

INFORMATION SHEET

ORDER R5-2013-XXXX
NANCY C. CLEAVINGER, TRUSTEE, ET AL.
FLORIN PERKINS LANDFILL
SACRAMENTO COUNTY

Background Information

The Florin Perkins Landfill is an inactive, unclassified landfill on Florin Perkins Road near the Jackson Highway about seven miles southeast of downtown Sacramento. The landfill operated from 1993 to 2005 under waste discharge requirements (Order Nos. 89-202 and 95-196) that limited the discharge to inert wastes. In February 2005, the property owner (Discharger under this Order) evicted the former landfill operator Florin Perkins Landfill, Inc. for noncompliance with Regional Board Orders and breaches of the operating agreement. Since then the landfill has been inactive.

The landfill was sited in a quarry pit that was mined to a maximum depth of about 52.5 feet below ground surface (bgs) or -2.5 feet MSL. Previous WDRs authorized a 106-acre unit area within the quarry pit area for landfilling. Three area fill cells totaling about 39 acres were ultimately developed on the north, south, and east sides of the authorized disposal area. Up to 11 feet of concrete and other inert debris was also buried in the central part of the unit (referred to as the Central Processing Area or CPA). This area was subsequently used for materials stockpiling and processing. Other onsite features include ancillary landfill facilities (e.g., ditches, monitoring wells, and access roads); a 10-acre transfer station/materials recovery facility (MRF); buffer land south of the unit (19 acres); a utility tower easement; and undeveloped areas of the quarry pit.

Uppermost groundwater at the site occurs in Riverbank alluvium at an average depth of about 63 feet bgs corresponding to -13 feet MSL. The shallow aquifer is unconfined. The groundwater flow direction is generally to the southeast at an average gradient of about 1.4 ft./1000 ft. No significant vertical gradients have been observed between upper and lower zones in the uppermost aquifer. Background water quality at the site has about 795 μ mhos/cm specific conductivity; 510 mg/L total dissolved solids (TDS) and 200 mg/L bicarbonate alkalinity. Groundwater impacts consisting of low concentrations of the volatile organic compound (VOC) trichlorofluoromethane (Freon 11) and mildly elevated general minerals have been historically detected at the site since 2002, primarily down gradient of the Southern Fill Area. For example, concentrations of Freon 11 detected in compliance well MW-F at the Southern Fill Area have historically ranged from about 1 to 22 μ g/L and averaged about 8 μ g/L. Lower average concentrations of Freon 11 have also been detected down gradient of the Northern Fill Area. No clear rising or falling trends have been historically evident in the Freon concentrations detected at either unit. The water quality limit for Freon 11 is the 150 μ g/L California Maximum Contaminant Level.

Evaluation Monitoring Program

In February 2003, Florin Perkins Landfill, Inc. (the former landfill operator and a

discharger under previous WDRs Order No. 95-196) submitted an Evaluation Monitoring Program (EMP) work plan under Title 27 to investigate the release per a 9 December 2002 Regional Board staff request.¹ The work plan proposed the following EMP tasks:

- Sampling of a nearby gas probe to assess whether the impacts detected in MW-F may been caused by VOCs in landfill gas (LFG);
- Semiannual monitoring of all six groundwater monitoring wells for VOCs; extended development of Wells D, E and F prior to sampling (i.e., to verify the wells were free of sediments from completion activities);
- Review of available well information and historical water quality data for offsite wells immediately east of the site; and
- Sampling of the latter wells after obtaining well access to assess the down gradient extent of the release and spatial changes in the groundwater chemistry.

In a 6 March 2003 letter, Regional Board staff approved the proposed EMP requesting that the former operator submit the following items by specified due dates:

- An addendum addressing staff's comments on the plan,
- An Engineering Feasibility Study, and
- A proposed corrective action plan.²

Florin Perkins Landfill, Inc. failed to implement the EMP and submit the above reports; and subsequently failed to respond to an August 2003 Water Code section 13267 Order for the reports issued by the Executive Officer. On 21 January 2011, the Executive Officer issued a Water Code section 13267 Order to the owner requesting various items by specified due dates, including, but not limited to, the following:

- By 30 March 2011, a report as to whether or not the owner planned to restart the landfill, and if not, by 30 December 2011, a final closure and postclosure maintenance plan for the landfill;
- By 30 May 2011, an addendum to the 2003 EMP including:
 - a response to Board staff's March 2003 comments on the EMP;
 - an evaluation of gas and groundwater monitoring data collected from onsite and offsite wells since 2003; and
 - proposed changes to the EMP to fully define the lateral and vertical extent of gas and groundwater impacts, both onsite and offsite; and
- By 30 December 2011, an Engineering Feasibility Study (EFS) report, including EMP Report and Corrective Action Plan (CAP) prepared in accordance with Title 27

1. See 10 February 2003 *Proposed Work Plan for Evaluation Monitoring Program*, prepared by Alisto Engineering.

2. The letter provided comments on the plan, including, but not limited to, the need to identify the source of the release (e.g., southern, northern or eastern fill area); define the lateral and vertical extent of impacts onsite and offsite; and include implementation dates for each task in the project schedule.

regulations.

The LEA also ordered the Discharger to conduct a site investigation so as to bring the site into compliance with state minimum standards under solid waste regulations. Specifically, a 25 February 2011 LEA directive requested a plan for determining the depth and extent of landfill waste; a gas sampling plan (including methane and trace gases); and an evaluation of all gas monitoring results since 2003. The directive was issued based on findings of an 8 December 2010 joint site inspection conducted with CalRecycle.

