

DEPARTMENT OF ECOLOGY
STATE OF WASHINGTON

IN THE MATTER OF THE COMPLIANCE BY) ORDER
Leichner Brothers Land Reclamation Corporation)
Corporation with Model Toxics) No. DE 89-S119
Control Act and the Rules and) Second Amendment
Regulations of the Department of)
Ecology)

IO: Leichner Brothers Land Reclamation Corporation
911 Northeast 94th Avenue
Vancouver, Washington 98666

Order No. DE 89-S119, dated April 27, 1989, is hereby amended as follows:

Section I - "JURISDICTION," shall be amended to read as follows: This Order is issued pursuant to the authority of Chapter 70.105D RCW, Hazardous Waste Cleanup -- Model Toxics Control Act, Section RCW 70.105D.050, Enforcement.

Section II, STATEMENTS OF FACT, shall be revised to include the following:

- F. Leichner Brothers Land Reclamation Corporation has installed and operated groundwater wells at the facility. Figure 1 locates the wells and is attached to this document. Leichner Brothers Land Reclamation Corporation has performed physical, chemical, and biological investigations of groundwaters underlying the site, and contiguous lands, with said wells. To date, the investigations have established the points which follow.
1. Well LB1 was pumped for 24 hours and well nest LB17 monitored for response. The waters in well LB17I, well LB17C, and LB17D lowered by approximately 0.3 feet through the period of pumping, while the water of LB17S lowered approximately 0.1 foot over the same period of monitoring - well LB17S monitoring waters above 17I, C, and D. During the pumping operation the discharge of LB1 was directed to a sediment pond overlying well nest 17.
 2. Well nest 17 monitors waters of the Alluvium in wells 17-S, -I, and -C; the deepest well of the nest monitors waters of the Upper Member of the Troutdale Formation (17D). Samples of waters from each well in nest 17 have been analyzed by Leichner Brothers Land Reclamation Corporation and shown to contain hazardous substances, including ammonia, and levels of pollutants, including dissolved solids, which violate drinking water standards.
 3. Other wells monitored and sampled for the project are constructed in the Alluvium and Troutdale formations; the analysis conducted by Leichner Brothers Land Reclamation Corporation from September 1989 through and including December 1989 indicate the following:
 - a. In December 1989, the sample taken from the well 6S had 5.1 ug/l of vinyl chloride and 51 ug/l cis-1,2-Dichloroethene.

- b. Various level(s) of Tetrachlorethene, and/or Trichloroethene, and/or Dichloroethene (any of the 3 forms) have been detected in wells contiguous to landfilled waste (e.g., well 20S), in wells along the Leichner Brothers Land Reclamation Corporation property line (e.g., wells 1S and 6S), and in wells off Leichner Brothers Land Reclamation Corporation property within 1,000 feet of landfilled waste (e.g., wells 10S and 10C). It has been demonstrated that vinyl chloride, detected in well 6S, can be a product of anaerobic bacteria metabolizing any of the chloroethene series.
 - c. The level of nitrates in the December 1989 sample from well 10S was 10 mg/l, which is the Safe Drinking Water Act limit for nitrates in drinking water.
 - d. Nitrate trends in well pairs 1S-1D, 3S-3D, 4S-4C, 5S-5C, 13S-13D, 13I-13D, 13C-13D, and 18S-18C are the reverse of background in that the lower wells have higher, or equal, median concentrations of nitrates than the paired upper well.
 - e. Well nest 10 had levels of dissolved solids in December 1989 which were close to the Safe Drinking Water Act limit for dissolved solids in drinking water (500 mg/l).
 - f. The level of chromium in well 17D, in September 1989, was 0.078 mg/l, which violates the Safe Drinking Water Act limit for Chromium, and the level of Cadmium in well 17D, in October 1989 was 0.011 mg/l, which violates the Safe Drinking Water Act for Cadmium.
- G. Leichner Brothers Land Reclamation Corporation has constructed a well termed LBRI for the purpose of capturing Alluvium groundwaters; furthermore, it has been demonstrated by Leichner Brothers Land Reclamation Corporation that a release of hazardous substances has occurred to groundwaters flowing from the region of the Landfill and to the well LBRI. Pilot testing of impaired groundwaters is intended to be accomplished by Leichner Brothers Land Reclamation Corporation at well LBRI to establish treatment technology for remediation.
- H. An Environmental Impact Statement, dated January 1979, by Leichner Brothers Land Reclamation Corporation described siltation/sediment ponds that were part of the Landfill's operation. They existed in the southwest corner, northwest corner, and northeast corner; the southwest pond is contiguous to well nest 17. The Environmental Impact Statement states, "Siltation ponds are located over unfilled zones to prevent refuse saturation while allowing direct groundwater recharge."
- I. The Environmental Impact Statement described under point H, above, also depicts former planned expansion of the landfill to the north. Before-and-after landfill expansion topography is depicted on a drawing entitled,

