

Five-Year Review

Kent Highlands Landfill Superfund Site Kent, Washington

I. Purpose of the Five-Year Review

Region 10 of the Environmental Protection Agency (EPA) has conducted a Five-Year Review of the Kent Highlands Landfill Superfund site (Kent Highlands, Site), and prepared this report consistent with the requirements of Section 121(c) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as amended in Section 300.430(f)(4)(ii) of the National Contingency Plan (NCP).

This is a *Statutory Review* per sections of CERCLA and the NCP cited above. The purpose of a Five-Year Review is to ensure that a remedial action remains protective of public health and the environment and is functioning as designed. This review (Type 1a) is applicable to a site at which response is ongoing.

This Five-Year Review was conducted pursuant to the Office of Solid Waste and Emergency Response Directives -355/7-02A, 9355.7-02, 9355-7-02FS1, 9355.7-02A (May 1991, August 1991, July 1994, and July 1995 respectively). This Five-Year Review Report is consistent with these OSWER guidance documents. The start of construction of the remedial action in 1993, triggered the CERCLA Section 121(c) requirements for a Five-Year Review.

II. Introduction

The Kent Highlands Landfill is a state-lead site. The Washington State Department of Ecology (Ecology) is responsible for the oversight management of this site is by) as stipulated by an agreement with EPA Region 10. The cleanup of this Site is managed by Ecology using state rules and regulations. Under the state-EPA agreement, EPA does not get involved with the oversight of the state's work but does still have the requirement to review Ecology's Cleanup Action Plan (CAP), which is the equivalent of an EPA Record of Decision (ROD). Also, EPA maintains the responsibility to verify that the remedial actions are protective and remain protective of human health and the environment.

Under this state-lead program, Ecology did a "Periodic Review of Cleanup Actions," dated September 8, 1997. The Ecology periodic review is a technical evaluation of the site to determine if the site remains protective of human health and

the environment and the remedial actions are functioning as designed. This evaluation is similar to EPA's Five-Year Review. A copy of Ecology's report is attached.

III. Site Location and Description

The Kent Highlands Landfill is a 60-acre municipal landfill owned and operated by the City of Seattle, Washington (Seattle). The landfill is located about 14 miles south of Seattle in an area that was annexed by the City of Kent. The city owns about 100 acres, of which approximately 60 acres contains refuse. The refuse filled a deep ravine with about a 220 foot elevation drop from the top of the site to the bottom (or toe) of the fill. The final landfill has refuse buried to a depth of 125 feet in some areas.

The Site was closed in 1993 and the cap/cover system and final gas collection system installed in 1994. The construction was completed in July, 1995.

IV. NPL Listing and RIFS Studies

Studies at the Site in 1984 identified heavy metals including; zinc, copper, barium, and manganese, in on-Site groundwater monitoring wells. In 1985, 1,2-dichloroethane and tetrachloroethylene were measured at levels of concern in the air at the edge of the Site. Landfill leachate seeps drained from the buried refuse into an on-Site leachate pond and then to the Green River. The Green River is a salmon habitat. Under a 1987 Consent Agreement between Seattle and Ecology, Seattle agreed to conduct a remedial investigation and feasibility (RIFS) study to determine the nature and extent of contamination.

Based on the above data, the Site was proposed for the NPL on June 24, 1988. The Site went final on the NPL on August 30, 1990.

Four major areas of concern were identified during the RIFS studies: gas migration off-Site, management of leachate, groundwater (springs) entering the refuse and generating additional leachate, and groundwater contamination. Run-on and run-off surface water could easily be controlled, but the groundwater seeping into the landfill would require some special groundwater interceptor controls.

The feasibility study was completed in 1991 which was equivalent to a landfill closure plan required under the state and federal solid waste regulations. Under Washington state regulations, remedy selection is documented in a Cleanup Action Plan (CAP). The CAP goes through a public review process.

The landfill reached its capacity in 1992 and was closed in 1993. Implementation of the landfill closure plan began during the final years of operation as

gas collection was modified to control off-site migration and leachate controls were constructed. Leachate was collected on-Site, treated by aeration, and discharged through a new force main to the regional sewer and finally, the publically owned treatment works (POTW). These actions mitigated two major environmental and human health risks.

During the closure construction, the gas collection system was further upgraded and the gas treatment facility was built. The groundwater seeps were intercepted and collected with the non-contact surface water that was collected on-Site. The non-contact surface water and groundwater are all collected in a lagoon on-Site and aerated before discharge to the Green River.

