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ENGINEERING CHANGE NOTICE

1. ECN 649599

Proj. ECN

2. ECN Category (mark one)	3. Originator's Name, Organization, MSIN, and Telephone No.	4. USQ Required?	5. Date
Supplemental [] Direct Revision [X] Change ECN [] Temporary [] Standby [] Supersedure [] Cancel/Void []	J.L. Gilbert/TFR&SO/R3-47/372-3088	[] Yes [X] No	July 21, 1997
	6. Project Title/No./Work Order No. Tank Farm Restoration & Safe Operations, "Upgrade Scope Summary Report (USSR)"	7. Bldg./Sys./Fac. No. Tank Farms	8. Approval Designator N/A
	9. Document Numbers Changed by this ECN (includes sheet no. and rev.) HNF-SD-W314-RPT-003, Rev. 2	10. Related ECN No(s). N/A	11. Related PO No. N/A

12a. Modification Work	12b. Work Package No.	12c. Modification Work Complete	12d. Restored to Original Condition (Temp. or Standby ECN only)
[] Yes (fill out 81k. 12b) [X] No (NA 81ks. 12b, 12c, 12d)	N/A	N/A Design Authority/Cog. Engineer Signature & Date	N/A Design Authority/Cog. Engineer Signature & Date

13a. Description of Change 13b. Design Baseline Document? [] Yes [X] No

The Upgrades Scope Summary Report (USSR) defines the baseline scope for Project W-314, Tank Farm Restoration and Safe Operations. Changes addressed in this revision to the USSR include: (1) revisions to the project's waste transfer system upgrades which will minimize the amount of construction required within the existing tank farm boundaries; (2) clarification of scope interfaces with Project W-211, Initial Tank Farm Retrieval System; and (3) incorporation of scope previously planned as CENRTC Project W-454, AW Jumper Manifold Upgrade. In addition, the revised Project W-314 scope description focuses primarily upon the project's Phase 1 upgrades supporting TWRS Privatization. Further definition of the W-314 Phase 2 scope will be addressed in a subsequent revision to the USSR.

14a. Justification (mark one)

Criteria Change	[]	Design Improvement	[X]	Environmental	[]	Facility Deactivation	[]
As-Found	[]	Facilitate Const	[]	Const. Error/Omission	[]	Design Error/Omission	[]

14b. Justification Details

See Continuation Page

15. Distribution (include name, MSIN, and no. of copies)

See Distribution Sheet

RELEASE STAMP

DATE: JUL 23 1998 STA: 4 HANFORD RELEASE ID: 38

A-7900-013-2 (05/96) GEF095

ENGINEERING CHANGE NOTICE

1. ECN (use no. from pg. 1): 649599

16. Design Verification Required	17. Cost Impact				18. Schedule Impact (days)	
	ENGINEERING		CONSTRUCTION			
[] Yes	Additional	[] $	Additional	[] $	Improvement	[]
[X] No	Savings	[] $	Savings	[] $	Delay	[]

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 2D.

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

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
N/A	N/A	N/A

21. Approvals

	Signature	Date		Signature	Date
Design Authority: D.E. Bowers	D.E. Bowers	7-23-98	Design Agent		
Proj. Eng.: J.L. Gilbert	J.L. Gilbert	7-23-98	PE		
Proj. Mgr.: J.L. Homan	K.A. Boes for J.L.H	7-23-98	QA		
QA: N/A			Safety		
Safety: N/A			Design		
Environ. N/A			Environ.		
Ops Project Sponsor: R.W. Jacobson	R.W. Jacobson	7/23/98	Other		
Retrieval Program: W.T. Thompson	W.T. Thompson	7/23/98			
DST Manager: R.A. Dodd	R.W. Jacobson for R.A. Dodd	7/23/98			
			DEPARTMENT OF ENERGY		
			Signature or a Control Number that tracks the Approval Signature		
			ADDITIONAL		

JUSTIFICATION

Scoping revisions related to Project W-314's 200 East Area waste transfer system upgrades are based upon the engineering analyses and recommendations documented in HNF-2500, *Waste Transfer Alternative Piping System Description*. The revised waste transfer system configuration will reduce the amount of in-farm construction required, while providing enhanced reliability and operational flexibility in support of the TWRS mission. Clarification of the W-314 scope interfaces with Project W-211 is provided to support detailed planning for the project. Incorporation of the AW jumper manifold upgrades, previously planned as CENRTC Project W-454, was directed by the Tank Waste Retrieval Program in letter, 73000-98-071, dated July 14, 1998. A detailed description of the W-314 Phase 2 upgrades will be provided at a later date, following technical and programmatic assessment of the TWRS mission requirements.

