

ENGINEERING CHANGE NOTICE

Page 1 of 21. ECN **661685**Proj.
ECN

2. ECN Category (mark one)		3. Originator's Name, Organization, MSIN, and Telephone No.		4. USQ Required?	5. Date
Supplemental <input type="checkbox"/>		TD Torres, COGEMA Engr, S7-90 372-2173		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	8-11-00
Direct Revision <input checked="" type="checkbox"/>		6. Project Title/No./Work Order No.		7. Bldg./Sys./Fac. No.	8. Approval Designator
Change ECN <input type="checkbox"/>		Hose in Hose Transfer Lines, Interim Stabilization Engineering		241-S, SX and U	ESQ
Temporary <input type="checkbox"/>		9. Document Numbers Changed by this ECN (includes sheet no. and rev.)		10. Related ECN No(s).	11. Related PO No.
Standby <input type="checkbox"/>		RPP-6153, Rev. 0		N/A	N/A
Supersedure <input type="checkbox"/>		12a. Modification Work		12d. Restored to Original Condition (Temp. or Standby ECNs only)	
Cancel/Void <input type="checkbox"/>		12b. Work Package No.		12c. Modification Work Completed	
		N/A		N/A	
		Design Authority/Cog. Engineer Signature & Date		Design Authority/Cog. Engineer Signature & Date	
13a. Description of Change					
13b. Design Baseline Document? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No					
Direct Revision of RPP-6153 Rev. 0 up to Rev.1.					
14a. Justification (mark one)		14b. Justification Details			
Criteria Change <input checked="" type="checkbox"/>		-This ECN reflects the inclusion of 241-U Tank Farm into the scope.			
Design Improvement <input type="checkbox"/>		-This ECN also incorporates changes to chemical constituents for S/SX tank farms.			
Environmental <input type="checkbox"/>		-This ECN reflects the changes to the organization of personal.			
Facility Deactivation <input type="checkbox"/>		-This modification will not change collective dose since it has no impact on radiological sources, contamination control or shielding.			
As-Found <input type="checkbox"/>		-Design verification selected per HNF-IP-0842, Vol IV Sec. 4.2.4 is informal review.			
Facilitate Const. <input type="checkbox"/>		-USQ tracking number TF-00-0412 Rev.5.			
Const. Error/Omission <input type="checkbox"/>					
Design Error/Omission <input type="checkbox"/>					
15. Distribution (include name, MSIN, and no. of copies)					
W. Zuroff S7-24 1		S. Swaney S7-24 1			
K. Hull T4-07 1		M. Tipps S7-34 1			
M. Koch S7-24 1					
G. Barnes S7-70 1					
T. Torres S7-70 1					
K. Ellingson S7-24 1					
RELEASE STAMP					
<div style="border: 2px solid black; padding: 10px; display: inline-block;"> <p>DATE: <u> </u></p> <p>STA: <u>4</u></p> <p>AUG 16 2000</p> <p>HANFORD RELEASE</p> <p>ID: <u>2</u></p> </div>					

ENGINEERING CHANGE NOTICE

Page 2 of 2

1. ECN (use no. from pg. 1)

661685

16. Design Verification Required

☐ Yes

☒ No

17. Cost Impact

ENGINEERING

Additional ☐ \$ N/A

Savings ☐ \$ N/A

CONSTRUCTION

Additional ☐ \$ N/A

Savings ☐ \$ N/A

18. Schedule Impact (days)

Improvement ☐ N/A

Delay ☐ N/A

19. Change Impact Review: Indicate the related documents (other than the engineering documents identified on Side 1) that will be affected by the change described in Block 13. Enter the affected document number in Block 20.

SDD/DD	<input type="checkbox"/>	Seismic/Stress Analysis	<input type="checkbox"/>	Tank Calibration Manual	<input type="checkbox"/>
Functional Design Criteria	<input type="checkbox"/>	Stress/Design Report	<input type="checkbox"/>	Health Physics Procedure	<input type="checkbox"/>
Operating Specification	<input type="checkbox"/>	Interface Control Drawing	<input type="checkbox"/>	Spares Multiple Unit Listing	<input type="checkbox"/>
Criticality Specification	<input type="checkbox"/>	Calibration Procedure	<input type="checkbox"/>	Test Procedures/Specification	<input type="checkbox"/>
Conceptual Design Report	<input type="checkbox"/>	Installation Procedure	<input type="checkbox"/>	Component Index	<input type="checkbox"/>
Equipment Spec.	<input type="checkbox"/>	Maintenance Procedure	<input type="checkbox"/>	ASME Coded Item	<input type="checkbox"/>
Const. Spec.	<input type="checkbox"/>	Engineering Procedure	<input type="checkbox"/>	Human Factor Consideration	<input type="checkbox"/>
Procurement Spec.	<input type="checkbox"/>	Operating Instruction	<input type="checkbox"/>	Computer Software	<input type="checkbox"/>
Vendor Information	<input type="checkbox"/>	Operating Procedure	<input type="checkbox"/>	Electric Circuit Schedule	<input type="checkbox"/>
OM Manual	<input type="checkbox"/>	Operational Safety Requirement	<input type="checkbox"/>	ICRS Procedure	<input type="checkbox"/>
FSAR/SAR	<input type="checkbox"/>	IEFD Drawing	<input type="checkbox"/>	Process Control Manual/Plan	<input type="checkbox"/>
Safety Equipment List	<input type="checkbox"/>	Cell Arrangement Drawing	<input type="checkbox"/>	Process Flow Chart	<input type="checkbox"/>
Radiation Work Permit	<input type="checkbox"/>	Essential Material Specification	<input type="checkbox"/>	Purchase Requisition	<input type="checkbox"/>
Environmental Impact Statement	<input type="checkbox"/>	Fac. Proc. Samp. Schedule	<input type="checkbox"/>	Tickler File	<input type="checkbox"/>
Environmental Report	<input type="checkbox"/>	Inspection Plan	<input type="checkbox"/>	N/A	<input checked="" type="checkbox"/>
Environmental Permit	<input type="checkbox"/>	Inventory Adjustment Request	<input type="checkbox"/>		<input type="checkbox"/>

20. Other Affected Documents: (NOTE: Documents listed below will not be revised by this ECN.) Signatures below indicate that the signing organization has been notified of other affected documents listed below.