V. Review of Current Status

A milestone review of the Site's status was held on July 22, 1998, in a briefing by Ecology. This is a critical review point because Ecology is finalizing the CAP (equivalent to an EPA ROD). This is coincidentally occurring five years after the start of landfill closure construction, hence the need for a Five-Year, Statutory Review.

Because Kent Highlands is a state-lead Superfund site, it is being addressed under the state's Model Toxics Control Act (MTCA), Ch. 70.105D RCW (Revised Code of Washington). Ecology has issued regulations for closure of landfills, Model Toxics Control Act Regulations, Ch 173-340 WAC (Washington Administrative Code). These regulations are the implementing authority under which Ecology is addressing the contamination and closure of this Superfund site.

The actual closure of the landfill has been completed even though the CAP has not been made final. In any case, the landfill had to be closed and capped under the solid waste rules and regulations. That work was consistent with the proposed remedial alternatives in the feasibility study. There are still some administrative actions required by MTCA that need to be completed before the remedial actions are considered complete. A "Periodic Review of Cleanup Action," for the Kent Highlands Landfill, Kent, Washington, dated September 8, 1997, was prepared for this Site. This document is included in this Five-Year Review as part of the technical assessment of the remedy's effectiveness.

VI. Site Inspection

A Five-Year Review Site visit and inspection was conducted by EPA on September 11, 1998. The purpose of the inspection was to verify that the remedial actions already implemented were functioning as designed and remained protective of human health and the environment.

The inspection team consisted of EPA, Ecology, and City of Seattle personnel. The Site currently has a seven person, full-time staff to operate and maintain it, although the City is currently planning to reduce the number of personnel assigned.

As part of the EPA inspection, a draft "Five-Year Review Site Inspection Checklist," was used to help gather information used to evaluate the condition of the Site. The checklist is attached to this report.

The landfill portion of the Site is completely capped with an engineered cover system consisting of a flexible membrane liner, drainage layer, and soil for a vegetative cover. The gas collection and treatment system is fully operational and automated. The leachate is collected and treated by the regional POTW. There was no surface water or non-contact cover drainage occurring during the Site inspection due to dry weather. No soil erosion or evidence of erosion repair was identified. According to the Site operator, the water channels easily convey all of the precipitation and runoff seen to date.

Two problems were identified during our discussions with the Site operators. One issue was the number of gas monitoring wells that were reported as "blocked" in the monitoring reports. There was some confusion as to how the wells were blocked so that samples could not be obtained. The wells are not damaged but the natural water table has risen to the level such that the screened interval in the gas well is effectively blocked for air flow. As a result, no air sample can be taken under these conditions.

The second issue that was discussed at length was the reported high concentrations of methane gas in several of the Site compliance monitoring wells. These wells may be influenced by the Perimeter Gas System. The Perimeter Gas System is currently operating under 40 inches of water vacuum. When sampling these particular compliance wells, they exhibit a negative pressure, one of them up to 40 inches of water. The sampling method has been to pull vacuum on the monitoring well to overcome the negative pressure and then evacuate the well volume (head space) of air before taking an air sample. This sampling technique may be reversing the flow of air (gas) to the Perimeter Gas System and pulling methane from the refuse into the compliance well.

The discovery of this sampling issue may necessitate the relocation of several compliance wells. The compliance wells were established to determine if any gas is migrating off-Site. The gas measurement from compliance wells is intended to be representative of the gas in the soil formation not the controlled landfill gas. This problem has to be further studied and evaluated before changes can be made in the sampling protocols. Resolution of this is recognized as work needing to be done.

VII. Recommendations

The closure of the landfill with the low permeability cover system has provided the basis for controlling the contaminants migrating from the Site. The single technical issue that was identified during this Five-Year Review was the sampling protocol in several gas compliance wells. The current sampling protocols may be reversing the flow of methane gas from the Perimeter Gas Collection System and pulling it into the compliance wells when the air sample is taken. All parties are now aware of this issue and the City of Seattle will have to evaluate these wells to determine how to establish gas compliance at the Site perimeter.

Seattle agreed to look into the problem and will be getting back to Ecology with a proposal on actions that can be taken to resolve this issue. Based on the normally negative pressure in the compliance wells of question, EPA is assuming that methane is not migrating past these points of compliance, but not all of the questions are fully answered at this time.

VIII. Statement of Protectiveness

I certify that the remedial actions implemented for this Site remain protective of human health and the environment. However, there are some sampling issues surrounding several of the gas compliance wells. The evaluation of this problem during the Site inspection determined that it was more likely a sampling problem than the uncontrolled migration of methane off-Site. Ecology has the lead on evaluating solutions to this issue.

IX. Next Review

The next Five-Year Review will be conducted within five years of this review.

Date

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