On 27 May 2011, in response to both the Water Board and LEA orders, the Discharger submitted an addendum proposing a multi-phase EMP site investigation. The proposed EMP had the following objectives:

- Phase I
 - Identify landfill units
 - Characterize and delineate extent of landfill waste;
 - Screen for landfill gas and leachate
 - Identify source of impacts
 - Map geologic controls
 - Develop site conceptual model
 - Prepare and submit Phase I results (i.e., interim memo)
- Phase II
 - Adjust monitoring well locations and designs, as necessary, based on Phase I results
 - Delineate the lateral and vertical extent of landfill gas, including VOCs
 - Delineate lateral and vertical extent of groundwater impacts
 - Identify contaminant fate and transport mechanism(s)
 - Review current and historical monitoring data
 - Refine site conceptual model
 - Develop corrective action alternatives
- Phase III
 - Prepare and submit EMP report
 - Prepare and submit EFS and CAP reports.

Phase I of the EMP, implemented during the summer of 2011, included the following activities:

- A subsurface geophysical survey of the landfill area (7 profiles);
- Cone penetrometer (CPT) testing (23 test holes);
- Excavation of test pits to characterize landfill waste (20 test pits);
- Auger borings through waste (DWs-1 to 6) and native material (DBs-1,2,3 & 5);
- Field screening of samples for methane and VOCs;
- Conversion of eight CPT test holes to vapor probes and two auger borings to dual completion leachate-gas wells; and

- Laboratory testing to identify sources and impacts closest to landfill.

The Phase I investigation indicated that landfill gas from the Southern Fill Area was the most likely source of groundwater impacts at the site and that unmined gravel in the unsaturated zone in this area was the most likely transport pathway for landfill gas migration to groundwater. The investigation included the Central Processing Area (CPA) as a potential source of the Freon 11 (e.g., foam insulation or white goods handling), but did not find any evidence of a release in this area. The Phase I EMP results were documented in a 22 September 2011 Interim Memo (*Evaluation Monitoring Program (EMP) Phase I Investigation – Interim Memo for the Florin Perkins Landfill*, prepared by the DE Team).

The Phase II scope included the following activities:

- Installation and sampling of the 10 perimeter gas monitoring wells described in Findings 31 and 32 (GPs-4 through 13);
- Installation and sampling of five groundwater monitoring wells, including two upper zone wells (MWs-G(S) and H(S)) and three lower zone wells (MWs-G(D), H(D), and I), as described in Finding 36.
- Development of various maps in support of the hydrogeologic contaminant transport model, including:
 - Trilinear plots of water chemistry;
 - Isopach maps showing sand and gravel thickness in the unsaturated and saturated zones;
 - Contour plots showing distribution and lateral extent of Freon 11 in soil gas and shallow groundwater; and
 - Geologic cross-sections based on well logs showing well completion information, soil type, and geologic controls
 - Geologic cross sections showing vertical distribution of Freon 11 in unsaturated and saturated zones based on test results

The Phase II results provided additional evidence supporting Phase I's conclusion that the Southern Fill Area was the most likely source of Freon 11 detected in soil gas and groundwater at the site. It also concluded that (based on the detection of leachate in only one waste boring) landfill leachate was not likely a source of the VOC impacts. For example, up to 30 feet of high permeability sand and gravel was logged in wells MW-F and MW-H(S) south of the SFA, where Freon 11 impacts to groundwater were estimated to extend vertically to about -45 feet MSL or 30 feet below the water table. The study did not address the Northern Fill Area as a potential source, attributing the detection of low concentrations of Freon 11 in compliance well MW-D to likely migration of landfill gas from the Southern Fill Area. Notwithstanding this conclusion, it is noteworthy that significant sand and gravel intervals were logged in the unsaturated and uppermost saturated zones in MW-D immediately south of the NFA, where Freon 11 was estimated to extend to about -38 feet MSL or about 25 feet below the water table.

The EMP investigation also concluded that such permeable unsaturated zone media could help to vent LFG to the surface, attenuating LFG impacts. In addition, low permeability (i.e., silt and clay) areas in the unsaturated zone (e.g., GP-8) could serve to impede LFG migration and in the saturated zone attenuate LFG impacts to groundwater (e.g., DB-1). See WDR Finding 42.

Phase III -- The complete EMP investigation was documented in the December 2011 report *Evaluation Monitoring Program Report for the Florin Perkins Landfill*, prepared by the DE Team.

Corrective Action

The EFS/CAP submitted by the Discharger under the January 2011 Water Code section 13267 Order evaluated various corrective action options and recommended passive landfill gas controls and landfill closure as the primary corrective action measures at the site. Also under the Water Code section 13267 Order, the Discharger subsequently submitted a December 2012 Landfill Gas Monitoring and Control Plan and a Final Closure and Postclosure Maintenance Plan for implementation of these recommended corrective action measures.

Revised WDRs

These revised WDRs incorporate and prescribe requirements for landfill closure and corrective action, including the installation of passive landfill gas controls (i.e., vents) at each unit as an interim corrective action measure; phased cover construction (including side slope regrading and installation of permanent gas controls); and postclosure monitoring of landfill gas, groundwater, and surface water runoff.

Surface water runoff at the site is discharged to onsite quarry pits. Street-level drainage in the area generally flows toward Morrison Creek, a tributary to the Sacramento River.