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March 27, 2017

Mr. Toraj Ghofrani, P.E.
King County Department of Natural Resources and Parks
Solid Waste Division
201 South Jackson Street, Suite 701
Seattle, Washington 98104

Re: Cedar Hills Regional Landfill, East Perched Zones Remedial Investigation and Feasibility Study

Dear Mr. Ghofrani:

King County Solid Waste Division (KCSWD) submitted a draft Remedial Investigation and Feasibility Study (RI/FS) Report for the Cedar Hills Regional Landfill East Perched Zones for Ecology's opinion in December 2016. The draft RI/FS Report describes independent remedial actions KCSWD is conducting at the Cedar Hills Regional Landfill (CHRL) under WAC 173-340-515 Independent remedial actions.

This letter provides Ecology's opinion. We are providing this opinion under the authority of the Chapter 173-340 WAC Model Toxics Control Act (MTCA) and Chapter 70.105D RCW. Ecology's opinions for independent remedial actions are advisory only, and are not official comments, endorsements, or approvals of the document conclusions and recommendations.

This opinion is based on an analysis of whether the RI/FS meets the substantive requirements of MTCA, Chapter 70.105D RCW, and it's implementing regulations, Chapter 173-340 WAC (collectively "substantive requirements of MTCA").

This opinion applies only to the Site described below. The Site is defined by the nature and extent of contamination associated with releases of hazardous substances to the environment as presented in:

1. East Main Hill Perched Zones Technical Memorandum, Cedar Hills Regional Landfill, prepared for King County Department of Natural resources and Parks, Solid Waste Division, prepared by Aspect Consulting, LLC, October 22, 2010.

2. Groundwater monitoring reports from the 1980s to the present, showing exceedances of contaminant levels set by Chapter 173-200 WAC Water Quality Standards for Ground Waters of the State of Washington.

This opinion does not resolve a person's liability to the state under MTCA or protect a person from contribution claims by third parties for matters addressed by the opinion. The state does not have the authority to settle with any person potentially liable under MTCA except in accordance with RCW 70.105D0.40 (4). The opinion is advisory only and not binding on Ecology.

Ecology's Waste 2 Resources Program has reviewed the following information regarding your proposed remedial action:

1. Cedar Hills Regional Landfill, Environmental Control Systems Modifications Project, Contract No. E00286E12, Draft East Perched Zones Remedial Investigation and Feasibility Study (Draft EPZ RI/FS), prepared by Aspect Consulting, LLC, December, 2016.

Based on a review of the documents listed above, Ecology is providing the following opinions:

Completeness of East Perched Zone Remedial Investigation

For the following reasons, Ecology does not consider the East Perched Zone (EPZ) Remedial Investigation (RI) complete enough to select a remedy:

Shallow Groundwater Evaluation - The purpose of the RI is to identify the horizontal and vertical extent of environmental impacts in the East Perched Zone (EPZ). It is not known how far vinyl chloride and arsenic-impacted groundwater have migrated east of each of the plumes. The Draft EPZ RI/FS falls short of meeting WAC 173-340-350(7) (c) (iii) requirements of "sufficient investigations to characterize the distribution of hazardous substances present at the Site", specifically subsection (C) "...to adequately characterize the areal and vertical distribution and concentrations of hazardous substances in the groundwater..." Additional monitoring wells/geoprobes are needed to further delineate the extent of vinyl chloride and/or arsenic-impacted groundwater in the EPZ. This additional characterization will provide information necessary for evaluating monitored natural attenuation (MNA) as a component of a remedial action.

Regional Groundwater Evaluation - Arsenic concentrations in the Regional Aquifer beneath the East Shallow Perched Zone (ESPZ) need to be included in the RI/FS. Arsenic levels in MW-68 are over two times the Maximum Contaminate Level (MCL) and show a statistically increasing trend. The residential wells sampled by King County Solid Waste Division annually east of the EPZ should be included in the Revised RI/FS.

Surface Water Evaluation – The RI doesn't meet the WAC 173-340-350(7) (c) (iii) (A) requirement, "Sufficient surface water sampling shall be performed to adequately characterize the areal and vertical distribution and concentrations of hazardous substances." The hydraulic continuity between perched groundwater and surface water is relevant for the transport analysis and assessment of an impact from the landfill in the ESPZ. Additionally, installing staff gauges and measuring water levels quarterly in the wetlands would assist in establishing the interrelationships between surface water and perched groundwater. Any COCs detected in the wetland surface water would be carried forward into the FS if they are above the proposed clean up levels.

