

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LOS ANGELES REGION

ORDER NO. 01-012

WASTE DISCHARGE REQUIREMENTS
FOR
LINDBERG HEAT TREATING COMPANY, HUNTINGTON PARK FACILITY
(POTASSIUM PERMANGANATE INJECTION PILOT TEST)
(FILE NO. 00-114)

The California Regional Water Quality Control Board, Los Angeles Region, (hereafter Board) finds that:

1. Lindberg Heat Treating Company (hereafter Discharger) is a wholly owned subsidiary of the Lindberg Corporation. The Discharger owns a manufacturing plant at 3370 Benedict Way, Huntington Park, Los Angeles County. The plant is in the SE-1/4 of Section 23, T2S, R13W and is approximately 1.5 miles from the Los Angeles River (Figure 1).
2. The manufacturing plant was originally built by Industrial Steel Treating Company and was initially used for the production of heat treated metal products. A cleaning solution (mostly trichloroethene or TCE) was used to degrease and clean metals after processing. The facility was opened in 1945. The current owner has been operating the facility since 1998. No volatile organic compounds (VOCs) have been used at this facility since the early 1990's.
3. In 1992, a Phase II environmental site assessment was conducted. Analytical results indicated that the groundwater was impacted with halogenated hydrocarbons and the soil was impacted with petroleum hydrocarbons, low levels of halogenated hydrocarbons and polychlorinated biphenyls (PCBs). In 1998, the Discharger conducted several soil and groundwater assessments at the facility and in its vicinity to determine the extent of these compounds in soil and groundwater. Groundwater analytical data indicate, in addition to TCE, the presence of cis-1,2-dichloroethene (cis-1, 2-DCE), trans-1, 2-dichloroethene (trans-1,2-DCE), 1,1-dichloroethene (1,1-DCE), 1,1-dichloroethane (1,1-DCA), tetrachloroethene (PCE), and vinyl chloride (VC). Soil VOC concentrations range from non-detect to 11 milligrams per kilogram (mg/Kg) cis-1,2-DCE, 0.7 mg/Kg trans-1,2-DCE, 0.43 mg/Kg 1,1 DCE, 2.2 mg/Kg 1,1-DCA, 1.4 mg/Kg PCE, and 5.8 mg/Kg TCE. No vinyl chloride was found in soil. Groundwater VOC concentrations range from non-detect to 3,000 microgram per liter ($\mu\text{g/L}$) cis-1,2-DCE, 410 $\mu\text{g/L}$ trans-1,2-DCE, 350 $\mu\text{g/L}$ 1,1 DCE, 440 $\mu\text{g/L}$ 1,1-DCA, 200 $\mu\text{g/L}$ PCE, 2,600 $\mu\text{g/L}$ TCE, and 12 $\mu\text{g/L}$ VC. Other VOCs identified in groundwater are 180 $\mu\text{g/L}$ 1,2-DCA, 89 $\mu\text{g/L}$ 1,1,1-trichloroethane (TCA), and 340 $\mu\text{g/L}$ 1,1,2-TCA.
4. Since 1999, the Discharger has been operating two soil vapor extraction (SVE) systems using Granular Activated Carbon (GAC). The systems include ten soil vapor extraction wells. As of June 29, 2000, approximately 380 pounds of VOCs have been removed by these systems.