Document Number/Revision

Document Number/Revision

Document Number/Revision

21. Approvals

Signature	Date
Design Authority <u>WF Zuroff</u>	<u>8/15/00</u>
Cog. Eng. <u>SL Swaney</u>	<u>8/14/00</u>
Cog. Mgr. <u>MR Koch</u>	<u>8-14-00</u>
QA <u>MC Tipps</u>	<u>8-15-00</u>
ENVIR. <u>SS (GWB)</u>	<u>8/15/00</u>
Safety <u>LL Parris</u>	<u>8-15-00</u>
SAFETY Environ. <u>LA Flowers</u>	<u>8-15-00</u>
Other _____	
Inf. Rev. <u>GA Barnes</u>	<u>8-14-00</u>
TD Torres <u>Teresa Torres</u>	<u>8-14-00</u>
KJ Hull <u>KJ Hull</u>	<u>08/14/00</u>

Signature	Date
Design Agent _____	
PE _____	
QA _____	
Safety _____	
Design _____	
Environ. _____	
Other _____	

DEPARTMENT OF ENERGY

Signature or a Control Number that tracks the Approval Signature

ADDITIONAL

Engineering Task Plan for Hose-in-Hose Transfer Lines for the Interim Stabilization Program

TD Torres

COGEMA Engineering

Richland, WA 99352

U.S. Department of Energy Contract DE-AC06-96RL13200

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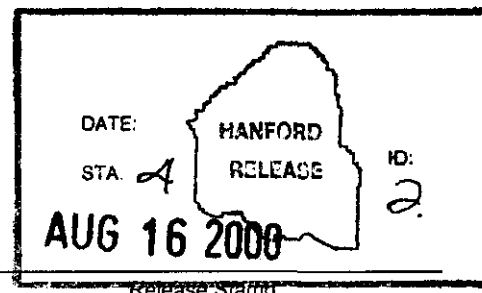
Key Words: S/SX Tank Farms, U Tank Farms, Engineering Task Plan, Hose-in-Hose Transfer Lines, Interim Stabilization Program, Over Ground Transfer Lines, Transfer Line Assemblies

Abstract: The document is the Engineering Task Plan for the engineering, design services, planning, project integration and management support for the design, modification, installation and testing of an over ground transfer (OGT) system to support the interim stabilization of S/SX and U Tank Farms.

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Date



Approved For Public Release

ENGINEERING TASK PLAN
FOR
HOSE-IN-HOSE TRANSFER SYSTEM FOR THE INTERIM STABILIZATION
PROGRAM

By
M. P. Rung
COGEMA Engineering Corporation

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ENGINEERING TASK PLAN FOR HOSE-IN-HOSE TRANSFER SYSTEM FOR THE INTERIM STABILIZATION PROGRAM

1.0 INTRODUCTION

In order to complete the interim stabilization of Single Shell Tanks (SSTs) in the 241-S, 241-SX and 241-U Tank Farms, pumpable liquids must be removed from all of the SSTs in these farms. This task is to provide a double encased hose-in-hose transfer line, suitable for placement on or near the soil surface to be used to convey pumpable liquids from the tanks in these farms to valve pits where the liquids can be routed as desired. See Figure 1 for the 241-S and SX Tank Farms pumping plan and Figure 2 for the 241-U Tank Farm pumping plan. The Interim Stabilization Program is to supply pumps and piping jumpers required to retrieve pumpable liquids for conveyance by the double encased transfer lines.

This plan describes the effort necessary to provide the engineering, design services, planning, project integration and management support for the design, modification, installation and testing of hose-in-hose transfer lines to support interim stabilization in 241-S, 241-SX and 241-U Tank Farms.

This plan does not include the effort necessary to review for repairing existing transfer system equipment or installing transfer lines for other tank farms. However, a preliminary engineering design to replace BY Farm transfer line supporting BY 105 & 106 will be completed by September 30, 2000.

2.0 SCOPE & OBJECTIVE

2.1 Objectives

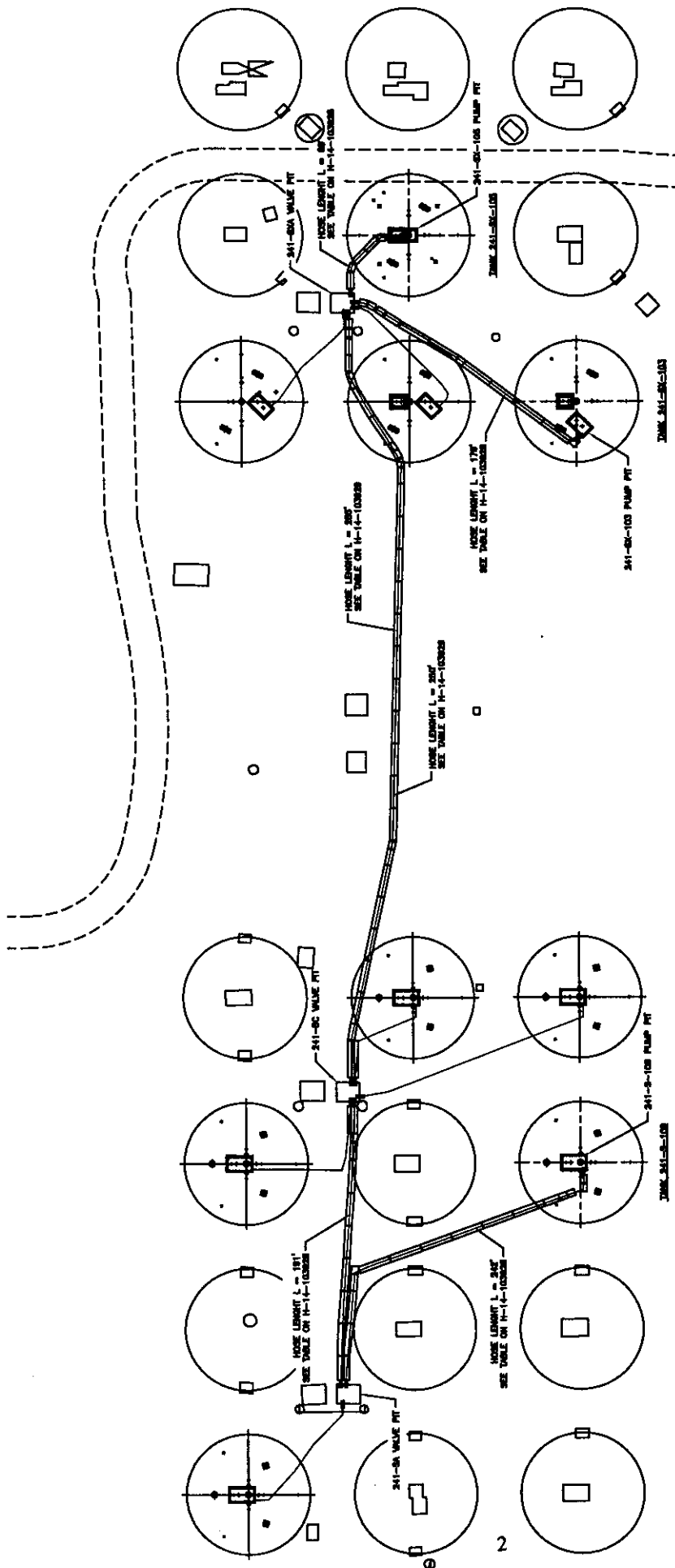
The objective is to design, provide, install and test, hose-in-hose waste transfer assemblies, as shown in Figure 3, so that the Interim Stabilization Program can connect to these transfer lines to pump liquids from nine single shell tanks as shown in Figure 1. The design shall include consideration for removal and disposal of the waste transfer lines.

