DOCUMENT RELEASE AND CHANGE FORM

Prepared For the U.S. Department of Energy, Assistant Secretary for Environmental Management
By Washington River Protection Solutions, LLC., PO Box 850, Richland, WA 99352
Contractor For U.S. Department of Energy, Office of River Protection, under Contract DE-AC27-08RV14800

Release Stamp

DATE: Aug 05,2020
HANFORD RELEASE

1. **Doc No:** RPP-12711 **Rev.** 07C

2. **Title:**
TEMPORARY WASTE TRANSFER LINE MANAGEMENT PROGRAM PLAN

3. **Project Number:** ☐N/A
T2R02

4. **Design Verification Required:**
☐Yes ☒No

5. **USQ Number:** ☒ N/A
RPP-27195

6. **PrHA Number** **Rev.** ☒ N/A

Clearance Review Restriction Type:
public

7. **Approvals**

Title	Name	Signature	Date
Clearance Review	Ayers, Lynn M	*Ayers, Lynn M*	08/05/2020
Document Control Approval	Alvarez, Efren	*Alvarez, Efren*	08/05/2020
Environmental Protection	Allen, Ruth M	*Allen, Ruth M*	08/04/2020
Originator	Erhart, Michael F	*Erhart, Michael F*	08/04/2020
Responsible Manager	Hanson, Carl	*Hanson, Carl*	08/05/2020

8. **Description of Change and Justification**

Problem: RPP-12711, Temporary Transfer Line Management Program Plan, describes the program established to manage temporary transfer lines used to convey waste throughout their life cycle. AX Retrieval activities are adding HIHTLs and Table B-1 needs to be updated to reflect future disposal dates.

Solution: Modify Table B-1 of this document to reflect changes in TPA-CN-895.

Analysis: RPP-12711, Revision 7 of this plan became a primary document under the Hanford Federal Facility Agreement and Consent Order (HFFACO), commonly referred as the Tri-Party Agreement (TPA). This minor revision reflects changes shown in TPA-CN-895 which lists temporary transfer lines added to Table B-1, Dates that HIHTLs are to be placed into waste containers. Modify Table B-1 of this document to add new HIHTLs.

This change adds dates for the AX-102 and AX-104 retrieval HIHTLs to Table B-1.

9. **TBDs or Holds** ☒N/A

10. **Related Structures, Systems, and Components**

a. **Related Building/Facilities** ☐N/A	b. **Related Systems** ☒N/A	c. **Related Equipment ID Nos. (EIN)** ☐N/A
241-AX-102 241-AX-104		HIHTL-17021-01 HIHTL-17021-02 HIHTL-17053-01 HIHTL-17053-02 HIHTL-17053-04 HIHTL-17053-05 HIHTL-17053-06 HIHTL-17053-07 HIHTL-17053-08 HIHTL-17053-09 HIHTL-17053-10 HIHTL-17053-11 HIHTL-17053-12

11. **Impacted Documents – Engineering** ☐N/A

Document Number	Rev.	Title
H-14-106249 SH 001	53	HIHTL TRACKING TABLE
H-14-106249 SH 002	35	HIHTL TRACKING TABLE

12. **Impacted Documents (Outside SPF):**
N/A

13. **Related Documents** ☐N/A

Document Number	Rev.	Title
H-14-106249 SH 001	53	HIHTL TRACKING TABLE
H-14-106249 SH 002	35	HIHTL TRACKING TABLE

14. **Distribution**

Name	Organization
Allen, Ruth M	RETRVL & CLOSURE/PROJ ENV CMPL
Erhart, Michael F	AY/AX FARM RETRIEVAL ENGRNG

DOCUMENT RELEASE AND CHANGE FORM

Doc No: RPP-12711 **Rev.** 07C

14. **Distribution**

Name	Organization
Greenwell, Doug	SST RETRIEVALS
Grier, Craig	AY/AX FARM RETRIEVAL ENGRNG
Hamilton, Peggy M	SST RETRIEVALS
Hamilton, James T	ENVIRONMENTAL PROTECTION
Hanson, Carl	AY/AX FARM RETRIEVAL ENGRNG
Parkman, David B	AY/AX FARM RETRIEVAL ENGRNG
Smith, David A	SST RETRIEVALS PROJECT MGMT
Stevens, Michael	SST RETRIEVALS PROJECT MGMT
Stowe, Garth J	SST RETRIEVALS PROJECT MGMT
Sutey, Mike	SST R&C PROJECT ENGINEERING

RPP-12711
Revision 7C

Temporary Waste Transfer Line Management Program Plan

Prepared by

M.F. Erhart
R.M. Allen
Washington River Protection Solutions, LLC

Date Published
August 2020

washington river protection solutions

Prepared for the U.S. Department of Energy
Office of River Protection

Contract No. DE-AC27-08RV14800

TABLE OF CONTENTS

LIST OF FIGURES

APPENDIXES

CHRONOLOGY OF REVISION TO RPP-12711, TEMPORARY TRANSFER LINE MANAGEMENT PROGRAM PLAN

DATE	DESCRIPTION OF REVISION
August 8, 2002	Letter dated August 8, 2002, from B. Wilson, Ecology to Mr. R. Schepens, USDOE-ORP and Mr. E.S. Aromi, Jr., CH2M HILL Hanford Group, Inc., regarding "Notice of Non-Compliance for deficient leak detection in single-shell tank farms."
August 29, 2002	Letter 02-OMD-059, dated August 29, 2002, from J.E. Rasmussen, USDOE-ORP to M.A. Wilson, Ecology regarding "Extension of Corrective Measures Due Dates on Notice of Non-Compliance for Deficient Leak Detection in Single-Shell Tank (SST) Farms"
September 18, 2002	Letter dated September 18, 2002, from B. Wilson, Ecology to Mr. J.E. Rasmussen, USDOE-ORP and Mr. W.T. Dixon, CH2M HILL Hanford Group, Inc., regarding "Approval of request for extension of time to comply with Ecology's August 8, 2002 Notice of Non-Compliance for deficient leak detection in single-shell tank farms."
October 22, 2002	Letter 02-OSO-080, dated October 22, 2002, from J.E. Rasmussen, USDOE-ORP to M.A. Wilson, Ecology regarding " Submittal of Response to Corrective Measure 1 – Notice of Non-Compliance for Deficient Leak Detection in Single-Shell Tank Farms."
December 17, 2002	Letter 02-ED-039, dated December 17, 2002, from J.E. Rasmussen USEDOE-ORP to M.A. Wilson, Ecology regarding "Submittal of Response to Corrective Action 2 – Notice of Non-Compliance for Deficient Leak Detection in Single-Shell Tank Farms."
February 5, 2003	Letter dated February 5, 2003, from B. Wilson, Ecology to Mr. R. Schepens, USDOE-ORP and Mr. E.S. Aromi, Jr., CH2M HILL Hanford Group, Inc., regarding "Failure to complete Corrective Measures per Notice of Non-Compliance for Deficient Leak Detection in Single-Shell Tank Farms."
March 25, 2003	Letter 03-TOD-019, dated March 25, 2003, from J.E. Rasmussen, DOE-ORP to M.A. Wilson, Ecology regarding "Submittal of Response to Corrective Measure 2 – Notice of Non-Compliance for Deficient Leak Detection in Single-Shell Tank Farms."
April 22, 2003	Letter dated April 22, 2003, from B. Wilson, Ecology to Mr. R. Schepens, USDOE-ORP and Mr. E.S. Aromi, Jr., CH2M HILL Hanford Group, Inc., regarding "Completion of Correctives Measures per Notice of Non-Compliance for Deficient Leak Detection in Tank Farms Temporary Transfer Lines"
May 14, 2007	Letter dated May 14, 2007, from B. Wilson, Ecology to Ms. S.J. Olinger, Acting Manager, USDOE-ORP and Mr. M.S. Spears, President, CH2M HILL Group, Inc. regarding "Notice of Violation for Unfit-For-Use Hazardous Waste Tank System Components"
May 31, 2007	Letter 07-TPD-029, dated May 31, 2007, from S.J. Olinger, USDOE-ORP, and M.S. Spears, CH2M HILL Hanford Group, Inc. to J.A. Hedges, Ecology regarding "Request for Extension of the State of Washington Department of Ecology Notice of Violation Corrective Measure Completion Date."

DATE	DESCRIPTION OF REVISION
August 31, 2007	Letter 07-TPD-048, dated August 31, 2007, from S.J. Olinger, USDOE-ORP to J.A. Hedges, Ecology regarding "Transmittal of Hose-in-Hose Transfer Line Storage, Use, and Removal Schedule in Response to Notice of Violation for Unfit-for-Use Hazardous Waste Tank System Components."
October 2, 2007	Letter dated October 2, 2007, from J.J. Lyon, Ecology to S.J. Olinger, USDOE-ORP, and J.C. Fulton, CH2M HILL, regarding "Management and Use of Expired Hose in Hose Transfer Lines (HIHTLs)"
December 11, 2007	Letter 07-TPD-062, dated December 11, 2007, from S.J. Olinger. USDOE-ORP to J.A. Hedges, Ecology regarding "Quarterly Report for the Tank Farm Temporary Transfer Lines."
February 15, 2008	Letter 08-TPD-008, dated February 15, 2008, from S.J. Olinger, USDOE-ORP to J.A. Hedges, Ecology regarding "Request for Approval of the Temporary Waste Transfer Line Management Program Plan."
May 5, 2008	Letter dated May 5, 2008, from J.J. Lyon, Ecology to S.J. Olinger, USDOE-ORP regarding "Conditional Approval of the Updated Temporary Waste Transfer Line Management Program Plan, RPP-12711, Revision 3K, Approval of the Hose in Hose Transfer Line (HIHTL) Compliance Removal Schedule, and Resolution of Ecology's HIHTL Outstanding Notice of Violation (NOV)"
July 23, 2008	Letter 08-TPD-035, dated July 23, 2008, from S.J. Olinger, USDOE-ORP to J.A. Hedges, Ecology regarding "Submittal of RPP-12711, Temporary Waste Transfer Line Management Program Plan, Revision 4."
August 30, 2011	Change Notice 2011-4, dated August 30, 2011, regarding "RPP-12711 Rev 6A, 'Temporary Waste Transfer Line Management Program Plan.'"
December 1, 2011	Change Notice 2011-8, dated December 1, 2011, regarding "RPP-12711, Rev. 6-C & 6-D 'Evaluation of Hose-in-Hose Transfer Line Service Life.'"
January 23, 2012	Letter 12-TPD-0001, dated January 23, 2012, from T.W. Fletcher, USDOE-ROP to J.A. Hedges, Ecology regarding "Submittal of RPP-12711, Temporary Waste Transfer Line Management Program Plan, Revision 4 Through 6B."
April 16, 2012	Change Notice 2012-01, dated April 16, 2012, regarding "RPP-12711, Rev. 6-E 'Revise RPP-12711 to Reflect Waste Retrieval from Tank C-109.'"
May 21, 2012	Change Notice 2012-04, dated May 21, 2012, regarding "RPP-12711, Rev. 6-F 'Remove Hold RPP-HOLD-51347 from RPP-12711.'"
July 25, 2012	Change Notice 2012-06, dated July 25, 2012, regarding "RPP-12711, Rev. 6-G 'POR104 to AN-06A HIHTL Replacement.'"
August 7, 2012	Letter 12-NWP-133, dated August 7, 2012, from J.J. Lyon, Ecology to T.W. Fletcher, USDOE-ORP regarding "Project Status of Hose-in-hose Transfer Line (HIHTL) Notice of violation (NOV) and Corrective Measures"."
December 4, 2012	Change Notice 2012-12, dated December 4, 2012, regarding "RPP-12711, Rev. 6-H 'Temporary Waste Transfer Line Management Program Plan'"
January 20, 2013	Change Notice 2013-01, dated January 20, 2013, regarding "RPP-12711, Rev 6-I 'Temporary Waste Transfer Line Management Program Plan.'"

