsible for contact with the Central Valley Water Board, and a statement. The statement shall comply with the signatory paragraph of General Provision K.2.e in the Standard Provisions and Reporting Requirements and state that the new owner or operator assumes full responsibility for compliance with this Order. Failure to submit the request shall be considered a discharge without requirements, a violation of the California Water Code. Transfer shall be approved or disapproved by the Executive Officer.
9. The Discharger shall provide proof to the Central Valley Water Board **within sixty days after completing final closure of all basins at the facility** that the deed to the 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 wastes.
 - b. Land use options for the parcel are restricted in accordance with post-closure land uses set forth in any post-closure plan (if applicable).
 - c. In the event that the Discharger defaults on carrying out either any corrective action needed to address a release, groundwater monitoring, or any post-closure maintenance (if applicable), then the responsibility for carrying out such work falls to the property owner.
10. All technical reports required herein that involve planning, investigation, evaluation, or design, or other work requiring interpretation and proper application of engineering or geologic sciences, shall be prepared by or under the direction of persons registered to practice in California pursuant to California Business and Professions Code sections 6735, 7835, and 7835.1. As required by these laws, completed technical reports must bear the signature(s) and seal(s) of the registered professional(s) in a manner such that all work can be clearly attributed to the professional responsible for the work.
11. The following reports shall be submitted pursuant to Water Code section 13267 and shall be prepared by a California-registered civil engineer or certified engineering geologist:

<u>Task</u>	<u>Compliance Date</u>
A. Construction Plans Submit construction and design plans for review and approval. (see all Construction Specifications in Section D and E, above and Section F of the SPRRs.)	At least 90 days prior to proposed construction
B. Construction Report Submit a construction report for review and approval upon completion demonstrating construction was in accordance with approved construction plans (see Standard Construction Specifications in Section F of the SPRRs).	At least 60 days prior to proposed discharge
C. Truck Washout Basin Upgrade Work Plan Submit a work plan to clean close the existing truck washout basin and to install a new steel tank washout containment area as proposed in the February 2014 ROWD and as described in this Order.	15 September 2014
D. Submit Evaluation Monitoring Program Results Submit Evaluation Monitoring Program/Site Investigation results report with the results of the site investigation from an approved work plan to investigate the extent of the salt-impacted groundwater. The report shall include the items listed in sections 3.a-3.g of the 27 December 2013 Central Valley Water Board staff letter.	15 March 2015
E. Submit Engineering Feasibility Study Submit an Engineering Feasibility Study (EFS) that evaluates the options to achieve background concentrations in groundwater at the downgradient portion of the site and that proposes to implement the recommended corrective action. The report shall include the items listed in sections 4.a-4.f of the 27 December 2013 Central Valley Water Board staff letter.	1 July 2015

F. Final Report for New Truck Washout

1 October 2015

Submit a final report documenting that clean closure and upgrade of the truck washout basin has been completed in accordance with the approved work plan.

G. Submit Corrective Action Upgrade Results

31 December 2015

Submit a report documenting that the upgraded corrective action measures, as approved by Central Valley Water Board staff, have been implemented.

H. Final Report for Clean Closure of Basin 8

2 November 2016

Submit a final report documenting that Basin 8 has been clean closed in accordance with the requirements of this Order, including removal of all drilling mud, the clay liner, and at least two feet of surrounding natural geologic materials.

12. 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 Central Valley Water Board.
13. The Central Valley Water Board will review this Order periodically and may revise requirements when necessary.
14. This Order shall take effect upon the date of adoption.
15. The Discharger shall comply with all General Provisions listed in Section K of the SPRRs dated November 2013.

I, PAMELA C. CREEDON, Executive Officer, do hereby certify the foregoing is a full, true and correct copy of an Order adopted by the California Regional Water Quality Control Board, Central Valley Region, on 8 August 2014.

PAMELA C. CREEDON, Executive Officer

WLB

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM NO. R5-2014-0105
FOR
AQUA CLEAR FARMS, INC. AND HATCH INVESTMENTS LIMITED PARTNERSHIP
AQUA CLEAR FARMS FACILITY
CLASS II SURFACE IMPOUNDMENTS
CONSTRUCTION, OPERATION, CLOSURE,
POST-CLOSURE MAINTENANCE, AND CORRECTIVE ACTION
SOLANO COUNTY

This monitoring and reporting program (MRP) is issued to Aqua Clear Farms, Inc. (facility owner and operator) and Hatch Investments Limited Partnership (landowner), hereafter referred to jointly as "Discharger", pursuant to California Water Code section 13267 and incorporates requirements for groundwater, surface water, and unsaturated zone 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 R5-2014-0105, and the Standard Provisions and Reporting Requirements dated November 2013 (SPRRs). Compliance with this MRP is ordered by the WDRs and the Discharger shall not implement any changes to this MRP unless a revised MRP is issued by the Central Valley Water Board or the Executive Officer. Failure to comply with this MRP, or with the SPRRs, constitutes noncompliance with the WDRs and with Water Code Section 13267, which can result in the imposition of civil monetary liability.

A. MONITORING

The Discharger shall comply with the detection monitoring program provisions of Title 27 for groundwater, surface water, and the unsaturated zone in accordance with Standard Monitoring Specifications in Section I of the SPRRs. All monitoring shall be conducted in accordance with sample collection and analysis procedures plan approved by Central Valley Water Board staff.

All 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 (COCs) as indicated and listed in Tables 1 through 5.

The Discharger shall use USEPA test methods with the lowest achievable detection limit for that constituent taking any matrix interferences into account. The reporting limit shall be no higher than the practical quantitation limit. The Discharger shall report all trace concentrations that are between the detection limit and the practical quantitation limit. All metals analyses shall be for dissolved metals.

The monitoring program of this MRP includes:

<u>Section</u>	<u>Monitoring Program</u>
A.1	Groundwater Monitoring
A.2	Unsaturated Zone Monitoring
A.3	Surface Water Monitoring
A.4	Surface Impoundment Monitoring
A.5	LCRS Monitoring, Action Leakage Rate, and Annual LCRS Testing
A.6	Waste Discharge Monitoring
A.7	Facility Monitoring
A.8	Corrective Action Monitoring

1. **Groundwater Monitoring**

The Discharger shall operate and maintain a groundwater detection monitoring system that complies with the applicable provisions of Title 27, sections 20415 and 20420. The detection monitoring system shall be certified by a California-licensed professional civil engineer or geologist as meeting the requirements of Title 27.

The current groundwater monitoring network, as shown on Attachment C of the WDRs, shall consist of the following (plus any new monitoring or extraction wells added after the date of this MRP, including those wells installed pursuant to Central Valley Water Board staff's 26 December 2013 letter):

<u>Well</u>	<u>Status</u>	<u>Purpose/Units Being Monitored</u>
6A	Background	Site Background Well
2R	Detection/Corrective Action	Basins 2 and 3
3R	GW Extraction/Corrective Action	Remove impacted groundwater
7A	Detection/Corrective Action	Basin 7
8R	Detection/Corrective Action	Basin 8
10R	GW Extraction/Corrective Action	Remove impacted groundwater
11R	Detection/Corrective Action	Basins 8 and 9
12R	Detection/Corrective Action	Basins 9 and 10
EMP-5	Detection/Corrective Action	Basins 2 through 5
EMP-6	Detection/Corrective Action	Basins 2 through 5
HA-3	Detection/Corrective Action	Offsite Evaluation
HA-7	Detection	Offsite Evaluation
HA1R	GW Extraction/Corrective Action	Remove impacted groundwater

Groundwater samples shall be collected at least semiannually from the background wells, detection monitoring wells, corrective action wells, and any additional wells added as part of the approved groundwater monitoring system. However, groundwater samples shall be collected quarterly from corrective action wells during 2016 and 2017 to assess the initial effectiveness of corrective action upgrades due by late 2015. The Discharger shall collect,

preserve, and transport groundwater samples in accordance with the approved Sample Collection and Analysis Plan. Depth to groundwater shall be measured to the nearest 0.01 feet. Samples shall be collected and analyzed for the monitoring parameters in accordance with the methods and frequency specified in the following table:

Table 1: Groundwater Monitoring			
<u>Parameters</u>	<u>Units</u>	<u>Monitoring Frequency</u>	<u>Reporting Frequency</u>
<u>Field Parameters</u>			
Groundwater Elevation	feet & hundredths, MSL	Quarterly	Semiannually
Temperature	°F	Quarterly/Semiannually ³	Semiannually
Electrical Conductivity	umhos/cm	Quarterly/Semiannually ³	Semiannually
pH	pH units	Quarterly/Semiannually ³	Semiannually
Turbidity	NTU	Quarterly/Semiannually ³	Semiannually
<u>Monitoring Parameters & EPA Method</u>			
Total Dissolved Solids (160.1)	mg/L	Quarterly/Semiannually ³	Semiannually
Chloride (300.0)	mg/L	Quarterly/Semiannually ³	Semiannually
Sulfate (300.0)	mg/L	Quarterly/Semiannually ³	Semiannually
TPH as Diesel (8015M)	mg/L	Semiannually	Semiannually
TPH as Oil and Grease (EPA 1664)	mg/L	Semiannually	Semiannually
Potassium (200.7)	mg/L	Annually	Annually
Sodium (200.7)	mg/L	Annually	Annually
Dissolved Metals ¹	ug/L	Annually	Annually
Formaldehyde ² (8315)	ug/L	Annually	Annually
Volatile Organic Compounds (EPA 8260B)	ug/L	Annually	Annually
Semi-volatile organic compounds (EPA 8270)	ug/L	Annually	Annually

¹ Dissolved metals by EPA Method 200.7 except where noted: arsenic (200.9), barium, boron, magnesium, manganese, mercury (245.1), nickel, and zinc.

² Formaldehyde analysis required for Wells 7A, 8R, 11R, and 12R, and any new wells required for future double-lined basins.

³ Corrective action wells 3R, 10R, and HA1R, and wells installed in response to staff's 26 December 2013 letter shall be sampled quarterly during 2016 and 2017 to assess the initial effectiveness of upgrades to corrective action. All other wells will be sampled semi-annually.

2. Unsaturated Zone Monitoring

The Discharger shall operate and maintain an unsaturated zone detection monitoring system that complies with the applicable provisions of Title 27,

sections 20415 and 20420. The current unsaturated zone detection monitoring system meets the applicable requirements of Title 27. The Discharger shall install unsaturated zone monitoring devices (after review and approval by Central Valley Water Board staff) each time a new Class II waste management unit is constructed.

The current unsaturated zone monitoring network, as shown on Attachment C, shall consist of:

<u>Mon Pt.</u>	<u>Status</u>	<u>Units Being Monitored</u>
LYS-B9	Detection	Basin 9
LYS-B10	Detection	Basin 10

Unsaturated zone samples shall be collected from the monitoring network listed above (and any lysimeters for future lined basins) and shall be analyzed for the parameters and constituents listed in the following table in accordance with the specified methods and frequencies.

<u>Parameters</u>	<u>Units</u>	<u>Monitoring Frequency</u>	<u>Reporting Frequency</u>
<u>Field Parameters</u>			
Electrical Conductivity	umhos/cm	Semiannually	Semiannually
pH	pH units	Semiannually	Semiannually
Moisture (Gypsum Block)	kilopascals	Semiannually	Semiannually
<u>Monitoring Parameters & EPA Method</u>			
Total Dissolved Solids (160.1)	mg/L	Semiannually	Semiannually
Chloride (300.0)	mg/L	Semiannually	Semiannually
Sulfate (300.0)	mg/L	Semiannually	Semiannually
TPH as Diesel (EPA 8015M)	mg/L	Semiannually	Semiannually
TPH as Oil and Grease (EPA 1664)	mg/L	Semiannually	Semiannually
Dissolved metals ¹	ug/L	Annually	Annually
Volatile Organic Compounds (8260B)	ug/L	Annually	Annually

¹ Dissolved metals by EPA Method 200.7 except where noted: arsenic (200.9), barium, boron, magnesium, manganese, mercury (245.1), nickel, and zinc.

Note: Priority on sampling/analysis based on what may be a limited amount of liquid recovered from a suction lysimeter shall be: TDS, chloride, sulfate, VOCs, TPH as diesel, TPH as oil & grease, and then dissolved metals.

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.

Monitoring results for the unsaturated zone shall be included in monitoring reports and shall include an evaluation of potential impacts of the facility on the unsaturated zone and compliance with the Water Quality Protection Standard.