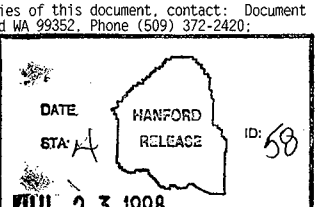
TANK FARM RESTORATION AND SAFE OPERATION, PROJECT W-314, UPGRADE SCOPE SUMMARY REPORT (USSR)

J. L. Gilbert
Numatec Hanford Corporation, Richland, WA 99352
U.S. Department of Energy Contract DE-AC06-96RL13200

EDT/ECN: 649599 UC: 2030
Org Code: 8C620 Charge Code: N311A
B&R Code: EW3120071 Total Pages: 66 67 Rms 7/23/98

Key Words: The Tank Waste Remediation Systems (TWRS), Project W-314, Upgrade Scope Summary Report (USSR), Revision 3.

Abstract: The revision to the Project W-314 Upgrade Scope Summary Report (USSR), incorporates changes to the project scope from customer guidance. Included are incorporation of the recommendations from HNF-2500, agreements regarding interfaces with Project W-211, and assumption of scope previously assigned to Project W-454.



Release Approval 7/23/98 Date

Release Stamp

Approved for Public Release

RECORD OF REVISION

(1) Document Number: HNF-SD-W314-RPT-003

(2) Title

Tank Farm Restoration and Safe Operation, Project W-314, "Upgrade Scope Summary Report (USSR)"

CHANGE CONTROL RECORD

(3) Revision	(4) Description of Change - Replace, Add, and Delete Pages	Authorized for Release	
		(5) Proj. Engr.	(6) Proj. Mgr. Date
RS 3	(7) Total revision ECN 649599	[signature]	KA Bass 7-23-98 for JL Homan
	Rev. 0; EDT 614281; May 6, 1996		
	Rev. 1; ECN 635138; January 7, 1997		
	Rev. 2; ECN 635172; March 19, 1997		

U.S. DEPARTMENT OF ENERGY
HANFORD SITE

TANK FARM RESTORATION AND SAFE OPERATIONS (TFRSO)

PROJECT W-314

UPGRADE SCOPE SUMMARY REPORT

July 23, 1998

Prepared for:

U.S. Department of Energy
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Richland, Washington 99352

Prepared by:

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TANK FARM RESTORATION AND SAFE OPERATION, PROJECT W-314, UPGRADE SCOPE SUMMARY REPORT

EXECUTIVE SUMMARY

The Upgrade Scope Summary Report (USSR) is a sequential element document of the systems engineering process that is used to identify, in summary fashion, the work included in the W-314 project scope. The purpose of the W-314 Project is to restore and/or upgrade existing Hanford Tank Farm facilities and systems to ensure that the Tank Farm infrastructure will be able to support the continued safe management of tank waste. The W-314 original Project USSR was specifically designed to define the scope on which to base development of a Conceptual Design Report (CDR). The upgrades defined in this document support the infrastructure necessary for the TWRS mission of managing tank waste.

Section I provides the Introduction for this document. This section contains general information on how and why the USSR was developed, the background information that was used to define the scope, and establish the basis of how the USSR is integrated into the document hierarchy for the W-314 Project. Section 2, Upgrade Scope Summary, provides an overview of the Project W-314 scoping process and a listing of the specific scope elements current at the time of this revision. Section 3 presents a synopsis of the initial risk assessment efforts for this task and identifies the next iteration of risk assessment. Section 4 is the Actions and Requirements, which describes the future mission requirements, and conclusions of the scoping process.

The appendices provide supporting information. Appendix A lists and identifies the acronyms and abbreviations contained in this document. Appendix B provides a listing of references germane to the USSR effort. Appendix C provides a crosswalk from the specific scope items in the USSR to the requirement or driver that determined inclusion in the scope.

Significant changes to Project W-314 scope identified by this revision to the USSR include:

Phase 1:

- Deletion of the new transfer line between 241-AN-B Valve Pit and the 241-AZ-02A Central Pump Pit
- Deletion of the new transfer line between 241-AX-B Valve Pit and the 241-AZ-02A Central Pump Pit
- Deletion of the new transfer line between 241-AX-B Valve Pit and the 241-A-B Valve Pit
- Deletion of the new transfer line between 241-AX-B Valve Pit and the 241-AY-02A Central Pump Pit
- Deletion of all scope related to 241-AX-B and 241-A-B Valve Pits
- Addition of new transfer lines that provide a waste transfer route from the existing cross-site transfer line to the 241-AN Tank Farm
- Addition of new transfer lines from 241-AZ-01A and 241-AY-02A Central Pump Pits to the new AZ Valve Pit
- Addition of new transfer line from 241-AN-04A Central Pump Pit to 241-AP-04D Pump Pit
- Addition of new transfer line from 241-AN-01A Central Pump Pit to the new AZ Valve Pit
- Addition of new transfer lines from the new AZ Valve Pit to 241-AP Valve Pit and the HLW Privatization contractor interface located east of tank 241-AP-104
- Adding a new valve pit located outside the 241-AZ Tank Farm