DATE	DESCRIPTION OF REVISION
March 12, 2013	Change Notice 2013-03, dated March 12, 2013, regarding "RPP-12711, Rev 6-J 'Temporary Waste Transfer Line Management Program Plan.'"
August 29, 2013	Change Notice 2013-03, dated August 29, 2013, regarding "RPP-12711, Rev 6-K 'Temporary Waste Transfer Line Management Program Plan' and RPP-12711, Rev. 6-L 'Temporary Waste Transfer Line Management Program Plan.'"
May 2, 2014	Letter 14-NWP-091, dated May 2, 2014, from K. Conaway, Ecology to T.W. Fletcher, USDOE-ORP, and L.D. Olson, Washington River Protection Solutions regarding "Department of Ecology's Dangerous Waste Compliance Inspection of Hose in Hose Transfer Lines (HIHTLs) at Tank Farms, RCRA ID# WA7890008967, on November 27, 2012."
June 27, 2014	Change Notice 2014-03, dated June 27, 2014, regarding "RPP-12711, Rev 6-L 'Temporary Waste Transfer Line Management Program Plan' and RPP-12711, Rev. 6-M 'Temporary Waste Transfer Line Management Program Plan.'"
April 16, 2015	Direct Revision 7 - complete re-write with input from regulators.

LIST OF TERMS AND ABBREVIATIONS

ALARA	as low as reasonably achievable
DCRT	double-contained receiver tank
Ecology	Washington State Department of Ecology
HIHTL	hose-in-hose transfer line
IQRPE	Independent Qualified Registered Professional Engineer
IS	interim stabilization
MBD	material balance discrepancy
WAC	*Washington Administrative Code*
WRPS	Washington River Protection Solution LLC

Units

cm	centimeter
ft	foot
gpm	gallons per minute
in.	inch
min	minute
mph	miles per hour
mrem/hr	millirem per hour

1.0 Purpose

Temporary waste transfer lines are deployed at the Hanford Tank Farm Project to convey tank mixed waste during retrieval, waste transfer, and processing activities, when existing buried transfer lines do not meet secondary containment requirements or when there is an operational emergency in compliant tank systems. Such routes are considered temporary since they are usually intended for a single programmatic mission of limited duration; however, they are still required to meet regulatory requirements of permanently installed ancillary equipment. Typically, these routes substitute for existing buried transfer lines that are in a potentially degraded condition.

Waste transfer lines are required to comply with applicable environmental regulations related to design and installation of new tank systems or components, inspections, detecting and responding to leaks, preventing releases to the environment and disposal. The specific regulations are specified below:

- WAC 173-303-140, "Land Disposal Restrictions"
- WAC 173-303-170 through 230, requirements for generators of dangerous waste
- WAC 173-303-283(3), "Performance standards"
- WAC 173-303-610, "Closure and post-closure"
- WAC 173-303-400, "Interim Status Facility Standards."

    - 40 CFR 265.192, "Interim Status Standards for Owners and Operators of Hazardous Waste, and Disposal Facilities - Design and installation of new tank systems or components," as incorporated by WAC 173-303-400(3)(a) and amended and modified by WAC 173-303-400(3)(b) and WAC 173-303-400(3)(c)(ix)

    - 40 CFR 265.193, "Interim Status Standards for Owners and Operators of Hazardous Waste, and Disposal Facilities - Containment and detection of releases," as incorporated by WAC 173-303-400(3)(a) and amended and modified by WAC 173-303-400(3)(b) and WAC 173-303-400(3)(c)(ix)

    - 40 CFR 265.194, "Interim Status standards for Owners and Operators of Hazardous Waste – General operating requirements," as incorporated by WAC 173-303-400(3)(a) and amended and modified by WAC 173-303-400(3)(b)

    - 40 CFR 265.195, "Interim Status Standards for Owners and Operators of Hazardous Waste, and Disposal Facilities-Inspections," as incorporated by WAC 173-303-400(3)(a) and amended and modified by WAC 173-303-400(3)(b) and WAC 173-303-400(3)(c)(ix)

    - 40 CFR 265.196, "Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities," "Response to leaks or spills and disposition of leaking or unfit-for-use tank systems," as incorporated by WAC 173-303-400(3)(a) and amended and modified by WAC 173-303-400(3)(b) and WAC 173-303-400(3)(c)(ix).

This *Temporary Transfer Line Management Program Plan* RPP-12711 (referred to hereafter as 'Plan') describes a program established to manage temporary transfer lines used to convey waste throughout their life cycle. Rev. 7 of the Plan became a primary document under the *Hanford Federal Facility Agreement and Consent Order* (HFFACO), commonly referred as the Tri-Party Agreement (TPA).

2.0 Scope

2.1 Prior to placing a temporary waste transfer line into service to transfer mixed-waste, the U.S. Department of Energy (DOE) must update RPP-12711 Table B-1 with the identification number and the date the temporary waste transfer line will be placed into a waste container. DOE will submit a TPA Change Notice, subject to the Washignton State Department of Ecology and DOE approval per TPA Action Plan Section 9.3.

2.2 This Plan is applicable to tank farm temporary waste transfer lines that contact mixed waste. This Plan is applicable to lines in operation at the time this document is issued and all subsequent temporary waste transfer lines deployed in the future by the Tank Farm Project in support of retrieval, waste transfer, and processing activities.

Where information regarding treatment, management, and disposal of the radioactive source, byproduct material, special nuclear material (as defined by the *Atomic Energy Act of 1954*) and/or the radionuclide component of mixed waste has been incorporated into this document, it is not incorporated for the purpose of regulating the radiation hazards of such components under the authority of this Plan or RCW Chapter 70.105.

Temporary transfer lines used at tank farms consist of the hose-in-hose transfer line (HIHTL) design. If additional types of temporary transfer lines will be used, then this Plan will be modified following the process for primary documents under HFFACO.

HIHTLs are defined as a primary hose encased in a secondary hose that begins at a connection to a secondary containment device (e.g., valve box, sluicer box, diversion box, and pit) and ends at the connection to another secondary containment device. HIHTLs are flexible pipelines with a limited useful life, are currently constructed of ethylene propylene diene monomer and are used to transfer tank waste. HIHTLs are considered ancillary equipment and a component of the tank system per WAC 173-303-040.

HIHTLs have a 7 year shelf life (i.e., life from manufacture until first service use) and 3 year service life, with a maximum total life of 10 years from the date of manufacture. See Appendix D for specific details.

The primary is fitted with hose end connections suitable for attaching to valve manifolds. The HIHTLs are installed either above grade or at-grade in a shallow trench, and may include shield plates or other shielding to reduce radiological dose rates during transfers. For transfer routes longer than what can be accommodated by a single, continuous assembly, two or more HIHTL assemblies are joined at midpoint connections to establish the required route. The HIHTL assemblies shown in Appendix A are typical examples of this type of connection.

2.3 Environmental compliance requirements are addressed in Section 3.0 and Appendixes A, B, C, and D.

2.4 Sections 3.0 and 4.0 address management of the program elements and reporting, respectively.

2.5 Appendix A describes the process for evaluating the leak detection capabilities for HIHTL.

2.6 Appendix B identifies a process for removing, storing, managing and disposing of lines planned for deployment. Appendix B also provides the requirements for using HIHTLs and issuing a summary of the actions, procedures, policies and schedules to be implemented for comprehensive life-cycle management of this equipment from procurement through disposal. This description of life cycle management includes full and complete descriptions of waste volume estimates, techniques for waste minimization, descriptions of waste designation, and plans for ultimate disposal of all HIHTLs.

2.7 Appendix C describes the process for flushing, draining, and air blowing HIHTL.

2.8 Appendix D describes the process and the criteria for HIHTL extension requests.

3.0 Requirements for Compliance with Environmental Regulations and Associated Management Program Plan Elements

To ensure compliance with the applicable requirements of interim facility standards of Subpart J of 40 CFR 265, the following elements related to temporary waste transfer lines are discussed below and in appendices in this Plan. The requirements in this section of this Plan will be implemented in Tank Farm Project procedure(s). The procedure(s) will be consistent with this Plan and require the Tank Farm Project, which uses HIHTLs, to comply with service life limits, leak detection methods, waste removal from secondary containment, and life cycle management as outlined and described this section. All deviations from this section will be discussed with Ecology and documented.

3.1 **40 CFR 265.192** – All new HIHTL installations must be certified by an Independent Qualified Registered Professional Engineer (IQRPE) in accordance with 40 CFR 265.192 prior to use, or if relocated prior to reuse. This certification will be maintained in the operating record. Appendix D describes HIHTL extension considerations. By exception, HIHTLs may be evaluated for extended service life by the process and considerations defined in Appendix D of this Plan. Evaluations of service life extension must be reviewed and certified by an IQRPE prior to the reuse of the HIHTL. Figure 1 is an HIHTL management flowchart.

3.2 **40 CFR 265.193** – A description of how each HIHTL is installed, maintained, and operated with leak detection sufficient to detect a leak within 24 hours to meet the requirements of 40 CFR 265.193(c)(3) is located in Appendix A. An evaluation of methods, limitations, and sensitivity for leak detection as described in Appendix A for each HIHTL will be prepared and maintained in the operating record over the life cycle of the waste transfer route. The means for installing, operating, and maintaining the HIHTLs to remove any accumulated liquids from the secondary encasement to meet the requirements of 40 CFR 265.193(c)(4) for all HIHTLs is located in Appendices A and C.

3.3 **40 CFR 265.194** – No hazardous waste or treatment reagents will be placed in HIHTLs if it could cause it or the secondary containment system to rupture, leak, corrode, or otherwise fail. Compatibility of the waste with the HIHTL is evaluated in the Tank Farm Project procedure(s). Appropriate controls and practices will be in place to prevent spills and overflows from the HIHTLs. Control(s) of the waste transfer process is defined in the Tank Farm Project procedure(s) for each waste transfer. Procedures will be maintained in the operating record.

3.4 **40 CFR 265.195** – In accordance with 40 CFR 265.195. HIHTL inspections will be performed according to Table A-1 in Appendix A. All inspections will be documented in the operating record per 40 CFR 265.195(g).

3.5 **40 CFR 265.196** – An HIHTL from which there is a leak or spill, or which is unfit for use, the owner or operator will comply with the requirements of 40 CFR 265.196. Appendix C describes flushing, draining, air blowing, and leak mitigation of HIHTLs. For new HIHTLs, that have different configurations, Appendix C, or project-specific documentation, will be updated to include alternative methods for flushing, draining, and air blowing.

3.6 **Other Regulations** – HIHTLs are managed over their life cycle in accordance with policies, procedures, and schedules that control activities for procurement, inspection, storage, installation, operation, maintenance, removal, and disposal. Appendix B describes waste handling and minimization techniques for transfer lines. For new HIHTLs, that have different configurations, Appendix B, or project-specific documentation will be updated to include new HIHTLs for disposal. Appendix B also describes the process for waste handling and disposing of HIHTLs in compliance with the generator regulations of WAC 173-303-170 through 230 and the Land Disposal Restrictions of WAC 173-303-140.

A tracking system for each HIHTL will be implemented and maintained to ensure HIHTLs are not used beyond their initial design service life or extended service life. In no case will HIHTLs be in service beyond 10 years in accordance with Appendix D. All of the information required on the HIHTL Tracking Table described in Section 4.1 will be maintained in the operating record.

