From:	Paul Nietfeld
To:	Benton Public Comment
Subject:	LU-24-027: Conditional Use Permit Application Regarding Landfill Expansion
Date:	Wednesday, May 7, 2025 11:01:04 AM
Attachments:	LU_24_027_Nietfeld_BentonCountyPlanningCommission_testimony_Apr2024_Final.pdf 2008_coffin_butte_benton_county_annual_report.pdf

From: Paul Nietfeld, 37049 Moss Rock Dr., Corvallis, OR, 97330

Dear Chair Fowler and Members of the Benton County Planning Commission:

Thank you for the opportunity to comment on this Conditional Use Permit (CUP) application, and in particular the extension of the public meeting schedule to accommodate all who wish to speak. The opportunity to present public testimony on the landfill issue is very much appreciated by many of the county residents, myself included.

Attached is the brief presentation I had prepared to deliver verbally, with the expectation that members of the public would either be allowed to present graphics electronically or at a minimum by handing out printed copies for Commissioners to view during my presentation. Understanding now that neither of these options is supported in the current meeting structure, I am providing this document in advance of my live testimony so that you will have access to the document for reference during my presentation and/or preview in advance.

Even this short presentation is now repetitive on some points already covered in public testimony of May 6. As requested, I will not repeat these in my live presentation, but I do wish to reiterate my support for the following:

Conditions of approval have proven to be wholly ineffective with regard to the Coffin Butte Landfill. I or other members of the public will provide separate additional written testimony documenting the specific conditions that have been ignored and/or unenforced. Based on the historical record the Planning Commission should consider the effectiveness of such conditions as highly dubious in the case of this CUP. I believe this applies in particular to the speculation noted by Outside Counsel Ryan in the April 29 meeting that the intake cap currently in force as a contractual obligation under the 2020 Landfill Franchise Agreement ("2020 LFA") could be effectively continued via a Condition of Approval if the Committee were to vote to approve this CUP application. I will elaborate on the importance of this point during my verbal testimony in reference to the Coffin Butte Landfill Intake plot (Page 2 of attached document).

The observed impacts and burdens of the landfill have grown significantly worse in recent years. Mr. Henkels and others noted this point, and as a resident living in the vicinity of the landfill I absolutely agree. In my verbal testimony I will address the intake volume increase in 2017 that I believe explains much of the observed increased impact.

Approval of a new landfill cell via LU-24-027 would increase the negative impacts of this landfill <u>and</u> extend the duration of these impacts. Both of these factors are important.

The character of the area is pastoral, not landfill. The landfill was long considered to be a temporary blight on this otherwise beautiful, productive area. As recently as 2008 (the year Republic Services took over operation) the landfill had been developed and managed in a manner that largely controlled its impact on surrounding property (see the aerial photo on the front page of the 2008 Coffin Butte Annual Report, attached). The landfill is now the largest, busiest industrial operation in Benton County, with corresponding burdens, harms and visual blight. The sooner expansion is foreclosed the sooner we collectively can proceed with returning the landfill area to a semblance of its former pastoral nature.

Given the landfill burdens and harms I have observed and the high probability of increased burdens and harms if the LU-24-027 application were to be approved, I ask you to please vote to deny this application.

Thank you again for all the personal time, effort and attention you are applying as Planning Commissioners to this complex and challenging decision.

Regards,
Paul Nietfeld

LU-24-027

Two Facts: Background/Context for the CUP Decision

Paul Nietfeld 37049 Moss Rock Dr. Corvallis, Oregon 97330

Member of the A.1 Subcommittee of BCTT: Landfill Size / Capacity / Longevity

Fact 1: Expansion of the Coffin Butte Landfill is already underway

Source: 2023 Coffin Butte Annual Report, Google Earth imagery of 3/30/2025, Applicant Testimony of 5/1/2025

- Filling of Cell 6 (Quarry cavity) began this year
- Approx. 14M cubic yards
- 50+% increase over current landfill size (1942 – 2025)
- No permit
- No Planning Commission review
- No conditions of approval

Credit: E J Harris Photography

Franchisee presentation of 5/1/2025 to Planning Commission

- Cell 6 not identified ("Quarry")
- Cell 6 similar in footprint area to proposed expansion
- Cell 6 similar in <u>structure</u> to proposed expansion: steep, sharp excavated cavity

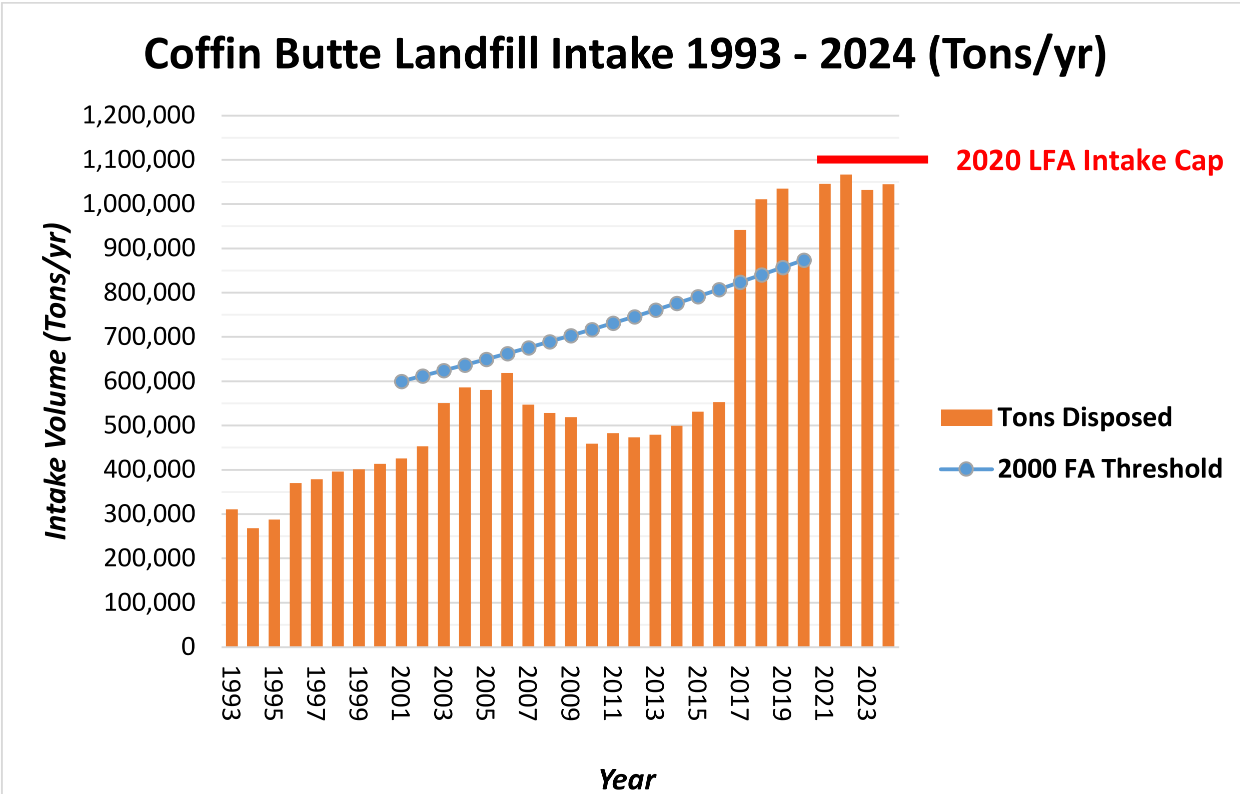
<u>Cell 6 burdens, harms, and damage are yet to be determined</u>

- Will add more than a 50% increase to waste in place volume over the next 11-12 years
- Unique characteristics: liner placement on steep face, excavation below ground level
- Groundwater contamination over time is a particular concern with this cell

It would be imprudent to approve a second expansion in parallel with Cell 6 <u>before the Cell 6 burdens are known</u>

Fact 2: A vote to approve LU-24-027 is a vote to remove the intake cap

Source: 2020 Landfill Franchise Agreement, Section 5(b)



Data/plot from BCTT Final Report, P. 620, with 2023 and 2024 intake figures added

Approval of LU-24-027 will remove the contractual legally binding intake tonnage cap

Outside counsel: Are conditions of approval or applicant statements similarly legally binding?

Franchisee could have asked to renegotiate the 2020 LFA prior to this CUP **but did not**

Intake for the past 8 years indicates high demand for landfill volume, but cap appears to be honored

Closure of the Reworld incinerator in Marion County will likely add to the demand

The 70% year-over-year increase 2016-2017 demonstrates volume increase capability

Intake volume growth rate 2000-2024 = approximately 3x the area population growth rate[1]

Franchisee's application drawings state an expected 1.5 – 1.86M CY/year fill rate[2]

No intake limit → No limit on the harms and burdens resulting from the intake rate

- Traffic / Accidents / Road Damage & Repair Cost / Trash: Roadside & Farm Fields / Noise / Odor

Therefore the application should be denied

[1] Area (Benton, Lincoln, Linn, Marion, Polk, Tillamook) growth = 30.3% 2000-2024 (Portland State Univ. Population Research Center), or approximately 1.9%/year; CBL intake growth = 152.5% 2000-2024, or approximately 6.8%/year.

[2] *322142 - Coffin Butte CUP Plans - Final Drawings_compressed_Part1.pdf*, Pages 15-18. Assuming this includes a 15% ADC burden, at 0.98 Tons/CY this corresponds to "Solid Waste" intake volumes of 1.28 M Tons/year and 1.59 M Tons/year respectively.