- Changing of the classification of the pit leak detection systems, transfer line encasements, and the cover blocks from "General Services" to "Safety Class"
- Addition of W-454 scope for providing jumper/valve manifolds and new cover blocks for 241-AW-A and -B Valve Pits

Phase 2:

- Deletion of scope related to selected cleanout boxes
- Deletion of cross-site reroute bypassing 244-A DCRT to the 241-AN-A and -B Valve Pits (Phase 2)
- Addition of scope to provide a bypass around 241-A-A Valve Pit for transfer lines LIQW-702 and SN-220 and bring into compliance as required. Scope related to 241-A-A Valve Pit was deleted in Phase 1
- Deletion of all scope related to 241-AX-A and 241-A-A Valve Pits
- Upgrading the classification of the ventilation systems and CAMs to Safety Class

Additionally, this revision of the USSR has changed the format and detail of the scope descriptions in section 2.0.

1.0 INTRODUCTION

This section provides general information on how and why the USSR was developed, identifies the background information that was used to establish the scope, and presents an explanation of how the USSR fits into the document hierarchy for the W-314 Project.

1.1 Background

The mission of the Tank Waste Remediation System (TWRS) Program is to store, treat, and immobilize highly radioactive tank waste in an environmentally sound, safe, and cost-effective manner. Within this program, "Tank Farm Restoration and Safe Operations" (TFRSO), Project W-314, has been established to provide major upgrades in the areas of instrumentation and control, tank ventilation, waste transfer, and electrical distribution for existing DST tank farm facilities.

The purpose of the W-314 Project is to restore and/or upgrade existing Hanford Tank Farm facilities and systems to ensure that the Tank Farm infrastructure will be able to support the continued safe management of tank waste. The capital improvements provided by this project will increase the margin of safety for Tank Farms operations, and will aid in aligning affected Tank Farm systems with requirements from applicable, state, Federal, and local regulations. Secondary benefits will be realized subsequent to project completion in the form of reduced equipment down-time, reduced health and safety risks to occupational workers, reduced operating and maintenance costs, and minimization of exposure to the environment from radioactive and/or hazardous material releases.

1.2 Scope and Purpose

The USSR is a key element required for defining the scope of Project W-314 .The initial USSR, with DOE-RL comments incorporated, was released on May 16, 1996. This provided the initial scope for the Conceptual Design Report (CDR), WHC-SD-W314-CDR-001, Rev 0. Subsequent to this, additional information was identified to help clarify the scope. Revision 1 of the USSR represented a refinement of the project scope and supporting requirements from which the CDR, Revision 1, was developed.

Revision 2 of the USSR incorporated changes identified by engineering studies, documented requirements interpretations, operational concepts, and newly developed technical specifications.

Revision 3 of the USSR incorporates changes identified by newly developed operational concepts and technical studies (i.e., HNF-2500) and adds scope previously contained with CENRTC Project W-454.

1.3 Document Interfaces

The Systems Engineering-Statement of Work (SE-SOW) directed the preparation of certain documents in support of the systems engineering process for Project W-314, including the "Facility Assessment Summary Report" (FASR) WHC-SD-W314-ES-023, Rev 0, the USSR, and CDR.

The FASR correlates the data gathered to describe the existing conditions, required upgrades, and

the definition of the upgrade work scope. Input documents include (among others) the Mission Analysis Report, Condition Assessment Surveys, Resource Allocation Sheets, and the Project W-314 preliminary Design Requirements Document (DRD). The FASR provided the initial data used for programmatic decisions concerning development of the Upgrades Scope Summary Report (USSR).

The W-314 FASR was prepared as a summarized report that documents the process used to determine acceptability or deficiency status of the systems, subsystems and/or components appraised during the initial Tank Farm systems assessments. The task involved the utilization of both historical and real-time evaluations to determine the status and conditions of the systems, subsystems, and components that potentially fall within the W-314 project scope. This systems assessment overview included walkdowns of the pertinent facilities, interviews, studies, and evaluations as needed to define the requirements for upgrades.

The USSR provides a link between the evaluation of existing conditions and required upgrades as defined by the FASR, emergent issues, and identified future requirements. The CDR translates the general scoping identified in the USSR into individual scope for structure/system/component (SSC) upgrades and provides the initial basis for cost and schedule baselines.

2.0 UPGRADE SCOPE SUMMARY

The systems inspections and assessments conducted prior to baselining the scope of Project W-314 provided the information utilized as the basis of the FASR. Emergent requirements, identified future needs, and further investigation into data obtained during the assessments have resulted in scope beyond that developed from the FASR. This revision to the USSR incorporates the scope changes currently identified for Project W-314.

