

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER NO. R5-2004-0134

WASTE DISCHARGE REQUIREMENTS
FOR
COUNTY OF YOLO
PLANNING AND PUBLIC WORKS DEPARTMENT
YOLO COUNTY CENTRAL LANDFILL
CLASS III LANDFILLS & CLASS II SURFACE IMPOUNDMENTS
CONSTRUCTION, OPERATION, CLOSURE, POST-CLOSURE MAINTENANCE
AND CORRECTIVE ACTION
YOLO COUNTY

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

1. The County of Yolo, Planning and Public Works Department, (hereafter Discharger) owns and operates the Yolo County Central Landfill, a Class III municipal solid waste (MSW) disposal facility with Class II surface impoundments. The landfill has been in operation since 1975, servicing the incorporated and unincorporated areas of Yolo County. The landfill accepts solid wastes classified as “inert” and “nonhazardous” under Sections 20220 and 20230, Title 27 of the California Code of Regulations (Title 27). Approximately 185,000 tons per year of MSW and other waste are disposed at the site.
2. The landfill is about four miles northeast of Davis and three miles southeast of Woodland, near the intersection of Roads 28H and 104 in Yolo County. The site covers 725 acres in Sections 29 and 30, T9N, R3E, MDB&M, corresponding to Assessor’s Parcel Numbers (APNs) 042-140-01, 042-140-02, and 042-140-06. See Attachment A: Location Map, a part of this Order.
3. The waste disposal facilities include six Class III landfills (WMUs 1-6) and two Class II surface impoundments (WMUs G & H). WMU 6, Module D is operated as a bioreactor demonstration project through a waiver on the addition of supplemental liquids granted by the United States Environmental Protection Agency (USEPA). An additional Class III landfill (WMU 7) has been approved for future construction. Future modules in WMUs 6 and 7 will be operated as dry landfill units (not bioreactors) unless this Order is revised to allow them to be operated as bioreactors in compliance with any future regulations or statewide rulemaking that would allow this.
4. The six existing landfills are designated WMUs 1-6. Of these, WMUs 1, 2, 4, and 5 have been inactive since 1992, but have not yet been brought to final grade for closure. Since 1992, the active units have included WMU 3 and WMU 6, Modules A-D. WMU 3 covers approximately 21 acres and WMU 6, Modules A-D range in size from 19 to 25 acres with Modules A-C being at or near capacity. There is also a small-scale bioreactor demonstration project at Module B. At build-out, four additional modules will be constructed at WMU 6 (E through H) and eight additional modules (I through P) at WMU 7. Filling will be completed in WMUs 1-5 and 6A-D prior to construction of new modules. Once filling is complete in WMUs 1-5 and WMU 6A-D, the new modules will be constructed about one every two to three years, depending on waste disposal needs.
5. The Class II surface impoundments are WMUs G and H. The former clay-only liner system in

WMU G was replaced with a composite liner system in 1995 and has a capacity of 1.5 million gallons. WMU H, completed in 1999, consists of three hydraulically connected ponds, (H1, H2, and H3), as shown in Attachment B: Site Map, a part of this Order. H3, the large pond, covers five-acres and has a capacity of 10 million gallons. H1 and H2 each cover 2.5 acres each and have a capacity of 3 million gallons each. All three surface impoundments at WMU H are hydraulically connected by overflow weirs and piping to form one WMU. WMU F, a surface impoundment described in previous Waste Discharge Requirements (WDRs), has been decommissioned and converted into a geosynthetic-lined water storage pond.

6. As a follow-up to the pilot bioreactor project in Module B, the Discharger is operating a full-scale bioreactor demonstration project constructed in Module D. Phase 1 of the project consisted of three bioreactors, one aerobic and two anaerobic, constructed in the western 12-acre portion of Module D already completed. The western half of Phase 1 is a 6 acre anaerobic unit and the eastern half of Phase 1 contains a 2.5 acre aerobic unit and a 3.5 acre anaerobic unit, as shown in Attachment B: Site Map. Phase 2 (eastern 13 acres) of Module D was constructed as an anaerobic unit. The design and operations of these cells is described in Finding Nos. 34, 35 and 52.
7. On 1 February 2000, the Discharger submitted a Joint Technical Document describing significant changes to the facility, including the addition of new leachate surface impoundments and a proposal for a new bioreactor demonstration project. The Regional Board adopted revised Waste Discharge Requirements (WDRs) in June 2000 to reflect these changes. On 14 February 2002, the Discharger submitted a Liner Performance Demonstration describing how the landfill liner system for Waste Management Unit 6, Module D, Phase 2 will comply with Title 27 performance standards. The WDRs were revised in June 2002 to incorporate the liner performance demonstration and approve the components of the liner system.
8. On 24 May 2004, the Discharger submitted a revised Final Closure and Post-Closure Maintenance Plan (revised on 1 June 2004) for Waste Management Units (WMUs) 1 through 5 (1-5) that included a justification report for a proposed alternative geomembrane final cover, a justification report for the proposed year-round filling, and a revised closure schedule for WMUs 1-5. On 22 June 2004, the Discharger submitted a revised Preliminary Closure and Post-Closure Maintenance Plan for WMUs 6 and 7 (6 & 7) that included a revised closure schedule. These WDRs provide Regional Board approval of the proposed changes to the WMUs 1-5 cover system, and include a schedule for closure of all WMUs at the site as outlined in the closure plans submitted by the Discharger. The adoption of this Order constitutes Regional Board approval of these documents.

WASTES AND THEIR CLASSIFICATION

9. The Discharger proposes to continue to accept landfill solid wastes classified as “inert” or “nonhazardous” under Title 27, including household, commercial, industrial, and special wastes. The special wastes include grit and screening wastes from the City of Davis and City of Woodland Wastewater Treatment Plants (WTPs), dewatered sludge from the Cache Creek WTP, and alternative daily cover materials consisting of chopped green waste and Kenaf plants. The Kenaf plants are harvested from an on-site treated groundwater discharge area that is regulated under

separate WDRs. The Discharger does not propose to accept solid wastes defined as "hazardous" or "designated" under Title 27, and these WDRs contain a prohibition against the disposal of such wastes.

10. The Discharger proposes to discharge liquid wastes classified as "nonhazardous" or "designated" to the surface impoundments, including landfill leachate, gas condensate and cooling water from the power plant, private septage, chemical toilet waste, and water treatment lime sludge. The Discharger does not propose to accept liquid wastes defined as "hazardous" under Title 27, and these WDRs contain a prohibition against the disposal of such wastes.
11. Wastes discharged to the pilot bioreactor cells in WMU6, Module B included non-hazardous household and commercial wastes. While these wastes were intended to be representative of typical landfill loads, inert wastes were excluded, and green waste was used instead of soil as alternative daily cover. These same types of wastes are discharged to the full-scale bioreactor project constructed at WMU 6, Module D.

SITE DESCRIPTION

12. The area topography is generally flat with a natural grade of approximately one foot of fall from north to south and six feet of fall from west to east. The natural elevation of the site is approximately 18 to 24 feet above mean sea level (MSL) and the maximum final landfill elevation is 81.4 feet MSL according to the NAVD 88 measurement system.
13. Land uses within 1,000 feet of the landfill include agriculture to the north (winter wheat, alfalfa and rice fields); a wastewater disposal area to the west (used for spray disposal of cannery wastewater until October 1999); City of Davis WTP ponds and wastewater reclamation fields to the east and south; and the Willow Slough Bypass Channel along the southern boundary. On the other side of the Willow Slough Bypass Channel is additional agricultural cropland. The nearest residence is located approximately 700 feet south of the landfill boundary.
14. There are 57 private wells within one mile of the site, including at least 38 used for irrigation, 17 for domestic supply, and 2 for livestock. Numerous additional domestic and irrigation wells are located further from the site.

SITE GEOLOGY

15. The soils underlying the site predominantly consist of low-permeability silty clays (90 to 100 percent passing the number 200 sieve). Test borings also show an interval of laterally discontinuous silty fine sands up to 12 feet thick between 6 and 35 feet below ground surface (bgs). This interval is known as the Upper Sand. Materials below 35 feet bgs are mostly clays, interspersed with minor amounts of inter-bedded sand and gravel, to a depth of about 80 feet bgs. More abundant coarse-grained material is encountered below 80 feet bgs. Due to the discontinuities, neither the Upper nor Lower Sands have been reliably correlated from well to well.
16. There are no known active faults traversing or projected through the site. The principal seismic impact would be strong ground shaking generated by movement on one or more of the faults in the western Sierra foothill fault system, the San Andreas fault system, and the blind thrust faults of the

Sierran Block/Coast Range boundary, including the Vacaville /Winters seismic region, and the Dunnigan fault. The maximum peak ground surface acceleration estimated to occur at the site is on the order of 0.32 gravity (g). The fault nearest the site is the Dunnigan fault about 11 miles northwest of the facility. The Maximum Credible Earthquake for this fault is estimated to be magnitude 6.25.

SURFACE WATER

17. Nearby surface waters include Willow Slough Bypass on the southern property boundary, Willow Slough about 2 miles to the north, Putah Creek approximately 4 miles to the south, Cache Creek approximately 6 miles to the north, and the Yolo Bypass (an overflow conveyance of the Sacramento River) 3 miles to the east. The Willow Slough Bypass Channel drains the southern part of the site and an unnamed canal drains the northern part of the site. The unnamed canal empties into the Yolo Bypass to the east.
18. The site is in the Lower Putah Creek Hydrologic Area of the Valley Putah-Cache Hydrologic Unit in the Sacramento Hydrologic Basin Planning Area (as depicted on the interagency hydrologic maps prepared by the Department of Water Resources in August 1986). The beneficial uses of the surface waters in this area are municipal and domestic supply, agriculture, recreation, fresh water habitat (warm), spawning (warm), and wildlife habitat.
19. The landfill does not impact any jurisdictional waters of the United States (ie. reservoirs, vernal pools and wetlands).

STORM WATER

20. The facility receives an average of 19.5 inches of precipitation per year as measured at Davis between the years 1973 and 2002. About 90 percent of annual precipitation occurs between the months of October and April. The mean evaporation for this facility is 87.1 inches per year as measured at Davis between the years 1970 and 1998. Based on these data, average annual net evaporation at the facility is 67.6 inches.
21. The 100-year wet season precipitation for the facility is 30.7 inches and the 100-year, 24-hour precipitation event is 4.26 inches. The 100-year, 24-hour precipitation event is based on California Department of Water Resources (DWR) precipitation records (1976).
22. On the latest Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map for Yolo County, dated May 17, 1988, the site is identified as within Zone B, "areas protected from the 100-year flood by levee, dike, or other structures subject to possible failure or overtopping during larger floods".

GROUNDWATER

23. The groundwater table beneath the site is naturally high and is additionally elevated from crop irrigation, spray disposal, and wastewater reclamation activities on adjacent lands. The water table

ranges seasonally between 4 and 15 feet below ground surface (bgs), corresponding to 19 and 8 feet MSL. In addition, a capillary rise up to three feet has been measured. A deeper aquifer underlies the shallow at about 80 feet bgs (-57 feet MSL).

24. The natural gradient of the shallow groundwater is to the south and southeast, but is reversed by operation of the extraction wells (these wells pump continuously year-round). Under pumping conditions, the shallow gradient is to the north/northwest. The gradient is also influenced by the wastewater reclamation and irrigation activities on surrounding lands.
25. The beneficial uses of the shallow groundwater are municipal and domestic supply, industrial service supply, and industrial process supply. The beneficial uses of deep groundwater are municipal and domestic supply, agricultural supply, industrial service supply, and industrial process supply.

CORRECTIVE ACTION

WMUs 1-5

26. Groundwater on the western part of the site has been impacted by volatile organic compounds (VOCs) from one or more of the older landfill units (WMUs 1 through 5). After installation an air stripper unit in 1993, the Discharger began groundwater pump and treat using existing de-watering wells. The treated groundwater is discharged to land under separate WDRs. VOCs recently detected in the source area at observation well OW-27 include cis-1,2 dichloroethene (up to 30 µg/l), 1,1-dichloroethane (up to 3.0 µg/l), tetrachloroethene (up to 3.9 µg/l), trichloroethane (up to 2.9 µg/l), and vinyl chloride (up to 3.0 µg/l). Since 1993, concentrations of total dissolved VOCs at OW-27 have declined from 52.8 µg/l to 26.4 µg/l. WMUs 1 through 5 remain in a Corrective Action Monitoring Program as specified in Monitoring and Reporting Program (MRP) No. R5-2004-0134.

WMUs 6B, 6C and G

27. Following the review of the 2001 Annual Monitoring Report, Regional Board staff issued a 10 April 2002 letter to the Discharger requiring them to prepare and Evaluation Monitoring Program (EMP) for WMUs 6B, 6C and G. This was due to the detection of several constituents-of-concern above the concentration limits in the unsaturated zone monitoring devices for these units. The Discharger submitted the proposed EMP in July 2002, and a revised EMP in August 2002 to address Regional Board staff comments. Following staff approval of the EMP on 10 September 2003, the Discharger submitted 29 March 2004 *Report of Waste Discharge Proposing a Corrective Action Program for WMU 6B, WMU 6C, and WMU G*. This report presented the results of the EMP and where applicable, proposed a Corrective Action Program (CAP) for each WMU.
28. The EMP for WMU 6B included additional sampling of pan lysimeters 6B-S-LYS and 6B-N-LYS. This sampling confirmed the presence of three VOCs in 6B-S-LYS and six VOCs in 6B-N-LYS at low levels. The sampling also confirmed the presence of elevated levels of various inorganic constituents in these lysimeters. As a corrective action measure, the Discharger had already been

pumping the liquid from these lysimeters and been collecting samples. The liquid in the lysimeters drains through a pipe into manhole located outside of the WMU. Therefore, liquid would not back up into the pan lysimeter so long as the level in the manhole is kept below the invert elevation of the pipe that goes into the manhole. Approximately 7,300 gallons were pumped from 6B-S-LYS in July/August 2002 and approximately 2,900 gallons were pumped from 6B-N-LYS in June 2002. Following this pumping, very little additional liquid has accumulated in or has been pumped from these lysimeters. The Discharger proposes to continue this practice as a corrective action measure in the future and has reported that liquids in these lysimeters did not rise above the invert piping elevation between 2002 and April 2004 when liquid rose approximately 1.5 inches above the invert elevation at lysimeter 6B-S-LYS. This Order requires the Discharger to continue sampling and to remove any liquid above the invert pipe elevation for corresponding manhole.

29. The EMP for WMU 6C included additional sampling of suction lysimeter 6C-S-LYS. This sampling confirmed the presence of four VOCs at low levels and elevated levels of nine inorganic constituents. The analyses indicate that concentrations of inorganic constituents in the samples were higher than in leachate samples from the 6C sumps, and that there were two VOCs in the samples that were not present in the leachate. The Discharger concluded that the source of the liquid in the lysimeters was construction water being squeezed from the clay layer. However, as a corrective action measure, the Discharger proposed to install additional landfill gas extraction wells in WMU 6C. This Order requires the Discharger to design and install additional landfill gas extraction wells in WMU 6C. Lysimeter 6C-S-LYS has also been moved from Detection Monitoring to Corrective Action Monitoring in MRP No. R5-2004-0134.
30. The EMP for WMU G (a Class II surface impoundment) included some additional monitoring of suction lysimeter G-LYS-1, as well as an analysis of historical data from the lysimeter and the overlying leak detection sump, and data from nearby WMUs. The analyses confirm the presence of six VOCs in G-LYS-1; however, none of these VOCs were detected in the leak detection sump above of the lysimeter. The Discharger therefore concluded that the source of the VOCs is not from the liquid in the surface impoundment. The Discharger also concluded that the source of the contamination in the suction lysimeter may be from residual contamination left in the underlying native soils following the removal of the former clay only liner system for this surface impoundment. The Discharger proposed to continue monitoring the G-LYS-1 lysimeter, and for WMU G to remain in a Corrective Action Monitoring Program as specified in MRP No. R5-2004-0134.
31. The EMP for the bioreactor pilot cell demonstration unit inside of WMU 6B included additional sampling of pan lysimeter CEC-LYS. The monitoring confirmed the presence of 20 VOCs in the lysimeter, and 15 of these were confirmed to be present in the overlying sump. The Discharger concluded that the liquid in the CEC-LYS is indeed leachate from the pilot cell unit. However, the Discharger stated that CEC-LYS was inappropriately labeled since it is really part of the primary liner system and acts as a secondary containment unit for the pilot cells. Unsaturated zone monitoring for WMU 6B in which the pilot cells are constructed is conducted at pan lysimeters beneath the 6B sumps. The Discharger proposed that the CEC-LYS be renamed CEC-SC for "secondary containment". Since unsaturated zone monitoring for all of WMU 6B is conducted at

6B-S-LYS and 6B-N-LYS, and since the CEC-LYS is part of the primary containment system for WMU 6B, this Order renames CEC-LYS as CEC-SC as requested by the Discharger. This Order also requires any liquid in secondary containment sumps to be measured, recorded and removed.

