INFORMATION SHEET

ORDER R5-2013-XXXX
COUNTY OF TULARE
CONSTRUCTION, OPERATION, CLOSURE, POSTCLOSURE MAINTENANCE, AND CORRECTIVE ACTION
VISALIA MUNICIPAL SOLID WASTE LANDFILL
TULARE COUNTY

The County of Tulare (hereafter Discharger) owns and operates a municipal solid waste landfill (facility) at the intersection of Road 80 and Avenue 328 about seven miles northwest of the City of Visalia.

The California Regional Water Quality Control Board (Central Valley Water Board) adopted Waste Discharge Requirements Order R5-2003-0146 (Order R5-2003-0146) on 5 September 2003, which classified waste management units I and II (Units I and II) as a Class III landfill as defined in Title 27, California Code of Regulations, Section 20005 et seq. (hereafter Title 27), that accepts or accepted municipal solid waste. The proposed Order revises the existing WDRs to provide for operation, construction of Unit II with an engineered alternative composite liner system, closure of Unit I with an evapotranspiration (ET) final cover system, postclosure maintenance, and the implementation of a corrective action program. Additionally, the proposed Order will rescind Order R5-2003-0146.

The 631-acre facility contains one existing unlined Unit that covers 127 acres (Unit I) and one 115-acre expansion unit (Unit II), east and adjacent to Unit I.

The facility is located on the westward dipping, eastern limb of the asymmetrical trough of the San Joaquin Valley. Of significance to the facility are the unconsolidated alluvial fan deposits of the Kaweah River. The unconsolidated alluvial fan deposits consist of approximately 330 to 350 feet of interbedded clayey-silt, silt, and fine-to-medium-grain fluvial and flood basin sands. A 30-foot thick, low resistivity, hard clay and silt zone that may possibly represent the regionally extensive E-Clay, occurs between 180 and 210 feet below ground surface (bgs) beneath the western margin of Unit I and areas west of Unit I. The low-resistivity layer is laterally continuous and serves as an aquitard that separates groundwater into an unconfined upper alluvial groundwater zone (above 180 feet bgs) and a lower alluvial groundwater zone (below 210 feet bgs).

The first encountered groundwater occurs between 40 and 50 feet below the native ground surface (bgs) depending on location. Groundwater elevations range between 235 and 250 feet mean sea level (MSL). The first encountered groundwater is unconfined. The depth to the first encountered groundwater fluctuates seasonally as much as 15 feet. Four distinct hydrostratigraphic units have been identified beneath the facility. The uppermost unit is termed the upper alluvial groundwater zone, which is unconfined and extends from the water table to about 180 feet below ground surface (bgs). Directly beneath the upper alluvial groundwater zone is a 30-foot thick, low resistivity, hard-clay and silt zone that the Discharger considers being the E-clay. According to the Discharger, the low resistivity zone extends from 180 to 210 feet bgs and is laterally continuous. Directly beneath the low resistivity layer is what the

Discharger terms the lower alluvial groundwater zone, which is confined or semi-confined. The lower alluvial groundwater zone extends from the base of the E-clay (about 210 feet bgs) downward to the top of oxidized continental deposits (about 340 feet bgs). Underlying the lower alluvial groundwater zone is what the Discharger terms the deep groundwater zone.

The existing groundwater monitoring network for the facility consists of 52 wells (42 on-site and ten off-site). There are eight upper alluvial groundwater zone background monitoring wells, 14 point of compliance monitoring wells, and 19 corrective action monitoring wells. There are three lower alluvial groundwater zone background monitoring wells and five corrective action monitoring wells. Additionally, the Discharger collects and analyzes groundwater samples from off-site private domestic and agricultural water supply wells.

There is no unsaturated zone detection system beneath Unit I to monitor liquids released from the unit. Unit I was permitted and in operation before 1 July 1991; therefore, it qualifies for exemption of unsaturated zone monitoring pursuant to Section 20415(d) of Title 27. The Discharger demonstrated that there is no monitoring device or method designed to operate under the existing subsurface conditions to collect liquids migrating from the base of Unit I to the unsaturated zone, the installation of an unsaturated zone detection monitoring system would require unreasonable dismantling or relocating of permanent structures, and Unit I has already leaked waste constituents to groundwater. The unsaturated zone detection monitoring system for Unit II is a pan lysimeter under the sumps for the primary and secondary leachate collection and removal system (LCRS) sumps, and extends approximately 70 feet under the central leachate collection pipe.

