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08-AMRC-0079

JAN 07 2008

Mr. Nicholas Ceto, Program Manager
Office of Environmental Cleanup
Hanford Project Office
U.S. Environmental Protection Agency
309 Bradley Blvd, Suite 115
Richland, Washington 99352

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EDMC

Dear Mr. Ceto:

TRANSMITTAL OF THE ENVIRONMENTAL RESTORATION DISPOSAL FACILITY
(ERDF) LEACHATE AND WASHWATER MANAGEMENT PLAN, (LWMP), WCH-182,
NOVEMBER 2007, REV. 0

The subject document is enclosed for your review and approval. A summary of the changes follows:

- Sections on "Responsibilities" and "Leachate Collection System Description" were deleted and other sections reorganized for improved readability.
- In Section 5, the definition of the Action Leakage Rate (ALR) has been corrected and the actual ALR calculation has been deleted.
- In Section 5, specific details on pump actuation and pump capacity have been deleted.
- In Section 5, notification requirements have been clarified.
- In Section 4, specific details on leachate piping testing have been deleted.
- In Section 3, actions to be taken in the event delisting levels are exceeded have been included.
- In Section 3, detailed discussions on dust suppression and waste compaction have been deleted. The water balance discussion was also deleted.
- In Section 3, discussions on Cells 1 and 2 and details on tank level management and water disposition have been deleted.
- A new Section 1.3 was added to provide an overview of the leachate collection system.

Mr. Nicholas Ceto
08-AMRC-0079

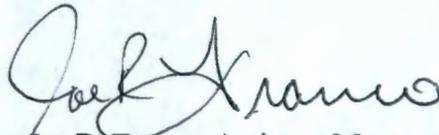
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- In Section 1, text was added to allow specific uses of water inside the landfill area (e.g., equipment decontamination and hand-washing) as the water is collected by the leachate collection system.

This revision has been discussed with Dave Einan of your staff. If you should have any questions, please contact Owen Robertson, of my staff, on (509) 373-6295.

Sincerely,



Joe R. Franco, Assistant Manager
for the River Corridor

AMRC:OCR

Enclosure

cc w/encl:

Administrative Record, H6-08

D. R. Einan, EPA

cc w/o encl:

K.A. Hadley, WCH

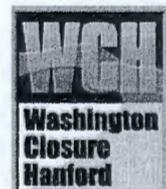
River Corridor Closure Contract

Environmental Restoration Disposal Facility Leachate and Washwater Management Plan

December 2007

Washington Closure Hanford

Prepared for the U.S. Department of Energy, Richland Operations Office
Office of Assistant Manager for River Corridor



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Title: Environmental Restoration Disposal Facility Leachate and Washwater Management Plan

Approval: O. C. Robertson
U.S. Department of Energy, Richland Operations Office

Signature

Date

D. R. Einan
U.S. Environmental Protection Agency

Signature

Date

STANDARD APPROVAL PAGE

Title: Environmental Restoration Disposal Facility Leachate and Washwater Management Plan

Author Name: K. A. Hadley

Approval: G. B. Snow, Waste Operations Project Engineer

Signature

Date

The approval signature on this page indicates that this document has been authorized for information release to the public through appropriate channels. No other forms or signatures are required to document this information release.

**River Corridor
Closure Contract** 

**Environmental Restoration
Disposal Facility Leachate and
Washwater Management Plan**

December 2007

Author:

K. A. Hadley

Washington Closure Hanford

Prepared for the U.S. Department of Energy, Richland Operations Office
Office of Assistant Manager for River Corridor



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ACRONYMS

ALR	action leakage rate
CFR	<i>Code of Federal Regulations</i>
COC	contaminant of concern
EPA	U.S. Environmental Protection Agency
ERDF	Environmental Restoration Disposal Facility
ETF	Effluent Treatment Facility
ROD	Record of Decision
SAP	sampling and analysis plan
SLCS	secondary leachate collection system
WCH	Washington Closure Hanford

1.0 PURPOSE, SCOPE, AND REGULATORY REQUIREMENTS

1.1 PURPOSE

The purpose of this Leachate and Washwater Management Plan is to establish the requirements for properly managing and handling leachate, decontamination washwater, and other contaminated water generated from operations and maintenance activities at the Hanford Site Environmental Restoration Disposal Facility (ERDF). The Washington Closure Hanford (WCH) team and its subcontractors are responsible for routine maintenance and inspection of the leachate collection and recovery system.