Landfill Gas/Soil Gas Evaluation – Gas has not been sampled at the ATC-GP-5 and ATC-GP-7 locations. The selection of a remedy cannot not be made without knowing the extent of landfill gas

(LFG) migration and the composition of LFG in the vicinity of Passage Point. Installation of gas probes at these locations should not be part of the remedial action. They should be installed as soon as possible for Site characterization and to adequately monitor the facility.

More information is needed about the Passage Point structures and below ground utilities in the area in order to evaluate risk. Information is also needed about the gas monitoring currently conducted, the presence of methane detectors in structures, and any other gas mitigation measures in place.

Additional gas probes (that is, in addition to ATC-GP-5 and ATC-GP-7) in the vicinity of Passage Point may be needed depending on monitoring results and additional facility information obtained.

Ecology's Recommends for Interim Actions, Supplemental Investigations, and Development of Alternatives

Interim Actions - Several remedial activities that are included in the alternatives evaluated could be implemented now as Interim Actions to help reduce LFG migration and to develop information for remedial action design while the Supplemental Investigation is being completed.

These activities include:

- decommissioning the groundwater extraction wells that are not necessary for future LFG control or future MNA monitoring
- optimizing LFG collection in the EPZ, as described in the FS
- conducting LFG well field influence tests to evaluate extraction facilities in the EPZ

Supplemental Investigations-Supplemental investigation activities necessary to complete the RI include:

- collection of surface water samples/gauging in Wetlands A and B
- additional groundwater well/geoprobes installation and sampling to further delineate both vinyl chloride and arsenic contamination in the SSPZ and ESPZ
- LFG probe installation and collection of baseline soil gas survey around Passage Point
- identification of water blockages at low points in the LFG collection system as discussed in chapter 8 of the draft RI/FS report.

Development of Alternatives-After the proposed Interim Actions and Supplemental Investigations are complete, the technologies and alternatives should be reconsidered. At a minimum, Ecology recommends an additional alternative that includes remedial technologies for removal and/or treatment of vinyl chloride in groundwater.

Ecology's General Comments on the Draft RI/FS

Groundwater Point of Compliance-The Point of Compliance (POC) defines the point or points on a Site where cleanup levels must be met. The standard POC is generally defined as throughout the Site. The MTCA regulation, however, allows for a conditional POC for groundwater if it is not practicable to meet the cleanup level throughout the Site. A landfill is actually given as an example of this in the Ecology publication "Focus, Model Toxics Control Act Cleanup Regulation: Establishing Cleanup Standards and Selecting Cleanup Actions" Focus No. 94-130, November 2007

(revised). "Attaining cleanup levels directly under a landfill, for example, would require the excavation of tons of garbage, possibly causing more harm than good. In such cases, Ecology may approve a conditional point of compliance, provided that the point is located as close to the source of contamination as possible." Therefore, Ecology considers the edge of the landfill the conditional POC for the CHLF EPZ.

Landfill Gas Point of Compliance- The POC for meeting the landfill gas standards needs to be identified. The applicable ARARs are from the solid waste regulations, chapter WAC 173-351, and are:

- The lower explosive limit (LEL) at the facility property boundary (Passage Point and point of compliance for explosive gas)
- 25% of the LEL in facility structures (not including gas management structures)
- 100 parts per million by volume (ppmv) in offsite structures

Ecology notes that the County is using the offsite structure standard of 100 ppmv for Passage Point structures and this is appropriate.

Ecology considers the Passage Point facility boundary adjacent to the landfill as the POC for meeting the LEL in gas probes. While the facility is on land owned by the County, it is operated by an independent organization for residential use. Landfill gas that exceeds the LEL should not be allowed to migrate past gas probes GP-1, GP-6, GP-7, GP-8, and GP-9.