Volatile organic compounds (VOCs) that are not naturally occurring have been detected in the upper and lower alluvial groundwater zones along the southern and western points of compliance and in off-site locations west and southwest of Unit I. The VOCs detected in groundwater are tetrachloroethylene (PCE); trichloroethylene (TCE); 1,1,1- trichloroethane (1,1,1-TCA); cis-1,2-dichloroethylene (cis-1,2-DCE); trans-1,2-dichloroethylene (trans-1,2-DCE); 1,1-dichloroethylene (1,1-DCE); 1,1-dichloroethane (1,1-DCA); 1,2-dichlorethane (1,2-DCA); vinyl chloride; and chloroethane) to groundwater. The First Semiannual Monitoring Report, 2012 (1st semiannual 2012 SMR) stated that 1,1-DCA, chloroform, cis-1,2-DCE, dichlorodifluoromethane, methylene chloride, PCE, TCE, and trichlorofluoromethane were detected in the upper alluvial groundwater zone point of compliance groundwater monitoring wells. Volatile organic compounds detected in the upper alluvial groundwater zone corrective action or non-point of compliance groundwater monitoring wells, included 1,1-DCA,chloroform, cis-1,2-DCE, dichlorodifluoromethane, vinyl acetate, PCE, trans-1,2-DCE, TCE, and trichlorofluoromethane. Additionally, the 1st semiannual 2012 SMR stated that dichlorodifluoromethane, PCE, TCE, and trichlorofluoromethane were detected in off-site lower alluvial groundwater zone monitoring wells. The VOCs migrated from the upper alluvial groundwater zone into the lower alluvial groundwater zone as a result of two agricultural supply wells and the landfill supply well that were screened across the E-Clay and into both groundwater zones. The aforementioned agricultural supply wells and the landfill supply wells have been properly destroyed.

Statistical analysis indicates that arsenic; barium; chloride, potassium; TDS; bicarbonate; chromium; cobalt; iron; sodium; sulfide; calcium; manganese; magnesium; total organic carbon; and EC have exceeded their respective background concentration limits on one or more occasions in one or more upper alluvial groundwater zone Point of Compliance monitoring wells. The 1st semiannual 2012 SMR stated that calcium, chromium, cobalt, iron, magnesium, manganese, and sodium possibly exceeded their respective background concentration in the upper alluvial groundwater zone along the southern Point of Compliance of Unit I and are comingled with the VOC plume.

Cleanup and Abatement Order 99-718, directed the Discharger to complete an evaluation monitoring program and establish a corrective action program in accordance with a time schedule. An evaluation monitoring program was completed in November 2002. The lateral extent of the VOC plume in the upper alluvial groundwater zone was determined to extend approximately 3,300 feet to the southwest of the southwestern corner of Unit I; approximately 750 feet north of the northwestern corner of Unit I; approximately 350 feet north of the northern boundary of Unit I; and approximately 450 east of the southeastern corner of Unit I. The lateral extent of the VOC plume in the lower alluvial groundwater zone was determined to extend approximately 2,300 feet southwest of the southwestern corner of Unit I to the Van Grouw Dairy South Well; possibly as much as 850 feet south of the southwestern corner of Unit I; and along the northwestern boundary of Unit I. Volatile organic compound degradation in the deep groundwater zone was determined to be localized around the Van Grouw Dairy South Well, the landfill's former supply well at the southwest corner of Unit I, and destroyed wells AG-13 and AG-15. The vertical extent of the VOC plume was determined to extend to the deep zone in the vicinity of the Van Grouw Dairy South Well (screened from 300 feet to 400 feet bgs), destroyed well AG-13 (screened from 153 feet to 360 feet bgs), and possibly in the vicinity of destroyed well AG-15 (screened from 201 feet to 371 feet bgs).

The vertical and lateral extents of inorganic waste constituent releases from Unit I fall within the upper alluvial groundwater zone VOC plume boundaries.