3. Surface Water Monitoring

The Discharger shall operate a surface water detection monitoring system for any facility where runoff from waste management unit areas flows or could flow to waters of the United States. Runoff from closed basins and areas outside of the open basins areas flows to the northeast corner of the site and offsite to a culvert that runs under Highway 113 to “Big Ditch” and then to the Delta. The Discharger collects a sample of runoff from the site twice per year at surface water monitoring point SW-1 at the northeast corner of the site prior to the culvert, as shown on Attachment C. The surface water detection monitoring system meets the applicable requirements of Title 27.

For surface water detection monitoring, the Discharger shall collect a sample of the site runoff at SW-1 twice per year and have it analyzed for the monitoring parameters and constituents in accordance with the methods and frequency specified in the following table:

Table 3: Surface Water Monitoring			
<u>Parameters</u>	<u>Units</u>	<u>Monitoring Frequency</u>	<u>Reporting Frequency</u>
<u>Field Parameters</u>			
Temperature	°F	Twice per year ¹	Semiannually
Electrical Conductivity	umhos/cm	Twice per year ¹	Semiannually
pH	pH units	Twice per year ¹	Semiannually
Turbidity	NTU	Twice per year ¹	Semiannually
<u>Monitoring Parameters & EPA Method</u>			
Total Dissolved Solids (160.1)	mg/L	Twice per year ¹	Semiannually
Chloride (300.0)	mg/L	Twice per year ¹	Semiannually
Sulfate (300.0)	mg/L	Twice per year ¹	Semiannually

¹ Beginning with the first storm of the rainy season and during at least one other storm event that produces runoff during the wet season.

4. Surface Impoundment Monitoring

Water samples shall be collected from the active Class II surface impoundments in accordance with the following table:

Table 4: Surface Impoundment Monitoring			
<u>Parameters</u>	<u>Units</u>	<u>Monitoring Frequency</u>	<u>Reporting Frequency</u>
<u>Field Parameters</u>			
Freeboard	feet and tenths	Weekly/Monthly ¹	Semiannually
Remaining Capacity	gallons	Monthly	Semiannually
Discharge Flow ²	See note 2	Monthly	Semiannually
Electrical Conductivity	umhos/cm	Semiannually	Semiannually
pH	pH units	Semiannually	Semiannually
<u>Monitoring Parameters & EPA Method</u>			
Total Dissolved Solids (160.1)	mg/L	Semiannually	Semiannually
Chloride (300.0)	mg/L	Semiannually	Semiannually
Sulfate (300.0)	mg/L	Semiannually	Semiannually
TPH as Diesel (8015M)	mg/L	Semiannually	Semiannually
TPH as Oil and Grease (EPA 1664)	mg/L	Semiannually	Semiannually
Potassium (200.7)	mg/L	Annually	Annually
Sodium (200.7)	mg/L	Annually	Annually
Dissolved Metals ³	ug/L	Annually	Annually
Formaldehyde (8315)	ug/L	Annually	Annually
Volatile Organic Compounds (EPA 8260B)	ug/L	Annually	Annually
Semi-volatile Organic Compounds (EPA 8270)	ug/L	Annually	Annually

¹ Freeboard shall be measured weekly from 1 November through 30 April, and monthly otherwise. Freeboard shall be measured from the top of the lowest point on the surface impoundment berm down to the water level in the impoundment and shall be measured using markings on the primary geomembrane liner, a free-standing gauge, or other method approved by Central Valley Water Board staff. If there is no water in the impoundment at the time of the measurement, the measurement shall be taken to the lowest elevation of the drilling mud solids and shall be further noted as "dry". Freeboard measurements are not required for basins that are filled with dried drilling mud above the berms in all areas of the basin, and this shall be stated in the monitoring reports for such basins.

² Volume of drilling mud discharged into Class II surface impoundment in gallons or barrels per month (1 barrel = 42 gallons). See also: Waste Discharge Monitoring in MRP Section A.6, below.

³ Dissolved metals by EPA Method 200.7 except where noted: arsenic (200.9), barium, boron, magnesium, manganese, mercury (245.1), nickel, and zinc.

5. LCRS Monitoring, Action Leakage Rate, and Annual LCRS Testing

LCRS Monitoring: The Discharger shall operate and maintain leachate collection and removal system (LCRS) sumps, record and calculate monthly leakage rates, and conduct annual testing of each LCRS in accordance with Title 27 and this monitoring program.

The current LCRS leachate sump monitoring points are:

<u>Mon Pt.</u>	<u>Unit Where Sump is Located</u>
Basin 9 Sump	Basin 9
Basin 10 Sump	Basin 10

All LCRS sumps for current and future double-lined basins shall be inspected monthly for the presence of leachate, and flow shall be recorded in accordance with the following table. LCRS sumps shall be inspected **monthly** for the presence of leachate and/or to record the flow totalizer reading. If leachate is detected in a previously dry sump, the Discharger shall verbally notify Central Valley Water Board staff within **seven days** and shall immediately sample and test the leachate for Field and Monitoring Parameters listed in the following table. Leachate in the LCRS sump shall then be sampled for all parameters and constituents in accordance with the frequencies listed in the following table whenever liquid is present.

Table 5: LCRS Monitoring			
<u>Parameters</u>	<u>Units</u>	<u>Monitoring Frequency</u>	<u>Reporting Frequency</u>
<u>Field Parameters</u>			
Presence of leachate	observation	Monthly ¹	Semiannually
Flow Rate ²	gallons/day	Monthly	Semiannually
Electrical Conductivity	umhos/cm	Semiannually	Semiannually
pH	pH units	Semiannually	Semiannually
<u>Monitoring Parameters & EPA Method</u>			
Total Dissolved Solids (160.1)	mg/L	Semiannually	Semiannually
Chloride (300.0)	mg/L	Semiannually	Semiannually
Sulfate (300.0)	mg/L	Semiannually	Semiannually
Volatile Organic Compounds (8260B)	ug/L	Annually	Annually

¹ Monthly observation and/or recording of flow at totalizer.

² Flow in gallons per day from LCRS sump back to surface impoundment.

Action Leakage Rate: If monthly monitoring of the flow rate into the LCRS shows an exceedance of the Action Leakage Rate required by the WDRs, the Discharger shall follow the procedures in the WDRs under “B. Discharge Specifications”. Tabulated monthly leakage rates shall be included in the semiannual monitoring reports.

Annual LCRS Testing: All LCRSs shall be tested annually pursuant to Title 27, section 20340(d) to demonstrate proper operation. The results of these tests shall be reported to the Central Valley Water Board in the Annual Monitoring Report and shall include comparisons with earlier tests made under comparable conditions. The next test shall be completed during 2014.

6. Waste Discharge Monitoring

The Discharger shall monitor all wastes discharged to the active Class II surface impoundments on a monthly basis and report the results in the semiannual monitoring reports in accordance with the following table:

Table 6: Waste Discharge Monitoring		
<u>Parameters</u>	<u>Units</u>	<u>Frequency</u>
Quantity Discharged to each SI	gallons or barrels	Monthly
Approximated Remaining Capacity	gallons or barrels	Monthly
Minimum Freeboard	feet and tenths	Weekly/Monthly ¹

¹ Refer to freeboard monitoring requirements in MRP Section A.4, above.

7. Facility Monitoring

a. Annual 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 repair and maintenance needed for exposed liner systems; LCRS pumps, piping and control systems; drainage control systems; groundwater monitoring wells; unsaturated zone monitoring systems; and shall assess preparedness for winter conditions including but not limited to the required surface impoundment capacity and erosion and sedimentation control. The Discharger shall take photos of any problems areas before and after repairs. Any necessary construction, maintenance, or repairs shall be completed by **31 October**. Annual facility inspection reporting shall be submitted as required in Section B.5 of this MRP.

b. Rainfall Monitoring

The Discharger shall monitor and record onsite rainfall data using an automated rainfall gauge. Data shall be used in establishing the severity of storm events and wet seasons for comparison with design parameters used for waste management unit design and conveyance and drainage design. Rainfall data shall be reported in the semiannual monitoring reports as required by this MRP under "Reporting".

8. Corrective Action Monitoring

The Discharger shall conduct corrective action monitoring to demonstrate the effectiveness of corrective action in accordance with Title 27, section 20430 and this MRP.

The groundwater extraction well network is as follows:

<u>Extraction Well</u>	<u>Area Being Addressed</u>
3R	NE Corner
10R	NE Corner
HA1R	NE Corner

The Discharger shall record the volume of impacted groundwater extracted from each extraction well and report this data in the Semiannual and Annual Monitoring Reports. Reporting shall include a table showing each year the system has operated with the amount of groundwater removed from each extraction well the reporting period and the cumulative amount since groundwater extraction began (including previous extraction wells before they were replaced).

As required in the Annual Report in MRP Section B.3.h, the Discharger shall also assess the effectiveness of the corrective action program in reducing the concentration of the constituents that exceed the concentration limits in the extraction wells including graphical presentation of the data since groundwater extraction began in wells 3R, 10R, HA1R, and any other extraction wells added to the program.

B. REPORTING

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

Reporting Schedule

<u>Section</u>	<u>Report</u>	<u>End of Reporting Period</u>	<u>Due Date</u>
B.1	Sampling and Analysis Plan	—	15 October 2014

B.2	Semiannual Monitoring Report	30 June, 31 December	1 August, 1 February
B.3	Annual Monitoring Report	31 December	1 February
B.4	Annual Impoundment Operations Report	—	1 October
B.5	Annual Facility Inspection Report	31 October	15 November
B.5	Financial Assurances Report	31 December	1 June

Reporting Requirements

The Discharger shall submit monitoring reports **semiannually** with the data and information as required in this Monitoring and Reporting Program and as required in WDRs R5-2014-0105 and the Standard Provisions and Reporting Requirements (particularly Section I: “Standard Monitoring Specifications” and Section J: “Response to a Release”). 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. Data shall also be submitted in a digital format, such as a computer disk.

Field and laboratory tests shall be reported in each monitoring report. Semiannual and annual monitoring reports shall be submitted to the Central Valley Water Board in accordance with the above schedule for the calendar period in which samples were taken or observations made. In addition, the Discharger shall enter all monitoring data, monitoring reports, and technical reports into the online Geotracker database as required by Division 3 of Title 27.

The results of **all monitoring** conducted at the site shall be reported to the Central Valley Water Board in accordance with the reporting schedule above for the calendar period in which samples were taken or observations made.

The Discharger shall retain records of all monitoring information, including all calibration and maintenance records, all original strip chart recordings of continuous monitoring instrumentation, copies of all reports required by this Order, and records of all data used to complete the application for this Order. Records shall be maintained throughout the life of the facility. Such records shall be legible and shall show the following for each sample:

- a) Sample identification and the monitoring point or background monitoring point from which it was taken, along with the identity of the individual who obtained the sample;

- b) Date, time, and manner of sampling;
- c) Date and time that analyses were started and completed, and the name of the personnel and laboratory performing each analysis;
- d) Complete procedure used, including method of preserving the sample, and the identity and volumes of reagents used;
- e) Calculation of results; and
- f) Results of analyses, and the method detection limit (MDL) and practical quantitation limit (PQL) for each analysis. All peaks shall be reported.

Required Reports

1. **Sampling and Analysis Plan:** By **15 October 2014**, the Discharger shall submit a Sampling and Analysis Plan (SAP) for review. The SAP shall include the following details and information: site map with all sampling points; tables with EPA analytical methods with the laboratory's method detection limits (MDLs) and practical quantitation limits (PQLs), and preservative and holding time; table with each sample location identifier (including field quality control samples) and the constituents for analysis; chain-of-custody control procedures and example forms; field shipment quality assurance/quality control procedures; and appendices with (1) example field logs, (2) sample collection procedures (e.g., low-flow, hydra-sleeve), (3) table identifying the location of the pump in comparison to the screen interval and the type of pump at each well, and (5) decontamination procedures.
2. **Semiannual Monitoring Report:** Monitoring reports shall be submitted semiannually and are due on **1 August** and **1 February**. Each semiannual monitoring report shall contain at least the following:
 - a) For each groundwater monitoring point addressed by the report, a description of:
 - 1) The time of water level measurement;
 - 2) 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;
 - 3) The method of purging used to stabilize water in the well bore before the sample is taken including the pumping rate; the equipment and methods used to monitor field pH, temperature, and conductivity during purging; results of pH, temperature, conductivity, and turbidity testing; and the method of disposing of the purge water;
 - 4) The type of pump - or other device - used for sampling, if different than the pump or device used for purging; and

- 5) A statement that the sampling procedure was conducted in accordance with the approved Sample Collection and Analysis Plan.
- b) A map or aerial photograph showing the locations of observation stations, monitoring points, and background monitoring points.
- c) The estimated quarterly groundwater flow rate and direction in the uppermost aquifer, in any zones of perched water, and in any additional zone of saturation monitored based upon water level elevations taken prior to the collection of the water quality data submitted in the report [Title 27, section 20415(e)(15)].
- d) Cumulative tabulated monitoring data for all monitoring points and constituents for groundwater, LCRS/leachate, unsaturated zone, surface water, and the surface impoundments. 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 the tables for each monitored medium unless specific justification is given to report in other units. Refer to the SPRRs Section I "Standard Monitoring Specifications" for requirements regarding MDLs and PQLs.
- e) Laboratory statements of results of all analyses evaluating compliance with requirements.
- f) An evaluation of the concentration of each monitoring parameter as compared to the current concentration limits, and the results of any required verification testing for constituents exceeding a concentration limit. Report any actions taken under Section J: Response to a Release in the SPRRs for verified exceedances of a concentration limit for wells/constituents not already in corrective action monitoring.
- g) Tabulated monthly freeboard levels in the Class II surface impoundments with comparison to the freeboard requirement in the Facility Specifications of the WDRs.
- h) Tabulated monthly leakage rates into the LCRS sump with comparison to the Action Leakage Rate in the Facility Specifications of the WDRs, and a discussion of required response if ALR was exceeded.
- i) A summary of all waste discharge monitoring required in Section A.6 of this MRP.
- j) A summary of all Facility Monitoring including onsite rainfall data for the reporting period required in Section A.7 of this MRP.
- k) A summary of the status of the groundwater extraction required for the Corrective Action Program monitoring required in Section A.8 of this MRP.
- l) A discussion about the amount of dried drilling mud removed from the processing basins (Basin 8 until clean closure is completed, Basin 9 until such

time as it is only accepting dried drilling mud from other basins, and any future processing basins) during the reporting period to regain capacity.