2.1 Scope Summary Process

The primary objectives of the system assessment were to determine if the functionality of existing systems is sufficient to fulfill the mission requirements defined in the preliminary Design Requirements Document (DRD) and to determine if the life expectancy of the existing systems would be sufficient for the mission duration. The DRD defines the system functionality required to meet the mission for a duration of 35 years. Tank Farm infrastructure systems addressed by the DRD are:

- Piping Systems
- Ventilation Systems
- Instrumentation and Controls
- Electrical Systems

The screening process conducted during the development of the FASR identified two types of requirements and related scopes of work; those that are to be included in the W-314 Project, and those to be excluded from the W-314 Project (the 'Other' category) The initial elements of work to be included in the W-314 Project scope are presented in detail in the Functions Assessment Tables (FATs) included with the initial assessment reports.

Revision 1 included future requirements, trade study results, and emergent information that was available.

Revision 2 to the USSR adjusted the W-314 scope to incorporate Alternative Generation Analysis (AGA) findings, revised requirements resulting from Project Development Specifications (PDS), clarified regulatory requirements, and operations functional requirements as identified by Project Design Concepts (PDC).

This revision to the USSR adjusts the W-314 scope to incorporate the new alternative transfer line option that was proposed in HNF-2500, "W-314 Waste Transfer Alternative Piping System Description" and validated by a Value Engineering session. In general, the new transfer lines provide waste transfer routing from the existing cross-site transfer line in the vicinity of the 244-A DCRT to the AP Tank Farm with connections to the AN, AY and AZ Tank Farms. The pipe routing follows a path that goes around the A-Farm complex. Additionally, the scope of previous Project W-454 is added to Project W-314.

2.2 Scope Summary

The criteria used to define the scope of W-314 are as follows:

1. Systems shall be provided and/or upgraded to support the TWRS Manage Tank Waste (MTW) function, Tri-Party Agreement (TPA) milestones, and retrieval Privatization needs. Formally identified requirements necessary for future needs will be evaluated for inclusion in W-314 as appropriate.

2. Systems shall be designed in such a manner as to ensure safety in the following areas:

   a. Off-Site Exposure
   b. Environment Exposure
   c. Personnel Safety
   d. System Safety

3. Systems shall perform such that the tank farm mission to Manage Tank Waste is satisfied (i.e. meets requirements documented in the DRD).

4. Systems shall be capable of performing requirements for the duration of the mission.

5. Systems shall comply with legal/regulatory constraints

6. Systems shall be capable of efficient operation as measured in terms of:

   a. Reliability, Availability, Maintainability
   b. Operability

7. System modification and replacement decisions shall consider applicable life cycle costs in the areas of:

   a. Design
   b. Construction
   c. Operations
   d. Support

2.2.1 Phase 1

Phase 1 scope of Project W-314 includes those scope elements necessary to support the TWRS Privatization mission, waste feed delivery.

2.2.1.1 AN Tank Farm Upgrades

The scope of work for the AN Tank Farm Upgrades includes jumper/valve manifolds with position sensors, new pit and encasement leak detection systems, special protective coating applied to the pits, cover block modifications or replacements, and electrical upgrades to support the monitoring instrumentation upgrades and new 200E waste transfer lines.

2.2.1.1.1 Electrical Scope

- Electrical power shall be provided for the new leak detection systems.
- The pipe stubouts used for the future flush/diluent lines (provided by Project W-211) shall be connected to the existing cathodic protection system.

2.2.1.1.2 Instrumentation and Control Scope

Leak Detection Systems

- New functionally testable pit leak detection systems shall be provided for 241-AN-A and -B Valve Pits and 241-AN-01A and -04A Central Pump Pits. The new pit leak detection system shall allow for easy removal without removing the cover blocks. The leak detection signals shall be connected directly to the new MPS system.
- The encasement leak detection system for 3"SN-268-M25 shall be replaced with new functionally testable systems. The leak detection signals shall be connected directly to the new MPS system.
- A new functionally testable encasement leak detection system for new transfer line in 241-AN-01A Central Pump Pit shall be provided. The leak detection signals shall be connected directly to the new MPS system.

Valve Position Systems

- Valve position systems shall be provided for all the valves installed as part of the jumper/valve manifolds in 241-AN-A and -B Valve Pits and 241-AN-01A Central Pump Pit (excludes remote encasement drain valves system). These position systems shall be located above the cover blocks to facilitate maintenance with the signals from these systems connected directly into the new MPS system.

2.2.1.1.3 Piping Scope

Jumper/Valve Manifolds

- New jumper/valve manifolds shall be provided in 241-AN-A and -B Valve Pits and 241-

AN-01A Central Pump Pit. There will be two separate manifolds in each valve pit. One manifold in each pit shall connect 2-inch nozzles and the other shall connect 3-inch nozzles. The following nozzles shall be connected together by the manifold arrangement:

241-AN-A

3-inch: L1, L14, L15, L16, L19
2-inch: L3, L5, L7, L9

W-211 Interface: allowance shall be made in the 3-inch manifold for future connection of a jumper to new nozzle L21; new W-211 3" flush/diluent line; and a future jumper (provided by W-211) that will cross-tie the 2-inch and 3-inch manifold.