Figure 1. Flowchart for Hose-in-Hose Transfer Line. (3 sheets)

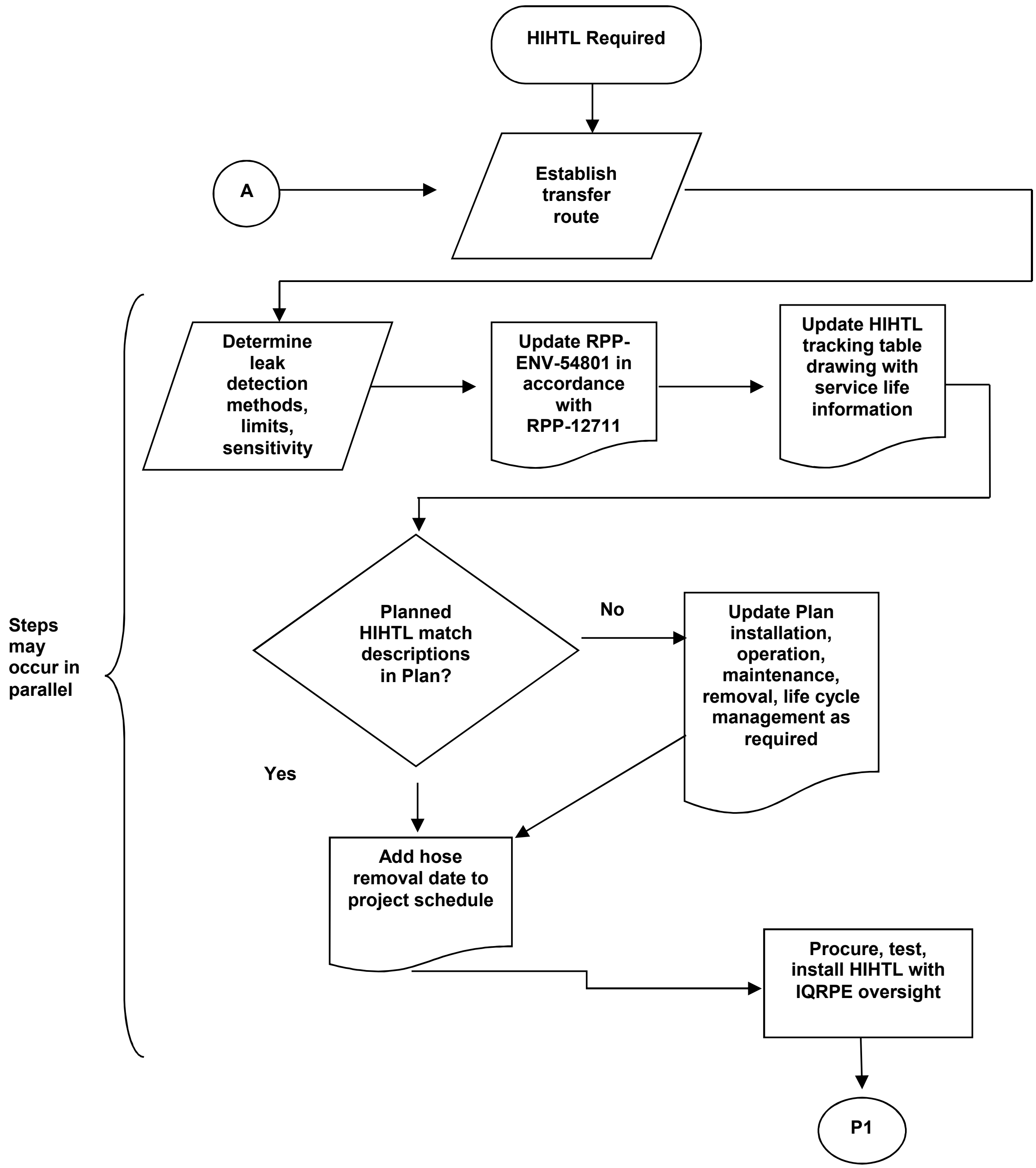


Figure 1. Flowchart for Hose-in-Hose Transfer Line. (3 sheets)

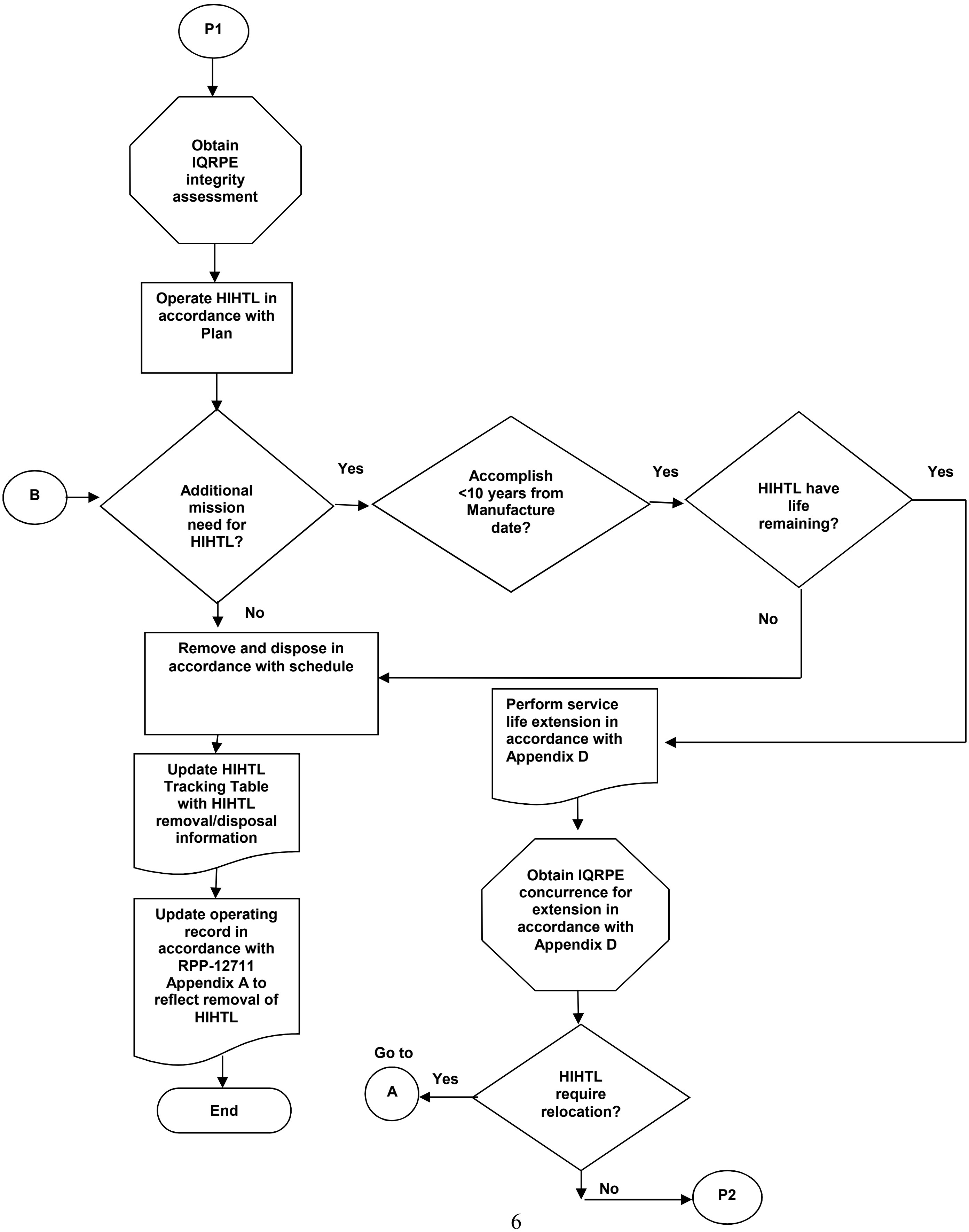
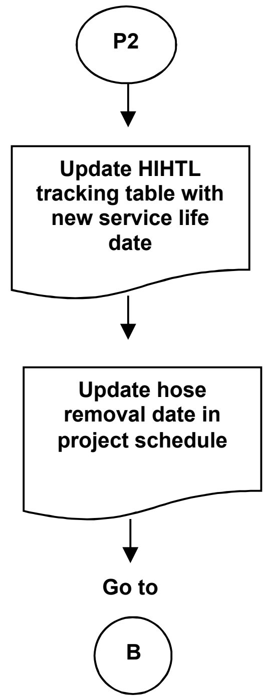


Figure 1. Management Flowchart for Hose-in-Hose Transfer Line. (3 sheets)



4.0 Reporting

4.1 Temporary Waste Transfer Line Annual Report

On an annual basis, a written report will be submitted to Ecology that provides a status of all temporary waste transfer lines. The annual period is April 1 through March 31. The report will be submitted to Ecology by May 31 of each year. At a minimum, the report will consist of the following:

- A summary of the life extension evaluations performed during the annual reporting period.
- A listing of the TPA change notices where the approval of new dates in Appendix B Table B-1 Dates that HIHTLs are to be placed into waste containers
- The HIHTL Tracking Table (H-14-106249) as of the last day of the reporting period, including all sheets based on the annual reporting period with the following information:
  - HIHTL assembly serial number.
  - Location – originating point (from) and destination point (to) of the HIHTL.
  - Hose assembly drawing number.
  - Date of manufacture of the HIHTL.
  - HIHTL in-service date.
  - Service life expiration date – for HIHTLs that have not been exposed to mixed waste, the expiration date is 7 years from the date of manufacture (i.e., shelf life). For HIHTLs that have been put in service, the expiration date is 3 years from the initial date of mixed-waste use (i.e., service life) or from an IQRPE certified service life extension, with a total life not to exceed 10 years from the date of manufacture. The dates need to include day, month, and year for HIHTLs procured after the release of this Plan.

- HIHTL length.
- Shelf life expired HIHTL that has not been used – shelf life expired hoses that have not been used and are expired will be identified to prevent mixed-waste use.
- Disposal package identification number (PIN) – the container PIN for the container that the HIHTL was placed in for shipping.
- Identification of which HIHTLs have service life extensions.

4.2 Updates on the status of HIHTLs will be provided during the U.S. Department of Energy, Office of River Protection (ORP) TPA Project Manager meetings.

5.0 References

40 CFR 265.192, “Interim Status Standards for Owners and Operators of Hazardous Waste, and Disposal Facilities-Design and installation of new tank systems or components,” *Code of Federal Regulations*, as incorporated by WAC 173-303-400(3)(a) and amended and modified by WAC 173-303-400(3)(b) and WAC 173-303-400(3)(c)(ix)

40 CFR 265.193, “Interim Status Standards for Owners and Operators of Hazardous Waste – Containment and detection of releases,” *Code of Federal Regulations*, as incorporated by WAC 173-303-400(3)(a) and amended and modified by WAC 173-303-400(3)(b) and WAC 173-303-400(3)(c)(ix).

40 CFR 265.194, “Interim Status standards for Owners and Operators of Hazardous Waste – General operating requirements,” *Code of Federal Regulations*, as incorporated by WAC 173-303-400(3)(a) and amended and modified by WAC 173-303-400(3)(b)

40 CFR 265.195, “Interim Status Standards for Owners and Operators of Hazardous Waste, and Disposal Facilities- Inspections,” *Code of Federal Regulations*, as incorporated by WAC 173-303-400(3)(a) and amended and modified by WAC 173-303-400(3)(b) and WAC 173-303-400(3)(c)(ix)

40 CFR 265.196, “Interim Status Standards for Owners and Operators of Hazardous Waste, and Disposal Facilities-Response to leaks or spills and disposition of leaking or unfit-for-use tank systems,” *Code of Federal Regulations*, as incorporated by WAC 173-303-400(3)(a) and amended and modified by WAC 173-303-400(3)(b) and WAC 173-303-400(3)(c)(ix)

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

APPENDIX A

INSPECTION AND EVALUATION OF LEAK DETECTION CAPABILITIES FOR HOSE-IN-HOSE TRANSFER LINE

Table of Contents

List of Figures

List of Tables

A-1 Introduction

Temporary waste transfer lines are deployed at the Hanford Tank Farm Project to convey tank mixed waste during retrieval, waste transfer, and processing activities. Such lines are considered temporary since they are usually intended for a single programmatic mission of limited duration (though for purposes of design and deployment, they are managed under the same procedures and programs as permanent facilities). Typically, these lines substitute for existing buried transfer lines that are in a potentially degraded condition.