- m) A copy of the quarterly monitoring reports submitted to Solano County pursuant to Solano County Use Permit U-89-33.

3. **Annual Monitoring Report:** The Discharger shall submit an Annual Monitoring Report to the Central Valley Water Board by **1 February** covering the reporting period of the previous monitoring year. If desired, the Annual Monitoring Report may be combined with the second semiannual report, but if so, shall clearly state that it is both a semi-annual and annual monitoring report in its title. Each Annual Monitoring Report shall contain the following additional information beyond what is required for semiannual monitoring reports:

- a) All monitoring parameters shall be graphed to show historical trends at each monitoring point and background monitoring point, for all samples taken within at least the previous five calendar years. Each such graph shall plot the concentration of one or more constituents for the period of record for a given monitoring point or background monitoring point, at a scale appropriate to show trends or variations in water quality. The graphs shall plot each datum, rather than plotting mean values. Graphical analysis of monitoring data may be used to provide significant evidence of a release.
- b) All historical monitoring data for which there are detectable results, including data for the previous year, shall be submitted in tabular form in a digital file format such as a computer disk. The Central Valley Water Board regards the submittal of data in hard copy and in digital format as "...the form necessary for..." statistical analysis [Title 27, section 20420(h)], that facilitates periodic review by the Central Valley Water Board.
- c) Hydrographs of each well 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.
- d) A comprehensive discussion of the compliance record, and the result of any corrective actions taken or planned which may be needed to bring the Discharger into full compliance with the waste discharge requirements.
- e) A written summary of the monitoring results, indicating any changes made or observed since the previous Annual Monitoring Report.
- f) The results of the annual testing of the LCRS for each double-lined Class II surface impoundment.
- g) Updated concentration limits for each monitoring parameter at each monitoring well based on the new background data set.

- h) A comprehensive discussion of the Corrective Action Program including a discussion of long-term trends in the concentrations of the pollutants in the groundwater monitoring wells and an analysis of whether the pollutants are being effectively treated. As required in MRP Section A.8, the Discharger shall report the amount of impacted groundwater extracted from each extraction well (including previous extraction wells before they were replaced). Also as required in MRP Section A.8, the Discharger shall assess the effectiveness of the corrective action program in reducing the concentration of the constituents that exceed the concentration limits in the extraction wells including graphical presentation of the data since groundwater extraction began in wells 3R, 10R, HA1R, and any other extraction wells added to the program.
4. **Annual Impoundments Operation Plan:** By **1 October** of each year, the Discharger shall submit an **Impoundments Operation Plan** for operating the surface impoundments over the upcoming 12-month period. The Annual Operations Plan shall identify the surface impoundments scheduled for accepting drilling mud/fluid and the available capacity for the upcoming 12-month period. The plan shall specify the conditions under which drilling mud will be transferred between surface impoundments (e.g., depth of solids in an impoundment, percent moisture of solids, etc.) and conditions under which liquids will be transferred between surface impoundments. Figures/schematics showing a plan view and cross-section of each active surface impoundment shall be provided. The figures/schematics shall show the total depth of the impoundment; the filling plan showing the change in depth of solids over time; the location for the discharge of waste into the surface impoundments; and the locations for drying and conditioning of solids within each surface impoundment. In addition, the planned location for pooling and evaporation of liquids shall be depicted. If solids are planned to be moved around within a surface impoundment, then this information shall be depicted on the figures/schematics.
5. **Annual Facility Inspection Report:** By **15 November** of each year, the Discharger shall submit a **Facility Inspection Report** describing the results of the inspection and the repair measures implemented, preparations for winter, and include photographs of any problem areas and the repairs. Refer to Section A.7.a. of this MRP, above.
6. **Financial Assurances Report:** By **1 June** of each year, the Discharger shall submit a report to the Central Valley Water Board that reports the balance of both the closure and corrective action funds or the amounts of the Guarantees and the adjustments to account for inflation in accordance with Title 27 Section 22236. Refer to Financial Assurances Specifications F.1 through F.6 of the WDRs.

C. WATER QUALITY PROTECTION STANDARD AND COMPLIANCE PERIOD

1. Water Quality Protection Standard Report

For each waste management unit, the Water Quality Protection Standard (currently the approved 1 November 1998 WQPS report) shall consist of all COCs, the concentration limit for each constituent of concern, the verification retesting procedure to confirm measurably significant evidence of a release, the point of compliance, and all water quality monitoring points for each monitored medium.

The Water Quality Protection Standard for naturally occurring waste constituents consists of the COCs, the concentration limits, and the point of compliance and all monitoring points. Any proposed changes to the Water Quality Protection Standard other than annual update of the concentration limits shall be submitted in a report for review and approval.

The report shall:

- a. Identify **all distinct bodies of surface and ground water** that could be affected in the event of a release from a waste management 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 Title 27, section 20405.
- c. Evaluate the perennial direction(s) of groundwater movement within the uppermost groundwater zone(s).
- d. Include a proposed statistical method for calculating concentration limits for monitoring parameters and constituents of concern that are detected in 10% or greater of the background data (naturally-occurring constituents) using a statistical procedure from Title 27, section 20415(e)(8)(A-D)] or section 20415(e)(8)(E).
- e. Include a retesting procedure to confirm or deny measurably significant evidence of a release pursuant to Title 27, section 20415(e)(8)(E) and section 20420(j)(1-3).

The Water Quality Protection Standard 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.

The Discharger proposed the methods for calculating concentration limits in the 1 November 1998 Water Quality Protection Standard (WQPS) report entitled *Ground Water Constituents of Concern Delineation Assessment Report*. The limits are calculated using Interwell tolerance limits at 95% confidence and 95% coverage based on background data from background monitoring well 6A.

Concentration limits shall be calculated as follows: After screening new data for trends (using Mann-Kendall and Sen's slope), outliers, seasonality, and normality, the data obtained over the previous 12-month monitoring period may be included in the proposed updated concentration limits for the following year. The formulas used to calculate the concentration limits shall be included. Calculations for the computation of all factors shall be included. A table summarizing the mean, standard deviation, factors, and new proposed concentration limit shall be included. An electronic MS Excel spreadsheet with the background monitoring data in a format suitable for statistical review by Water Board staff shall be included. In order for Water Board staff to evaluate compliance with the Water Quality Protection Standards and as a final part of the statistical analysis the Discharger shall compare the power of the statistical test method against the USEPA's reference power curve in the Unified Guidance.

The Water Quality Protection Standard shall be updated annually for each monitoring well using new and historical monitoring data.

2. Monitoring Parameters

Monitoring parameters are a select group of constituents that are monitored during each monitoring event that are the waste constituents, reaction products, hazardous constituents, and physical parameters that provide a reliable indication of a release from a waste management unit. The monitoring parameters for all waste management units are those listed in Tables 1 through 5 of this MRP.

3. Concentration Limits

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

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

The methods for calculating concentration limits were included in the 1 November 1998 WQPS report. The approved method uses Interwell tolerance limits at 95% confidence and 95% coverage based on background data from background monitoring well 6A.

Concentration limits are required to be updated annually based on the new background data set (see MRP Section B.3.g. for the Annual Report, above). The most recent concentration limits for select parameters as reported in the 15 January 2014 *Second Biannual and Annual 2013 Environmental Monitoring Report* were as follows:

Constituent	Units	Concentration Limit (2013)
Electrical Conductivity	umhos/cm	1,077
pH	pH units	7.10-8.29
Total Dissolved Solids	mg/L ¹	594
Sulfate	mg/L	53.9
Chloride	mg/L	113.1
Arsenic	mg/L	0.0035
Barium	mg/L	0.404
Boron	mg/L	0.363
Magnesium	mg/L	51.2
Manganese	mg/L	0.014
Mercury	mg/L	>MDL
Nickel	mg/L	0.012
Potassium	mg/L	0.65
Sodium	mg/L	64.4
Zinc	mg/L	>MDL
TPH as Diesel	ug/L ²	>MDL
VOCs	ug/L	>MDL
Formaldehyde	ug/L	>MDL

¹ Milligrams per liter
² Micrograms per liter

The concentration limits shown above for non-naturally occurring constituents (diesel, VOCs, and formaldehyde) are set at the MDL since they should not be present in unimpacted background groundwater.

4. Retesting Procedures for Confirming Evidence of a Release

If monitoring results indicate measurably significant evidence of a release, as described in Standard Monitoring Specification I.43 of the SPRRs, then:

- a. For analytes that are detected in less than 10% of the background samples (such as non-naturally occurring constituents), the Discharger shall use the non-statistical retesting procedure required in Standard Monitoring Specification I.44 of the SPRRs.

- b. For analytes that are detected in 10% or greater of the background samples (naturally occurring constituents), the Discharger shall use one of the statistical retesting procedure as required in Standard Monitoring Specification I.45 of the SPRRs.

5. Point of Compliance

The point of compliance for the water standard at each waste management unit is a vertical surface located at the hydraulically downgradient limit of the Unit that extends through the uppermost aquifer underlying the unit. The following are monitoring locations at the point of compliance:

<u>Cell or Module</u>	<u>Point of Compliance Monitoring Wells</u>
Basins 2 through 5	2R, EMP-5, EMP-6
Basins 7 through 10	7A, 8R, 11R, 12R
Future Basins 11 through 13	Future well(s) required prior to waste discharge

6. Compliance Period

The compliance period for each waste management 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 waste management unit. The compliance period shall begin anew each time the Discharger initiates an evaluation monitoring program [Title 27, section 20410].

7. Monitoring Points

A monitoring point is a well, device, or location specified in the waste discharge requirements, which monitoring is conducted and at which the water quality protection standard applies. The monitoring points for each monitored medium are listed in Section A of this MRP.

D. TRANSMITTAL LETTER FOR ALL REPORTS

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.

Ordered by: _____
PAMELA C. CREEDON, Executive Officer

_____ 8 August 2014
(Date)

WLB

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

STANDARD PROVISIONS AND REPORTING REQUIREMENTS
FOR
WASTE DISCHARGE REQUIREMENTS
FOR
INDUSTRIAL FACILITIES REGULATED BY TITLE 27
(Title 27, § 20005 et seq.)

NOVEMBER 2013

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A. APPLICABILITY

1. These Standard Provisions and Reporting Requirements (SPRRs) are applicable to Class II surface impoundments, waste piles, and land treatment units that are regulated by the Central Valley Regional Water Quality Control Board (hereafter, Central Valley Water Board) pursuant to the provisions of California Code of Regulations, title 27 ("Title 27"), section 20005 et seq.
2. "Order," as used throughout this document, means the Waste Discharge Requirements (WDRs) to which these SPRRs are incorporated.
3. The requirements prescribed herein do not authorize the commission of any act causing injury to the property of another, and do not protect the Discharger from liabilities under federal, state, or local laws. This Order does not convey any property rights or exclusive privileges.
4. The provisions of this Order are severable. If any provision of this Order is held invalid, the remainder of this Order shall not be affected.
5. If there is any conflicting or contradictory language between the WDRs, the Monitoring and Reporting Program (MRP), or the SPRRs, then language in the WDRs shall govern over either the MRP or the SPRRs, and language in the MRP shall govern over the SPRRs.
6. If there is a site-specific need to change a requirement in these SPRRs for a particular facility, the altered requirement shall be placed in the appropriate section of the WDRs and will supersede the corresponding SPRRs requirement. These SPRRs are standard and cannot be changed as part of the permit writing process or in response to comments, but they will be periodically updated on an as-needed basis.
7. Unless otherwise stated, all terms are as defined in Water Code section 13050 and in Title 27, section 20164.