241-AN-B

3-inch: R14, R15, R16, R19
2-inch: R5, R7, R9, R20 (new)

241-AN-01A

3-inch: A, C, D, G, and existing pump P-001 discharge

All manifold arrangements shall use a combination of 3-way valves and 2-way block valves.

The valves in the manifolds shall be manually operated from above the cover blocks.

Valve Pit Modifications

- A new 3-inch nozzle (L21) shall be provided in the 241-AN-A Valve Pit for a new 3-inch flush line. This line shall be terminated outside the pit wall and Project W-211 will provide the flush line connection.

- A new 2-inch nozzle (R20) shall be provided in the 241-AN-B Valve Pit for a new 2-inch flush line. This line shall be terminated outside the pit wall and Project W-211 will make the connection of the flush line.

Note: 2-inch jumper/valve manifold system will be used for flush/diluent delivery only. Waste transfers will not occur through this system.

- Two new 3-inch nozzles and encasement drain systems shall be provided in 241-AN-01A Central Pump Pit. These nozzles are for the new waste transfer lines that connect to the pit.

- A new 3-inch nozzle and encasement drain system shall be provided in 241-AN-04A Central Pump Pit. This nozzle is for the new waste transfer line that connects to the pit.

Cover Blocks

- New cover blocks shall be provided for 241-AN-A and -B Valve Pits. These new cover

blocks shall be provided with penetration for the manifold valve operators, pit leak detection system, gas sampling ports, washdown ports, and inspection ports.

- Modifications will be made to the existing cover blocks 241-AN-01A and -04A Central Pump Pits. These modifications shall be provided for the manifold valve operators, drain valve operators, and pit leak detection system, as required.

Special Protective Coatings

- A Special Protective Coating (SPC) shall be applied to the walls and floor of 241-AN-A and -B Valve Pits. Additionally, the SPC shall be applied to the tops and bottoms of the new cover blocks. This SPC is provided to facilitate decontamination of the pits and cover blocks in the future.

- The existing Special Protective Coating (SPC) shall be repaired, as necessary, to facilitate future pit cleanup in 241-AN-01A and -04A Central Pump Pits.

2.2.1.2 AZ Tank Farm Upgrades

The scope of work for the AZ Tank Farm Upgrades includes new pit and encasement leak detection systems, new pump pit nozzles, a new waste transfer line between the two central pump pits, new waste transfer line to the new AZ Valve Pit, cover blocks modifications, and electrical upgrades to support the instrumentation upgrades.

2.2.1.2.1 Electrical Scope

- Electrical power shall be provided for the new leak detection systems.

- Cathodic protection shall be provided to the new transfer line between 241-AZ-01A and -02A (SN-631) Central Pump Pits.

2.2.1.2.2 Instrumentation and Control Scope

Leak Detection Systems

- New functionally testable pit leak detection systems shall be provided for 241-AZ-01A and -02A Central Pump Pits. The new pit leak detection system shall allow for easy removal without removing the cover blocks. The leak detection signals shall be connected directly to the new MPS system.

- A new functionally testable encasement leak detection system shall be provided for the new transfer line between 241-AZ-01A and -02A (SN-631) Central Pump Pits. The leak detection signals shall be connected directly to the new MPS system.

- A new functionally testable encasement leak detection system shall be provided for the new transfer line between 241-AZ-01A Central Pump Pit and the new AZ Valve Pit (SN-632). The leak detection signals shall be connected directly to the new MPS system.

2.2.1.2.3 Piping Scope

Jumper Arrangements

- A flexible jumper (temporary) shall be provided in 241-AZ-01A and -02A Central Pump Pits. The flexible jumper will be of a sufficient length to connect new nozzle U11 in 241-AZ-01A Central Pump Pit to any other nozzle and from new nozzle U13 in 241-AZ-02A Central Pump Pit to any other nozzle.

Note: a permanent jumper/valve manifold will be provided by W-521 for 241-AZ-01A Central Pump Pit and by W-211 for 241-AZ-02A Central Pump Pit.

Central Pump Pit Modifications

- New 3-inch nozzle (U11) (with encasement thru the pit wall) shall be provided in 241-AZ-01A Central Pump Pit for the new 3-inch line that shall be run between the two central pump pits.

- New 3-inch nozzle (U13) (with new encasement drain piping thru the pit wall with low point leak detection jumper and a 3-position drain valve in the pit) shall be provided in 241-AZ-02A Central Pump Pit for the new 3-inch line that shall be run between the two central pump pits.

- New 3-inch nozzle (U12) (with new encasement drain piping thru the pit wall with low point leak detection jumper and a 3-position drain valve in the pit) shall be provided in 241-AZ-01A Central Pump Pit for the new 3-inch line that shall be run between the 241-AZ-01A Central Pump Pit and the new AZ Valve Pit located east of the 241-AZ Tank Farm.

New Transfer Lines

- A new 3-inch waste transfer line (SN-631), with a 6-inch encasement, shall be provided between 241-AZ-01A and -02A Central Pump Pits.

