CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

CEASE AND DESIST ORDER __

FOR
STANISLAUS COUNTY DEPARTMENT OF ENVIRONMENTAL RESOURCES
GEER ROAD CLASS III LANDFILL, STANISLAUS COUNTY

TO CEASE AND DESIST

FROM DISCHARGING CONTRARY TO REQUIREMENTS

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

1. On 24 April 2009, the Central Valley Water Board adopted Waste Discharge Requirements ("WDRs") Order R5-2009-0051, prescribing waste discharge requirements and compliance schedules for the Geer Road Class III landfill. According to the WDRs, the landfill is owned, and was formerly operated by, the Stanislaus County Department of Environmental Resources (hereafter referred to as Discharger).

2. The Geer Road Landfill is eight miles east of Modesto, adjacent to the Tuolumne River. The 168-acre facility comprises Assessor's Parcel Numbers 9-29-09, 9-29-12 and 18-03-13, and includes the closed Class III landfill and a sedimentation basin (see Attachment A, a part of this Order). The site was operated as a sanitary landfill by Stanislaus County from 1970 until 1990 and accepted residential, commercial, industrial, cannery, construction and demolition wastes. The Discharger estimates that the landfill contains approximately 4.5 million tons of waste. Stanislaus County also owns the Triangle Ranch (Assessor's Parcel Number 9-029-015), which is adjacent to the northwest side of the landfill.

3. The landfill was closed in 1995. For the top deck, a geomembrane liner is overlain by vegetative soil. For the slide slopes, compacted clay is overlain by vegetative soil. Closure was approved in July 1996 and the WDRs prescribe post closure and corrective action requirements, as well as requirements to maintain financial assurances and conduct monitoring.

4. The discharge of wastes has polluted the groundwater beneath the landfill with volatile organic compounds (VOCs) and metals. This pollution was first identified in 1985. Since that time, several investigations have been completed. The Discharger has implemented multiple phases of corrective action, including: no longer accepting waste; closure of the landfill with the cap described above; installation and subsequent expansion of a landfill gas extraction system; installation of a shallow zone groundwater extraction and treatment system at the southwestern edge of the landfill; and optimization of the existing groundwater extraction system.

5. However, as described in the Findings of the 2009 WDRs, (a) the horizontal and vertical extent of groundwater contamination has not been defined on the northwest, west, and southwest sides of the landfill; and (b) the existing landfill gas and groundwater extraction systems are not adequate to prevent migration of VOCs and inorganic constituents away from the site or into deeper groundwater zones.

HYDROGEOLOGIC FRAMEWORK AND MONITORING

6. The Findings of the WDRs describe the surface water and groundwater conditions at the landfill. To summarize, the landfill is bordered on the south and west by agricultural land. The Tuolumne River is within 300 feet of the southern boundary of the landfill and with 600 feet of the western boundary (see Attachment A). Groundwater elevations tend to vary over time by up to five feet, and can rise up to 15 feet above normal levels in response to seasonal high river flows.[1] This indicates that the shallow groundwater beneath the landfill is in hydraulic communication with the river.

7. Wastes were deposited at some depth below the ground surface and at approximately 40 feet above the ground surface.[2] It is highly probable that groundwater rises into the waste mass at times[3]. As stated on page 3 of the Kleinfelder's 2001 *Groundwater Investigation Report, Geer Road Landfill*,

> "An employee from Stanislaus County, who was present at the landfill in 1985 and 1986, reported that excavations in the landfill area north of Janzten Road were dug to depths of approximately 80 feet below grade. He also stated that water was often observed in the northern cell during construction. It is likely that the water in the excavation was from groundwater entering the excavation….Many of the depths of the cells [in the southern and western area of the landfill] are not known, but if they were dug deeper than the 1974 plans, it is possible that they were also excavated into groundwater."

The issue of groundwater in the waste was also discussed on page 6 of SCS Engineers' 2009 *Engineering Feasibility Study* which states

> "A County employee who worked at the site during active operations has stated that excavations for waste disposal were frequently advanced until groundwater was encountered and there was evidence of groundwater infiltration into some of the disposal trenches during periods of operation."

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1 *First Semi-Annual 2010 Detection, Evaluation, and Corrective Action Monitoring Report Geer Road Landfill, Stanislaus County.* SCS Engineers, 2010

2 *Evaluation Monitoring and Engineering Feasibility Study, Geer Road Landfill.* Kleinfelder, 2002.

3 See page 7 of Kleinfelder's 2002 *Evaluation Monitoring and Engineering Feasibility Study*

Board staff has analyzed post-closure topographic survey data, landfill gas extraction well boring logs and groundwater elevations measured in 2010,[4] and find that that groundwater continues to be in contact with low-lying waste in the northern portion of the landfill. Although there is less specific data for the southern portion of the landfill, it appears probable that wastes are also in contact with groundwater in this area as well.

8. First groundwater is monitored by 22 wells with screens set between an average upper screen elevation of 67 feet mean sea level (msl) to an average bottom interval of 48 feet msl. The deeper zone groundwater is monitored by 12 wells, with screens set between an average upper screen elevation of 27 feet msl to an average bottom elevation of 9 feet msl. Based on vertical gradients measured in the monitoring wells, the deeper zone is likely in hydraulic communication with the shallow zone and the river.[5]

9. During the February and May 2010 monitoring events, the groundwater flow direction for the shallow zone was calculated to be southwest, towards the Tuolumne River. During the same monitoring events, a downward gradient was present in shallow monitoring wells in the eastern portion of the landfill. The western portion of the landfill has periods of upward gradient. The boundary conditions between the two aquifer zones have not been defined well enough to understand the cause of the change in groundwater potentials, although the Discharger has stated that the "…apparent conflicting gradients…may result from laterally discontinuous zones of semi-confined strata and pumping of groundwater extraction wells."[6]

10. The base of the deeper zone appears to be defined by a clay unit that was intersected during the drilling of the landfill's Supply Well 2 at approximately 140 feet bgs. The Discharger has not yet adequately defined the thickness and lateral extent of the deep zone, although several of the existing monitoring wells partially penetrate this zone. The groundwater flow direction in the deep zone during the February and May 2010 monitoring events was towards the west-southwest (toward the Tuolumne River).[7]

