Waste Piles Plan
For
Chemical Waste Management of the Northwest, Inc.

Arlington Facility • ORD 089 452 353
17629 Cedar Springs Lane
Arlington, Oregon

Standalone Document No. 21

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WASTE PILES DESIGN AND OPERATIONS PLAN

1 INTRODUCTION

This Waste Pile Design and Operations Plan addresses the design and management of hazardous waste stored and processed within the Waste Piles (hereinafter referred to as waste piles) at the Chemical Waste Management of the Northwest, Inc. (CWMNW) Arlington Facility. One operational waste processing and storage pile WP-1 is included in this plan.

- Design of the waste pile is shown on Drawing C-1 included in Appendix A of this plan.
- Locations of expanded WMA-2 and the waste pile are shown on Facility map 1-1 contained within the Part B Permit.

Operational requirements associated with the waste piles are presented in Section 2.0. Design features of the waste pile storage areas, are discussed in Section 3.0, design drawing C-1 is included in Appendix A.

Expected hazardous constituents provisions are discussed in section 4.0 of this document as evidence of compliance with the alternative liner requirements contained in §40 CFR 264.251(b) and §264.251(d).

The response action plan (RAP) is included as a part of this plan as sections 5.0 through 10.0 at the end of this document.

Inspections for the waste pile are included in *Standalone Document 3 – Inspection Plan*

Help modeling results are outlined in appendix C of this document

2 UMATILLA CONCRETE PROCESSING AND STORAGE IMPOUNDMENT WP-1 OPERATIONS

The following outlines the operational demonstration required by §264.251(b) and §264.251(d) for the concrete processing and waste pile operations. The concrete processing and waste pile operations area is operated pursuant to §264.251(d) to prevent the migration of any hazardous constituent into the ground water or surface water at least as effectively as the prescriptive liners and leachate collection and removal systems in §264.251(c), and will allow detection of leaks of hazardous constituents through the top liner at least as effectively as the prescriptive liner system outlined in §264.251(c)

2.1 Wastes Stored and Treated in Crushed Concrete Processing and Storage Area

Pursuant to §264.251(b)(1); Wastes processed and ultimately stored in waste pile WP-1 area are limited to the concrete demolition debris and wastes generated from the Umatilla Army Depot - incinerator demolition project. Quantities of this waste stream are estimated at approximately 60,000 tons including entrained rebar.

Pursuant to §264.251(d)(1); These wastes have been determined to be hazardous waste assigned Hazardous Waste Codes P999, P998, F999 and F998 and are not expected to migrate hazardous constituents into the groundwater or surface water . These wastes identified with these waste codes do not require treatment prior to disposal in Chemical Waste Management's approved Subtitle C landfill facility.

2.2 Acceptance of Wastes Into the Storage and Processing Area

The area will receive concrete and rebar containing wastes with deminimus other contaminants primarily via long haul truck and trailer. Upon arrival the loads will be reviewed for contamination and then stockpiled for future size reduction and segregation.

2.3 Processing of Wastes

All concrete delivered to the storage and processing area will be size reduced by crushing, chopping, shearing and other methods. Substantially all rebar and other metals contained in the concrete will be segregated, stockpiled and relocated to Landfill L-14 for direct disposal. Processed concrete will be sized, segregated, and stockpiled for later use inside Landfills L-14, L-13, and L-12. The WP_1 waste pile life expectancy is 7 years from the date of first waste being placed in the area.

2.4 Transfer of Contents Out of Storage

Ferrous and Non-Ferrous reinforcing metals will be loaded on landfill hauling equipment or other transport vehicles and transferred out of the processing and storage area to Landfill L-14. Sized concrete debris will be relocated as needed to landfills L-14, L-13, L-12 and the Macro Area for use as;

- Landfill cover,
- Macro box fill,
- Landfill sliver fill

- Landfill operations layer
- Landfill interior road base
- Others as approved by DEQ

2.5 Periodic Stormwater/Leachate Removal

Waste Pile storage and processing area will be generally sloped to drain toward two storm-water/leachate sumps located on the south side of the Waste Pile storage and processing area. Any accumulated leachate or stormwater will be analyzed by CWMNW on-site lab for RCRA metals. Due to the nature of the materials stored and processed in the waste pile area, no contamination of the stormwater/leachate is expected. Once cleared the accumulated liquids will be pumped out and transferred to permitted surface impoundments P-A and/or P-B, or sprayed within the lined interior of landfill L-14 for dust control. The waste pile storage and processing area will be inspected monthly for defects that could affect the run-off/run-on properties of the impoundment.