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5. Quarterly groundwater sampling performed by the Discharger indicate that the TCE plume is not being remediated effectively by the SVE system. Therefore, the Discharger is proposing an *in situ* remediation method using potassium permanganate oxidation to cleanup the VOCs.
6. A City of Huntington Park Municipal Supply Well is situated within 0.25 miles from this facility. This well is hydraulically cross-gradient of the site. Its total depth is 1500 feet below grade and it is screened from 1000 to 1500 feet. No indication of TCE contamination has been reported.
7. The Discharger proposes to test an innovative approach for providing cleanup of the contaminated groundwater using the chemical potassium permanganate (KMnO_4). The intent is to treat the high concentrations of TCE with this method. In order to determine if potassium permanganate can be used to provide full-scale remediation of the plume, the Discharger proposes to conduct a 6-month pilot test. If the pilot test indicates that potassium permanganate can be used successfully to treat TCE in this area, the Discharger may propose to treat other areas of the aquifer impacted by TCE. The Discharger anticipates treatment of TCE in the pilot test area to be effective enough to achieve concentrations below 0.5 $\mu\text{g/L}$ within 6 months. By comparison, the average groundwater extraction system is estimated to require an additional 5 to 10 years to remediate groundwater to concentrations below 0.5 $\mu\text{g/L}$.
8. Potassium permanganate would be injected over a period of 1 to 3 days into a small portion of the polluted aquifer to oxidize VOCs to by-products which include hydrogen and chloride ions, carbon dioxide (CO_2), and manganese dioxide (MnO_2). The drawback of chemical oxidation of VOCs is that this process may increase total dissolved solids (TDS) levels and chloride levels. Potassium permanganate may also cause the precipitation of manganese oxides that may result in reduction of the permeability of the aquifer. An additional drawback is the lack of adequate distribution of KMnO_4 in the aquifer that may limit the effectiveness of this technology.
9. The Discharger will conduct bench-scale testing to determine the amount of KMnO_4 to be needed in the pilot test area. Results will indicate the amount of KMnO_4 that reacts with the aquifer materials as well as with the halogenated compounds. This will provide good estimates on the amount of TDS, chlorides, and MnO_2 that will be produced. Previously studies have indicated that the permeability of the aquifer would only be reduced minimally.
10. The Discharger has submitted a document titled *Potassium Permanganate Injection Pilot Test*, dated March 30, 2000, prepared by the Discharger's consultant, Levine Fricke. The plan, approved by the Regional Board staff on September 14, 2000, consists of test procedures and methods for evaluating the halogenated hydrocarbon concentrations in the treatment area including TCE and other VOCs listed above.
11. The Discharger proposes to sample groundwater from the monitoring wells for baseline groundwater parameters prior to the start of the pilot test. Then, the groundwater will be monitored closely in the pilot test area (50 ft x 60 ft, as shown on Figure 2) as well as beyond the test area, starting two weeks after potassium permanganate has been applied to the treatment zone. A computer simulated migration analysis was conducted by the Discharger to determine how far the potassium permanganate and its by-products would migrate within a year. These

analyses suggest that the potassium permanganate by-products would not migrate off-site or to the Los Angeles River during this time period. With setup of the proposed monitoring wells, proper hydraulic containment of the injected solution within the test area can be achieved.