11. During August 2010, the Discharger completed a video survey of monitoring well MW-14S and of the former supply wells (SW-1 and SW-2). The 8 September 2010 *Results of Well Video Surveying* documents that the well casing for MW-14S is damaged, and recommends that the well be destroyed. The Discharger also recommends destroying SW-1 and SW-2 "since they are currently acting as potential conduits for shallow and deep aquifer zone cross contamination." The Discharger submitted a 29 October 2010 *Well Destruction and Replacement Plan* to destroy the

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4 *Second Semi-Annual and Annual 2010 Detection, Evaluation, and Corrective Action Monitoring Report, Geer Road Landfill, Stanislaus County,* SCS Engineers, 2010

5 *First Semi-Annual 2010 Detection, Evaluation, and Corrective Action Monitoring Report Geer Road Landfill, Stanislaus County.* SCS Engineers, 2010

6 *Evaluation Monitoring and Engineering Feasibility Study, Geer Road Landfill.* Kleinfelder, 2002.

7 *First Semi-Annual 2010 Detection, Evaluation, and Corrective Action Monitoring Report Geer Road Landfill, Stanislaus County.* SCS Engineers, 2010

three wells and replace MW-14S. Board staff agrees with the conclusions reached by the *Well Destruction and Replacement Plan*, and this Order requires that it be implemented.

LANDFILL GAS

12. The conditions at the landfill promote the generation of landfill gas and uncontrolled leachate drainage, both of which have caused groundwater pollution.[8] Landfill gas production rates are dependent on a number of factors: refuse composition and tonnage, free oxygen availability, moisture content, landfill cover, soil pH, and temperature. Gas production increases when the moisture level of the waste increases. This can happen when groundwater rises up into the waste, or when a landfill is not properly closed and rainfall saturates the waste from above.[9] Gas production decreases as the waste decomposes and the resulting gas is extracted and/or migrates through the cap or underlying soil.

13. As noted above, the Geer Road Landfill operated as a cut and fill operation adjacent to the Tuolumne River. During the dry months, the landfill operator would excavate down to the water table and would then begin to fill the pit with waste. When the groundwater elevation rises, waste in the lower portion of the pits may become inundated with groundwater, thus promoting the generation of landfill gas and leachate.[10] As stated in the WDRs, the landfill does not have a bottom liner system, and therefore, leachate and landfill gas condensate can freely drain to the underlying groundwater. This is supported by the Discharger's 2002 Engineering Feasibility Study, which states:

> "Some waste may be immersed in groundwater either constantly or periodically as groundwater rises and falls over time. When immersed in water, the waste releases VOCs some depth beneath groundwater. This may be the reason for the increasing VOC concentrations with depth discovered immediately downgradient of the landfill."

The Discharger's 2009 Engineering Feasibility Study also supports the above statements:

> "It is also probably that VOCs in groundwater are caused, in part, by liquid-phase processes – either movement of leachate downward to groundwater, or transfer from wastes directly to groundwater if groundwater is in contact with the bottom of the wastes."

14. Because landfill gas contributes to groundwater pollution, in 2009 the Discharger expanded the landfill gas extraction system by adding ten additional landfill gas extraction wells. Pressure readings provided in the Discharger's 2010 *LFG Recovery*

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8 *Engineering Feasibility Study, Geer Road Landfill*, SCS Engineers, 13 February 2009

9 *Procedural Guidance Manual for Sanitary Landfills, Volume II, Landfill Gas Monitoring and Control Systems*," SCS Engineers, for the CIWMB, April 1989.

10 *Evaluation Monitoring and Engineering Feasibility Study, Geer Road Landfill.* Kleinfelder, 2002.

System First and Second Quarter reports show that many of the landfill gas extraction wells in the northern portion of the landfill exhibited positive or zero gas pressure during the six monthly monitoring events. These readings mean that a vacuum is not present, that landfill gas is not being collected from those wells, and that landfill gas is free to migrate downward to the underlying groundwater.

15. Certain conditions at this site inhibit the efficiency of the landfill gas extraction system. For example, because the sides of the landfill are capped with clay instead of a geomembrane, maintaining a sufficient vacuum on the wells to remove landfill gas may pull too much oxygen into the waste, which could cause a fire. In addition, the landfill gas extraction system is not designed to remove contaminants once they enter the groundwater. Additionally, some of the VOCs present in the landfill gas have a relatively low vapor pressure, which means that they are less likely to volatilize sufficiently to be captured by vacuum extraction. This Order requires that the Discharger optimize operation of the current landfill gas collection system given the site constraints.

16. The Discharger has been voluntarily submitting quarterly landfill gas monitoring reports. Because landfill gas extraction is an integral part of the Discharger's corrective action program, it is appropriate to require continued monitoring of landfill gas to assess spatial and temporal trends, show that the corrective action system is being optimized, and assess whether expansion of the system is warranted. The current Monitoring and Reporting Program (MRP) does not require monitoring of all landfill gas extraction and monitoring wells. This Order includes a revised MRP that includes gas monitoring requirements.

IMPACTS ON GROUNDWATER QUALITY

17. The *Second Semi-Annual and Annual 2010 Detection, Evaluation, and Corrective Action Monitoring Report* shows that the following constituents are currently present in the groundwater beneath and downgradient of the landfill at concentrations exceeding established concentration limits[11]: specific conductance, bicarbonate alkalinity, chloride, total dissolved solids, benzene, 1,4-dichlorobenzene, dichlorodifluoromethane (Freon-12), 1,1-dichloroethane, 1,1-dichloroethene, cis-1,2-dichloroethene, trans-1,2-dichloroethene, 1,2-dichloropropane, methyl t-butyl ether, tetrachloroethene, trichloroethene, trichlorofluoromethane (Freon-11), vinyl chloride, di-isopropyl ether, chloroform, chlorobenzene, and chloromethane.