2.2 Tasks and Deliverables

The deliverables associated with this work scope include the following

2.2.1 Design Tasks

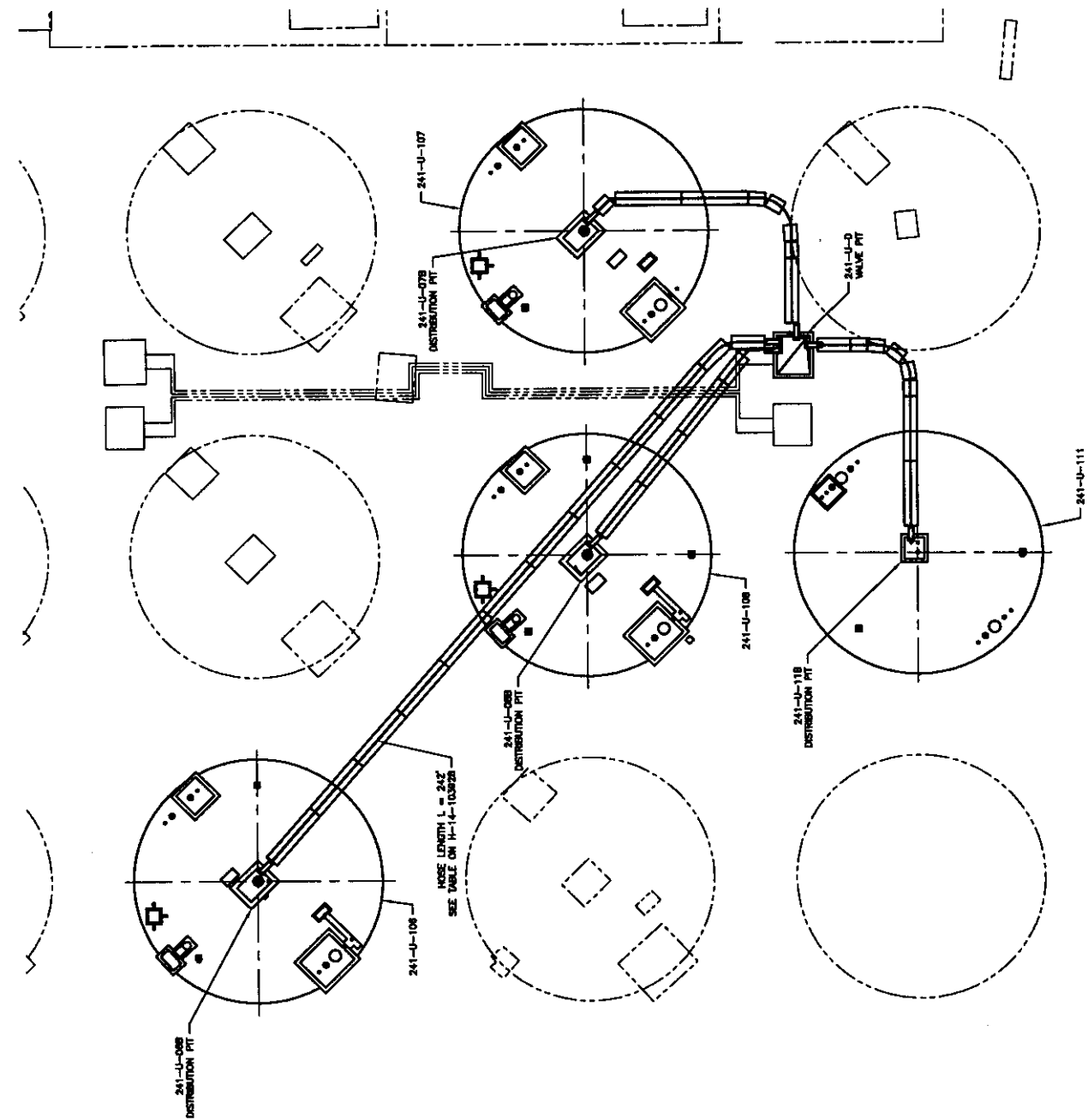
Task 1 – Develop Engineering Task Plan. An engineering task plan prepared in accordance with the guidance provided in RPP-PRO-1819 will cover the engineering, design services, planning, project integration and management support for the design, modification, installation, testing, fabrication, and deployment of hose in hose transfer lines. This plan will delineate which company, organization or department is responsible for each deliverable and how the parties interface with each other. The functional requirements and technical criteria for transfer lines are included in Appendix A of this document.



TANK FARM 241-SX

TANK FARM 241-S

FIGURE 1



TANK FARM 241-U

FIGURE 2

Task 2 – Prepare Interface Drawings. The interface for hose-in-hose transfer lines will be developed based on the functional requirements and technical criteria and the existing tank systems and structures. Interface drawings will include installation details for transfer line equipment where they mate with existing and planned pit covers. Interfaces with electrical systems for hose heat tracing will also be developed.

Task 3 – Prepare a Design. Based on the functional requirements and technical criteria provided in Appendix A, and current River Protection Project (RPP) procedures including HNF -IP-0842 and RPP-PRO-097, a design and procurement specification(s) shall be prepared. The design will include considerations for field installation and operation and hose-in-hose removal and disposal. The hose-in-hose transfer lines will be fabricated and tested by an established hose assembly manufacturer off-site. Some system components may be built on site. The design will rely on existing leak detectors in valve and pump pits. Subsystems within the cognizance of this task plan include:

- Hose-in-Hose transfer lines
- Electrical power (for heat tracing)
- Installation hardware/structures, including shielding box assemblies and shielding plates

For a conceptual description see Section 3.0. For each of these systems several general scope requirements will apply.

The following will be included as part of the design as required:

- Fabrication drawings and test procedures will be developed and issued
- H-14 drawings for the transfer lines and components will be prepared and approved
- A structural analysis report covering the system configuration will be prepared and issued
- Engineering Change Notices (ECNs) will be issued as required to reflect the new proposed field configuration.

Additional documentation will include:

- Test Reports
- Vendor Information Data & Index
- ALARA checklist/dose rate calculation(s)
- As-built drawings
- Commercial Grade Item dedication forms
- Applicable Tank Dome Loading Analysis
- Unreviewed Safety Questions (USQs)

Task 4 – Integrity Assessment. A review of the system integrity of the new systems, structures and components added by this project will be conducted by an independent qualified professional engineer as required and defined in Washington Administrative Code 173-303-640. This review will include the design, installation and testing of the system. Any recommendations shall be incorporated before the transfer lines are used.

Task 5 – Structural Analysis. The analysis of the transfer system configuration will be reviewed and revised as necessary to ensure tank integrity. Dome loading, seismic and wind loads, missile impacts on shielding box assemblies and shielding plate loading will be considered. An overall structural analysis report will be prepared and issued.

Task 6 – Identify Required Environmental Documentation. An evaluation will be performed to identify applicable environmental permits or Notice of Construction(s). If required, the permitting process will be initiated. The scope of this work plan is limited to a level of effort required to support the development of required environmental documentation. The definition and creation of any environmental permitting is the responsibility of the Interim Stabilization Program.

