

Interim Remedial Action Plan

Commercial Low-Level Radioactive Waste Disposal Site

Richland, Washington

April 2010

**Washington State Department of Ecology
Nuclear Waste Program**

1.0 INTRODUCTION

1.1 Purpose

The purpose of this Interim Remedial Action Plan is to fulfill the requirements of Washington Administrative Code (WAC) 173-340-430(7). One requirement is that, except in certain circumstances, a report be prepared before conducting an interim action under the Model Toxics Control Act (MTCA).

1.2 Summary of Proposed Interim Action

The Washington State Department of Health (Health) proposes to construct the lower layer of a Resource Conservation and Recovery Act (RCRA)-equivalent cover on filled trenches at a commercial low-level radioactive waste disposal site located near Richland, Washington. This action is necessary to prevent exceeding the offsite human exposure standard of 25 millirem (mrem) a year as specified in WAC 246-250-170.¹

The Washington State Department of Ecology (Ecology) supports this interim remedial action as it is necessary to reduce a threat to human health and the environment by preventing further infiltration that could mobilize hazardous substances. This action was identified as the preferred alternative for closure activity in a Final Environmental Impact Statement as further described below.

2.0 SITE DESCRIPTION

2.1 Background

US Ecology, Inc. (USE) operates the commercial Low Level Radioactive Waste (LLRW) disposal site located in Benton County approximately 23 miles northwest of Richland, Washington. The site is located near the center of the 560-square mile United States Department of Energy (USDOE) Hanford Facility. It covers approximately 100 acres of federal land leased to the state of Washington and sublet to USE. The commercial LLRW disposal site (Figure 1) has been in operation since 1965. Additional details on the location and description of the site can be found in the *Data Quality Objectives Summary Report to Support the Model Toxics Control Act Remedial Investigation/Feasibility Study for the Low-Level Radioactive Waste Disposal Site* (DQO Report) (EQM, 2003).

Previous LLRW disposal site investigations performed between 1988 and 1999 generated site characterization information. These investigations involved data collection from slanted borings to assess soil and soil gas contamination under the waste disposal trenches, vertical borings to evaluate soil contamination around the resin tank area, installation of groundwater monitoring wells and groundwater sampling to evaluate groundwater contamination. Information from these investigations is documented in USE 1988, USE 1998, USE 1999, USE 1999a, and Landau

¹ This number is cited in the Final Environmental Impact Statement as the regulatory limit for closure. A second number is also cited, and is in the Department of Health Addendum. It is the performance criterion for the cover and is 22 mrem per year.

1998. The DQO Report summarizes the information. USE generates annual environmental monitoring reports, including groundwater monitoring data. Other data generated during previous investigations remain on file at the USE Richland office.