[11] Sections 20390 to 20405 of Title 27 require that the Board establish a Water Quality Protection Standard, including a concentration limit for each constituent reasonably expected to be present in the groundwater. The concentration limit applies at the downgradient edge of the unit. If groundwater constituents exceed the concentration limits, then Section 20430 requires that Discharger take corrective action to clean up the release so the constituents do not exceed the concentration limits. Site specific concentration limits are found in the WDRs.

18. The table below summarizes selected analytical results for five shallow zone monitoring wells. Four of these wells are on the downgradient boundary of the landfill and one well is further downgradient, next to the Tuolumne River. The May 2010 monitoring results shows that each of these wells contains VOCs at levels up to 40 times higher than the applicable concentration limits. Additional VOCs are present in some of the wells at levels below the concentration limits.

VOCs in Shallow Zone Monitoring Wells
(Concentrations in micrograms per liter, ug/L)

Constituent	Concentration Limit	MW3S*	MW4S*	MW5S*	MW8S*	MW23S**
1,1 Dichloroethane	0.5	1.2	6.0	0.29 J	2.3	0.37 J
cis 1,2 Dichloroethane	0.5	ND	8.6	ND	10	0.48 J
Dichlorodifluoromethane	0.5	7.8	0.44 J	2.4	7.0	0.52
Trichlorethene (TCE)	0.5	1.6	1.8	0.23	4.4	0.18
Tetrachloroethene (PCE)	0.5	1.8	ND	0.81	2.8	ND
Vinyl Chloride	0.5	ND	23	ND	0.62	ND

*= point of compliance well along landfill boundary
**= corrective action well, approximately 500 feet downgradient of MW4S, next to Tuolumne River
J = The reported value was obtained from a reading that was less than the laboratory reporting limit (RL) but greater than or equal to the Method Detection Limit (MDL).
ND = not detected

19. The table below lists several deep-zone monitoring wells, two of which are along the downgradient boundary of the landfill and one of which is further downgradient, next to the Tuolumne River. The May 2010 monitoring results shows that each of these wells contains VOCs at levels up to 20 times higher than the applicable concentration limits. Additional VOCs are present in some of the wells at levels below the concentration limits.

VOCs in Deeper Zone Monitoring Wells
(Concentrations in micrograms per liter, ug/L)

Constituent	Concentration Limit	MW3D*	MW4D*	MW23D**
1,1 Dichloroethane	0.5	ND	0.52	0.36 J
Dichlorodifluoromethane	0.5	0.95	10	1.7
Trichloroethene (TCE)	0.5	ND	0.65	0.30 J
Tetrachloroethene (PCE)	0.5	ND	1.6	0.17 J

*= point of compliance well
**= corrective action well, approximately 500 feet downgradient of MW4D, next to the Tuolumne River

J = The reported value was obtained from a reading that was less than the laboratory reporting limit (RL) but greater than or equal to the Method Detection Limit (MDL).
ND = not detected

20. The table below lists results for three inorganic constituent in two downgradient shallow/deep well pairs. These wells are beyond the hydrologic control of the landfill's groundwater extraction wells and beyond the influence of the landfill gas extraction system. The May 2010 sampling event shows that these wells contain elevated levels of three constituents that are commonly present due to a release of leachate. Arsenic, iron and manganese concentrations in these wells exceed concentrations found in background monitoring well MW-20S.

Inorganic Constituents in Downgradient Monitoring Well Pairs
(Units as noted)

Constituent	**Concentration Limit in WDRs**	**MW15S**	**MW15D**	**MW23S**	**MW23D**
Specific Conductance (umhos/cm)	973	731	720	**1,101**	623
Chloride (mg/l)	155	**180**	**180**	**210**	37
Bicarbonate (mg/l)	141	**180**	140	**220**	**190**

Bold Text = Concentration exceeds concentration limit in the WDRs
MWxxS = Shallow zone; MWxxD = Deeper zone well

21. The Discharger has installed a groundwater extraction and treatment system to address the migration of contamination in the underlying aquifer. The system consists of 12 extraction wells that are 300 to 400 feet apart and screened in the shallow zone only. The wells pump at different rates; the total pumping rate for the entire system is approximately 40 gpm. Extracted groundwater is conveyed to a treatment system consisting of two granular-activated carbon vessels for the removal of VOCs. Effluent from the groundwater treatment system is discharged to the subsurface through a series of injection trenches located approximately 200 feet from southeast edge of the landfill.[12]

22. The Discharger completed repairs and enhancements to the existing groundwater extraction system in 2008. Following the repairs, the system was tested for effectiveness in controlling the movement of groundwater flow. The evaluation found that the groundwater extraction system produces measurable drawdown in some of the extraction wells, but that the radius of influence around the extraction wells at the current extraction rate is approximately 40 feet, which is much less than the distance between each well of 300 to 1,200 feet. No influence (drawdown) was observed in the nearby monitoring wells during the pumping tests.[13] Combined with groundwater monitoring

[12] *Engineering Feasibility Study, Geer Road Landfill*, SCS Engineers, 2009
[13] *Corrective Action Workplan,* SCS Engineers, 2010

data for wells along the landfill boundary and downgradient of the landfill, the aquifer pumping tests show that the current groundwater corrective action system allows polluted groundwater to migrate off-site between the extraction wells. Additionally, although constituents of concern are routinely detected in the deeper zone monitoring wells at the downgradient edge of the landfill and downgradient of that, the groundwater corrective action system is not designed to capture polluted groundwater from the deeper zone.

23. Groundwater monitoring data for two shallow and deep zone well pairs located downgradient of the landfill and at the edge of the Tuolumne River (MW-15S, MW-15D, MW-23S, and MW-23D) show that aromatic VOCs, halogenated VOCs, and metals are present in groundwater in both the shallow and deeper groundwater zones. It is believed that the shallow groundwater is in connection with the river,[14] and because the existing groundwater remediation system is not capable of containing the plume, it is likely that groundwater contaminants are entering the Tuolumne River. No monitoring has yet taken place to confirm or deny such a discharge, but if it were to occur, it would be in violation of the Clean Water Act and/or State Water Board Resolution 68-16. Therefore, this Order requires the Discharger to (a) submit a surface water Sampling and Analysis Plan, (b) monitor water quality for certain constituents of concern in the Tuolumne River, and (c) upgrade the groundwater remediation system such that the plume of contaminated shallow groundwater on the west-southwest side of the landfill is captured and treated.