The waste disposal operations at ERDF generate leachate that must be collected and properly managed. The definition of leachate is any liquid (including suspended components in the liquid) that has percolated through or drained from active or filled ERDF waste disposal cells. The U.S. Environmental Protection Agency (EPA), Washington State Department of Ecology, and U.S. Department of Energy, Richland Operations Office (commonly referred to as the Tri-Parties) have signed an amendment to the ERDF Record of Decision (ROD) and the associated sampling and analysis plan (SAP) that excludes or delists ERDF leachate from the list of regulated wastes as provided in 40 *Code of Federal Regulations* (CFR) 261.31, "Hazardous Wastes from Non-Specific Sources." Based on the current delisted status of the leachate, secondary containment for the storage and loadout systems is not required.

ERDF waste disposal operations also have the potential to generate washwater from decontamination operations such as equipment cleanup, and water may be collected from empty disposal cells (cells that have not yet been used for waste disposal). These liquids must be appropriately managed. Water may be used in the landfill to decontaminate equipment and containers for reuse or at portable hand-washing stations. This water is collected by the leachate collection and recovery system.

1.2 SCOPE

This plan includes the requirements to collect, sample, analyze, determine the appropriate disposal option(s), and implement these disposal option(s) for leachate, washwater, and other contaminated waters generated as a result of operations and maintenance activities at ERDF. Also addressed are inspection requirements, action leakage rate (ALR) response, and storage tank leak response.

1.3 LEACHATE SYSTEM OVERVIEW

1.3.1 Leachate Collection and Removal System

The ERDF leachate collection and removal (i.e., recovery) system is required to be designed, constructed, operated, and maintained to collect and remove leachate to ensure the leachate depth on the top (i.e., primary) and bottom (i.e., secondary) liners does not exceed 0.3 m (1 ft). A leakage rate that causes an excess of the 0.3 m (1 ft) head limit during operations will require a response, potentially including shutdown and repair of the ERDF. The leachate collection and removal system immediately above the top (primary) liner must be designed, constructed, operated, and maintained to collect and remove leachate from the landfill during the active life and post-closure care period.

The leachate collection and removal system between the liners, and immediately above the bottom (secondary) composite liner in the case of multiple leachate collection and removal systems, is also a leak detection system (LDS). This LDS must be capable of detecting, collecting, and removing leaks of hazardous constituents at the earliest practicable time through all areas of the top (primary) liner likely to be exposed to waste or leachate during the active life and post-closure care period.

The requirements for a LDS are satisfied by installation of a system that is, at a minimum:

- Constructed with a bottom slope of one percent or more;
- Constructed of granular drainage materials with a hydraulic conductivity of 1×10^{-2} cm/sec or more and a thickness of 12 in. (30.5 cm);
- Constructed of materials that are chemically resistant to the waste managed in the landfill and the leachate expected to be generated, and of sufficient strength and thickness to prevent collapse under the pressures exerted by overlying wastes, waste cover materials, and equipment used at the landfill;
- Designed and operated to minimize clogging during the active life and post-closure care period; and
- Constructed with sumps and liquid removal methods (e.g., pumps) of sufficient size to collect and remove liquids from the sump and prevent liquids from backing up into the drainage layer. Each unit must have its own sump(s). The design of each sump and removal system must provide a method for measuring and recording the volume of liquids present in the sump and of liquids removed.

As part of the CERCLA process, the ERDF landfill design incorporated the above requirements and was subsequently reviewed and approved by the EPA.

1.3.2 Leachate Monitoring and Inspection

The ERDF leachate collection and removal system is designed so that the sump pumps operate to remove accumulated liquid in a manner that avoids backup into the drainage layer and minimizes the head on the bottom liners.

Each sump and removal system must provide a method for measuring and recording the volume of liquids present in the sump and of liquids removed. The ERDF leachate collection and removal system uses pressure transducers to measure the depth of the liquid in the sump as an indirect method of determining the volume and to activate the sump pumps to remove the accumulated leachate. A correlation was developed during the design between the sump depth and volume. The actual volume removed is measured and recorded by a flow totalizer meter on each pump's discharge pipeline.

The leachate storage tanks were sized to manage a 25-year, 24-hour storm event (1.56 inches) with an additional surge capacity. Leachate is transferred to the Effluent Treatment Facility to maintain the 25-year, 24-hour storm design capacity.

1.3.3 Action Leakage Rate

The ERDF operations must be monitored to determine whether the action leakage rate is exceeded. The action leakage rate is defined as the maximum design flow rate that the LDS can remove without the fluid head on the bottom (secondary) liner exceeding 1 foot. The action leakage rate must contain an adequate safety margin to allow for uncertainties in the design (e.g., slope, hydraulic conductivity, thickness of drainage material), construction, operation, and location of the LDS, waste and leachate characteristics, likelihood and amounts of other sources of liquids in the LDS, and proposed response actions (e.g., the action leakage rate must consider decreases in the flow capacity of the system over time resulting from siltation, and clogging, rib layover and creep of synthetic components of the system, overburden pressures, etc.).