WMU DESIGN

32. The as-built containment systems for the landfills and surface impoundments at the facility are summarized in the following table:

TABLE I

| WMU | Year Built/ Size | WMU Base Liner Design | Design | WMU Status |
|-----|--------------------|---|-------------------------------------|-----------------------|
| | | | Siting | |
| 1 | 1975 23.4 Acres | Subgrade sloped for leachate drainage to perimeter trench | Ch 15 (unlined) | Inactive ⁵ |
| 2 | 1977 40.6 Acres | Subgrade sloped for leachate drainage to perimeter trench | Ch 15 (unlined) | Inactive ⁵ |
| 3 | 1981 21.1 Acres | Subgrade sloped for leachate drainage to perimeter trench | Ch 15 (unlined) | Active |
| 4 | 1983 8.5 Acres | Subgrade sloped for leachate drainage to perimeter trench | Ch 15 (unlined) | Inactive ⁵ |
| 5 | 1988 30.9 Acres | Operations layer (one foot of soil) Dendritic LCRS - lateral trenches containing gravel & perforated pipe draining via longitudinal trenches and a trunk line to a pump station. Two feet of compacted clay ($k \leq 1 \times 10^{-6}$ cm/sec) | Ch 15 prescriptive liner | Inactive ⁵ |
| | | | pump gw 5' separation | |
| 6A | 1991 19.9 Acres | Operations layer (one foot of soil) Blanket type LCRS –geonet draining via longitudinal trenches to perimeter trunk line ¹ 60-mil HDPE liner Two feet of compacted clay ($k \leq 1 \times 10^{-7}$ cm/sec) | Subtitle D prescriptive liner | Inactive ⁶ |
| | | | EAD 3' separation | |

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YOLO COUNTY CENTRAL LANDFILL
CLASS III LANDFILLS & CLASS II SURFACE IMPOUNDMENTS
YOLO COUNTY

| WMU | Year Built/ Size | WMU Base Liner Design | Design | WMU Status |
|----------------------------|-------------------------------------|--|--|------------|
| | | | Siting | |
| 6B | 1993 19.8 Acres | Operations layer – one foot of soil Geotextile cushion Blanket type LCRS –geonet draining via longitudinal trenches to perimeter trunk line ¹ 60-mil HDPE liner 1.72 to 2.54 feet of compacted clay ($k \leq 1 \times 10^{-8}$ cm/sec) | Subtitle D prescriptive liner | Active |
| | | | EAD 3' separation | |
| 6C | 1996 19.3 Acres | Operations layer – one foot of soil Geotextile cushion Blanket type LCRS –geonet draining via longitudinal trenches to perimeter trunk line ¹ 60-mil HDPE liner Two feet of compacted clay ($k \leq 1 \times 10^{-7}$ cm/sec) Three feet earthfill 40-mil HDPE liner (capillary break) | Subtitle D prescriptive liner ¹ | Active |
| | | | EAD ² 5' separation | |
| 6D ³ Phase 1 | 1999 12 acres | Same as Module C except: Operations layer – three feet of shredded tires ($k \geq 1$ cm/sec) Cushion layer – six inches of pea gravel ⁴ Blanket LCRS - geotextile bonded to both sides of geonet, drains via longitudinal trenches to interior sumps ¹ | Same as Module C ¹ | Active |
| 6D ³ Phase 2 | 2002 12.7 acres | Operations layer – three feet of shredded tires or one foot of soil Geotextile filter layer LCRS – 1 foot thick layer gravel ⁴ Primary Liner - 60-mil HDPE geomembrane Two feet of compacted clay ($k \leq 1 \times 10^{-7}$ cm/sec) Three feet of compacted earthfill Leak detection geocomposite drainage layer 40-mil HDPE geomembrane liner | Same as Module C ¹ | Active |
| G | 1995 2.0 acres 1.5 MG | Southern half lined inside with compacted concrete, halves separated by concrete wall Primary liner - 60-mil HDPE geomembrane ($k \leq 1 \times 10^{-7}$ cm/sec) Blanket LCRS – geonet, drains via longitudinal trenches to interior sumps Secondary liner - 40-mil HDPE geomembrane Two feet of compacted clay ($k \leq 1 \times 10^{-7}$ cm/sec) One to three feet earthfill, 40-mil HDPE geomembrane (to function as a capillary break) | Exceeds T27 prescriptive | Active |
| | | | EAD 5' separation ⁷ | |

| WMU | Year Built/ Size | WMU Base Liner Design | Design | WMU Status |
|-----|---|--|---------------|------------|
| | | | Siting | |
| H | <p><u>H1 & H2</u> 2.5 acres 3 MG</p> <p><u>H3</u> 5 acres 10 MG</p> | Same as WMU G except no concrete lining or interior walls. All three impoundments hydraulically connected by overflow weirs and pipes over sides which allow pumping from one to the other | Same as WMU G | Active |

1. LCRS trenches and sump areas have double-composite liner
2. Minimum separation reduced to three feet in LCRS trench and sump areas per EAD.
3. Future modules in WMU 6 and WMU 7 will have same design as WMU6, Module D, Phase 2.
4. Regional Board staff may approve of other materials in lieu of pea gravel upon a demonstration by Discharger that they will provide adequate drainage and will not damage the geomembrane.
5. Unit is currently inactive but will require reactivation and placement of additional waste to achieve final grade for closure.
6. Unit is currently inactive but may require reactivation to fill within WMU 5 and WMU 6 to achieve final grade for closure.
7. Minimum separation is reduced to two feet under LCRS trench and sump area per EAD.

33. Leachate from the unlined WMUs and WMU 5 is conveyed via trunkline to Pump Station No. 1, while leachate from WMU 6, Modules A, B, and C is conveyed to Pump Station No. 2. Both pump stations pump to WMU G or H. Leachate from Module D is conveyed directly to WMU G or H from its four leachate sumps. Liquid from each surface impoundment's LCRS is returned to that impoundment.

Bioreactors

34. The bioreactor units in WMU 6, Module D were constructed with compacted clay perimeter levees around the cell base. Low-permeability wall between the aerobic and anaerobic cells were constructed as required for cell isolation.
35. During waste placement, instrumentation has been placed at various levels within the bioreactor cells to monitor process conditions, including temperature sensors, moisture sensors, and pressure transducers. The pressure transducers measure hydrostatic head in the LCRS. Multi-port water injection and gas recovery systems were also placed at various levels within the waste. Leachate from the WMU 6, Module D sumps is either pumped directly to WMU H or re-circulated in WMU 6D.

WMU SITING

36. Section 20240 (c) of Title 27 requires that new landfills, waste piles and surface impoundments be "sited, designed, constructed and operated", to ensure or maintain at least five feet of separation between the contained wastes and the highest anticipated level of the groundwater table. Existing WMUs are to be "operated" to maintain the required separation. WMUs 1, 2, 3, and 4 are "existing units" under Title 27.

37. Groundwater elevation monitoring indicates that during periods of high groundwater there is inadequate separation between groundwater and the landfill units. In siting WMU 5 (in 1988), the Discharger installed a slurry wall and a line of extraction wells along the northwest perimeter of the site to help reduce the water table to maintain the required separation. The trench for the wall was excavated to an elevation of about 15 feet below MSL. The Discharger has since been operating these de-watering wells to maintain a minimum five feet of separation.
38. The Regional Board (in previous requirements) approved an EAD for WMU 6, Modules A and B, which reduced the required amount of separation to three feet, as measured from groundwater to the base of the 60 mil HDPE primary liner. The engineered alternative design recognized the composite liner design, slurry wall, and de-watering system, as “engineered structures” for the purpose of ensuring that there is adequate separation from wastes and that an upward hydraulic head does not occur on the bottom of the liner. The Discharger agreed to continue de-watering as necessary to meet the operating requirements of Section 20240 (c) of Title 27. The EAD approved for the remaining WMU 6 modules and the surface impoundments, however, required installation of a capillary break or groundwater barrier layer and five feet of separation, except below the LCRS trenches and sumps where the minimum separation is three feet for WMU 6 modules and two feet for the surface impoundments. The siting designs for all the WMUs are summarized in Table I.
39. In approving these engineered alternative designs, the Regional Board found that the Discharger made the demonstration required by Section 20080(b) of Title 27, namely that construction of the prescriptive standard is unreasonably or unnecessarily burdensome and will cost substantially more than an EAD, and that there is a specific EAD that is consistent with both the performance goal and the prescriptive standard which affords equivalent protection against water quality impairment.
40. On 15 September 2000 the Regional Board adopted Resolution No. 5-00-213 *Request For The State Water Resources Control Board To Review The Adequacy Of The Prescriptive Design Requirements For Landfill Waste Containment Systems To Meet The Performance Standards Of Title 27*. The State Board responded, in part, that “a single composite liner system continues to be an adequate minimum standard” however, the Regional Board “should require a more stringent design in a case where it determines that the minimum design will not provide adequate protection to a given body of groundwater.”

In a letter dated 17 April 2001, the Executive Officer notified Owners and Operators of Solid Waste Landfills that “the Board will require a demonstration that any proposed landfill liner system to be constructed after 1 January 2002 will comply with Title 27 performance standards. A thorough evaluation of site-specific factors and cost/benefit analysis of single, double and triple composite liners will likely be necessary.”

41. The performance standard for the design and construction of a Class III waste management unit specified in Section 20310(c) of Title 27 is “Class III landfills shall have containment structures which are capable of preventing degradation of waters of the state as a result of waste discharges to the landfills if site characteristics are inadequate.”

42. The Discharger submitted a liner performance demonstration for WMU 6, Module D, Phase 2 which demonstrates that the system will comply with the applicable Title 27 performance standards by combining a Subtitle D composite liner with additional containment components in critical hydraulic areas (i.e. sumps and trenches) and a secondary layer that provides both containment and leak detection under the entire unit.

The Discharger demonstrated the adequacy of their proposed liner system by calculating the system efficiency for inhibiting leaks; the potential leakage rates; and by estimating the potential impacts on groundwater. The Discharger calculated the system efficiency between 99.999912% and 100% based on the permeability of the sub-grade soils; the effects of the leak location survey; and by using a weighted average approach of leachate contact on various portions of the liner. Using the system efficiency and average leachate generation rates at various stages of landfill development, the leakage potential was estimated to be 0.0001 gallons per acre per day (gpad). The Discharger then estimated the chemical constituent levels that may occur in groundwater by relating the leakage potential (0.0001 gpad) to an estimated affected volume of groundwater and then calculating predicted constituent levels due to dispersion and dilution. The volume of impacted groundwater is calculated based on estimated groundwater velocities and gradients beneath Module D, and by conservatively considering a limited "plume" width of 10 feet and a depth of 10 feet at the point of compliance with no attenuation. The highest measured concentrations of VOCs, metals, and general chemical parameters in leachate were used. Based on the calculations, the Discharger concluded that there would be no measurable groundwater impairment.

43. This Order requires future modules for WMU 6 & 7 to be constructed with the EAD composite liner system approved for WMU 6, Module D, Phase 2 following Regional Board staff approval of a Final Design Report for each module that includes engineered design plans and a construction quality assurance (CQA) plan.

OPERATION OF FACILITIES

44. Refuse is placed in the landfill by compacting lifts approximately 2 feet thick until a total lift thickness of about 14 feet is obtained. A 6-inch thick layer of clean soil is then placed over the refuse as daily cover and compacted at the end of each day and up to 12-inches of intermediate cover is placed over the top and external side slopes of the cell. Alternative daily covers with a maximum exposure time of 7 days are used on the internal side slopes. Final landfill contours at closure will reach elevations of about 81.4 feet MSL (NAVD 88).
45. Expansion will be accomplished by the addition of new Class III landfill units in the area east of the existing WMUs. The landfill will be developed by extending the road north of the surface impoundments out to the east. The landfill units will extend to within approximately 100 feet of the property boundary.
46. The Discharger proposes to use alternative daily and interim cover due to soil deficiencies at the facility. The type of products and material to be considered as Alternate Daily Cover (ADC) include but are not limited to commercially available foams, spray-ons, and geosynthetics, as well as indigenous materials, such as ash based materials, sludge, chipped green waste, compost, and

shredded tires as discussed in EPA Document 600/R-93/172. Each material to be used will be approved before use by the appropriate regulatory agencies and the Regional Board's Executive Officer. In separate WDRs, the Regional Board has already approved the use of Kenaf plants harvested from the groundwater discharge area as ADC during the dry season. In addition to daily cover or ADC applied where there is active waste filling, interim cover will be applied to areas of the landfill where filling is not anticipated within 180 days. Landfill areas that are not used for more than 30 days during the wet season, running from 1 November through 30 April, will have a minimum of one foot of interim cover placed on them.

47. The bioreactors at WMU 6, Module D will be operated as they are filled and instrumented. The bioreactor cells were covered with a geomembrane prior to the start of liquid injection to inhibit the uncontrolled inflow and outflow of liquids and gases from the cell surface. ADC materials were placed over the surface and external side slopes underneath the interim cover materials to facilitate liquid and air injection and gas extraction during bioreactor operation.
48. To control and recover landfill gas (LFG), the Discharger has installed a gas extraction system and has been extracting LFG since 1985. The LFG is piped to an onsite power plant, which burns the gas to generate electricity. The gas extraction system and cogeneration plant are owned and operated by a third party contractor, which sells the power in the private market.
49. During evaporation operations, the large surface impoundment (H3) will be operated at a constant level, and any excess will be pumped into the smaller storage ponds. During the wet season, the large pond will also be used for leachate storage.
50. Section 28 of Subtitle D (40 CFR 258.28) prohibits the discharge of "bulk or non-containerized liquid waste" in an MSW landfill unless:
 - a. The waste is household waste other than septic waste; or
 - b. The waste is leachate or gas condensate from an MSW landfill with a composite liner and LCRS (the Discharger must place this demonstration in the operating record)

As part of approval of the proposed Module D bioreactor, USEPA has granted a project-specific waiver of these restrictions to allow for the addition of supplemental liquids to the bioreactor. These WDRs contain a discharge prohibition against the addition of supplemental liquids to any bioreactor at the facility absent such a waiver.

51. Subject to federal Subtitle D regulations, Title 27 includes the following regulations regarding the discharge of liquids to a landfill:
 - a. Section 20340 (g) requires that leachate be returned to the same WMU or to another authorized disposal facility. This section also allows leachate to be discharged to a different WMU provided that:
 - i. The receiving unit has an LCRS, at least the same classification as the originating unit,

and contains wastes of similar classification and characteristics as those in the originating unit; and

- ii. The discharge is approved by the Regional Board; and
 - iii. The discharge does not exceed the moisture-holding capacity of the receiving unit, and complies with Title 27, Section 20200(d).
- b. Under Section 20200(d)(3), liquids and semi-solid wastes (other than de-water sewage sludge) may not be discharged to a Class III landfill unless the Discharger can demonstrate that the discharge will not exceed the moisture-holding capacity of the landfill.

These WDRs contain a discharge specification prohibiting the discharge of leachate and/or supplemental liquids into a landfill WMU in excess of its moisture holding capacity.