24. The Discharger's consultant has reported that the vertical and lateral extent of the plume has yet to be fully defined; that the VOC plume in the deep zone may extend beneath the Tuolumne River; and that the VOC plume may extend up to 1,000 feet beyond the landfill.[15] The groundwater data, the aquifer test results discussed above, and the documents in the case file indicate that the current groundwater extraction system is unable to:

    a. Prevent inundation of the waste from rising groundwater;

    b. Prevent or control migration of constituents of concern from the shallow zone into the deeper zone;

    c. Prevent groundwater pollution from moving beyond the downgradient monitoring wells; and

    d. Address the polluted groundwater that has migrated offsite.

    This Order provides a time schedule for the Discharger to define the vertical and lateral extent of the plume in all groundwater zones affected by the release, which was a

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[14] *Engineering Feasibility Study, Geer Road Landfill,* SCS Engineers, 2009

[15] Evaluation Monitoring and Engineering Feasibility Study, Geer Road Landfill, Kleinfelder, 2002 *Evaluation of Impacted Groundwater in North Area* and *Evaluation Monitoring*, SCS Engineers, 2009 and *Engineering Feasibility Study*, SCS Engineers, 2009.

requirement contained in the WDRs. Subsequent to defining the vertical and lateral extent of the plume, the Discharger must determine whether additional groundwater corrective action measures are needed.

VIOLATIONS OF THE WASTE DISCHARGE REQUIREMENTS

25. The Provisions of the WDRs contain a schedule for specific work that the Discharger was required to complete to address the above issues. The scope of required work and reports was based on the Discharger's proposals, which were contained in the Report of Waste Discharge (RWD) and Engineering Feasibility Study (EFS) upon which the WDRs are based. Key provisions of the WDRs require that the Discharger submit the following:

    a. By **30 July 2009**, a LFG extraction well installation report for the 10 new LFG extraction wells at the south area of the landfill (Provision G.12.d).

    b. By **30 October 2009**, an evaluation monitoring report documenting the nature and extent of groundwater contamination at the north area of the landfill (Provision G.12.f).

    c. By **29 January 2010**, a corrective action plan for groundwater remediation at the north area of the landfill (Provision G.12.g).

    d. By **30 August 2010**, a well installation report for corrective action at the north area of the landfill (Provision G.12.h).

    e. By **31 October 2010**, a corrective action plan for installation of either: (1) 28 additional LFG extraction wells and a new 1,500 scfm gas flare, or (2) 20 dual-completion groundwater extraction wells and upgraded groundwater treatment units as described in the Discharger's 13 February 2009 EFS (Provision G.12.i).

    f. By **29 July 2011,** an operations and maintenance plan for the new corrective action facilities for the north and south areas of the landfill (Provision G.12.j).

    g. By **31 October 2011**, a report documenting completion of installation, startup, operation, and maintenance of the facilities and improvements described in the two corrective action work plans (required by G.12.g and G.12.i) for the north and south areas of the landfill (Provision G.12.k).

26. The Discharger has not completed all of the work that was required in the WDRs. This Order requires the Discharger to address deficiencies that have caused or contribute to groundwater pollution, thereby coming into compliance with the WDRs. This Order was prepared to address the following violations:

a. Failure to completely define the vertical and lateral extent of VOCs in groundwater as required by Provision G.7 and G.12.f.

b. Failure to submit a corrective action plan for groundwater remediation at the north area of the landfill as required by Provision G.12.g.

c. Submittal of an inadequate corrective action plan for additional LFG and dual-completion groundwater extraction wells. The report did not comply with the required scope of required work, which was specified in Provision G.12.i.

d. Failure to make upgrades to the corrective action system as required by Provisions G.12.h.

e. Failure to protect the underlying aquifer from contaminants emanating from the landfill as required by Provision E.5 and G.8; and

f. Failure to construct a groundwater monitoring system that meets the standards in California Code of Regulations, title 27 ("Title 27"), section 20415, as required by Provision E.1 and G.2.

27. With regard to Provision G.12.f (definition of the extent of contamination in the north area), the Discharger submitted the required report, but the evaluation of the nature and extent of groundwater contamination was incomplete. Rather than defining the complete vertical and lateral extent of the plume in all zones affected by the release as required, the report stated that no further investigation was necessary. The report also stated that the existing landfill gas issue will be addressed by the existing LFG extraction system, and that no additional investigation of landfill gas is necessary because additional groundwater corrective action measures are planned.

28. With regard to Provision G.12.g (corrective action plan for the north area groundwater plume), the Discharger did not submit the required corrective action plan for groundwater impacts at the north end of the landfill.

29. With regard to Provision G.12.i, the Discharger did submit a *Corrective Action Workplan.* The document describes the results of an aquifer test, groundwater treatability study, and an infiltration study. Based on the aquifer test, the workplan states that fewer than 20 additional groundwater extraction wells are needed to create a barrier along the southern and western boundary of the landfill. The workplan recommends replacing the existing groundwater extraction system with an expanded system consisting of 13 shallow zone extraction wells, spaced approximately 400 feet apart, with a flow rate of 30 gallons per minute (gpm) per well. The workplan recommends against installing deeper zone extraction wells because of the potential for drawing VOCs downward from the shallow zone. The workplan recommends that groundwater be treated with a Hazleton system (with air stripping, filtration, granulated activated carbon) and

discharged through new infiltration trenches. However, instead of implementing this plan, the Discharger states in the report transmittal letter "…*we are not recommending implementation of this system at this time*…"

30. With regard to Provisions G.12.j and k (the due date for (a) an operations and maintenance plan and (b) a report documenting completion of installation and startup testing of improved corrective actions systems), neither the 29 July 2011 nor the 31 October 2011 due date have yet passed. However, the Discharger's failure to comply with the predecessor Provisions, as well as its statement that it will not comply with its own plan, means that timely compliance with these requirements is unlikely.