- A new 3-inch waste transfer line, with a 6-inch encasement, shall be provided between 241-AZ-01A Central Pump Pit and the new AZ Valve Pit located east of the 241-AZ Tank Farm.

Cover Blocks

- The existing cover blocks for 241-AZ-01A and -02A Central Pump Pits shall be modified with penetrations for the encasement drain valve operators and the pit leak detection systems, as required.

Special Protective Coatings

- Existing Special Protective Coating (SPC) shall be repaired, as necessary, to facilitate future pit cleanup in 241-AZ-01A and -02A Central Pump Pits.

2.2.1.3 AY Tank Farm Upgrades

The scope of work for the AY Tank Farm Upgrades includes new pit and encasement leak detection systems, new central pump pit nozzles, a new waste transfer line between the two central pump pits, cover blocks modifications, and electrical upgrades to support the instrumentation upgrades.

2.2.1.3.1 Electrical Scope

- Electrical power shall be provided for the new leak detection systems.
- Cathodic protection shall be provided to the new transfer line between Pump Pits 241-AY-01A and -02A (SN-635).

2.2.1.3.2 Instrumentation and Control Scope

Leak Detection Systems

- New functionally testable pit leak detection systems shall be provided for 241-AY-01A and -02A Central Pump Pits. The new pit leak detection system shall allow for easy removal without removing the cover blocks. The leak detection signals shall be connected directly to the new MPS system.
- A new functionally testable encasement leak detection system shall be provided for the new transfer line between 241-AY-01A and -02A (SN-635) Central Pump Pits. The leak detection signals shall be connected directly to the new MPS system.

2.2.1.3.3 Piping Scope

Jumper/Valve Manifolds

Note: The jumper/valve manifold for 241-AY-01A will be addressed in Phase 2 of Project W-314. The jumper/valve manifold for 241-AY-02A will be provided by Project W-211.

Valve Pit Modifications

- New 3-inch nozzle (U13) (with new encasement drain piping thru the pit wall with low point leak detection jumper and a 3-position drain valve in the pit) shall be provided in 241-AY-01A Central Pump Pit for the new 3-inch line that shall be run between the two central pump pits.
- New 3-inch nozzle (U12) (with encasement thru the pit wall) shall be provided in 241-AY-02A Central Pump Pit for the new 3-inch line that shall be run between the two central pump pits.
- New 3-inch nozzle (U5) (with encasement thru the pit wall) shall be provided in 241-AY-02A Central Pump Pit for the new 3-inch line that will be run between 241-AY-02A Central Pump Pit and the new AZ Valve Pit located east of the 241-AZ Tank Farm.

New Transfer Lines

- A new 3-inch waste transfer line (SN-635), with a 6-inch encasement, shall be provided between 241-AY-01A and -02A Central Pump Pits.

- A new 3-inch waste transfer line, with a 6-inch encasement, shall be provided between 241-AY-02A Central Pump Pit and the new AZ Valve Pit located east of the 241-AZ Tank Farm.

Cover Blocks

- The existing cover blocks for 241-AY-01A and -02A Central Pump Pits shall be modified with penetrations for the valve operators and the pit leak detection systems, as required.

Special Protective Coatings

- Existing Special Protective Coating (SPC) shall be repaired, as necessary, to facilitate future pit cleanup in 241-AY-01A and -02A Central Pump Pits.

2.2.1.4 AW Valve Pit Upgrades

The scope of work for the AW Valve Pit Upgrades includes new pit leak detection systems, new position sensors on the new jumper/valve manifolds, new jumper/valve manifolds, special protective coating applied to the pits, cover block modifications, and electrical upgrades to support the instrumentation upgrades.

2.2.1.4.1 Electrical Scope

- Electrical power shall be provided for the new leak detection systems.

2.2.1.4.2 Instrumentation and Control Scope

Leak Detection Systems

- New functionally testable pit leak detection systems shall be provided for 241-AW-A and -B Valve Pits. The new pit leak detection system shall allow for easy removal without removing the cover blocks. The leak detection signals shall be connected directly to the new MPS system.

Valve Position Systems

- Valve position systems shall be provided for all the valves installed as part of the jumper/valve manifolds in 241-AW-A and -B Valve Pits (excludes remote encasement drain valves system). These position systems shall be located above the cover blocks to facilitate maintenance with the signals from these systems connected directly into the new MPS system.

2.2.1.1.3 Piping Scope

Jumper/Valve Manifolds

- New jumper/valve manifolds shall be provided in 241-AW-A and -B Valve Pits. There will be two separate manifolds in each pit. One manifold in each pit shall connect 2-inch nozzles and the other shall connect 3-inch nozzles. The following nozzles shall be connected together by the manifold arrangement:

  241-AW-A

  3-inch: L1, L2, L14, L15, L16, L17
  2-inch: L3, L4, L7, L9

  241-AW-B

  3-inch: R14, R15, R16, R17
  2-inch: R3, R4, R7, R9

Note: The existing AW flushing system shall be connected to the 3-inch manifold system (nozzles L17 & R 17).