Waste transfer equipment works in an integrated fashion to convey mixed waste from point to point in a manner compliant with applicable regulations (Federal and State) and nuclear safety requirements. This evaluation considers how temporary waste transfer lines work with valve pits, pump pits, tank level measurements, totalized flow elements, and leak detector elements to detect leakage that may occur along the route.

All temporary waste transfer lines in operation at the Hanford Site tank farms are required to be considered in this evaluation as specified in Section 4.1.1 of this plan.

Section A-9 contains a listing of drawings containing construction details and supporting documentation.

A-2 Hose-in-Hose Transfer Line Design

This section provides a general design description of the hose-in-hose transfer line (HIHTL) considered by this evaluation.

HIHTLs are temporary transfer lines consisting of a primary hose encased in a secondary hose. The primary is fitted with hose end connections suitable for attaching to valve manifolds with remote connectors. For transfer lines too long to be made out of one continuous length of hose, two or more HIHTL assemblies are joined at midpoint connections to establish the required route.

Figure A-1 is a cross-sectional view of a typical HIHTL assembly end connection used for waste transfer applications. This view presents a general arrangement of this design detail. Actual construction details may differ from Figure A-1. Design drawings of deployed equipment record actual configurations and are located in the operating record. However, the general arrangement of a primary line within an encasement is typical for all HIHTL designs.

Figure A-2 is a cross-sectional view of a typical HIHTL mid-point connection. As with Figure A-1, this view presents a general arrangement of this design detail. Actual construction details may differ from Figure A-2. For example, midpoint primary connections may consist of approved pipe fittings other than raised face flanges. As with Figure A-1, design drawings of deployed equipment record actual configurations.

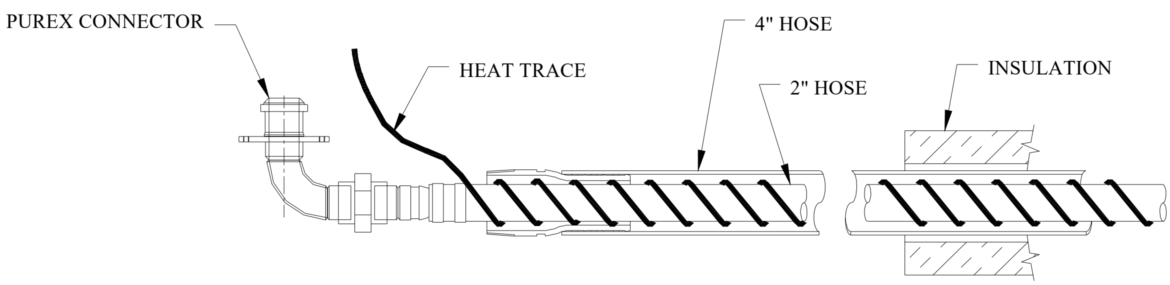


Figure A-1. Typical Configuration of Hose-in-Hose Transfer Lines.

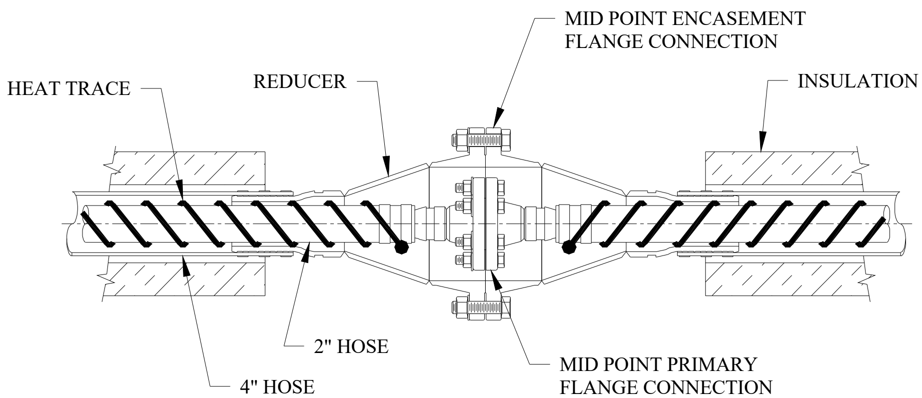


Figure A-2. Typical Jointed Connection.

The HIHTLs are wrapped with self-limiting heat trace, either about the primary or encasement hoses, and incorporate insulation. These measures are provided to assist in maintaining waste temperature during a transfer as a means to mitigate the potential for forming a plug in the line and to prevent freezing due to low ambient temperatures.

The HIHTLs are installed with ends rising over pit walls and down into valve and pump pits or similar structures. Typically, hose ends are secured to pit walls with an attached frame (e.g., Figure A-3), though the specific means of pit installation may be found on design drawings for each HIHTL deployed.

Compliance with the design requirements of 40 CFR 265.193, "Interim Status Standards for Owners and Operators of Hazardous Waste, and Disposal Facilities—Containment and detection of releases," incorporated by reference at WAC 173-303-400(3)(a) and amended and modified by WAC 173-303-400(3)(b) and WAC 173-303-400(3)(c)(ix), specifically subparts (c)(1) and (c)(2) are part of the Independent Qualified Registered Professional Engineer (IQRPE) assessment performed in accordance with 40 CFR 265.192. Details of HIHTL waste compatibility (c)(1) and physical support details (c)(2) are contained in RPP-6711, *Evaluation of Hose-in-Hose Transfer Line Service Life*.

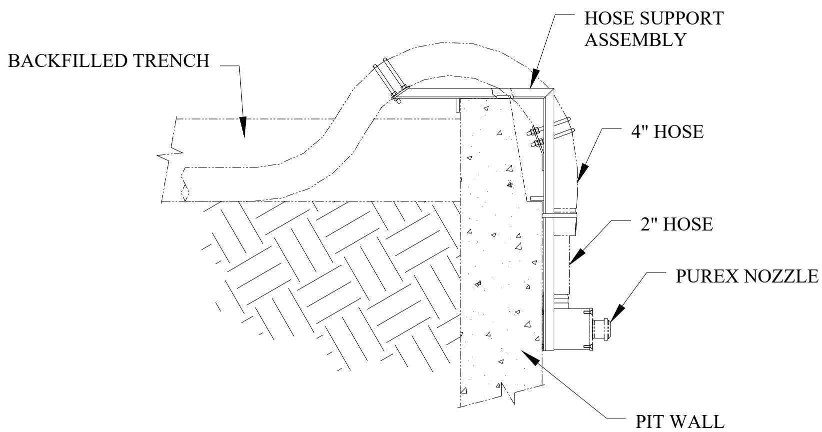


Figure A-3. Typical Arrangement of Hose-in-Hose Transfer Line End at Wall of Process Pit.

The service life of HIHTLs is specified as 3 years from the time they are first exposed to waste. By exception, HIHTLs may be evaluated for extended service life by the process defined in Appendix D of this Plan. Extensions will be limited to just those HIHTLs with mission need (e.g., to complete an ongoing retrieval, to support a new retrieval to begin soon, or HIHTL with only light duty accumulated with an anticipated opportunity for reuse). Evaluations of service life extension must consider the elements of Appendix D and must be reviewed and certified by an IQRPE. The manufacturing date, in-service date, and expiration date of each HIHTL is recorded on the HIHTL Tracking Table. Waste transfer procedures that utilize HIHTLs incorporate requirements for the system engineer and operations personnel to verify adequate HIHTL service life is available to accomplish the planned activity before the transfer is initiated to ensure the line is not used beyond its expiration date.

A-3 Leak Detection Overview

Detection of a leak from primary containment during a waste transfer is mandated by regulatory requirements in 40 CFR 265.193, incorporated by reference at WAC 173-303-400(3)(a) and amended and modified by WAC 173-303-400(3)(b) and WAC 173-303-400(3)(c)(ix). Waste transfers using HIHTLs governed by this document employ an integrated system of administrative and engineered leak detection methods to ensure a leak is detected and responded to in accordance with the regulations. Elements of this system include:

1. In-Pit Leak Detection (Engineered Leak Detection Method)

Pits at the sending and receiving tanks and along the waste transfer route house the piping equipment used in waste transfers. These pits, along with the encasement portion of the transfer line, serve to retain leakage from primary piping and return it to a suitable storage tank via drains. Pits are fitted with leak detector elements that sense the presence of a conductive fluid and provide an alarm indication.

2. Material Balance Discrepancy (MBD) Monitoring (Administrative Leak Detection Method)

   Sending and receiving tank levels and/or waste flow into the tank are monitored before, during, and after transfers to ensure measured tank volumes are within expected parameters for waste volume pumped and waste volume received. Monitoring frequency during transfers is determined by Tank Farm Project procedure(s). However, projects may increase the frequency of monitoring. Where a volume MBD cannot be performed due to multiple tank retrievals, equipment configuration, or recirculation within a tank, radiation surveys may be used as a substitute for MBD monitoring as described in Tank Farm Project procedures(s).

Supplementary methods that may be used during waste transfer are radiological surveys. Regular surveys are conducted along HIHTL transfer routes during a waste transfer. Each survey is compared to baseline surveys taken before the transfer commences and immediately after transfer start-up. Tank Farm Project procedure(s) specifies the radiological surveys and controls that are required during the waste transfers. An increase in radiological dose rate during such surveys has been shown to be a reliable means for detecting primary containment leakage. The "Settlement Agreement and Stipulated Order of Dismissal," PCHB No. 98-249; No. 98-250 (SY Settlement Agreement) states that the use of annulus continuous air monitors to detect radioactive contamination is used as a supplemental detection method in the double-shell tank system. In a similar manner surveys of the HIHTL transfer route are considered a supplemental detection method to the in-pit leak detection and MBD monitoring.

While use of this integrated system of leak detection methods has successfully detected leaks in the past, the most suitable means is to detect a leak using an engineered leak detection method. HIHTLs developed after initial issuance of this Plan will be designed to be able to detect a leak in accordance with 40 CFR 265.193(c)(3) using in-pit (electronic) leak detection alone where possible. Administrative leak detection methods will then provide verification of the engineered leak detection method.

Sections A-4 and A-5 provide detailed information on in-pit leak detection and MBD monitoring to allow determination of quantitative measures such as estimated time to leakage detection and minimum detectable leak rate.

There are two approaches for quantifying the **sensitivity** of leak detection systems: the detection time required in the event of a significant leak, and the minimum leak rate that is detectable by the system within the specified detection period of 24 hours.

A-4 In-Pit Leak Detection Methods

HIHTLs interface with many different valve and pump pits. As these pits have been constructed at various times over the life of the facility, several different designs have emerged that have an impact on how in-pit leak detection works.

Process pits vary in size and drain design. In many cases, these pits were built with an open drain. Since leak detector elements require liquid to pool to a depth sufficient to be sensed by the instrument, various means have been installed in drains to ensure pooling occurs. A **coffer dam** is a device installed in process pits to increase the sensitivity of in-pit leak detection. These devices impede drain flow until a liquid height sufficient to submerge a leak detector element is achieved. By partially obstructing the open drain, the leakage rate that can be detected by this system within the specified time period is decreased (i.e., the detection system is made more sensitive).

The presence of a standing pool of leaked waste in a process pit potentially poses flammable gas hazards to site workers and the environment as discussed in Tank Farm Project procedure(s). To mitigate this hazard (and to fulfill as low as reasonably achievable [ALARA] requirements), some coffer dams are modified by including a small hole that allows the pit to drain leakage without operator intervention. While these **self-draining** coffer dams increase the sensitivity of detection systems when compared to pits with open drains, the minimum rate of leakage that can be detected is greater than for pits fitted with unmodified coffer dams.

RPP-ENV-54801, *In-Pit Leak Detection Methods and Time to Leak Rates for Hose in Hose Transfer Lines*, Table 1 lists the specific process pits that are interconnected by HIHTLs currently installed or planned for installation in the near term. For each pit, the devices used to detect retained leaks are listed, along with any pertinent limitations associated with the design.