B. TERMS AND CONDITIONS

1. Failure to comply with any waste discharge requirement, monitoring and reporting requirement, or Standard Provisions and Reporting Requirement, or other order or prohibition issued, reissued, or amended by the Central Valley Water Board or the State Water Board, or intentionally or negligently discharging waste, or causing or permitting waste to be deposited where it is discharged into the waters of the state and creates a condition of pollution or nuisance, is a violation of this Order and the Water Code, which can result in the imposition of civil monetary liability [Wat. Code, § 13350(a)]
2. After notice and opportunity for a hearing, this Order may be terminated or modified for cause, including, but not limited to [Wat. Code, § 13381]:

- a. Violation of any term or condition contained in this Order;
 - b. Obtaining this Order by misrepresentation, or failure to disclose fully all relevant facts;
 - c. A change in any condition that results in either a temporary or permanent need to reduce or eliminate the authorized discharge; or
 - d. A material change in the character, location, or volume of discharge.
3. Before initiating a new discharge or making a material change in the character, location, or volume of an existing discharge, the Discharger shall file a new report of waste discharge (ROWD), or other appropriate joint technical document (JTD), with the Central Valley Water Board [Wat. Code, § 13260(c) and § 13264(a)]. A material change includes, but is not limited to, the following:
- a. An increase in area or depth to be used for solid waste disposal beyond that specified in waste discharge requirements;
 - b. A significant change in disposal method, location, or volume (e.g., change from land disposal to land treatment);
 - c. A change in the type of waste being accepted for disposal; or
 - d. A change to previously-approved liner systems or final cover systems that would eliminate components or reduce the engineering properties of components.
4. Representatives of the Central Valley Water Board may inspect the facilities to ascertain compliance with the waste discharge requirements. The inspection shall be made with the consent of the owner or possessor of the facilities or, if the consent is refused, with a duly issued warrant. However, in the event of an emergency affecting the public health or safety, an inspection may be made without consent or the issuance of a warrant [Wat. Code, §13267(c)].
5. The Central Valley Water Board will review this Order periodically and will revise these waste discharge requirements when necessary [Wat. Code, § 13263(e) and Title 27, § 21720(b)].
6. Except for material determined to be confidential in accordance with California law and regulations, all reports prepared in accordance with terms of this Order shall be available for public inspection at the offices of the Central Valley Water Board [Wat. Code, § 13267(b)]. Data on waste discharges, water quality, geology, and hydrogeology shall not be considered confidential.
7. A discharge of waste into the waters of the state is a privilege, not a right. No discharge of waste into waters of the state, whether or not the discharge is

made pursuant to waste discharge requirements, shall create a vested right to continue the discharge [Wat. Code, § 13263(g)].

8. Technical and monitoring reports specified in this Order are requested pursuant to the Water Code [§13267(b)]. Failure to furnish the reports by the specified deadlines or falsifying information in the reports, are misdemeanors that may be liable civilly in accordance with §13268(b) of the Water Code [Wat. Code, §13268(a)].

C. STANDARD PROHIBITIONS

1. The discharge of wastes which have the potential to reduce or impair the integrity of containment structures or which, if commingled with other wastes in the waste management unit, could produce violent reaction, heat or pressure, fire or explosion, toxic by-products, or reaction products, which, in turn:
 - a. require a higher level of containment than provided by the unit; or
 - b. are 'restricted wastes'; or
 - c. impair the integrity of containment structures;is prohibited [Title 27, § 20200(b)].
2. The discharge of wastes outside of a waste management unit or portions of a unit specifically designed for their containment is prohibited.
3. The discharge of waste to a closed waste management unit is prohibited.
4. The discharge of waste constituents to the unsaturated zone or to groundwater is prohibited, except within the treatment zone at a land treatment unit.
5. The discharge of solid or liquid waste or leachate to surface waters, surface water drainage courses, or groundwater is prohibited.

D. STANDARD DISCHARGE SPECIFICATIONS

1. The Discharger is responsible for accurate characterization of wastes, including a determination of whether or not wastes will be compatible with containment features and other wastes at the waste management unit and whether or not the wastes are required to be managed as a hazardous waste [Title 27, § 20200(c)] or designated waste [Title 27, § 20210].
2. Leachate collected from a waste management unit shall be discharged to the unit from which it came, or discharged to an appropriate waste management unit in accordance with Title 27 and in a manner consistent with the waste classification of the liquid [Title 27, § 20200(d) and § 20340(g)].

3. Wastes shall be discharged only into waste management units specifically designed for their containment and/or treatment, as described in this Order.
4. The discharge shall remain within the designated disposal area at all times.
5. The discharge of waste shall not cause a nuisance condition [Wat. Code, § 13050(m)].

E. STANDARD FACILITY SPECIFICATIONS

1. All waste management units shall be designed, constructed, and operated to ensure that wastes, including leachate, will be a minimum of 5 feet above the highest anticipated elevation of underlying groundwater [Title 27, § 20240(c)], including the capillary fringe.
2. Surface and subsurface drainage from outside of a waste management unit shall be diverted from the unit [Title 27, § 20365(e)].
3. The Discharger shall **immediately** notify the Central Valley Water Board staff of any slope failure occurring at a waste management unit. Any failure which threatens the integrity of containment features or the waste management unit shall be promptly corrected in accordance with an approved method [Title 27, § 21710(c)(2)].
4. The Discharger shall **immediately** notify Central Valley Water Board staff of any flooding, unpermitted discharge of waste off-site or outside of waste management units, equipment failure, or other change in site conditions which could impair the integrity of waste or leachate containment facilities or precipitation and drainage control structures.
5. The Discharger shall maintain in good working order any facility, control system, or monitoring device installed to achieve compliance with the waste discharge requirements.
6. The Discharger shall lock all groundwater monitoring wells with a lock on the well cap or monitoring well box. All monitoring devices shall be clearly labeled with their designation including all monitoring wells, LCRS risers, and lysimeter risers and shall be easily accessible for required monitoring by authorized personnel. Each monitoring device shall be clearly visible and be protected from damage by equipment or vehicles.
7. The Discharger shall maintain the depth of the fluid in the sump of each waste management unit at the minimum needed for efficient pump operation (the depth at which the pump turns on given the pump intake height and maximum pump cycle frequency).

8. Each LCRS shall be tested at least annually to demonstrate proper operation. The results of the tests shall be compared with earlier tests made under comparable conditions [Title 27, § 20340(d)].
9. The Discharger shall maintain a *Storm Water Pollution Prevention Plan and Monitoring Program and Reporting Requirements* in accordance with State Water Board Order No. 97-03-DWQ (or most recent general industrial storm water permit), or retain all storm water on-site.

F. STANDARD CONSTRUCTION SPECIFICATIONS

1. The Discharger shall submit for review and approval at least **90 days** prior to proposed construction, design plans and specifications for new Class II waste management units that include the following:
 - a. Detailed construction drawings showing all required liner system components, the LCRS, leachate sump, unsaturated zone monitoring system, and access to the LCRS for required annual testing.
 - b. A Construction Quality Assurance (CQA) Plan prepared by a California-registered civil engineer or certified engineering geologist, and that meets the requirements of Title 27, section 20324.
 - c. A geotechnical evaluation of the area soils, evaluating their use as the base layer or reference to the location of this information in the ROWD/JTD [Title 27, § 21750(f)(4)].
 - d. Information about the seismic design of the proposed new waste management unit (or reference to the location of this information in the ROWD/JTD) in accordance with Title 27, section 20370.
 - e. A revised water quality monitoring plan for groundwater detection monitoring (or information showing the existing plan is adequate) in accordance with Title 27, section 20415.
 - f. An Operation Plan (or reference to the location of this information in the ROWD/JTD) meeting the requirements of Title 27, sections 21760(b) and 20375(b).
2. All containment structures shall be designed by, and construction shall be supervised by, a California registered civil engineer or a certified engineering geologist, and shall be certified by that individual as meeting the prescriptive standards, or approved engineered alternative design, in accordance with this Order prior to waste discharge.
3. The Discharger shall not proceed with construction until the construction plans, specifications, and all applicable construction quality assurance plans have

been approved. Waste management units shall receive a final inspection and approval of the construction by Central Valley Water Board staff before use of the unit commences [Title 27, § 20310(e)].

4. Any report, or any amendment or revision of a report, that proposes a design or design change that might affect a waste management unit's containment features or monitoring systems shall be approved by a California registered civil engineer or a certified engineering geologist [Title 27, § 21710(d)].
5. Materials used in containment structures shall have appropriate chemical and physical properties to ensure that such structures do not fail to contain waste because of pressure gradients, physical contact with waste or leachate, chemical reactions with soil or rock, climatic conditions, the stress of installation, or because of the stress of daily operations [Title 27, § 20320(a)].
6. Waste management units and their respective containment structures shall be designed and constructed to limit, to the greatest extent possible, ponding, infiltration, inundation, erosion, slope failure, washout, and overtopping [Title 27, § 20365(a)].
7. The Discharger shall design storm water conveyance systems for Class II units for a 1,000-year, 24-hour storm event [Title 27, § 21750(e)(3)].
8. All Class II waste management units shall be designed to withstand maximum credible earthquake without damage to the foundation or to the structures that control leachate, or surface drainage, or erosion [Title 27, § 20370(a)].
9. The Discharger shall perform stability analyses that include components to demonstrate the integrity of the waste management unit foundation, final slopes, and containment systems under both static and dynamic conditions throughout the life of the unit [Title 27, § 21750(f)(5)].
10. New Class II Units, other than LTUs and expansions of existing Class II units, shall have a 200 foot setback from any known Holocene fault. [Title 27, § 20250(d)].
11. Liners shall be designed and constructed to contain the fluid, including waste, and leachate [Title 27, § 20330(a)].
12. Hydraulic conductivities shall be determined primarily by appropriate field test methods in accordance with accepted civil engineering practice. The results of laboratory tests with both water and leachate, and field tests with water, shall be compared to evaluate how the field permeabilities will be affected by leachate. It is acceptable for the Discharger to use appropriate compaction tests in conjunction with laboratory hydraulic conductivity tests to determine field permeabilities as long as a reasonable number of field hydraulic conductivity tests are also conducted [Title 27, § 20320(c)].

13. Hydraulic conductivities specified for containment structures other than the final cover shall be relative to the fluids (leachate) to be contained. Hydraulic conductivities for the final cover shall be relative to water [Title 27, § 20320(b)].
14. A test pad for each barrier layer and any final cover shall be constructed in a manner duplicating the field construction. Test pad construction methods, with the designated equipment, shall be used to determine if the specified density/moisture-content/hydraulic conductivity relationships determined in the laboratory can be achieved in the field with the compaction equipment to be used and at the specified lift thickness [Title 27, § 20324(g)(1)(A)].
15. The Discharger shall ensure proper preparation of the subgrade for any liner system that includes a GCL so as to provide a smooth surface that is free from rocks, sticks, or other debris that could damage or otherwise limit the performance of the GCL.
16. The Discharger shall propose an electronic leak location survey of the top liner for any new waste management unit in the construction quality assurance plan unless the Discharger demonstrates that a leak location survey is not needed.
17. Leachate collection and removal systems are required for Class II surface impoundments [Title 27, § 20340(a)].
18. The LCRS shall be designed, constructed, maintained, and operated to collect and remove twice the maximum anticipated daily volume of leachate from the waste management unit [Title 27, § 20340(b)].
19. Leachate collection and removal systems shall be designed and operated to function without clogging through the life of the waste management unit.
20. The leachate sump, leachate removal pump, and pump controls shall be designed and set to maintain a fluid depth no greater than the minimum needed for efficient pump operation [Title 27, § 20340(c)].
21. All construction of liner systems and final cover systems shall be performed in accordance with a Construction Quality Assurance Plan certified by a registered civil engineer or a certified engineering geologist [Title 27, § 20323].
22. The Construction Quality Assurance program shall be supervised by a registered civil engineer or a certified engineering geologist who shall be designated the CQA officer [Title 27, § 20324(b)(2)].
23. The Discharger shall ensure that a third party independent of both the Discharger and the construction contractor performs all of the construction quality assurance monitoring and testing during the construction of a liner system.