Evaluation of Alternatives in the Draft RI/FS-Ecology reviewed the FS and offers these comments on the alternatives evaluation presented in the report for use in the revised RI/FS:

- Ecology would score the alternatives presented differently. Attachment A shows Ecology's benefit scoring and rationale.
- Ecology noted mistakes in the cost estimates and recalculated the costs with corrections made. The recalculated costs are shown in Attachment B with an explanation of the changes made in the footnotes.
- Ecology considers costs to be disproportionate to benefits if the incremental costs of a higher cost alternative over that of a lower cost alternative substantially exceed the incremental benefits achieved by the higher cost alternative over that of the lower cost alternative. The evaluation of the alternatives in the FS does not indicate disproportional costs of Alternatives 3 and 4 over that of Alternative 2. (Note that the benefit/cost ratios for Alternatives 2, 3, and 4 shown in Table 11.2 could all be rounded to 1.8.) When Ecology evaluated the alternatives using the same scoring system used in the FS, the benefit/cost ratios were close together (1.8, 1.7, and 2.0 for Alternatives 2, 3, and 4, respectively); however, Alternative 4 had the highest ratio. This further supports the point that Alternatives 3 and 4 do not have disproportionate costs over Alternative 2. Alternative 4 provides the greatest benefit at a cost that is not disproportionate compared to the other alternatives evaluated.

Public Outreach-Ecology does not direct public outreach in an independent MTCA action; however, we encourage the County to notify the landfill neighbors of the Remedial Investigation/Feasibility Study work being done and provide them access to the Final RI/FS. Passage Point management should be included in the public notification.

Ecology's Specific Comments on the Draft RI/FS

Ecology's specific comments are included on an Excel spreadsheet (see Attachment C of this letter). This format has been used in the past to submit document review comments to KCSWD. Both KCSWD and Ecology have found it to be an efficient way to track comments and responses. A copy of the spreadsheet is enclosed and an electronic version will be transmitted via email for your use.

The state, Ecology, and its officers and employees make no guarantees or assurances by providing this opinion, and no cause of action against the state, Ecology, its officers or employees may arise from any act or omission in providing this opinion.

Please contact us with any questions you have about our comments.

Sincerely,

Tim O'Connor LG, LHG
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Waste 2 Resources Program
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Enclosures (4)

cc: Darshan Dhillon, Public Health – Seattle & King County
Darcy Webber, Public Health – Seattle & King County
Peter Christiansen, Ecology, Waste 2 Resources Program

Attachment A

Ecology Benefit Scoring

Alternatives	Alternative 2	Alternative 3	Alternative 4
Components			
Institutional/engineering controls	√	√	√
Optimize LFG control (i.e., more aggressive)	√	√	√
Decommission extraction wells	√	√	√
MNA of groundwater	√	√	√
New gas probes and monitoring wells	√	√	√
New perimeter gas collection		√	√
New deep gas extraction wells in East Main Hill			√

Benefit Scoring (see rationale below)

Criteria	Weight (%)	Raw Score	Weighted Score	Raw Score	Weighted Score	Raw Score	Weighted Score
Protectiveness	30%	6	1.8	7	2.1	9	2.7
Permanence	20%	4	0.8	4	0.8	7	1.4
Long-term effectiveness	20%	6	1.2	7	1.4	9	1.8
Short-term risks	10%	8	0.8	7	0.7	6	0.6
Technical and administrative implementability	10%	9	0.9	8	0.8	6	0.6
Public concerns	10%	6	0.6	7	0.7	9	0.9
Composite Totals	100%	6.1		6.5		8	
Overall Alternative Benefit Ranking		3		2		1	

Scoring rationale:

Protectiveness - For protectiveness we considered the degree to which existing risks are reduced and the time required to reduce the risk. Alternative 4 was scored the highest at 9, because it includes additional gas extraction at both the perimeter and at depth. Alternative 3, with perimeter extraction, was scored at 7. Alternative 2 was given the lowest score, 6, because it relies on adjustments to the existing gas extraction system only.

Permanance - The aim of all of the alternatives is to reduce the mobility of the LFG into the environment for the purpose of eliminating it as a source of groundwater contamination, a potential inhalation hazard, and a potential explosive hazard. The degree to which the alternatives permanently reduce the mobility of LFG was considered. None of the alternatives are permanent in the sense that they will need to continue as long as the waste is generating LFG. If any of them are stopped, migration is likely to increase. Relative to each other, however, we scored them as Alternatives 2 and 3 having lower permanence than Alternative 4, because 4 more aggressively controls gas migration. The scores were 4 for Alternatives 2 and 3, and 7 for Alternative 4.