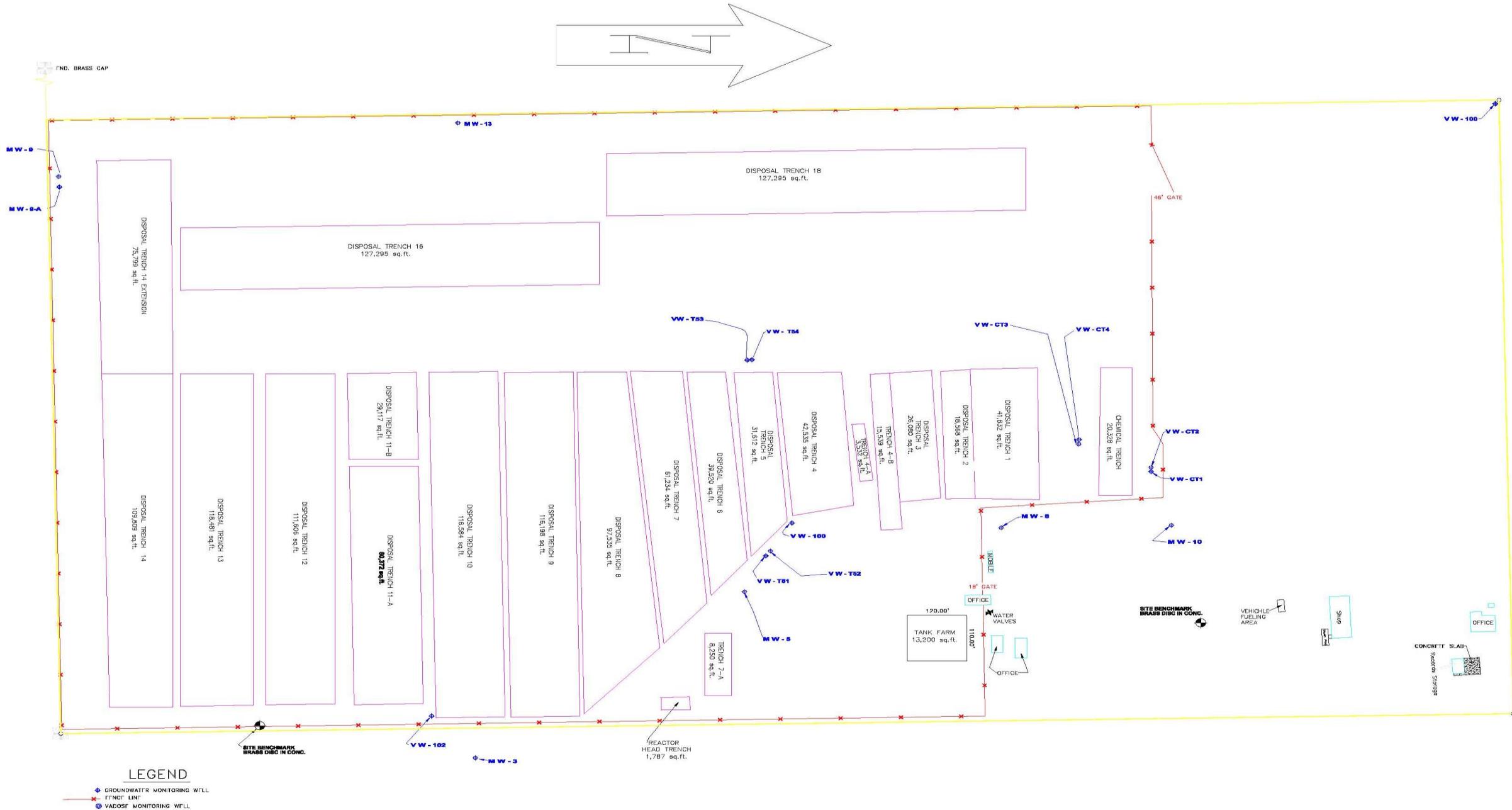


Figure 1 – US Ecology Low-Level Radioactive Waste Disposal Site

2.2 Site History

The following provides a brief history of the LLRW disposal site.

In 1965, the commercial LLRW disposal site was licensed to California Nuclear, Inc. and began accepting LLRW, chemical wastes and mixed low level wastes (MLLW). In 1968, Nuclear Engineering Company acquired California Nuclear, Inc. and took over as site operator. Around 1970, the chemical trench, holding approximately 17,000 cubic feet of waste, was closed. After this, purely chemical waste was banned from disposal; however, MLLW was still accepted.

In October 1979, the LLRW disposal site was temporarily closed due to transportation-related noncompliance events. The site was reopened in November of the same year.

In 1980, Congress passed the LLRW Policy Act. As a result, packaging requirements became more stringent. Cardboard and fiberboard packaging were prohibited. Wooden boxes were prohibited in 1987. In 1985, disposal of all RCRA MLLW, including scintillation fluids containing a hazardous component, ceased. In 1986, oils and chelates were required to be solidified. By 1993, the Northwest Compact restricted disposal of LLRW to member states and Rocky Mountain Compact states (11 states total).

When Ecology issued the Hazardous and Solid Waste Act portion of the Hanford Facility RCRA Dangerous Waste Permit, the LLRW disposal site was included for corrective action, Condition II.Y.3.a.

In 1997 a Draft Environmental Impact Statement (EIS) was started, and in 1998 the LLRW disposal site investigation began. The final EIS was issued in May 2004 and listed three preferred alternatives:

- a. Renew the current radioactive materials license with additional requirements.
- b. Amend the WAC Chapter 246-249 with the goal of limiting discrete Naturally Occurring or Accelerator Produced Radioactive Material (NARM) wastes for disposal.
- c. Construct a cover over filled trenches that includes a geosynthetic liner in two phases beginning in year 2006 (WDOH, 2004). Additional historical information can be found within the DQO Report and other references listed within this Plan.

