Draft
Cleanup Action Plan
For
Bainbridge Island Landfill

March 2001

Washington State Department of Ecology
Northwest Regional Office
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EXECUTIVE SUMMARY

The Bainbridge Island Landfill is a closed municipal solid waste landfill located on Vincent Road in the City of Bainbridge Island, Washington. Kitsap County has owned the landfill site since 1942. During its 29 years of operation, the landfill accepted mostly domestic waste, but also accepted Wyckoff wood treatment waste, petroleum waste, and sewage waste. Refuse was burned at the site until 1968. The site stopped accepting waste in 1975 and was closed in 1977. A transfer station and recycling center was opened at the site and continues operations today.

A Remedial Investigation/Feasibility Study (RI/FS) has been completed for this site. The Remedial Investigation (RI) was performed in phases and a report with two supplements was produced. These documents focused on collecting data to evaluate the nature and extent of contamination. Soil, sediment, air, surface water, and groundwater, including nearby domestic wells were extensively sampled. The primary medium of concern at the site is groundwater, which is used offsite as a domestic drinking water source. Volatile Organic Compounds in groundwater exceed cleanup levels at the property boundary. Lower concentrations of these contaminants have also been detected in offsite domestic wells.

The Washington State Department of Health conducted six Health Consultation Reports to evaluate the water quality of nearby domestic wells. The Health Department concluded that no apparent public health hazard exists as a result of exposure to contaminants detected in any of the domestic wells sampled.

The Feasibility Study (FS) identified contaminants of concern and developed three feasible remedial alternatives for the site. The preferred remedial alternative has been identified as waste reclamation with a soil cover, monitoring, institutional controls, and monitored natural attenuation of groundwater. This Cleanup Action Plan provides the necessary documentation to support the cleanup effort and summarizes information describing the proposed cleanup for the site.

1 INTRODUCTION

1.1 Purpose

This document presents the Cleanup Action Plan (CAP) for the Bainbridge Island Landfill, Bainbridge Island, Washington. This documentation is required by the site cleanup process established by the Department of Ecology under Chapter 173-340 WAC, "The Model Toxics Control Act Cleanup Regulations" (MTCA), and meets the requirements specified in WAC 173-340-360(10), Draft Cleanup Action Plan.

The purpose of the CAP is to:

- Describe the proposed cleanup action including compliance monitoring
- Summarize the other alternative cleanup actions evaluated in the Feasibility Study
- Present the site cleanup levels and points of compliance for each hazardous substance and media of concern
- Present the schedule for implementing the cleanup action plan
- Discuss institutional controls and site use restrictions
- Provide justification for selecting the cleanup action
- Discuss applicable state and federal laws for the proposed cleanup action
- Provide a preliminary determination by Ecology that the proposed cleanup action will comply with WAC 173-340-360(2) and (3)
- Specify the type, level and amounts of hazardous substances remaining on site and the measures that will be utilized to prevent migration and contact with those substances
- Provide a document through which public comment may be solicited regarding the selected cleanup actions

1.2 The Cleanup Action Plan and Cleanup Process

The RI/FS document presents the results of investigations into the nature and extent of contamination at the Bainbridge Island Landfill site and evaluates the feasibility of alternative methods of cleanup up the site. The investigations and studies were performed in accordance with Enforcement Order No. 94TC – N399, effective date November 18, 1994. The CAP provides a general description of the proposed cleanup action and sets forth functional requirements that the cleanup must meet for cleanup

levels specified for the site. The CAP is one in a series of documents used by Ecology to monitor progress of site investigation and cleanup. Other documents to be developed for site cleanup include;

- Final Cleanup Action Plan
- Engineering Design Report
- Construction Plans and Specifications
- Operation and Maintenance Plan
- Compliance Monitoring Plan

The Final CAP is prepared from this Draft CAP after consideration of comments received during the Draft CAP public comment period. The contents of the Final CAP will be agreed to by Kitsap County and Ecology in a consent decree. The consent decree will serve as an agreement between Kitsap County and Ecology for implementing the remedial actions discussed in the Final CAP.