24. The Discharger shall notify Central Valley Water Board staff at least **14 days** prior to commencing field construction activities including construction of a new Class II waste management unit, construction of a final cover (for units closed as a landfill), or any other construction that requires Central Valley Water Board staff approval under this Order.
25. The Discharger shall submit for review and approval at least **60 days** prior to proposed discharge, final documentation required in Title 27 Section 20324(d)(1)(C) following the completion of construction of a new Class II waste management unit. The report shall be certified by a registered civil engineer or a certified engineering geologist and include a statement that the liner system was constructed in accordance with the approved design plans and specifications, the CQA Plan, the requirements of the WDRs, and that it meets the performance goals of Title 27. The report shall contain sufficient information and test results to verify that construction was in accordance with the design plans and specifications, the construction quality assurance plan, and the performance goals of Title 27.
26. The Discharger shall not discharge waste onto a newly constructed liner system until the final documentation report has been reviewed and an acceptance letter has been received.

G. STANDARD CLOSURE AND POST-CLOSURE SPECIFICATIONS

1. The final closure and post-closure maintenance plan for the waste management unit shall include at least the following: an itemized cost analysis, closure schedule, any proposed final treatment procedures, map, changes to the unit description presented in the most recent ROWD, future land use, and a construction quality assurance plan [Title 27, § 21769(c) & (d)].
2. Closure of each waste management unit shall be under the direct supervision of a registered civil engineer or certified engineering geologist [Title 27, § 20950(b)].
3. The final cover of waste management units closed as a landfill shall be designed, graded, and maintained to prevent ponding and soil erosion due to high run-off velocities [Title 27, § 21090(b)(1)(A)].
4. The final grading design shall be designed and approved by a registered civil engineer or certified engineering geologist [Title 27, § 21090(b)(1)(C)].
5. All final cover designs shall include a minimum 1-foot thick erosion resistant vegetative layer or a mechanically erosion-resistant layer [Title 27, § 21090(a)(3)(A)(1 & 2)].

6. Areas with slopes greater than ten percent, surface drainage courses, and areas subject to erosion by wind or water shall be designed and constructed to prevent such erosion [Title 27, § 21090(b)(2)].
7. The Discharger shall design storm water conveyance systems for Class II units that are closed as a landfill for a 1,000-year, 24-hour storm event [Title 27, § 21750(e)(3)].
8. Construction or repair of a final cover system's low-hydraulic conductivity layer is to be carried out in accordance with an approved construction quality assurance plan [Title 27, § 21090(b)(1)(E)].
9. Within **30 days** of completion of all closure activities, the Discharger shall certify that all closure activities were performed in accordance with the most recently approved final closure plan and CQA Plan, and in accordance with all applicable regulations. The Discharger shall also certify that units that are closed as a landfill shall be maintained in accordance with an approved post-closure maintenance plan [Title 27, § 21710(c)(6)].
10. The post-closure maintenance period for units closed as a landfill shall continue until the Central Valley Water Board determines that wastes remaining in the landfill unit(s) no longer pose a threat to water quality [Title 27, § 20950(a)(1)].
11. The Discharger shall periodically inspect and identify problems with the final cover including areas that require replanting, erosion, areas lacking free drainage, and any areas damaged by equipment operations [Title 27, § 21090(a)(4)(B)].
12. The Discharger shall repair any cover promptly in accordance with a cover repair plan to be included in the final post-closure maintenance plan [Title 27, § 21090(a)(4)(C)].

H. STANDARD FINANCIAL ASSURANCE PROVISIONS

1. The Discharger shall establish an irrevocable fund (or provide other means) for closure to ensure closure of each Class II unit in accordance with an approved closure plan [Title 27, § 20950(f) and § 22207(a)].
2. The Discharger shall obtain and maintain assurances of financial responsibility for initiating and completing corrective action for all known and reasonably foreseeable releases from the waste management unit [Title 27, §20380(b) and § 22222].

I. STANDARD MONITORING SPECIFICATIONS

1. The water quality monitoring program shall include appropriate and consistent sampling and analytical procedures and methods designed to ensure that

monitoring results provide a reliable indication of water quality at all monitoring points and background monitoring points [Title 27, § 20415(e)(4)].

2. All monitoring systems shall be designed and certified by a registered geologist or a registered civil engineer [Title 27, § 20415(e)(1)].
3. All monitoring wells shall be cased and constructed in a manner that maintains the integrity of the monitoring well bore hole and prevents the bore hole from acting as a conduit for contaminant transport [Title 27, § 20415(b)(4)(A)].
4. All sample chemical analyses of any material shall be performed by a laboratory certified by the California Department of Health Services [Wat. Code, § 13176(a)].
5. A Detection Monitoring Program for a new Class II waste management unit shall be installed, operational, and one year of monitoring data collected from background monitoring points prior to the discharge of wastes [Title 27, § 20415(e)(6)].
6. Background for water samples shall be represented by the data from all samples taken from applicable background monitoring points during that reporting period (at least one sample from each background monitoring point).
7. The Discharger shall submit for approval, establish, and maintain an approved Sample Collection and Analysis Plan. The Sample Collection and Analysis Plan shall at a minimum include:
 - a. Sample collection procedures describing purging techniques, sampling equipment, and decontamination of sampling equipment;
 - b. Sample preservation information and shipment procedures;
 - c. Sample analytical methods and procedures;
 - d. Sample quality assurance/quality control (QA/QC) procedures;
 - e. Chain of Custody control; and
 - f. Sample analysis information including sample preparation techniques to avoid matrix interferences, method detection limits (MDLs), practical quantitation limits (PQLs) and reporting limits (RLs), and procedures for reporting trace results between the MDL and PQL.

If required by the Executive Officer, the Discharger shall modify the Sample Collection and Analysis Plan to conform with this Order.

8. For any given monitored medium, the samples taken from all monitoring points and background monitoring points to satisfy the data analysis requirements for a given reporting period shall all be taken **within a span not to exceed 30 days**, unless a longer time period is approved, and shall be taken in a manner that ensures sample independence to the greatest extent feasible. Specific methods of collection and analysis must be identified. Sample collection, storage, and analysis shall be performed according to the most recent version of USEPA Methods, such as the latest editions, as applicable, of: (1) Methods for the Analysis of Organics in Water and Wastewater (USEPA 600 Series), (2) Test Methods for Evaluating Solid Waste (SW-846, latest edition), and (3) Methods for Chemical Analysis of Water and Wastes (USEPA 600/4-79-020), and in accordance with the approved Sample Collection and Analysis Plan. Appropriate sample preparation techniques shall be used to minimize matrix interferences.
9. If methods other than USEPA-approved methods or Standard Methods are used, or there is a proposed alternant USEPA method than the one listed in the MRP, the proposed methodology shall be submitted for review and approval prior to use, including information showing its equivalence to the required method.
10. 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% non-numerical determinations (i.e., "trace" or "ND") in data from background monitoring points for that medium, the analytical method having the lowest MDL shall be selected from among those methods which would provide valid results in light of any matrix effects or interferences.
11. The laboratory reporting limit (RL) for all reported monitoring data shall be set no greater than the practical quantitation limit (PQL).
12. **"Trace" results** - results falling between the MDL and the PQL - shall be reported as such, and shall be accompanied both by the estimated MDL and PQL values for that analytical run.
13. Laboratory data shall not be altered or revised by the Discharger. If the Discharger observes potential lab errors, it shall identify the issue in the monitoring report and shall describe steps that will be taken to prevent similar errors in the future.
14. **MDLs and PQLs** shall be derived by the laboratory for each analytical procedure, according to State of California laboratory accreditation procedures. These MDLs and PQLs shall reflect the detection and quantitation capabilities of the specific analytical procedure and equipment used by the lab, rather than simply being quoted from USEPA analytical method manuals. In relatively

interference-free water, laboratory-derived MDLs and PQLs are expected to closely agree with published USEPA MDLs and PQLs. MDLs and PQLs shall be reported.

15. If the laboratory suspects that, due to a change in matrix or other effects, the true detection limit or quantitation limit for a particular analytical run differs significantly from the laboratory-derived MDL/PQL values, the results shall be flagged in the laboratory report accordingly, along with estimates of the detection limit and quantitation limit actually achieved. **The MDL shall always be calculated such that it represents the lowest achievable concentration associated with a 99% reliability of a nonzero result.** The PQL shall always be calculated such that it represents the lowest constituent concentration at which a numerical value can be assigned with reasonable certainty that it represents the constituent's actual concentration in the sample. Normally, PQLs should be set equal to the concentration of the lowest standard used to calibrate the analytical procedure.
16. All **QA/QC data** shall be reported, along with the sample results to which they apply, including the method, equipment, analytical detection and quantitation limits, the percent recovery, an explanation for any recovery that falls outside the QC limits, the results of equipment and method blanks, the results of spiked and surrogate samples, the frequency of quality control analysis, and the name and signature of a responsible person from the laboratory. **Sample results shall be reported unadjusted for blank results or spike recoveries.** In cases where contaminants are detected in QA/QC samples (i.e., field, trip, or lab blanks), the accompanying sample results shall be appropriately flagged, but the analytical results shall not be adjusted.
17. Unknown chromatographic peaks shall be reported, flagged, and tracked for potential comparison to subsequent unknown peaks that may be observed in future sampling events. Identification of unknown chromatographic peaks that recur in subsequent sampling events may be required.
18. The sampling interval of each monitoring well shall be appropriately screened and fitted with an appropriate filter pack to enable collection of representative groundwater samples [Title 27, § 20415(b)(4)(B)].
19. All borings are to be logged during drilling under the direct supervision of a registered geologist or registered civil engineer with expertise in stratigraphic well logging [Title 27, § 20415(e)(2)].
20. Soils are to be described according to the Unified Soil Classification System [Title 27, § 20415(e)(2)(A)]. Rock is to be described in a manner appropriate for the purpose of the investigation [Title 27, § 20415(e)(2)(B)].

21. The Discharger shall submit a work plan for review and approval at least **60 days** prior to installation or abandonment of groundwater monitoring wells.
22. The Discharger shall provide Central Valley Water Board staff a minimum of **one week** notification prior to commencing any field activities related to the installation or abandonment of monitoring devices.
23. The water quality protection standard shall consist of the constituents of concern (COC), concentration limits, and the point of compliance. The water quality protection standard shall apply during the active life of the waste management unit, closure period, post-closure maintenance period, and any compliance period under Title 27, section 20410 [Title 27, § 20390].
24. The point of compliance at which the water quality protection standard applies is a vertical surface located at the hydraulically downgradient limit of the waste management unit that extends through the uppermost aquifer underlying the unit [Title 27, § 20405).
25. The compliance period is the minimum period of time during which the Discharger shall conduct a water quality monitoring program and is the number of years equal to the active life of the waste management unit plus the closure period [Title 27, § 20410(a)].
26. The groundwater monitoring system shall include a sufficient number of monitoring points, installed at appropriate locations, to yield groundwater samples from the uppermost aquifer that represent the quality of groundwater that has not been affected by a release from the waste management unit [Title 27, § 20415(b)(1)(A)].
27. The Detection Monitoring Program shall include a sufficient number of monitoring points, installed at appropriate locations and depths to yield groundwater samples from the uppermost aquifer that represent the quality of groundwater passing the point of compliance to allow the detection of a release from the waste management unit [Title 27, § 20415(b)(1)(B)1.].
28. Additional monitoring points shall be added as necessary to provide the best assurance of the **earliest possible detection** of a release from the waste management unit [Title 27, § 20415(b)(1)(B)2.].
29. The Detection Monitoring Program shall also include a sufficient number of monitoring points installed at appropriate depths and locations to yield groundwater samples from other aquifers or perched zones not already monitored to provide the **earliest possible detection** of a release from the waste management unit [Title 27, § 20415(b)(1)(B)3. and 4., and §20420(b)].