A-4.1 Estimating Time for Detection of Leakage using In-pit Leak Detection

As mentioned previously, one method for quantifying the **sensitivity** of the various in-pit detection systems is to assess the amount of time it takes to detect a significant leakage event.

A leak to secondary containment at the rate of 2 gpm is postulated for comparison purposes. This rate is derived from the minimum in-pit detection goal established for HIHTLs in Tank Farm Project procedure(s) (2–3 gpm). While the minimum pumping rate (0.05 gpm) is less than this value, such an assumption makes possible the computation of representative detection times. If the HIHTL connections at two pits are located at approximately the same elevation, then for conservatism the flow can be assumed to be equal to both boxes. The leak to secondary containment rate used would then be one half of 2 gpm.

As shown in Figure A-3, temporary waste transfer lines using HIHTLs rise at either end over pit walls or connect into pit-like boxes. In the event leakage occurs along the length of the transfer line, the potential exists for the entire encasement hose to fill before retained waste flows into an associated pit for detection. This establishes the worst-case condition for detecting leakage using in-pit leak detection. Where pits are fitted with modified coffer dams or otherwise drain continuously, an allowance must be included to account for the drainage rate.

By combining the methods and limitations recorded in RPP-ENV-54801, Table 1 with the hold-up volume of the associated secondary containment structures (encasement hose and valve/pump pits), the amount of time required to detect an assumed leak using in-pit leak detectors may be identified. Since each transfer route interconnects two pits, and retained waste may flow to either pit in the event of primary containment leakage, two detection times are calculated for each route.

A-4.2 Computing Minimum Detectable Leak Rate using In-pit Leak Detection

For process pits that do not drain continuously, the minimum leak rate that can be detected in a 24-hr period can be determined by dividing hold-up volume (transfer line plus pit volumes) by that time period. Taking HIHTL "HOSE-SY101-PPP/SYA" as an example, the minimum detectable leak rate in the Prefabricated Pump Pit on SY-101 is 0.07 gpm (98.8 gal hold-up divided by 24 hrs; see Section A-6.1).

This method for determining minimum detectable leak rate holds for pits that do not continuously drain (i.e., those fitted with unmodified coffer dams). In the instance of pits fitted with self-draining coffer dams, leakage flow into the drain must be accounted for. While this continuous drain feature fulfills ALARA goals, it increases the minimum leak rate that can be detected in 24 hrs (i.e., decreases the sensitivity of the in-pit detection system).

The drain hole provided in modified coffer dams is calculated to discharge 1.3 gpm to drain when submerged to a full 1 in. of depth—the depth required for leak detector activation. Since the drainage rate through such a hole is directly proportional to submergence, a leak rate equal to or greater than 1.3 gpm will result in the pooling required for leak detection. For a conservative computation of the minimum rate that can be detected in 24 hrs, one can assume the coffer dam allows a full 1.3-gpm drain flow regardless of submergence (once the transfer line encasement is filled). In such a case, the relationship between minimum detectable leak rate in a 24-hr period and hold-up volumes may be expressed as follows:

$$(V_H/Q_L) + [V_P/(Q_L - Q_D)] = 24 \text{ hrs (or 1440 minutes)}$$

where

V_H = Maximum hold-up volume of the transfer line (gal)
V_P = Hold-up volume of the pit under consideration (gal)
Q_L = Minimum detectable leak rate (gpm)
Q_D = Rate of drainage from the pit (gpm)

Having determined hold-up volumes for pits and transfer lines, we may solve the above relationship for minimum detectable leak rate (see Section A-6.1).

A-5 Material-Balance Discrepancy Monitoring

Material balance discrepancy (MBD) monitoring assesses totalized flow and/or level of each tank connected to a transfer line to detect leakage. Tank levels and flow totalizers are also monitored and compared to ensure that pumps are functioning and that waste is being received in the correct tanks. Procedures specify how often waste levels are to be measured as a function of transfer flow rates.

Note that for tanks where no free liquid surface is available to measure tank liquid content, flow totalizers are used on sending tanks that do not have a liquid surface to allow use of a level monitor.

Each tank has an allowable MBD value assigned based on known parameters associated with the tank's volume. This value is commonly expressed in inches of tank depth (though the MBD for double-contained receiver tanks [DCRT] is expressed in gallons). When expressed in inches, MBD can be converted to a volume discrepancy by multiplying it times a factor for the receiver tank (the ratio of receiver tank volume to depth, e.g., 2,750 gal/in. for Tank SY-102). This value can be used as the basis for determining minimum detectable leak rates. Also, the maximum amount of time to detect a leak using MBD monitoring can be determined based on minimum pumping and dilution flow rates.

The MBD limits are determined for each tank being pumped. Procedures are written specifically for each transfer to receiving tanks. These procedures incorporate the individual MBDs for sending tanks into MBD calculations. As an example, the following is a list of allowable MBD limits for some of the tanks pumped by Hanford's Interim Stabilization (IS) Program that are served by HIHTL-based transfer routes:

S Tank Farm	0.19 in.
SX Tank Farm	0.43 in.
U Tank Farm	0.51 in.
SY-102	0.25 in.

A-5.1 Estimating Time for Detection of Leakage using Material Balance Discrepancy Monitoring

Any continuous leak, no matter how small, will eventually show in MBD data sheets. The time to detect such a leak using MBD is most conservative (i.e., least sensitive) in the case of multiple tanks pumping to one receiver (as in IS transfers) with one route leaking.

Considering the significant leak rate of 2 gpm discussed in Section A-4.1, the following computation shows that leakage at this rate under these pumping conditions could be detected within 31.6 hr using MBD as the detection method:

1. Add MBD for each tank involved to determine overall allowable MBD (for worst-case conditions, assume simultaneous pumping from S, SX, and U Farms to SY Farm).

   0.19 in. + 0.43 in. + 0.51 in. + 0.25 in. = 1.38 in.

2. Multiply total MBD by ratio of tank depth to volume for the receiver tank (2,750 gal/in. for receiver SY-102). This determines the leaked volume that is the threshold of action.

   1.38 in. * 2,750 gal/in. = 3,795 gal

3. Assuming a significant leak at the rate of 2 gpm, compute the time to detection by dividing the volume above by this rate, and convert units to hr.

   3,795 gal/2.0 gpm = 1,900 min = <u>31.6 hr</u>

This time period exceeds the expected detection time using in-pit methods. Therefore, significant leakage (i.e., 2 gpm or greater) will be detected with in-pit methods before it is discovered using MBD methods (assuming multiple farms are pumping simultaneously).

While MBD monitoring may be considered a **coarse** leak detection method, its ability to accumulate data over time allows it to detect small leaks (though not necessarily within 24 hrs). Consider how MBD monitoring can detect leaks that occur at less than the significant rate of 2 gpm. In IS applications, the minimum amount of waste flow allowed from a tank (before it is declared stabilized) is 0.05 gpm. This is a low rate that bounds all foreseeable waste transfers using temporary waste transfer lines. The minimum dilution rate during IS waste transfers is typically 0.5 gpm. These rates sum to 0.55 gpm for any one transfer route. The following computation shows that leakage at this rate under these pumping conditions would be detected within 4.8 days using MBD as the detection method:

1. Add MBD for each tank involved to determine overall allowable MBD (for worst-case conditions, assume simultaneous pumping from S, SX, and U Farms to SY Farm).

   0.19 in. + 0.43 in. + 0.51 in. + 0.25 in. = 1.38 in.

2. Multiply total MBD by ratio of tank depth to volume for the receiver tank (2,750 gal/in. for receiver SY-102). This determines the leaked volume that is the threshold of action.

   1.38 inch * 2,750 gal/in. = 3,795 gal

3. Assuming the minimum IS pumping rate of 0.55 gpm leaks, compute the time to detection by dividing the volume above by this rate, and convert units to days.

3,795 gal/0.55 gpm = 6,900 min = 115 hr = 4.8 days

A-5.2 Computing Minimum Detectable Leak Rate using Material Balance Discrepancy Monitoring

The example above is a conservative estimate that results from the worst-case condition of multiple farms pumping to a common receiver at minimum rates. Under those conditions, the minimum detectable leak rate using MBD monitoring is greater than the minimum rate detectable using in-pit leak detection methods (see above).

In some cases MBD monitoring can detect a leak smaller than those that can be detected by in-pit means. This occurs when we compare the minimum rate for in-pit detection in instances when modified coffer dams are used (approximately 1.3 gpm; see Section A-4.2), and under conditions where there is a single pumping tank and a single receiver.

Consider IS pumping from S Farm to a receiver tank in SY Farm. The following computation shows a leak as small as 0.8 gpm can be detected within 24 hrs when transferring from S Tank Farm to SY-102. This assessment assumes that MBD is calculated every 4 hr, as required by IS procedures and the Tank Farms Safety Basis.

1. Add MBD for each tank involved (assume pumping from S Farm to SY Farm) to determine allowable MBD.

0.19 in. + 0.25 in. = 0.44 in.

2. Multiply total MBD by ratio of tank depth to volume for the receiver tank (again, 2,750 gal/in. for receiver SY-102).

0.44 in. * 2,750 gal/in. = 1,210 gal

3. Compute the minimum detectable leak rate by dividing the volume from above by the detection time limit requirement of 24 hrs (or 1,440 minutes).

1,210 gal/1,440 min = 0.8 gpm

Another example where utilizing MBD monitoring detects smaller leak rates than capable with in-pit detection using self-draining coffer dams is when pumping to 244-BX DCRT. In such an example, the allowable MBD value is 700 gal. Over 24 hrs, this equates to a detectable leak rate of 0.5 gpm (700 gal/1,440 min = 0.5 gpm).

It should be noted that the above computations presume no waste is being pumped out of receivers (such as SY-102 and 244-BX DCRT) while transfers are underway.

A-6 Evaluation of Leak Detection Capabilities

RPP-ENV-54801, Table 2 lists each HIHTL in operation or planned for near-term deployment in support of waste transfer activities at Hanford's tank farms, along with the two pits each line interconnects.[1]

A-6.1 Leak Detection for Typical Hose-in-Hose Transfer Line

The computed estimate of time to detect an assumed leak using in-pit leak detection for transfers that use HIHTLs may be found in Columns K and L (in terms of minutes and hours, respectively) of RPP-ENV-54801, Table 2. These estimates are determined by function of the waste hold-up in the transfer line encasement and pit sufficient to be detected by the leak detector element. This is a worst-case computation that presumes the entire encasement hose must fill before retained waste accumulates in a pit. Time to detection is computed by dividing this volume by the rate at which the primary containment is assumed to leak (2 gpm), less an allowance for continuous draining (if any). If the HIHTL connections at two pits are located at approximately the same elevation, then for conservatism the flow can be assumed to be equal to both boxes. The leak to secondary containment rate used would then be one half of 2 gpm.

The estimate of minimum detectable leak rate associated with in-pit leak detection is found in Column M of RPP-ENV-54801, Table 2. These values are determined in the manner noted in footnote 4 of RPP-54801, Table 2 (i.e., hold-up divided by 24 hrs for pits with plugged drains or standard coffer dams; or according to the formula presented in Section A-4.2 for pits with self-draining coffer dams or other drain mechanisms).

A-7 Inspection Requirement for Hose-In-Hose Transfer Line

In accordance with 40 CFR 265.195 HIHTL inspections will be performed according to Table A-1. All inspections will be documented in the operating record per 40 CFR 265.195(g).

Table A-1. Inspection Requirements for Hose-In-Hose Transfer Lines.

Regulation	Requirement	Inspection Description	Frequency
§265.195(a)	The owner or operator must inspect, where present, data gathered from monitoring equipment and leak-detection equipment (e.g., pressure or temperature gauges, monitoring wells) to ensure that the tank system is being operated according to its design.	1) Verify on route leak detector(s) is not in alarm 2) Monitor for material balance discrepancy, which includes waste receiver tank level, waste/water flow, and radiological monitoring.	Once each operating day
§265.195(b)(1) and WAC 173-303-400(3)(c)(ix)	The owner or operator must inspect overfill/spill control equipment (e.g., waste-feed cutoff systems, bypass systems, and drainage systems) to ensure that it is in good working order.	1) Verify on route leak detector(s) is not in alarm 2) Monitor for material balance discrepancy, which includes waste receiver tank	Once each operating day

[1] Some of these transfers may be complete.