The Engineering Design Report and Construction Plans and Specifications provide the necessary technical drawings and specifications to allow a contractor to implement the methods described in the Final CAP for cleaning up the site. Construction documentation will be provided to include as-built drawings and documentation of construction and any changes or modifications that were necessary during the course of implementing the remedial actions.

The Operation and Maintenance Plan presents technical guidance and regulatory requirements to assure effective operations under normal and adverse conditions.

The Compliance Monitoring Plan will provide for: Protection Monitoring to confirm that human health and the environment are adequately protected during construction and the operation and maintenance period of the cleanup action; Performance Monitoring to confirm that the cleanup action has attained cleanup goals; and Confirmational Monitoring to confirm the long-term effectiveness of the cleanup action once cleanup goal have been attained.

2 BACKGROUND

2.1 Site Description

The Bainbridge Island Landfill is located west of Eagle Harbor on Bainbridge Island, near Seattle, Washington (Figures 1 & 2). The site covers 40 acres, approximately 7 of

which were used for disposing various types of waste between 1948 and 1975. The main landfill is located on an east-facing slope at an elevation of approximately 200 to 260 feet above sea level (NAVD-88). The site was originally a steep, narrow, east-sloping ravine, which was reshaped and largely filled in by landfill activities. The only structures onsite are refuse transfer and recycling stations. A gate at the northern entrance off Vincent Road restricts access.

The Bainbridge Island Landfill site consists of the following waste disposal areas:

- Main landfill
- West end area (subdivided into northern and southern)
- Five septage pits (1- west/1-south/3-central)
- Trench 1-2
- Trench 3

The locations of these disposal areas are shown in Figure 3. The main landfill and west end area accepted and burned primarily domestic refuse and a small amount of commercial waste. The five septage pits received liquid-solid sludge from domestic septic system haulers. The largest pit is the south septage pit, located southwest of the main landfill. Trench 3, located just north of the south septage pit, was an excavation in native soil where liquid wood-preserving waste from the Wyckoff Company was disposed. Based on the results of the remedial investigation Trench 1-2 appears to never have received waste.

2.2 Site History

Kitsap County acquired the property that was later to become the Bainbridge Island Landfill as part of a tax foreclosure process in 1942. It was operated as a landfill by several parties over 29 years, during which time it accepted typical domestic waste, tank bottoms from the nearby Wyckoff wood treatment facility (in Trench 3), and petroleum products. Until 1968, refuse was burned at the site.

The landfill ceased accepting waste in 1975, when a lawsuit brought against the County by a neighboring resident expedited closure of the landfill. Closure activities were completed in 1977. Also in 1977, the Bainbridge Disposal Company opened a refuse transfer station at the site that continues to operate today.

In 1975 the first of several government agencies became involved with the site's investigation and cleanup. The Washington State Department of Ecology sampled surface water and leachate between 1975 and 1978. In 1986 the U.S. Environmental Protection Agency (EPA) conducted a Site Investigation, sampling several waste sources and environmental media, including domestic water wells, surface water, surface and subsurface soil, and sediment. The investigation identified organic contaminants in surface water and leachate, and organic and inorganic contaminants in the septage pits,

Trench 3, and the main Landfill. Domestic water samples showed no evidence of contamination (E&E 1987).

Between 1988 and 1994, the Bremerton-Kitsap County Health District collected samples from domestic wells near the landfill, and sampled surface water, leachate, and septage pit sludge from the site (Bremerton-Kitsap County Health District, 1988, and 1992). The samples from the drinking water wells, surface water, and leachate were in compliance with state primary drinking water standards. The metal content of the sludge was similar to typical septage, and viral assays were negative.

In 1990 Ecology became the lead regulatory agency for site management, and in 1992 ranked the site as a level one (highest) waste site under MTCA). Also in 1992, Kitsap County performed an independent remedial action on Trench 3 – approximately 475 tons of contaminated sludge from Trench 3 were removed, stabilized and disposed at a hazardous waste landfill, and an additional 930 tons of contaminated soil were removed and disposed (Golder Associates, 1993). Kitsap County began the RI/FS for cleanup of the landfill in 1996 under an enforcement order from Ecology. The RI was completed in August 1999. The data and interpretations of the RI are recorded in three documents: the RI Report and the RI Report Supplements 1 & 2. The FS was completed in May 2000.