Long-term effectiveness - Considering the degree of certainty that the alternative will be successful at reducing the migration of LFG from the waste that is impacting groundwater and has the potential to result in explosive gas migrating to structures on or offsite, Alternative 4 was scored the highest at 9 because it is expected to reduce LFG migration at depth. Alternative 3 was assigned a score of 7 because it does not address deep migration. Alternative 2 was assigned a scope of 6 because it only includes increasing the vacuum on existing extraction wells.

Short-term risks - All of the alternatives involve installing new monitoring wells and gas probes. Alternative 3 adds the retrofitting and connections for perimeter gas extraction, and Alternative 4 includes deep borings in the waste. For these reasons, the scores assigned were 8, 7, and 6 for Alternatives 2, 3, and 4, respectively.

Technical and administrative implementability - All of the alternatives are implementable, evidenced by the fact that they have been implemented in the past at the landfill. Alternative 2 is the easiest to implement and was given a score of 9, Alternative 3 is more involved with the addition of perimeter gas extraction and was given a score of 8. Alternative 4 was given a score of 6 because of the addition of installing deep borings through the waste.

Consideration of public concerns - Assuming the public is concerned that LFG does not migrate offsite and LFG does not impact the regional groundwater:
Alternative 4 is more aggressive at preventing LFG migration, particularly beneath the landfill which is believed to be a major pathway of migration, and was assigned a score of 9. Alternatives 3 and 2 are less aggressive and were assigned scores of 7 and 6, respectively.

Attachment B

Ecology-Corrected Cost Estimate*

		Alternative 2			Alternative 3			Alternative 4		
Total Purchased Equipment	PEC	$5,136			$8,346			$8,346		
Total Direct Installation Costs	DI	$190,450			$224,950			$432,950		
Total Direct Costs (TDC)	PEC+DI	$195,586			$233,296			$441,296		
Indirect Costs	IC	$64,500			$74,500			$74,500		
Total Capital Investment (subtotal)	TDC+IC	$260,086			$307,796			$515,796		
Contingency	20%	$52,017			$61,559			$103,159		
Total Capital Investment	**TCI**			**$312,103**			**$369,355**			**$618,955**
Annual monitoring yr 1-5		$153,000			$165,000			$165,000		
Project management	15%	$22,950			$24,750			$24,750		
		$175,950	x 5 years	**$879,750**	$189,750	x 5 years	**$948,750**	$189,750	x 5 years	**$948,750**
Annual monitoirng yr 6 - 30		$95,000			$107,000			$107,000		
Project management	15%	$14,250			$16,050			$16,050		
		$109,250	x 25 years	**$2,731,250**	$123,050	x 25 years	**$3,076,250**	$123,050	x 25 years	**$3,076,250**
Total Alternative Cost (actual dollars)				**$3,923,103**			**$4,394,355**			**$4,643,955**
Total Alternative Cost (NPV, 30 years) **				**$3,372,600**			**$3,775,900**			**$4,025,500**
Ecology benefit ranking (from Attachment A)				**6.1**			**6.5**			**8.0**
Benefit/cost ratio				**1.8**			**1.7**			**2.0**

Notes

* Cost estimate from FS with errors corrected:
adding error in calculating total capital investment
unit cost to install precision control valves made consistent for all alternatives @ $1,200
Alternative 3 extended cost for Data Management, Evaluation, and Reporting changed from $25,000 to $20,000
Alternative 4 Engineering Design Report cost changed from $2,000 to $20,000

** discount rate 1.2%
http://www.calculatorsoup.com/calculators/financial/net-present-value-calculator.php

PEC = Purchased Equipment Cost
DI = Direct Costs
IC = Indirect Costs
TDC = Total Direct Costs
TCI = Total Capital Costs
NPV = Net Present Value

Attachment C

Project Name: Cedar Hills Regional Landfill, East Perched Zones Remedial Investigation and Feasibility Study

Contract #:

Reviewer: Madeline Wall/Ecology Tim O'Connor/Ecology

Deliverable Name:

Review Date: *12/16/2016*

Response Date: *3/24/2017*

Deliverable Review					Response		
Comment No.	Reviewer Name	Page, Figure, Specification or Sheet No.	Section / Paragraph	Reviewer's Comment	Responder Name	Response Comment	Resolved?
0				*Be as specific as possible. Minimize open ended comments. PM to resolve conflicting or out-of-scope comments*		*Agreed/Incorporate as stated.* *Agreed/Describe how comment will be incorporated.* *Disagree/Describe how comment will be addressed.* *Disagree/Further discussion warranted*	
1	Tim O'Connor/ECY	ES-2	Executive Summary	The seasonally saturated till/lacustrine (SSPZ) unit is not consistently referred to as a separate hydrogeologic unit in this Draft RI/FS nor shown in Figure 1.3. There should be three localized areas of pearched groundwater units in the EPZ.			
2	Tim O'Connor/ECY	7	2.2.5	More information is needed on the former drain field associated with the former alcohol treatment center. Confirm the location - it is shown in a different location than in previous reports. Include information on how it was decommissioned. Discuss whether or not its presence could affect the groundwater system in that area. Now that it is shown adjacent to EW-22 (which supplied most of the water during the pump and treat operations) the statement by CH2M Hill indicating that it may be drawing water from a trench appears true. Additional decomissioning of the trench by backfilling with bentonite at each end as it cuts across the wetland may reduce water influx into the ESPZ.			
3	Tim O'Connor/ECY	10	3.2.2	The wetlands should be included in the surface water monitoring in the EPZ. The hydraulic continuity between perched groundwater and surface water is relevant for the transport analysis and assessment of an impact from the landfill around MW-47; no surface water sample was collected from either Wetland A or B. Additionally, placing staff gauges in the wetlands would assist in establishing the interrelationships between surface water and perched groundwater, collecting water quality samples from the wetlands are also necessary.			
4	Madeline Wall/ECY	11	3.2.3	Provide the LFG monitoring probe data reviewed - January 2011 through November 2013 - in an appendix.			
5	Tim O'Connor/ECY	Figure 3.3, 11	3.2.4	Change Figures 3.3 to show GP-ATC-5 and 7 as "unlocateable", so the reader doesn't think they could have been sampled by looking at the figure.			
6	Madeline Wall/ECY	12	3.2.5	"During the June and September 2015 events, insufficient flow at MH-17 precluded leachate sample collection." What does this indicate about leachate production and the source of observed flow during the wet season?			

7	Madeline Wall/ECY	14	3.2.7	New gas probes are needed now to adequately monitor the Passage Point facility for methane and volatile organics.			
8	Tim O'Connor/ECY	14	3.2.7	Third bullet: GP-ATC-4 was installed (See Attachment D to the comment letter for the well log)			
9	Madeline Wall/ECY	14	3.2.7	Fourth bullet: MW-104 was not in the soil gas sampling plan.			
10	Tim O'Connor/ECY	15	3.2.7	10th bullet-with these levels of VC in MW-47 it is not appropriate to delay the point-of-vacuum and zone-of-influence testing. Ecology suggests conducting a Interium Action for this task.			
11	Madeline Wall/ECY	16	4	Information should be included about the Passage Point facility, such as the type of buildings present (slab on grade, crawl spaces, basements), subsurface utility lines, the presence of vapor barriers or methane detectors. This information is important when evaluating potential risks, and when considering remedial measures.			
12	Tim O'Connor/ECY	17	4.5.1	Show VC and arsenic contamination on cross-sections to give the reader an idea of the extent of contamination.			
13	Tim O'Connor/ECY	22	4.6.3	See comment # 1 above, our Figure 1.3 doesn't have yellow shading or the SSPZ represented in the ledged.			
14	Tim O'Connor/ECY	22	4.6.3	Why are the SSPZ water elevations in EW-1 through EW-11 not plotted on Figures 4.7 and 4.8? If the wells were measured, please put the elevation or dry even if it doesn't match the NESPZ or ESPZ contour map.			
15	Tim O'Connor/ECY	23	4.6.5	Include NPW-1 through 3 and other domestic water supply well logs in Appendix A. When was the last well log database checked for offsite domestic wells adjacent to the EPZ?			
16	Madeline Wall/ECY	23	5.1	The MTCA work is being done independently, not under an agreement with Ecology. Therefore, permits are still required. The list should include the local laws as well - County Health Code, Puget Sound Clean Air Agency regulations.			
17	Tim O'Connor/ECY	28	5.5.1 and Table 5.2	The CUL of 11,200 ug/L selected for iron is appropriate for protecting health, however MTCA requires using the lower secondary MCL of 300 ug/L (based on aesthetic effects that would make water impractical to use). The Concise Explanatory Statement for the 2001 revisions to MTCA (General Question 10.1.8 on e-page 185) indicates that secondary MCLs listed in the Department of Health's regulations are considered ARARs under MTCA. Therefore, the CUL for iron should be 300 ug/L. For 1,1-Dichloroethane, the MTCA cancer equation 720-2 should use a cancer risk of 1E10-6 to produce a concentration of 7.7 ug/L. Using 1E-5 is not allowed in cases where there is no ARAR. Please use a CUL for 1,1-Dichloroethane of 7.7 ug/L even though it is not carried forward as a COC.			
18	Madeline Wall/ECY	32	6.3	Please check if the AMEC-recommended replacement wells have been installed and update the report if they have been.			
19	Madeline Wall/ECY	37	7.1.3	Include lab reports for TO-15 and TO-17 as an Appendix.			
20	Tim O'Connor/ECY	40	7.2.1	The extent of arsenic and VC does not appear to be delineated to the east in the ESPZ and SSPZ. Additional MW's/geoprobes should be installed to delineate the horizontal and vertical extent of each COC as directed in WAC 173-340-350(7)(C)(iii)(C) for groundwater. This will assist in the COC mass calculations as required by MNA guidance.			
21	Tim O'Connor/ECY	45	7.2.2	The RI should discuss recent monitoring data from offsite domestic wells and whether or not evidence of potential landfill impacts is present.			