12. Any injection of potassium permanganate into the groundwater is a discharge of waste as defined by the California Water Code. However, the discharge of potassium permanganate is intended to provide more efficient remediation of TCE polluted groundwater and may significantly reduce the anticipated cleanup time of the aquifer as compared to pump-and-treat technology should it be used to remediate the groundwater.
13. The Discharger proposes to inject up to 10,000 liters (approximately 2,641 gallons) of 40 grams per liter (g/l) KMnO_4 (final concentrations may vary depending on the bench test) into the shallow aquifer zone at three locations, IW-A, B, and C, (Figure 2) extending from 45 to 55 feet below the ground surface. Three monitoring wells, LFMW-10, LFMW-12 and MW-1, are located 10 feet, 50 feet and 180 feet, respectively downgradient of the injection wells. These wells are situated to monitor the migration of the KMnO_4 and provide groundwater control, if needed.
14. The Water Quality Control Plan for the Los Angeles Region designates the groundwater in the Los Angeles Coastal Plain Central Basin for beneficial uses including municipal and domestic supply, industrial process supply, industrial service supply, and agricultural supply.
15. The permitted discharge is consistent with the antidegradation provisions of State Water Resources Control Board Resolution No. 68-16 (Anti-degradation Policy). The discharge may result in some localized exceedance of background concentrations of constituents such as chloride (Cl⁻), manganese (Mn), pH, and total dissolved solids (TDS), but these parameters, after injection of KMnO_4 , are not anticipated to exceed the primary or secondary standards. Moreover, any parameter change resulting from the discharge:
 - a. will be consistent with maximum benefit to the people of the State,
 - b. will not unreasonably affect present and anticipated beneficial use of such waters, and
 - c. will not result in water quality less than that prescribed in the Water Quality Control Plan for the Los Angeles Region.
16. This Regional Board has assumed lead agency role for this project under the California Environmental Quality Act and has conducted an Initial Study in accordance with Title 14, California Code of Regulations, Section 15063, entitled Guidelines for Implementation of the California Environmental Quality Act. Based on the Initial Study, the Regional Board prepared a Mitigated Negative Declaration that the project will not have a significant adverse effect on the environment.
17. The Regional Board has notified the applicant and interested agencies and persons of its intent to prescribe Waste Discharge Requirements for this discharge and has provided them with an opportunity to submit their written views and recommendations. The Regional Board, in a public

meeting, heard and considered all comments pertaining to the discharge and to the tentative requirements.

IT IS HEREBY ORDERED that Lindburg Heat Treating Company, in order to meet the provisions contained in Division 7 of the California Water Code and regulations and guidelines adopted thereunder, shall comply with the following:

A. Discharge Limits

1. The Discharge of potassium permanganate solution into the shallow aquifer shall not exceed 10,000 liters (approximately 2,641 gallons) in volume. In the event of extra injection volume of potassium permanganate solution is required, written approval by the Executive Officer shall be obtained before such injection is carried out.
2. During this pilot test, the injection concentration of potassium permanganate solution shall not exceed 40 g/L or the bench-test-determined concentration should this concentration be used instead.
3. The Discharger shall not cause the groundwater outside of the pilot test area to exceed background concentrations of chloride and TDS established prior to start of the pilot test.
4. The discharge of potassium permanganate solution into the shallow aquifer shall only be performed during the 6 months pilot test period.

B. Discharge Prohibitions

1. The Discharger shall provide hydraulic control, that is full and complete containment of any by-products of the chemical oxidation process, beginning no later than 4 months after the injection of potassium permanganate in the pilot test area, or as soon as detectable potassium permanganate is detected in down-gradient Well LFMW-12, which ever comes sooner.
2. The Discharge of potassium permanganate or any by-products into any surface, surface water drainage course, or to surface waters is prohibited.
3. The Discharger shall not cause the permeability of the aquifer, either inside or outside of the potassium permanganate treatment area, to be affected to such a degree that the Discharger is unable to effectively operate the interim or full-scale groundwater pump-and-treat systems.
4. The Discharger shall submit a Work Plan acceptable to the Executive Officer, which shall provide specific methods to be used to evaluate any changes to the aquifer transmissivity, hydraulic conductivity and/or storativity inside the pilot test potassium permanganate treatment area. Aquifer testing performed in the pilot test area must be designed to independently test all the impacted aquifers to determine aquifer properties. Mathematical and computer models should be used to predict groundwater flow and contaminant movement, if **necessary**.

5. The Discharger's activities shall not cause the by-products of the chemical oxidation process to migrate outside of the potassium permanganate treatment area as shown in Figure 2.
6. The Discharger's activities shall not cause the groundwater outside of the pilot test area to contain taste, color or odor producing substances in concentrations that cause nuisance or adversely affect beneficial uses.
7. The Discharger's activities shall not cause the groundwater to contain concentrations of chemical constituents, including permanganate and its by-products, in concentrations that may adversely affect municipal, domestic, industrial or agricultural uses as a result of the Potassium Permanganate Pilot Study.