2.6 Periodic Inspection of Waste Pile Storage and processing Integrity

Waste pile storage and processing areas will be inspected monthly to ensure desiccation cracking and other surface anomalies are not occurring allowing accelerated infiltration of accumulated stormwater and leachate. Inspection forms are included in *Standalone Document 3 – Inspection Plan*

2.7 Waste Pile WP-1 Anticipated Life

The WP_1 waste pile life expectancy is 7 years from the date of first waste being placed in the area.

2.8 Equipment Decontamination

All third party equipment used in the processing of the concrete materials will be decontaminated prior to leaving the CWMNW facility.

2.9 Waste Pile WP-1 Closure

Prior to placing waste in the WP-1 area a total of 30 grab samples for the base grade of the area will be composited into 7 background soil samples. These samples will be analyzed for RCRA metals. These samples will be used during the closure period to assess clean closure of the area.

For closure of the WP-1 area; all sized concrete and metals will be removed from the waste pile storage and processing area, CWMNW will over excavate the entire area by at least 12” and remove the stormwater run-on and run-off berms. All excavated soils will be used as cover within the landfill L-14.

Upon removal of all concrete materials from the area and the area has been over excavated, a total of 30 confirmatory grab samples from the bottom of the excavation will be composited into 7 background soil samples, analyzed for RCRA metals and compared to the background samples

CWMNW Standalone document 5 – Closure/Post Closure Plan has been updated to reflect the WP-1 Unit.

2.10 Waste Pile WP-1 Clean Closure Demonstration

A total of 30 confirmatory grab samples from the bottom of the excavation will be composited into 7 background soil samples, analyzed for RCRA metals and compared to the background samples to demonstrate clean closure of Waste Pile WP-1.

3 UMATILLA CONCRETE PROCESSING AND WASTE PILE WP-1 DESIGN

Pursuant to §264.251(b)(2); The concrete processing and storage area is designed pursuant to §264.251(b) locations of the active waste pile processing and storage area WP-1 is shown on Drawing C-1 in appendix A. The waste pile processing and storage area dimensions and operating capacities are presented in Table 3-1. Applicable design and construction documents and key design components are summarized in Table 4-2. Waste pile processing and storage area WP-1 is constructed in accordance with alternative design practices to those specified in §264.251(b) and §264.251(d).

3.1 Alternate Liner System

Pursuant to §264.251(b)(2); Waste pile processing and storage area WP-1 will be developed and founded in native soils in the immediate area. These native soils will act as the alternative liner system for the waste pile area. Some localized grading and drainage will be completed to prepare the area to allow positive drainage to the sump in the SW corner of the waste pile processing and storage area.

Settlement of the native soils is not expected, due to the low compressibility characteristics of these soils. Infiltration of contaminants from the processed and stored waste is not expected to achieve significant depth within the native soils due to the relatively low permeability of the native soils in the area. Simulation of moisture drainage through the compacted native soil liner was performed using the HELP Model (Hydrologic Evaluation of Landfill Performance V3.07). The predicted average vertical percolation rate would be approximately 0.61 in/yr, resulting in a total infiltration depth of approximately 4.29 inches during the operational life of WP-1.

3.2 Hydrogeologic Setting

Pursuant to §264.251(b)(3); The hydrogeologic setting for the entire facility is detailed in following documents contained in the Standalone 7 – *Groundwater Monitoring Plan*.