"Three Year Operation & Grading Plan, sheet 1 of 1," attached to this document as Figure 2. A section view of the expansion area to the northeast, labelled Section A-A, establishes the planned limit of excavation for the northeast quadrant of the site at elevation 195 feet above mean sea level (MSL).

- J. Alluvial waters to the north and east of the landfill area depicted in Section A-A, noted under Point I above, are monitored for elevation by Leichner Brothers Land Reclamation Corporation at wells MWNE and LB4S. The elevation of phreatic waters measured in these wells has varied from elevation 198.99 to 205.18 feet above MSL, and 198.63 to 202.98 feet above MSL, respectively.
- K. Leichner Brothers Land Reclamation Corporation constructed two wells in December 1989 identified as LB19S and LB20S. These wells monitor phreatic waters closer to the landfilled waste, and north of residential property that is upgradient of well LB1. Waters sampled in December 1989 at well LB20S, by Leichner Brothers Land Reclamation Corporation, contained volatile organic species including 22 ug/l Trichloroethane, and concentrations of metals, such as iron, lead, manganese and chromium, which violated proposed and final standards of the Safe Drinking Water Act.
- L. The Model Toxics Control Act has been codified under Chapter 70.105D RCW. Furthermore, Chapter 173-340 WAC has been adopted to implement the policy declared by Chapter 70.105D RCW. A copy of each chapter is enclosed with this Amendment to Order DE-S119.
- M. Leichner Brothers Land Reclamation Corporation has applied for a NPDES permit for an existing stormwater discharge from the landfill cover system, and Ecology has found their application complete.

Section III., ECOLOGY DETERMINATIONS, shall be revised to include the following:

- G. The hydraulic testing and chemical/biological analyses accomplished by Leichner Brothers Land Reclamation Corporation on the site have indicated hazardous substances and other drinking water contaminants are being released to the porous media known as the Upper Member of the Troutdale Formation, in the southwest area of landfilled waste, near well nest LB17. Furthermore, the hydrodynamic nature of the release may not be abated by well LB1 to the southwest.
- H. Hazardous substances and other drinking water contaminants have been found off Leichner property in wells 13S and 10S, to the west and south, respectively, which have lower piezometric heads than well LB1. There is reason to establish the ability of well LB1 to remediate these releases. Furthermore, future remediation of groundwaters off Leichner Brothers Land Reclamation Corporation property may impact non-Leichner Brothers Land Reclamation Corporation groundwater users.