Task 7 – Perform Safety Analysis. Safety analysis and hazards evaluations of the proposed transfer lines must be completed before transfer lines can be used. The scope of this task plan is limited to a level of effort required to support the development of a safety analysis. The definition and creation of a safety analysis is the responsibility of the Interim Stabilization Program. It is planned that an unresolved safety question (USQ) or unresolved safety question determination (USQD) can be used to allow the use of the hose-in-hose transfer system for this application.

Task 8 – Interface with Fabrication and QA/QC Personnel. Interfaces will be maintained between 200 Area Site Fabrication Services and engineering design team members. Project personnel shall also interface as required with cognizant QA/QC personnel.

2.2.2 Procurement Tasks

Task 1 – Procurement Specifications. Procurement specifications will be developed based on the functional requirements and technical criteria provided in Appendix A.

Task 2 – Procure Equipment and Materials. Safety Class and Safety Significant items will be procured in accordance with HNF -IP-0842 Volume IV, Section 5.13, *Procurement of Safety Class Items and Management of Spares*. General service items will be procured in accordance with RPP-PRO-268, *Control of Purchased Items and Services*. Engineering personnel shall provide assistance to procurement and quality organizations in support of these activities.

Task 3 – Travel/Source Inspections. Equipment or materials requiring on-site inspection or acceptance shall be supported.

2.2.3 System Acceptance

Task 1 – Acceptance Criteria. Acceptance criteria will be developed for all equipment fabricated or delivered. For equipment fabricated on-site, an acceptance plan will be defined in the design media. For equipment procured off-site, the acceptance criteria will be detailed in the procurement specifications.

Task 2 – Commercial Grade Item Dedications. Commercial Grade Item (CGI) Dedication forms will be completed as required for Safety Class or Safety Significant items as per HNF-IP-0842, Vol. IV, Sec. 3.11, *Replacement Item Evaluation*, *Commercial Grade Item Dedication* and Vol. IV, Sec. 5.13, *Procurement of Safety Class Items and Management of Spares*.

2.2.4 Testing

Task 1 – Vendor Testing. The hose-in-hose assemblies will be tested at the vendor's facility. Additional components may be tested on site if necessary.

Task 2 – Acceptance Testing. An Acceptance Testing Procedure (ATP) will be prepared and conducted for the identified equipment. Upon completion of testing, an Acceptance Test Report (ATR) shall be generated and released.

2.2.5 Field Deployment

Task 1 – Training. Training will be supported as required. The development of training plans will be the responsibility of Interim Stabilization. Engineering shall provide assistance as requested.

Task 2 – Field Assembly and Installation Support. A planner will be provided by Interim Stabilization Engineering for the preparation of work packages for field assembly and installation. Engineering support for this task shall be provided by Interim Stabilization, as required.

Task 3 – Operational Support. Support will be provided by Interim Stabilization to Operations for the development of required operational procedures or modifications to procedures.

Task 4 – Start-up. Assistance with start-up and operation will be provided on an as-needed basis.

3.0 PHYSICAL DESCRIPTION

This section defines each subsystem in sufficient detail to allow distinct work scopes to be developed for each subsystem. The distinction between each subsystem is provided by:

- providing a general physical description
- describing the general function of each subsystem
- identifying where each sub-system interface begins and ends.

Transfer line assemblies include:

- double contained, hose-in-hose, transfer line assemblies (see Figures 1,2 and 3)
- heat tracing subsystem connected to existing electrical power
- installation hardware/structures.

3.1 Transfer Lines

The transfer line assemblies (of various lengths) consist of a 2" nominal diameter primary hose wrapped in heat tracing and inserted into a 4" nominal diameter secondary hose. Appropriate end connectors will be attached to each end of the primary and secondary hoses to mate-up with piping jumpers supplied and installed by others. The outer hose will be insulated. The transfer line assemblies will be installed on the ground or in the ground no more than 12" deep. A protective and/or radiation shielding cover will be placed over each transfer line assembly. The functional requirements and technical criteria for these assemblies are provided in Appendix A. See Figure 3 for a conceptual design of a typical hose-in-hose transfer line assembly.

3.2 Heat Tracing Subsystem

The 2" nominal diameter primary hose will be wrapped with heat tracing to aid in maintaining acceptable temperatures within the wastes being transferred. Electrical power (tapped from some convenient location) will be required.

3.3 Installation Hardware

Hardware will be developed as required to ensure a safe and reliable installation. The installation hardware will be defined during the detailed design. Some examples of installation hardware may include transfer line anchorage assemblies (hose saddles), road crossing protective trenching and heat tracing mounting rack(s). Existing valve and pump pit cover blocks will be modified or new steel cover plates will be fabricated for pits to allow installation of the hose-in-hose transfer line assemblies. Shield box assemblies will be installed around the transfer line assemblies when they loop over the wall of the pump and valve pits.

4.0 PROJECT SCOPE & ORGANIZATION

A procurement specification will be written for the design, fabrication, testing and delivery of the transfer line assemblies. Some or all end connections may be fabricated at Hanford and shipped to the fabricator of the transfer line assemblies to ensure proper mate-up. Other portions of this work scope will be designed on-site.

The program/project organization to complete the work is provided in Section 4.1 through 4.12.

4.1 River Protection Project – CH2MHILL Hanford Group Inc.

CH2MHILL Hanford Group Inc. (CHG) has the overall responsibility for this effort. CHG has assembled a team for this effort under the control of the Interim Stabilization Program. Support staff from various other departments within CHG will be used when needed to augment the Interim Stabilization Program staff. Interim Stabilization Program will provide funding and overall management/direction. Key organizations and personnel are listed below.

Interim Stabilization Program:

Director: T. L. Hissong
Programs Manager: D. J. Saueressig

Interim Stabilization Engineering:

Cognizant Engineering Manager: M. R. Koch
Interim Stabilization Design Authority: W. F. Zuroff
Interim Stabilization Cognizant Engineer: J. J. Elsen - S and SX Farms
Interim Stabilization Cognizant Engineer: S. L. Swaney - U Farm

Interim Stabilization Operations Manager: M. N. Johnson
Interim Stabilization "Person-in-Charge (fieldwork supervisor): J. L. Hawley/C. W. Peoples

Responsibilities:

Interim Stabilization will have full responsibility and cognizance for the design, installation, and testing of the transfer system prior to formal turnover. Interim Stabilization will participate in the design and fabrication efforts, as an observer, as a minimum.

- Approve revised functions and criteria
- Prepare work package(s) for electrical modifications
- Prepare work package(s) to install the hose-in-hose transfer lines
- Install the hose-in-hose transfer lines
- Perform operational test procedures (OTPs) and functional checks
- Review and approve operating, training and maintenance procedures
- Perform any operational readiness activities
- Accept ownership of the hose-in-hose transfer lines prior to operation
- Operate the equipment when installed

4.2 Single Shell Tank (SST) Cog Engineering

S/SX, U and BY Farms Cognizant Engineering Manager: W. E. Bryan
S/SX Farms Cognizant Engineer: J. N. Doeler
U Farm Cognizant Engineer: K. J. Hull/SX and UFarms Design Authority: P. F. Kison

SST Engineering will assume engineering responsibility and cognizance of the transfer system after formal turnover.