All manifold arrangements shall use a combination of 3-way valves and 2-way block valves.

The valves in the manifolds shall be manually operated from above the cover blocks.

Cover Blocks

- New cover blocks shall be provided for 241-AW-A and -B Valve Pits. These new cover blocks shall be provided with penetration for the manifold valve operators, pit leak detection system, gas sampling ports, washdown ports, and inspection ports.

Special Protective Coatings

- A Special Protective Coating (SPC) shall be applied to the walls and floor of 241-AW-A and -B Valve Pits. Additionally, the SPC shall be applied to the tops and bottoms of the new cover blocks. This SPC is provided to facilitate decontamination of the pits and cover blocks in the future.

2.2.1.5 200E Waste Transfer System Upgrades

A set of new transfer lines that provide a waste transfer route from the existing cross-site transfer line to the 241-AN Tank Farm, with connections from the 241-AN Tank Farm to the 241-AP, 241-AZ, and 241-AY Tank Farms shall be provided. The following sections provide the specific scope of these lines.

2.2.1.5.1 Electrical Scope

- Electrical power shall be provided for the new leak detection systems.

2.2.1.5.2 Instrumentation and Control Scope

Leak Detection Systems

- New functionally testable pit leak detection systems shall be provided for the new AZ Valve Pit and 241-AP Valve Pit. The new pit leak detection systems shall allow for easy removal without removing the cover blocks. The leak detection signals shall be connected directly to the new MPS system.

- New functionally testable low point encasement leak detection system for the new transfer lines that connect to 241-AY-02A Central Pump Pit, 241-AP Valve Pit, and the PC interface point in 241-AP Tank Farm. The leak detection signals shall be connected directly to the new MPS system.

- The continuous leak detection system that is installed in the existing cross-site transfer lines will be utilized in the transfer lines that are routed from the cross-site transfer line interface point to the 241-AN Tank Farm.

Valve Position Systems

- Valve position systems shall be provided for all the valves installed as part of the jumper/valve manifolds in the new AZ Valve Pit (excludes remote encasement drain valves system). These position systems shall be located above the cover blocks to facilitate maintenance with the signals from these systems connected directly into the new MPS system.

- The existing position switches that are part of the existing valves in the 241-AP Valve Pit shall be connected to the new MPS system.

- Valve position systems shall be provided for the new valves installed by Project W-314 in 241-AP Valve Pit.

2.2.1.5.3 Piping Scope

Cross-Site Transfer Line Reroute

New Pipelines

- Two transfer lines shall be routed from the existing cross-site transfer line. The WT-SLL-3160 transfer line will be routed to a riser on Tank 241-AN-104 while the WT-SNL-3150 transfer line shall be routed to 241-AN-01A Central Pump Pit. The two new transfer lines shall connect directly to the existing cross-site transfer lines just west of the 244-A lift station.

The new transfer lines shall be routed, as much as possible, above grade on an earthen berm. The route for the transfer lines shall be around the existing east tank farms, outside the fences of the farms.

Cross-Site Transfer Line Tie-In

The new transfer lines will tie-in directly to the cross-site transfer lines at a point west of the 244-A lift station. These new lines will extend the continuous leak detection system that is installed in the cross-site transfer line to the two end points in the 241-AN Tank Farm.

200E Waste Transfer Line Replacements

New Pipelines

- One new transfer line shall be routed from 241-AN-04A Central Pump Pit to new 241-AP-04D Pump Pit (provided by Project W-211).

- One new transfer line shall be routed from 241-AN-01A Central Pump Pit to the new AZ Valve Pit located just east of Tank 241-AZ-101.

- Two new transfer lines shall be routed from the new AZ Valve Pit located just east of Tank 241-AZ-101 to the 241-AP Tank Farm. One of the transfer lines shall be routed to 241-AP Valve Pit and the other line shall be routed to the High-Level Waste interface point for the privatization contractors.

The new transfer lines shall be routed, as much as possible, above grade on an earthen berm. The route for the transfer lines shall be around the existing east tank farms, outside the fences of the farms.

Jumper/Valve Manifolds

- All the nozzles that have a new transfer line associated with them shall be connected together as a manifold in the new AZ Valve Pit.

- New valved jumper system shall be provided in 241-AP Valve Pit to connect nozzles 14 and 16 with the existing jumper manifold system.

All manifold arrangements shall use a combination of 3-way valves and 2-way block valves.

The valves in the manifolds shall be manually operated from above the cover blocks.

Valve Pit Modifications

- Core drill nozzle 16 in 241-AP Valve Pit and replace with a stainless steel nozzle and pipe stubout for the new 3-inch line that shall be routed to the new AZ Valve Pit.

Cover Blocks

- New cover blocks shall be provided for the new AZ Valve Pit. The new cover blocks shall be provided with penetration for the manifold valve operators, pit leak detection system, gas sampling ports, washdown ports, and inspection ports.