3 DESCRIPTION OF PROPOSED CLEANUP ACTION

3.1 Waste Reclamation with Soil Cover

The selected cleanup action alternative for the Bainbridge Island Landfill will consist of waste reclamation with a soil cover, monitoring, institutional controls, and monitored natural attenuation. The waste will be excavated and sorted by size. All materials larger than about 1½ inches will be disposed of off site. Materials smaller than 1½ inches will remain on site and be covered with a soil cap.

The reclamation process will begin by removing the landfill cover soil (about 24,600 tons). The contaminated portion of the cover soil identified in the RI will be disposed of at a permitted landfill off site. The remaining cover will be used to re-grade the site after the landfill waste is excavated. The main landfill and west end area waste will be excavated then screened and sorted into three sizes. The septage pit wastes will be disposed of off site at a permitted facility without screening or sorting. Sediments will be excavated and placed with the inert fraction materials to be contained on site.

The bulky fraction (greater than 3 inches) contains large items such as furniture and appliances and comprises an estimated 26 percent of the waste material by weight (about 14,700 tons). This material will be disposed of off site at a permitted landfill or whenever possible, recycled. The garbage fraction (1½ to 3 inches) contains material similar to household garbage and has some decomposable organic material but not enough for composting to be a beneficial technology. The garbage fraction comprises an

estimated 7 percent of the waste material by weight (3,960 tons) and will also be disposed of off site at a permitted landfill. The removal of these materials will eliminate the generation of landfill gas and acid-producing leachate, both of which contribute to groundwater contamination.

The inert fraction (less than 1½ inch) contains mostly soil, gravel, and ash, with small fragments of metal, glass and plastic. This material makes up the majority of the landfill composition (67 percent by weight/37,910 tons) and will remain on site for re-grading after the excavation is complete. Chemical analysis of the inert fraction shows residual contamination of semi-volatile organic compounds (SVOC), metals, and polychlorinated biphenyls. These contaminants have low mobility and low solubility, and will not likely be transported very far from their source areas.

A 2-foot minimum soil cap will be placed on top of the inert material to prevent direct contact exposures and allow surface water to infiltrate through the inert material. This will provide oxygen and other trace nutrients that may enhance the natural biodegradation process to further reduce the organic contaminants. The inert material and soil cap will be graded and stormwater will be channeled and managed to control erosion. Erosion protection materials may include erosion mats and large gravel in the center of a constructed drainage channel. After the soil cap is installed, it will be re-vegetated.

The cleanup action will include the following:

- Excavate all waste, screen main landfill and west end area waste, and re-grade the site with the inert waste fraction (less than 1½ inches)
- Dispose of the bulky waste fraction (greater than 3 inches) off site
- Dispose of the garbage waste fraction (greater than 1½ inch, less than 3 inches) off site
- Dispose of the septage pit wastes and main landfill cover hotspot soils off site
- Construct a minimum 2-foot thick soil cover on top of the inert waste
- Restore site drainage and reestablish site vegetation
- Monitor natural attenuation in groundwater
- Monitor surface water for compliance with cleanup levels
- Establish institutional controls, that may include installation of fencing to control access, zoning, and deed restrictions to prevent access to groundwater and protect the final cover system

4 COMPLIANCE MONITORING

Compliance monitoring will be performed in accordance with WAC 173-340-410, Compliance Monitoring Requirements. Kitsap County shall prepare a Compliance Monitoring Plan that provides for protection, performance, and confirmational monitoring and submit them to Ecology for review and approval.

The compliance monitoring plan will include a contingency plan to install active groundwater remediation if cleanup levels are not met with monitored natural attenuation. The contingency plan will be implemented if vinyl chloride concentrations do not decrease over time. The contingency plan will be reviewed after 30 years of post-reclamation monitoring. Please refer to the compliance monitoring plan for a detailed description of the proposed contingency plan.