The action leakage rate (ALR) was previously determined and approved by the EPA to be 177 gallons/acre/day. The calculation of the ALR and response to exceeding the ALR is discussed in Section 5.0.

2.0 SAMPLING AND ANALYSIS

2.1 SAMPLING OBJECTIVES

The objectives of sampling and analyzing ERDF leachate and washwater are to ensure the material meets the Effluent Treatment Facility (ETF) pre-treatment criteria, to support the continuing delisted status of ERDF leachate, and to support the groundwater protection program. ETF has agreed to accept the results of routine sampling required by the delisting ROD amendment in lieu of separate specific sampling.

The ERDF leachate SAP contains details concerning sampling, analysis, and acceptable contaminant levels for each leachate contaminant of concern (COC).

2.2 LEACHATE AND WASHWATER SAMPLING METHODS

The sampling will be performed to the requirements of the approved ERDF leachate SAP and in accordance with a specific leachate sampling procedure.

3.0 DISPOSITION DETERMINATION

The EPA has signed an amendment to the ERDF ROD that excludes or delists ERDF leachate from the list of regulated waste contained in 40 CFR 261.31. As a result, ERDF leachate is not considered a listed hazardous waste. This designation will remain in effect as long as leachate is managed in accordance with the amended ROD and associated SAP and sample results are below identified limits for COCs. The required controls for leachate, decontamination washwater, and other water generated as a result of ERDF operations and maintenance are dependent upon the source as well as the results of sampling/analysis described in Section 2.0, but will fall into one the of the following categories:

- Water from inactive cells will be released and disposed of in the ERDF stormwater/run-off system.
- Leachate, decontamination washwater, and other contaminated water generated from ERDF operations that is not regulated as a hazardous waste and is acceptable for reuse may be recycled within the landfill as compaction and/or dust-suppression waters.
- Leachate, decontamination washwater, and other contaminated water generated from ERDF operations that is not regulated as a hazardous waste and is not selected for reuse within the landfill will be transferred via a cross-site transfer line to ETF for treatment and disposal.
- Should the results of ongoing sampling and analysis indicate that one or more leachate constituents exceed delisting levels, EPA shall be notified immediately and use of the cross-site transfer line suspended. Proposed corrective actions will be developed and EPA will be consulted prior to implementation.

3.1 BASIS OF LEACHATE/WASHWATER MANAGEMENT STRATEGY

ERDF currently generates leachate that does not require management as a hazardous waste. The Tri-Parties have determined that ERDF leachate may be collected and stored at ERDF for use as appropriate. Appropriate uses are currently limited to application for dust suppression and waste compaction.

The ERDF leachate collection system is designed, constructed, operated, and maintained in a manner intended to ensure that leachate depth over the liners does not exceed one foot. This is accomplished through a combination of design features (e.g., manual and automatic pumping systems), weekly inspections and other operational requirements.

4.0 INSPECTION PROGRAM

4.1 PERIODIC INSPECTIONS

The leachate system will be inspected weekly, at a minimum. These include inspecting above-ground piping, monitoring the liquid level in the leachate collection and washwater tanks, recording totalizers and sump levels, testing alarms, and trending leachate generation. Surveillances also include performing inspection of run-on/run-off controls, performing ALR calculations, and verifying the proper operation of the leachate collection system. Regular cycling of the pumping system is necessary to minimize clogging potential. Following a significant storm event, the run-on/run-off controls and leachate system operability will be verified. Documentation of the inspections, including the quantity of leachate removed from the landfill cells and the running level of leachate in the two leachate storage tanks, will be maintained.

4.2 INTEGRITY ASSESSMENTS

Integrity assessments are not required for the primary and secondary piping system as long as the leachate remains delisted. If the leachate becomes listed, discussions will be held with the EPA to determine what integrity assessments need to be performed.

The ERDF leachate collection system is designed to provide early warning/detection in the event of a piping failure. Should the primary piping leak, leachate will collect in the secondary piping, which empties into separate manholes. The manholes are equipped with moisture detectors that trigger warning lights. These warning lights are inspected daily and tested once per week during the normal work week (i.e., Monday through Thursday).

4.3 CROSS-SITE TRANSFER LINE TEST

All transfers of leachate through the cross-site transfer line will be documented using the in-line flow meters at ERDF and the ETF. The flow totalizer readings in these two facilities shall be within 5% in order to provide documentation that the transfer operations did not result in a leak to the environment.