C. Provisions:

1. This Order includes the attached "Standard Provisions and Applicable to Waste Discharge Requirements." If there is any conflict between provisions stated herein before and the attached "Standard Provisions", those provisions stated herein before prevail.
2. Discharge of wastes to any point other than specifically described in this order is prohibited and constitutes a violation thereof.
3. In the event of any change in name, ownership, or control of this facility, the Discharger shall notify this Regional Board in writing and shall notify any succeeding owner or operator of the existence of this Order by letter; a copy of which shall be forwarded to this Regional Board.
4. A copy of these requirements shall be maintained at an on-site office and be available at all times to operating personnel.
5. This Order includes the attached Monitoring and Reporting Program No. CI-8228. If there is conflict between provisions stated in the Monitoring and Reporting Program No. CI-8228 and the Standard Provisions, those provisions stated in the former prevail.
6. The Discharger shall notify Regional Board staff by telephone within 24 hours, followed by written notification within one week, in the event it is unable to comply with any of the conditions of this Order due to:
 - a) Breakdown of waste treatment equipment,
 - b) Accident caused by human error or negligence,
 - c) Other causes such as acts of nature, or
 - d) Site construction or development operations.
7. In the event that wastes are transported and disposed of to a disposal site, the Discharger shall report types of wastes and quantity of each type; name and address of each hauler of wastes (or method of transport if other than by hauling); and location of the final point(s) of disposal for each type of waste.

8. The Discharger shall submit a 6-month pilot test Summary Report detailing the results of the 6-month pilot test. The report should include an evaluation of the effectiveness of using potassium permanganate to supplement the full-scale remediation of VOC-contaminated groundwater at the facility, the impact of any by-products on the receiving groundwater quality, the hydraulic properties on the aquifer, and any other effects the in-situ treatment may have.
9. The Discharger shall comply with all conditions of this Order, including timely submittal of technical and monitoring reports as specified in Monitoring and Reporting Program No. CI-8228. Violations may result in enforcement action, including Regional Board or court order requiring corrective action or imposing civil monetary liability, or in revision or rescission of this Order.
10. The use of the chemical potassium permanganate shall not cause a condition of pollution or nuisance as defined by the California Water Code, Section 13050.
11. The Discharger shall cleanup and abate the effects of injecting potassium permanganate including extraction of any by-products which adversely affect beneficial uses and shall provide an alternate water supply source for any municipal, domestic or other water use wells that become contaminated in exceedance of water quality objectives as a result of using potassium permanganate.
12. All work must be performed by or under the direction of a registered civil engineer, registered geologist, or certified engineering geologist. A statement is required in all technical submittals that the registered professional in direct responsible charge actually supervised or personally conducted all the work associated with the project.
13. All technical submittals must be wet stamped by a California licensed civil engineer, registered geologist, or certified engineering geologist.
14. These requirements do not exempt the Discharger from compliance with any other laws, regulations, or ordinances, which may be applicable. They do not legalize the waste treatment facility, and they leave unaffected any further restraints on the facility that may be contained in other statutes of and/or required by other agencies.
15. This Order does not alleviate the responsibility of the Discharger to obtain other necessary local, state, and federal permits to construct facilities necessary for compliance with this Order; nor does this Order prevent imposition of additional standards, requirements, or conditions by any other regulatory agency.
16. After notice and opportunity for a hearing, this Order may be terminated or modified for cause including, but not limited to:
 - a. Violation of any term or condition contained in this Order;
 - b. Obtaining this Order by misrepresentation, or failure to disclose all relevant facts;
 - c. A change in any condition that requires either a temporary or permanent reduction or elimination of authorized discharge.

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LINDBURG HEAT TREATING COMPANY
HUNTINGTON PARK FACILITY

File No. 00-114

I, Dennis A. Dickerson, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Los Angeles Region, on January 11, 2001.

Dennis A. Dickerson, Executive Officer

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