- *Geologic and Hydrogeologic Site Characterization Report, Part B Permit Application*, prepared for Chem-Security Systems, Inc., by Dames and Moore, dated April, 1987;
- *RCRA Facility Investigation Report for Landfill Units L-9 and L-10*, prepared for Waste Management, Inc. (Arlington, Oregon), by CH_2MHill and Rust Environment and Infrastructure, Inc., dated May 20, 1996; and
- *Hydrogeologic Investigation and Engineering Design Report for Landfill L-14, Arlington, Oregon*, prepared for Chemical Waste Management of the Northwest, Inc., by Rust Environment and Infrastructure Inc., dated February, 1998.
- *Updated Hydrogeologic Conceptual Model Report*, prepared for Chemical Waste Management of the Northwest, Inc., by CH2M HILL, dated June, 2007.

In general all of the landfill units are located well above the saturated zone (i.e., the uppermost aquifer). The Umatilla concrete demolition debris are not reasonably expected to transmit any hazardous constituents as defined by §264.93 to either the surface water

or groundwater from the processing or storage of the processed concrete demolition materials.

Radiocarbon dating results indicate that the groundwater in the uppermost aquifer at the site has a probable age range between 1000 to 4000 years. On this basis, it is reasonable to expect no changes in groundwater quality of the uppermost aquifer are anticipated during the life of WP-1. Characterization of vertical percolation in the unsaturated zone adjacent to the leachate collection system sumps will determine if any possible constituents of concern could affect groundwater quality.

WMA-2 has been expanded to encompass the new WP-1 area, wells 2E-9 and 3H-1 have been added to the WMA-2 monitoring system and will be used to monitor the uppermost aquifer during the WP-1 7 year operational period.

3.3 Waste Pile Storage Area Leak Detection

Pursuant to §264.251(d)(2); Characterization of the leachate collected from the collection sump will determine any possible constituents of concern that could contribute to migration through the native soil liner.

CWMNW regularly monitors the uppermost aquifer at the facility pursuant to the approved groundwater monitoring plan. Based on the materials being stored or processed in the waste pile area, and the limited vertical percolation predicted by the HELP model simulation, it is not expected that contaminants will migrate through the native soils to the uppermost aquifer. Pan lysimeters and/or soil suction lysimeters will be installed near the proposed sumps to determine if contaminants of concern are migrating through the native soil liner of the waste pile area.

WMA-2 has been expanded to encompass the new WP-1 area, wells 2E-9 and 3H-1 have been added to the WMA-2 monitoring system and will be used to temporarily monitor the uppermost aquifer during the WP-1 7 year operational period.

3.4 Leachate Collection and Removal Structures

Dozer compacted stormwater run-on and run-off diversion berms will be constructed around the waste pile processing and storage area from native soils in the area. Two stormwater/leachate collection sumps will be constructed on the south side of the waste pile storage and processing area. Due to the nature of the materials stored and processed in the waste pile area, no contamination of the storm-water/leachate is expected. All accumulated liquids in either sump will be treated as leachate and will be characterized by CWMNW on-site lab for RCRA metals. Once cleared the accumulated liquids will be

pumped out and transferred to impoundments P-A and/or P-B, and/or sprayed within the interior of landfill L-14 for dust control.

3.5 Preventing Migration of Hazardous Constituents

Pursuant to §264.251(b) and §264.251(d)(1); CWMNW exhibits location characteristic which will limit the infiltration of leachate into the native soils. The facility is located in an arid climate and consequently is expected to generate very limited amounts of stormwater and leachate. It is expected that some leachate infiltration will occur during both the crushing and storage phases of waste pile processing and storage area WP-1's life. Simulation of infiltration through the compacted native soil liner during the life of WP-1 was performed using the HELP model. Modeling of vertical flow predicts that vertical percolation will be limited to the upper 4.3 inches of the compacted native soil liner during the operational life of WP-1.

Pursuant to §264.251(b)(4) the Umatilla demolition concrete is characterized by hazardous waste codes P999, P998, F999 and F998 and does not carry a characteristic or listed hazardous waste code, contamination from the processed and stored concrete is not reasonably expected to occur. Leachate and stormwater once characterized will be regularly removed from the sump, additionally over excavation and testing of the foundation soils during the closure phase will occur to ensure no contamination remains.