52. At start-up, supplemental liquids were added to each bioreactor at WMU 6, Module D in order to achieve optimum moisture levels for biological activity. Air is also injected into the aerobic bioreactor. The planned rate of liquid addition in the anaerobic bioreactor was 10 gpm per 10,000 square feet (44 gpm per acre), the same rate as for the pilot cell. The liquid addition at the aerobic bioreactor at Module D was planned be at a rate three to four times higher than that for the anaerobic cell due to evaporation losses from air injection. Based on results from the pilot cell, it was anticipated that the peak leachate production rate would be about 20 gpm per acre over the six-acre anaerobic cell area (47% of the peak injection rate). During 2003, the average leachate production rate in the 6-acre anaerobic cell in western half of Phase 1 of Module D peaked in December at 0.2 gpm per acre when 54,900 gallons were recovered from the sump during that month.
53. Previous WDRs Order No. R5-2002-0118 limited filling in unlined WMUs 1-4 to the dry season. This requirement was intended to prevent excessive infiltration since the intermediate cover would not be present in the area of filling. The Discharger submitted a 12 March 2004 *Justification Report for the Proposed Year-Round Filling of Waste Management Units 1-5* that presented their justification to allow year-round filling in these WMUs. The report included estimates of infiltration into the waste for each of these WMUs with and without wintertime filling. The report indicates that the difference in infiltration caused by removing the intermediate cover in the filling area was negligible compared to the benefit derived from reaching final grades years sooner so that the final cover could be installed. This Order therefore allows year-round filling in these WMUs.
54. Previous WDRs for the facility required interim cover to be a minimum of two feet thick. The Discharger submitted a 23 July 2004 *Justification for One Foot of Interim Cover* report presenting justification to reduce the minimum interim cover thickness to one foot, which is the minimum thickness required by Title 27. In the Discharger stated that the final cover design calls for one foot of foundation layer (see Finding Nos. 57 and 61 below), and that the requirement for two feet of interim cover would mean having to remove one foot of the interim cover to obtain a one foot thick foundation layer at closure. The Discharger used the Visual Hydrogeologic Evaluation of Landfill Performance (VHELP), Version 2.2 model to compare the performance of a one foot vs. a two foot

thick interim cover composed of identical soils. The results of the VHELP model indicate that the amount of percolation into the waste is virtually identical (within about 3% of each other). Therefore, this Order requires a minimum interim cover thickness of one foot at the landfill.

CLOSURE

WMUs 1 Through 5

55. WMUs 1, 2, 4 and 5 have been inactive since 1992, but were never closed and must therefore comply with Subtitle D. Filling in WMU 3 resumed in 2002 during the dry season. The units have two to four feet of intermediate cover and have settled about three feet since 1992.
56. The Discharger has submitted a revised Final Closure and Post-Closure Maintenance Plan (FCP) for WMUs 1 through 5, which proposed phased closure beginning with WMU 3. Under the plan, intermediate cover will be removed in areas where additional fill is needed, and wastes will then be discharged to reach final grade. There will be no lateral expansions of any of the units. Soil will then be re-applied as intermediate cover and engineered as foundation layer for final cover. Based on the most recent aerial topographic map (July 2003), a total of approximately 3.3 million cubic yards of wastes will be discharged to reach a final maximum elevation of 81.4 feet MSL (NAVD 88) in WMUs 1-5.
57. Two final cover design options may be utilized for the top deck and side-slopes of WMUs 1 through 5:

Option 1 from top to bottom is as follows:

- Erosion-resistant/vegetative cover layer – One foot vegetative cover soil
- Low hydraulic conductivity /barrier layer – one-foot of compacted clay ($k \leq 1 \times 10^{-6}$ cm/sec)
- Foundation layer – two-feet of compacted soil or existing intermediate cover.

The proposed design Option 1 is prescriptive under Title 27 but is an EAD to the prescriptive standard of Subtitle D, which requires that the barrier layer be at least 18 inches thick. ($k \leq 1 \times 10^{-5}$ cm/sec). The Discharger has demonstrated, however, that the proposed Title 27 design is more stringent than Subtitle D, given that the maximum hydraulic conductivity of the proposed barrier layer will be one-tenth of the maximum allowed under Subtitle D. Further, the vegetative cover layer will be six inches thicker than that required under Subtitle D, providing additional protection from infiltration.

Option 2 from top to bottom is as follows:

- Erosion-resistant/vegetative cover layer – One foot vegetative cover soil
- Geocomposite drainage layer (geonet with geotextile bonded on both sides) - side slope only
- 40 mil linear low-density polyethylene (LLDPE) geomembrane low hydraulic conductivity /barrier layer w/surface texturing (asperity height) of at least 20-mils on both sides
- Foundation layer – one-foot of prepared existing intermediate cover.

The proposed design is an EAD to the prescriptive standard under Title 27. The Discharger has

demonstrated, however, that the proposed EAD is equivalent to the prescriptive. This demonstration is included in the January 2003 *Justification Report for the Proposed Alternative Cover System of Waste Management Units 1-5* (Alternative Cover Justification Report) which is included in Appendix C of the FCP. This report includes a comparative infiltration analysis that indicates the prescriptive cover (Option 1) would allow 45 percent greater infiltration than the EAD cover (Option 2).

58. The above referenced January 2003 Alternative Cover Justification Report also includes a slope stability analysis for the proposed 3:1 side-slopes indicating the cover will be stable under dynamic conditions; a settlement analysis indicating that settlement of the waste after closure will not cause drainage problems; a drainage layer analysis indicating that the geocomposite drainage layer on the side-slopes will provide adequate drainage to prevent excess pore pressure from building up in the overlying soil layer; and describes the installation of horizontal landfill gas extraction piping during filling to remove landfill gas and excess moisture from the waste and from beneath the geomembrane layer of the final cover system. Further details on each of these topics can be found in the report.
59. The top deck of WMUs 1 through 5 will be sloped at 5% for adequate drainage. Perimeter slopes will be no greater than 3:1 (horizontal-to-vertical). Since it is anticipated that the side-slopes will span less than 50 feet of vertical from the base of each unit, the closure plan does not include benching.

WMUs 6 and 7

60. The Discharger has submitted a Preliminary Closure and Post-Closure Maintenance Plan (PCPMP) for WMUs 6 and 7, and required periodic updates. As with WMUs 1 through 5, closures of modules in WMUs 6 and 7 will be implemented in phases as the modules are filled and allowed to settle.
61. The final cover design for the top deck and sides slopes of WMUs 6 and 7 will be as follows:
- Erosion-resistant/Vegetative Cover layer:
One-foot vegetative cover soil
 - Low hydraulic conductivity/barrier layer:
Geocomposite drainage layer (geonet bonded to geotextile)
40-mil linear low-density polyethylene liner (LLDPE) w/surface texturing (asperity height) of at least 20-mils on both sides
Geosynthetic clay liner ($k \leq 1 \times 10^{-8}$ cm/sec) reinforced by stitching or needle punching
 - Foundation layer - two-feet of compacted soil or existing intermediate cover

The use of GCL in lieu of compacted clay represents an EAD to the prescriptive standards of Title 27 and of Subtitle D for a low hydraulic conductivity/barrier layer, which require that the

permeability of the low conductivity/barrier layer be no greater than that of the base liner (T27, Section 21090(a)(2), Subtitle D, Section 258.60(a)(1)). The proposed geosynthetic cap ensures that the permeability of the cap will be no greater than that of the Subtitle D composite base liner. Pursuant to Section 20080(b) of Title 27, the Discharger has demonstrated that construction of the prescriptive standard is unreasonably or unnecessarily burdensome and will cost substantially more than the proposed EAD. The Discharger has also demonstrated that the proposed EAD is consistent with both the performance goals and the prescriptive standards of Title 27 and affords equivalent protection against water quality impairment.

62. The top deck of WMUs 6 and 7 will be sloped at 5% for adequate drainage. Perimeter slopes will be not greater than 3:1 (horizontal-to-vertical). Designing and constructing 15-foot wide benches will achieve erosion control and access at least every 50 vertical feet, as required under Section 21090 of Title 27. The maximum elevation upon closure will be 81.4 feet MSL (NAVD 88), approximately 60 feet above surrounding (undisturbed) grade.

Bioreactors

63. Upon completion of the pilot bioreactor project at Module B, the project will be de-commissioned and wastes discharged to final elevation for closure of Module B. The bioreactor will then be incorporated and closed with the remainder of Module B in accordance with the cover design specified in Finding No. 61 and preliminary closure plan and schedule (see Table V).
64. The full-scale bioreactors at Module D will receive final cover within five years of reaching final elevation, in accordance with Closure Specification No. 25, the cover design specified in Finding No. 61, and the preliminary closure plan and schedule for Module D (see Table V).

Surface Impoundments

65. When no longer needed to retain landfill leachate, surface impoundments will be de-commissioned and clean-closed per Title 27, Section 21400. One or more impoundments may remain in operation as others are closed. As part of de-commissioning, the impoundments will first be cleaned in accordance with the O&M Plan. Any remaining liquids will be either pumped out of the impoundment or allowed to evaporate. Pumped liquids will either be discharged to a remaining impoundment or to tanks for offsite disposal at an authorized facility. Residual sludges/solids will also be removed and discharged to an authorized onsite unit or offsite facility. The containment system will then be inspected and removed in accordance with Title 27.

FINANCIAL ASSURANCES

66. The financial assurance mechanism consists of an enterprise fund for closure and post-closure maintenance. Monies are paid into the fund annually as waste is discharged to the landfill. The Discharger has reported that trust fund contained \$10.1 million as of 1 January 2004.
67. The estimated closure costs for the facility are as follows:

Table II

| WMU | Closure and Postclosure Cost Estimates ¹ | | | |
|--------------------|---|---------------------------|----------------|-------|
| | Closure | Post-Closure ² | | Total |
| | (\$M) | Annual (\$K) | 30-Years (\$M) | (\$M) |
| 1 - 5 | 7.9 | 115 | 3.5 | 11.4 |
| 6 & 7 | 39.0 | 148 | 4.4 | 43.4 |
| G & H ³ | --- | --- | --- | --- |

1. As presented in the 2004 closure and post-closure maintenance cost estimate.
2. Excludes costs of corrective action-related post-closure maintenance and monitoring.
3. WMUs G & H will be clean closed after the end of the post-closure maintenance period for WMUs 6 & 7. Closure costs for clean closure of WMUs G & H are included in the estimate for WMUs 6 & 7.

68. Title 27 requires that the Discharger provide financial assurance to the California Integrated Waste Management Board (CIWMB) for corrective action of a known or reasonably foreseeable release. The corrective action for the known release from WMUs 1-5 is funded through the operating budget of the facility. There is a separate financial assurance mechanism for funding corrective action costs for a reasonably foreseeable release at the facility (all WMUs). The Discharger's cost estimates for corrective action for a reasonably foreseeable release at the facility are as follows:

Table III

| Reasonably Foreseeable Release (\$K) ¹ | | | |
|---|-------------|------------|-------|
| Additional Facilities | Maintenance | Monitoring | Total |
| 163 | 608 | 897 | 1,668 |

1. 1993 estimates in 2003 dollars using the inflation factors determined by the CIWMB.

CEQA AND OTHER LEGAL REFERENCES

69. In October 1992, the Yolo County Board of Supervisors approved a final environmental impact report (EIR) for addressing impacts associated with the then existing landfill and construction of WMUs G, 6 and 7. On 6 June 1999, the Board of Supervisors further approved a negative declaration for the three surface impoundments comprising WMU H, and in June 2000 approved a negative declaration for the full-scale bioreactor project proposed for WMU 6, Module D. Regional Board staff has considered these documents, including the negative declaration for the bioreactor project, in preparation of these WDRs.

70. 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 Chapters 1 through 7, Subdivision 1,

Division 2, Title 27, of the California Code of Regulations, effective 18 July 1997, and subsequent revisions;

- c) The prescriptive standards and performance criteria of RCRA Subtitle D, Part 258;
- d) State Water Resources Control Board Resolution No. 93-62, *Policy for Regulation of Discharges of Municipal Solid Waste*, adopted 17 June 1993.

71. Section 13267(b) of California Water Code provides that: "In conducting an investigation specified in subdivision (a), the Regional Board may require that any person who has discharged, discharges, or is suspected of discharging, or who proposed to discharge within its region, or any citizen or domiciliary, or political agency or entity of this state who had discharged, discharges, or is suspected of discharging, or who proposed to discharge waste outside of its region that could affect the quality of the waters of the state within its region shall furnish, under penalty of perjury, technical or monitoring program reports which the board requires. The burden, including costs of these reports, shall bear a reasonable relationship to the need for the reports and the benefits to be obtained from the reports. The monitoring and reporting program required by this Order and the attached Monitoring and Reporting Program No. R5-2004-0134 are necessary to assure compliance with these waste discharge requirements. The Discharger operates the facility that discharges the waste subject to this Order.

PROCEDURAL REQUIREMENTS

- 72. 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.
- 73. The Regional Board notified the Discharger and interested agencies and persons of its intent to prescribe waste discharge requirements for this discharge, and has provided them with an opportunity for a public hearing and an opportunity to submit their written views and recommendations.
- 74. The Regional Board, in a public meeting, heard and considered all comments pertaining to the discharge.
- 75. Any person affected by this action of the Regional Board may petition the State Water Resources Control Board to review the action in accordance with Sections 2050 through 2068, Title 23, California Code of Regulations. The petition must be received by the State Water Resources Control Board, Office of Chief Counsel, P.O. Box 100, Sacramento, California 95812, within 30 days of the date of issuance of this Order. Copies of the laws and regulations applicable to the filing of a petition are available on the Internet at http://www.swrcb.ca.gov/water_laws/index.html and will be provided on request.

IT IS HEREBY ORDERED, pursuant to Sections 13263 and 13267 of the California Water Code, that Order No. R5-2002-0118 is rescinded, and it is further ordered that the County of Yolo, Department of

Planning and Public Works and its agents, assigns and successors, 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. Discharge Prohibitions

Landfills

1. The discharge of solid wastes defined as "hazardous " or "designated" to any landfill unit is prohibited. For the purposes of this Order, the terms "hazardous" "designated" and "nonhazardous" are as defined in Title 27.
2. The discharge of solid waste outside of a landfill WMU is prohibited.
3. The discharge of waste to either a new landfill unit, or to a lateral expansion of an existing landfill unit is prohibited, unless the new unit or expansion area is equipped with a containment system with the components in the Regional Board-approved EAD described in these WDRs, as demonstrated by the Discharger to meet the prescriptive and performance standards of Title 27 and Subtitle D (through Resolution 93-62).
4. The discharge of wastes to WMUs 1 through 5 is prohibited, except to the extent necessary to bring these units to final grade for closure as specified in the April 2004 Final Closure Plan.
5. With the following exceptions, the discharge of liquid wastes or semi-solid waste (i.e., waste containing less than 50 percent solids) to landfill WMUs is prohibited:
 - a. Landfill leachate may be discharged to the bioreactor cells at WMU 6, Modules B and D.
 - b. Supplemental liquids (listed in Discharge Specification No. 6 herein) may be injected into the bioreactor cells at WMU6, Modules B and D, provided that the Discharger possesses a waiver of the Subtitle D restrictions on liquid additions (see Finding No. 50).
 - c. De-watered sewage or water treatment sludge, as provided in Section 20220(c) of Title 27, may be discharged to any active landfill modules with composite liners.
6. The discharge of solid waste containing free liquid or moisture in excess of the waste's moisture holding capacity to any landfill module is prohibited.
7. The disposal of containerized liquids at this facility is prohibited.
8. The disposal of wastes containing greater than one percent (>1%) friable asbestos is prohibited.
9. The disposal of shredded automobile bodies, household appliances and recyclable sheet metal at this facility is prohibited.

Surface Impoundments

10. The discharge of hazardous wastes to any surface impoundment is prohibited.
11. The discharge of liquid waste to the Water Storage Pond, which is located where WMU F used to be, is prohibited.
12. With the exception of the discharges listed in Discharge Prohibition No. 5, the discharge of liquid wastes or semi-solid waste (i.e., waste containing less than 50 percent solids) outside of a Class II surface impoundment is prohibited.
13. Except for semi-solid wastes and solids that settle from the impounded liquid, the discharge of solid wastes to any surface impoundment is prohibited.
14. The discharge of waste to ponded water from any source, except Class II surface impoundments, is prohibited.

Other

15. The discharge of waste within 50 feet of surface waters is prohibited.
16. The discharge of solid or liquid waste or leachate to surface waters, surface water drainage courses, or groundwater is prohibited.
17. 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 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,
 - b. are "restricted hazardous wastes", or
 - c. impair the integrity of containment structures,is prohibited.
18. The discharge of landfill or surface impoundment wastes to the storm water sedimentation basin is prohibited.

B. Discharge Specifications

1. The treatment, storage, or disposal of wastes shall not cause pollution or a nuisance, as defined in the California Water Code, Section 13050.