Coffin Butte Landfill
2008 Benton County Annual Report

COFFIN BUTTE LANDFILL

2008 Summary of Operations and Environmental Monitoring

This report provides a summary of the following aspects of Coffin Butte Landfill operational and environmental status for calendar year 2008:

- Landfill Capacity
- Future Landfill Cell and Infrastructure Development
- Summary of Annual Groundwater Monitoring Report
- Summary of Annual Leachate Management Report
- Summary of Title V Air Monitoring Report
- Summary of Landfill Users by County of Origin, Tonnage and Total Vehicles
- Status of Environmental Trust Fund and Insurance
- Summary of Environmental and Regulatory Permits
- Summary of Customer Complaints at Coffin Butte Landfill
- Summary of Processing and Recovery Center Activity

LANDFILL CAPACITY

Coffin Butte Landfill has permitted airspace of 39,594,002 cubic yards (including consumed). During 2008 the landfill accepted 528,395 tons of solid waste. Based on historical aerial fly-over data, the average effective density of the in-place waste at the Coffin Butte Landfill is 0.80 tons/cy.[1] Therefore, an estimated 660,494 cubic yards of airspace was used for the year. A total of 11,808,920 cubic yards has been consumed as of December 31, 2008.

The remaining capacity for the entire permitted landfill footprint as of the end of 2008 was approximately 27,785,082 cubic yards. This information is updated annually with aerial flyovers. Using 0.80 tons/cy, the remaining available landfill space expressed in tons is about 22,228,066 tons. Using the current disposal rate of approximately 600,000 tons per year, there are about 37.1 years of landfill space available.

FUTURE INFRASTRUCTURE DEVELOPMENT

The following projects and estimated timing for construction are anticipated for the upcoming year:

- A real-time flow monitor will replace the existing "smart box" used to control leachate discharge volumes to the City of Corvallis Waste Water Reclamation Plant (WWRP). Installation and testing will be completed in spring of 2009.

- Approximately 25 vertical and horizontal landfill gas extraction wells are scheduled for decommission/abandonment and/or replacement on Cells 2B, 2C, and 3C during the summer of 2009. In addition, approximately 10 new pumps will be installed during spring/summer of 2009

[1] Effective density incorporates the effects of daily and intermediate soil cover usage. It is calculated by measuring the amount of airspace occupied between successive aerial flyovers using photogrammetric maps, and dividing that volume into the number of tons of waste received at the gate.

SUMMARY OF ANNUAL GROUNDWATER MONITORING REPORT

This annual report provides a summary of the water quality monitoring activities at Coffin Butte Landfill during 2008. Coffin Butte Landfill, located in Benton County, Oregon, is a municipal solid waste landfill owned and operated by Valley Landfills, Inc. (VLI). Environmental monitoring and associated reporting is required by the landfill's solid waste disposal permit number 306, issued and administered by the Oregon Department of Environmental Quality (DEQ).

During 2008, no significant changes in water quality were measured. Volatile organic compound (VOC) concentrations in wells along the compliance boundary were below primary drinking water standards with the exception of MW-12S, where tetrachloroethene (PCE) was detected above the drinking water standard. Beginning in 2007, the trend in MW-12S declined and is currently below 10 micrograms per liter (µg/L). Vinyl chloride was not detected in any of the site monitoring wells and represents continued depletion of VOCs in the aquifer. Other than PCE, five VOCs were detected at low concentrations (below 3 µg/L) and several inorganic parameters were present above background concentrations. Since the landfill cover was installed on Cells 1/1A in 1996 and landfill gas removal wells were installed in Cell 1 in 1994, the number and concentrations of VOCs have declined in compliance wells. Groundwater conditions at the detection wells (MW-17, MW-18, MW-19, and P-8), 300 to 400 feet downgradient of the compliance boundary, reflect background water quality.

At the compliance boundary for Cell 2, no primary drinking water standards were exceeded and concentrations of monitored parameters are at or below the permit-specific concentration limits.

Downgradient of the closed landfill, groundwater quality trends are stable as well. Based on the age of the landfill, it is expected that the existing low level impacts will diminish with time.

Leachate production for the water year 2007-2008 was estimated at 27.2 million gallons of leachate. This was generated by Cells 1, 2, and 3 during the water year ending September 30, 2008. VLI continues to monitor the secondary leachate collection system (SLCS) beneath Cell 2. The rate of liquid infiltrating to the system declined in 2008 to below that of the previous year.

The text portion of the groundwater report is presented in Appendix A.

SUMMARY OF ANNUAL LEACHATE MANAGEMENT REPORT

Leachate production and management for the water-year October 2007 to October 2008 is discussed in a report by Thiel Engineering (2008). The text portion of the leachate report is presented in Appendix B.

SUMMARY OF ANNUAL TITLE V AIR MONITORING REPORT

Air emissions generated at the Coffin Butte Landfill in 2008 were summarized in a report on DEQ forms prepared by Valley Landfills. The air emissions generated in 2008 were less than the plant site emission limits (PSELs) allowed under the Title V Operating Permit and there were not any deviations from the Title V Operating Permit conditions.

The landfill received, responded to, documented and reported 38 odor complaints to DEQ. Semi-annual meetings with the public are conducted as part of Title V permit. The meetings give the public and Coffin Butte Landfill an opportunity to discuss improvements being made to address the odor issues.

SUMMARY OF LANDFILL USERS BY COUNTY OF ORGIN, TONNAGE AND TOTAL VEHICLES

Tables showing the 2007 and 2008 landfill users by vehicle class, tonnage and county of origin are presented in Appendix C.

STATUS OF ENVIRONMENTAL TRUST FUND AND INSURANCE

The value of the Environmental Trust on 12/31/2008 was $4,496,176.

The value of the Environmental Trust on 12/31/2007 was $6,841,458.

The value of the Environmental Trust on 12/31/2006 was $6,472,396.

A copy of the Certificate of Liability Insurance, showing Benton County as an additional insured is presented in Appendix D.

SUMMARY OF ENVIRONMENTAL AND REGULATORY PERMITS

Permit Number	Permit Type	Permit Terms	Renewal Date	Enforcement Actions - 2008	Comments
SWDP # 306	Solid Waste	10 Year	March 1, 2009	None	Application Accepted – Automatic Permit Extension
# 1200Z	NPDES Stormwater	5 Year	June 30, 2007	None	Application to Permit Reviewer
#101545	NPDES Leachate Treatment	5 Year	September 30, 2008	None	Application Complete
#02-9502	Title V Air Quality	5 Year	February 1, 2010	None	Application Renewal Submitted Alternative Operating and Monitoring Plan Approved

SUMMARY OF CUSTOMER COMPLAINTS – COFFIN BUTTE

Customer Complaints at Coffin Butte Landfill and the Process & Recovery Center - 2008

Price	Public Tipping Area	Process and Recovery Center
6	6	0

The table was compiled from the verbal complaints logged at the Coffin Butte and the Process and Recovery Center scale houses. The landfill also received positive compliments related to the public tipping area and assistance at the public tipping.

SUMMARY OF PROCESSING AND RECOVERY CENTER ACTIVITY 2008

Green waste and urban wood waste recycling activity at the Processing and Recovery Center (PRC), including and compost and hog fuel sales are presented in Appendix E.

REFERENCES

2008 Annual Monitoring Report for the Coffin Butte Landfill. Prepared by Tuppan Consultants LLC and submitted to the DEQ on March 2009.

2007-08 Annual Leachate Management Report for Coffin Butte. Prepared by Thiel Engineering, and submitted to DEQ on December 2008.

Annual Report for Year 2008, Oregon Title V Operating Permit Number 02-9502, Coffin Butte Landfill. Prepared by Valley Landfills, Inc. and submitted to the DEQ February 2009. This annual report provides a summary of the air quality monitoring activities at Coffin Butte Landfill during 2008. Coffin Butte Landfill, located in Benton County, Oregon, is a municipal solid waste landfill owned and operated by Valley Landfills, Inc. (VLI) a subsidiary of Allied Waste. Environmental monitoring and associated reporting is required by the landfill's Title V permit, issued and administered by the Oregon Department of Environmental Quality (DEQ).

Appendix A

Text Portion of Annual Groundwater Monitoring Report

2008 ANNUAL MONITORING REPORT

COFFIN BUTTE LANDFILL

BENTON COUNTY, OREGON

Prepared for

Valley Landfills, Inc.

March 19, 2009

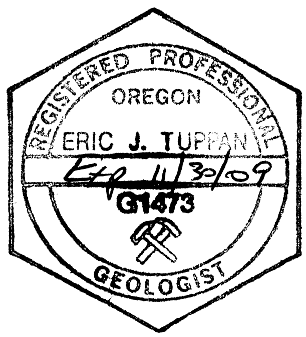
Prepared by

TUPPAN CONSULTANTS LLC
460 SECOND STREET, SUITE 103
LAKE OSWEGO, OREGON 97034

Project VLI-001-002

2008 Annual Monitoring Report
Coffin Butte Landfill
Benton County, Oregon

The material and data in this report were prepared under the supervision and direction of the undersigned.



TUPPAN CONSULTANTS LLC

Eric J. Tuppan, R.G.

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EXECUTIVE SUMMARY

This annual report provides a summary of the water quality monitoring activities at Coffin Butte Landfill during 2008. Coffin Butte Landfill, located in Benton County, Oregon, is a municipal solid waste landfill owned and operated by Valley Landfills, Inc. (VLI). Environmental monitoring and associated reporting is required by the landfill's solid waste disposal permit number 306, issued and administered by the Oregon Department of Environmental Quality (DEQ).

During 2008, no significant changes in water quality were measured. Volatile organic compound (VOC) concentrations in wells along the compliance boundary were below primary drinking water standards with the exception of MW-12S, where tetrachloroethene (PCE) was detected above the drinking water standard. Beginning in 2007, the trend in MW-12S declined and is currently below 10 micrograms per liter (µg/L). Vinyl chloride was not detected in any of the site monitoring wells and represents continued depletion of VOCs in the aquifer. Other than PCE, five VOCs were detected at low concentrations (below 3 µg/L) and several inorganic parameters were present above background concentrations. Since the landfill cover was installed on Cells 1/1A in 1996 and landfill gas removal wells were installed in Cell 1 in 1994, the number and concentrations of VOCs have declined in compliance wells. Groundwater conditions at the detection wells (MW-17, MW-18, MW-19, and P-8), 300 to 400 feet downgradient of the compliance boundary, reflect background water quality.