TABLE 3-1

CONCRETE CRUSHING AND STORAGE IMPOUNDMENT DIMENSIONS AND OPERATING AREA

Waste Impoundment	Dimensions (feet)	Operating Area
WP-1	Irregular shape ~503 x ~347 x ~2 feet	~144,450 Sq Ft

4 Expected Hazardous Constituents

Pursuant to §264.251(d)(1); The Umatilla concrete demolition wastes have been determined to be hazardous waste assigned Hazardous Waste Codes P999, P998, F999 and F998, and are not expected to migrate hazardous constituents into the groundwater or surface water . These wastes identified with these waste codes do not require treatment prior to disposal in Chemical Waste Management's approved Subtitle C landfill facility.

4.1 Potential adverse effects on ground-water quality

Pursuant to §264.93(b)(1)(i) the physical characteristic of the wastes being processed in the waste pile are general concrete demolition debris with significant ferrous and non-ferrous rebar and reinforcement materials. Leachate from stormwater and dust control water is not reasonably expected to have the potential to migrate hazardous constituents through the native soils into the uppermost aquifer.

Pursuant to §264.93(b)(1)(ii) the hydrological characteristics of the facility and surrounding area is well defined in Standalone 7 – Groundwater Monitoring Plan.

- *Geologic and Hydrogeologic Site Characterization Report, Part B Permit Application*, prepared for Chem-Security Systems, Inc., by Dames and Moore, dated April, 1987;
- *RCRA Facility Investigation Report for Landfill Units L-9 and L-10*, prepared for Waste Management, Inc. (Arlington, Oregon), by CH_2MHill and Rust Environment and Infrastructure, Inc., dated May 20, 1996;
- *Hydrogeologic Investigation and Engineering Design Report for Landfill L-14, Arlington, Oregon*, prepared for Chemical Waste Management of the Northwest, Inc., by Rust Environment and Infrastructure Inc., dated February, 1998; and
- *Updated Hydrogeologic Conceptual Model Report*, prepared for Chemical Waste Management of the Northwest, Inc., by CH2M HILL, dated June, 2007.
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Pursuant to §264.93(b)(1)(iii)**;** The quantity of ground water and the direction of ground-water flow is monitored as part of the overall facilities approved groundwater monitoring plan. Soil pore water quality in the unsaturated soils adjacent to the leachate collection sumps will be monitored using lysimeters.

WMA-2 has been expanded to encompass the new WP-1 area, wells 2E-9 and 3H-1 have been added to the WMA-2 monitoring system and will be used to temporally monitor the uppermost aquifer during the WP-1 7 year operational period.

Pursuant to §264.93(b)(1)(iv); The proximity and withdrawal rates of ground-water users has been established in the facilities approved groundwater monitoring plan and the hydrogeologic assessments indicated above.

Pursuant to §264.93(b)(1)(v); The current and future uses of ground water in the area has been established in the facilities approved groundwater monitoring plan and the hydrogeologic assessments indicated above.

Pursuant to §264.93(b)(1)(vi); The existing quality of ground water, including other sources of contamination and their cumulative impact on the ground-water quality has been established in the facilities approved groundwater monitoring plan and the hydrogeologic assessments indicated above.

Pursuant to §264.93(b)(1)(vii); The potential for health risks caused by human exposure to waste constituents contained in the concrete and demolition debris are limited to the risks associated with normal concrete and reinforcement rebar. Little to no health risks are expected from the processing and storage of these materials in the waste pile area

Pursuant to §264.93(b)(1)(viii); The potential damage to wildlife, crops, vegetation, and physical structures caused by exposure to waste constituents in the concrete and demolition debris are limited to the risks associated with normal concrete and reinforcement rebar. Little to no damage is expected from the processing and storage of these materials in the waste pile area.

Pursuant to §264.93(b)(1)(ix); The persistence and permanence of the potential adverse effects from the processing and storage of the concrete debris is very low, and limited to the persistence and risks associated with normal concrete and reinforcement rebar.. A total of 30 grab samples for the bottom of the excavation will be composited into 7 background soil samples. These samples will be analyzed for RCRA metals. These samples will be used during the closure period to assess clean closure of the area.