22	Tim O'Connor/ECY	46	7.2.2.2	Arsenic concentrations under the ESPZ in the regional aquifer need to be addressed. Arsenic levels in MW-68 are over 2 times the MCL and showing an statistically increasing trend.			
23	Tim O'Connor/ECY	53	8.1	Please outline the hydraulic characteristics and groundwater impacts of the SSPZ.			
24	Tim O'Connor/ECY	55	8.2.1	Consider an Interim Action to evaluate "blockages in the infrastructure" which cause fugitive LFG in the EPZ area. This was a data gap in the RI Work Plan.			
25	Tim O'Connor/ECY	59	8.3.1.3	It is not known how far the VC impacted groundwater plume has migrated from the toe of the refuse. Ecology needs analytical confirmation that VC is not present east of the plumes identified in this Draft RI/FS; not that they are "limited by the laterial and vertical constraints of the geologic units". Further delineation would be required to define the COC's extent in each plume identified in this Draft RI/FS.			
26	Madeline Wall/ECY	62	8.4	Manganese is a health concern above 2,200 µg/L and iron above 11,200 µg/L. It is not appropriate to write that manganese and iron exhibit very low toxicity. They are a health concern when at concentrations exceeding these levels.			
27	Madeline Wall/ECY	65	8.5.1.1	The trend for arsenic in MW-68 is increasing. The text explains it as within background ranges. The text should state that arsenic levels have been increasing in MW-68 since around 2012. Concentrations are well above the proposed cleanup level and the drinking water MCL. This is most likely a landfill impact.			
28	Madeline Wall/ECY	65	8.5.1.1	Regarding arsenic attenuation between MW-68 and MW-80, show the data and provide specific information rather than generalities such as "significant attenuation observed". Use the most current data available.			
29	Madeline Wall/ECY	67	9.1	Add local laws to the list of ARARS including Title 10, Board of Health Solid Waste Regulations, 10.09.060 Construction Standards for Methane Control.			
30	Madeline Wall/ECY	68	9.1	Second to the last bullet: Include explosive gas criteria and post-closure care requirements.			
31	Madeline Wall/ECY	69	9.2	The bottom paragraph is not accurate. Washington State has not "determined that is impracticable to treat or move the refuse from a municipal solid waste landfill". WAC 173-340-710(7)(c) pertains to closure requirements for a solid waste landfill undergoing the MTCA cleanup process. It only speaks to closure and says the minimum requirements for closure of a solid waste landfill are those found in chapter 173-304 WAC. This landfill already has a cover that meets the 304 closure requirements.			
32	Madeline Wall/ECY	73	9.5.4	The Point of Compliance (POC) defines the point or points on a site where cleanup levels must be met. The standard POC is generally defined as throughout the site. The MTCA regulation, however, allows for a conditional POC for groundwater if it is not practicable to meet the cleanup level throughout the site. A landfill is actually given as an example of this in the Ecology publication "Focus, Model Toxics Control Act Cleanup Regulation: Establishing Cleanup Standards and Selecting Cleanup Actions" Focus No. 94-130, November 2007 (revised). "Attaining cleanup levels directly under a landfill, for example, would require the excavation of tons of garbage, possibly causing more harm than good. In such cases, Ecology may approve a conditional point of compliance, provided that the point is located as *close to the source of contamination as possible* ."			