At the compliance boundary for Cell 2, no primary drinking water standards were exceeded and concentrations of monitored parameters are at or below the permit-specific concentration limits.

Downgradient of the closed landfill, groundwater quality trends are stable as well. Based on the age of the landfill, it is expected that the existing low level impacts will diminish with time.

Leachate production for the water year 2007-2008 was estimated at 27.2 million gallons of leachate. This was generated by Cells 1, 2, and 3 during the water year ending September 30, 2008. VLI continues to monitor the secondary leachate collection system (SLCS) beneath Cell 2. The rate of liquid infiltrating to the system declined in 2008 to below that of the previous year.

1 INTRODUCTION

This report presents results of water quality and landfill gas probe monitoring during the 2008 calendar year at the Coffin Butte Landfill in Benton County, Oregon (Figure 1-1), operated by Valley Landfills, Inc. (VLI). For the April event, water quality sampling was performed by Kennec, Inc. Subsequently, TUPPAN CONSULTANTS LLC oversaw sampling (the October event), managed the water quality data, and prepared this annual report. Annual reporting is required by Section 17.2 of the landfill's solid waste disposal permit number 306, issued by Oregon Department of Environmental Quality (DEQ) on March 9, 1999.

In late 2004 and 2005, the process for selecting and approving a remedy for the west side of the site and for setting concentration limits for the east side of the site was completed. The solid waste permit was amended November 4, 2004, to incorporate concentration limits for the east side and cleanup levels for the west side. The DEQ signed the Record of Decision (ROD) on November 2, 2005 (DEQ, 2005). Subsequent to issuing the ROD, VLI updated and revised the Environmental Monitoring Plan (TC, 2005b), which describes methods of evaluating water quality data and updates the practical aspects of monitoring at the site. The Environmental Monitoring Plan (EMP) also outlines the manner in which water quality data is used to evaluate the remedy performance and describes types of response actions that would be implemented if concentrations at east-side compliance well MW-22 were exceeded.

As defined in the EMP, the annual report serves as the mechanism to (1) collate and report analytical data for the past year, (2) assess achievement of remedial goals for the west side, and (3) evaluate detection monitoring data for east-side cells which bears on the performance of the engineered liner systems for the active waste management units. The last two items will be discussed in Section 4 of the annual report.

For the west side, the purpose of the report is to assess (1) the effect of remedial actions on groundwater quality (i.e., assess progress of cleanup) and (2) protection of potential human health receptors. Consequently, the intent of the report focuses data evaluation on the following objectives:

- Assess aquifer restoration and contaminant removal rates based on concentration trends.
- Evaluate the effectiveness of source control.

- Evaluate stabilization of the plume based on the extent and concentration of volatile organic compounds (VOCs).
- Discuss results of protectiveness monitoring at domestic wells and at early warning detection wells.

For the east side, the report compares analytical results to permit specific concentration limits (PSCLs) and examines the data for indications of a significant change as described in Section 4.2.2. Results are also compared to relevant water quality standards.

Consistent with solid waste permit requirements, municipal solid waste guidance (DEQ, 1996), and the updated EMP, the annual report contains the following:

- A cover letter that
  - Compares the analytical results with relevant monitoring standards.
  - States whether or not federal or state standards were exceeded for the relevant media.
  - States whether or not a significant change in water quality occurred.
- An executive summary.
- Assessment of the current status of the environmental monitoring network and recommendations for improvements.
- Data analysis and evaluation, based on the following:
  - Updated groundwater elevation information for each sampling event and monitored unit, depicting groundwater flow velocities and direction, and piezometric water contours.
  - Data evaluation tools (e.g., time-series plots, box plots, trilinear diagrams) as appropriate, for selected constituents of concern; to be used in assessing data.
  - Summary of results of monitoring for the year, including a table that compares results with water quality standards.
- Description of activities resulting from exceeding a relevant standard or significant change in water quality, such as resampling or additional investigation.
- Results of landfill gas (LFG) probe monitoring (monitoring related to operations of the gas-to-electric plant are not reported as part of the environmental monitoring program).
- Summary of sampling and analysis, field quality assurance and quality control (QA/QC), and laboratory QA/QC techniques implemented during the year.
- Copies of applicable information, including field data, laboratory analytical reports, and chain-of-custody reports; data are cross-referenced and labeled with the designated field sampling location.

2 WATER QUALITY MONITORING

2.1 Monitoring Network

The water quality monitoring network has five components: (1) groundwater monitoring wells, which include compliance and detection wells, (2) water level observation wells and piezometers, (3) the secondary leachate collection system (SLCS), (4) leachate sumps, and (5) surface water monitoring points. In addition to water quality, landfill gas is monitored at probes surrounding the landfill, and in buildings or structures near the landfill. The rationale for the network design and the media monitored was presented in the updated EMP (TC, 2005b). The water quality monitoring locations are summarized on Table 2-1. A summary of the well construction, survey information, and lithologic completion intervals is provided in Table 2-2.

With construction of the supplemental leachate holding pond in summer 2004, nomenclature for sampling points was revised. The older 4-million gallon leachate surge pond was renamed the West Leachate Pond and the new pond is referred to as the East Leachate Pond. Sampling points for the secondary leachate collection system for each pond will be referred to as LDS-WLP and LDS-ELP, respectively.

In addition to these points, 6 shallow piezometers were installed during January 2008, in the fields south of the west-side landfill, in the area previously referred to as Field C. These piezometers are monitored intermittently to evaluate water levels near the wetland mitigation area along Soap Creek.

2.2 Sampling and Analysis Program

Monitoring in 2008 was conducted consistent with the updated EMP for Coffin Butte Landfill (TC, 2005b). The EMP presents monitoring rationale, sampling and analysis parameters, locations, and a schedule. The DEQ approved the plan by letter (DEQ, 2006). The frequency of monitoring, the sampling points, and the analytical parameters for 2008 are summarized in Table 2-3.

Water was sampled consistent with procedures described in the site sampling and analysis plan in Appendix C of the EMP. Samples were submitted to TestAmerica's laboratory in Denver, Colorado.

In 2008, samples could not be collected from several locations as follows:

- Second Quarter: S-U2 was dry and no sample was collected.

- Fourth Quarter: S-3, S-U2, S-U3, and SU-4 were not sampled because sample discharge pipes were dry. At MW-12S and MW-17, a minimal level of water in the wells prohibited collecting enough water to test for inorganic and metal constituents, however, a sample from each well was collected for VOCs. Both wells are outfitted with dedicated bladder pumps with the pump inlet located near the bottom of the screened interval.

Memoranda that document field sampling procedures, copies of field sampling data sheets that record measurements for the sampling events, and laboratory reports are included in Portable Document Format (PDF) on a compact disc (CD) attached to the inside back of the report cover. Memoranda that review laboratory quality assurance and quality control data can be found in Appendix A.

3 FINDINGS

The discussion of hydrogeology is summarized from sections on site characterization in past reports and the EMP (EMCON, 1994, 1996, 2000; TC, 2003a,b, 2005b).

3.1 Hydrogeology

The landfill is situated along the south flank of Coffin Butte. The upper third (approximately) of the butte consists of steep grass-covered slopes, the middle third of exposed bedrock with little vegetation, and the lower third of gentle, soil-covered slopes. Generally, the steeper slopes are underlain by basalt bedrock and the lower, flatter slopes on the flanks of Coffin Butte are underlain by alluvium that consists of silty clay to clayey silt with variable amounts of thin, interbedded sands and silty to sandy gravels (commonly referred to as Willamette Silt).

There are two principal water-bearing units: unconsolidated alluvium, and bedrock volcanics. Groundwater occurs in both units, although the alluvial deposits are absent or unsaturated over much of the site where landfill occurs. Where both units are present, they are hydraulically connected. The two units are monitored separately by groundwater monitoring wells.

3.1.1 Groundwater Occurrence and Flow

Depth to groundwater depends on season and topography. In site wells, the groundwater depths range from over 80 feet below the ground surface midway up the slopes of Coffin Butte (in bedrock) to less than 1 foot in the flat lowland area southeast of the butte (in alluvium). East of Cell 2, potentiometric elevations measured during the wet winter and spring months are near or higher than the ground surface elevation, indicating the potential for groundwater to discharge in this area.

Table 3-1 summarizes the groundwater elevations for 2008. Seasonal fluctuations vary, depending on the hydrogeologic position of the monitoring point. The seasonal changes in 2008 ranged from less than 2 feet in MW-22, MW-23, MW-25, and P-16 to approximately 20 feet in well MW-13. Figures 3-1 to 3-4 illustrate the range of seasonal fluctuations for typical site wells in similar hydrogeologic positions. The average site-wide fluctuation in monitoring wells and piezometers was approximately 4 feet, with the lowest groundwater elevations in late summer to fall and the highest in winter and spring.

The direction of groundwater flow is controlled by the topographic setting of Coffin Butte and Poison Oak Hill and the intervening low areas. Groundwater in the bedrock generally flows downslope from the hills until it reaches a groundwater divide near the southeast corner of Cell 1. At the divide, groundwater flows toward the east and west, generally following the long axes of the valleys. Groundwater flow direction in the saturated portion of the alluvium mimics the underlying bedrock.

Groundwater contours for the site are illustrated on Figures 3-5 and 3-6. The groundwater elevations are from wells screened either in the alluvium or the bedrock. With the relatively large topographic relief between wells, any vertical gradients (generally small) between hydrogeologic units at monitoring locations are insignificant, and therefore do not substantially affect the site's groundwater flow pattern or horizontal gradients.

Factors affecting the groundwater gradients include the topographic slope, hydrogeologic material, and the season. The steepest horizontal gradients measured at the site are on the flanks of Coffin Butte. These range from approximately 0.049 to 0.068 foot per foot (ft/ft) downslope of well MW-13, to 0.14 ft/ft downslope of piezometer P-17. Smaller gradients are an order of magnitude lower, approximately 0.014 ft/ft, downgradient of Cell 2 (in alluvium between MW-23 and MW-9S), and average between 0.006 and 0.009 ft/ft downgradient of Cells 1 and 1A. Downgradient of the Closed Landfill, the gradient is relatively consistent between seasons at approximately 0.06 to 0.079 ft/ft.