- I. Hazardous substances and other drinking water contaminants monitored by Leichner Brothers Land Reclamation Corporation in well LB20S would have to cross residential property if remediated by well LBRI.
- J. The southwest siltation/sediment pond described in Leichner Brothers Land Reclamation Corporation 1979 Environmental Impact Statement is a probable conveyance of hazardous substances, and other drinking water contaminants, from the landfill to groundwaters of the Alluvium and Troutdale formations. A similar occurrence may be taking place in the region of the northern siltation/sedimentation ponds.
- K. Waters of the Alluvium may be of an elevation along the north and east bounds of landfilled waste at Leichner Brothers Land Reclamation Corporation which is higher than elevation 195 feet above mean sea level. This would provide means for contiguous groundwaters to enter landfilled waste from the north and east, become contaminated during transport, and exit the landfill system vertically and/or horizontally. This potential source of contamination would not be abated by the cover system designed for closure of the landfill.
- L. Leichner Brothers Land Reclamation Corporation established well LBRI for the purpose of treating groundwaters; this action will create a point source discharge. While Leichner Brothers Land Reclamation Corporation has applied for an NPDES permit for another point source discharge of the project, that permit will not contain effluent limitations suitable to the remediation of groundwaters at the Leichner facility under the Model Toxics Control Act. Hence, it is necessary to establish interim treatment standards for constituents of concern at the site which are expected to be treated in Leichner Brothers Land Reclamation Corporation's remediation.
- M. Anaerobic biochemical activity within the landfill system is capable of converting volatile species such as cis-1,2-dichloroethene into vinyl chloride, and both of these compounds were observed in well 6S. The level of vinyl chloride sampled exceeded the final drinking water standard for vinyl chloride; the level of cis-1,2-dichloroethene sampled did not violate the proposed drinking water standard for cis-1,2-dichloroethene. Hence, the kinetics accomplished by bacteria hosts of the landfilled waste are a probable site-specific conversion process which yields unacceptable levels of lesser chlorinated compounds from biodegraded parent compounds existing at levels which do not exceed proposed drinking water standards.
- N. Additional groundwater capture wells are necessary to clean up subsurface regions of the Alluvium waters and abate transport of pollutants to the Troutdale formation.

Section IV., ORDER, shall be revised to include the following:

B.5. Further Investigations:

- a. Reference is made to the Leichner Brothers Land Reclamation Corporation Environmental Impact Statement of 1979; specifically, to the drawing entitled, "Three Year Operation & Grading Plan," in the appendix, attached to this document as Figure 2, which locates a sediment pond at the northwest corner of the main body of the landfill. Leichner Brothers Land Reclamation Corporation shall install and monitor a well nest, similar to nest LB17, excluding the intermediate well, in the vicinity of the northwest sediment pond depicted on the drawing. The nest's location shall vary, in distance, from the northwest sediment pond no further than nest 17 varies relative to the southwest sediment pond. Final location is left to Leichner Brothers Land Reclamation Corporation so interferences with existing structures or appurtenances may be avoided. Leichner Brothers Land Reclamation Corporation shall exercise the same quality control and quality assurance in conducting this work as employed in all previous Leichner Brothers Land Reclamation Corporation work of this Order. The nest shall investigate the waters of the Alluvium and Troutdale formations to develop data which may be used to ascertain the quality of the respective formation waters and directions of their movements. Analysis of each well shall be accomplished monthly, for four consecutive months, to establish potential head, volatile organic compounds, total metals for Ca, Cd, Cr, Cu, Pb, Ni, Zn, Mn, and Fe, temperature, pH, dissolved oxygen concentration, electrical conductivity, COD, TKN, nitrates/nitrites, ammonia, total solids, total dissolved solids, total coliform bacteria, and turbidity. Results shall be published in monthly Leichner Brothers Land Reclamation Corporation reports which shall be submitted to Ecology.
- b. Three shallow Alluvium wells shall be constructed along the north and east bounds of the landfilled waste to ascertain field parameters on the upper 10 feet of phreatic water. The north well shall be located just beyond the northern termination of the liner edge forming the North Detention Basin for the landfill; it shall lie on a line projected due south from the center of well MWNE for the project. The northernmost east well shall be located along the eastern property line of the landfill, midway between the westerly projections of Northeast 99th and Northeast 93rd Streets. The southernmost east well shall be located along the eastern property line of the landfill. The exact position of each well shall be left to Leichner Brothers Land Reclamation Corporation determination so as to avoid interferences with utilities, traffic, etc.

Each of the wells shall be analyzed initially for potential head, pH, dissolved oxygen concentration, electrical conductance, and temperature. If potential head in any well is equal to, or greater than, mean sea level elevation 191.00 feet, then all three wells shall be analyzed once for the additional parameters described under point IV.B.5.a, above. The results of this work shall be reported as described in IV.B.5.a and performed with identical quality control and quality assurance.