2. The discharge of wastes shall not cause water quality degradation by allowing an exceedance of concentration limits or a statistically significant increase over background concentrations per the detection monitoring methodologies of Monitoring and Reporting Program No. R5-2004-0134.
3. Wastes shall only be discharged into, and shall be confined to, WMUs specifically designed for their containment.
4. Pursuant to Title 27, Sections 20200(d) and 20340 (g), the amount of leachate and/or supplemental liquids injected into any bioreactor cell shall not exceed the “moisture holding capacity” of the waste mass, as defined in Title 27. The generation of leachate in the LCRS during liquid injections shall not be construed as violating this specification, provided that leachate continues to be absorbed into the waste mass in significant quantities and that the rate of liquid injection is adjusted as practicable to minimize excessive leachate production. The moisture holding capacity (also referred to as “field capacity”) of the bioreactor shall be construed as the point where, under sustained (ie. steady-state) conditions, leachate is no longer being absorbed into the waste mass in significant quantities, as evidenced by the rate of leachate production being about the same as the liquid injection rate.
5. Pursuant to Section 20340 (g) of Title 27, landfill leachate may be discharged to a Class II surface impoundment. However, leachate destined for a bioreactor cell shall not be commingled with, and shall be stored separately from, other designated wastes
6. Liquids discharged to a bioreactor cell shall be limited to leachate generated from WMU 6 and supplemental liquids necessary to reach and/or maintain the bioreactor at field capacity. Supplemental liquid additions shall be limited to the following:
 - a. Leachate from other landfill WMUs
 - b. Leachate stored in the surface impoundments
 - c. Other non-hazardous liquids from the surface impoundments
 - d. Landfill gas condensate
 - e. Extracted groundwater
 - f. Supply water
7. Leachate and supplemental liquids that may be discharged to a bioreactor during the active life of a module (per Discharge Prohibition No. 5) may be discharged to that bioreactor during the post-closure period, with Regional Board staff approval, per Section 21090(a)(5) of Title 27.

C. Facility Specifications

Landfills

1. With the following exceptions, a minimum separation of 5 feet shall be maintained between

wastes (or leachate) and the highest anticipated elevation of underlying groundwater, including the capillary fringe:

- a. A minimum of three feet of separation shall be maintained between the primary liner and high groundwater, including the capillary fringe, at WMU 6, Modules A and B, per the EAD described in Finding No. 38 and Table I herein.
 - b. A minimum of three feet of separation shall be maintained between the primary liner and installed capillary break at the LCRS trenches and sumps for WMU 6, Modules C and D, per the EAD described in Table I herein. A minimum of five feet shall be maintained between the primary liner and an installed capillary break at the remainder of WMU 6, Modules C and D, per the EAD described in Finding No. 38 and Table I herein.
 - c. A minimum of five feet of separation shall be maintained between the primary liner and installed capillary break at future modules to be constructed in WMUs 6 and 7, per the EAD described in Finding No. 38.
2. Each new landfill module in WMU 6 & 7 shall have a composite design as described for WMU 6D, Phase 2 in Table I of the Findings.
 3. Each landfill unit shall have a blanket-type LCRS immediately above the liner, which is designed and operated to prevent the development of hydraulic head on the liner. LCRS material shall be selected so as not to puncture the underlying geomembrane and, if necessary, a geotextile cushion layer shall be placed between the geomembrane and the LCRS material.
 4. Prior to the beginning of construction for each phase of a new landfill liner or cover, a Final Design Report shall be submitted to the Regional Board for review and approval, and shall include, but not be limited to, the engineered design plans for the WMU and a construction quality assurance (CQA) plan to verify that construction specifications will be met, and if necessary, a revised water quality monitoring plan. Approval of the final design report shall be obtained from Regional Board staff prior to starting construction.
 5. Prior to the discharge of waste to any new landfill unit or module, the Discharger shall submit a final construction report for approval by Regional Board staff. The report shall include, but not be limited to a completion report, as-built plans and drawings, and a CQA report. The CQA report shall include a written summary of the CQA program, all test results, analyses, copies of the inspector's original field notes, and a certification as described in the Standard Provisions and Reporting Requirements.
 6. Interim cover shall be applied to areas of the landfill where filling is not anticipated within 180 days. Interim cover shall consist of at least one foot of compacted low permeability soil or an approved EAD. Interim cover soil on side-slopes shall be protected from erosion.
 7. Precipitation and drainage control systems shall be constructed on both active and closed WMUs. They shall be designed and constructed to accommodate the anticipated volume of

precipitation and peak flows from surface runoff under 100-year, 24-hour precipitation conditions contained in the Standard Provisions and Reporting Requirements referenced in Provision No. 2 below.

8. Annually, prior to the anticipated wet season but no later than **1 November**, any necessary erosion control measures shall be implemented, and any necessary construction, maintenance, or repairs of precipitation and drainage control facilities shall be completed to prevent erosion or flooding of the facility and to prevent surface drainage from contacting or percolating through wastes. By **1 October of each year**, the Discharger shall submit to the Regional Board a Winterization Plan describing measures planned to prepare the site and conduct operations during the wet season. By **1 December of the same year**, the Discharger shall submit an Annual Winterization Report (AWR) to the Regional Board describing implementation of the Winterization Plan and measures taken to comply with this specification. The AWR may be included in the Annual Report submitted under Monitoring and Reporting Program No. R5-2004-0134.
9. New landfill units, existing landfill units, and lateral expansions thereof, shall not be located in the 100-year floodplain of any surface water unless the Discharger has successfully completed, and the Regional Board has approved, all demonstrations required for such discharge under Subtitle D (40 CFR 258.11).
10. The Discharger shall submit a revised Bioreactor O&M Plan if any changes to the operations and/or maintenance of the bioreactors are to occur. The Bioreactor O&M Plan should outline strategies and methods for leachate re-circulation, supplemental liquid injection, and achieving moisture holding capacity. The Bioreactor O&M Plan shall also include calculations regarding expected leachate production levels and a response plan in the event leachate production levels exceed expected levels, maximum levels prescribed in Facility Specification No. 11, and levels that threaten to violate Facility Specification Nos. 19 or 20.
11. The hydraulic head on the Module D bioreactors liner shall not exceed four inches. If LCRS monitoring indicates that the hydraulic head on the liner exceeds this value, the Discharger shall immediately adjust the liquid injection rate, check the sump pumps for proper operation, and implement other appropriate measures to reduce the head, as set forth in the Bioreactor O&M Plan. If the hydraulic head on the liner exceeds 10 inches, the Discharger shall immediately (1) notify the Regional Board, (2) cease the discharge of liquids to the unit, and (3) implement any other necessary corrective measures to reduce the head to four inches or less.
12. All landfill modules shall be equipped with horizontal landfill gas extraction wells during filling as described in the Final Closure Plan for WMUs 1-5 and the Preliminary Closure Plan for WMUs 6 & 7. Landfill gas shall be extracted from each new and existing extraction well at rates sufficient to prevent migration of landfill gas outside of the units.

Surface Impoundments

13. Per the EAD described in Finding No. 38 and Table I, a minimum of minimum of five feet of separation shall be maintained between the secondary liner and installed capillary break or groundwater barrier layer at all surface impoundments, except under the LCRS trenches and sumps where the minimum separation is two feet.
14. The Discharger shall submit a revised Surface Impoundment O&M Plan to the Regional Board if any changes to the operations and/or maintenance of the surface impoundments are to occur. The Surface Impoundment O&M Plan shall outline strategies and methods for evaporating leachate, minimizing vectors and odors, managing pond levels, conducting liner inspections, cleaning the ponds and other relevant information. The plan shall include calculations as to the amount of leachate expected to be generated in and pumped from the LCRS back into the impoundment under normal operations in the absence of a liner failure. The plan shall identify the failure criteria of the upper liner and include a response plan in the event of an upper liner failure.
15. Solids which accumulate in the surface impoundments shall be removed as necessary to maintain minimum freeboard requirements and sufficient capacity for leachate storage and disposal. Prior to removal of these solids, sufficient samples shall be taken for their characterization and classification pursuant to Article 2, Subchapter 2, Chapter 3, Division 2 of Title 27. The rationale for the sampling protocol used, the results of this sampling, and a rationale for classification of the solids shall be included in the Surface Impoundment O&M Plan.
16. Liquid collected in the surface impoundment's LCRS shall not exceed design requirements. If the amount of liquid generated exceeds the failure criteria of the primary liner, then the Discharger shall immediately cease discharges to the leaking surface impoundment, and shall notify the Regional Board in writing within seven days. Notification shall include a timetable for remedial action to repair the upper liner to the impoundment or other action necessary to reduce leakage production as set forth the Surface Impoundment O&M Plan.

All WMUs

17. All WMU containment structures shall meet the general criteria set forth in Section 20320 of Title 27.
18. WMU containment structures shall be designed and constructed under the direct supervision of a California registered civil engineer, or a certified engineering geologist, and shall be certified by that individual as meeting the prescriptive standards (except where exempt or approved as an engineered alternative design herein) and performance goals of Title 27 and as meeting the requirements of this Order prior to waste discharge.
19. LCRSs shall be designed, constructed, and maintained to be free-draining and to prevent the buildup of hydraulic head on the underlying liner at any time. The LCRS should be sized to collect twice the anticipated daily volume of leachate generated at the landfill or surface

impoundment. LCRS sump pumps shall be installed in the sump at or above the minimum level necessary for proper operation. Prior to the discharge of wastes to any new landfill module, the LCRSs and sump pumps shall be tested for capacity and proper operation (the results of these tests shall be reported to the Regional Board in the Final CQA Report).

20. Leachate generation by a landfill unit or surface impoundment shall not exceed 85% of the design capacity of the LCRS or sump pump, and the depth of the fluid in any LCRS sump shall be kept at the minimum level needed for safe pump operation. If leachate generation exceeds 85% of the design capacity, or if the depth of fluid in the sump is too high, then the Discharger shall immediately cease the discharge of sludge and other high-moisture wastes to the landfill unit and shall notify the Regional Board in writing within seven days. Notification shall include a timetable for corrective action necessary to reduce leachate production.
21. In addition to sampling required by MRP No. R5-2004-0134, any liquids or leachate detection in a pan lysimeter or a secondary containment sump shall be removed from the lysimeter/sump (or corresponding manhole) such that liquid does not back-up into the lysimeter or sump and shall be handled/disposed of as leachate. The Discharger shall measure, record and tabulate the elevation of the liquid and the amount of liquid removed from each lysimeter, sump or manhole.
22. The Discharger shall provide engineered structures or drainage systems to insure upward hydraulic head due to high groundwater does not occur on any new WMU liner. Where a synthetic liner is used for a capillary break, it shall be installed in the upper portion of the capillary fringe to minimize the potential for upward hydraulic head on the capillary break. The construction of new WMUs shall include a monitoring network to determine groundwater elevations and whether upward hydraulic head due to high groundwater occurs on any new WMU liner or capillary break. If the Discharger or Regional Board determines through analyses of monitoring data that upward hydraulic head has occurred on the liner or capillary break, the Discharger shall submit a revised Report of Waste Discharge within 180 days which specifies the method by which upward hydraulic head on the liner due to high groundwater will be prevented and a time schedule for remedial action.
23. Prior to the discharge of waste to a WMU, all wells within 500 feet of the WMU shall have sanitary seals, which meet the requirements of the Yolo County Health Department or shall be properly abandoned. A record of the sealing and/or abandonment of such wells shall be sent to the Regional Board and to the State Department of Water Resources.

WMU Closure Specifications

WMUs 1 Through 5

24. WMUs 1 through 5 shall be incrementally closed in accordance with the Final Closure Plan and shall receive a final cover in accordance with the prescriptive standards of Title 27 and Subtitle D, or the EAD described in Finding No. 57.

25. For the prescriptive cover (Option 1), the low hydraulic conductivity layer for WMUs 1 through 4 shall have a maximum hydraulic conductivity of 1×10^{-6} cm/sec and a minimum relative compaction of 90%. The low hydraulic conductivity layer for WMU 5 shall have a maximum hydraulic conductivity of 1×10^{-6} cm/sec, or equal to the permeability of the underlying clay liner, whichever is less. Hydraulic conductivities of cap materials shall be determined by laboratory tests using water.

For the geomembrane cover (Option 2), the geomembrane for WMUs 1 through 5 shall be a minimum 40-mil LLDPE with surface texturing (asperity height) of at least 20 mils on both sides.

26. The closure schedule for WMUs 1 through 5 shall be as follows:

Table IV

| Closure Schedule for WMUs 1-5 | | |
|--------------------------------------|---------------------------------|--|
| WMUs to be Closed | Date to Complete Filling | Date to Complete Closure Construction |
| WMU 1/2 ¹ | 2010 | 2011 |
| WMU 3 | 2005 | 2006 |
| WMU 4/5 ¹ | 2012 | 2013 |

¹ WMUs 1 & 2 and 4 & 5 will be filled as single units.

WMUs 6 and 7

27. WMUs 6 & 7 shall be incrementally closed in accordance with the Preliminary Closure Plan. Each module shall receive a final cover in accordance with the design described in Finding 61.
28. The incremental closure schedule for WMUs 6 & 7 shall be as follows:

Table V

| Preliminary Closure Schedule for WMUs 6 & 7 | | |
|--|---------------------------------|--|
| WMUs to be Closed | Year to Complete Filling | Year to Complete Closure Construction |
| 6A-D ¹ | 2013 | 2013-2014 |
| 6E-H | 2026 | 2026-2025 |

| | | |
|------|------|-----------|
| 7I-L | 2035 | 2035-2036 |
| 7M-P | 2044 | 2044-2045 |

¹ Includes de-commissioning and closure of bioreactors.

All Landfill WMUs

29. The WMU slopes shall not exceed a horizontal-to-vertical ratio of 3:1, and shall have at least one 15-foot wide bench for every 50 feet of exterior side-slope rise. WMU closure designs for side-slopes shall be supported by a Slope and Foundation Stability Report (SFSR), prepared by a registered civil engineer or certified engineering geologist per Section 21750(f)(5) of Title 27 and approved by Regional Board staff. Other 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. The SFRS may be included in the FCP and/or the design report for closure of each landfill or landfill module.
30. Vegetation shall be planted and maintained over each closed landfill module. Vegetation shall be selected to require a minimum of irrigation and maintenance and shall have a rooting depth not in excess of the vegetative layer thickness.
31. At closure, landfill final slopes shall not be less than five percent and shall be maintained at no less than three percent grade during the post-closure maintenance period to prevent ponding and infiltration.
32. Select waste shall be placed within the final two feet of the landfill mass to prevent materials from penetrating the interim cover and cover system foundation soil layer.
33. The landfill gas extraction system shall remain operational throughout closure construction and the post-closure maintenance period to ensure that gases do not build up under the cover potentially causing uplift, instability of the cover, and development of excess condensation.

Surface Impoundments

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

WMU Post-Closure Maintenance Specifications

36. As specified in the Final Post-Closure Maintenance Plan (FPCMP) for WMUs 1-5 and the Preliminary Post-Closure Maintenance Plan (PPCMP) for WMUs 6 & 7, the Discharger shall conduct monitoring of the following during the post-closure maintenance period:
- a. Final cover monitoring;
 - b. Settlement monitoring;
 - c. Surface water monitoring and control;
 - d. Leachate collection and removal system monitoring;
 - e. Landfill gas monitoring and control;
 - f. Groundwater monitoring and control;
 - g. Air stripper effluent monitoring and control; and
 - h. Vadose zone monitoring.

This monitoring shall be conducted in accordance with the FPCMP and PPCMP, this Order and the attached MRP, and any other Orders issued by the Regional Board for these items. In the event of a conflict between a Regional Board Order and the FPCMP or PPCMP, the requirements of the Regional Board Order shall prevail.

37. The Discharger shall visual inspections the final cover of any closed landfill unit at least **quarterly** to check for evidence of settlement, erosion, ponded water, odor, exposed waste, exposed geomembrane, cracks, slope failure, leachate seeps, or damage to vegetation. More frequent inspections shall be conducted during the wet season as necessary. Areas of the final cover showing evidence of any of the problems described above shall be repaired in a timely manner, and the cause shall be investigated to prevent recurrences of the problem(s). Inspections conducted during the late summer or fall shall be coordinated with the Winterization requirements in Facility Specification No. 8, above.

D. RECEIVING WATER LIMITATIONS

The concentrations of Constituents of Concern, passing the Points of Compliance shall not exceed the Concentration Limits in the "Water Quality Protection Standard" established pursuant to MRP No. R5-2004-0134, which is attached to and made part of this Order.

E. PROVISIONS

1. The Discharger shall comply with these WDRs and the attached MRP No. R5-2004-0134. A violation of the MRP is a violation of these waste discharge requirements. The Discharger shall further comply with all applicable provisions of Title 27 and Subtitle D not specifically referred to in this Order.
2. The Discharger shall comply with the Standard Provisions and Reporting Requirements, dated August 1997, which are hereby incorporated into this Order. A violation of any of the Standard Provisions and Reporting Requirements is a violation of these waste discharge requirements.