A Model Toxics Control Act (MTCA) remedial investigation was initiated in 2008 under Agreed Order DE 3834. Data from this on-going investigation is posted on the Ecology web page at: [www.ecy.wa.gov/program/nwp/llrw.htm#US Ecology](http://www.ecy.wa.gov/program/nwp/llrw.htm#US%20Ecology)

The investigation is not complete and a Remedial Investigation (RI) Report and Feasibility Study are in progress. Preliminary data indicate the following contaminants:

- Trichloroethene, chloroform, chlorotrifluoroethene, and 1,1,2-trichlorotrifluoroethane in soil gas.
- Hexavalent chromium, trichloroethene, chloroform, and arsenic in groundwater.
- Nitrate, nitrite, uranium, hexavalent chromium and methylene chloride in soil (for the protection of groundwater).

The DQO Report states that “the purpose of the RI is to collect sufficient data to select a cleanup

action in accordance with WAC 173-340-360 through 390. In addition, the quantity of data collected must ensure the cleanup action selected complies with requirements per WAC 173-340-740(6)(f) for containment as part of the cleanup action.” In addition to supporting the RI, soil and soil gas data is being used to support cover design.

3.0 REGULATORY AUTHORITY

3.1 Interim Actions

According to the state cleanup regulation WAC 173-340-430(1), an “interim action” is distinguished from a “cleanup action” in that an interim action only partially addresses the cleanup of a site. The remediation conducted under an interim action may end up constituting the complete cleanup action for a site if the interim action subsequently is shown to meet requirements in the rule for a complete cleanup action. The regulation defines three categories of interim actions.

The interim action proposed for the LLRW disposal site qualifies under the following category defined in the state rule. WAC 173-340-430(1)(a) defines an interim action as “A remedial action that is technically necessary to reduce a threat to human health or the environment by eliminating or substantially reducing one or more pathways for exposure to a hazardous substance at a facility.” By reducing the potential for infiltration, this action will satisfy the offsite human exposure standard of 25 mrem/year in the future as specified in WAC 246-250-170.

WAC 173-340-430 (2) states that interim actions may:

- (a) Achieve cleanup standards for a portion of the site
- (b) Provide a partial cleanup, that is, clean up hazardous substances from all or part of the site, but not achieve cleanup standards; or
- (c) Provide a partial cleanup of hazardous substances and not achieve cleanup standards, but provide information on how to achieve cleanup standards; for example, an unproven cleanup technology demonstration project.

Additional requirements of an interim action, as stated in WAC 173-340-430(3), are that the interim action will be consistent with the cleanup action and that the interim action shall not foreclose reasonable alternatives for the cleanup action. As described in the EIS, the “presumptive remedy” at landfills such as the commercial LLRW site is to construct an appropriate cover over waste trenches.

The final cleanup action is not known at this time and a Cleanup Action Plan has not yet been written for the site. This action will not preclude the MTCA evaluation of alternatives and remedy selection for the chemical contamination at the site. However, it is expected that long-term soils vapor and groundwater monitoring may be needed based on the preliminary data collected during the investigation. Coordination during the investigation and installation of the

first phase of the cover is critical so that existing and additional vadose zone and ground water wells are not adversely affected by the interim action.

4.0 Interim Action Alternatives

4.1 Alternatives Considered

The following alternatives were considered as interim actions at the LLRW disposal site:

- No action. This option was not selected because the Nuclear Regulatory Commission and Washington State Department of Health human health standard of 25 mrem/year would be exceeded.
- Delay construction until completion of the MTCA investigation. This option was not selected for a number of reasons:
 - The EIS preferred alternative of “Close-As-You-Go” schedule contemplated the lower layer of the cover would be built in 2005, followed by the upper layer after the MTCA investigation was completed.
 - The 25 mrem/year standard would be exceeded.
 - Further delay would result in increased construction costs, and jeopardize surety in both the near and long-term.
- Construct the entire cover now. This option was not selected for the following reasons:
 - This is inconsistent with the preferred alternative specified in the EIS.
 - The Cleanup Action Plan may require additional remediation at the facility which could result in significant costs should the upper layer of the cover be disturbed or require modification.
- Construct the lower layer over filled-trenches. This option was selected for the following reasons:
 - This option is consistent with the preferred alternative specified in the EIS.
 - Future human health via a groundwater pathway will not be at risk as the 25 mrem/year standard will not be exceeded.
 - There will be an assumed, and needed reduction in construction costs.
 - This option will take maximum advantage of the availability of soils free of charge from the Environmental Restoration Disposal Facility.

5.0 Description of the Interim Remedial Action

5.1 Site Preparation

The facility is leveling out areas, expanding the controlled area and establishing access roads to facilitate continued operations after cover placement. To accomplish this, a trailer is being relocated, new fencing and access gates are being installed, and surface soils are being altered to direct surface water runoff.