Upon removal of all concrete materials from the area and the area has been over excavated, a total of 30 confirmatory grab samples from the bottom of the excavation will be composited into 7 background soil samples, analyzed for RCRA metals and compared to the background samples

4.2 Potential adverse effects on hydraulically-connected surface water quality

Pursuant to §264.93(b)(2)(i) The approximate volume of concrete and rebar debris is 60,000 tons, and physical and chemical characteristics of the waste in the regulated unit is non-characteristically hazardous waste concrete demolition debris.

Pursuant to §264.93(b)(2)(ii); The hydrogeological characteristics of the facility and surrounding land is well defined in Standalone 7 – Groundwater Monitoring Plan.

- *Geologic and Hydrogeologic Site Characterization Report, Part B Permit Application*, prepared for Chem-Security Systems, Inc., by Dames and Moore, dated April, 1987;

- *RCRA Facility Investigation Report for Landfill Units L-9 and L-10*, prepared for Waste Management, Inc. (Arlington, Oregon), by CH_2MHill and Rust Environment and Infrastructure, Inc., dated May 20, 1996;
- *Hydrogeologic Investigation and Engineering Design Report for Landfill L-14, Arlington, Oregon*, prepared for Chemical Waste Management of the Northwest, Inc., by Rust Environment and Infrastructure Inc., dated February, 1998; and
- *Updated Hydrogeologic Conceptual Model Report*, prepared for Chemical Waste Management of the Northwest, Inc., by CH2M HILL, dated June, 2007.

Pursuant to §264.93(b)(2)(iii); The quantity and quality of ground water, and the direction of ground-water flow is monitored as part of the overall facilities approved groundwater monitoring plan. Soil pore water quality will be monitored using lysimters installed adjacent to the leachate collection sumps.

WMA-2 has been expanded to encompass the new WP-1 area, wells 2E-9 and 3H-1 have been added to the WMA-2 monitoring system and will be used to temporarily monitor the uppermost aquifer during the WP-1 7 year operational period.

Pursuant to §264.93(b)(2)(iv); The patterns of rainfall in the region is generally described as rainfall in an arid climate. The site averages 7 to 9 inches of combined rain and snow.

Pursuant to §264.93(b)(2)(v); The waste pile area is approximately 6 miles south of the Columbia River. The site has been established as having no potential to discharge contaminants to regulated water bodies or other navigable waters of the US.

Pursuant to §264.93(b)(2)(vi); There are no current and future uses of surface waters in the area and no water quality standards established for surface waters in the area.

Pursuant to §264.93(b)(2)(viii); The potential for health risks caused by human exposure to waste constituents contained in the concrete and demolition debris are limited to the risks associated with normal concrete and reinforcement rebar. Little to no health risks are expected from the processing and storage of these materials in the waste pile area.

Pursuant to §264.93(b)(2)(ix); The potential damage to wildlife, crops, vegetation, and physical structures caused by exposure to waste constituents in the concrete and demolition debris are limited to the risks associated with normal concrete and reinforcement rebar. Little to no damage is expected from the processing and storage of these materials in the waste pile area

Pursuant to §264.93(b)(2)(x) The persistence and permanence of the potential adverse effects from the processing and storage of the concrete debris is very low, and limited to the persistence and risks associated with normal concrete and reinforcement rebar. A total of 30 grab samples for the bottom of the excavation will be composited into 7 background soil samples. These samples will be analyzed for RCRA metals. These samples will be used during the closure period to assess clean closure of the area.

Upon removal of all concrete materials from the area and the area has been over excavated; a total of 30 confirmatory grab samples from the bottom of the excavation will be composited into 7 background soil samples, analyzed for RCRA metals and compared to the background samples to demonstrate clean closure of WP-1

4.2.1 Underground Sources of Drinking Water and Exempted Aquifers

Pursuant to §264.93(c); the facility is not in noncompliance with any permits or conditions for underground sources of drinking water and exempted aquifers subject to §40 CFR 144.8 reporting.