The selected remedial alternative provides for long-term monitoring to ensure that groundwater continues to meet cleanup standards after remedial actions have been completed. Protection monitoring will be used to ensure that human health and the environment are protected during the reclamation activities. Performance monitoring will be conducted to confirm that natural attenuation is occurring and cleanup levels and treatment goals have been attained. After remedial actions have been completed, confirmational monitoring will be conducted to confirm and ensure the long term effectiveness of the cleanup action.

5 Summary of Other Alternatives Considered

5.1 Waste Consolidation and Containment

Waste consolidation and containment with monitored natural attenuation of groundwater was one of two other technologies retained for further consideration in the FS. This alternative would excavate the septage pit waste, sediment, and outlying waste areas and consolidate them in the main landfill area. All wastes would then be covered with an impermeable cap with a passive gas collection system. This cleanup alternative would include the following:

- Excavate waste, sediment, septage pit residue, and soil, and consolidate them on the main landfill
- Fill excavated areas, re-grade and re-seed the site
- Install a five-layer cap with a 40-mil liner low density polyethylene barrier layer
- Install a passive landfill gas venting system

- Install a surface water diversion and detention system

- Monitor natural attenuation in groundwater

- Monitor surface water and landfill gas for compliance with cleanup levels

- Establish institutional controls including installation of fencing to control access to the site, zoning, and deed restrictions to protect the final cover system

Surface water control facilities would include ditches upstream from the landfill and around the final cover area; a lined ditch along the south side of the main landfill; a detention pond on the southeast side of the main landfill; a controlled outlet and discharge pipe from the detention pond; and a riprap/energy dissipater at the outlet of the discharge pipe. Monitoring of groundwater, surface water, subsurface landfill gas, and landfill gas vent emissions would include contingencies for conversion to active landfill gas extraction and active groundwater remediation if cleanup levels are not met.

5.2 Waste Reclamation with an Impermeable Cover

Waste reclamation with an impermeable cover, monitoring, institutional controls, and monitored natural attenuation of groundwater is similar to the proposed cleanup alternative in that the wastes would be removed and disposed of off site. However, in this alternative, the cover over the inert materials would consist of a combination soil and impermeable geomembrane layer to reduce water infiltration.

6 CLEANUP LEVELS AND POINTS OF COMPLIANCE

6.1 Soil and Sediment

The chemicals of concern and proposed cleanup levels for all media are shown in Table 1. The remedial action objective for soil and sediments is to protect human health and ecological receptors. All soil and sediments with contaminant concentrations exceeding direct contact criteria will require appropriate remedial measures. As part of the planned remediation of the site, these soils will be covered with a minimum of 2 feet of clean soil to prevent direct contact. Contaminated sediments will be excavated and placed with the inert fraction materials to be contained on site. In addition, institutional controls will be established to ensure that appropriate measures are taken to limit future exposure to affected soils. The points of compliance for soil are:

- From 0-15 feet below the ground surface for protection of human health

- Everywhere on the site for volatile organic constituents for protection of groundwater

6.2 Surface Water

The point of compliance for surface water is the property boundary or the point at which hazardous substances are released to waters of the state. Because the remedial action is expected to stop the flow of the leachate seep, a point at which hazardous substances from the site enter waters of the state may not be identifiable. Therefore, the point of compliance for surface water will be monitored at the east end of the site, east of the main landfill mass but west of the property boundary (in the vicinity of Surface Water (SW) sampling station 4). If an engineered surface water collection system is constructed for the remedial action, then surface water will be monitored at the point where the discharge enters the natural stormwater flow. Monitoring of an upstream surface water site may be needed to establish background water quality. This station will be upstream of any areas disturbed by original landfilling or remediation actions. It will be west of station SW1.