31. Provision E.5 of the WDRs states: "The concentrations of the constituents of concern in waters passing the Point of Compliance shall not exceed the concentration limits established pursuant to Monitoring and Reporting Program No. R5-2009-0051." The data presented in the above Findings show that certain VOCs, specific conductivity, chloride, and bicarbonate concentrations in groundwater exceed the WDRs' concentration limits at, and downgradient of, the point of compliance in both the shallow and deeper zones.

REGULATORY CONSIDERATIONS

32. The Discharger's acts and failure to act have caused or permitted waste to be discharged or deposited where it has discharged to waters of the state and has created, and continues to threaten to create, a condition of pollution or nuisance.

33. The *Water Quality Control Plan for the Sacramento River and San Joaquin River Basins*, Fourth Edition, revised September 2009 (hereafter "Basin Plan"), designates beneficial uses, establishes water quality objectives, and contains implementation plans and policies for all waters of the Basin.

34. The designated beneficial uses of underlying groundwater, as stated in the Basin Plan, are domestic and municipal supply, agricultural supply, and industrial supply.

35. Surface water runoff from the site is to the Tuolumne River. The beneficial uses of the Tuolumne River in the reach between New Don Pedro Dam and the San Joaquin River are municipal and domestic supply; agricultural supply; water contact recreation; noncontact water recreation; warm freshwater habitat; cold freshwater habitat; migration of aquatic organisms; spawning, reproduction and/or early development; and wildlife habitat.

36. Water Code section 13301 states in part,

> When a regional board finds that a discharge of waste is taking place or threatening to take place in violation of requirements or discharge prohibitions prescribed by the regional board or the state board, the board may issue an order to cease and desist and direct that those

> persons not complying with the requirements or discharge prohibitions (a) comply forthwith, (b) comply in accordance with a time schedule set by the board, or (c) in the event of a threatened violation, take appropriate remedial or preventative action. In the event of an existing or threatened violation of waste discharge requirements in the operation of a community sewer system, cease and desist orders may restrict or prohibit the volume, type, or concentration of waste that might be added to such system by dischargers who did not discharge into the system prior to the issuance of the cease and desist order. Cease and desist orders may be issued directly by a board, after notice and hearing, or in accordance with the procedure set forth in Section 13302.

37. Water Code section 13267(b)(1) states that:

> In conducting an investigation specified in subdivision (a), the regional board may require that any person who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge waste within its region, or any citizen or domiciliary, or political agency or entity of this state who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge, waste outside of its region that could affect the quality of waters within its region shall furnish, under penalty of perjury, technical or monitoring program reports which the regional board requires. The burden, including costs, of these reports shall bear a reasonable relationship to the need for the report and the benefits to be obtained from the reports. In requiring those reports, the regional board shall provide the person with a written explanation with regard to the need for the reports, and shall identify the evidence that supports requiring that person to provide the reports.

38. As described the Form 200 that was submitted on 31 October 2007 and incorporated into the WDRs, the Discharger owns the Geer Road Landfill and maintains and monitors the facility subject to this Order. This Order does not impose significant new monitoring or investigative reporting requirements; most of the reports described herein are obligations that are already required under the existing WDRs and in the Discharger's existing MRP. However, this Order obligates the Discharger to continue to submit monitoring results for the landfill gas extraction system, as described in Finding No. 16, and imposes a requirement to conduct additional surface water sampling, as described in Finding No. 23. The landfill gas extraction system monitoring is already being conducted by the Discharger, and the results of the monitoring are currently being submitted voluntarily. It is necessary to include these reporting requirements in the MRP so that the Board can determine whether the landfill gas extraction system is being operated in a manner that maximizes extraction of VOCs from the landfill mass. The additional surface water sampling is required to determine whether waste constituents from the landfill are impacting the Tuolumne River. This Order, which requires compliance with a revised MRP, also imposes greater monitoring frequencies for certain monitoring wells to determine whether remedial actions are effective. The additional monitoring includes monitoring for constituents that are carcinogenic or cause damage to the liver, kidneys, nervous system, or circulatory system. The additional monitoring reports and other technical reports required by this Order are necessary to determine compliance with Waste Discharge Requirements Order R5-2009-0051, Title 27, and this Order, and to ensure protection of human health and the environment. The burden

placed on the Discharger to comply with the additional requirements is reasonable, considering the gravity of the water quality impacts associated with these constituents.

39. The WDRs require the Discharger to, "comply with all applicable provisions of Title 27 and 40 Code of Federal Regulations Part 258 (Subtitle D) that are not specifically referred to in this Order. (Provision G.2.) Applicable sections from Title 27 include:

a. Title 27, section 20405(a), which states in part:

For each Unit, the RWQCB shall specify in the WDRs the Point of Compliance at which the Water Standard… applies. The Point of Compliance is a vertical surface located at the hydraulically downgradient limit of the Unit that extends through the uppermost aquifer underlying the Unit.

b. Title 27, section 20425(b), which states in part:

The discharger shall collect and analyze all data necessary to assess the nature and extent of the release from the Unit. This assessment shall include a determination of the spatial distribution and concentration of each COC throughout the zone affected by the release. The discharger shall complete and submit this assessment within 90 days of establishing an evaluation monitoring program.

c. Title 27, section 20425(i), which states in part:

Any time the RWQCB determines that the evaluation monitoring program does not satisfy the requirements of this section, the RWQCB shall send written notification of such determination to the discharger by certified mail, return receipt requested. The discharger shall, within 90 days of such notification by the RWQCB, submit an amended report of waste discharge to make appropriate changes to the program.

d. Title 27, section 20430(b), which states:

The discharger shall take corrective action to achieve the following goals: to remediate releases from the Unit; to ensure that the discharger achieves compliance with the Water Standard adopted under section 20390 for that Unit.

e. Title 27, section 20430(c), which states:

The discharger shall implement corrective action measures that ensure that COCs achieve their respective concentration limits at all Monitoring Points and throughout the zone affected by the release, including any portions thereof that extend beyond the facility boundary, by removing the waste constituents or treating them in place.

f. Title 27, section 20430(j), which states in part:

Any time the RWQCB determines that the corrective action program does not satisfy the requirements of this section, the discharger shall, within 90 days of receiving written notification of such determination by the RWQCB, submit an amended report of waste discharge to make appropriate changes to the program.

g. Title 27, section 20400, which states in part:

(a) …For each Constituent of Concern…, the discharger shall propose one of the following…:

(1) **Background Value —** a concentration limit not to exceed the background value of that constituent as determined pursuant to §20415(e)(10)(A);

(2) **Value Redetermined Each Time —** that the WDRs include a statement that, at any given time, the concentration limit for that COC will be equal to the background value of that constituent, as determined pursuant to §20415(e)(10)(B); or

(3) **CLGBC** — a concentration limit greater than background (**CLGB**) established pursuant to this section for a corrective action program.