33	Madeline Wall/ECY	74	9.7	Add control LFG migration to meet explosive gas concentration criteria.			
34	Madeline Wall/ECY	74	10	Consider actions to prevent potential LFG - particularly methane - from entering Passage Point structures, such as vapor barriers. Consider more monitoring and explosive gas detectors.			
35	Tim O'Connor/ECY	75	10.2	Provide evidence that "periodic monitoring of groundwater documents that the processes are occurring at the desired rates". MTCA requires estimation of a restoration time frame. MNA is not a stand-alone alternative; it is a finishing tool along with/after remedial action and only in a stable or decreasing plume.			
36	Tim O'Connor/ECY	77	10.5	Lining stormwater ditches and tight-lining stormwater conveyance systems have been suggested by the County's consultants since 2004. This could be done in the ditch adjacent to the wetlands to reduce stormwater contribution to the ESPZ.			
37	Tim O'Connor/ECY	81	11.1.2	If groundwater extraction well decommissioning is a common element, Ecology suggests KCSWD conduct this as an Interium Action. Some extraction wells should also be repurposed for MNA monitoring and others for LFG extraction.			
38	Madeline Wall/ECY	77	10.6	Other methods of groundwater extraction that may perform better than wells and groundwater treatment technologies should be considered - e.g., gravel-filled trench			
39	Madeline Wall/ECY	80-81	11.1.1	The environmental covenant does not do all of this. It's the Cleanup Action Plan (CAP), implementation of the CAP, and periodic review that do this.			
40	Madeline Wall/ECY	82	11.1.4	The new LFG probes installed near Passage Point should be added to the routine gas migration monitoring program. Measurements for methane and other field parameters should be collected at the same frequency as at the perimeter probes. The results should be reported to Public Health and Ecology.			
41	Tim O'Connor/ECY	83	11.2.1	Alternative 1, MNA of Groundwater, is not appropriate as it does not meet the threshold limits. Please include another remedial alternative, possibly including source removal in the area of MW-47 or in-situ remediation.			
42	Madeline Wall/ECY	84	11.2.2	Bullet lists for all alternatives should include groundwater extraction well decommissioning and should specify how many wells will be decommissioned.			
43	Madeline Wall/ECY	85	11.2.3	The last paragraph says additional data evaluation, etc. are needed. Specify what these are.			
44	Madeline Wall/ECY	86	11.2.4	What additional evaluation would be needed before deep gas extraction wells could be implemented?			
45	Madeline Wall/ECY	87	11.3.2	For an independent remedial actions such as this, Ecology will not "determine whether changes to the report are needed in response to public comments."			
46	Madeline Wall/ECY	88	11.3.3	Again, Ecology will not be responding to public comments.			
47	Madeline Wall/ECY	89	11.4.5	Since Alternative 1 does not meet the threshold requirements, it should be dropped here. It should not be included in the DCA. You only have 3 alternatives, which is not enough given the complexity of the site.			
48	Madeline Wall/ECY	90	11.5.1	Institutional controls may prevent installation of new wells within 1,000 feet of the landfill, but the institutional controls proposed will not prevent impacted regional groundwater from leaving the Site or prevent fugitive LFG from impacting offsite groundwater.			
49	Tim O'Connor/ECY	92	11.6	Describe the estimated restoration time frame for each alternative and the basis for this estimate. Discuss the reasonableness of this time frame using the criteria in WAC 173-340-360 (4).			