TABLE 3-2

SUMMARY OF APPLICABLE DESIGN AND CONSTRUCTION DOCUMENTS AND KEY DESIGN COMPONENTS

UNIT	Applicable Design and Construction Documents				Description of Key Design Components
	Phase	Documents	Approvals	Response Action Plan	
Waste Pile WP-1	Design/ Construction	Construction Drawings, Waste Pile WP-1, EIL August 2013.		See plan's Response Action Plan for Waste Pile WP-1 document.	Meets or Exceeds Minimum Technology Requirements for Surface Impoundments Required to be "Clean Closed" in accordance with Section 3.7.
	CQA	No CQA Required	NA		
	Closure	Not Yet Closed, Plan not Required.			

Notes:
CWMNW- Chemical Waste Management of the Northwest
CQA- Construction Quality Assurance
LDCRS- Leachate Detection, Collection, and Recovery System
DEQ- Oregon Department of Environmental Quality

APPENDIX A – Design Drawings

DESIGN DRAWINGS

Waste Pile WP-1 drawing C-1

APPENDIX B - RESPONSE ACTION PLAN FOR WASTE PILE WP-1

B1 INTRODUCTION

This *Response Action Plan* (RAP) describes the response actions to be taken to address possible hazardous contaminates identified in collected stormwater in waste pile processing and storage area WP-1. These actions include;

- Modifying operational procedures
- Modifying closure plans to achieve clean closure

Notifications to appropriate agencies

B2 DESCRIPTION OF WASTE PILE PROCESSING AND STORAGE LINING SYSTEM

Waste Pile WP-1 has a surface area of approximately 145,000 square feet and is an irregularly shaped area measuring approximately 503 x 347 feet. The area is founded on native soils with a 2 -3 foot high containment and diversion berm surrounding all but the high side of the storage and processing area. The waste pile processing and storage area bottom slopes at approximately 1-2 percent toward the sumps located in the South end of the area. The run-on/run-off control berms have side wall slopes of approximately 2:1 or flatter. Design/construction drawings of the waste pile processing and storage area are presented in the *Waste Pile Design and Operations Plan*.

The waste pile processing and storage area is designed to meet or exceed EPA guidelines for waste pile construction and is constructed in accordance with alternative design practices and exemptions specified in §264.251(b) and §264.251(d). The waste pile processing and storage area design includes primary containment, and a leachate detection, collection and removal system (LDCRS) located in the SW corner of the waste pile processing and storage area.

The native soil liner consists of landfill equipment compacted native soils. The waste pile processing and storage area is designed with a LDCRS and all collected liquids from the LDCRS will be characterized and placed in the facilities surface impoundments P-A and/or P-B, or used as dust control within the waste pile area or in Landfills L-12, L-13, and L-14.

B3 SOURCES OF FLUID WITHIN THE LEACHATE DETECTION, COLLECTION AND REMOVAL SYSTEM (LDCRS)

The purposes of this section are to (1) describe the basis for determining various response actions, and (2) aid operations personnel in understanding and locating contamination sources.

There are three potential sources for liquids entering the LDCRS. These include;

(1) Construction and processing liquids collected in the collection sump,
(2) Outside fluids contained within the incoming waste
(3) Stormwater water collected

Each of these sources is described briefly in the following paragraphs.

B.3.1 Construction and Processing Liquids

A possible source of fluid in the LDCRS is liquids from excess clean water used as dust control for ongoing concrete processing and storage of the concrete materials and reinforcing rebar. The quantity of collected liquids resulting from the ongoing processing and dust control activities is estimated to be between 500 and 5,000 gallons per day (gpd), and should be relatively

independent of precipitation. Collected liquids resulting from the ongoing processing and dust control activities in the waste pile processing and storage area will generally decrease with time. Collected liquids from dust control water is expected to be intermittent depending on climatic conditions and volumes and methods used in the processing of the concrete. Amounts of dust control liquids used during these operations will be managed to minimize the collection of liquids.

Collected liquids will be properly characterized and if non-hazardous will be re-used as dust control within the waste pile processing and storage area. Although remote, should the collected liquids be found to be characteristically hazardous, these liquids will be stabilized to meet LDR requirements prior to landfilling.