- Review design basis and technical documentation
- Approve design basis and technical documentation and revisions (only Cognizant Engineer, J. N. Doeler or K. J. Hull approval required)

4.3 Design Engineering

Design Engineering Manager: C. E. Hanson (COGEMA Engineering Corporation)
Technical Lead: G. A. Barnes
Engineering/Operations Liason: J. R. Biggs

A multi-company group has been assembled under the design engineering management of C. E. Hanson to conduct/coordinate all of the design, procurement, fabrication, acceptance testing, and product delivery of the hose-in-hose transfer lines for the Interim Stabilization Program. To accomplish this task, a design engineering team and support staff has been assembled to complete the following:

- Prepare this task plan
- Assemble the core team as identified in the following sections
- Delegate the responsibility for the deliverables listed in Section 2
- Identify necessary analysis
- Assist in the coordination of presentations
- Define scope for transfer system-related activities
- Perform cost estimating
- Status overall design effort
- Schedule activities
- Initiate, review and approve procurement of contracts for fixed scope deliverables
- Review, approve, and issue pertinent documents into the PHMC system
- Prepare appropriate commercial grade item (CGI) dedication for vendor fabrication
- Identify required manpower resources
- Provide direction for as-building and design changes
- Direct fabrication shop work as required
- Provide unreviewed safety questions (USQs)
- Prepare Engineering Change Documentation and associated USQs
- Prepare, check and issue mechanical, electrical, and instrument drawings
- Revise drawings/sketches as required
- Review supporting structural design criteria document and revise as necessary
- Provide report(s) documenting the results of all analyses.
- Prepare and issue acceptance test reports (ATRs)
- Specify the QC inspections required and any material requirements
- Prepare and release Acceptance for Beneficial Use to fulfill checklist in Appendix A

The responsibilities associated with this work plan include coordination with other organizations to reach scope, schedule and cost agreement, all approvals and any necessary support.

4.4 Fabrication Activities

Site Fabrication Services Manager: M. A. Butterworth

Site Fabrication Supervisor: L. A. Mercer

Fabrication of selected items needed for transfer line components will be performed on the Hanford site by Site Fabrication Services (Dyncorp). The design team will provide technical direction to the fabrication organization. Site Fabrication Services will be responsible for cost and schedule commitments of fabrication activities. The design team will be responsible for the following:

- Provide all project management and coordination between the design team and Site Fabrication Services
- Provide design
- Provide work order number

- Provide technical direction for any procurement
- Provide technical direction for fabrication work and inspections
- Provide all quality control (QC) inspection criteria
- Approve the turnover package developed by Site Fabrication Services

The safety classification and the approval levels of this task are described in detail in Section 7.0 (Quality Assurance). Shipping and handling instructions will be developed after the design is sufficiently developed.

4.5 SST Radiological Control

Radiological Control Manager: K. W. Gray
Radiological Control Engineers: D. J. Foust

Responsibilities:

- Participate as a design and fabrication team member
- Provide radiological support as a point of contact
- Prepare or assist in preparation of ALARA Management Worksheets (AMWs)
- Support the preparation of work plans for the installation of the hose-in-hose transfer system
- Review training, operating and maintenance procedures as required
- Assist in preparation of the ALARA design review and coordinate reviews required with the ALARA chairman

4.6 SST Quality Assurance

Quality Assurance Manager: M. A. Wright
Quality Assurance Engineers: M. C. Tipps

Responsibilities:

- Participate as a design and fabrication team member as Quality Assurance Representative
- Provide Quality Assurance support. Support the review and approval of work plans for the installation of the hose-in-hose transfer system.
- Review training, operating and maintenance procedures as required

4.7 Industrial Safety

Industrial Safety Manager: M. T. Hughey
Industrial Safety Engineer: L. A. Flowers

Responsibilities:

- Participate as a design review team member
- Provide Industrial Safety support
- Review and approve the installation of the hose-in-hose transfer system
- Review training, operating and maintenance procedures

4.8 Nuclear Safety and Licensing (NS & L)

NS & L Manager: C. E. Leach

NS & L Engineer: R. D. Smith

Responsibilities:

- Review all designs generated. Perform safety analysis as required to address the installation, operation, modifications and removal of the hose-in-hose transfer system.
- Provide new controls if necessary and prepare authorization basis (AB) revision documents.

4.9 Environmental Support

Environmental Manager: B. G. Erlandson

Environmental Representative: P. C. Miller

Responsibilities:

- Provide dedicated environmental review of documentation.
- Negotiate the environmental controls with the Washington State Department of Ecology and other regulators, as required, for this program.

4.10 Process Control

Process Engineering Manager: N. W. Kirch

Process Engineering Lead: D. A. Reynolds

Responsibilities:

- Review the hose-in-hose transfer system functional requirements and technical criteria
- Provide general support

4.11 Plant Support Engineering

Plant Support Manager: A. H. Friberg

Maintenance tasks will be completed in support of the hose-in-hose transfer system. The Vendor Information (VI) data shall be complete and available for procedure verification. A VI index will be developed that will provide the equipment label, a brief description of the equipment and give the VI file and supplement number for each piece of equipment. Design Engineering is responsible for the development of the Vendor Information List, if required per HNF-IP-0842, IV, 4.23. The list will be released as a supporting document.

5.0 QUALITY ASSURANCE

The "quality" management system for this activity is designed to achieve project control and meet our customer's quality requirements as specified in 10 CFR 830.120, *Quality Assurance*. Additional customer quality requirements are derived from the *Hanford Federal Facility Agreement and Consent Order (Tri-Party Agreement)* (Ecology et al. 1994). These quality requirements are transmitted to this activity through RPP-MP-600, *Quality Assurance Program Description (draft)*.

6.0 SCHEDULE

The schedule for this task is provided as Appendix C. This schedule was defined for Fiscal Year 2000 and will be updated when the budget is finalized.

7.0 COST (Fiscal Year 2000)

Engineering, Procurement, Fabrication and Construction Cost Estimate. This cost estimate was defined for Fiscal Year 2000 and will be updated when the budget is finalized.

Hose	\$200,000	(\$169/foot for 1,186 feet)
Shielding	\$190,000	(\$126/foot for 2" x 4'-0 CS plate)
Shielding Rework	\$ 25,000	
Hose End Connections	\$ 25,000	
Pit Hose Support Assemblies	\$ 30,000	
Heat Tracing Stands	\$ 30,000	
Hose Line Connections	\$ 15,000	
Shielding Box Assemblies	\$ 75,000	
Design Team		
• Engineers		
• Designers		
• Operations/Engr. Support		
• Planning	<u>\$671,000</u>	subtotal
	\$1,261,000	Total

Assumptions:

1. Design and fabrication of pump and valve pit covers are by others.
2. Design, fabrication, installation/modification of pit jumpers are by others.