- c. Leichner Brothers Land Reclamation Corporation shall specifically investigate the ability of well LBRI to protect and remediate contaminated groundwaters west, southwest, and south of well LBRI in the directions of well 6S, and nests 13 and 10. This investigation may be accomplished by pumping well LBRI for an extended period, during which time the discharge shall be contained or treated to the limits described in D.3 of this document. If LBRI pumpage is treated to said limits, the treated fluid may be discharged to Curtin Creek. Leichner Brothers Land Reclamation Corporation may accomplish the investigation required by this paragraph in any other manner provided the method achieves the purpose of the first sentence in this paragraph. Leichner Brothers Land Reclamation Corporation shall inform Ecology of the method proposed to accomplish the investigation; the method shall be subject to Ecology approval.
- d. Leichner Brothers Land Reclamation Corporation shall investigate and report to Ecology any planned remedial action which, if accomplished, would impact groundwater transport beyond Leichner Brothers Land Reclamation Corporation property. The intention of this paragraph is to consider any water rights, under Chapter 90.44 RCW, existing around the Landfill. Leichner Brothers Land Reclamation Corporation shall also file for water rights, under Chapter 90.44 RCW, with the Water Resources Program of Ecology for the Southwest Region, on all extraction wells for the project remediation. After completion of remedial actions, all wells pertaining to said water rights application shall be abandoned in accordance with WAC 173-160-415, Abandonment of Wells, and WAC 173-160-560, Abandonment of Resource Protection Wells.

C.6. Reporting:

Leichner Brothers Land Reclamation Corporation shall study Chapter 173-340 WAC and Chapter 173-160 WAC, and report all work as required and in conformance with the pertinent sections of each WAC. Particular attention shall be given to Parts IV and VIII of Chapter 173-340 WAC when Leichner Brothers Land Reclamation Corporation submits pertinent documents to Ecology for review and remediation information. The WAC shall be used to guide Leichner's preparation of amendments to the remedial investigation and feasibility study, if necessary, as well as

remediation pilot studies, remediation design documents, and remediation construction documents. All documents shall be submitted as soon as possible to ensure the cleanup proceeds as expeditiously as possible to protect human health and the environment.

D. INTERIM REMEDIAL ACTIONS

Leichner Brothers Land Reclamation Corporation shall remediate groundwaters in the areas described herein, which are of higher potential than the waters of capture well LBR1. The remediation shall be accomplished within the local regions of impaired groundwater quality and as near to the source of pollution as feasible.

1. One area which shall have local remedial controls is that region of Leichner Brothers Land Reclamation Corporation property bounded by well LB19S, well nest LB1, well nest LB3, and well LB20S. Contaminated waters of this region which are able to move off Leichner Brothers Land Reclamation Corporation property shall be remediated separately from Leichner Brothers Land Reclamation Corporation remediation efforts in the vicinity of LBR1. In performing such work as is necessary to remediate groundwaters in this area, Leichner Brothers Land Reclamation Corporation shall take care not to impair existing water rights.
2. Another area to have local remedial control established is the entire Alluvium underlying the southern sediment pond of the landfill, contiguous to well nest LB17. Leichner Brothers Land Reclamation Corporation shall abate the downward transport of contaminants, as evidenced at well nest LB17, from the landfill to the Alluvium and Troutdale formations. This work shall be accomplished underneath, and contiguous to, landfilled waste residing within the Alluvium. A Leichner Brothers Land Reclamation Corporation designed capture well shall be used to effect capture in the area of the sediment pond contiguous to well nest LB17. The objectives of the hydrological control are to capture pollutants in the Alluvium, and to reverse potential gradient between the Troutdale and Alluvium formations in this region. All work shall be accomplished using the same quality assurance and quality control employed by Leichner Brothers Land Reclamation Corporation to date.
3. Interim Treatment Standard: Ecology is mindful that the actions of Leichner Brothers Land Reclamation Corporation at well LBR1, and those actions required herein, will necessitate Leichner Brothers Land Reclamation Corporation creating a point source discharge. Ecology is also mindful that treatment of the impaired waters requires pilot testing, full-scale testing, and time for startup to transpire. Through these activities discharges will necessarily be created. Ecology notes that Leichner Brothers Land Reclamation Corporation has constructed an approved stormwater outfall and has applied for a NPDES

permit for same. Hence, this point of the Order shall establish Interim Treatment Standards which Leichner Brothers Land Reclamation Corporation shall meet when treating project groundwaters for the purpose of moving the remediation forward. Furthermore, those waters conforming to the standards set forth hereinafter shall be allowed to be discharged to Leichner Brothers Land Reclamation Corporation's stormwater control system discharging to Curtin Creek.