3.1.2 Groundwater Velocity

Groundwater velocity depends on hydraulic conductivity, horizontal hydraulic gradient, and effective porosity of the water-bearing medium. The horizontal velocity (V_h) of groundwater is calculated by the following equation:

$$V_h = \frac{Ki}{n_e}$$

where

V_h = horizontal groundwater velocity.
K = hydraulic conductivity.
i = horizontal hydraulic gradient.
n_e = effective porosity.

Estimates of V_h were calculated at the Coffin Butte Landfill for three areas: on the east side, downgradient of Cell 2, and on the west side, downgradient of Cell 1 and the Closed Landfill. Near Cell 2, estimates of V_h are fairly consistent between seasons because the gradient does not change significantly (low slopes and an area of groundwater discharge to the marsh). V_h is calculated at approximately 1.3 feet per year (ft/yr), given a hydraulic conductivity of 6.3×10^{-2} feet per day (ft/day) for the alluvium (EMCON, 1994), an estimated effective porosity of 25 percent (Morris and Johnson, 1967), and a hydraulic gradient of 0.014 ft/ft.

Downgradient of Cells 1/1A, estimates for V_h are 50 to 250 ft/yr in the spring and somewhat lower in the drier months at 30 to 160 ft/yr in the fall. Assumptions include an average hydraulic conductivity of 4 ft/day for the bedrock (EMCON, 1994), an estimated effective porosity of between 5 and 25 percent (Morris and Johnson, 1967), and an average hydraulic gradient of 0.0086 ft/ft in the spring and 0.0056 ft/ft in the fall.

Downgradient of the Closed Landfill, estimates for V_h are approximately 6 to 7 ft/yr for the alluvium, and 360 to 460 ft/yr in the bedrock. Assumptions include the hydraulic conductivities for alluvium and bedrock noted above, an estimated effective porosity of 25 percent both for alluvium and weathered bedrock (Morris and Johnson, 1967), and an average hydraulic gradient of 0.06 ft/ft.

3.2 Water Quality

Water quality summary tables for 2008 can be found in Appendix B. The tables organize the monitoring points by wells, surface water stations, leachate (Cell 1, Cell 2, or Cell 3), and the SLCS (LDS monitoring points).

3.2.1 Data Quality

Results of laboratory quality assurance and quality control data indicate acceptable results (see data review memoranda in Appendix A). TestAmerica's standard laboratory reporting limits (RLs) for several of the trace metals are higher than reporting limit goals devised by the DEQ at 10 percent of the primary drinking water standard. The laboratory can report at lower values to meet these goals, although the laboratory must qualify the data as estimated since the resultant values are below the standard laboratory RL, but above the method detection limit. Qualified data are discussed in the memoranda in Appendix A (along with a table comparing the various reporting limits) and listed in the summary tables in Appendix B.

3.2.2 Groundwater

This section evaluates groundwater quality at Coffin Butte Landfill by examining trends that can be used to predict or assess subtle changes in water quality or which track parameter concentrations used to assess areas with existing impacts. This qualitative examination is complemented with quantitative comparisons in Section 4 to assess remedy performance for the west side, or whether water quality meets concentration limits for the east side.

The following discussion is divided into geographic areas on the basis of trend evaluation. At the compliance boundary for Cell 2, baseline data for background water quality were characterized in the compliance well (no upgradient background well can be feasibly located) as part of an intrawell evaluation approach.

Parameters evaluated for Cell 2 include site-specific indicator parameters that are tested semiannually and a group of site-specific trace metals that are tested annually. For Cells 1 and 1A, parameter evaluation focuses on the same suite of indicators and selected VOCs that have been consistently detected over the years. Water quality evaluation downgradient of the Closed Landfill focuses on site indicator compounds and three historically detected VOCs. A list of wells and time-series concentration plots by parameter can be found in Appendix C.

Time-series concentration plots for groundwater wells that monitor the former leachate irrigation Fields B and C document recovery of groundwater quality since leachate irrigation was discontinued in 1998. Plots for these wells can also be found in Appendix C.

TUPPAN CONSULTANTS visually examined groundwater quality trends and summarized those findings in Tables 3-2, 3-4, 3-5, and 3-6. These tables show the most recent trend (approximately the last five years) and indicate the general range of parameter concentrations for that period. Trend information from decommissioned wells (e.g., MW-6, MW-7S/7D, and MW-16) can be found in annual reports from 2004 and earlier (e.g., TC, 2005a). Descriptive evaluation terms include the following:

- Upward: generally upward trend during the last five years; this is indicated by shading in the tables.
- Downward: generally downward trend during the last five years; there may have been earlier periods of water quality variability.
- Stable: indicates that the water quality varies within a range (degree of variability depends on well or parameter) and that no long-term consistently upward or downward trend is apparent.
- Peaked: concentrations have peaked and are now either declining or appear to have stabilized, suggesting that water quality is beginning to improve.

3.2.2.1 West Side

Cells 1 and 1A. Groundwater in this area is characterized by elevated, but declining, concentrations of inorganic compounds downgradient of Cell 1A and low concentrations of inorganic compounds downgradient of Cell 1. Except for MW-12S at Cell 1, VOC concentrations in this area have declined to below 3 micrograms per liter (µg/L) and continue to trend downward (Table 3-3). Trace metals concentrations are low to nondetect and generally follow stable trends.

Downgradient of Cell 1A, inorganic trends are mixed (Table 3-2), but there are fewer parameters with upward trends than last year (nine in 2008 compared to fifteen in 2007). This is most apparent for well MW-12S, in which bicarbonate, calcium, magnesium and sodium all appear to have peaked and stabilized since 2005. Wells downgradient of Cell 1 have much lower inorganic concentrations than those downgradient of Cell 1A and the magnitude of any increases is slight. Overall, the inorganic concentrations downgradient of Cell 1 are considerably lower than in well pairs MW-10 or MW-11 (downgradient of Cell 1A), and chloride concentrations are more than an order of magnitude below the secondary drinking water standard of 250 milligrams per liter (mg/L).

Of the four VOCs historically detected in well pair MW-10S/10D downgradient of Cell 1A (see Tables 3-3 and 3-4), concentrations of 1,1-dichloroethane (1,1-DCA) continue to decline in both wells. Cis-1,2-dichloroethene (cis 1,2, DCE) and chloroethane were only detected in MW-10S, and vinyl chloride was not detected in either well in 2008. No VOCs were detected in either MW-11S or MW-11D in 2008. Downgradient of Cell 1, PCE had been routinely detected in well MW-12S, and since 1994 had shown an upward trend. In October 2000, the concentration peaked at 25 µg/L. Beginning last year, the trends appears to be headed downward and is currently below 10 µg/L. Trichloroethene (TCE), while still being detected in MW-12S, also appears to be declining in concentration. In deep well MW-12D, PCE was detected both sampling events at less than 1 µg/L.

Closed Landfill. The closed landfill is monitored by two monitoring wells designated as compliance wells in the solid waste permit addendum: one completed in the alluvium (MW-20) and one completed in bedrock (MW-21). The alluvial well has shown stable to downward trends for the site indicator parameters. Trends are summarized in Table 3-5.

In the bedrock well, bicarbonate alkalinity, which had increased in concentration before 2001, appears to have peaked; the other indicator compounds appear stable the past 5 years. Of the three historically detected VOCs in MW-21, cis-1,2-DCE has not been detected since May 1995, 1,2 dichlorobenzene has been nondetect since 1999, and chlorobenzene was last detected at 0.62 µg/L in 2006. No VOCs were detected in either well in 2008.

3.2.2.2 East Side

Cell 2 - Compliance Well MW-22 and Detection Wells MW-24, MW-25. Wells near Cell 2 include compliance well MW-22 downgradient of Cell 2, detection well MW-24 at the upgradient edge of Cell 2A, and MW-25 which is downgradient of the southeast corner of Cell 2B, but upgradient of MW-22. Both MW-22 and MW-25 are completed in shallow alluvium and MW-24 is completed in shallow weathered bedrock (the alluvium is not saturated in this area). Piezometer P-16, which is sampled once a year, was added to the trend plots to supplement information on natural water quality variability in the alluvium.

Trends for indicator parameters (Table 3-6) at the compliance well MW-22 were stable through 2008, although for the last 3 to 4 years (since approximately 2005), concentrations for sodium and chloride appear to be marginally higher more frequently. This relationship is explored more fully in Section 4.2. Parameters tested in MW-24 and MW-25 are stable, and reflect natural water quality in the area. Of those two wells, MW-25 (completed in alluvium) is more similar in water quality to MW-22. Subtle differences, though, are present, for instance lower concentrations for bicarbonate, calcium, and sodium, and higher natural chloride and arsenic in MW-25 than in MW-22.

Cell 2 – Detection Well MW-23. Early in its history, detection well MW-23 had shown increases for bicarbonate alkalinity, chloride, hardness, total dissolved solids (TDS), for five of the major dissolved metals, and for arsenic (As). This had been attributed to localized seepage of leachate from the south side of the landfill. Since 2000 to 2001, the upward trends for bicarbonate, chloride, hardness, TDS, Ca, Fe, Mg, Mn, Na, and As peaked, and within the last year have declined to the range of background concentrations. Of those, the cations, bicarbonate, and chloride continue to demonstrate seasonality with higher concentrations in the fall and lower concentrations in the spring.

3.2.2.3 Former Leachate Irrigation Fields

Field B (East Side). In Field B wells MW-8S and MW-15, concentrations of inorganic indicators continue longer-term trends of past years (see time-series concentration plots in Appendix C). At MW-8S, an earlier increasing trend for chloride peaked in 2001 and is declining gradually, while Na has remained relatively consistent in concentration.