5.2 Cover Conceptual Design

Conceptual designs and performance evaluations for the cover were presented in the Final Environmental Impact Statement (FEIS). These designs plan for an evapotranspiration (ET) cover constructed primarily of natural materials and a geosynthetic membrane. Multiple layers are provided to include a biota intrusion barrier and radon emission barrier. See Figure 2. (Daniel B. Stephens, 2007)

Approval of an ET cover requires a demonstration that the cover will meet the regulatory requirements of both Ecology and Health. To address issues of the design life of synthetic membranes and soil desiccation in arid environments, an alternative cover design that meets the performance standards of a conventional design was described in the FEIS. ET covers take advantage of site-specific attributes such as very dry climates by storing water in the soil until it is released to the atmosphere through surface evaporation and transpiration in plants.

The ET cover is designed to minimize or eliminate infiltration to protect human health and the environment, and limit post-closure escape of radionuclides and hazardous substances to ground water or the atmosphere. The FEIS cover construction schedule allows that the site investigation be completed in order to modify the final cover design as necessary to accommodate possible other remedial actions.

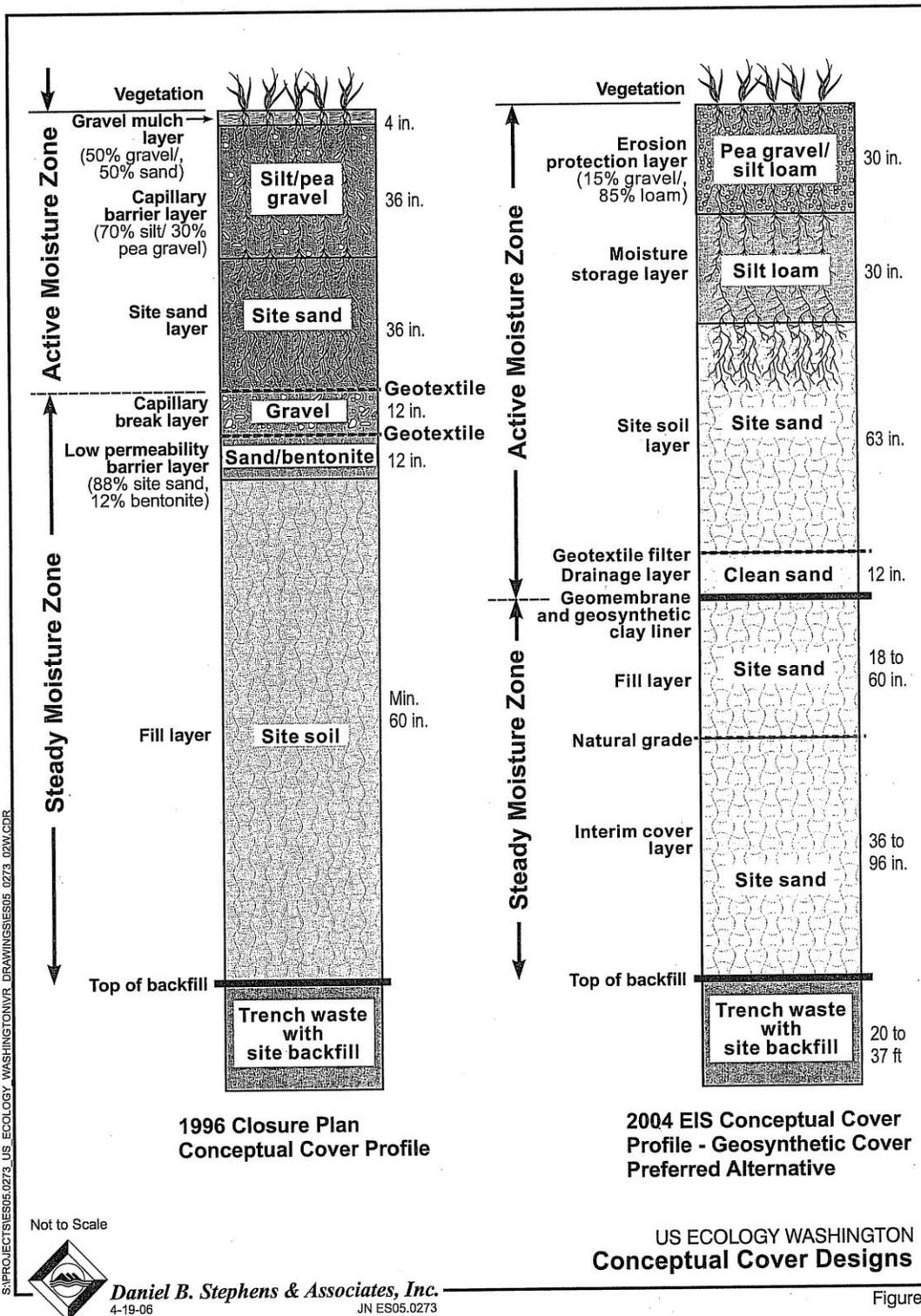


Figure 1

Figure 2 – Title?

5.3 Cover Construction

Following regulatory review and approval of the cover design, the first steps to construct the lower layer of the cover over filled trenches will be to hire a construction contractor and a construction quality assurance contractor. These activities will occur through a contract between US Ecology Washington, Inc. (the site operator) and Ecology, and through a subcontract issued by USE.

After site preparation is completed, the plan is to initially stockpile soils from the USDOE Environmental Restoration Disposal Facility at the northwest of the Chemical Trench, followed by stockpiling on Trenches 12A to 14, and on Trench 16. The basic construction plan is to start on the north end of the filled trenches and work south. The resin tank will not be covered.

It is likely that piping will be installed at the midpoint of each trench, running the length of the trenches in anticipation of a Soil Vapor Extraction system. The exact design of the system is still being considered based on the preliminary data being collected. Also, "pipe-boots" will be installed to lengthen the existing vapor and groundwater monitoring wells. Some wells of older construction dates will most likely require repair and/or decommissioning with new wells drilled in their stead. Currently, the construction schedule allows time to resolve these specific items.