8.0 REFERENCES

- AASHTO, 1989, Standard Specifications for Highway Bridges, 14th edition, American Association of State Highway and Transportation Officials
- ASCE, 1998, Minimum Design Loads for Buildings and Other Structures, American Society of Civil Engineers standard 7-98
- CHG Interoffice Memo File No. 74B20-00-047, *Chemical Characteristics for Liquid Waste in S and SX Tank Farms*, August 2000.
- CHG Interoffice Memo File No. 74B20-00-048, *Chemical Characteristics for Liquid Waste in U Tank Farm*, August 2000.
- HNF-5183, Rev. 0, Tank Farm Radiological Control Manual, CH2M Hill Hanford Group, Inc., Richland, Washington
- HNF-SD-WM-SAR-067, Facility Safety Analysis Report, Rev. 1-H
- HNF-SD-WM-TSR-006, Technical Safety Requirements, Rev. 1-H
- Manual of Steel Construction, 9th Edition, American Institute of Steel Construction, Inc. One East Wacker Drive, Suite 3100, Chicago, IL 60601-2001
- RPP-IP-0842, RPP Administration, CH2M Hill Hanford Group, Inc., Richland, Washington
- RPP-PRO-097, Rev 0, Engineering Design and Evaluation, CH2M Hill Hanford Group, Inc. Richland, Washington
- RPP-PRO-268, Rev. 1, Control of Purchased Items and Services, CH2M Hill Hanford Group, Inc. Richland, Washington
- RPP-PRO-1621, Rev. 0, ALARA Decision-Making Methods, CH2M Hill Hanford Group, Inc. Richland, Washington
- RPP-PRO-1622, Rev. 0, Radiological Design Review Process, CH2M Hill Hanford Group, Inc. Richland, Washington
- RPP-PRO-1819, Rev. 0, Engineering Requirements, CH2M Hill Hanford Group, Inc. Richland, Washington
- WAC 173-303, Dangerous Waste Regulations, Department of Ecology, Washington Administrative Code, State of Washington, Olympia, Washington

APPENDIX A
FUNCTIONAL REQUIREMENTS AND TECHNICAL CRITERIA

APPENDIX A

Functional Requirements and Technical Criteria

1. Hose-In-Hose Transfer Line Assemblies

Application: Transfer of radioactive mixed waste in support of tank stabilization operations.

Description: Double contained transfer line, hose in hose, suitable for placement on or near soil surface.

Functional requirements:

- Primary (inner) hose rated working pressure shall be not less than 375 psig.
- Secondary (outer) hose rated working pressure not less than 60 psig and shall withstand vacuum to a negative 6 inches water column.
- Primary hose burst pressure rating not less than 1500 psig.
- Secondary hose burst pressure rating not less than 300 psig.
- Primary hose tensile strength capable of withstanding axial load equal to weight of hose filled with fluid of specific gravity equal to 1.5 with a factor of safety equal to 2.25.
- Secondary hose tensile strength capable of withstanding axial load equal to weight of hose filled with fluid of specific gravity equal to 1.5 with a factor of safety equal to 2.25.
- Both primary and secondary hoses shall be manufactured in such a manner as to prevent the build up of static charge between the two during their assembly, installation, operation, and dismantling. The use of anti-static rubber products meeting the definition of ASTM D991, Standard Test Method for Rubber Property – Volume Resistivity of Electrically Conductive and Anti-Static Products (resistance between 10^4 and 10^{11} ohms) is required for inner and outer surfaces of the secondary encasement hose, and for the outer surface of the primary hose.
- The primary chemical constituents of the waste to be transferred and their concentration prior to dilution are given in the Chemical Constituents of Undiluted Waste tables below. Table 1 lists chemicals of concern for S/SX Tanks Farms and Table 2 lists chemicals of concern for U Tank Farm as provided from memo in Appendix D. Transfer line materials of construction shall be compatible with the specified waste. Both the primary and secondary hoses shall be of ethylene propylene diene monomer (EPDM) construction for resistance to the radiological attributes of the waste. Material selection, transfer line design, and fabrication shall maximize the useful service life of finished assemblies towards a service life goal of three years.

TABLE 1
CHEMICAL CONSTITUENTS OF UNDILUTED WASTE FOR S/SX TANK FARMS

Chemical Constituent	Concentration, mg/g ¹	Concentration, mg/kg ¹	Concentration, mg/L
Sodium Hydroxide ²	156	156,000	211,000
Ammonia	1.33	1,330	1,800
Total Organic Carbon	4.75	4,750	6,410
Organic Constituent			
Acetate	2.03	2,030	2,740
Formate	2.17	2,170	2,930
Glycolate	0.739	739	998
Oxalate	7.93	7,930	10,700

Notes:

¹Calculated assuming a specific gravity of 1.35

²Based on hydroxide analysis, with a conversion factor of 2.35

TABLE 2
CHEMICAL CONSTITUENTS OF UNDILUTED WASTE FOR U TANK FARM

Chemical Constituent	Concentration, mg/g ¹	Concentration, mg/kg ¹	Concentration, mg/L
Sodium Hydroxide ²	83.0	83,000	116,000
Ammonia	1.29	1,290	1,800
Total Organic Carbon	34.6	34,600	48,400
Organic Constituent			
Acetate	1.10	1,100	1,540
Formate	9.57	9,570	13,400
Glycolate	8.71	8,710	12,200
Iminodiacetate	2.20	2,200	3,080
Nitrilotriacetate	0.957	957	1,340
Oxalate	7.36	7,360	10,300

Notes:

¹Calculated assuming a specific gravity of 1.4

²Based on hydroxide analysis

- The primary hose shall have a nominal inside diameter of 2".
- The secondary hose shall have a nominal inside diameter of 4".
- The minimum bend radius of primary and secondary hoses shall not be greater than 16".
- Primary hose and any appurtenant heat tape shall be designed to be pulled through the secondary line without mechanical damage to any component. The design shall incorporate the static dissipative features described above.

- Primary and secondary hoses, and any appurtenant insulation or heat tracing, shall be suitable for installation in an outdoor environment, in direct contact with soil, shaded from direct sunlight, with an ambient temperature range of -25 degrees F to 130 degrees F.
- The transfer line assemblies shall be capable of operating over an ambient temperature range of 20 degrees F to 110 degrees F.
- Primary and secondary hoses shall be suitable for use at process fluid temperatures ranging from 80 degrees F to 180 degrees F. Transfer line assemblies will incorporate heat tracing and insulation to assist in maintaining this process temperature. The heat tracing and insulation shall be designed to only maintain the temperature of the waste in the primary hose at or above 110 degrees F. Hot water flushing will be required to initially pre-heat the primary hose to a minimum of 110 degrees F. Self regulating electrical heat tracing shall be wrapped in a helical manner around the exterior of the primary hose. The exterior surface of the primary hose, and any appurtenant overwrap required for dissipation of static charges, shall be suitable for direct continuous contact with specified heat tracing (155 degrees F contact temperature).
- The design of the transfer hose assemblies shall be per ASME B31.3, Process Piping; ASME B16.5, Pipe Flanges and Flanged Fittings and Rubber Manufacturers of America Hose Handbook (RMA IP-2). Testing methods shall be per ASTM D380, Standard Test Methods for Rubber Hose. The latest issue and addenda of these national standards and specifications shall govern.
- The secondary hose which functions as a secondary containment barrier to the primary hose shall comply with the WAC 173-303-640 (4) "Containment and detection of releases".
 - The system design shall be capable of detecting a leak of two to three gallons per minute within twenty four hours [WAC 173-303-604 (4) (C) (iii)].
 - The secondary hose shall be equipped with four inch male national pipe thread (NPT) fittings that can be connected with a flushing system to clear any primary system leaks that may develop [WAC 173-303-604 (4) (C) (iv)].