In well MW-15 chloride shows an upward trend, but is still below the concentration in MW-8S. Over the same period, bicarbonate and calcium have declined slightly. Inorganic concentrations in wells MW-8S and MW-15 contrast with those at MW-16, which was screened in fresh bedrock, and had naturally lower concentrations for indicators than the alluvium.

Trace metals in Field B wells were detected at low to trace concentrations, or were not detected in 2008. Historically, trend plots show distinctly lower concentrations beginning with the fall 1996 sampling event (e.g., barium, lead and nickel). That was the first sampling event in which dedicated bladder pumps were used, and the results for trace metals reflect lower suspended solids in the water samples. Since then, concentrations have remained low with more limited variability. None of the wells shows a trend indicating effects of past leachate irrigation. No VOCs were detected.

Field C (West Side). Past leachate irrigation in Field C appears to have mildly affected the concentrations of some inorganic parameters over the last few years. Since irrigation stopped in 1998, levels appear to be recovering to pre-irrigation conditions, although some variability persists (see time-series concentration plots in Appendix C). It is possible that this minor variability could be related to amending the field with lime to improve agricultural production or more recently, to disruption of the surface soils in creating wetlands in the area, especially near well MW-19 which has seen increased concentrations for chloride, Ca, and Mg.

As with Field B, trace metals were either not detected in Field C wells, or were detected at low to trace concentrations. Where detected, none of the wells showed a trend indicative of past leachate irrigation. No VOCs were detected in former irrigation field wells except for dichlorodifluoromethane[1] (Freon 12) in MW-19 (at 1.5 µg/L). Beginning in 1999, Freon 12 was first detected at low levels (<1 µg/L) in that well. In 2005, the trend increased slightly to its current level at 1.5 µg/L. Upgradient, near the edge of the landfill in MW-11S/11D, concentrations in the early 1990s had been between 3.5 and 4 µg/L for Freon 12. However, since 2000, it has not been detected in that well pair. We expect that Freon 12 concentrations at MW-19 will follow the upgradient pattern and dissipate with time.

3.2.3 Surface Water

Surface water is monitored upstream (S-1) and downstream (S-2 and S-4) in Soap Creek to test for potential impacts from the west side of the facility, and for residual impacts from spray irrigation on Field C. Surface water is also monitored on the east side, where an intermittent creek crosses the landfill access road (S-3). In 2008, water flowed at this point during the April sampling event, but no sample could be collected in October because it was dry.

At the Soap Creek monitoring points, year 2008 results for biological oxygen demand (BOD), total Kjeldahl nitrogen, total phosphorus, and orthophosphate were either nondetect or were virtually identical in concentration between the upstream and downstream monitoring points. This is similar to past years.

The other inorganic parameters (chloride, Ca, Fe, Mg, Mn, and Na) showed seasonal changes in concentration, with low concentrations in April (high stream flow) and higher concentrations in October (low stream flow). There were no significant differences between upstream and downstream points for those parameters, with most concentration differences less than 1 mg/L. Differences in concentration between seasons are typically greater, from 8 to 11 mg/L (e.g., for chloride).

3.2.4 Underdrains

Results of sampling the underdrains for Cell 3 (S-U3) and from below the East Leachate Pond (S-U4) are shown in Tables 3-7 and 3-8. The Cell 2C/D subdrain was not sampled because no water flowed at the sampling point. Elevated concentrations for some of the inorganic parameters for Cell 3 in the October 2003 and subsequent sampling events are likely related to construction activities in the area during the summers of 2003 to 2005.

[1] Freon 12 was not identified as a chemical of concern in the remedial investigation and has a preliminary remediation goal (PRG) of 390 µg/L.

Current water quality from this underdrain is comparable to a sample collected from upgradient bedrock well MW-13, suggesting that water from this underdrain is not being affected by landfill operations.

Water quality from the East Leachate Pond underdrain (S-U4) represents baseline concentrations. Concentrations for inorganic compounds and dissolved metals from the underdrain are comparable to or lower than concentrations at MW-16, which was a background well that monitored bedrock in the pond location before it was decommissioned in 2004.

3.3 Secondary Leachate Collection System

The SLCS was monitored by riser pipes at four locations: beneath the Cell 2 sump in the southeast corner of that cell (LDS-2B), beneath the Cell 3 sump (LDS-3), and beneath the west and east leachate ponds (LDS-WLP and LDS-ELP, respectively). Results for liquid quantity and quality are shown graphically in Appendix D.

3.3.1 Cell 2

Historical variations in the concentrations of indicator parameters measured for LDS-2B reflect changes to the volume and liquid chemistry from different sources. These had varied (1) seasonally as the amount of leachate generated changed, surface water runoff changed, and groundwater levels fluctuated, and (2) from year to year as sources had been eliminated through reconstruction. Increased concentrations were generally attributed to a greater volume of leachate-dominated sources, while decreases reflected a greater ratio of surface water or groundwater to leachate. Trend plots of indicator parameters for both the SLCS and Cell 2 leachate can be found in Appendix D.

The volume of liquid that infiltrated into the SLCS for the water years since 1995 is shown in Table 3-9. Cumulative water purged from the system is shown in Figure D-1. For the 2007-2008 water year, an infiltration performance value of 10.2 gallons per acre per day (gpad) was calculated. This is below the 20 gpad action level generally suggested in the literature, and used by the USEPA and several states (Thiel, 2001).

Liquid levels in the primary and secondary leachate collections systems are not illustrated for the past year because the telemetry system malfunctioned and did not produce reliable data. The transducers and telemetry system continued to have significant technical problems this year. The situation is being corrected and data should be available for the next reporting period. Based on the settings for the on/off switch for the pumps in the primary and secondary sumps, it can be inferred that on average, the head levels in the sumps met permit requirements.

3.3.2 Leachate Ponds

Both leachate ponds were used to store leachate this past year. The detection system underlying the West Leachate Pond (previously referred to as the leachate surge pond) was outfitted with a pump in first quarter 1999. Except for purging during sampling events, no liquid was pumped from the LDS-WLP in 2008. The 5-million-gallon East Leachate Pond was constructed in 2004. No liquid was pumped from the secondary system except to collect samples. Sample quality results are listed on the water quality summaries in Appendix B. For the leachate pond SLCSs, the liquid is generally high in inorganic indicators such as chloride, bicarbonate, dissolved calcium, magnesium, and sodium with detections of several VOCs, such as benzene, toluene, ethylbenzene, xylenes, and acetone.

3.4 Leachate Production

Leachate production for the water year 2007-2008 was discussed in a report by Thiel Engineering (Thiel, 2008). An estimated 27.2 million gallons of leachate as calculated by volumetrics and by flowmeters were generated by Cells 1, 2, and 3 during the water year. This is slightly lower than last year at 29.9 million gallons. Tabular and graphical weekly leachate production data from totalizing flowmeters are used to illustrate overall seasonal trends in the data (Appendix D).

3.5 Landfill Gas Monitoring

VLI routinely monitors a total of six landfill gas monitoring probes around the perimeter of the landfill (GP-2 through GP-6), in addition to the interior of twelve site structures. Monitored parameters include lower explosive limit (LEL), methane, and oxygen. Levels of percent LEL and methane were zero for all monitoring events. Results of 2008 gas monitoring are shown in Table 3-10.

4 DISCUSSION

Monitoring wells at Coffin Butte Landfill are sited to assess a number of different areas around the landfill. For older areas that have undergone a focused risk assessment and feasibility study (TC, 2003a), the purpose of monitoring is to evaluate the performance of the remedy in protecting potential receptors and in restoring groundwater quality. The purpose of evaluating groundwater data at the east-side landfill cells is to determine if engineering controls (e.g., the landfill liner, cover, leachate or landfill gas [LFG] collection and removal systems) and operations are effective in preventing the release of landfill-derived compounds to the environment. Early identification of a release can mitigate those impacts relatively quickly, as documented for historical impacts in MW-23.

Consequently, the approach to evaluating monitoring data is slightly different for each area. For older areas, the monitoring objective is to assess the performance of the remedy in restoring groundwater quality to RACLs and in protecting potential receptors. For the active landfill on the east side, monitoring is classified as detection monitoring—in essence, to identify whether the landfill is leaking. Instrumental to this purpose is comparing monitoring results of indicator parameters with PSCLs and assessing the data for significant change.

4.1 West Side

For the west side, the purpose of the report is to assess (1) the effect of remedial actions on groundwater quality (i.e., assess progress of cleanup) and (2) protection of potential human health receptors. These are discussed in the following sections.

4.1.1 Aquifer Restoration-Contaminant Removal

Areas downgradient of the landfills on the west side rely on containment and control of the source with natural attenuation in groundwater downgradient. Contaminant removal occurs through natural processes and is measured with respect to trends of constituent concentrations with time. Cleanup levels referred to as RACLs, are the long term goals of aquifer restoration.

4.1.1.1 Cells 1/1A

Groundwater quality along the compliance boundary of Cells 1 and 1A has been relatively stable the past few years. Fewer inorganic indicator parameters exhibit upward trends (e.g., bicarbonate, likely as a result of dissolution of carbonate minerals lining fractures or in pores driven by carbon dioxide produced through the metabolism of microorganisms in breaking down VOCs), and most have peaked or show downward trends.

Of the inorganic compounds, only chloride and manganese exceed their RACLs, and their trends continue to decline. Trends of VOC have peaked and are declining in each of the compliance wells (many are now nondetect), and except for PCE at MW-12S, none exceeded its RACL (Table 4-1). For the ninth year, vinyl chloride was not detected at concentrations above its MCL, nor was it detected at any monitoring well in 2008. From 300 to 400 feet downgradient of the compliance boundary, groundwater quality approximates background conditions in detection wells MW-17 through MW-19, indicating that contaminants attenuate significantly between the compliance boundary and the downgradient detection wells.

4.1.1.2 Closed Landfill

Trends of monitored parameters downgradient of the closed landfill are stable and reflect a steady improvement in groundwater quality. None of the parameters measured in 2008 indicated increases in concentration or levels of concern with respect to water quality standards; each was below its respective RACL except for manganese. On the basis of the landfill's age (20 to 50 years) and its low potential for significant leachate generation, it is expected that existing low level impacts to the aquifer will diminish with time.