(b) **…** Upon final approval by the RWQCB, each concentration limit and each statement shall be specified in WDRs...

(c) **Establishing a CLGB —** For a corrective action program, the RWQCB shall establish a CLGB… only if the RWQCB finds that it is technologically or economically infeasible to achieve the background value for that constituent and that the constituent will not pose a substantial present or potential hazard to human health or the environment as long as the CLGB is not exceeded. In making this finding, the RWQCB shall consider the factors specified in ¶(d), the results of the engineering feasibility study submitted pursuant to §20425(c), data submitted by the discharger pursuant to §20425(d)(2) to support the proposed CLGB, public testimony on the proposal, and any additional data obtained during the evaluation monitoring program.

…

(e) **CLGB Ceiling —** In no event shall a CLGB for a constituent of concern exceed the lowest concentration that the discharger demonstrates and the RWQCB finds is technologically and economically achievable. No provision of this section shall be taken to allow a CLGB for a constituent of concern to exceed the maximum concentration that would be allowed under other applicable statutes or regulations [e.g., Maximum Concentration Limits established under the federal Safe Drinking Water Act…].

On 13 February 2009, the Discharger proposed CLGB[16] for some constituents of concern equivalent to the Maximum Concentration Limits established under the Safe Drinking Water Act. However, the proposed CLGBs were not included in the WDRs adopted by the Board. A review of the proposal finds that the Discharger did not provide sufficient information to justify its request. The Board did adopt concentration limits for both VOCs and inorganics based on background concentrations. However, some of the inorganic concentration limits may have been inappropriately calculated by using wells affected by landfill gas. This Order requires the Discharger to propose new inorganic concentration limits using the appropriate background well. In addition, the Discharger may wish to provide detailed information to propose CLGB for certain volatile organic compounds in accordance with the regulations described above.

[16] *Engineering Feasibility Study, Geer Road Landfill*. SCS Engineers, 2009

40. Provision G.8 of Waste Discharge Requirements Order R5-2009-0051 states:

> The owner of the waste management facility shall have the continuing responsibility to assure protection of waters of the state from discharged wastes and from gases and leachate generated by discharged waste during the postclosure maintenance period of the Unit(s) and during subsequent use of the property for other purposes.

41. The issuance of this Order is an enforcement action by a regulatory agency and is exempt from the provisions of the California Environmental Quality Act, pursuant to California Code of Regulations, title 14, section 15321(a)(2).

42. On __ April 2011, in Rancho Cordova, California, after due notice to the Discharger and all other affected persons, the Central Valley Water Board conducted a public hearing at which evidence was received to consider a Cease and Desist Order under Water Code section 13301 to establish a time schedule to achieve compliance with waste discharge requirements.

SUMMARY OF THE ACTIONS REQUIRED BY THIS ORDER

43. As described and defined in detail below, this Order requires compliance with the WDRs by compelling the Discharger to:

    a. Define the lateral and vertical extent of contamination in the shallow and deep groundwater zones;

    b. Optimize the current landfill gas extraction system to extract as much gas as possible, given the site constraints.

    c. Properly destroy the two groundwater supply wells that provide a conduit between the shallower and deeper groundwater zones. In addition, destroy the damaged groundwater monitoring well and replace it.

    d. Prevent the discharge of contaminants into the Tuolumne River on the south and southwest side of the landfill by installing the enhanced groundwater extraction system described in Section 5.0 of the 29 October 2010 *Corrective Action Work Plan*;

    e. Comply with an updated Monitoring and Reporting Program that has been revised to include requirements to (1) monitor the Tuolumne River, (2) monitor certain groundwater monitoring wells on a more frequent schedule to ascertain whether the corrective actions are successful, and (3) submit landfill gas monitoring reports on a semi-annual instead of quarterly basis.

    f. Upon definition of the lateral and vertical extent of contamination, prepare a revised Report of Waste Discharge and possibly an Engineering Feasibility Study to

discuss whether additional landfill gas and/or groundwater corrective action measures are needed to comply with the requirements of the WDRs, the Basin Plan, Title 27, and State Board Resolution 68-16. The Discharger may wish to propose concentration limits greater than background ("CLGB"). The EFS shall also evaluate whether additional permanent groundwater monitoring wells need to be installed.

IT IS HEREBY ORDERED that, pursuant to Water Code sections 13301, 13260 and 13267, Stanislaus County, its agents, successors, and assigns shall, in accordance with the following tasks and time schedule, implement the following improvements to their monitoring, and corrective action systems to ensure compliance with WDRs Order R5-2009-0051.

Each report submitted to the Central Valley Water Board shall be included in the Discharger's Operating Record. Furthermore, any person signing a document submitted under this Order shall make the following certification:

"I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my knowledge and on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

<u>Revised Monitoring and Reporting Program</u>

1. Effective **1 May 2011**, the Discharger shall comply with the Revised Monitoring and Reporting Program (MRP R5-2009-0051) adopted concurrently with this Oder.

2. By **15 June 2011**, the Discharger shall submit and implement a *Tuolumne River Sampling and Analysis Plan* (SAP) containing the details of where and how samples will be collected to comply with the surface water monitoring requirements of the Revised MRP. Surface water sampling shall begin in July 2011.