30. A surface water monitoring system shall be established to monitor each surface water body that could be affected by a release from the waste management unit [Title 27, § 20415(c)].
31. An unsaturated zone monitoring system shall be established for each waste management unit [Title 27, § 20415(d)].
32. The Discharger shall notify Central Valley Water Board staff within **seven days** if fluid is detected in a previously dry LCRS, unsaturated zone monitoring system, or if a progressive increase is detected in the volume of fluid in a LCRS [Title 27, § 21710(c)(3)].
33. Driller's logs for all monitoring wells shall to be submitted to the Central Valley Water Board and the Department of Water Resources [Wat. Code, § 13751 and Title 27, § 20415(b)(3)].
34. Groundwater elevation, temperature, electrical conductivity, turbidity, and pH are to be accurately measured at each well each time groundwater is sampled [Title 27, § 20415(e)(13)].
35. The groundwater flow rate and direction in the uppermost aquifer and in any zones of perched water and in any additional portions of the zone of saturation being monitored shall be determined at least quarterly [Title 27, § 20415(e)(15)].
36. The Discharger shall graph all analytical data from each monitoring point and background monitoring point and shall submit the graphs to the Central Valley Water Board annually [Title 27, § 20415(e)(14)].
37. For each waste management unit, the Discharger shall collect all data necessary for selecting appropriate data analysis methods for establishing background values for each constituent of concern and for each monitoring parameter [Title 27, § 20420(c)]. The Discharger shall propose a data analysis method that includes a detailed description of the criteria to be used for determining "measurably significant" (as defined in Title 27, section 20164) evidence of a release from the waste management unit and determining compliance with the water quality protection standard [Title 27, § 20415(e)(6) and (7)].
38. For statistical analysis of data, the Discharger shall use one of the methods described in Title 27, section 20415(e)(8)(A)-(E). A non-statistical data analysis method can be used if the method can achieve the goal of the particular monitoring program at least as well as the most appropriate statistical method [Title 27, § 20415(e)(8)]. The Discharger shall use a statistical or nonstatistical data analysis method that complies with Title 27, section 20415(e)(7, 8, 9, and 10), to compare the concentration of each constituent of concern or monitoring parameter with its respective background concentration to determine whether

there has been a measurably significant evidence of a release from the waste management unit. For any given monitoring point at which a given constituent has already exhibited a measurably significant indication of a release at that monitoring point, the Discharger may propose to monitor the constituent, at that well, using a concentration-versus-time plot.

39. The Discharger may propose an alternate statistical method [to the methods listed under Title 27, section 20415(e)(8)(A-D)] in accordance with Title 27, section 20415(e)(8)(E), for review and approval.
40. The statistical method shall account for data below the practical quantitation limit (PQL) with one or more statistical procedures that are protective of human health and the environment. Any PQL validated pursuant to Title 27, section 20415(e)(7) that is used in the statistical method shall be **the lowest concentration (or value) that can be reliably achieved** within limits of precision and accuracy specified in the WDRs or an approved Sample Collection and Analysis Plan for routine laboratory operating conditions that are available to the facility. The Discharger's technical report (Sample Collection and Analysis Plan and/or Water Quality Protection Standard Report), pursuant to Title 27, section 20415(e)(7), shall consider the PQLs listed in Appendix IX, Article 19 to Chapter 14 of Division 4.5 of Title 22, CCR, for guidance when specifying limits of precision and accuracy. For any given constituent monitored at a background or downgradient monitoring point, an indication that falls between the MDL and the PQL for that constituent (hereinafter called a "trace" detection) shall be identified and used in appropriate statistical or non-statistical tests. Nevertheless, for a statistical method that is compatible with the proportion of censored data (trace and ND indications) in the data set, the Discharger can use the laboratory's concentration estimates in the trace range (if available) for statistical analysis, in order to increase the statistical power by decreasing the number of "ties".
41. The water quality protection standard for organic compounds which are not naturally occurring and not detected in background groundwater samples shall be taken as the detection limit of the analytical method used (e.g., USEPA methods 8260 and 8270).
42. Alternate statistical procedures may be used for determining the significance of analytical results for common laboratory contaminants (i.e., methylene chloride, acetone, diethylhexyl phthalate, and di-n-octyl phthalate) if part of an approved water quality protection standard. Nevertheless, analytical results involving detection of these analytes in any background or downgradient sample shall be reported and flagged for easy reference by Central Valley Water Board staff.
43. **Confirmation of Measurably Significant Evidence of a Release.** Whenever a constituent is detected at a detection monitoring point at a concentration that exceeds the concentration limit from the water quality protection standard, the

Discharger shall conduct verification sampling to confirm if the exceedance is due to a release or if it is a false-positive (unless previous monitoring has already confirmed a release for that constituent at that monitoring point). An exceedance of the concentration limit from the water quality protection standard is considered measurably significant evidence of a release that must be either confirmed or denied. There are two separate verification testing procedures:

- a. Standard Monitoring Specification I.44 provides the procedure for analytes that are detected in less than 10% of the background samples such as non-naturally occurring constituents like volatile organic compounds; and
- b. Standard Monitoring Specification I.45 provides the procedure for analytes that are detected in 10% or greater of the background samples such as naturally occurring constituents like chloride.

44. Verification Procedure for Analytes Detected in Less than 10% of Background Samples. The Discharger shall use the following non-statistical method for all analytes that are detected in less than 10% of the background samples. The non-statistical method shall be implemented as follows:

- a. **Initial Determination of Measurably Significant Evidence of a Release.** Identify each analyte in the **current** detection monitoring point sample that exceeds either its respective MDL or PQL, and for which a release has not been previously confirmed. The Discharger shall conclude that the exceedance provides a preliminary indication of a release or a change in the nature or extent of the release, at that monitoring point, if **either**:
 - 1) The data contains two or more analytes that equal or exceed their respective MDLs; or
 - 2) The data contains one or more analyte that equals or exceeds its PQL.
- b. **Discrete Retest** [Title 27, § 20415(e)(8)(E) and § 20420(j)(1-3)]:
 - 1) In the event that the Discharger or Central Valley Water Board staff concludes (pursuant to paragraph I.44.a., above) that there is a preliminary indication of a release, then the Discharger shall **immediately** notify Central Valley Water Board staff by phone or e-mail and, within **30 days** of such indication, shall collect two new (retest) samples from the monitoring point where the release is preliminarily indicated and analyze them for the constituents that caused the need for the retest.
 - 2) **Confirmation of a Release.** As soon as the retest data are available, the Discharger shall conclude that measurably significant evidence of a release is confirmed if (not including the original sample) two or more

analytes equal or exceed their respective MDLs or if one or more analyte equals or exceeds its PQL. The Discharger shall then:

- a) **Immediately** verbally notify the Central Valley Water Board whether or not the retest confirmed measurably significant evidence of a release for the analyte at the monitoring point, and follow up with written notification submitted by certified mail **within seven days** of the verbal notification; and
- b) Carry out the requirements of Section J, **RESPONSE TO A RELEASE** if a release has been confirmed.
- c) Add any five-year analyte that is confirmed per this method to the monitoring parameter list such that it is monitored during each regular monitoring event.

45. **Verification Procedure for Analytes Detected in 10% or Greater of the Background Samples.** The Discharger shall use either a statistical or non-statistical method pursuant to Title 27, section 20415(e)(8)(E) for all analytes that are detected in 10% or greater of the background samples. The Discharger shall use one of the statistical methods required in Title 27, section 20415(e)(8)(E) unless another method has been proposed by the Discharger in a Water Quality Protection Standard Report (or equivalent report) and approved by the Central Valley Water Board in a Monitoring and Reporting Program pursuant to Title 27, section 20415(e)(8)(A-D)] or section 20415(e)(8)(E). The method shall be implemented as follows:

- a. **Initial Determination of Measurably Significant Evidence of a Release.**
The Discharger shall compare the value reported by the laboratory for each analyte to the statistically-derived concentration limit from the most recent report (Annual Monitoring Report or Water Quality Protection Standard Report) that uses the approved statistical procedure. If the value exceeds the concentration limit for that constituent, the Discharger shall conclude that there is measurably significant evidence of a release [Title 27, § 20420(i)].
- b. **Retest Method** [Title 27, § 20415(e)(8)(E) and § 20420(j)(1-3)].
 - 1) In the event that the Discharger or Central Valley Water Board staff concludes (pursuant to paragraph I.45.a., above) that there is a preliminary indication of a release, then the Discharger shall **immediately** notify Central Valley Water Board staff by phone or e-mail and, within **30 days** [Title 27, § 20415(e)(8)(E)(3)] of such indication, the Discharger shall implement a verification procedure/retest option, in accordance with Title 27, sections 20415(e)(8)(E) and 20420(j)(2). The verification procedure shall include either a single “composite” retest (i.e., a statistical analysis that augments and reanalyzes the data from the monitoring point that indicated a release) or shall consist of at least two “discrete” retests

(i.e., statistical analyses each of which analyzes only newly-acquired data from the monitoring point that indicated a release) [Title 27, § 20415(e)(8)(E)]. The Discharger may use an alternate method previously approved by the Central Valley Water Board and included in the Monitoring and Reporting Program. The verification procedure shall comply with the requirements of Title 27, section 20415(e)(8)(E) in addition to the performance standards of Title 27, section 20415(e)(9). The retest samples shall be collected from the monitoring point where the release is preliminarily indicated and shall be analyzed for the constituents that caused the need for the retest. For any indicated monitoring parameter or constituent of concern, if the retest results of one or more of the retest data suites confirm the original indication, the Discharger shall conclude that measurably significant evidence of a release has been confirmed.

- 2) **Confirmation of a Release.** As soon as the retest data are available, the Discharger shall evaluate the results pursuant to paragraph I.45.b.1, above and shall:
 - a) **Immediately** verbally notify the Central Valley Water Board whether or not the retest confirmed measurably significant evidence of a release for the analyte at the monitoring point, and follow up with written notification submitted by certified mail **within seven days** of the verbal notification; and
 - b) Carry out the requirements of Section J, **RESPONSE TO A RELEASE** if a release has been confirmed.
 - c) Add any five-year analyte that is confirmed per this method to the monitoring parameter list such that it is monitored during each regular monitoring event.

46. **Physical Evidence of a Release.** If the Discharger determines that there is a significant **physical** evidence of a release, the Discharger shall immediately verbally notify Central Valley Water Board staff and provide written notification **by certified mail within 7 days** of such determination, and within **90 days** shall submit an amended report of waste discharge to establish an Evaluation Monitoring Program [Title 27, § 20385(a)(3) and § 20420(l)(1) & (2)].

J. RESPONSE TO A RELEASE

1. **Measurably Significant Evidence of a Release Has Been Confirmed.** If the Discharger has confirmed that there is measurably significant evidence of a release from a waste management unit pursuant to Standard Monitoring Specification I.44 or I.45, then the Discharger shall:
 - a. **Immediately** sample all monitoring points in the affected medium at that waste management unit and determine the concentration of all monitoring parameters and constituents of concern for comparison with established concentration limits. Because this constituent of concern scan does not involve statistical testing, the Discharger will need to collect and analyze only a single water sample from each monitoring point in the affected medium [Title 27, § 20420(k)(1)].
 - b. **Within 90 days** of confirming measurably significant evidence of a release, the Discharger shall submit an amended report of waste discharge to establish an Evaluation Monitoring Program meeting the requirements of Title 27, sections 20420(k)(5)(A-D), including but not limited to the results of sampling pursuant to paragraph J.1.a, above. The Evaluation Monitoring Program shall be designed for the collection and analysis of all data necessary to assess the nature and extent of the release and to determine the spatial distribution and concentration of each constituent throughout the zone affected by the release [Title 27, § 20420(k)(5) and § 20425(b)].
 - c. **Within 180 days** of confirming measurably significant evidence of a release, the Discharger shall submit to the Central Valley Water Board an initial engineering feasibility study for a Corrective Action Program necessary to meet the requirements of Title 27, section 20430. At a minimum, the initial engineering feasibility study shall contain a detailed description of the corrective action measures that could be taken to achieve background concentrations for all constituents of concern [Title 27, § 20420(k)(6)].
 - d. If the Discharger confirms that there is measurably significant evidence of a release from the waste management unit at any monitoring point, the Discharger may attempt to demonstrate that a source other than the waste management unit caused the evidence of a release or that the evidence is an artifact caused by an error in sampling, analysis, or statistical evaluation or by natural variation in groundwater, surface water, or the unsaturated zone. The Discharger may make a demonstration pursuant to Title 27, section 20420(k)(7) in addition to or in lieu of submitting both an amended report of waste discharge or an engineering feasibility study; however, the Discharger is not relieved of the requirements and due dates of Title 27, sections 20420(k)(6) & (7) unless Central Valley Water Board staff agree that the demonstration successfully shows that a source other than the waste management unit caused the evidence of a release or that the evidence resulted from error in sampling, analysis, or statistical evaluation

or from natural variation in groundwater, surface water, or the unsaturated zone. In order to make this demonstration, the Discharger shall notify the Central Valley Water Board by certified mail of the intent to make the demonstration **within seven days** of determining measurably significant evidence of a release, and shall submit a report **within 90 days** of determining measurably significant evidence of a release [Title 27, § 20420(k)(7)].

- e. **Within 90 days** of the date that the Evaluation Monitoring Program from paragraph J.1.b is approved (the date is it established), the Discharger shall complete and submit the following:
- i) **Results and Assessment for the Evaluation Monitoring Program.** A report with the results and assessment based on the approved Evaluation Monitoring Program [Title 27, § 20425(b)].
 - ii) **Updated Engineering Feasibility Study.** An updated engineering feasibility study for corrective action based on the data collected to delineate the release and data from the ongoing monitoring program required under Title 27, section 20425(e) [Title 27, § 20425(c)].
 - iii) **Amended ROWD for a Corrective Action Program.** An amended report of waste discharge to establish a Corrective Action Program meeting the requirements of Title 27, section 20430 based on the data collected to delineate the release and based on the updated engineering feasibility study [Title 27, § 20425(d)].