4.1.2 Source Control Effectiveness

Source control includes the final cover at the landfill, leachate removal, and active landfill gas recovery to control the migration of landfill gas that contains methane and VOCs. Effectiveness can be measured qualitatively by examining (1) the trends and number of VOCs at downgradient monitoring wells and (2) whether landfill gas is migrating to perimeter gas probes.

Groundwater Quality. Since the landfill cover was installed on Cells 1/1A in 1996 and LFG removal wells installed in Cell 1 in 1994, the number and concentrations of VOCs have declined in compliance wells. This is illustrated by Table 4-2 in which the number of VOCs are tallied for five periods beginning in 1990 (last column on table) and ending with total number of VOC for 2008. At each well along the compliance boundary, the total number of VOCs has decreased since 1990. In 2005 for the first time, no VOCs were detected in one of the wells, MW-11S. Concentrations continue to decline in each of the other wells, even in MW-12S, where PCE and TCE concentrations appear to be declining from last year. The reduction in the number and decrease in concentration of VOCs can be partly attributed to removal of landfill gas, which contains VOCs, and covering the landfill to prevent infiltration of rainwater to the waste pile.

Another source control measure for Cell 1 is leachate removal. Cell 1A does not have leachate removal but it has been shown that the base elevation of that cell is above the groundwater table and therefore, it is unlikely to generate a significant amount of leachate, if any.

LFG Probe Results. Probe monitoring shows that LFG does not migrate laterally away from the landfill, but is being contained by the gas recovery wells. Gas recovery rates for Cell 1 are monitored routinely by Pacific Northwest Generating Cooperative as part of optimizing flow and maximizing methane recovery for the gas-to-energy plant.

4.1.3 Plume Stabilization

The stability of the VOC plume can be evaluated qualitatively by examining whether concentrations at impacted wells are increasing and whether monitoring wells downgradient of the VOC plume detect VOCs. Both criteria suggest a stable to shrinking plume as concentrations are declining within the plume and wells outside the plume have not detected VOCs. (One exception was MW-19 in which residual concentrations of Freon 12 were detected.) Continued retraction of the extent of VOCs is further indicated by recent declines to nondetect within the last few years for:

- 1,1-DCA in MW-11S and MW-11D
- Chloroethane in MW-10D and MW-11S/11D
- Cis-1,2-DCE in MW-10D and MW-11S/11D
- Vinyl chloride in MW-10S/10D and MW-11S/11D

4.1.4 Protectiveness Monitoring

Protectiveness is assessed at two locations: at the Phillips domestic well and at P-8, which is spatially between the domestic well and the landfill. Trend plots for indicator parameters for these wells can be found in Appendix C. Analytical results for the Phillips well were either nondetect or significantly below safe drinking water standards for inorganics and metals (see tables in Appendix B). No VOCs were detected. Trends of indicator parameters do not show significant upward movement suggestive of impacts from the landfill.

Early warning detection monitoring well P-8 is located between the landfill and the Phillips well, near the hydrogeologic divide that protects the domestic well from landfill-contaminant migration. None of the indicator parameter trends for that well suggest changes in groundwater quality, and no VOCs were detected in 2008.

4.2 East Side

For the east side, the report compares analytical results for MW-22 to PSCLs established in the solid waste permit addendum, and examines the data for indications of a significant increase. Results are compared to water quality standards in Section 4.3.

4.2.1 Comparison to Concentration Limits

Permit-specific concentration limits were formalized for eight indicator parameters in the solid waste permit addendum. PSCLs apply to compliance well MW-22 for the east-side multiunit landfill, and are based on intrawell statistics (TC, 2003b). Table 4-3 compares analytical results since October 2000 with the PSCLs. None of the values in 2008 was above a concentration limit, although the sodium concentration was comparable to its PSCL of 27 mg/L in October. This duplicates last year's October sodium concentration for that well (the results are further examined below). Concentrations for each of the indicator parameters was within the historical range of variability as illustrated on the trend plots in Appendix C (the PSCLs are shown on the plots as a dashed line).

4.2.2 Indications of Significant Change

Sample results that could indicate an increase above what are considered to be natural background concentrations are evaluated to determine their significance with regard to operations or potential receptors. Potential actions taken in response to significant change are discussed in the Section 5.1.2 of the EMP. Examples of significant change include:

- Exceedance of a Safe Drinking Water Standard (primary MCL), unless historical water quality also exceeds that value (i.e., background is elevated). An example of elevated background concentration is arsenic which exceeds its MCL of 10 µg/L, but whose statistical background concentration is 12.1 µg/L.

- Detection at a concentration an order of magnitude higher than the historical trend.

- Detection of a previously undetected VOC.

None of these criteria were met in 2008 for analytical results from MW-22.

4.2.3 Trends

Downgradient of the active landfill cell on the east side, indicator parameter concentrations are stable in detection monitoring well MW-22. However, as mentioned above, sodium has been measured at its PSCL twice, in October of 2007 and 2008. In examining the longer-term trend for sodium in this well, it appears that there has been a slow creep upward in concentrations of a few mg/L over thirteen years. Chloride also shows a modest increase, but none of the other indicators follow this pattern and, for some the trend is downward. Clearly, the degree of the relative increase is still within the calculated PSCL, but given the low statistical variability for sodium concentrations in this well and the short time frame for accumulating the baseline data (from August 1994 to April 2003, a total of 16 analyses), it could be that the long term natural variability of the statistical population was not fully defined when originally deriving the PSCLs.

For instance, climatic conditions over decades can alter groundwater quality in subtle ways. As an example, we plotted the annual precipitation for the Corvallis area over the period of monitoring. We then applied simple trend lines to the rainfall data and sodium data and found that from 1994 to 2008, the annual rainfall has declined while the sodium concentration for MW-22 has increased slightly (shown in Figure 4-1). This inverse correlation suggests that factors unrelated to a possible release (e.g., climate) could affect long-term trends in groundwater quality. In this situation, it could be from a lack of rainfall which affects the natural dilution of sodium in groundwater. Other site specific information that supports a cause other than the landfill is the sodium concentration in intervening detection monitoring well MW-25, which is upgradient and closer to the southeast perimeter of the landfill than MW-22. That well has lower sodium concentrations than at MW-22, effectively precluding a landfill-related release as the explanation for the inflection of the MW-22 sodium data.

In the mean time, VLI will continue to closely watch concentrations at MW-22, and if the sodium concentration exceeds a PSCL, will consult with the DEQ on developing an explanation as to the cause of the excursion. Part of the resolution may be to re-examine the statistical assumptions for the PSCLs in light of other causes of marginally increasing concentrations.

Table 5-4 of the EMP recommends potential actions that could be implemented should a non-hazardous compound increase in concentration or exceed a PSCL. In the situation that currently exists, possible responses include:

- Re-evaluate the statistical distribution of the baseline water quality data
- Continue monitoring
- Examine other compounds and other wells for any associated increases

Any findings from further data exploration could be presented to the DEQ, with a possible result being to re-set the PSCLs at statistically higher values for sodium and chloride based on additional baseline data.

4.3 Comparison to Water Quality Standards

Water quality standards are discussed with respect to detection and compliance wells on the east side and west side. Table 4-4 lists monitoring results that exceeded a water quality standard. Additionally, the water quality summary tables in Appendix B list relevant water quality standards at the head of each column.

Primary Maximum Contaminant Levels (MCLs). No federal or state primary MCLs (health-based) were exceeded at eastside compliance well MW-22. The arsenic concentration in detection monitoring well MW-23 exceeded the primary MCL of 10 µg/L both sampling events (in this part of the landfill, the primary MCL is below the background concentration, which was estimated at 12.1 mg/L). Arsenic has declined in this well since approximately 2000 to background levels, but still shows some variability. The primary MCL for PCE was exceeded downgradient of Cell 1 along the west-side compliance boundary in MW-12S. VOCs were not detected in a detection monitoring well (P-8) approximately 250 feet downgradient of MW-12S. No other primary MCLs were exceeded at west-side wells for VOCs, trace metals or inorganic parameters.

Secondary MCLs. Federal and state secondary MCLs (non-health-based) were exceeded at eastside compliance well MW-22 for Fe and Mn, downgradient of Cell 2. Concentrations for those compounds are stable and reflect natural background conditions for this part of the site. Secondary MCLs for Fe and Mn were also exceeded at detection wells MW-23 and MW-25. Concentrations at MW-25 represent natural conditions for this part of the site.

At the west-side compliance boundary, the secondary MCL for chloride was exceeded at MW-10S where the trend is declining. The secondary MCL for Mn was exceeded at well pair MW-10S/10D both sampling events. These values are consistent with historical concentrations for those wells. Groundwater samples from compliance wells MW-20 and MW-21 (downgradient of the closed landfill) exceeded the secondary MCL for manganese in October.

5 MONITORING PLAN MODIFICATIONS AND RECOMMENDATIONS

There are minor changes planned for the landfill monitoring network or the monitoring program in 2009. One is to decommission piezometer QP-1S, which is located at the head of the Closed Landfill, very near to current quarry operations. The reason for decommissioning is that quarry will be operating next to the well and it was deemed prudent to remove the well rather than risk damaging it. Other changes to the monitoring network in the eastern part of the landfill could possibly occur in 2010 to accommodate construction of Cell 4. This would include decommissioning wells within and near the footprint of the planned cell, and establishing new compliance wells along the eastern, downgradient perimeter of the new cell. The other task is to repair the telemetry system that relays depth of liquid information for the primary and secondary sumps in Cells 2 and 3.

The October 2009 sampling event is scheduled as a split sampling event with the DEQ as specified in the solid waste permit.

Based on the information and discussion presented in Section 4.2, VLI proposes to not resample at MW-22, should the sodium concentration in that well be detected above the PSCL of 27 mg/L. Should sodium be detected above the PSCL, VLI will review the data and contact the DEQ in a timely manner to discuss possible actions to explain the excursion.