A final engineering feasibility study for a corrective action program was submitted by the Discharger on 14 April 2005. In a 26 May 2005 letter and memorandum, Central Valley Water Board staff, concurred with the Discharger's engineering feasibility study for a corrective action program. The corrective action program consists in part, of four groundwater extraction wells (EW-1 through EW-4) constructed within the upper alluvial groundwater zone along the western Point of Compliance of Unit I where total VOC concentrations of 100 micrograms per liter (µg/l) and above (target zone) were detected. Extracted groundwater treatment consists of air stripping with treated effluent water discharged to a borrow pit north and hydraulically upgradient of Unit I. Additionally, the Discharger proposed monitored natural attenuation of VOCs not captured by the groundwater extraction system and the injection of 3D Microemulsion Hydrogen Release Compound into injection wells along the Unit I southern Point of Compliance to accelerate in-situ biodegradation rates of VOCs in the upper alluvial groundwater zone.

Section 20080(b) of Title 27 allows the Central Valley Water Board to consider the approval of an engineered alternative to the prescriptive standard liner design. In order to approve an engineered alternative in accordance with Sections 20080(c)(1) or (2) of Title 27, the Discharger was required to demonstrate that the prescriptive design is unreasonably and unnecessarily burdensome and will cost substantially more than an alternative which will meet the criteria contained in Section 20080(b) of Title 27 or would be impractical and would not promote attainment of applicable performance standards.

The Discharger adequately demonstrated that construction of a Subtitle D prescriptive standard liner would be unreasonably and unnecessarily burdensome when compared to the proposed engineered alternative design and would cost substantially more than the alternative design.

The Discharger demonstrated that the proposed engineered alternative is consistent with the performance goals of Section 20310(c) of Title 27, and affords at least equivalent protection against water quality impairment.

The engineered alternative liner system for the bottom of Unit II consists of, in ascending order: 1) a six-inch thick engineered subgrade that meets specific gradation and compaction criteria; 2) a secondary double non-woven geosynthetic clay liner (GCL); a secondary double-textured 60-mil thick high-density polyethylene (HDPE) geomembrane; 4) a tri-planar geocomposite LCRS (secondary LCRS); 5) a one-foot thick protective clean soil layer; 6) a primary double nonwoven GCL; and 7) a primary double-textured 60-mil HDPE geomembrane. A primary LCRS is placed atop the primary geomembrane consisting of a tri-planar geocomposite drainage layer on which will be placed an HDPE geopipe network nestled in a gravel layer exhibiting a permeability of one centimeter per second or greater and wrapped by a non-woven geotextile filter fabric. A two-foot thick clean soil operations layer is placed over the primary LCRS.

The side slope liners are constructed of the same materials and in the same sequence and manner as the bottom liner system. A two-foot thick operation soil layer is placed over the side slope liner system for protection from refuse and landfill equipment.

A final closure and postclosure maintenance plan for the proposed ET final cover system for Unit I was submitted on 7 May 2012. An addendum to the final closure and postclosure maintenance plan containing additional information was subsequently submitted. The final closure and postclosure maintenance plan proposed, in part, a six and one-half feet thick ET final cover system for Unit I that would meet the equivalency design criteria of a percolation rate of less than ten millimeters per year. In addition, a pan lysimeter is proposed to be constructed beneath the ET final cover system at the top deck of Unit I where storm water percolation will be at a maximum and runoff at a minimum. The pan lysimeter will be used to monitor the performance of the ET final cover. Central Valley Water Board staff determined that the final closure and postclosure maintenance plan is consistent with the provisions of Section 21090 of Title 27 and that the final closure and postclosure maintenance plan was adequate.

The Tulare County Resource Management Agency certified the final environmental impact report for expansion Unit II on 26 September 2001. The Tulare County Resource Management Agency filed a Notice of Determination on 25 September 2001 in accordance with the California Environmental Quality Act (Public Resources Code Section 21000 et seq.) and California Environmental Quality Act guidelines (14 CCR Section 15000 et seq.). The Central Valley Water Board considered the environmental impact report and incorporated mitigation measures from the environmental impact report into these waste discharge requirements designed to prevent potentially significant impacts to design facilities and to water quality.

This order requires full containment of wastes and does not permit degradation of surface water or groundwater. Further, antidegradation analysis is therefore not needed. The discharge is consistent with the antidegradation provisions of State Water Resources Control Board Resolution 68-16.