K. GENERAL PROVISIONS

1. In the event the Discharger does not comply or will be unable to comply with any prohibition or limitation of this Order for any reason, the Discharger shall notify the appropriate Central Valley Water Board office by telephone **as soon as** it or its agents have knowledge of such noncompliance or potential for noncompliance, and shall confirm this notification in writing **within two weeks**. The written notification shall state the nature, time, and cause of noncompliance, and shall describe the measures being taken to prevent recurrences and shall include a timetable for corrective actions.
2. All reports and transmittal letters shall be signed by persons identified below:
 - a. For a corporation: by a principal executive officer of at least the level of senior vice-president.
 - b. For a partnership or sole proprietorship: by a general partner or the proprietor.

- c. For a municipality, state, federal or other public agency: by either a principal executive officer or ranking elected or appointed official.
 - d. A duly authorized representative of a person designated in a, b or c above if:
 - 1) The authorization is made in writing by a person described in a, b, or c of this provision;
 - 2) The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a Unit, superintendent, or position of equivalent responsibility (a duly authorized representative may thus be either a named individual or any individual occupying a named position); and
 - 3) The written authorization is submitted to the Central Valley Water Board.
 - e. Any person signing a document under this Section shall make the following certification:

“I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.”
3. The Discharger shall take all reasonable steps to minimize any adverse impact to the waters of the State resulting from noncompliance with this Order. Such steps shall include accelerated or additional monitoring as necessary to determine the nature, extent, and impact of the noncompliance.
 4. The owner of the waste management facility shall have the continuing responsibility to assure protection of waters of the state from discharged wastes and leachate generated by discharged waste during the active life, closure, and any post-closure maintenance period of the waste management units and during subsequent use of the property for other purposes.
 5. The fact that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with this Order shall not be regarded as a defense for the Discharger's violations of this Order.
 6. The Discharger shall notify the Central Valley Water Board of a material change in; the types, quantity, or concentrations of wastes discharged; site operations and features; or proposed closure procedures, including changes in cost

estimates. This notification shall be given a reasonable time before the changes are made or become effective. No changes shall be made without Central Valley Water Board approval following authorization for closure pursuant to the site Notification of Closure [Title 27, § 21710(a)(4)].

7. The Discharger shall maintain legible records of the volume and type of each waste discharged at each waste management unit or portion of a unit, and the manner and location of discharge. Such records shall be maintained by the Discharger until the beginning of the post-closure maintenance period. These records shall be on forms approved by the State Water Board or Central Valley Water Board and shall be maintained at the waste management facility until the beginning of the post-closure maintenance period. These records shall be available for review by representatives of the State Water Board or Central Valley Water Board at any time during normal business hours. At the beginning of the post-closure maintenance period, copies of these records shall be sent to the Central Valley Water Board [Title 27, § 21720(f)].
8. In the event of any change in landowner or the operator of the 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 Central Valley Water Board.
9. In the event of any change of ownership or responsibility for construction, operation, closure, or post-closure maintenance of the waste discharge facilities described in this Order, the Discharger shall notify the Central Valley Water Board prior to the effective date of the change and shall include a statement by the new Discharger that construction, operation, closure, or post-closure maintenance will be in compliance with this Order and any revisions thereof [Title 27, § 21710(c)(1)].
10. To assume ownership or operation 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 this facility. The request must contain the requesting entity's full legal name, the State of incorporation if a corporation, the name and address and telephone number of the persons responsible for contact with the Central Valley Water Board, and a statement. The statement shall comply with the signatory requirements contained in General Provision K.2 and state that the new owner or operator assumes full responsibility for compliance with this Order. Failure to submit the request shall be considered a discharge without requirements, a violation of the Water Code. Transfer of this Order shall be approved or disapproved by the Central Valley Water Board.

L. STORM WATER PROVISIONS

1. The Discharger shall design storm water conveyance systems for Class II units for a 1,000-year, 24-hour storm event [Title 27, § 21750(e)(3)].

2. Waste management units and their respective containment structures shall be designed and constructed to limit, to the greatest extent possible, ponding, infiltration, inundation, erosion, slope failure, washout, and overtopping under the precipitation conditions for the unit [Title 27, § 20365(a)].
3. Precipitation on Class II waste piles which is not diverted by covers or drainage control systems shall be collected and managed through the LCRS, which shall be designed and constructed to accommodate the precipitation conditions for each class unit [Title 27, § 20365(b)].
4. Diversion and drainage facilities shall be designed, constructed, and maintained to [Title 27, § 20365(c)]:
 - a. Accommodate the anticipated volume of precipitation and peak flows from surface runoff and under the precipitation conditions for the waste management unit.
 - b. Effectively divert sheet flow runoff laterally, via the shortest distance, into the drainage and collection facilities.
 - c. Prevent surface erosion through the use of energy dissipators where required to decrease the velocity of runoff, slope protection, and other erosion control measures where needed to prevent erosion.
 - d. Control and intercept run-on, in order to isolate uncontaminated surface waters from water that might have come into contact with waste.
 - e. Take into account:
 - i) For closed waste management units and for closed portions of units, the expected final contours of the closed unit, including its planned drainage pattern.
 - ii) For operating portions of waste management units other than surface impoundments, the unit's drainage pattern at any given time.
 - iii) The possible effects of the waste management unit's drainage pattern on and by the regional watershed.
 - iv) The design capacity of drainage systems of downstream and adjacent properties by providing for the gradual release of retained water downstream in a manner which does not exceed the expected peak flow rate at the point of discharge if there were no waste management facility.
 - f. Preserve the system's function. The Discharger shall periodically remove accumulated sediment from the sedimentation or detention basins as needed to preserve the design capacity of the system.

5. Collection and holding facilities associated with precipitation and drainage control systems shall be emptied immediately following each storm or otherwise managed to maintain the design capacity of the system [Title 27, § 20365(d)].
6. Surface and subsurface drainage from outside of a waste management unit shall be diverted from the unit [Title 27, § 20365(e)].
7. Cover materials shall be graded to divert precipitation from the waste management unit, to prevent ponding of surface water over wastes, and to resist erosion as a result of precipitation [Title 27, § 20365(f)].
8. Any drainage layer in a final cover shall be designed and constructed to intersect with the final drainage system for the waste management unit in a manner promoting free drainage from all portions of the drainage layer [Title 27, §20365(f)].

INFORMATION SHEET

ORDER NO. R5-2014-0105
AQUA CLEAR FARMS FACILITY
CONSTRUCTION, OPERATION, CLOSURE,
POST-CLOSURE MAINTENANCE, AND CORRECTIVE ACTION
SOLANO COUNTY

Aqua Clear Farms, Inc. (facility owner and operator) and Hatch Investments Limited Partnership (landowner), hereafter referred to jointly as “Discharger”, own and operate the Aqua Clear Farms facility (facility). The Aqua Clear Farms Facility is a drilling mud waste disposal facility located at the intersection of Highway 113 and Flannery Road near Highway 12 south of Dixon and west of Rio Vista in Solano County. The site has been used for disposal of drilling mud primarily from drilling of natural gas wells since 1970. Drilling mud is currently discharged to double-lined Class II surface impoundments that are regulated under Title 27.

The facility was initially operated by J&J Disposal from 1970 to 1973 under Resolution 70-157 that provided waste discharge requirements (WDRs) for disposal of drilling mud directly to the ground surface. At that time, the property was owned by a Mr. Flannery. The site was purchased by the Discharger in 1973, and WDRs 74-500 were issued requiring drilling mud and rainfall to be retained onsite by dikes. The Discharger constructed Basins 1 through 5 to contain the drilling mud and contact rainfall onsite. Basin 1 was an “auxiliary pond” that was not used for waste disposal and was removed in 2012. Following the issuance of WDRs 81-028, Basins 6 through 10 were constructed with 12-inch clay liners in 1982-83 prior to the 1984 regulations requiring liner systems then contained in Chapter 15 of Title 23 (now in Title 27 as of 1997). In 1992 and 1993, WDRs 92-013 and 93-013 were issued requiring retrofitting of some basins with liners meeting the requirements of Chapter 15 and closure of others as landfills. An approved 30 to 54-inch replaceable clay liner was installed in Basin 8 in 1993. Following the issuance of WDRs R5-2002-0120, Basins 2 through 5 were closed as landfills and Class II double liner systems consisting of synthetic and clay components were installed in Basins 9 and 10.

Current operations at the facility generally consist of discharge of wet drilling mud from tanker trucks directly into double-lined Class II surface impoundments. The drilling mud solids settle to the bottom of the impoundment, and the water or “top water” rests on top of the mud. During the dry season, the top water evaporates or is transferred to another lined Class II basin and the underlying wet mud is mechanically processed with low ground pressure equipment to dry it. Once the mud reaches 50% moisture content or less, it is either moved to another lined Class II basin to make room for more incoming wet drilling mud, or it is compacted in place. Basins with dried mud compacted in place or that accept dried mud from other basins will be closed as landfills once filled with mud to final grade with 4H:1V side slopes above the top of the impoundment berms.

Current onsite facilities include four closed basins (Basins 2-5), two active double-lined basins (Basins 9 and 10), one formerly active clay-only lined basin that is being clean closed

(Basin 8), two inactive basins (Basins 6 and 7), a truck washout area, an office trailer, various groundwater monitoring and extraction wells, and an industrial water supply well. Soil for the soil layers in basin liners and covers is currently excavated from where future Basins 11 through 13 will be located and was previously excavated from a soil borrow area west of the site entrance.

Shallow groundwater at the site has been impacted with salt constituents from historical drilling mud disposal practices, particularly when wet drilling mud was discharged directly to the ground surface in the early 1970s, to unlined Basins 2 through 5 later in the 1970s, and to Basins 7 through 10 with 12-inch clay liners in the 1980s as was allowed by the WDRs and the regulations at the time. High salinity was discovered in shallow groundwater in the early 1980s after installation of monitoring wells 2 through 6. Elevated constituents include TDS, chloride, sulfate, sodium, and other inorganics. Additional wells were installed in 1983 through 1985 including monitoring wells 7 through 10, and additional clustered wells at varying depths. Several investigations have been conducted at the site since the 1990s that have included additional monitoring wells, extraction wells, borings, test pits, and waste characterization. Most of these monitoring wells were replaced during 2013.

In 1992 and 1993, the Central Valley Water Board issued WDRs requiring corrective action for groundwater impacts and for Basin 8 to be lined in accordance with regulations that are now contained in Title 27. Cease and desist orders were issued in 1995 and 1998 requiring specific basins to have liquid removed, be closed, and/or be cleaned out. Requirements to close Basins 2 through 5 were also placed in the previous WDRs R5-2002-0120. Basin 8 was lined in 1993 and used for drilling mud discharge and processing until the replaceable clay liner showed breakthrough to the leachate detection system pan lysimeter in the liner in 2013. Drilling mud was removed from Basins 7, 9, and 10 as required, and Basins 9 and 10 have since been retrofitted with double liners. Between 2003 and 2011, Basins 2 through 5 were closed with the final cover approved in WDRs R5-2002-0120.