<u>Landfill Gas Corrective Action Tasks</u>

3. By **30 September 2011**, the Discharger shall submit a *Landfill Gas Extraction System Optimization Report.* The Plan shall describe steps that need to be taken to modify the physical components or operating elements of the landfill gas system to prevent landfill gas, to the extent possible, from entering the groundwater throughout the entire footprint of the landfill (and if appropriate, from the vadose zone adjacent to and beneath the landfill). For purposes of this Order, "optimization" is defined as structural or operational improvements which may be completed within the Discharger's discretionary fiscal authority and does not require approval from the Board of Supervisors or going out for

bid. The Report shall include:

a. A description of the measures that have been taken to provide and maintain, to the extent possible, continuous negative pressure[17] in each landfill gas extraction well for each interval monitored;

b. Certification that those measures have been fully implemented;

c. An *Operational Procedures* document that describes on-going procedures that will be implemented to ensure that landfill gas extraction is continuously optimized. The document may reference requirements from the regulations pertaining to Methane Emissions from Municipal Solid Waste Landfills contained in the California Code of Regulations, title 17, Subchapter 10, Article 4, Subarticle 6, section 95460 et seq.

Groundwater Corrective Action Tasks

4. **Immediately upon adoption of this Order**, the Discharger shall take all internal steps necessary such that the expanded groundwater extraction and treatment system described in Section 5.0 of the 29 October 2010 *Corrective Action Work Plan* is installed no later than 30 October 2012.

5. By **30 July 2011**, the Discharger shall submit a Report of Waste Discharge for the discharge of the treated groundwater from the expanded system. The Discharger shall consider whether a General Order[18] may be more applicable than an individual order. If the Discharger determines that it prefers an individual permit, then the RWD shall include proposed effluent limits for the treatment system, analytical data for the groundwater underlying the new disposal area, and the additional information listed in Attachment B to this Order.

6. By **30 November 2011**, the Discharger shall submit a *Well Destruction and Replacement Report of Results* to document that wells MW-14S, SW-1, SW-2 were destroyed in accordance with the 29 October 2010 work plan, and that MW-14S was replaced as described in the work plan.

7. By **30 December 2011**, the Discharger shall submit a *Groundwater Plume Investigation Workplan* that describes a specific plan to define the nature and extent of groundwater

[17] For purposes of this Order, "continuous negative pressure" means that each wellhead shall be operated under a vacuum (negative pressure) except (a) when a well has been decommissioned with approval of the Assistant Executive Officer, (b) when necessary to prevent or control a landfill fire, (c) during maintenance, construction, or well raising activities on a well, or (d) when the gas collection system has been temporarily shut down for maintenance or repairs.

[18] For example, the NPDES General Order for Limited Threat Discharges of Treated/Untreated Groundwater from Cleanup Sites, Wastewater from Superchlorination Projects, and Other Limited Threat Wastewaters to Surfaces Waters (Order R5-2008-0082).

impacts associated with the Geer Road landfill. Consistent with Title 27, section 20425, the investigation shall include the installation of additional groundwater monitoring wells. All new wells shall become part of the well network required to be monitored under the MRP. The workplan shall contain the information listed in the first section of Attachment C, *Items to Include in Monitoring Well Installation Workplan and Report of Results*, and shall be designed to:

a. Determine the **vertical** distribution and concentration of each constituent of concern[19] in groundwater in each aquifer zone affected by the release, with attention paid to the deep "deep gravel" zone found at 125-140 feet bgs at Supply Well-2. At a minimum, three wells shall be installed into the deep gravel zone. The first well shall be installed at the southwest edge of the landfill in the vicinity of monitoring wells MW-4S/4D, and shall be screened into the deep gravel zone and the next deeper water bearing zone. The second well shall be installed along the northwest edge of the landfill, between monitoring wells MW-3S/D and MW-17 S/D, and shall monitor the shallow zone and the deep gravel zone. The third well shall be north of MW-23S/D along the Tuolumne River and shall monitor the shallow zone and the deep gravel zone. All borings shall be continuously cored and logged following the protocol outlined in ASTM Standard D2488-09a Standard Practice for Description and Identification of Soils (Visual-Manual Procedure). Special attention shall be made to define the presence, thickness, and characteristics of the semi-confining layer between the shallow zone and the deep gravel zone, as well as the complete thickness of the deep gavel zone.

b. Determine the **lateral** distribution and concentration of each constituent of concern[7] in groundwater at the northwest side of the landfill (Triangle Ranch property). Existing piezometers in this area, as well as the wells listed in Item 6.a may be used to accomplish this task, or additional wells may be proposed. All borings shall be continuously cored and logged.

c. Evaluate whether groundwater on the west-southwest side of the Tuolumne River has been affected by the releases. At a minimum, this task shall be accomplished by:

   i. Identifying all domestic and municipal water supply wells within a one-mile radius downgradient (west and southwest) of the landfill and using records available from the California Department of Water Resources and Stanislaus County.

   ii. For wells with screened intervals in either the shallow aquifer or deep gravel zone, preparing a sampling plan to determine if they have been impacted by the landfill plume and contacting the landowners for access to the property.

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[19] At a minimum, the constituents of concern include the "monitoring parameters" listed in Table I of the MRP.

iii. Installing a minimum of three wells to determine the lateral extent of the plume in the groundwater corresponding to the landfill's shallow and deep gravel zones. Monitoring wells may be installed along County right-of-ways.