The Interim Treatment Standards for Leichner Brothers Land Reclamation Corporation Groundwater Remediation Activities shall be as follows:

<u>GROUNDWATER CONSTITUENT</u>	<u>INTERIM TREATMENT STANDARD</u>
Benzene	5 ug/l
Bromomethane	10 ug/l
Chlorobenzene	5 ug/l
Chloroethane	5 ug/l
Chloroform (THM)	100 ug/l
Dichloroethylene (all forms)	2 ug/l
Dichlorobenzene p	5 ug/l
Dichlorobenzene o-, m-	10 ug/l
Dichloroethane (all forms)	5 ug/l
Ethylbenzene	5 ug/l
Tetrachloroethylene	2 ug/l
Toluene	5 ug/l
Trichloroethane (all forms)	5 ug/l
Trichloroethylene	2 ug/l
Vinyl Chloride	2 ug/l
Xylenes	5 ug/l
Cadmium	1 ug/l*
Chromium (total)	50 ug/l
Chromium (VI)	11 ug/l

<u>GROUNDWATER CONSTITUENT</u>	<u>INTERIM TREATMENT STANDARD</u>
Lead	10 ug/l
Nickel	100 ug/l
Nitrate + Nitrite	10 mg/l
Total Ammonia	0.32 mg/l
Total Coliform	1 organism/100 ml
Copper	12 ug/l*
pH	6.5 - 8.5
Zinc	110 ug/l*
Max. Temperature	18°C
Dissolved Oxygen	8 mg/l
Turbidity	1 NTU

* Assumes 100 mg/l hardness as CaCO₃ in sample.

These standards are intended to be protective of public health and the environment for surface and subsurface water supplies. They will be supplemented as required to reflect additional contaminants encountered during cleanup. They shall be in effect until such time as a Waste Discharge Permit is issued to Leichner Brothers Land Reclamation Corporation for the groundwater remediation treatment process.

4. Additional parameters to monitor during pilot work:

During the pilot studies to be used to determine the most effective treatment technologies to remediate the groundwaters polluted by the landfill leachate, Leichner Brothers Land Reclamation Corporation shall monitor the following parameters on the influent and effluent flows of the pilot treatment facility:

Iron

Manganese

Total Dissolved Solids

Hardness as CaCO₃

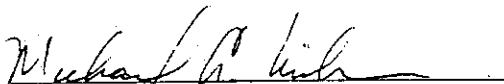
Leichner Brothers Land Reclamation Corporation shall monitor any other constituent which is pertinent to the evaluations of the pilot treatment system. Leichner Brothers Land Reclamation Corporation should be attentive to the ongoing groundwater investigations so that any new information which comes out of the investigatory work may be evaluated within the framework of the pilot treatment system.

E. Permits

1. Upon finalizing a location of discharge for treated groundwaters, Leichner Brothers Land Reclamation Corporation shall submit a revised NPDES permit application which shall provide for the addition of the groundwater treatment outfall(s) to the existing NPDES permit.
2. Leichner Brothers Land Reclamation Corporation shall identify and apply for and/or obtain permits and approvals, if required for construction, or to otherwise implement the cleanup action prior to, or during, the design phase to avoid delays during construction and implementation of the cleanup action.

No other condition or requirement of Order No. DE 89-S119 is affected by this amendment.

DATED this 10TH day of August, 1990 at Olympia, Washington.



Michael A. Wilson
Southwest Region Supervisor
Hazardous Waste Investigations & Cleanup
Department of Ecology
State of Washington