3. The Discharger shall submit reports required by this Order pursuant to Section 13267 of the California Water Code. Failure to submit the reports by the due dates shown may lead to enforcement action pursuant to Section 13268.
4. By **1 December 2004**, the Discharger shall submit a report proposing a design for additional landfill gas extraction wells as a corrective action measure for the confirmed release at WMU 6C. The report shall include engineering calculations for the expanded system showing that the additional wells and extraction rates will be sufficient to prevent migration of landfill gas outside of the unit. Pursuant to Section 20425(d)(3), the report shall also be submitted to the Local Enforcement Agency, and if appropriate, the CIWMB to ensure the resulting gas control program satisfies the needs of all agencies concerned.
5. By **31 July 2005**, the Discharger shall submit a report documenting the completion of the installation of additional landfill gas extraction wells as a corrective action measure for the confirmed release at WMU 6C.
6. The Discharger shall maintain waste containment facilities and precipitation and drainage control systems throughout the post-closure maintenance period, and shall immediately notify the Regional 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 of precipitation and drainage control structures.
7. The Discharger shall continue to monitor each WMU and all underlying media per MRP No. R5-2004-0134 throughout the post-closure maintenance period, and shall continue until the Regional Board determines that the wastes remaining at the site no longer threaten water quality.
8. The Discharger shall have the continuing responsibility to assure protection of usable waters from discharged wastes, including leachate that may be generated and discharged during the closure, and post-closure maintenance period of the facility and during subsequent use of the property for other purposes.
9. The Discharger shall maintain legible records of the volume and type of each waste discharged for each landfill module and the manner and location of discharge. Such records shall be maintained at the facility or the facility's administration office until the beginning of the post-closure maintenance period. These records shall be available for review by representatives of the Regional Board and of the State Water Resources Control Board at any time during normal business hours. At the beginning of the post-closure maintenance period for each of the landfill areas, copies of these records shall be sent to the Regional Board.
10. The Discharger shall provide proof to the Regional Board **within sixty days after completing final closure** that the deed to the landfill 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 as a municipal solid waste landfill;

- b. land use options for the parcel are restricted in accordance with the post-closure land uses set forth in the post-closure plan and in WDRs for the landfill; and
 - c. in the event that the Discharger defaults on carrying out either the post-closure maintenance plan or any corrective action needed to address a release, then the responsibility for carrying out such work falls to the property owner.
11. The Discharger or persons employed by the Discharger shall comply with all notice and reporting requirements of the State Department of Water Resources with regard to the construction, alteration, destruction, or abandonment of all monitoring wells used for compliance with this Order or with MRP No. R5-2004-0134, as required by Sections 13750 through 13755 of the California Water Code.
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 prior to the change in ownership. A copy of that notification shall be sent to the Regional Board.
13. As necessary, the Discharger shall submit to the Regional Board an updated preliminary closure and post-closure maintenance plan, prepared in accordance with Section 21769 of Title 27. The plan shall include conceptual designs for closing all landfill modules, bioreactors and surface impoundments. The plan shall further include all information necessary for Regional Board staff review and approval of financial assurance cost estimates for closure and post-closure maintenance of each landfill submitted to the California Integrated Waste Management Board (CIWMB), pursuant to Sections 20950(f), and 22205 et seq. of Title 27.
14. The Discharger is required to maintain financial assurance mechanisms for closure and post-closure maintenance costs as specified in Chapter 6 of Title 27. The Discharger is required to submit the financial assurance mechanism to the Financial Assurances Section of the California Integrated Waste Management Board, which determines if the mechanism meets the requirements of Chapter 6, Title 27, and if the amount of coverage is adequate.
15. The Discharger shall obtain and maintain assurances of financial responsibility for initiating and completing corrective action for all known or reasonably foreseeable releases from the landfill in an amount approved by the Executive Officer, and shall submit the financial assurance mechanism to the Financial Assurances Section of the California Integrated Waste Management Board.
16. In the event the Regional Board determines that the County of Yolo has failed or is failing to perform corrective action as required by law, the California Integrated Waste Management Board may direct the County of Yolo to pay from the pledged revenue such amounts as necessary to ensure sufficient corrective action. The County of Yolo shall be obligated to use such funds for corrective action in accordance with the directives of the Regional Board.

17. If at any time the Executive Officer determines that the bioreactor demonstration project at Module D is not in compliance with these WDRs, the Executive Officer may order immediate cessation of the project.
18. A copy of this Order shall be kept at the discharge facility for reference by operating personnel. Key operating personnel shall be familiar with its contents.
19. The Regional Board will review this Order periodically and will revise these requirements when necessary.

If, in the opinion of the Executive Officer, the Discharger fails to comply with the provisions of this order, the Executive Officer may apply to the Attorney General for judicial enforcement or issue a complaint for Administrative Civil Liability.

I, THOMAS R. PINKOS, 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 10 September 2004.

THOMAS R. PINKOS, Executive Officer

WLB

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM NO. R5-2004-0134
FOR
COUNTY OF YOLO
PLANNING AND PUBLIC WORKS DEPARTMENT
YOLO COUNTY CENTRAL LANDFILL
CLASS III LANDFILLS & CLASS II SURFACE IMPOUNDMENTS
CONSTRUCTION, OPERATION, CLOSURE, POST-CLOSURE MAINTENANCE
AND CORRECTIVE ACTION
YOLO COUNTY

The Discharger shall maintain water quality monitoring systems that are appropriate for detection monitoring and corrective action, and that comply with Subchapter 3, Chapter 3, Subdivision 1, Division 2, Title 27, CCR, and any other applicable provisions therein.

Compliance with this Monitoring and Reporting Program, and with the companion Standard Provisions and Reporting Requirements, is ordered by Waste Discharge Requirements (WDRs) Order No. R5-2004-0134. Failure to comply with this Program, or with the Standard Provisions and Reporting Requirements, constitutes non-compliance with the WDRs and with Division 7 of the Water Code, which can result in the imposition of civil monetary liability.

I. REPORTING

The Discharger shall report monitoring data and information as required in this Monitoring and Reporting Program and as required in the Standard Provisions and Reporting Requirements. Reports that do not comply with the required format will be rejected and the Discharger shall be deemed to be in noncompliance with the WDRs.

A narrative discussion of the monitoring results, including notations of any water quality violations shall precede tabular summaries of the water quality data. Further, each monitoring report shall include a summary and certification of completion of all Standard Observations for the waste management unit (WMU), for the perimeter of the WMU, and for the receiving waters. The standard observations shall be performed on a weekly basis and shall include those elements as defined in the Standard Provisions and Reporting Requirements.

In reporting the monitoring data required by this program, the Discharger shall arrange the data in tabular form so that the date, the constituents, the concentrations, and the units are readily discernible. The data shall be summarized in such a manner so as to illustrate clearly the compliance with waste discharge requirements or the lack thereof. Historical and current monitoring data shall be graphed at least once annually. Graphs for the same constituent shall be plotted at the same scale to facilitate visual comparison of monitoring data. Method detection limits and practical quantitation limits shall be reported. All peaks shall be reported, including those that cannot be quantified and/or specifically identified. Metals shall be analyzed according to the method listed in Attachments E and F.

The results of any monitoring done more frequently than required at the locations specified herein shall be reported to the Regional Board in the monitoring report(s) for that period.

A. MONITORING REPORTS

1. Monitoring Reports

Monitoring Reports shall be prepared and submitted to the Regional Board by the 30th day of the month following the end of each calendar semester (**30 July and 30 January**). The reports shall include the results of all monitoring programs listed herein.

2. Annual Report

An Annual Report, which summarizes the monitoring results for the prior year, shall be submitted to the Regional Board by **30 January** each year. The Discharger shall submit the Annual Report as specified in the Standard Provisions and Reporting Requirements. The report shall contain both tabular and graphical summaries of the detection and corrective action monitoring data and a discussion of the progress toward re-establishment of compliance with WDRs and the Water Quality Protection Standard (WQPS). In reporting the progress of corrective action, the report shall include contaminant contour maps for representative volatile organic compounds and inorganic constituents and compare the current plumes with those prior to the start of corrective action. The Annual Report shall be jointly submitted with the second semester Detection Monitoring Report.

3. Constituents-of-Concern (COC) Report

The Discharger shall submit reports of the results of ground water monitoring for the Constituents of Concern (COC) every 5 years, or more frequently if required. The ground water monitoring for COC Report shall alternate between the Fall and Spring seasons. The results of COC monitoring shall be submitted with, or reported in, the Annual Report for that year.

B. OTHER REPORTS

1. Water Quality Protection Standard Report

Any changes to the water quality protection standard are to be included in the Annual Report.

2. Notification of Release and Re-test

For any WMU, if the results of a detection monitoring program (DMP) shows that there is a measurably significant increase in an indicator parameter or waste constituents over the WQPS at or beyond the points of compliance (i.e., measurably significant evidence of an exceedance or release), the Discharger shall:

- a. immediately notify the Regional Board by telephone, email or fax of the exceedance,
- b. within seven days of the initial findings, follow up with written notification by certified mail (or acknowledgment of the Regional Board's finding),
- c. within 30 days of the initial finding, re-sample for the constituent(s) or parameter(s) at the

point where the standard was exceeded, and

- d. within 60 days of the initial finding, submit the results of the re-sampling and statistical analysis, indicating whether or not an exceedance or release was confirmed by the re-test.

3. New Release - Amended Programs

Upon verifying a measurably significant evidence of a release from a WMU according to Section 20420(j) of Title 27 and Section A.6 of this MRP, the Discharger shall follow the procedures and timeline set forth in the Standard Provisions and in Sections 20420(k) and 20425 of Title 27.

4. Existing Release

Within 30 days upon confirmation of an exceedance from an existing release, the Discharger shall submit for Regional Board staff approval an amendment to the Corrective Action Program, describing measures planned or taken to contain the release and further corrective action. The Discharger shall also note any necessary changes to the DMP and Corrective Action Monitoring Program monitoring locations as a result of the exceedance (see Section IV.B herein).

C. STANDARD OBSERVATIONS

Each monitoring report shall include a summary and certification of completion of all Standard Observations for the waste management unit, for the perimeter of the WMU, and for the receiving waters. The standard observations shall be performed on a weekly basis and shall include those elements as defined in the Standard Provisions and Reporting Requirements.

II. MONITORING PROGRAMS

A. SOLID WASTE MONITORING

The Discharger shall monitor and report all wastes discharged to each WMU on a monthly basis as follows:

Table II.A.1: Nonhazardous Solid Waste Monitoring

| <u>Parameter</u> | <u>Units</u> | <u>Reporting Frequency</u> |
|---------------------------------------|---------------------|----------------------------|
| Source(s) of material discharged | | Semi-annually |
| Maximum discharge elevation | MSL feet & tenths | Semi-annually |
| Results of Load Checking Program | --- | Semi-annually |
| Quantity discharged | Cubic yards or tons | Semi-annually |
| Type of material discharged | --- | Semi-annually |
| Capacity of landfill/module remaining | Percent | Annually |

Table II.A.2: Liquid and Semi-solid Waste Monitoring

The Discharger shall monitor all wastes discharged to the Class II surface impoundments on a daily basis and report to the Regional Board as follows:

| <u>Parameter</u> | <u>Units</u> | <u>Reporting Frequency</u> |
|-------------------------------|------------------------------|----------------------------|
| Quantity discharged | gallons, cubic yards or tons | Semi-annually |
| Type of liquid discharged | --- | Semi-annually |
| Capacity remaining | Percent/gallons | Semi-annually |
| Source of material discharged | --- | Semi-annually |
| Minimum freeboard | Feet & tenths | Semi-annually |

B. CONSTITUENTS OF CONCERN

Except as otherwise indicated in this Order, the Discharger shall monitor each media of each new and existing landfill module for applicable Constituents of Concern (per Subtitle D/State Water Resources Control Board Resolution 93-62). The monitoring locations, analytical methods, and frequency of analysis are as follows:

1. Monitoring Locations

- a. Leachate – As specified in Table II.C.1
- b. Unsaturated zone
 - i) pore fluid - lysimeters for monitoring each WMU, as identified in Table III.B.
- c. Groundwater - all monitoring wells screened in each location as follows:
 - i) each aquifer zone (shallow and deep) down gradient of each WMU or contiguous landfill WMUs
 - ii) upgradient background wells for each WMU or WMU group

2. Monitoring Schedule

**TABLE II.B.1
CONSTITUENTS OF CONCERN MONITORING**

| <u>Constituents of Concern¹</u> | <u>Units</u> | <u>Frequency</u> |
|---|--------------|----------------------------|
| Carbonate | mg/l | Every 5 years ² |
| Inorganics (dissolved) | mg/l | Every 5 years ² |
| Volatile Organic Compounds (EPA Method 8260B) | µg/l | Every 5 years ² |
| Semi-Volatile Organic Compounds (EPA Method 8270B) | µg/l | Every 5 years ² |
| Organochlorine Pesticides (EPA Method 8081A) | µg/l | Every 5 years ² |
| PCBs (EPA Method 8082) | µg/l | Every 5 years ² |
| Chlorophenoxy Herbicides (EPA Method 8151) | µg/l | Every 5 years ² |
| Organophosphorus Pesticides (EPA Method 8141A) | µg/l | Every 5 years ² |

1. The constituent-by-constituent listings for each of the above groups are included in Attachment F which accompanies this Order.
2. Except for leachate which shall be monitored for COCs annually (see Table II.C.2).

C. LEACHATE MONITORING

1. Monitoring Locations

The leachate monitoring locations shall be as follows:

TABLE II.C.1: LEACHATE MONITORING LOCATIONS

| WMU | Module | Impoundment | Monitoring Location |
|---------------|-----------------|-------------|-----------------------------------|
| 1, 2, 3, 4, 5 | --- | --- | LPS1 |
| 6 | A, B, C | --- | LPS2 |
| 6 | B | --- | LPS2, CEC-SC ¹ |
| 6 | D (Phase 1) | --- | 6D1-E-LS, 6D1-W-LS |
| 6 | D (Phase 2) | --- | 6D2-E-LS, 6D2-W-LS |
| 6 | D - bioreactors | | Pressure transducers ² |
| G | --- | G | G-LD |
| H | --- | H1, H2, H3 | H1-LD, H2-LD, H3-E-LD, H3-W-LD |

1. "CEC-SC was formerly called "CEC-LYS", and as described in the In the *Amended Report of Waste Discharge Proposing a Corrective Action Program for WMU 6B, 6C, and G submitted to the RWQCB on March 26, 2004*, this was an incorrect naming of this monitoring point since it does not actually monitor the vadose zone under WMU 6B, but is a secondary containment for the CEC Enhanced Control Cell.
2. Includes pressure transducers in LCRS trenches and on geocomposite drainage layer.

2. Monitoring Schedule

Leachate monitoring shall be conducted as specified in Table II.C.2.

**TABLE II.C.2
 LEACHATE MONITORING PROGRAM
 (ALSO USE FOR UNSATURATED ZONE MONITORING)**

| <u>Parameter</u> | <u>Units</u> | <u>Frequency</u> |
|---|--------------------------|------------------|
| <i>Field Parameters</i> | | |
| Flow Rate ¹ | Gallons/day | Monthly |
| Volume | Gallons | Monthly |
| Specific Conductance | µmhos/cm | Monthly |
| pH | pH units | Monthly |
| Hydraulic head ² | ft | continuously |
| <i>Monitoring Parameters</i> ³ | | |
| Ammonia as N | mg/l | Semi-annually |
| Bicarbonate | mg/l | Semi-annually |
| Chloride | mg/l | Semi-annually |
| Nitrate | mg/l | Semi-annually |
| Sulfates | mg/l | Semi-annually |
| Total Alkalinity | mg/l | Semi-annually |
| Total Kjeldahl Nitrogen | mg/l | Semi-annually |
| Total Dissolved Solids (TDS) | mg/l | Semi-annually |
| Inorganics (dissolved) | mg/l | Annually |
| Volatile Organic Compounds | µg/l | Semi-annually |
| <i>Constituents of Concern</i> | | |
| Table II.B.1 constituents ^{1,4} | Varies, see Table II.B.1 | Annually |

1. Leachate monitoring only.

2. Module D bioreactors only.

3. The constituent-by-constituent listing for Monitoring Parameters is included in Attachment E, which accompanies this Order.

4. The constituent-by-constituent listing for Constituents of Concern is included in Attachment F, which accompanies this Order.