8. By **30 December 2012**, the Discharger shall submit a *Shallow Groundwater Extraction and Treatment System Expansion Report* documenting that 13 shallow zone extraction wells, spaced approximately 400 feet apart, with a flow rate of 30 gpm per well have been installed and that the system is operating as proposed in Section 5.0 of the 29 October 2010 *Corrective Action Work Plan*

9. By **30 December 2012**, the Discharger shall submit a *Groundwater Plume Investigation Report* that presents of the findings of the hydrogeologic investigation completed pursuant to the approved workplan. The report should incorporate data obtained during previous investigations, and shall include :

   a. A well installation report for any newly installed monitoring points.

   b. Documentation of all investigative activities and data derived from the investigation described in Item 6, above. The document shall include the information listed in the second section of Attachment C, *Items to Include in Monitoring Well Installation Workplan and Report of Results.*

   c. A detailed evaluation of the lateral extent of all COCs in the shallow, gravel, and deeper saturated zones that extends in all directions from the landfill, with an emphasis on the west-southwest side of the landfill, including the Triangle Ranch property and across the Tuolumne River to the west-southwest of the landfill. If analytical data does not provide a "non detect" point for any of these zones, then include modeled points (and rationale) where all COCs are not detected in groundwater samples from those zones.

   d. A site conceptual model that defines the stratigraphy; hydrogeologic properties of the shallow and deeper aquifer zones; and the influence of water supply wells, river stage and on-site disposal of treated groundwater on groundwater elevation and gradient under current site conditions.

   e. A calibrated numeric groundwater model based on current site-specific data that depicts the existing groundwater plumes and can be used to model alternative groundwater remediation strategies.

Evaluation of Need for Additional Corrective Actions

10. By **30 December 2013**, the Discharger shall submit a Report of Waste Discharge (ROWD) to allow the WDRs to be updated. At a minimum, the ROWD shall describe the following:

    a. The nature and extent of groundwater impacts for each COC in all zones affected by the release (use the information submitted in the *Groundwater Plume Investigation Report*, and expand with the additional year of monitoring).

    b. Proposed Water Quality Protection Standards for all constituents listed in Table VII of the MRP, and an estimated date when compliance with all water quality protection standards will be achieved for all zones affected by the release. If the Discharger proposes concentration limits greater than background, the ROWD shall address all of the requirements set forth in section 20400 of Title 27. Unless otherwise justified, well MW-20S shall be considered the background well for the shallow groundwater zone and well MW-20D shall be considered the background well for the deep groundwater zone.

    c. An evaluation of the effectiveness of the LFG corrective action system in terms of its ability to capture LFG to provide source control.

    d. An evaluation of the expanded GWETS system in terms of its ability to capture the contaminant plume onsite to prevent off-site migration of impacted groundwater.

    e. An evaluation of whether additional corrective action is need to address all groundwater impacts in order to ensure compliance with State Water Resources Control Board Resolution 92-49, the Basin Plan, and Title 27.

    f. An evaluation of whether additional permanent monitoring wells are needed to document the effectiveness of the corrective actions.

    g. Updated financial assurance estimates for post-closure maintenance and for corrective action.

    If additional corrective action measures are needed to ensure compliance with either the site-specific concentration limits, State Water Board Resolution 92-49, Title 27, or the Basin Plan, then the ROWD shall include an *Updated Engineering Feasibility Study (EFS) Report* that presents an updated engineering feasibility analysis of alternatives to expand and/or modify the existing LFG system and/or the existing groundwater extraction and treatment system so that it will achieve compliance with the applicable limits for each COC. The feasibility analysis shall include a revised cost estimate for capital and annual operation/maintenance/monitoring costs, as well as selection of the preferred alternative and justification for the selection. The feasibility analysis shall demonstrate, based on the numeric model, that the selected alternative will result in compliance with the Water Quality Protection Standards within a defined period of time.

Progress Reports

11. **Beginning with the second quarter 2011,** the Discharger shall submit quarterly progress reports describing the work completed to date to comply with each of the requirements described above. The Quarterly Progress Reports shall be submitted by the **15 th day of the month following the end of the quarter** (e.g. by 15 April, 15 July, 15 October, and 15 January).

In accordance with California Business and Professions Code sections 6735, 7835, and 7835.1, engineering and geologic evaluations and judgments shall be performed by or under the direction of registered professionals competent and proficient in the fields pertinent to the required activities. All technical reports specified herein that contain workplans for, that describe the conduct of investigations and studies, or that contain technical conclusions and recommendations concerning engineering and geology shall be prepared by or under the direction of appropriately qualified professional(s), even if not explicitly stated. Each technical report submitted by the Discharger shall contain the professional's signature and/or stamp of the seal.

The Assistant Executive Officer may extend the deadlines contained in this Order if the Discharger demonstrates that circumstances beyond the Discharger's control, including a delay beyond 60 days for Board staff to complete the first review of workplans, have created delays, provided that the Discharger continues to undertake all appropriate measures to meet the deadlines. The Discharger shall make any deadline extension request in writing at least 30 days prior to the deadline. The Discharger must obtain written approval from the Assistant Executive Officer for any departure from the time schedule shown above. Failure to obtain written approval for any departures may result in enforcement action.

If, in the opinion of the Assistant Executive Officer, the Discharger fails to comply with the provisions of this Order, the Assistant Executive Officer may refer this matter to the Attorney General for judicial enforcement, may issue a complaint for administrative civil liability, or may take other enforcement actions.

Failure to comply with this Order or with the WDRs may result in the assessment of Administrative Civil Liability of up to $10,000 per violation, per day, depending on the violation, pursuant to the California Water Code, including sections 13268, 13350 and 13385. The Central Valley Water Board reserves its right to take any enforcement actions authorized by law.

Any person aggrieved by this action of the Central Valley Water Board may petition the State Water Board to review the action in accordance with Water Code section 13320 and California Code of Regulations, title 23, sections 2050 and following. The State Water Board must receive the petition by 5:00 p.m., 30 days after the date that this Order becomes final, except that if the thirtieth day following the date that this Order becomes final falls on a

Saturday, Sunday, or state holiday, the petition must be received by the State Water Board by 5:00 p.m. on the next business day. Copies of the law and regulations applicable to filing petitions may be found on the Internet at:

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

or will be provided upon request.

I, KENNETH D. LANDAU, Assistant 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 __.

_____

KENNETH D. LANDAU, Assistant Executive Officer

Attachment A: Site Map
Attachment B: Requirements for a Report of Waste Discharge
Attachment C: Monitoring Well Installation Workplan and Report Requirements

Additional document: 2011 Revised Monitoring and Reporting Program R5-2009-0051

HFH/ALO/WSW: 3/21/2011