Table A-1. Inspection Requirements for Hose-In-Hose Transfer Lines.

Regulation	Requirement	Inspection Description	Frequency
		level, waste/water flow, and radiological monitoring.	
§265.195(b)(2) and WAC 173-303-400(3)(c)(ix)	The owner or operator must inspect aboveground portions of the tank system, if any, to detect corrosion or releases of waste.	Radiological monitoring and visual inspection of HIHTL route. All portions of the HIHTLs that are located belowground or under shielding are exempt from this inspection requirement.	Once each operating day
§265.195(b)(3) and WAC 173-303-400(3)(c)(ix)	The owner or operator must inspect the construction materials and the area immediately surrounding the externally accessible portion of the tank system, including the secondary containment system (e.g., dikes) to detect erosion or signs of releases of hazardous waste (e.g., wet spots, dead vegetation).	Radiological monitoring and visual inspection of HIHTL route.	Once each operating day

"Each operating day" means every day the hose-in-hose transfer line (HIHTL) is actively transferring waste. When an active transfer has concluded, there is no flow through the HIHTLs.

A-8 Summary

Using in-pit leak detection, the time to detect a 2-gpm leak from a transfer route employing HIHTLs ranges from 17 minutes to around 7 hrs. The estimated minimum leak rate that can be detected in 24 hrs by in-pit detectors ranges from 0.02 gpm to 1.36 gpm.

The use of 2 gpm as an assumed leak is not conservative for saltwell transfers performed by the IS Program. Often such transfers occur at rates less than 2 gpm. Detection of leaks at these low flow rates would not be likely using in-pit methods that incorporate ALARA features for self-draining. However, these leaks would be detectable by MBD monitoring (though the period required may be greater than 24 hrs, depending on the number of farms pumping simultaneously).

While MBD monitoring is a **coarse** method for detecting a small leak within 24 hrs, its ability to accumulate the impact of a leak over time makes it a meaningful detection tool. MBD alone cannot detect all leaks quickly, but it will eventually identify even small leaks over time.

In addition, while not credited for regulatory compliance, trends can be identified using MBD monitoring. This ability to trend and uncover a pattern before reaching a set criterion indicates MBD monitoring will typically offer a higher degree of sensitivity that can be shown in a worst-case evaluation.

Finally, direct observations, such as walkdowns and radiation surveys, are important techniques to provide a qualitative indication of whether or not leakage is occurring.

A-9 References

40 CFR 265.193, "Interim Status Standards for Owners and Operators of Hazardous Waste – Containment and detection of releases," *Code of Federal Regulations*, as incorporated by WAC 173-303-400(3)(a) and amended and modified by WAC 173-303-400(3)(b) and WAC 173-303-400(3)(c)(ix)

Drawing H-2-34965, Various revisions, *Leak Detector Assembly, Typical Details,* U.S. Department of Energy, Office of River Protection, Richland, Washington.

Drawing H-2-37781, Revision 3, *Piping, Sections and Details, Valve Pits 241-SY-A and SY-B*, Westinghouse Hanford Co., Richland, Washington.

Drawing H-2-46155, Revision 1, *Structural, Typical Details and General Notes,* Vitro Engineering Corp., Richland, Washington.

Drawing H-2-70210, Revision 4, *Addition of Tripping Power and Master Transmitter Trip Indication*, Atlantic Richfield Hanford Company, Richland, Washington.

Drawing H-2-70895, Revision 5, *Piping Arrangement, Pump Pits, Tank Farms 241-B, BX, and BY*, Vitro Engineering Corp., Richland, Washington.

Drawing H-2-73758, Revision 1, *Piping, Pump Pit Arrangement, 241-S Tank Farm*, Vitro Engineering Corp., Richland, Washington.

Drawing H-2-93633, Revision 1, *Piping, Floor Drain Seal Assembly*, Kaiser Engineers Hanford Company, Richland, Washington.

Drawing H-14-103355, Revision 2, *Instrument 241-AN-01A Pump Pit Elevations and Details*, U.S. Department of Energy, Office of River Protection, Richland, Washington.

Drawing H-14-103592, Revision 2, *Rapid Mitigation SYS ASSD General Arrangement*, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

Drawing H-14-103596, Revision 2, *SY-101 Cross-site Transfer System Hose and Hose Assembly*, U.S. Department of Energy, Office of River Protection, Richland, Washington.

Drawing H-14-103661, Revision 1, *RAPID Mitigation System, PPP Seal Loop Dam Assembly*, U.S. Department of Energy, Office of River Protection, Richland, Washington.

Drawing H-14-103928, Revision 2, *Interim Stabilization Continuous Hose Transfer Line Assembly*, U.S. Department of Energy, Office of River Protection, Richland, Washington.

Drawing H-14-103929, Revision 2, *Interim Stabilization Jointed Hose Assembly*, U.S. Department of Energy, Richland, Washington.

Drawing H-14-103935, Revision 2, *Interim Stabilization General Hose Support Assembly*, U.S. Department of Energy, Office of River Protection, Richland, Washington.

Drawing H-14-104863, Revision 1, *Mechanical Piping Plan*, U.S. Department of Energy, Office of River Protection, Richland, Washington.

Drawing H-14-105311, Revision 0, *Interim Stabilization Jointed and Swaged Hose Transfer Line Assembly*, U.S. Department of Energy, Office of River Protection, Richland, Washington.

Drawing H-14-106526, Revision 8, U.S. Department of Energy, Office of River Protection, Richland, Washington.

Drawing H-14-105610, Revision 1, U.S. Department of Energy, Office of River Protection, Richland, Washington.

Drawing H-14-105994, Revision 0, *In-Line Leak Detector Well Assembly*, U.S. Department of Energy, Office of River Protection, Richland, Washington.

Drawing H-14-106036, Revision 0, *In-Line Leak Detector Well Assembly*, U.S. Department of Energy, Office of River Protection, Richland, Washington.

Drawing H-14-106091, Revision 1, *Leak Detector Assembly Typical Details*, U.S. Department of Energy, Office of River Protection, Richland, Washington.

Drawing H-14-106249, Revision 15, *HIHTL Tracking Table*, U.S. Department of Energy, Office of River Protection, Richland, Washington.

Drawing H-14-107049, U.S. Department of Energy, Office of River Protection, Richland, Washington.

Drawing H-14-107258, Revision 0, *241-C Sluice Retrieval C-109 to AN-106 Site Plan*, U.S. Department of Energy, Office of River Protection, Richland, Washington.

Drawing H-14-107328, Revision 0, *Mechanical WRS Valve Box Assembly,* U.S. Department of Energy, Office of River Protection, Richland, Washington.

Drawing H-14-107391, Revision 1, *241-C Sluice Retrieval Mechanical Diversion Box Assembly*, U.S. Department of Energy, Office of River Protection, Richland, Washington.

Drawing H-14-107904, Revision 0, Sheet 1, *Mechanical TVFM Box Assembly*, U.S. Department of Energy, Office of River Protection, Richland Washington.

HNF-IP-1266, Current Revision, *Tank Farm Operations Administrative Controls*, Washington River Protection Solutions, LLC, Richland, Washington.

RPP-6153, *Engineering Task Plan for Hose-in-Hose Transfer System for the Interim Stabilization Program*, Rev. 2, COGEMA Engineering Corp., Richland, Washington.

RPP-6711, *Evaluation of Hose-in-Hose Transfer Line Service Life*, Current Revision, Washington River Protection Solutions, LLC, Richland, Washington.

RPP-6725, 2000, *Hose-in-Hose Transfer Lines Calculation Notes for Hanford's Interim Stabilization Program*, Rev. 0), COGEMA Engineering Corp., Richland, Washington.

RPP-13033, 2009, *Tank Farms Documented Safety Analysis*, Rev. 3-F, Washington River Protection Solutions, LLC, Richland, Washington.

RPP-ENV-54801, Current Revision, *In-Pit Leak Detection Methods and Time to Leak Rates for Hose in Hose Transfer Lines*, Washington River Protection Solutions, LLC, Richland, Washington

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

APPENDIX B

HOSE-IN-HOSE TRANSFER LINE
WASTE HANDLING PLAN
AND MINIMIZATION TECHNIQUES

Table of Contents

Table of Tables

B-1 Scope

This appendix presents waste management requirements and methodologies established for use of hose-in-hose transfer lines (HIHTL). It specifies waste minimization techniques to be employed when planning removal of this equipment, waste categories associated with HIHTL-based transfer system parts, and considerations related to handling HIHTLs as waste during recovery and disposal. The requirements are intended to provide assurance that HIHTLs are managed in a manner compliant with regulatory requirements related to waste management.

Considerations for disposal of the HIHTL can be separated using a chain of decisions. The first decision before disposal is if the HIHTL can be reused. Reuse depends on the level of contamination, service life, and cost effectiveness, which are further discussed in Section B-4.1. If the HIHTL part cannot be reused then it will be disposed in one of the following ways:

- If the HIHTL part did not come in contact with tank waste, then it may be disposed of in accordance with nondangerous solid waste regulations or as low-level waste, as discussed in Section B-4.2.

- If the HIHTL part did come in contact with tank waste it will be disposed of as mixed waste, as discussed in Section B-5.

For single-shell tanks, both the *Washington v. Chu* Consent Decree and the *Hanford Federal Facility Agreement Consent Order* Appendix I, Section 2.1.3, state that any tank waste retrieval work plan that identifies the use of new aboveground tanks, tank system, or treatment systems (not otherwise permitted), will require the following additional information:

> … Describe the disposition of the system at completion of the retrievals. For this requirement, TWRWPs reference this plan (RPP-12711, Temporary Waste Transfer Line Management Program Plan) as how HIHTL will be managed for disposition. Section B-5 discusses handling of the HIHTL at the end of mixed-waste transfer use. Table B-1, Appendix B of RPP-12711, contains the DOE-ORP and Ecology approved dates that HIHTLs are to be placed into waste containers.

B-2 Waste Minimization Techniques

Waste minimization is a key component in the design of HIHTLs since some may need to be replaced several times to complete an extensive waste transfer. This appendix discusses methods for reducing the amount of waste and type of waste produced when removing and disposing HIHTLs that are in accordance with Tank Farm Project's procedures and waste management requirements.

One method of waste minimization is to reuse HIHTLs as feasible (i.e., where achievable under as low as reasonably achievable constraints for HIHTLs with sufficient service life left to warrant their reuse). This method minimizes waste as long as the HIHTL material is compatible with the waste in each tank.

Another method for waste minimization is to minimize the amount of waste that will be disposed of as mixed waste. The HIHTLs transfer systems are assemblies using multiple parts that can be segregated to reduce the volume of hazardous waste. The HIHTL assembly is comprised of a primary hose with end fittings, heat trace with tape, secondary hose with end fittings, and insulation. Systems using HIHTLs also include items such as shield boxes, shield plates, modified coffer dams, hose supports, lead blankets, vehicle impact barriers, and electrical connections. Sections B-4.1 through B-4.3 describe how each part may be disposed. Selection of specific disposal methods will consider cost benefits of separation/segregation with consideration of as low as reasonably achievable goals.

B-3 Overview – Recovering and Disposing of Used Hose-in-Hose Transfer Lines

HIHTLs are deployed in several tank farm applications at the Hanford Site. These transfer lines are used to convey tank waste during retrieval and other waste transfer activities. These lines are considered to be temporary as they are designed and installed to fulfill specific programmatic objectives of limited duration. The process described below does not apply to HIHTLs whose shelf life of 7 years has expired and have not been used to transfer mixed-waste. If an HIHTL has exceeded its 7-year shelf life and has been placed in a contaminated area, it will be disposed of in accordance with Section B-4.2.