2. Radiological Design Criteria

- The hose-in-hose transfer system shall be designed to keep personnel exposures As Low As Reasonably Achievable (ALARA) in accordance with RPP-PRO-1621, "ALARA Decision-Making Methods" and RPP-PRO-1622, "Radiological Design Review Process".
- The hose-in-hose transfer system shall be designed to simplify the cut-up, dismantlement, removal and packaging of structures, systems and components in accordance with RPP-PRO-1622.
- The hose-in-hose transfer system shall be designed such that access controls to radiation and high-radiation areas meet the requirements of HNF-5183 (latest revision), Tank Farms Radiation Control Manual.

3. Vehicular Traffic Criteria

- The transfer line assemblies shall be installed such as to minimize impacts to vehicular traffic restrictions in and around the tank farms and shall meet the requirements of HNF-SD-WM-TSR-006, Rev. 1-H, Section 5.12, Transfer Controls (concrete barriers shall be placed around the overground portion of each hose-in-hose assembly).
- There shall be no significant load placed on the installed transfer line assemblies from any vehicular traffic. Hose-in-hose assemblies will be protected from vehicular traffic by placing assemblies in a shallow trench and installing steel plate over the assemblies except where the hose-in-hose assemblies come out of the trench at the pit walls.

4. Electrical power

- Electrical power shall be routed and supplied to the hose-in-hose transfer system in accordance with the NFPA 70, 1999 National Electrical Code requirements.
- Electrical power conduit and wiring shall be designed and constructed to allow easy disconnection and removal when no longer required.

5. Structural

- Structural components shall be designed in accordance with the ninth edition of the American Institute of Steel Construction (AISC) manual.

APPENDIX B

ACCEPTANCE FOR BENEFICIAL USE CHECKLIST

Note: The acceptance for beneficial use (ABU) checklist that follows identifies the minimum documentation that is required to be completed prior to turnover of the hose-in-hose transfer system to Operations for beneficial use. Objective evidence of completion of the documentation, such as citation of an Engineering Data Transmittal (EDT) releasing a supporting document, will be required. As a minimum, official turnover requires the approval/agreement of West Tank Farms Operations, Single Shell Tank Engineering, and Maintenance.

ACCEPTANCE FOR BENEFICIAL USE CHECKLIST

<p>ENGINEERING</p> <p>[X] Engineering Task Plan</p> <p>[X] Activity Schedule</p> <p>[] Final Safety Analysis Report</p> <p>[] Interim Safety Basis - update</p> <p>[X] Safety Assessment</p> <p>[X] Safety Equipment List</p> <p>[] Operational Safety Requirements - or update existing</p> <p>[] Operational Safety Document(s) - or update existing</p> <p>[X] Functional Requirements & Technical Criteria</p> <p>[] System Design Description</p> <p>[X] Test Plan/Specifications</p> <p>[X] Acceptance Test Procedures and Final Test Report</p> <p>[] Operational Test Procedures and Final Test Report</p> <p>[] Environmental Impact Statement</p> <p>[] Environmental Report</p> <p>[] Environmental Permit</p> <p>[] Hazardous Waste Disposal Plan/Procedures</p> <p>[] Solid Waste Disposal Plan/Procedure</p> <p>[X] Stress/Seismic Analysis</p> <p>[] Stress/Design Report</p> <p>[] Design Specifications/Report</p> <p>[X] Equipment Specifications</p> <p>[X] Procurement Specifications</p> <p>[] Construction Specification</p> <p>[] Essential Material Specifications</p> <p>[X] Final Design Drawings</p> <p>[X] Installation Drawings</p> <p>[] Installation Work Plan Approval</p> <p>[X] As-built Drawings</p> <p>[X] Interface Control Drawings</p> <p>[] ICFD Drawings</p> <p>[X] Systems Drawings</p> <p>[X] Drawing Tree</p> <p>[X] Incorporate Outstanding Project Generated ECNs</p> <p>[] Balance of Plant Instruments</p> <p>[] Safety/Environmental Compliance Matrix</p> <p>[] Hard to find information including PNNL Reports, NOC Letters, Other Letter reports, etc.</p> <p>[] Project will modify S/SX Farm Index to include Project Drawings, specifications, and vendor index</p> <p>[] Project Index listing all drawings, documents, etc. required for this project. This index will be the final ABU.</p> <p>[X] Commercial grade dedications per HNF-IP-0842, IV 3.11</p> <p>[] Converted vendor drawings into issued Hanford Plant Drawings</p>	<p>MP Rung</p> <p>BH Morrison</p> <p>M. Grigsby</p> <p>RD Smith</p> <p>RD Smith</p> <p>Eng. Task Plan</p> <p>JR Buchanan</p> <p>DJ Moore</p> <p>BW Smyth</p> <p>JR Buchanan</p> <p>JR Buchanan</p> <p>TC Dale</p> <p>TC Dale</p> <p>TC Dale</p> <p>TC Dale</p> <p>TC Dale</p> <p>TC Dale</p> <p>GA Barnes</p> <p>GA Barnes</p>	<p>ADP</p> <p>[] Software Configuration Mgmt Plan</p> <p>[] System Requirements Spec</p> <p>[] Software Design Description</p> <p>[] Software Validation/Verification</p> <p>TRAINING</p> <p>[] Training Plan</p> <p>[] Training Manuals</p> <p>[] Training to Operating Crews</p> <p>[] Training to Maintenance Crews</p> <p>[] Training Mock-Up</p> <p>OPERATIONS/MAINTENANCE</p> <p>[] Operating and Maintenance Manuals</p> <p>[] Operating Procedures</p> <p>[] Surveillance Procedures</p> <p>[] Calibration Procedures</p> <p>[] Preventative Maintenance Proc.</p> <p>[] Repair/Maintenance Procedures</p> <p>[] Functional Check/Test Procedures</p> <p>[] LCO Setpoint Evaluation</p> <p>[] Master Instrument List</p> <p>[] PM/S Datasheets</p> <p>[] Program Instrument Setup Data/Parameters</p> <p>[] Final Joint Safety walkdown by Operations, Engineering, maintenance, and Health Physics Technicians, as appropriate.</p> <p>QUALITY ASSURANCE</p> <p>[X] Inspection Plan</p> <p>[] QAPP</p> <p>[] QAP,P</p> <p>PROCUREMENT</p> <p>[X] Vendor Information Files (VI)</p> <p>[] Comprehensive Equip. List (MEL)</p> <p>[] Spare Parts List</p> <p>[] Spare Parts in Stock</p> <p>MC Tipps</p> <p>GA Barnes</p>
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APPENDIX C
SCHEDULE

										2000																																				
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+ 13MAR00A 30MAY00A 57 0 100																																														
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+ 24APR00A 17MAY00A 5 0 100 DALE																																														
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Run Date										05JUN00 10:29																																				
© Primavera Systems, Inc.																																														

APPENDIX D

CHG Interoffice Memo File No. 74B20-00-047
Chemical Characteristics for Liquid Waste in U Tank Farm

CHG Interoffice Memo File No. 74B20-00-048
Chemical Characteristics for Liquid Waste in S and SX Tank Farms

INTEROFFICE MEMO

CH2MHILL
Hanford Group, Inc.