B.3.2 Outside Fluid Sources

Since the water table is greater than 100 feet below the base of the surface impoundments, the probability of water entering the LDCRS through the native soil component of liner is extremely low.

B.3.3 Stormwater Collected

The facility is located in an arid climate with normal average rainfall of 7 to 9 inches per year. During precipitation events it is expected that minimal amounts of leachate will be generated and collected in the LDCRS or infiltrated into the native soil liner system. Help modeling results are included as appendix C of this plan.

B.3.4 Infiltration Into The Native Soil Liner System

Limited infiltration into the native soil primary liner system is expected, the extent of leachate infiltration is controlled through managed operational application of the required dust control liquids used in the processing of the concrete. Help modeling results are included as appendix C of this plan.

B4 LEACHATE DETECTION, COLLECTION AND REMOVAL SYSTEM (LDCRS) SUMP CAPACITY

The quantity of liquids which are expected to accumulate in the LDCRS during the active life of the waste pile area is very low. In formulating this RAP, the LDCRS sump capacity is considered to be the upper bound for continued operation of the impoundment. The general designed capacity of the LCDRS is approximately 56,000 gallons. Should the capacity of the sump not be sufficient during time of extraordinary precipitation, pumps will be used to reduce the collected volumes to prevent overtopping the sump area and containment berm.

B5 LEAK DETECTION AND TRANSIT TIMES

B.5.1 Leak Detection Time

Except for limited quantities of gravel in the sump area, the LDCRS consist of native soils. Consequently leak detection due to infiltration is not expected; leaks from the sump and containment area will be identified visually and conservatively estimated to be identified in less than 48 hours.

B.5.2 Transit Time

This is the time it takes for contaminated fluid entering the sump to pass through the underlying native soil layers to the uppermost aquifer. This calculation requires the use of multiple variables like head, soil porosities throughout the section under the sump among many others. Transit time for the liquids in the sump is considered indeterminate as the depth to the uppermost aquifer is in excess of 100 feet, and the underlying soils are such that any stored liquids in the sump will not reasonably reach the uppermost aquifer during the operational life of the waste pile. Simulation of moisture drainage through the compacted native soils using the HELP Model suggests that vertical percolation would be approximately 0.61 in/yr, or 4.29 inches total during the operational life of WP-1.

B6 LIQUIDS ACCUMUCLATION RESPONSES

The actions required to respond to accumulations in the LDCRS sump is provided in this section. For all accumulations, the following procedure is required for the LDCRS. The LDCRS sump will be visually inspected once every operational day for the presence of leachate in accordance with the facility's *Inspection Plan*.

A representative sample will be taken of the accumulated liquids and analyzed by the onsite lab for RCRA 8 metals

B.6.1 Non-Hazardous Liquid Accumulations in LDCRS

If the liquids are found to be non-characteristically hazardous, the liquids will be managed in the following manner;

- Reapplied as dust control to the concrete processing and storage waste pile area
- Applied as dust control liquids within the lined areas of landfills L-12. L-13 and L-14.
- Disposed in surface impoundment P-A and P-B.

Pumpable quantities[1] of fluids contained in the LDCRS sump will be removed and the quantity of fluids determined. If present, additional inflow to the LDCRS sump will be pumped and quantities removed.

B.6.2 Hazardous Liquids Accumulations in LDCRS

If the liquids are found to be characteristically hazardous; a confirmatory sample of the liquids will be taken within 2 operational days of the hazardous result. The confirmation sample will be sent to a third party lab and analyzed for RCRA 8 metals. The liquids will be pumped and managed in the following manner;

- Stabilized to meet LDR standards and landfilled.

- And -

- Notification will be made within 2 business days to ODEQ that the liquids in the LDCRS sump have been found to be hazardous.
- A plan for the continued operations and/or possible closure of the waste pile area will be submitted within 90 days of the initial notification to the department.

Pumpable quantities of fluids contained in the LDCRS sump will be removed and the quantity of fluids determined. If present, additional inflow to the LDCRS sump will be pumped and quantities removed.