HIHTLs that have come in contact with mixed waste will be disposed of in accordance with the generator regulations of WAC 173-303-170 through 230, and the land disposal restrictions of WAC 173-303-140 HIHTLs will be placed in a container for disposal by the date listed in Table B-1, "Dates that HIHTLs are to be Placed into Waste Containers." The schedule of when an HIHTL is required to be placed in a container in Table B-1 will be approved by the Washington State Department of Ecology (Ecology) and the U.S. Department of Energy per the Tri-Party Agreement Action Plan, Section 9.3, "Document Revisions." The HIHTL Tracking Table will contain the information listed in Section 4.1 of this Plan and will be kept in the operating record.

Following physical removal from its installation, HIHTLs will be disposed. Disposal activities include packaging the HIHTL after it is removed, documenting the removal, and storing it appropriately (e.g., in the 90-day storage/accumulation area if it is mixed waste). The date the HIHTL is placed in a waste container must be before or on the date specified on Table B-1.

Note that some HIHTLs may not be operated for extended durations while activities are executed to verify an objective has been met (e.g., as in evaluating a tank for declaring it **Retrieval Complete**). In such cases, the transfer line is considered in service until such time as it is deemed no longer needed for its intended application. Also, in consideration of waste minimization goals, reuse plans may require HIHTLs to be stored for a specified time period. If an HIHTL is planned for reuse, it will be stored in accordance with the manufacturer's recommendations until it is redeployed or the design life expires. In these instances, HIHTLs are not considered to have completed their mission, and are thus not yet subject to the requirements discussed in this appendix. Any HIHTLs unfit for use will follow 40 CFR 265.196, according to those methods discussed in Appendix C, and put in a configuration that is protective of human health and the environment.

B-4 Waste Categories

Current tank farm practices will be used for decontamination and storage, which are in accordance with WAC 173-303, "Dangerous Waste Regulations." Contaminated parts will be evaluated for reuse as specified in Tank Farm Project procedure(s). Lists of the parts that make up the HIHTL transfer system and of the waste disposal categories are contained in the following.

The HIHTL assembly and associated parts can be divided into the following general waste forms:

1. HIHTL assembly major parts:
   a. Primary hose with end fittings.
   b. Heat trace with tape.
   c. Secondary hose with end fittings.
   d. Insulation.
   e. Hose Supports.
2. Electrical connections[2]
3. Coffer dams.[2]
4. Leak detector elements.[2]
5. Vehicle impact barriers (i.e. Shield Boxes).
6. Shield plates.

These parts will be divided into three categories:

1. Parts to be disposed of as mixed waste.
2. Parts to be disposed of as low-level waste.
3. Reusable parts.

B-4.1 Mixed Waste Parts

1. Coffer dam

   Future use of coffer dams installed in pits to enhance leak detection sensitivity will be evaluated on a case-by-case basis. If it is determined that a coffer dam will no longer be used, then it will be removed and disposed of in accordance with WAC 173-303-170 through 230, WAC 173-303-140, 40 CFR 262, and 40 CFR 268.

2. Vehicle impact barriers (i.e., shield boxes)

   Vehicle impact barriers that are located at a pit entrance will be surveyed after completing a waste transfer for an individual tank. If contaminated, the vehicle impact

[2] This part or piece has multiple uses beyond being used just to support HIHTLs.

barriers will be disposed of in accordance with WAC 173-303-170 through 230 and WAC 173-303-140.

3. HIHTL assemblies

   Decontamination and disposal of HIHTL assemblies will incorporate the elements described in Section B-5.

B-4.2 Low-Level Waste

If the primary hose remained intact, then the following items may be disposed of as low-level waste or in accordance with nondangerous solid waste regulations. If small portions of the hose parts were contaminated, then the tank waste contacted parts may be cut away from the remaining hose and the non-tank-waste contacted hose parts disposed of as low-level waste.

HIHTL Parts:

1. Secondary hose with end fittings.
2. Insulation.
3. Heat trace with tape.
4. Hose supports.

B-4.3 Reusable Parts

1. Shield plates.

   To be left inside the contamination zone to support future operations.

2. Electrical connections.

   To be left inside the contamination zone to support future operations.

3. In-pit leak detector elements

   Although in-pit leak detector elements are a subsystem of HIHTL-based waste transfer lines, they may be used for other purposes and should remain in place.

4. HIHTL assemblies

   HIHTLs that have not exceeded their service life may be rerouted to connect to other tanks/pits as long as waste compatibility issues are resolved.

5. Vehicle impact barriers (i.e., shield boxes)

   Vehicle impact barriers that are located at a pit entrance will be surveyed after completing a waste transfer for an individual tank. If not contaminated, the vehicle impact barriers will be stored within the tank farm for reuse. Vehicle impact barriers can be reused if the dimensions are checked to verify they will provide adequate vehicle resistance (i.e., pit wall width and pit wall height above grade).

B-5 Waste Handling

The following information is provided to guide development of decontamination and disposal work documents for HIHTLs. Dates that HIHTLs are to be placed into waste containers are contained in RPP-12711 Appendix B, Table B-1, "Dates that HIHTLs are to be Placed into Waste Containers." Changes to the dates that HIHTLs are to be placed into waste containers will be approved by Ecology and the U.S. Department of Energy, Office of River Protection per Tri-Party Agreement Action Plan Section 9.3. For all HIHTL's not covered under an Appendix I Tank Waste Retrieval Work Plan, the date listed in RPP-12711 Appendix B, Table B-1 is the date the HIHTL becomes waste. If the date to place the HIHTL in the waste container will not meet the date as listed in Table B-1, Ecology will be notified as soon as possible, before the scheduled date is missed.

B-5.1 Decontamination

After completing the waste transfer, the HIHTL will be thoroughly flushed and drained to minimize residual contamination. Before draining activities begin, the shielding will be removed and stored for future use. The HIHTL will be flushed. The HIHTL will be drained using methods such as those discussed in Appendix C or air blown with compressed air.

A radionuclide inventory estimate will be generated for each hose assembly. Tank-specific waste characterization data will be used to estimate the inventory of radiological and hazardous constituents.

Contact dose rates will be determined at representative points along the length of the hose assembly with the shield plates removed. This information is needed to:

1. Establish the overall effectiveness of previous flushing/decontamination of the hose assembly, and determine whether additional source term reduction (e.g., additional flushing) should be performed.

2. Provide input for numerical modeling to be used to characterize the waste using established waste management procedures.

B-5.2 Disconnection

With the shield plates and shield boxes removed, the next action will be to lift and drain the hose assembly (see Appendix C) or air blow the HIHTL with compressed air.

After draining, or air blowing, the HIHTL will finish being disconnected from connections in the pit; some items may have been disconnected previously to aid in drainage. Once the hose is removed from the pit, the ends of the primary and secondary hoses will be sealed to prevent any potential leakage. Any flanges on HIHTLs will be disconnected and blanked off. Also, where a flange was used to connect to a pit, the flanges in the connecting pit will also be blanked off.

B-5.3 Waste Documentation and Container Selection

The preliminary survey of contact dose rates along the length of the hose will provide essential information for preparing documentation for packaging, manifesting, transporting, storing, and disposing of the HIHTL assembly. Actions taken to lift and drain the hose and carefully seal the hose ends will mitigate the presence of free liquids for packaging.

The following documentation may be prepared and submitted as needed when waste is generated by Tank Farms Operations:

1. Waste planning checklist
2. Container request
3. Waste inventory sheet
4. Generator certification.

B-5.4 Waste Packaging and Turnover

A container of appropriate size and type will be delivered to the site by the Waste Management Services organization in advance of loading. The container will be packaged according to U.S. Department of Transportation (DOT) regulations and in compliance with the acceptance criteria of the receiving treatment, storage, or disposal unit. Packaging will be performed in the following sequence of steps:

1. The hose assembly will be lifted and loaded into the container.
2. Add absorbent material.
3. When the hose assembly has been loaded into the container, the inner and outer poly bags will be sealed with a pigtail closure.
4. Complete Waste Inventory Sheet and Generator Certification.
5. The container will be closed and secured.
6. An external dose-rate survey will be performed to verify that the package conforms to limit criteria.
7. Appropriate identification and labeling will be applied to the outside of the container.
8. Generator will turn in inventory sheets and Generator Certification to Waste Management Services.

When these actions are completed, the container (if mixed waste) will be placed in a 90-day storage area, and then shipped for treatment and/or disposal in compliance with DOT regulations.

B-5.5 Waste Designation

HIHTLs will be designated per WAC 173-303-070 to 110.

B-5.6 Dates that HIHTLs are to be placed into waste containers

Table B-1
Dates that HIHTLs are to be Placed into Waste Containers

HIHTL ID	Dates that HIHTLs are to be Placed into Waste Containers
12501-01	09/30/2018
12501-02	09/30/2018
12501-03	09/30/2018
12501-04	09/30/2018
12701-01	09/30/2018
12701-02	09/30/2018
12701-03	09/30/2018
13011-01	09/30/2018
13011-02	09/30/2018
I-15390-0-01	09/30/2017
I-15390-0-02	09/30/2017
I-15390-0-03	09/30/2017
I-15390-0-04	09/30/2017
I-15390-0-05	09/30/2017
I-15390-0-06	09/30/2018
I-15390-0-07	09/30/2018
I-15390-0-08	09/30/2018
I-15390-0-09	09/30/2018
I-15390-0-10	09/30/2018
I-15390-0-11	09/30/2018
I-15390-0-12	09/30/2018
I-15390-0-13	09/30/2018
I-26986-0-04	09/30/2017
I-26986-0-05	09/30/2017
14081-01	09/30/2018
14081-02	09/30/2018
15011-01	03/30/2024
15011-02	03/30/2024
15011-03	03/30/2024
15041-01	03/30/2024
15011-04	03/30/2024
15011-05	03/30/2024
15011-06	03/30/2024
15011-07	03/30/2024
15011-08	03/30/2024
15011-09	03/30/2024
15011-10	03/30/2024
15011-13	03/30/2024
15011-14	03/30/2024
15011-15	03/30/2024

HIHTL ID	Dates that HIHTLs are to be Placed into Waste Containers
15011-16	03/30/2024
15011-17	03/30/2024
17053-01	10/31/2026
17053-02	10/31/2026
17053-04	10/31/2026
17053-05	10/31/2026
17053-06	10/31/2026
17053-07	10/31/2026
17053-08	10/31/2026
17053-09	10/31/2026
17053-10	10/31/2026
17053-11	10/31/2026
17053-12	10/31/2026
17021-01	10/31/2026
17021-02	10/31/2026

B-6 References

40 CFR 265.196, "Interim Status Standards for Owners and Operators of Hazardous Waste, and Disposal Facilities-Response to leaks or spills and disposition of leaking or unfit-for-use tank systems," as incorporated by WAC 173-303-400(3)(a) and amended and modified by WAC 173-303-400(3)(b) and WAC 173-303-400(3)(c)(ix).

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

WAC-173-303-070, "Designation of Dangerous Waste," *Washington Administrative Code,* as amended.

APPENDIX C

HOSE-IN-HOSE TRANSFER LINE FLUSHING, BLOWING, AND DRAINING

Table of Contents

C-1 Introduction

Design of a flexible hose transfer line allows consideration for alternative draining possibilities when compared to steel pipe transfer line designs. In consideration for removal and replacement of the hose-in-hose transfer lines (HIHTL) it was decided to bury the HIHTLs in a shallow, nominal 1-ft trench and not to slope the transfer lines. (Some HIHTLs are installed at grade and some are installed on/in sloped terrain.) Since many of the transfer lines are not self-draining, flushing, draining, and air blowing alternatives were decided in the design process. These alternatives are discussed in the following sections along with some examples and lessons learned.