Upon detection of leachate in a previously dry sump or pump station, the leachate shall be sampled in accordance with the above schedule and the results included in the monitoring report

All visible portions of synthetic liners shall be inspected on a monthly basis. If, during the active life of the impoundment, the wastes are removed and the impoundment is cleaned down to the liner, an inspection shall be made of the bottom liner prior to refilling of the impoundment.

Each landfill and surface impoundment LCRS shall be hydraulically tested annually to demonstrate that it is still operating in conformance with the WDRs (i.e., no clogging, collapse,

or reduced drainage capacity). The results shall be reported to the Regional Board in the annual report and include comparison with earlier tests made under comparable conditions.

D. GROUNDWATER ELEVATION MONITORING

The ground water surface elevation (in feet and hundredths, MSL) in all wells and piezometers shall be measured on a quarterly basis and used to determine the gradient and direction of ground water flow. Groundwater elevations taken prior to purging the well and sampling for Monitoring Parameters may be used to fulfill this requirement. Groundwater elevations for all up-gradient and down-gradient wells for a given groundwater body shall be measured within a period of time short enough to avoid temporal variations in groundwater flow which could preclude accurate determination of groundwater gradient and direction. This information shall be included in the semi-annual monitoring reports. The results of ground water elevation monitoring shall be displayed on a water table contour map and/or ground water flow net for the site and submitted with the semi-annual monitoring reports.

III. DETECTION MONITORING

A. GENERAL

The Discharger shall perform Detection Monitoring on all media potentially affected by a release, including surface water, groundwater, and the unsaturated zone. For any given monitored medium, a sufficient number of samples shall be taken from all Monitoring Points and Background Monitoring Points to satisfy the data analysis requirements for a given Reporting Period, and shall be taken in a manner that ensures sample independence to the greatest extent feasible.

The Discharger shall use a Regional Board-approved statistical (or non-statistical) procedure to determine whether there has been a measurably significant increase in a constituent over the water quality protection standard, as set forth in Section 20415(e)(7) of Title 27.

B. UNSATURATED ZONE

Unsaturated zone monitoring devices shall be checked monthly for fluid and monitoring shall include the volume of fluid recovered. The monitoring locations shall be as follows:

1. Monitoring Locations

WMUs 1 through 6A were constructed before 1992 and do not have unsaturated zone monitoring. Further, WMUs 1 through 5 are in corrective action. The unsaturated zone monitoring for the remaining WMUs consists of pan and vacuum lysimeters placed in the subgrade of each landfill unit and surface impoundment. The unsaturated zone monitoring points shall be as listed in Tables III.B below (and as shown in Attachment C):

Table III.B
Unsaturated Zone Monitoring Locations

| <u>WMU</u> | <u>Lysimeter</u> |
|-----------------|--|
| 6A | --- |
| 6B ¹ | 6B-N-LYS, 6B-S-LYS |
| 6C ² | 6C-N-LYS, 6C-S-LYS |
| 6D ³ | 6D1-E-LYS, 6D1-W-LYS (Phase 1) 6D2-E-LYS, 6D2-W-LYS (Phase 2) |
| G ⁴ | G-LYS-1, G-LYS-2, and G-LYS-3 |
| H1 ⁴ | H1-LYS |
| H2 ⁴ | H2-LYS |
| H3 ⁴ | H3-E-LYS and H3-W-LYS |

1. Module B has strip drains consisting of geomembrane, geonet and geotextile from bottom to top, underneath the northern and southern LCRS trenches (which connect directly to the trunk line on the eastern perimeter of the module). The strip drains direct flow to separate pan lysimeter manholes on the eastern side of the module (north and south half). The northern pan lysimeter manhole also services the strip drains under the two LCRS trenches for the pilot bioreactor cells.
2. Module C has vacuum lysimeters above the capillary break on the northern and southern half. The vacuum lysimeters are accessed by riser pipe which extends up the slope of the perimeter berm. Lysimeter 6C-S-LYS has been moved from detection monitoring to corrective action monitoring due to the confirmed presence of VOCs in this lysimeter as stated in the WDRs.
3. Module D, phase 1 capillary fringe break covers the entire unit, but has strip drains consisting of geonet covered with geotextile under the LCRS trenches and in several locations in "dendritic" format draining towards the low points of the liner, which are under the LCRS trenches and drain north to south. Module D, phase 2 capillary fringe break covers the entire cell and has a blanket geocomposite over the entire unit draining towards the low points in the liner, which are under the LCRS trenches and drain north to south. Both Module D, phase 1 and phase 2 have pan lysimeters located at the southern perimeter of unit, which are part of the capillary fringe break liner, and into which the strip drains and blanket geocomposite (respectively) drain.
4. Vacuum lysimeters were installed underneath the sumps of each surface impoundment and are accessed by riser pipe which extends up the slope of the perimeter berms.

If liquid is detected in a lysimeter that has always been dry, a sample shall be collected immediately and analyzed for the monitoring parameters listed in Table II.C.2. Lysimeters shall constitute the "points of compliance" with respect to soil-pore liquid.

2. Monitoring Schedule

The monitoring schedule for unsaturated zone monitoring shall be the same as that for leachate monitoring (Table II.C.2).

C. GROUNDWATER

1. Monitoring Locations

WMUs 1 through 5 and G are in corrective action. The groundwater detection monitoring points for WMUs 6 and H, shown in Attachment D, are as follows:

**TABLE III.C.1
Ground Water Detection Monitoring Locations**

| <u>WMU</u> | <u>Aquifer</u> | <u>Monitoring Method</u> ⁴ | <u>Background</u> | <u>Detection</u> ¹ |
|------------------|----------------|---------------------------------------|-------------------|-------------------------------|
| 6 A ² | shallow | Intrawell | OW10, LTPZA, | EW10, EW16 ³ |
| B | shallow | Intrawell | LTPZB, OW10 | EW10, EW16 ³ |
| C | shallow | Intrawell | LTPZC, OW15 | EW10, EW16 ³ |
| D | shallow | Intrawell | LTPZD, OW14, OW23 | EW10, EW16 ³ |
| H | shallow | Intrawell | SIMW5, OW14, OW17 | OW23, SIMW4 |

1. Gradient created by line of extraction wells used for detection monitoring
2. All four modules (A, B, C, and D) are contiguous
3. Wells used for de-watering only (not part of corrective action system).
4. Intrawell analysis was approved by Regional Board staff following a demonstration made by the Discharger in the First Semester 2003 Monitoring Report.

The natural gradient cannot be used as the reference gradient for detection monitoring purposes because the WMUs are within the influence of the extraction system. The gradient created by the extraction system, which runs from southeast to northwest, is therefore used instead.

2. Monitoring Schedule - The analytes and frequency of groundwater monitoring is as follows:

**TABLE III.C.2
GROUNDWATER MONITORING PROGRAM¹**

| <u>Parameter</u> | <u>Units</u> | <u>Frequency</u> |
|---|------------------------|------------------|
| <i>Field Parameters</i> | | |
| Temperature | °C | Semi-annually |
| Groundwater Elevation | Feet & hundredths, MSL | Semi-annually |
| Turbidity | turbidity units | Semi-annually |
| Specific Conductance | µmhos/cm | Semi-annually |
| pH | pH units | Semi-annually |
| <i>Monitoring Parameters</i> ¹ | | |
| Ammonia, as N | mg/l | Semi-annually |
| Bicarbonate | mg/l | Semi-annually |
| Chlorides | mg/l | Semi-annually |
| Nitrate | mg/l | Semi-annually |
| Sulfates | mg/l | Semi-annually |
| Total Alkalinity | mg/l | Semi-annually |
| Total Kjeldahl Nitrogen | mg/l | Semi-annually |
| TDS | mg/l | Semi-annually |
| Inorganics (dissolved) | mg/l | Annually |
| VOCs | µg/l | Semi-annually |
| <i>Constituents of Concern</i> ² | | |
| Table II.B.1 constituents | µg/l | Every 5 years |

1. The constituent-by-constituent listing for Monitoring Parameters is included in Attachment E, which accompanies this Order.
2. The constituent-by-constituent listing for Constituents of Concern is included in Attachment F, which accompanies this Order.

D. SURFACE WATER

1. Monitoring Locations

The Discharger shall monitor surface water at a representative background location and at the location, or locations where surface water flows offsite from the landfill facility. These locations have not been previously designated by the Discharger and are therefore not designated in this MRP.

2. Monitoring Schedule

The monitoring schedule for surface water shall be the same as for groundwater as specified in Table III.2.C, with the exception of “Groundwater Elevation” which does not apply.

IV. CORRECTIVE ACTION

A. GROUNDWATER EXTRACTION

Groundwater extraction is conducted for the purpose of both corrective action and de-watering to maintain separation from the base of the modules. The extraction well network, shown in Attachment D, is as follows:

**TABLE IV.A.1
GROUNDWATER EXTRACTION WELLS**

| <u>WMU</u> | <u>Aquifer</u> | <u>Purpose</u> | <u>Extraction Wells</u> |
|------------|----------------|-----------------------------------|-------------------------|
| 1 | Shallow | corrective action | EWs 1 through 8 |
| 2 | Shallow | corrective action | EWs 1 through 8 |
| 3 | Shallow | corrective action | EWs 1 through 8 |
| 4 | Shallow | corrective action | EWs 1 through 8 |
| 5 | Shallow | corrective action and de-watering | EWs 1 through 8 |
| 6 | Shallow | de-watering | EWs 9 through 16 |

B. CORRECTIVE ACTION MONITORING

1. Monitoring Locations

The corrective action monitoring points, shown in Attachment D, are as follows:

TABLE IV.B.1
Corrective Action Monitoring Locations

| <u>Source Area</u> | <u>Monitoring Method</u> | <u>Background Wells</u> | <u>Shallow Wells</u> | <u>Deep Wells</u> | <u>Lysimeter</u> |
|--------------------|--------------------------|-------------------------|----------------------|-------------------|------------------|
| WMU 1, 2 | Intrawell ¹ | OW1, OW4, OW5 | OW17, OW18, OW21 | PZ1, DW1, DW2 | N/A |
| WMU 3 | Intrawell | OW5, OW6 | OW26, OW27 | DW6 | N/A |
| WMU 4, 5 | Intrawell | OW7, OW24 | EW2, EW7 | DW7 | N/A |
| WMU 6C | N/A | N/A | N/A | N/A | 6C-S-LYS |
| WMU G ² | Intrawell | SIMW1 | OW18, SIMW4 | DW2 | N/A |

1. Each well functions as its own background well.
2. The pond which WMU G replaced was unlined and may have impacted the vadose zone.

As of the Second Semester 2003, the following wells have confirmed detections of VOCs: OW18, OW27, EW2, EW7, DW1, and DW2. The other wells in the corrective action program have had sporadic detections of VOCs but are not considered impacted at this time.

2. Monitoring Schedule

The monitoring schedule for the corrective action wells shall be the same as for detection monitoring (see Table III.C.2).

C. WATER QUALITY PROTECTION STANDARD

The Water Quality Protection Standard (Standard) consists of the following elements:

1. Constituents of Concern

The 'COC list' (list of Constituents of Concern required under Title 27 shall include all constituents listed in Attachment F. The Discharger shall monitor all COCs every five years, or more frequently as required.

2. Concentration Limits

Concentration limits for all monitoring parameters and constituents-of-concern shall be calculated anew using data collected during each monitoring event and including all available historical background data. Any data point that tests as an outlier shall not be used in the data set.

Inorganic Data Evaluation:

Concentration limits for inorganic constituents shall be calculated using either an interwell or intrawell tolerance limit as required in Table III.C.1 and Table IV.B.1, above. Parameters not requiring concentration limits include temperature, oxygen reduction potential, turbidity, and dissolved oxygen. The upper tolerance limit shall be used for all constituents and parameters except for pH for which both upper and lower limits shall be calculated.

A **parametric tolerance limit** shall be calculated if the background data set passes a normality test using the Coefficient of Variation Test, and if less than 50 percent of the data is non-detect. If the data tests as normally distributed and greater than 15 percent but less than 50 percent of the background data is non-detect, the mean and standard deviation of the data set shall be adjusted using the Aichison's Method and a tolerance limit shall be calculated using the adjusted values.

A **nonparametric tolerance limit** shall be calculated when the background data set contains greater than 50 percent non-detects (except when normally distributed and greater than 15 percent of the data is non-detect), and/or the data distribution is not normal or transformed normal. A concentration limit shall only be calculated using this method when the data set contains enough points to achieve a false positive rate of 5 percent or less.

Organic Data Evaluation:

The concentration limit for non-naturally occurring organic constituents shall be the method detection limit.

3. Monitoring Points

The groundwater monitoring points for detection monitoring shall be the monitoring locations listed in Table III.C.1. The unsaturated zone monitoring points shall consist of those lysimeters installed beneath waste management units as listed in Table III.B. All detection monitoring points are shown on Attachments C and D.

4. Points of Compliance

The point(s) of compliance at each groundwater monitoring point is the vertical surface located at the downgradient limit of the WMU that extends through the uppermost aquifer underlying the WMU. Since the WMUs are contiguous, these points correspond the corrective action and de-water wells on the northern boundary of the site as listed in Table III.C.1 and IV.B.1.

5. Compliance Period

The Compliance Period is the number of years equal to the active life of the waste management unit plus the closure period. Each time the Water Quality Protection Standard is exceeded (i.e., a release is discovered), the landfill begins a Compliance Period on the date the Regional Board directs the Discharger to begin an Evaluation Monitoring Program. If the Discharger's Corrective Action Program (CAP) has not achieved compliance with the Standard by the scheduled end of the Compliance Period, the Compliance Period is automatically extended until the landfill has been in continuous compliance for at least three consecutive years.

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

Ordered by: _____

THOMAS R. PINKOS
Executive Officer

10 September 2004
(Date)

WLB

INFORMATION SHEET

ORDER NO. R5-2004-0134
COUNTY OF YOLO
PLANNING AND PUBLIC WORKS DEPARTMENT
YOLO COUNTY CENTRAL LANDFILL
CLASS III LANDFILLS & CLASS II SURFACE IMPOUNDMENTS
CONSTRUCTION, OPERATION, CLOSURE, POST-CLOSURE MAINTENANCE
AND CORRECTIVE ACTION
YOLO COUNTY

The County of Yolo, Planning and Public Works Department, (hereafter Discharger) owns and operates the Yolo County Central Landfill, a Class III municipal solid waste (MSW) disposal facility with Class II surface impoundments. The landfill has been in operation since 1975, servicing the incorporated and unincorporated areas of Yolo County. The landfill accepts solid wastes classified as “inert” and “nonhazardous” under Sections 20220 and 20230, Title 27 of the California Code of Regulations (Title 27). Approximately 185,000 tons per year of MSW and other waste are disposed at the site.

Facilities

The waste disposal facilities include six Class III landfills (WMUs 1-6), two Class II surface impoundments (WMUs G and H), and a pilot-scale bioreactor demonstration project. WMUs 1-4 are unlined; WMU 5 is clay-only lined; and WMU 6 contains multiple modules that are compositely lined. Module D of WMU 6 contains a full-scale bioreactor project in cooperation with the Regional Board and USEPA. Other landfill facilities include borrow areas for module construction, a ground water extraction and treatment system, storm water drainage ditches and a storm water retention pond, a supply water storage pond, two leachate pump stations, gas extraction facilities, pipelines, and an onsite power plant for co-generation of electricity. Diversion facilities include a materials recycling area, a household hazardous waste collection area, and a wood/yard-waste facility.

There are currently 63 ground water monitoring wells at the facility, including 43 shallow observation wells, 15 extraction wells (EWs 1 through 14, and EW16), and five deep wells (DWs-1, 2, 6 and 7, and PZ1). The shallow observation wells are OWs 1 through 28, SIMWs 1, 4, and 5, LPTZs A, B, C, and D, PZs 3 through 7, and DIMWs 1, 2, and 3. As described in the WDRs, the ground water on the western part of the site is impacted by VOCs from the older landfill units.

The existing onsite surface water drainage facilities include perimeter ditches at all WMUs and one storm water sedimentation basin. The facility has obtained coverage under the General Industrial Storm Water Permit for storm water discharges. The permit applies to direct storm water discharges and storm water discharges from the sedimentation basin. This Order also requires monitoring of landfill constituents in storm water at a background location and at the location where runoff leaves the facility.