Should the accumulated liquids originally sampled not be present at the time of the confirmation sample, samples of the soils in the sump will be taken and analyzed for RCRA metals..

[1] Pumpable quantities will be removed from the sumps by using a portable pump.

Appendix C – Help Modeling

C1 Groundwater Monitoring

GSI reviewed the existing wells located near the proposed Waste Management Area 2 and Waste Pile No. 1. On the basis of available well locations, the hydraulic properties of the unsaturated zone, and the hydrogeologic properties of the saturated zone deep percolation from WP-1 is not anticipated. In fact, groundwater infiltrating at WP-1 would likely take between 1000 to 4000 years to reach the saturated zone based on radiocarbon dating of groundwater in the uppermost aquifer at the site (CH2M HILL, 2007).

On this basis, groundwater and soil moisture will be evaluated using lysimeters installed beneath or adjacent to the Waste Pile sump(s) to evaluate characterize the vertical percolation and determine its potential to affect groundwater quality. Additionally WMA-2 has been expanded to encompass the new WP-1 area, wells 2E-9 and 3H-1 have been temporarily added to the monitoring system and will be used to monitor the uppermost aquifer during the WP-1 7 year operational period.

C2 HELP Model Documentation and Results

The HELP model is a "quasi-two-dimensional" layer model for estimating the water balance of open and closed landfills and especially of bottom liner and cover systems. It's primary purpose is the comparison of design alternatives as judged by the water balance under the climate of the particular site. HELP models several hydrologic processes using a one-day time step. Vertical and lateral processes are combined, but a two-dimensional flow actually is not modeled (i.e. quasi-two-dimensional).

Required input data are daily values of precipitation, air temperature and solar radiation of at least 1 and up to 100 complete calendar years, parameters to calculate evapotranspiration, data of soil and material properties, and data of the layer design and the site. The only vegetation considered are grasses, or alternatively the soil may be bare.

C.2.1 Model Construction

In the case of Waste Pile-1 GSI simulated a vertical percolation using a single layer model consisting of a vertical percolation layer that was a bare layer of native soil that was 12-inches thick (thickness was based on closure over-excavation plans). HELP version 3.07 defaults to a vertical percolation layer if a barrier soil layer is not present beneath a lateral drainage layer, thus all drainage is vertical. A waste layer above the vertical percolation layer was not uses as the proposed waste at the Site is crushed concrete which is relatively impermeable and would not be anticipated to significantly affect vertical infiltration. GSI feels that the single layer makes the model more conservative and results in an over-prediction of vertical infiltration through the native compacted soil liner.

C.2.2 Selected Model Inputs and Sources

Climactic data – Data from the NWS station in Pendleton, Oregon were used as the basis for the precipitation in the model because publicly available climactic data at Arlington is no longer maintained. The monthly precipitation values were reduced by 28 percent to match historical values of 7 to 9 inches of annual precipitation near the CWMNW facility. The precipitation frequency Atlas for Oregon (downloaded from NOAA) suggests that 1.8 inches represents a 25 yr-24 hr event.

Soil Properties – GSI used available geologic information from the well log at piezometer 2Na-1, I-2 and soil properties for soils mapped at the site from the National Cooperative Soil Survey. Mapping indicated that soil types vary, but that a "Krebs Silt Loam" was present over the majority of the proposed location to a depth of up to 48 inches. On this basis, GSI used the default hydrologic properties for a material classification of "26 – SiCL*", which represents a compacted silty clay loam. Default values for total porosity, field capacity, wilting point and saturated hydraulic conductivity from the HELP default values for soil, waste and geosynthetic materials

Based on GSI's experience at the site and review of the available data, there is significant variability in the surficial materials and those present in the shallow subsurface. Materials present range from silt, interbedded layers of silt and gravel to cemented conglomerate in the upper 15 feet of the subsurface in the proposed Waste Pile 1 footprint.

C3 Result Summary

Using the silty loam values resulted in a vertical percolation of 4.29 inches in the soil profile beneath Waste Pile 1 after 7 years of operation. These HELP model results should be considered preliminary and the model refined based on materials observed after excavation of the site is complete.