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TC. 2003b. Letter (re: Permit-Specific Concentration Limits for Coffin Butte Landfill, Solid Waste Permit 306, Benton County, Oregon) to G. Hargreaves, Oregon Department of Environmental Quality, Salem, from E. Tuppan, Tuppan Consultants LLC, Lake Oswego, Oregon. November 5.

TC. 2005a. 2004 Annual Monitoring Report, Coffin Butte Landfill, Benton County, Oregon. Prepared for Valley Landfills, Inc., by Tuppan Consultants LLC, Lake Oswego, Oregon. March 28

TC. 2005b. Environmental Monitoring Plan, Coffin Butte Landfill, Benton County, Oregon. Prepared for Valley Landfills, Inc., by Tuppan Consultants LLC, Lake Oswego, Oregon. December 16.

Thiel. 2001. Annual Leachate Management Report, Coffin Butte Landfill, Benton County, Oregon. Prepared for Valley Landfills, Inc., by Thiel Engineering, Oregon House, California. January 15.

Thiel. 2008. Letter (re: 2007-08 Annual Leachate Management Report for Coffin Butte) to B. May, Valley Landfills, Inc., Corvallis, Oregon from R. Thiel, Thiel Engineering, Oregon House, California. December 24.

Appendix B

Text Portion of Annual Leachate Management Report for Coffin Butte

Brian May
Valley Landfills, Inc.
28972 Coffin Butte Rd.
Corvallis, OR 97330

December 24, 2008

Re: 2007-08 Annual Leachate Management Report for Coffin Butte

Dear Brian:

This letter-report is being sent to you to fulfill the condition in Solid Waste Disposal Permit No. 306, Section 17.5, that an annual leachate management report for the Coffin Butte landfill be submitted for the previous water year. Information contained in this report is a summary of information provided by your staff to Thiel Engineering. This report covers the 2007-08 water year, from approximately October 1, 2007 to October 1, 2008.

1. OVERVIEW OF LEACHATE MANAGEMENT FOR THE 2007-08 WATER YEAR

During the 2007-08 rain year, leachate was generated from Cells 1, 2, and 3. Leachate from all sources was pumped into one of two leachate surge ponds on the south side of Coffin Butte Road. Leachate was treated by the following methods:

- All of the leachate was trucked to the waste-water treatment plant in the City of Corvallis. No leachate was irrigated onto the waste, and none was delivered to other treatment plants.

2. PRIMARY LEACHATE MANAGEMENT

Section 17.5 of the site's solid waste permit No. 306 lists the information that is to be included in the annual leachate management report. The six items to be reported are described in the following paragraphs.

2.1 Yearly Totals by Month

The permit requests that monthly totals be reported for (a) leachate volume generated from the landfill sumps and (b) leachate volume treated. These two values would be expected to be similar taking into account the difference in pond volume at the beginning and end of the water year, and any rain that falls into an active leachate pond.

There are two ways to estimate the volume of leachate generated. One is to use flow meters on the discharge lines from the leachate sumps. The other is use the volume

US Mail: PO Box 1010 *Physical address*: 9768 Yuba Ranch Way Oregon House, CA 95962 (530) 692-9114 *fax* (530) 692-9115 *email:* Richard@rthiel.com

treated (volumetrics). Both methods were used and are presented in the data provided by the Coffin Butte landfill in Table 1.

Both the flow meters and the volumetrics indicated that 27.2 million gallons (MG) of leachate were generated during the reporting period (compared to 29.9 MG last year).

Attachment 1 provides raw data on volumes of leachate treated, flow-meter data, and rainfall records.

The volume of leachate from the secondary leachate collection systems (SLCS) in Cells 2 and 3 is not itemized separately on Table 1 because this liquid was pumped directly into the primary sumps (the volumes are tracked for internal use). From the point of view of leachate management, the total volume of leachate managed from the primary Cells 2 and 3 sumps are inclusive of the SLCS volume. The volume that was extracted from the SLCS is discussed separately later in the report.

Table 1 - Summary of Coffin Butte Landfill 2007-2008 Leachate Volumes

2007-2008 Leachate Management Summary

Coffin Butte Landfill

Month	Corvallis WWTP	Leachate Irrigation onto Landfill	Treatment Plant	Pond Vol at Start of Month	Rainfall (inches)	Cell 1 Flowmeter	Cell 2 Flowmeter	Diaphragm Pumps	Downwell Pumps	Condensate Sump	Cell 3 Flowmeter	No. of days irrig. occurred	Avg irrig. per day
Oct-07	2,159,117	0	0	3,750,000	3.05	206,331	669,110	155,975	90,215		530,550	0	0
Nov-07	1,855,458	0	0	3,260,000	3.53	302,681	650,965	191,868	178,817		584,355	0	0
Dec-07	2,625,002	0	0	3,600,000	9.55	308,893	1,332,340	392,357	430,503		1,419,475	0	0
Jan-08	4,746,465	0	0	4,590,000	8.92	330,020	1,330,865	464,794	572,591		1,451,300	0	0
Feb-08	3,701,442	0	0	3,900,000	3.15	386,363	948,787	511,509	456,738		991,460	0	0
Mar-08	3,349,984	0	0	3,370,000	4.89	340,379	549,871	489,950	258,565	62,980	759,050	0	0
Apr-08	2,844,547	0	0	2,890,000	2.48	327,915	375,235	484,968	230,922	101,625	576,740	0	0
May-08	2,422,499	0	0	2,100,000	0.18	266,437	283,150	437,026	229,419	122,087	502,780	0	0
Jun-08	1,836,176	0	0	1,430,000	0.72	249,868	175,052	378,440	140,548	104,678	446,370	0	0
Jul-08	1,363,195	0	0	1,170,000	0.04	326,930	172,201	354,476	149,143	97,400	404,040	0	0
Aug-08	1,402,962	0	0	1,120,000	1.57	240,406	445,221	77,386	168,378	112,090	404,411	0	0
Sep-08	1,109,419	0	0	1,230,000	0.37	229,534	510,864	40,242	185,105	132,670	333,299	0	0
Oct-08				1,540,000									
Totals	29,416,266	0	0		38.45	3,515,757	7,443,662	3,978,992	3,090,944	733,530	8,403,830	0	0

2007-2008 TOTAL LEACHATE VOLUME TREATED:	29,416,266
LEACHATE GENERATED FROM VOLUMETRICS:	27,206,266
LEACHATE GENERATED FROM FLOWMETERS:	27,166,714
Ratio of flowmeters to volumetrics:	1.00

Notes: 1.) All values in gallons unless noted

2.) Leachate season Oct 1 to Oct 1

2.2 Review of Significant Leachate Management Events That Occurred During the Last Water Year

Significant events for the 2007-08 water year are noted in the points below.

- Rainfall of 38.45 inches which is slightly below normal average precipitation (normal at Hyslop is approx 41 inches).

- Leachate volumes generated were slightly lower than the previous year.

- Cell 3D-Phase 2 construction was performed in 2008, adding approximately 4.2 acres of new lined area. No cell closure construction was performed in 2008.

- No leachate irrigation was performed on the landfill in the last water year.

2.3 Review of Leachate Monitoring Network and Recommendations for Improvements

The leachate monitoring network includes the following components:

- Volume estimates for each of the treatment methods are made using a range of techniques such as flow meters, or truck counts.

- Monitoring effluent quality of the on-site treatment plant is performed in accordance with the site's NPDES permit (none performed in 2008).

- Leachate quality monitoring is performed for the POTWs and for the solid waste permit in the annual groundwater monitoring report.

- Monitoring of head levels in the landfill primary and secondary sumps (for Cells 2 and 3) is intended to be performed using transducers and automatic recording. The transducers and telemetry system continued to have significant technical problems this past year, and no head-data is available. This situation is actively being corrected, and data should be available for the next report. Based on settings for the on/off switch for the pumps in the primary and secondary sumps, and the fact that the pumps operated normally, without any pump failures, it can be inferred that, on average, the head levels in the sumps met permit requirements.

- Monitoring of pond levels (volumes) is recorded regularly using manual dip-sticks in the leachate holding ponds. West Pond is manual dipped. The East pond volume is estimated from the flow meters. The inventory of both ponds combined is included in Table 1.

- The regular maintenance for the leachate sumps (pumping sediment well, pump, check valves, and flowmeters) was performed on a quarterly basis.

2.4 Summary of Site Conditions and Compilation of Monitoring and Analysis Data

Table 2 provides a summary of the monitoring and analysis data references. Site conditions relative to leachate management in the 2007-08 water year were efficient and well-managed, with the exception of the telemetry system not working.

Table 2 - Monitoring and Analysis Summary Data References

Monitoring or Analysis Item	Reference
Flow meters from landfill sumps	Significant amounts of useful data over the reporting period, summarized in Att. 1.
Volumes handled by various methods	Table 1.
Gas production changes, waste saturation, and side-slope seeps in waste irrigation areas	Since leachate irrigation was not performed, these issues are not monitored relative to leachate, and they are managed separately.
Effluent quality from treatment plant	Monthly monitoring reports sent to DEQ (Water Quality Dept) for NPDES compliance (reported “No Discharge” each month this year).
Leachate quality	Annual Water Quality Monitoring Report to be issued by March 31 of each year.
Head level in Cell 2 primary and secondary leachate sumps. Head Level in Cell 3 primary and secondary.	Technical problems with the data-logging equipment this year. Repairs are actively underway with consultant.
Rainfall	Recorded automatically by site weather station.
Pond levels (volumes)	Table 1 for beginning and ending volumes; monitored weekly.

2.5 Summary of Reports for Monitoring Irrigation on Waste

The leachate irrigation program was phased out and put on indefinite hold at the beginning of the 2006-07 water-year, and none occurred in the 2007-08 water-year.

2.6 Proposed Plans/Changes for Upcoming Leachate Management

The strategy for future leachate management is as follows:

- Continue with aggressive landfill operations and cover procedures to reduce leachate generation from precipitation to the extent possible.