Leachate Handling

WMUs 1 through 4 are constructed on compacted sub-grade, which has been graded for leachate runoff. A perimeter trench captures leachate runoff from these units and conveys it to a trunk line to Pump Station No. 1. Since the trench is below grade, it may also be capturing ground water when ground water is high. Since these units are unlined and do not have an LCRS, any leachate that does not runoff to the perimeter drains has the potential to percolate to ground water and impact ground water. WMU H is plumbed to Pump Stations No. 1 and 2, and WMU 6D. Leachate from the WMU 6D sumps is directly pumped to the surface impoundment WMU H. The impoundment will be used to store landfill leachate during the wet season and evaporate it during the dry season. The large pond is equipped with spray and drip facilities to enhance evaporation. Pump station No.1 collects leachate from WMUs 1 through 5. Pump Station No. 2 collects leachate from WMU 6A, 6B, and 6C.

Corrective Action

Groundwater on the western part of the site has been impacted by volatile organic compounds (VOCs) from one or more of the older landfill units (WMUs 1 through 5). After installation an air stripper unit in 1993, the Discharger began groundwater pump and treat using existing de-watering wells that were installed between the landfills and a slurry wall to maintain the required groundwater separation from waste. The treated groundwater was formerly discharged to surface water under an NPDES permit but is now discharged to land under separate WDRs due to high boron and selenium concentrations.

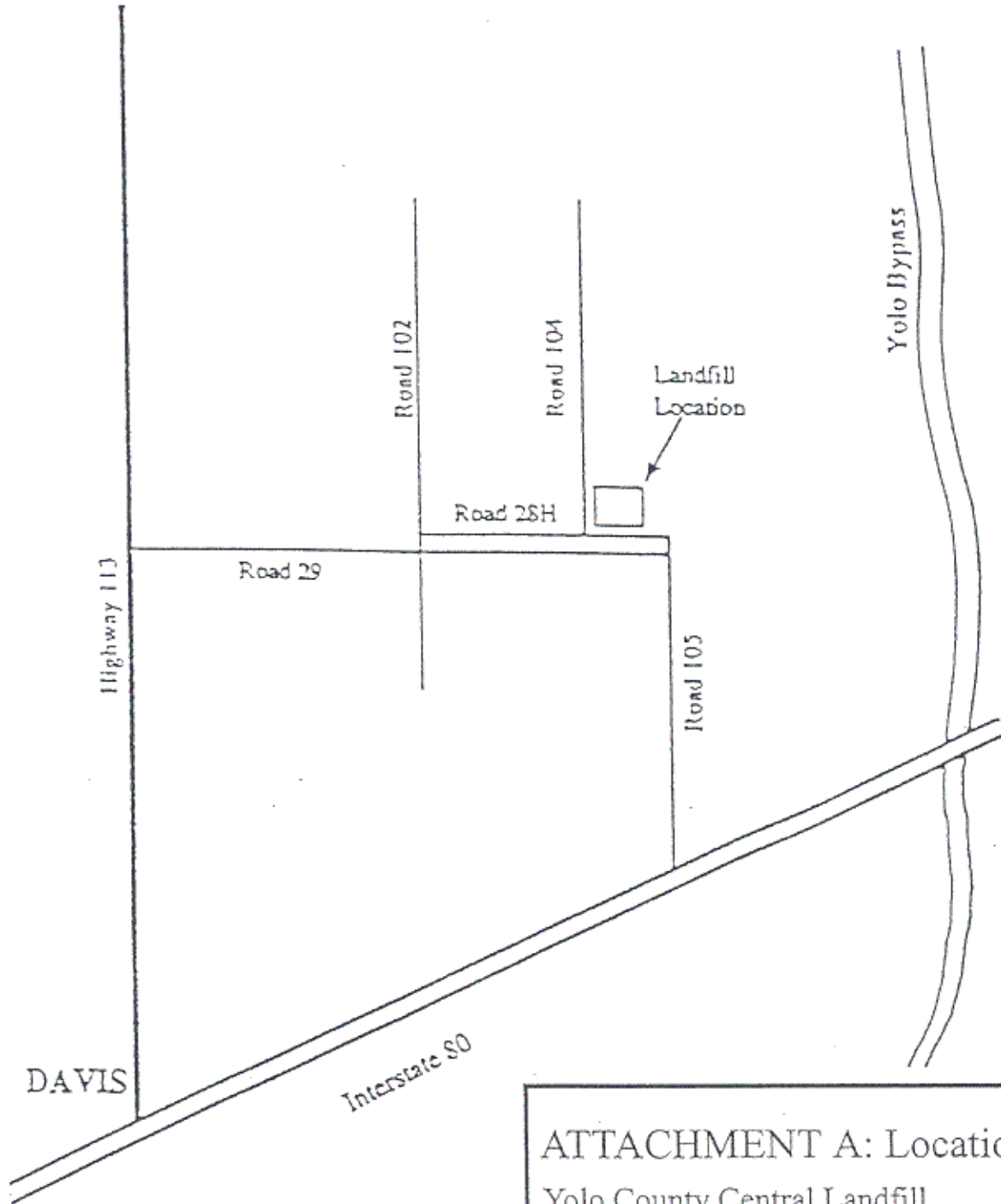
Through a recent Evaluation Monitoring Program, the Discharger confirmed a release from WMU 6, Module C in one of the suction lysimeters. The Discharger proposed to install additional landfill gas extraction wells in this module as a corrective action measure to address VOCs detected in the lysimeter. This Order requires the Discharger to install these additional landfill gas extraction wells.

Bioreactor Project and Liner System Requirements

As a follow-up to the pilot bioreactor project, the Discharger is operating a full-scale bioreactor demonstration project at WMU6, Module D. The project consists of both anaerobic and aerobic bioreactor cells. Instrumentation is placed in bioreactors to monitor moisture levels and other process parameters. The information is used to adjust liquid injection levels as necessary to stay below the moisture holding capacity of the waste mass. These WDRs require that the Discharger not exceed the moisture holding capacity of the landfill, as defined in Title 27. The WDRs also require that the Discharger maintain waiver from the USEPA regarding the restrictions on liquid additions to Subtitle D landfills contained in 40 CFR 258.28 before adding certain supplemental liquids to the bioreactor.

The bioreactors utilize a Subtitle D composite liner system, which is underlain by engineered fill to maintain separation from groundwater, and the engineered fill is underlain by a groundwater barrier layer to prevent groundwater from rising above the required separation level. Phase 2 of Module D (and future modules) are also required to have a drainage layer above the groundwater barrier layer that drains to a pan lysimeter to monitor the entire unsaturated zone beneath the composite liner system. This liner system design was demonstrated by the Discharger to meet the performance standards of Title 27.

WOODLAND



DAVIS

Interstate 80

Yolo Bypass

Landfill
Location

Road 28H

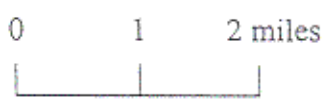
Road 102

Road 104

Road 29

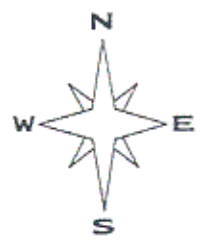
Road 105

Highway 113



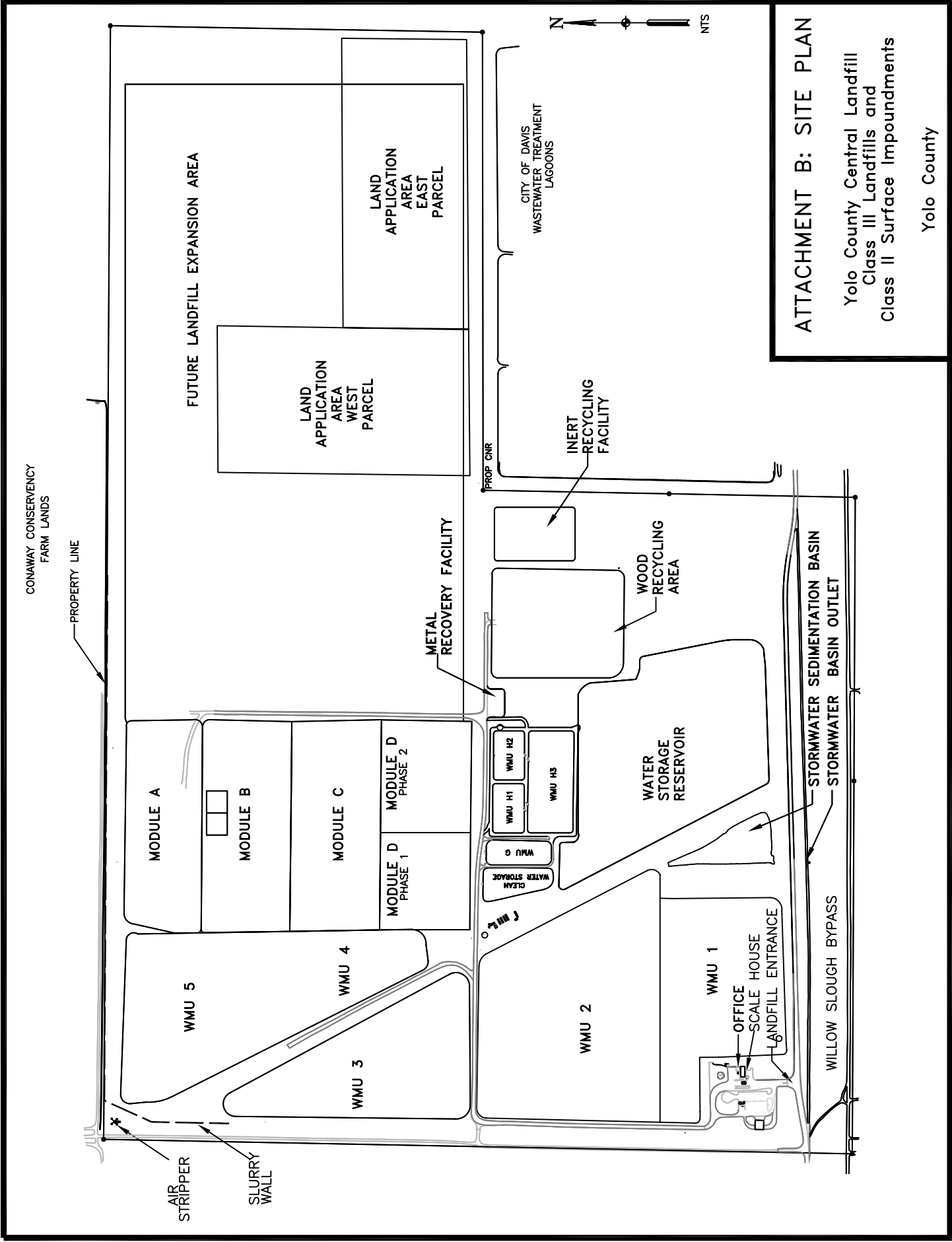
ATTACHMENT A: Location Map

Yolo County Central Landfill
Class III Landfills and
Class II Surface Impoundments



Yolo County

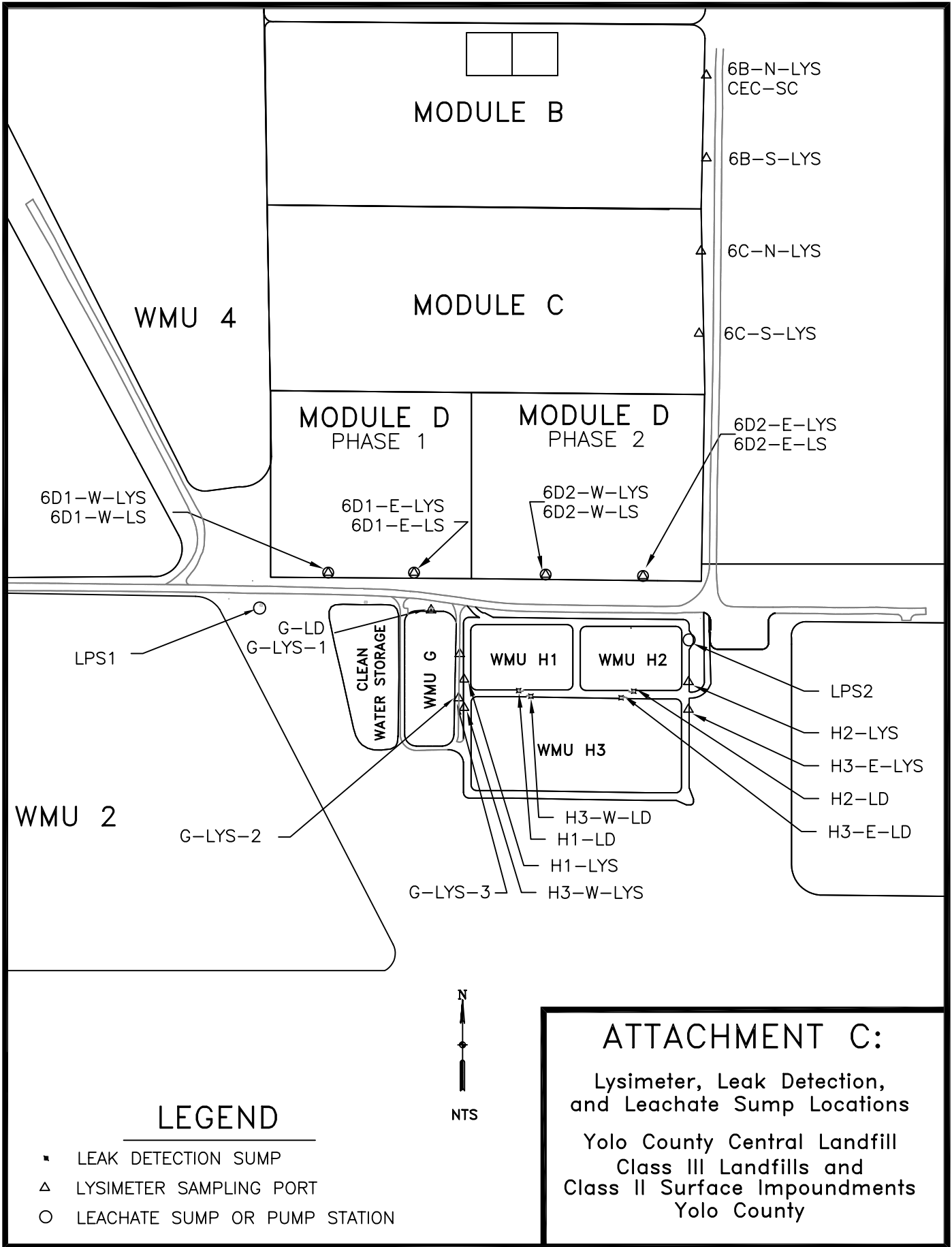
Sections 29&30 T9N, R3E MDB&M



ATTACHMENT B: SITE PLAN

Yolo County Central Landfill
 Class III Landfills and
 Class II Surface Impoundments