Approximately 260,000 cubic yards of soil will be needed before the geosynthetic liner is laid down in pieces and the seams are welded. This soil will be further sampled and analyzed for suitability for the upper layer of the cover.

6.0 Health and Safety Plan

A Site Health and Safety Plan has been written by Daniel B. Stephens and Associates (Daniel B. Stephens, 2007), the subcontractor responsible for the cover design. It includes:

- Project Name and Location
- Project Personnel
- Emergency Response Contacts
- Site Activities and Hazard Assessment
- Requirement for Personal Protective Equipment, signage, emissions control and air monitoring

7.0 Worker Qualifications

All subcontractors must provide documentation of individual employee training/testing for the following USE/regulatory requirements prior to being allowed into the LLRW disposal site.

1. Radiation Worker to meet 10 CFR 805 requirements
2. Fitness for Duty
3. Medical Qualifications
4. Hazwopper Certification

Additional site specific or task specific training and requirements may be necessary.

8.0 References

- Daniel B. Stephens & Associates, Inc. and Dwyer Engineering, LLC. February 2007. *90-Percent Design for Evapotranspiration Final Cover Low-Level Radioactive Waste Facility US Ecology Washington.*
- Environmental Quality Management (EQM), November 2003, *Data Quality Objectives Summary Report to Support the Model Toxics Control Act Remedial Investigation/Feasibility Study for the Low-Level Radioactive Waste Disposal Site, Richland, Washington.*
- Landau, 1998, *Comprehensive Investigation US Ecology – Richland Operations, Landau Associates, Inc., Edmonds, Washington.*
- USDOE, 1993, *Hanford Federal Facility State of Washington Leased Land, DOE/RL-93-76, Department of Energy, Richland Operations Office, Richland, Washington.*
- USE, 1988, Letter from Steven R. Adams, Chief Radiological Control and Safety Officer for US Ecology, to C.E. Ingersoll, Office of Radiation Protection Department of Social & Health Services and Mr. Roger Stanley, Washington Department of Ecology, dated August 4, 1988.
- USE, 1998, *US Ecology 1998 Site Investigation Design Summary, US Ecology, Inc., Richland, Washington.*
- USE, 1999, Site Investigation Soil Chemistry Data Summary, US Ecology, Inc., Richland, Washington.
- USE, 1999a, Comprehensive Facility Investigation, Richland LLRW Disposal Facility – Phase I and II Report, Richland, WA
- WDOH and WDOE, May 2004, *Final Environmental Impact Statement – Commercial Low-Level Radioactive Waste Disposal Facility, Richland, Washington, DOH Publication 320-031, Washington State Departments of Health and Ecology, Olympia, Washington.*