6.3 Groundwater

The point of compliance for groundwater will be specifically identified in the compliance monitoring plan. It will consist of upper aquifer monitoring wells located both upgradient and downgradient of the sources. Monitoring wells MW13, MW14, and MW15 are located on the northern property boundary, downgradient of the sources, and have shown impacts from sources during the RI. These wells would be a logical choice for downgradient groundwater compliance monitoring and would be good indicators of the effectiveness of the remedial action on the upper aquifer groundwater.

7 SCHEDULE FOR IMPLEMENTATION

The proposed schedule for the cleanup action is as follows;

- Finalize Cleanup Action Plan — March, 2001
- Finalize Engineering Design Report — April, 2001
- Finalize Construction Plans and Specifications — April, 2001
- Finalize Operation and Maintenance Plan — April, 2001
- Finalize Compliance Monitoring Plan — April, 2001
- Begin Construction — June, 2001

8 Institutional Controls and Site Use Restrictions

Institutional controls will be implemented, and will include appropriate measures designed to protect the integrity of the cleanup action and remedial components, and prevent exposure to residual contaminants contained at the site. Access restrictions will be provided by installing temporary fencing around the active reclamation area during construction. Site uses would be constrained by restrictive covenants that are required by

MTCA (WAC 170-340-440(4)(a)). If, in the future, there is interest in developing the site, Kitsap County, with public input and Ecology approval, could develop a site use plan that conforms to the restrictive covenants. Elements of the restrictive covenants for the site include: 1) prohibition of the beneficial use or withdrawal of site groundwater, 2) prohibition on installing wells other than those required under this CAP, and 3) prohibition on activities that would damage the integrity of the soil cover placed over the inert waste material. The text of the restrictive covenants is attached as Appendix A.

9 Justification for Selected Cleanup Alternative

The goal of the feasibility study was to identify a preferred remedial action alternative that meets MTCA requirements and site-specific remedial action objectives. The preferred remedial action was chosen in two steps: first, all three alternatives were evaluated relative to criteria required by MTCA;

- Overall protectiveness of human health and the environment
- Attainment of cleanup levels and compliance with ARARs
- Short-term effectiveness
- Long-term effectiveness
- Reduction in toxicity/mobility/volume through treatment
- Implementability
- Cost
- Community concerns
- Degree to which recycling/reuse/waste minimization are used

The three alternatives scored similarly relative to these criteria, so a second evaluation step was added, decision analysis, which incorporated additional evaluation criteria. The decision analysis results were developed using a computer model, multiattribute utility analysis or MUA. All three alternatives were evaluated again relative to a new set of criteria;

- Net remediation cost to Kitsap County
- Land value
- Land use potential
- Liability
- Permanence of remedial action
- Reasonable time frame
- Additional public concerns

These criteria were weighed to reflect their relative importance. In assigning weights, input from stakeholders, including Kitsap County Public Works staff and managers, the Kitsap County Prosecuting Attorney's and Risk Management Offices, the Bremerton-Kitsap County Health District, Ecology, and public interest groups was incorporated.

Based on the results of the decision analysis, waste reclamation with a soil cover was selected as the preferred remedial alternative. Chapter 7 of the Feasibility Study provides a more detailed description of the decision analysis process.

10 Applicable Laws

The preferred remedial alternative will comply with federal, state, and local ARARs. Applicable requirements are promulgated federal and state laws or regulations that specifically apply to a hazardous substance, cleanup action, location, or a special circumstance at a site (e.g. presence of endangered species). Chemical-specific ARARs identify health- or risk-based cleanup limits for specific hazardous substances. Location-specific ARARs apply to the concentration of hazardous substances or the conduct of activities solely because they occur in a particular location. Action-specific ARARs define acceptable controls or restrictions on particular kinds of activities. In general, chemical- and location-specific ARARs help to determine the objectives and goals of remedial action, and action-specific ARARs help determine how the remedial action will be performed. These ARARs are presented in Tables 2-4. Please see Chapter 3 of the Feasibility Study for a more detailed description of the development of applicable laws.