5.0 ACTION LEAKAGE RATE AND RESPONSE PLAN

5.1 ACTION LEAKAGE RATE

As noted in Section 1.3.2, the ALR for a landfill is defined by EPA as the maximum capacity of the secondary leachate collection system (SLCS) so as not to exceed the 0.3-m (1-ft) head on

the bottom cell liner. The actual SLCS flow rate will be calculated on a weekly basis and compared to the ALR to determine if/when actions are required.

5.2 RESPONSE FOR LEAKAGE RATES LESS THAN THE ALR

Under normal operating conditions, flows into the SLCS are expected to be less than the ALR. The SLCS includes an automatic pumping system designed to maintain the cell's secondary sump levels below those that would cause the 0.3-m (1-ft) head limitation to be exceeded. If these conditions are maintained, no additional actions are required.

5.3 RESPONSE FOR LEAKAGE RATES ABOVE THE ALR

5.3.1 Notifications

If the SLCS flow exceeds the ALR, Washington Closure Hanford (WCH) management will be notified when the anomalous condition is identified. WCH management will ensure that appropriate additional notifications are made, including verbal notification of DOE and EPA. In addition, EPA will be notified in writing of this condition within seven days of determination.

5.3.2 Assessment for Size, Location, and Cause of Leak

The following steps will be taken as appropriate.

1. Assess the origin and amounts of liquids by source in accordance with approved procedures.
2. Examine the exposed side slope in an attempt to identify the size, location, cause, and severity of any observed leak.
3. Perform a fingerprint or tracer-type study to determine the source of the leak and the hazards/mobility of the liquid if the previous assessments have not identified the source/reason for SLCS flow exceeding the ALR.
4. Perform limited waste retrieval to determine the cause of the leak if unable to determine the location from the above assessments.

Within 14 days of the determination, a preliminary written assessment will be submitted to DOE and EPA, addressing quantity of liquids, likely sources of liquids, possible location, size and cause of any leaks, and short-term actions taken or planned.

5.3.3 Short-Term Corrective Actions

- Cease waste placement in the affected cell.
- Assess the seriousness of any leaks in terms of potential for escaping into the environment.
- Repair any damage to the leachate containment and recovery system in accordance with an approved work package.

- Make a preliminary determination as to whether or not the cell should be closed.
- If trending data indicate that the capacity of the SLCS pump is exceeded, evaluate flow rates and replace or supplement the pump with a larger pump capable of meeting the SLCS flow rate.

Within 30 days after initial notification that the ALR has been exceeded, submit to EPA the results of analyses performed, the results of actions taken, and actions planned. Monthly thereafter, as long as the flow rate in the leak detection system exceeds the ALR, submit to EPA a report summarizing the results of any remedial actions taken and actions planned.

5.3.4 Long-Term Corrective Actions

- If large-scale waste retrieval is required for investigation of leaks, a work package will be generated to cover the necessary investigative and repair activities.
- If leaks cannot satisfactorily be corrected, partial or complete closure of cells will be considered.

6.0 RESPONSE TO STORAGE TANK LEAKS

With the approval of the delisting petition for ERDF leachate, the leachate and washwater tanks are no longer regulated by 40 CFR 264.196, "Response to Leaks or Spills and Disposition of Leaking or Unfit-for-Use Tank Systems," and WAC 173-303, "Dangerous Waste Regulations." In order to establish a process for managing the tanks and any potential leaks, the EPA guidance for ALR determination was used to establish a permissible leakage rate for the primary liners of the leachate storage tanks. If the permissible leakage rate is exceeded, the steps outlined below will be implemented.

1. Immediately stop the flow of leachate into the leaking tank.
2. ERDF Operations notifies WCH management of evidence of the leak. WCH management will ensure that appropriate additional notifications are made.
3. As early as practicable, draw down the contents of the tank in question to the other tank until the leak is repaired or the tank is emptied. If such transfer is not possible (due to the other tank being full, leaking, or otherwise impaired), begin transfer as quickly as possible to an appropriate facility or tanker.
4. The following shall be completed in an expeditious manner by the appropriate parties: inspection and repair of the tank, appropriate testing of the repairs, certification of the repairs prior to returning the tank to service, and appropriate documentation commensurate with the repairs.
5. If there has been a release into the secondary containment system, all released materials must be removed to the other tank or another appropriate location in a timely manner to prevent release to the environment.

7.0 REFERENCES

40 CFR 261.31, "Hazardous Wastes from Non-Specific Sources," *Code of Federal Regulations*, as amended.

40 CFR 264.196, "Response to Leaks or Spills and Disposition of Leaking or Unfit-for-Use Tank Systems," *Code of Federal Regulations*, as amended.

WAC 173-303, "Dangerous Waste Regulations," *Washington Administrative Code*, as amended.

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