FF

From: Data Development and Interpretation 74B20-00-047
 Phone: 373-1027
 Date: August 11, 2000
 Subject: CHEMICAL CHARACTERISTICS FOR LIQUID WASTE IN U TANK FARM

To: C. E. Hanson S7-70

Copies: G. A. Barnes S7-70
 J. R. Buchanan S7-70
 J. G. Field JSE R2-12
 L. A. Fort R2-12
 W. F. Zuroff S7-24
 LMS File/LB

- References:
- (1) "Sample Analysis/Tank Results RPP-241," available on the Tank Characterization Database at <http://twins.pnnl.gov/data/datamenu.htm>, dated, August 9, 2000.
 - (2) RPP-6028, "Specification for Hose in Hose Transfer Lines for Hanford's Interim Stabilization Project," Rev. 0, dated April 3, 2000.

The purpose of this memo is to document the bounding chemical concentrations of the liquid waste in tanks 241-U-106, 241-U-107, 241-U-108, and 241-U-111 for the Interim Stabilization Project procurement specification of a hose-in-hose transfer line for use on these tanks (Reference 2). The chemical constituents for which these concentrations were requested are: sodium hydroxide, ammonia, organic carbon, and organic compounds.

Table 1 lists the highest observed concentrations of sodium hydroxide and total organic carbon in liquid waste samples from tanks 241-U-106, 241-U-107, 241-U-108, and 241-U-111 (Reference 1 and Attachment). Table 2 lists the highest concentrations of specific organic compounds observed in these samples. Because of limited ammonia data for these tanks, the ammonia value in Table 1 is taken from the highest ammonia concentration observed in liquid waste samples from tanks containing wastes similar to the wastes in tanks 241-U-106, 241-U-107, 241-U-108, and 241-U-111. Other than the organic compounds listed in Table 2, there are no organic analysis data available for tanks 241-U-106, 241-U-107, 241-U-108, 241-U-111 or for tanks containing similar wastes.

Table 1. Chemical Constituents of Undiluted Waste

Constituent	Concentration, mg/g ¹	Concentration, mg/kg ¹	Concentration, mg/L
Sodium Hydroxide ²	83.0	83,000	116,000
Ammonia	1.29	1,290	1,800
Total Organic Carbon	34.6	34,600	48,400

Notes:

¹Calculated assuming a specific gravity of 1.4²Based on hydroxide analysis

C. E. Hanson

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August 11, 2000

Table 2. Organic Compounds Identified

Constituent	Concentration, mg/g ¹	Concentration, mg/kg ¹	Concentration, mg/L
Acetate	1.10	1,100	1,540
Formate	9.57	9,570	13,400
Glycolate	8.71	8,710	12,200
Iminodiacetate	2.20	2,200	3,080
Nitrilotriacetate	0.957	957	1,340
Oxalate	7.36	7,360	10,300

Note:

¹Calculated assuming a specific gravity of 1.4

If there are any questions regarding this information, please contact me at 373-1027 or Mr. J. G. Field, on 376-3753.

Lm Sasaki

L. M. Sasaki, Engineer II

Data Development and Interpretation

dmn

Attachment

**INTEROFFICE MEMO**

From: Data Development and Interpretation 74B20-00-048
Phone: 373-6343
Date: August 11, 2000
Subject: CHEMICAL CHARACTERISTICS FOR LIQUID WASTE IN S AND SX TANK FARMS

To: C. E. Hanson S7-70

cc: G. A. Barnes S7-70
J. R. Buchanan S7-70
J. G. Field *JGF* R2-12
L. A. Fort R2-12
W. F. Zuroff S7-24
TLL File/LB

- References: (1) "Sample Analysis/Tank Results RPP-241," available on the Tank Characterization Database at <http://twins.pnl.gov/data/datamenu.htm>, dated August 9, 2000.
- (2) RPP-6028, "Specification for Hose in Hose Transfer Lines for Hanford's Interim Stabilization Project," Rev. 0, dated April 3, 2000.

The purpose of this memo is to document the bounding chemical concentrations of the liquid waste in tanks 241-S-101, 241-S-107, 241-S-109, 241-S-111, 241-S-112, 241-SX-101, 241-SX-102, 241-SX-103, and 241-SX-105 for the Interim Stabilization Project procurement specification of a hose-in-hose transfer line for use on these tanks (Reference 2). The chemical constituents for which these concentrations were requested are: sodium hydroxide, ammonia, organic carbon, and organic compounds.

Table 1 lists the highest observed concentrations of ammonia, sodium hydroxide and total organic carbon in liquid waste samples from tanks 241-S-101, 241-S-107, 241-S-109, 241-S-111, 241-SX-101, 241-SX-102, 241-SX-103, and 241-SX-105 (Reference 1). Analytical data from tank 241-S-112 was not available, however the waste in tank 241-S-112 is well represented by the values of the other tanks listed. Table 2 lists the highest concentrations of specific organic compounds observed in these samples. Other than the organic compounds listed in Table 2, there are no organic analysis data available for tanks 241-S-101, 241-S-107, 241-S-109, 241-S-111, 241-SX-101, 241-SX-102, 241-SX-103, and 241-SX-105 or for tanks containing similar wastes. The average specific gravity of 1.35 measured for tanks 241-S-101, 241-S-107, 241-S-109, 241-S-111, 241-SX-101, 241-SX-102, 241-SX-103, and 241-SX-105 was used to convert liquid units to solid units.

Table 1. Chemical Constituents of Undiluted Waste

Constituent	Concentration, mg/g ¹	Concentration, mg/kg ¹	Concentration, mg/L
Sodium Hydroxide ²	156	156,000	211,000
Ammonia	1.33	1,330	1,800
Total Organic Carbon	4.75	4,750	6,410

Notes:

¹Calculated assuming a specific gravity of 1.35²Based on hydroxide analysis, with a conversion factor of 2.35

Table 2. Organic Compounds Identified

Constituent	Concentration, mg/g ¹	Concentration, mg/kg ¹	Concentration, mg/L
Acetate	2.03	2,030	2,740
Formate	2.17	2,170	2,930
Glycolate	0.739	739	998
Oxalate	7.93	7,930	10,700

Note:

¹Calculated assuming the average specific gravity of 1.35

If there are any questions regarding this information, please contact me at 373-6343 or Mr. J. G. Field, on 376-3753.

T. L. Lauricella

T. L. Lauricella, Scientist
Data Development and Interpretation

dmn