C-1.1 Liquid Removal

Sloping a transfer line provides an easy path for draining the primary or secondary lines of a transfer route. However in the instance of HIHTLs, it is sometimes advantageous to not slope the line. Comparing the implications of design and construction requirements for the at-grade line versus a sloped arrangement (i.e., pipe-in-pipe or hose-in-pipe) demonstrates the at-grade line offered reduced exposure during installation and reduced risk from industrial hazards.

Considering the HIHTL is not sloped, flushing, draining, and air blowing, plans are in place in the event of leakage from primary to encasement. The primary line is easily flushed in the same manner as during a routine waste transfer. The encasement is to be flushed only in the instance where the primary line has failed and waste is contained in the secondary. The design allows for flushing the encasement at any time without damaging the entire assembly such that it could not be reused.

C-1.2 Flushing

Flushing, in general, is performed using water at different flow rates and temperatures to ensure that the waste is removed from the HIHTL. This method is very effective so that the dose rate is reduced to such a minuscule amount that the HIHTL can be handled by hand. Flushes should be performed as soon as possible after it is determined that the HIHTL will no longer be used to reduce the chance of waste settling in the bottom of the HIHTL.

C-1.3 Draining

One manner of draining the HIHTL uses an engineered tool attached to a forklift (dewatering tool) to lift the hose in a controlled manner and allow flush water to drain to the adjacent valve pits. Hose ends can be secured and the hose assembly can be lifted by crane and placed on the dewatering tool. Insulation can be removed from the HIHTL before it is placed on the dewatering tool. Dewatering is achieved by moving the tool down the route of the HIHTL assemblies at a rate of about 1 mph. The process was repeated until no water was heard or seen by operators monitoring either pit, providing evidence that dewatering was complete.

The dewatering tool is made of a troughing idler welded to an 8-ft pipe that attaches to a forklift. The tool requires no maintenance since the bearings are factory sealed. The tool is stored in a secure tank farm facility and would be inventoried prior to use.

If the ground the HIHTL is installed on is sloped in a manner to facilitate draining of the HIHTL to a suitable tank then the HIHTL can be gravity drained.

C-1.4 Air Blowing

For some transfer activities it is undesirable for flush water to return to the source tank after it has transferred waste (e.g., tank retrieval). In this case an air flush of the transfer line may be performed to force as much flush water as possible to the receiving tank before the line is drained. During the performance of this activity, the air pressure within the receiving tank must be carefully monitored to ensure it maintains negative pressure in relation to atmospheric.

C-1.5 Lessons Learned

Prior to flushing and draining the S-C to SX-A temporary transfer line that failed in January 2002, the suspect joint in the HIHTL was evaluated using radiographic examination, which showed no evidence of a gross failure of the primary line's flanged joint. Visual examination was performed after the HIHTL joint was flushed and drained. A subject matter expert from the HIHTL manufacturer was present during the visual examination and concluded the failure occurred at a fitting-to-hose connection caused by insufficient torque of the fitting bands. Contributing factors to the failure were allowing the HIHTL to be exposed to waste/flush water at higher temperatures and pressures for an extended length of time that were greater than what the connection had been rated for. Operation limits were placed on HIHTLs of the same configuration as the failed HIHTL.

The HIHTLs were redesigned in response to the failure of HIHTL between pits S-C and SX-A. Part of the redesign included using a swaging technique instead of bands to connect end fittings to the hose. Swaging allows end fittings to withstand higher temperatures and pressures. The midpoint flange on the primary hose was replaced with a threaded connection, which allows for more movement. These new design attributes do not change the methods for decontaminating and disposing of HIHTLs.

C-2 Leak Mitigation for Transfer Line Leak

If a tank waste retrieval work plan is available it will be used for leak mitigation. If a tank waste retrieval work plan is not available then these guidelines will be used.

Transfer line leakage occurring near a tank would likely drain to that tank. All other transfer line leakage will drain back to either the other tank in the waste transfer system or a containment structure on the transfer line. Leakage to the containment structure is transferred to tank. Response to transfer leak detection alarms is performed per procedure (procedures for waste transfer will be developed before waste transfer operations). Leak detection is performed in a similar manner to, and response is similar to that for, existing tank farm transfers. There is nothing unique to the tank waste transfer, using HIHTLs, leak detection system logic when compared to existing tank farms transfer leak detection. Leak mitigation is provided by the design of equipment that channels all leakage into an outer encasement that drains to an alarmed location and a collection tank. The transfer is shut down when the alarm occurs.

Should a leak be detected in the aboveground diversion boxes or pits, the waste transfer pumps would be shut down and the leakage would be transferred to a tank using a sump pump or gravity drain. Leaks within one of the sluicer boxes will result in pump shutdown with leakage draining to a tank. Leaked waste will be returned to a tank and would not be transferred to a tank through a transfer system with unknown or questionable integrity. The leaks would be repaired or the leak location bypassed before resuming waste transfer operations.

Should a visible (aboveground) leak or release be detected during waste transfer operations, any transfers in progress would be stopped immediately and response actions defined in the Building Emergency Plan for Tank Farms, would be implemented. A visible leak or spill would only occur as a result of an accident or equipment failure. The Building Emergency Plan for Tank Farms identifies the facility hazards, including hazardous materials, and defines the facility-specific emergency planning and response. The emergency plan also describes incident response actions including the initial response actions to immediately protect the health and safety of persons in the affected area, determining if emergency notification is necessary, and taking steps necessary to ensure that a secondary release, fire, or explosion does not occur. The response actions also include steps taken to collect and contain released waste per the regulatory requirements of WAC 173-303.

C-3 References

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

APPENDIX D

HOSE-IN-HOSE TRANSFER LINE
LIFE EXTENSION CRITERIA EVALUATION

The following items are to be considered during the service life extension process of any hose-in-hose transfer line (HIHTL).

A. The following are required:

- HIHTLs have a 7-year shelf life (i.e., the life from manufacture until first service use) and 3-year service life, with a maximum total life of 10 years from the date of manufacture. The HIHTL can be operated for longer than three calendar years with the performance of a service life extension in accordance with this appendix. For example, if an HIHTL was only used intermittently during the 3-year service life, an Independent Qualified Registered Professional Engineer (IQRPE) certified life extension process could show that the HIHTL could be extended for use as determined by the IQRPE.

- No use of an HIHTL beyond 10 years regardless of the storage time, field deployment, or service life time. This duration includes post-operation field storage (i.e., time between retrieval activities). In no case will HIHTLs be in use for longer than 10 years.

- Certification of "fit for use" by an IQRPE for the HIHTL and the entire configuration of the system will meet the requirements of 40 CFR 265.192. These reports will be placed in the operating record.

- If the 10-year maximum time has not been exceeded and the HIHTL is still in current operation for a retrieval campaign (beyond the projected campaign timeline), an additional extension may be performed as required.

B. The HIHTL life extension determination will consider the following elements:

- Operating temperatures and durations will be included.
- Dose calculations and assumptions will be included.
- Chemical composition of previous transfer will be included.
- The entire HIHTL assembly will be considered.
- HIHTL suitability to new and existing equipment will be considered including hose length, need of a midpoint joint, end connection, type of shielding, and mechanical and physical parameters.
- Operational parameters and data included in the extension determination package:
  - Documentation of flushing/test history from the end of campaign to ensure residuals are removed and parameters indicate the line retained its integrity.
  - Percent of the volume of liquid.
  - Percent of the volume of solids.
  - Waste form (e.g., salt cake, sludge, liquid).

- Chemical compatibility.
- Temperature.
- Pressure required for removal and pumping.
- Radiation dosage.

C. The HIHTLs would only be extended if they were not operated outside the specification requirements they were procured to (e.g., RPP-14859, *Specification for Hose-in-Hose Transfer Lines and Hose Jumpers*). Examples for 2-in. hose are listed in the following – in practice, the service life evaluation would be more limiting than these absolute values:

- Primary hose pressure 2-in. hose less than or equal to 425 psig

  Examples of potential controls: Limit over pressurization by design (e.g., pump dead head below required pressure), measurements determined by process control, protection from over pressurization by design (e.g., pressure relief valve settings), and monitoring during retrieval operations.

- Secondary hose pressure less than or equal to 170 psig.

  Examples of potential controls: Open to the pit atmosphere, no pressure source installed. Leak detection within the pits may indicate this parameter's measurements are changing.

- Hose has not been collapsed by vacuum.

  Note: Specification calls for hose to withstand vacuum to -6 in. of water column without collapse.

  Examples of potential controls: Open to the pit atmosphere, no vacuum source installed or rated for vacuum use.

- Tensile force 2-in. primary hose (380 ft long) less than or equal to 3,140 lb.

  Examples of potential controls: Inspection of installation, daily operations observations, and absence of any physical occurrences.

- Tensile force: Secondary hose (380 ft long) less than or equal to 10,240 lb.

  Examples of potential controls: Inspection of installation, daily operations observations, and absence of a physical occurrence.

- Primary and secondary hose temperature: less than or equal to 180°F.

  Examples of potential controls: Temperature bounded by the heat trace during operations, storage temperatures, and data sheets from the thermocouple in the waste.

- Chemical compatibility examples of potential controls:
  - No chemical exposure outside those assumed by engineering evaluation to be compatible.
  - Additional data besides the best-basis inventory, process information, industrial hygiene data, annual operating plan additions, data from retrieved tanks similar in historical mission, and receipt of similar process wastes.

  - Learn from the manufacturer, ASTM International guidance, etc., what class of organic chemicals are of a concern.
  - Possible additional operational constraints (e.g., flushing or chemical additions) may be required or used to extend the operational life of the HIHTL.
  - Sodium hydroxide concentration less than or equal to 50 percent by weight.
- Radiation less than or equal to 100Kgray = 1 x 10^7 Rad.
  - Examples of potential controls:
    - Measurement of the transfer line in the field using a Geiger-Mueller and portable alpha meter and walking the line down, usually every 12 hrs during retrieval with a correction factor for the shielding.
    - Dosage calculations using surveillance data and the best-basis inventory. Surveillance data should be used to validate and support the calculations based on the best-basis inventory and limit the associated uncertainty.

D. A visual inspection of the HIHTL to be witnessed by the IQRPE or his representative for the full length of the HIHTL during transfer of an HIHTL (i.e., physical movement of the HIHTL from one location to another). If HIHTL is not being transferred, IQRPE or his representative to witness movement of any portions of the HIHTL moved.

Observations will focus on stresses, abnormalities, etc. of the secondary hose.

E. A leak test of the HIHTL connections in pits will be performed, which will be witnessed by the IQRPE or his representative. This leak test, in conjunction with the factory pressure tests performed prior to the HIHTL being placed in service, satisfies the **Tightness Testing** requirements specified in 40 CFR 265.192(d). HIHTL connections will not be broken to perform leak inspections of midpoints or at any point in the line that has not been disconnected since its last leak test was performed. If the leak test shows that any HIHTL is found to not be tight, all repair to remedy the leak in the system will be performed prior to the tank system being covered, enclosed, or placed in use.

F. A formal notification of the determination to extend the service life of an HIHTL will be submitted to the Washington State Department of Ecology. The package will include the evaluation, which considers each of the items A through E, reviewed and certified by an IQRPE. The scope of the IQRPE review will be consistent with and satisfy the requirements of 40 CFR 265.192.

G. The completed package to extend the service life of an HIHTL will be placed in the operating record.

H. References

Title 40 CFR 265.192, “Interim Status Standards for Owners and Operators of Hazardous Waste, and Disposal Facilities-Design and installation of new tank systems or components,” *Code* *of Federal Regulations*, as incorporated by WAC 173-303-400(3)(a) and amended and modified by WAC 173-303-400(3)(b) and WAC 173-303-400(3)(c)(ix).

Publication No. 94-114, 1994, "Guidance for Assessing and Certifying Tank Systems that Store and Treat Dangerous Waste," Washington State Department of Ecology, Olympia, Washington.

RPP-14859, 2009, *Specification for Hose-in-Hose Transfer Lines and Hose Jumpers*, Rev. 6, Washington River Protection Solutions, LLC, Richland, Washington.