- Continue to maintain all management options for treating leachate.

LEACHATE COLLECTED FROM THE SECONDARY LEACHATE COLLECTION SYSTEM (SLCS)

The amount pumped from the Cell 2 SLCS for the 2007-08 water year was approximately 108,457 gallons, compared to 126,030 gallons in the previous year. This is less than half the amount that was collected the 2005-06 water year (227,760 gallons). Production from Cell 3 SLCS was not recorded for the water year because it was minimal.

If there are any questions concerning the contents of this report, please call me at 530/692-9114.

Sincerely,
Thiel Engineering

R Thiel

Richard Thiel, P.E.
Oregon RCE # 14894

Attachments:

1. Site data for leachate volumes handled, flow meters, and rainfall.

Appendix C

Summary of Landfill Users by County of Origin, Tonnage and Total Vehicles

Coffin Butte Landfill Vehicles by Class and Tons Disposed - Total for Year 2008

	Commecial Vehicles Intercompany Franchised &		Private Vehicles	Total Vehicles	Total Tons
	MSW	C&D	(Includes Special Waste, Asbestos, & Public)		
County	Tons	Tons	Tons		
Benton	46,649.43	5,058.06	8,023.75	23,116	59,731.24
Linn	91,502.39	3,057.04	29,268.12	22,304	123,827.55
Polk	25,470.92	1,318.16	4,392.37	11,250	31,181.45
Marion	49,100.10	1,417.02	9,834.67	4,838	60,351.79
Lane	1,496.49	418.23	40,403.18	1,819	42,317.90
Tillamook	23,734.27	-	1,992.49	1,260	25,726.76
Yamhill	0.00	7.42	17.62	9	25.04
Lincoln	27,501.97	8.85	538.47	1,295	28,049.29
Coos	19,368.39	-	2,186.33	775	21,554.72
Curry	0.00	-	14.88	1	14.88
Washington	44,116.76	0.00	3,229.87	1,724	47,346.63
Josephine	-	-	8.81	1	8.81
Multnomah	0.00	0.00	31.55	122	31.55
Douglas	0.00	0.00	358.75	19	358.75
Clackamas	10,193.24	20.77	2,745.29	582	12,959.30
Columbia	-	-	4,607.45	154	4,607.45
Harney	-	0.00	0.37	1	0.37
Gilliam	-	-	0.00	0	0.00
Baker	3.46	1.82	1.78	10	7.06
Malheur	-	-	0.00	0	0.00
Lake	-	-	0.59	2	0.59
Misc. County	0.00	0.00	11.40	2	11.40
King, WA	0.00	0.00	0.00	0	0.00
Cowlitz, WA	-	0.00	372.05	16	372.05
Pierce, WA	1.79	-	0.00	5	1.79
Snohomish, WA	-	-	0.00	0	0.00
M-Clackamas	-	-	29,061.03	1,686	29,061.03
M-Multnomah	-	-	24,036.07	999	24,036.07
M-Washington	15,286.87	-	1,525.25	703	16,812.12
Totals	**339,139.21**	**11,307.37**	**161,136.89**	**72,693**	**528,395.59**

Coffin Butte Landfill Vehicles by Class and Tons Disposed - Total for Year 2007					
	Commecial Vehicles Intercompany Franchised &		Private Vehicles	Total Vehicles	Total Tons
	MSW	C&D	(Includes Special Waste, Asbestos, & Public)		
County	Tons	Tons	Tons		
Benton	45,888.36	7,905.09	7,246.46	26,268	61,039.91
Linn	105,373.22	5,649.96	17,794.66	25,393	128,817.84
Polk	29,004.33	2,430.29	4,024.95	13,507	35,459.57
Marion	63,054.04	3,764.88	4,385.40	6,874	71,204.32
Lane	1,453.22	200.38	2,345.90	389	3,999.50
Tillamook	24,448.75	-	923.99	1,176	25,372.74
Yamhill	21.57	0.54	44.48	16	66.59
Lincoln	28,897.99	32.74	569.59	1,399	29,500.32
Coos	23,385.64	-	1,163.40	1,011	24,549.04
Washington	76,600.68	3.86	16,443.70	3,783	93,048.24
Jackson	-	-	0.13	1	0.13
Multnomah	58.21	8.82	22,457.36	922	22,524.39
Douglas	0.00	54.62	914.87	67	969.49
Clackamas	7,496.30	0.33	29,475.62	1,946	36,972.25
Columbia	-	-	13,152.56	459	13,152.56
Harney	0.60	0.00	0.49	3	1.09
Gilliam	0.21	-	0.00	1	0.21
Sherman	-	-	0.20	1	0.20
Deschutes	-	8.36	0.00	3	8.36
Baker		3.89	3.70	12	7.59
Malheur	0.64	-	0.00	1	0.64
Lake	-	2.70	4.04	3	6.74
King, WA	1.02	0.00	0.00	1	1.02
Cowlitz, WA	120.98	0.00	123.12	10	244.10
Pierce, WA	2.70	2.80	0.00	8	5.50
Snohomish, WA	-	-	44.07	8	44.07
Totals	**405,808.46**	**20,069.26**	**121,118.69**	**83,262**	**546,996.41**

Appendix D

Certificate of Liability Insurance Showing Benton County as Additional Insured

MARSH

CERTIFICATE OF INSURANCE

CERTIFICATE NUMBER
HOU-000690885-06

PRODUCER
Marsh USA Inc.
1000 Main Street, Suite 3000
Houston, TX 77002
Attn: Houston.Certs@marsh.com Fax# 212.948.0509

016022-AWNA-Poll-08-10 F32

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER OTHER THAN THOSE PROVIDED IN THE POLICY. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES DESCRIBED HEREIN.

COMPANIES AFFORDING COVERAGE

COMPANY	
A	American International Specialty Lines Ins Co
B	
C	
D	

INSURED
Allied Waste North America, Inc.
(Named Insured Continued Below)
18500 North Allied Way
Phoenix, AZ 85054

COVERAGES This certificate supersedes and replaces any previously issued certificate for the policy period noted below. 5

THIS IS TO CERTIFY THAT POLICIES OF INSURANCE DESCRIBED HEREIN HAVE BEEN ISSUED TO THE INSURED NAMED HEREIN FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THE CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, CONDITIONS AND EXCLUSIONS OF SUCH POLICIES. AGGREGATE LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

CO LTR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY)	POLICY EXPIRATION DATE (MM/DD/YY)	LIMITS	
	GENERAL LIABILITY COMMERCIAL GENERAL LIABILITY CLAIMS MADE / OCCUR OWNER'S & CONTRACTOR'S PROT				GENERAL AGGREGATE PRODUCTS - COMP/OP AGG PERSONAL & ADV INJURY EACH OCCURRENCE FIRE DAMAGE (Any one fire) MED EXP (Any one person)	\$ \$ \$ \$ \$ \$
	AUTOMOBILE LIABILITY ANY AUTO ALL OWNED AUTOS SCHEDULED AUTOS HIRED AUTOS NON-OWNED AUTOS				COMBINED SINGLE LIMIT BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE	\$ \$ \$ \$
	GARAGE LIABILITY ANY AUTO				AUTO ONLY - EA ACCIDENT OTHER THAN AUTO ONLY: EACH ACCIDENT AGGREGATE	\$ \$ \$
	EXCESS LIABILITY UMBRELLA FORM OTHER THAN UMBRELLA FORM				EACH OCCURRENCE AGGREGATE	\$ \$ \$
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY THE PROPRIETOR/ PARTNERS/EXECUTIVE OFFICERS ARE: INCL / EXCL				WC STATU-TORY LIMITS / OTH-ER EL EACH ACCIDENT EL DISEASE-POLICY LIMIT EL DISEASE-EACH EMPLOYEE	 \$ \$ \$
A	**OTHER** Pollution Legal Liability	PLS 1897971	06/01/08	06/01/10	Each Incident Limit Aggregate Self-Insured Retention	6,000,000 6,000,000 5,000,000

DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES/SPECIAL ITEMS
Named Insured Includes Valley Landfills, Inc, DIV# F32

CERTIFICATE HOLDER
Benton County, Oregon
Chairman of the Board of Commissioners
408 SW Monroe Avenue, Suite 111
PO Box 3020
Corvallis, OR 97339-3020

CANCELLATION
SHOULD ANY OF THE POLICIES DESCRIBED HEREIN BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE INSURER AFFORDING COVERAGE WILL ENDEAVOR TO MAIL 30 DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED HEREIN, BUT FAILURE TO MAIL SUCH NOTICE SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE INSURER AFFORDING COVERAGE, ITS AGENTS OR REPRESENTATIVES, OR THE ISSUER OF THIS CERTIFICATE.

AUTHORIZED REPRESENTATIVE
of Marsh USA Inc.
BY: Stephanie S. Story

MM1(3/02) VALID AS OF:01/20/09

Appendix E

Summary of Processing and Recovery Center Activity 2007 - 2008

Summary of Processing and Recovery Center Activity 2008							
	Recycling				Sales		
	Green Waste		Urban Wood Waste		Wood Chips	Hog Fuel	Compost
	Cubic Yards	Tons	Cubic Yards	Tons	Cubic Yards	Tons	Cubic Yards
Inbound	12,274.00	18,360.83	5,430.43	5,474.10			
Outbound					0.00	12,717.87	15,458.55
Totals	**12,274.00**	**18,360.83**	**5,430.43**	**5,474.10**	**0.00**	**12,717.87**	**15,458.55**

Summary of Processing and Recovery Center Activity 2007							
	Recycling				Sales		
	Green Waste		Urban Wood Waste		Wood Chips	Hog Fuel	Compost
	Cubic Yards	Tons	Cubic Yards	Tons	Cubic Yards	Tons	Tons
Inbound	17,335.50	18,780.32	8,550.00	7,040.00			
Outbound					0.00	10,381.67	17,178.55
Totals	**17,335.50**	**18,780.32**	**8,550.00**	**7,040.00**	**0.00**	**10,381.67**	**17,178.55**