Yolo County



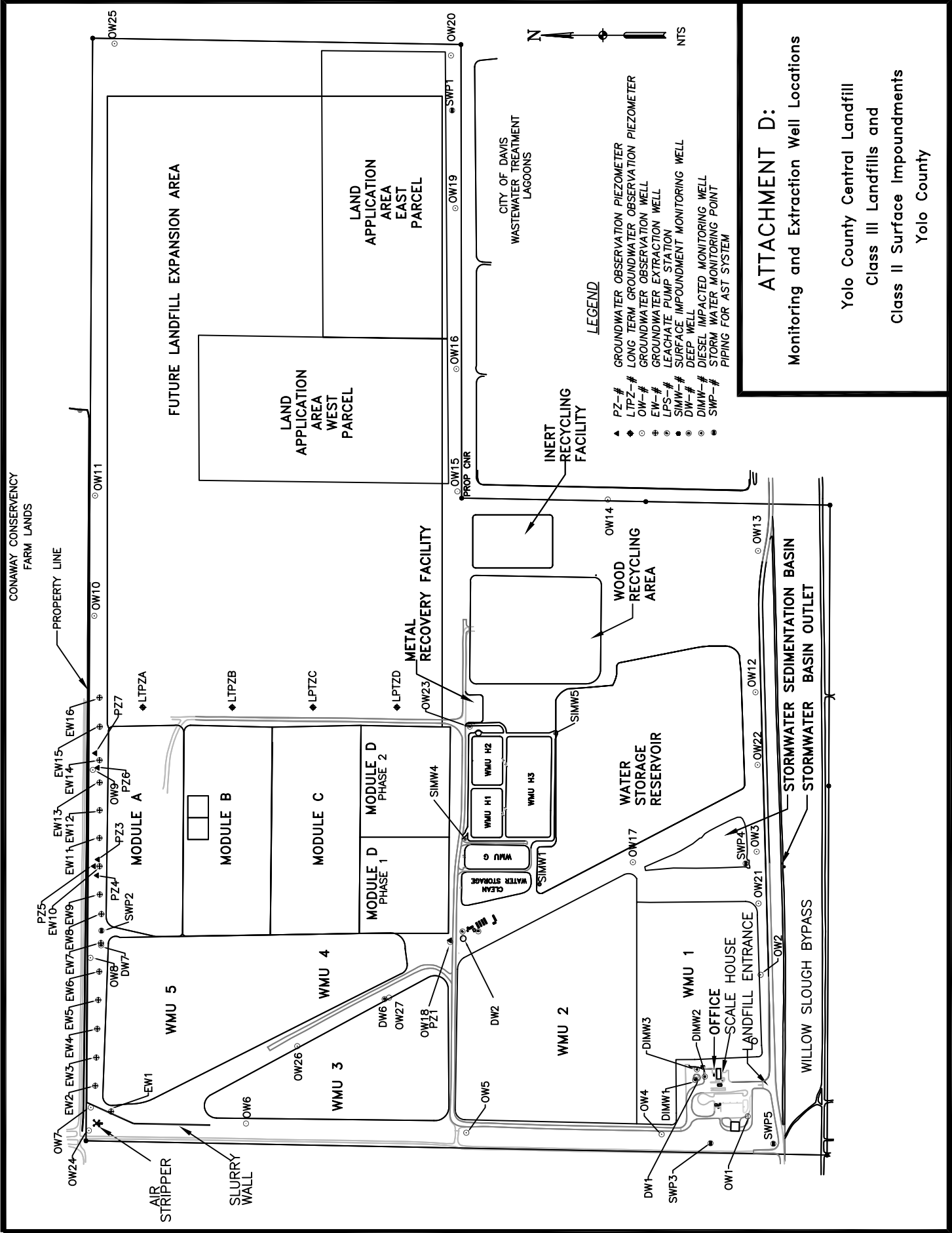
LEGEND

- ▣ LEAK DETECTION SUMP
- ▲ LYSIMETER SAMPLING PORT
- LEACHATE SUMP OR PUMP STATION

ATTACHMENT C:

Lysimeter, Leak Detection,
and Leachate Sump Locations

Yolo County Central Landfill
Class III Landfills and
Class II Surface Impoundments
Yolo County



ATTACHMENT D:
Monitoring and Extraction Well Locations

Yolo County Central Landfill
 Class III Landfills and
 Class II Surface Impoundments
 Yolo County

- LEGEND**
- ▲ PZ-# GROUNDWATER OBSERVATION PIEZOMETER
 - ◆ LPTZ-# LONG TERM GROUNDWATER OBSERVATION PIEZOMETER
 - OW-# GROUNDWATER OBSERVATION WELL
 - ⊕ EW-# GROUNDWATER EXTRACTION WELL
 - ⊕ LPS-# LEACHATE PUMP STATION
 - DW-# DEEP WELL
 - DIMW-# SURFACE IMPOUNDMENT MONITORING WELL
 - SWP-# DIESEL IMPACTED MONITORING WELL
 - SWP-# STORM WATER MONITORING POINT
 - PIPING FOR AST SYSTEM

CONWAY CONSERVANCY
 FARM LANDS

CITY OF DAVIS
 WASTEWATER TREATMENT
 LAGOONS

WATER STORAGE
 RESERVOIR

WOOD
 RECYCLING
 AREA

METAL
 RECOVERY FACILITY

INERT
 RECYCLING
 FACILITY

FUTURE LANDFILL EXPANSION AREA

LAND APPLICATION
 AREA
 WEST
 PARCEL

LAND APPLICATION
 AREA
 EAST
 PARCEL

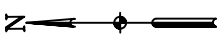
AIR STRIPPER

SLURRY WALL

WILLOW SLOUGH BYPASS

STORMWATER SEDIMENTATION BASIN
 STORMWATER BASIN OUTLET

PROPERTY LINE



NTS

ATTACHMENT E

MONITORING PARAMETERS & APPROVED USEPA ANALYTICAL METHODS

General

Ammonia as N
Bicarbonate
Chloride
Nitrate
Sulfates
Total Alkalinity
Total Kjeldahl Nitrogen
Total Dissolved Solids

| Inorganics ¹ | USEPA Method: |
|-------------------------|---------------|
| Cobalt | 6020 |
| Copper | 6020 |
| Iron | 6010B |
| Manganese | 6010B |
| Vanadium | 6010B |
| Zinc | 6010B |
| Nickel | 6020 |
| Potassium | 6010B |

1. Leachate, groundwater, and unsaturated zone samples shall be analyzed and reported as dissolved

Volatile Organic Compounds (VOCs)¹ (by USEPA Method 8260B):

Acetone
Acrylonitrile
Benzene
Bromochloromethane
Bromodichloromethane
Bromoform (Tribromomethane)
Carbon disulfide
Carbon tetrachloride
Chlorobenzene
Chloroethane (Ethyl chloride)
Chloroform (Trichloromethane)
Dibromochloromethane (Chlorodibromomethane)
1,2-Dibromo-3-chloropropane (DBCP)

ATTACHMENT E (CONTINUED)

1,2-Dibromoethane (Ethylene dibromide; EDB)
o-Dichlorobenzene (1,2-Dichlorobenzene)
p-Dichlorobenzene (1,4-Dichlorobenzene)
trans- 1,4-Dichloro-2-butene
1,1-Dichloroethane (Ethylidene chloride)
1,2-Dichloroethane (Ethylene dichloride)
1,1-Dichloroethylene (1,1-Dichloroethene; Vinylidene chloride)
cis-1,2-Dichloroethylene (cis- 1,2-Dichloroethene)
trans-1,2-Dichloroethylene (trans-1,2-Dichloroethene)
1,2-Dichloropropane (Propylene dichloride)
cis-1,3-Dichloropropene
trans-1,3-Dichloropropene
Ethylbenzene
2-Hexanone (Methyl butyl ketone)
Methyl bromide (Bromomethene)
Methyl chloride (Chloromethane)
Methylene bromide (Dibromomethane)
Methylene chloride (Dichloromethane)
Methyl ethyl ketone (MEK; 2-Butanone)
Methyl iodide (Iodomethane)
Methyl tert-butyl ether (MTBE)
4-Methyl-2-pentanone (Methyl isobutylketone)
Styrene
1,1,1,2-Tetrachloroethane
1,1,2,2-Tetrachloroethane
Tetrachloroethylene (Tetrachloroethene; Perchloroethylene)
Toluene
1,1,1-Trichloroethane (Methylchloroform)
1,1,2-Trichloroethane
Trichloroethylene (Trichloroethene)
Trichlorofluoromethane (CFC-11)
1,2,3-Trichloropropane
Vinyl acetate
Vinyl chloride
Xylenes

1. Report all peaks identified by the EPA test methods.

ATTACHMENT F

CONSTITUENTS OF CONCERN & APPROVED USEPA ANALYTICAL METHODS

| Inorganics ¹ | USEPA Method: |
|--------------------------------|---------------|
| Aluminum | 6010B |
| Antimony | 6020 |
| Barium | 6010B |
| Beryllium | 6010B |
| Cadmium | 6020 |
| Calcium | 6010B |
| Chromium | 6010 |
| Chromium VI ⁺ | 7196A |
| Cobalt | 6020 |
| Copper | 6020 |
| Iron | 6010B |
| Manganese | 6010B |
| Magnesium | 6010B |
| Potassium | 6010B |
| Silver | 6020 |
| Sodium | 6010B |
| Tin | 6010B |
| Vanadium | 6010B |
| Zinc | 6010B |
| Arsenic | 6020 |
| Lead | 6020 |
| Mercury | 7470A |
| Nickel | 6020 |
| Selenium | 6020 |
| Thallium | 6020 |
| Cyanide, Total | 9012A |
| Sulfide, Total | 376.2 |

1. Leachate, groundwater, and unsaturated zone samples shall be analyzed and reported as dissolved, except as noted above.

Volatile Organics (USEPA Method 8260B):

Acetone
Acetonitrile (Methyl cyanide)
Acrolein
Acrylonitrile
Allyl chloride (3-Chloropropene)

ATTACHMENT F (CONTINUED)

Benzene
Bis(2-ethylhexyl) phthalate
Bromochloromethane (Chlorobromomethane)
Bromodichloromethane (Dibromochloromethane)
Bromoform (Tribromomethane)
Carbon disulfide
Carbon tetrachloride
Chlorobenzene
Chloroethane (Ethyl chloride)
Chloroform (Trichloromethane)
Chloroprene
Dibromochloromethane (Chlorodibromomethane)
1,2-Dibromo-3-chloropropane (DBCP)
1,2-Dibromoethane (Ethylene dibromide; EDB)
o-Dichlorobenzene (1,2-Dichlorobenzene)
m-Dichlorobenzene (1,3-Dichlorobenzene)
p-Dichlorobenzene (1,4-Dichlorobenzene)
trans- 1,4-Dichloro-2-butene
Dichlorodifluoromethane (CFC 12)
1,1-Dichloroethane (Ethylidene chloride)
1,2-Dichloroethane (Ethylene dichloride)
1,1-Dichloroethylene (1,1-Dichloroethene; Vinylidene chloride)
cis- 1,2-Dichloroethylene (cis- 1,2-Dichloroethene)
trans- 1,2-Dichloroethylene (trans- 1,2-Dichloroethene)
1,2-Dichloropropane (Propylene dichloride)
1,3-Dichloropropane (Trimethylene dichloride)
2,2-Dichloropropane (Isopropylidene chloride)
1,1 -Dichloropropene
cis- 1,3-Dichloropropene
trans- 1,3-Dichloropropene
Ethylbenzene
Hexachlorobutadiene
2-Hexanone (Methyl butyl ketone)
Isobutyl alcohol
Isodrin
Methacrylonitrile
Methyl bromide (Bromomethane)
Methyl chloride (Chloromethane)
Methyl ethyl ketone (MEK; 2-Butanone)
Methyl iodide (Iodomethane)

ATTACHMENT F (CONTINUED)

Methyl methacrylate
Methyl tert-butyl ether (MTBE)
4-Methyl-2-pentanone (Methyl isobutyl ketone)
Methylene bromide (Dibromomethane)
Methylene chloride (Dichloromethane)
Naphthalene
Propionitrile (Ethyl cyanide)
Styrene
1,1,1,2-Tetrachloroethane
1,1,2,2-Tetrachloroethane
Tetrachloroethylene (Tetrachloroethene; Perchloroethylene; PCE)
Toluene
1,2,4-Trichlorobenzene
1,1,1-Trichloroethane, Methylchloroform
1,1,2-Trichloroethane
Trichloroethylene (Trichloroethene; TCE)
Trichlorofluoromethane (CFC- 11)
1,2,3-Trichloropropane
Vinyl acetate
Vinyl chloride (Chloroethene)
Xylene (total)

Semivolatile Organics (USEPA Method 8270B - base, neutral, & acid extractables):

Acenaphthene
Acenaphthylene
Acetophenone
2-Acetylaminofluorene (2-AAF)
Aldrin
4-Aminobiphenyl
Anthracene
Benzo[a]anthracene (Benzanthracene)
Benzo[b]fluoranthene
Benzo[k]fluoranthene
Benzo[g,h,i]perylene
Benzo[a]pyrene
Benzyl alcohol
alpha-BHC
beta-BHC
delta-BHC

ATTACHMENT F (CONTINUED)

gamma-BHC (Lindane)
Bis(2-chloroethoxy)methane
Bis(2-chloroethyl) ether (Dichloroethyl ether)
Bis(2-chloro-1-methylethyl) ether (Bis(2-chloroisopropyl) ether; DCIP)
4-Bromophenyl phenyl ether
Butyl benzyl phthalate (Benzyl butyl phthalate)
Chlordane
p-Chloroaniline
Chlorobenzilate
p-Chloro-m-cresol (4-Chloro-3-methylphenol)
2-Chloronaphthalene
2-Chlorophenol
4-Chlorophenyl phenyl ether
Chrysene
o-Cresol (2-methylphenol)
m-Cresol (3-methylphenol)
p-Cresol (4-methylphenol)
4,4'-DDD
4,4'-DDE
4,4'-DDT
Diallate
Dibenz[a,h]anthracene
Dibenzofuran
Di-n-butyl phthalate
o-Dichlorobenzene (1,2-Dichlorobenzene)
m-Dichlorobenzene (1,3-Dichlorobenzene)
p-Dichlorobenzene (1,4-Dichlorobenzene)
3,3'-Dichlorobenzidine
2,4-Dichlorophenol
2,6-Dichlorophenol
Dieldrin
Diethyl phthalate
p-(Dimethylamino)azobenzene
7,12-Dimethylbenz[a]anthracene
3,3'-Dimethylbenzidine
2,4-Dimethylphenol (m-Xylenol)
Dimethyl phthalate
m-Dinitrobenzene
4,6-Dinitro-o-cresol (4,6-Dinitro-2-methylphenol)
2,4-Dinitrophenol

ATTACHMENT F (CONTINUED)

2,4-Dinitrotoluene
2,6-Dinitrotoluene
Di-n-octyl phthalate
Diphenylamine
Endosulfan I
Endosulfan II
Endosulfan sulfate
Endrin
Endrin aldehyde
Ethyl methacrylate
Ethyl methanesulfonate
Famphur
Fluoranthene
Fluorene
Heptachlor
Heptachlor epoxide
Hexachlorobenzene
Hexachlorobutadiene
Hexachlorocyclopentadiene
Hexachloroethane
Hexachloropropene
Indeno(1,2,3-c,d)pyrene
Isophorone
Isosafrole
Kepone
Methapyrilene
Methoxychlor
3-Methylcholanthrene
Methyl methanesulfonate
2-Methylnaphthalene
Naphthalene
1,4-Naphthoquinone
1-Naphthylamine
2-Naphthylamine
o-Nitroaniline (2-Nitroaniline)
m-Nitroaniline (3-Nitroaniline)
p-Nitroaniline (4-Nitroaniline)
Nitrobenzene
o-Nitrophenol (2-Nitrophenol)
p-Nitrophenol (4-Nitrophenol)

ATTACHMENT F (CONTINUED)

N-Nitrosodi-n-butylamine (Di-n-butylnitrosamine)
N-Nitrosodiethylamine (Diethylnitrosamine)
N-Nitrosodimethylamine (Dimethylnitrosamine)
N-Nitrosodiphenylamine (Diphenylnitrosamine)
N-Nitrosodipropylamine (N-Nitroso-N-dipropylamine; Di-n-propylnitrosamine)
N-Nitrosomethylethylamine (Methylethylnitrosamine)
N-Nitrosopiperidine
N-Nitrosopyrrolidine
5-Nitro-o-toluidine
Pentachlorobenzene
Pentachloronitrobenzene (PCNB)
Pentachlorophenol
Phenacetin
Phenanthrene
Phenol
p-Phenylenediamine
Polychlorinated biphenyls (PCBs; Aroclors)
Pronamide
Pyrene
Safrole
1,2,4,5-Tetrachlorobenzene
2,3,4,6-Tetrachlorophenol
o-Toluidine
Toxaphene
1,2,4-Trichlorobenzene
2,4,5-Trichlorophenol
2,4,6-Trichlorophenol
0,0,0-Triethyl phosphorothioate
sym-Trinitrobenzene

Organophosphorus Pesticides (USEPA Method 8141A):

0,0-Diethyl 0-2-pyrazinyl phosphorothioate (Thionazin)
Dimethoate
Disulfoton
Methyl parathion (Parathion methyl)
Parathion
Phorate

ATTACHMENT F (CONTINUED)

Chlorinated Herbicides (USEPA Method 8151):

2,4-D (2,4-Dichlorophenoxyacetic acid)
Dinoseb (DNBP; 2-sec-Butyl-4,6-dinitrophenol)
Silvex (2,4,5-Trichlorophenoxypropionic acid; 2,4,5-TP)
2,4,5-T (2,4,5-Trichlorophenoxyacetic acid)

Organochlorine Pesticides (USEPA Method 8081A)

Aldrin
BHCs
Chlordane
4,4'-DDD
4,4'-DDE
4,4'-DDT
Dieldrin
Endosulfan I
Endosulfan II
Endosulfan sulfate
Endrin
Endrin aldehyde
Heptachlor
Heptachlor epoxide
Lindane
Methoxychlor
Toxaphene

PCBs (USEPA Method 8082)

PCB-1016
PCB-1221
PCB-1232
PCB-1242
PCB-1248
PCB-1254
PCB-1260