50	Madeline Wall/ECY	91	11.5.4	This paragraph should also mention that all alternatives include installation of 6 new monitoring wells.			
51	Madeline Wall/ECY	92	11.5.6	Again, Ecology will not be involved in collecting or addressing public comments. Given the concerns the public has expressed in the past about the landfill, they are likely to think the alternatives that take a more aggressive approach to controlling LFG migration address their concerns better. The alternatives, therefore should not all be rated the same in this category.			
52	Tim O'Connor/ECY	94	12.2.1.2	Please continue sampling and reporting all VOC's. Please provide trend analysis data for inorganic's prior to removing from the SAP. A revised SAP would be required prior to approval of a reduction in monitoring parameters.			
53	Tim O'Connor/ECY	94	12.2.1.2	Consider including hydrogen, total inorganic carbon (TIC), and Nitrate as well to demonstrate natural attenuation.			
54	Tim O'Connor/ECY	95	12.2.1.3	All groundwater analytical data should be entered into the EIM database annually. Please include this verbiage in the Final CHRLF EPZ RI/FS.			
55	Madeline Wall/ECY		Table 10.1	Remedial Technology Screening - the screening summary for groundwater extraction and treatment says this is an applicable technology and was retained. We agree this general technology category should be retained and considered for use in an alternative. However, in spite of the statement in the screening summary column, it was not retained.			
56	Madeline Wall/ECY		Table 11.1	GW extraction well abandonment was not listed as a remedial technology on Table 10.1. If it is to be included in Table 11.1 it needs to be presented on Table 10.1 and explained why it is a remedial technology.			
57	Madeline Wall/ECY		Table 11.1	Tables 10.1 and 11.1 would be cleaner and more understandable by the public if you made them consistent. The remedial technologies listed on Table 11.1 should be on Table 10.1 with the same title. Landfill gas collection on Table 10.1 could be broken down to categories such as perimeter gas collection and deep borings and optimized. Then when Table 11.1 uses a term like "perimeter gas collection", the reader can look at Table 10.1 to see what it is. Also, using "LFG collection" on Table 11.1 might cause a reader to think no gas is being collected at all under Alternative 1. Suggest footnote to say this is in addition to what is currently done at the landfill.			
58	Madeline Wall/ECY		Table 11.2	Alternative 1 should not be included since it did not meet threshold requirements.			
59	Madeline Wall/ECY		Table 11.2	The benefit scoring is subjective and even small differences in scoring the alternatives lead to different results. Ecology scored the alternatives using the same system. See Attachment A to the comment letter..			
60	Madeline Wall/ECY		Appendix G	Ecology noted some mistakes in the cost tables. See Attachment B to the comment letter.			

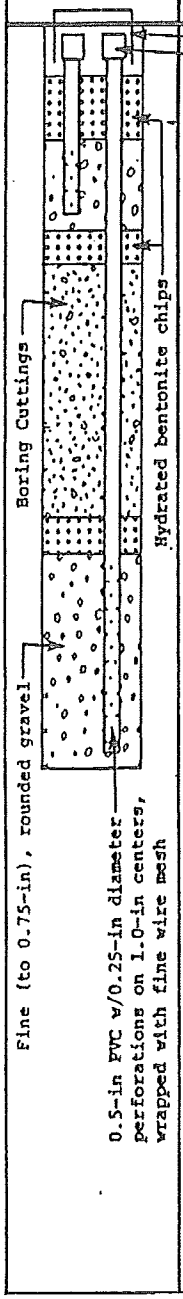
ATTACHMENT D

Sweet, Edwards & Associates, Inc.

BORING LOG

PROJECT Cedar Hills - A.T.C. Gas Probes

Location North of Extended Care Unit
Boring No. GP-ATC-4
Surface Elevation
Drilling Method Air Rotary
Total Depth 21 feet
Drilled By Hayes Well Drilling
Date Completed 10/7/86
Logged By D.E. Mills

WELL DETAILS	PENETRATION TIME/RATE	DEPTH (FEET)	SAMPLE NO.	SAMPLE TYPE	PERMEABILITY TESTING	SYMBOL	LITHOLOGIC DESCRIPTION	WATER QUALITY
		5	1	Grab			0'-1' Dark brown TOPSOIL 1'-9' Gravelly fine sandy SILT (ML), orange-brown, moist. Trace medium sand. Gravel to 0.5 in.dia., subangular.	
		10	2	Grab			9'-17' Silty fine to med. SAND (SM), orange-brown to grey-brown (toward 17'), moist. Trace coarse sand. Trace fine, subangular gravel. (WEATHERED TILL)	
		15	3	Grab				
		20	4	Grab			17'-21' Gravelly fine to medium SAND (SP), brownish-grey, moist. Gravel to 0.5 in. dia., subangular. Trace silt. Possible cobbles at lower 3'. (UNWEATHERED TILL)	
		25					Bottom at 21 feet	