Pursuant to RCW 70.105D.0900(1), Kitsap County must meet the substantive requirements of chapters 70.94, 70.95, 70.105, 75.20, 90.48, and 90.58 RCW and of any laws requiring or authorizing local government permits or approvals for implementing the remedial alternative. The only substantive requirements identified to date is for a grading permit issued by the City of Bainbridge Island , however, the Uniform Building Code (UBC) Appendix Chapter 33, Excavation and Grading provides for exempted work in section 3306.2. Specifically, refuse disposal sites controlled by other regulations are exempt from grading permit requirements.

11 Ecology Determination

Consistent with Chapter 70.105D RCW, "Model Toxics Control Act", as implemented by Chapter 173-340 WAC, "Model Toxics Control Act Cleanup Regulation", it is determined that the selected cleanup actions are protective of human health and the environment, attain federal and state requirements which are applicable or relevant and appropriate, comply with cleanup standards, and provide for compliance monitoring. The cleanup actions satisfy the preference expressed in WAC 173-340-360 for the use of permanent solutions to the maximum extent practicable, provide for a reasonable restoration time frame, and consider public concerns raised during public comment on the draft CAP.

_____ _____

Brian S. Sato, P.E. Date
Project Manager
Toxics Cleanup Program, NWRO
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_____ _____

Steven M. Alexander Date
Section Manager
Toxics Cleanup Program, NWRO
Washington State Department of Ecology

Appendix A
Restrictive Covenants

RESTRICTIVE COVENANT

KITSAP COUNTY, BAINBRIDGE ISLAND LANDFILL

This Declaration of restrictive Covenant is made pursuant to RCW 70.105D030(1)(f) and (g) and WAC 173-340-440 by Kitsap County, its successors and assigns, and the State of Washington Department of Ecology, its successors and assigns (hereafter "Ecology").

A remedial action (hereafter "Remedial Action") occurred at the property that is the subject of this Restrictive Covenant. The Remedial Action conducted at the property is described in the Cleanup Action Plan, dated _____ located at Ecology's Northwest Regional Office (NWRO) in Bellevue, Washington.

This Restrictive Covenant is required because the Remedial Action resulted in residual concentrations of certain hazardous substances which exceed the Model Toxics Control Act cleanup level for Soil established under WAC 173-340-740, as described in the Remedial Investigation/Feasibility Study for the Bainbridge Island Landfill dated November 1, 2001.

The undersigned, Kitsap County, is the fee owner of real property (hereafter "Property") in the County of Kitsap, State of Washington, that is subject to this Restrictive Covenant. The Property is legally described as: Northeast ¼ Northwest ¼ of Section 33 Township 25 Range 02 WM Kitsap County Washington.
Situated in the County of Kitsap, State of Washington.

Kitsap County makes the following declaration as to limitations, restrictions, and uses to which the Property may be put and specifies that such declarations shall constitute covenants to run with the land, as provided by law and shall be binding on all parties and

all persons claiming under them, including all current and future owners of any portion of or interest in the Property (hereafter "Owner").

Section 1. Any activity on the Property that may interfere with the integrity of the Remedial Action and continued protection of human health and the environment is prohibited.

Section 2. Unless authorized by the Cleanup Action Plan or this Restrictive Covenant, any activity on the Property that may result in the release or exposure to the environment of a hazardous substance that remains on the Property as part of the Remedial Action, or create a new exposure pathway, is prohibited without prior written approval from Ecology.

Section 3. Unless authorized by the Cleanup Action Plan, the Owner will not withdraw groundwater from the Property.

Section 4. The Owner of the Property must give thirty (30) day advance written notice to Ecology of the Owner's intent to convey any interest in the Property. No conveyance of title, easement, lease, or other interest in the Property shall be consummated by the Owner without adequate and complete provision for continued monitoring, operation, and maintenance of the Remedial Action.

Section 5. The Owner must restrict leases to uses and activities consistent with the Restrictive Covenant and notify all lessees of the restrictions on the use of the Property.

Section 6. The Owner shall allow authorized representatives of Ecology the right to enter the Property at reasonable times for the purpose of evaluating the Remedial Action; to take samples, to inspect remedial actions conducted at the property, and to inspect records that are related to the Remedial Action.