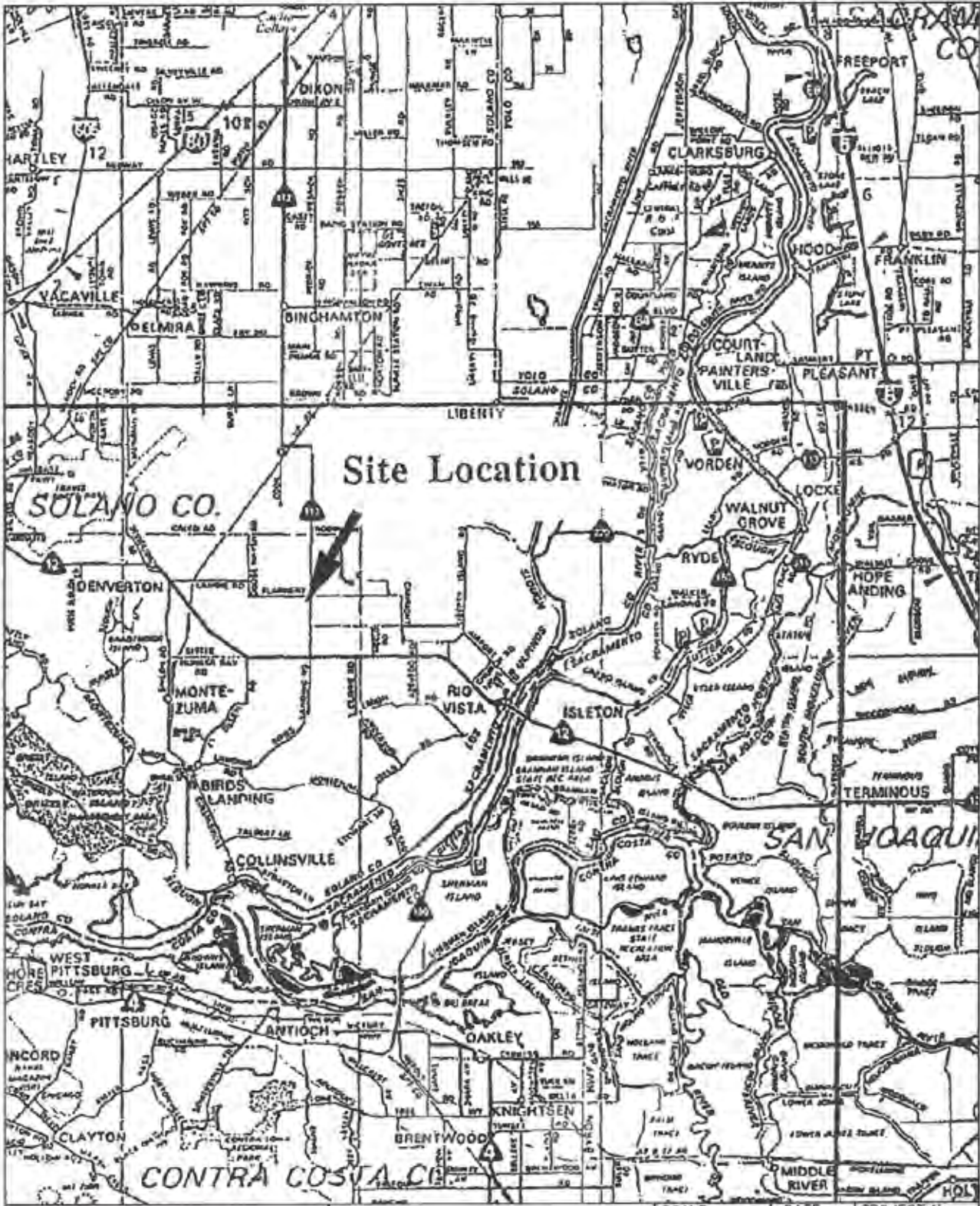
An Evaluation Monitoring Program report was submitted in 1998, and a Corrective Action Program (CAP) was submitted in 1999. The CAP was approved in WDRs R5-2002-0120 and previously consisted of groundwater extraction from wells 3, 3B, HA-1A, and P-5 formerly located at the downgradient northeast corner of the facility. The wells produced very little water due to the construction of the wells and the limited nature of the higher permeability layers of perched groundwater in which they were screened. During 2013, in accordance with an approved work plan, the Discharger replaced the two inch diameter extraction wells with larger four inch diameter wells and installed upgraded pumps to improve flow rates. The current CAP now consists of groundwater extraction from the new four inch wells that include 3R, 10R, and HA1R. Groundwater extraction rates with the new wells are higher than the old wells, but are still relatively low (0.01 to 0.03 gallons per minute per well) due to the limited nature of the zones in which the perched groundwater resides. Extracted groundwater is routed to the active double-lined Class II surface impoundments.

The major items being addressed in this revision of the WDRs include:

1. Providing information about improvements to the waste management units and corrective action program since 2002,
2. Providing an updated water balance and freeboard requirements for the impoundments,
3. Providing information and requirements for how the surface impoundments will be managed during filling with dried drilling mud and be closed as landfills,
4. Providing management of runoff from impoundments that are filled with dried drilling mud,
5. Upgrading the truck washout area,
6. Updating the MRP to list the new monitoring wells at the site, and
7. Updating the financial assurances requirements.
8. Requiring improvements to the corrective action program for groundwater impacts.

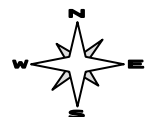
Surface drainage from approximately 90% of the facility area drains to a culvert under Highway 113 near the northeast corner of the site that flows to "Big Ditch", a tributary to Lindsay and Cache Sloughs which flow into the Sacramento River within the Sacramento-San Joaquin Delta. Other areas of the site drain to a soil borrow area that is located to the west of the site entrance.

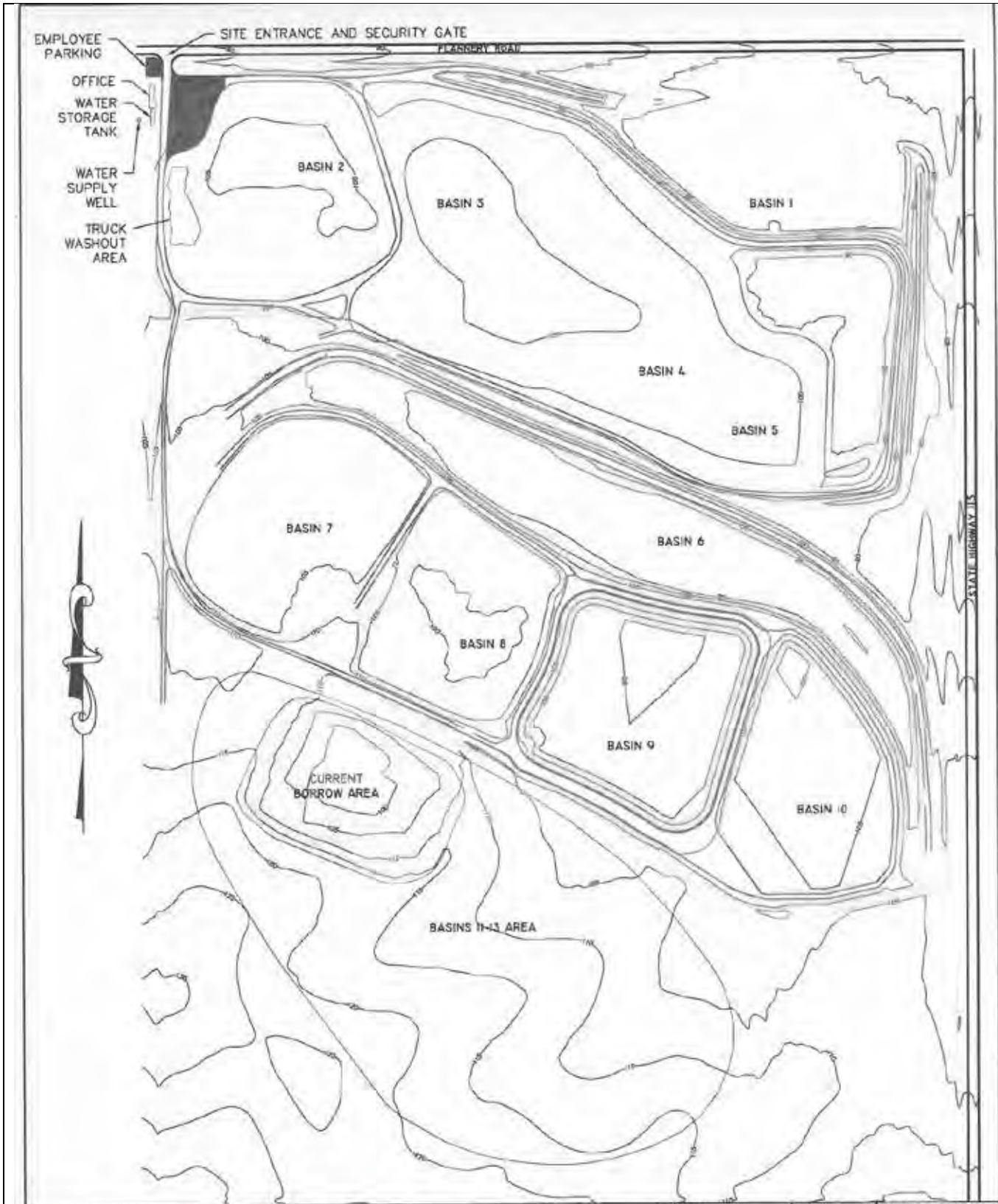
WLB



Drawing Reference:
Amended Report of Waste
Discharge, The SERES
Group, Figure 1

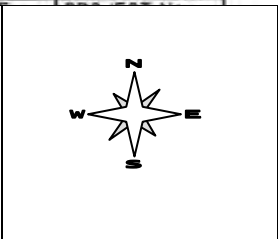
SITE LOCATION MAP
Aqua Clear Farms Facility
Solano County

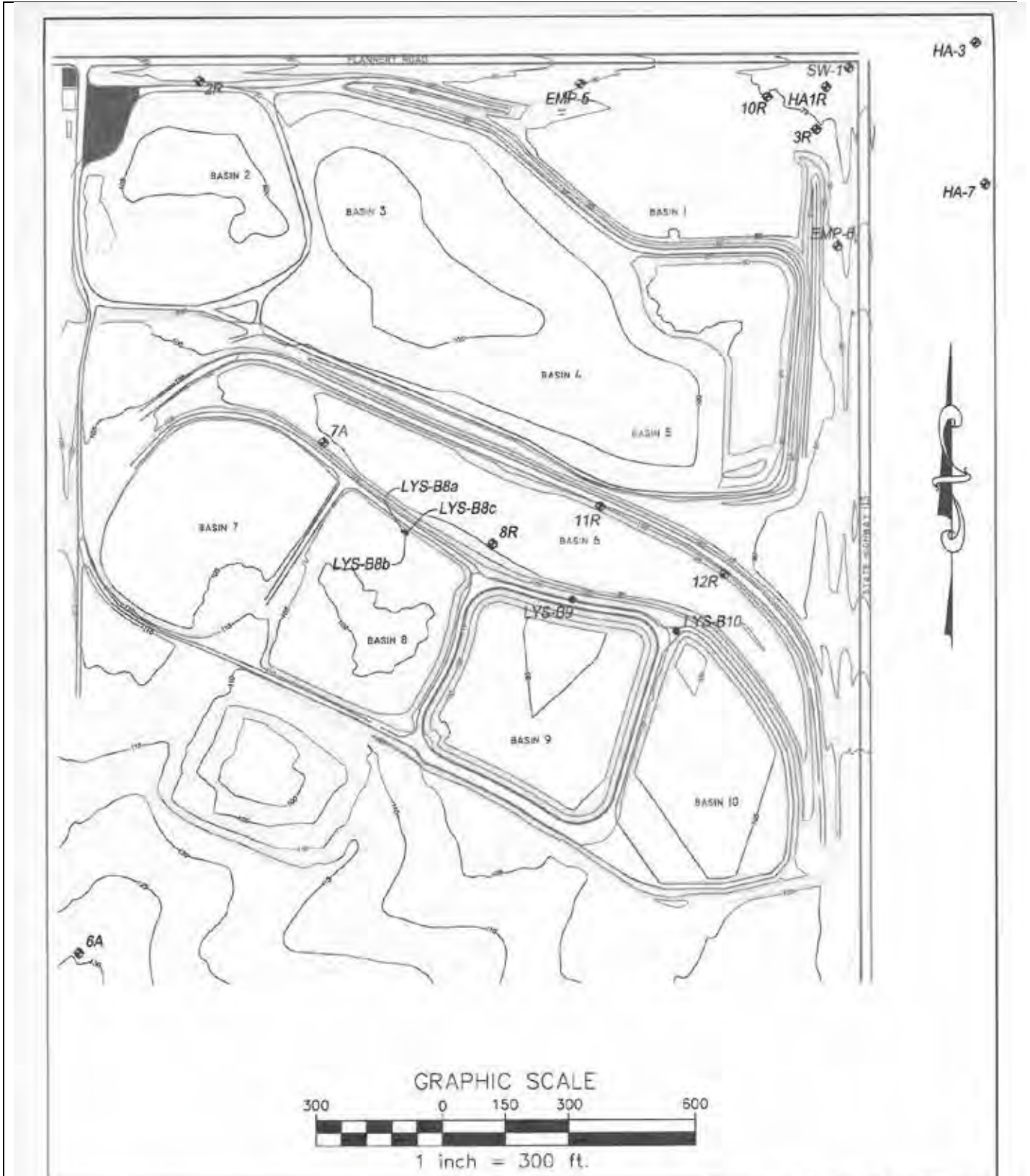




Drawing Reference:
Amended Report of Waste Discharge, The SERES Group, Figure 3

CURRENT AND FUTURE BASIN LOCATIONS
Aqua Clear Farms Facility
Solano County





Drawing Reference:
Amended Report of Waste
Discharge, The SERES
Group, Figure 23

MONITORING LOCATIONS
Aqua Clear Farms Facility
Solano County