- Modifications will be made to the existing cover blocks for 241-AP Valve Pit. These modifications shall be provided for the manifold valve operators, drain valve operators, and pit leak detection system, as required.

Special Protective Coatings

- A stainless steel liner shall be provided for the new AZ Valve Pit and the cover blocks.
- The existing Special Protective Coating (SPC) shall be repaired, as necessary, to facilitate future pit cleanup in 241-AP Valve Pit.

New AZ Valve Pit

- A new valve pit shall be provided outside the 241-AZ Tank Farm
- A pit drain that drains back to Tank 241-AZ-101 shall be provided for the new AZ Valve Pit.
- Five 3-inch nozzles (with associated 2-inch drain nozzles) shall be provided for the new transfer lines that are routed to the new pit.
- Four spare nozzles shall be provided for the new AZ Valve Pit.

2.2.1.6 Master Pump Shutdown System

The existing Master Pump Shutdown (MPS) system shall be replaced with a Programmable Logic Controller/Human Machine Interfaces (PLC/HMI) based system. This system shall provide transfer flexibility, increased reliability, and future expandability to accommodate future system needs. The specific scope includes:

- PLC Network Nodes which include PLC, Input/Output (I/O) modules for PLC connections to existing MPS system relay inputs and transfer pump interlock relays located inside the Instrument buildings, PLC-to-PLC shutdown network connections, PLC to I/O box connections, I/O box to field connections, PLC to HMI network connections, and PLC power supply.
- HMIs which include a personal computer type industrial workstation with mouse, keyboard, video display, ergonomic computer stand and chair, HMI-to-HMI network connections, HMI-to-PLC network connection, HMI-to-HLAN/TMACS connection, alarm summary printer, MPS system database and HMI software package.
- Terminal boxes are connected to field located devices each providing a MPS system input signal.
- I/O boxes with appropriate mounting in the building where the 242-A relay cabinets and the SY Tank Farm relay cabinets and motor control centers (MCCs) are located . The I/O box will connect each of the inputs from the relays and MCC to a master PLC located in the 241-AW-271 Instrument Building and the 252-S Building, respectively.
- A network will be provided to implement a Tank Farm Local Area Network (TFLAN) used to communicate MPS system signals between tank farms. The network will also implement a HMI-to-HMI (TFLAN) network used to communicate files to MPS system databases that reside in the HMIs and TMACS via HLAN. A hardwired, PLC shutdown network, will be provided between all PLCs.

- Underground signal cabling between tank farm terminal boxes listed above and the nearest instrument buildings that house the PLCs including trenching, backfill, conduit, terminations and wiring.

- DST Transfer Pump Interlock relays including mounting, any required enclosures, wiring and conduit. Interconnections between the relay and the transfer pump motor control circuit. Relays implement transfer pump shutdown function.

- Existing MPS relays shall be connected to interface the existing MPS devices not replaced by Project W-314 by either using spare contacts, providing spare contacts, or adding new relays duplicating the MPS relay, whichever is most cost effective.

2.2.2 Phase 2

Phase 2 scope supports future waste storage, retrieval, and feed staging operations and selected regulatory compliance upgrades. The final scope for Phase 2 will be defined as the start date for Phase 2 gets closer. The scope for Phase 2 should include the scope items discussed in the following sub-sections.

2.2.2.1 Piping Scope

- Selected central pump pits and valve pits/diversion boxes along the waste transfer routes for double-shell tanks will be cleaned, decontaminated, and upgraded with a protective coating in order to meet all decontaminability.

- New manifold jumper arrangements shall be installed in selected valve and pump pits to provide a greater degree of flexibility in transfer routes, reduce jumper change out and maintenance requirements, and minimize personnel exposure. Valves utilized in the manifolds shall lend themselves to both manual operation and automatic operation via motors outside the pit.

2.2.2.2 Ventilation Scope

- Upgrading the primary ventilation systems for AN, AP, and AW Tank Farms

- Upgrade the annulus ventilation systems for SY farm

- Upgrade the complete ventilation systems for double contained receiver tank (DCRT) 244-S

Note: The ventilation systems will include seal pot and drainage systems, and filtration systems. The new ventilation systems will be modular in design to facilitate modifications in support of gaseous effluent treatment requirements as identified in the DRD PDCs, and PDSs.

2.2.2.3 Instrumentation and Control Scope

- Replace the existing method of annulus leak detection in selected DST's with better

technology.

- Replace the specific gravity-weight factor (SpG-WF) method of annulus leak detection in the 244-S DCRT with better technology.
- Upgrade the constant air monitor (CAM) annulus leak detectors in selected DST's and 244-S DCRT with new models.
- Alarm high liquid level in selected DST's.
- Replace the existing leak detection systems in selected cleanout boxes with an operationally testable system.
- Replace existing primary pipeline leak detectors with an operationally testable system in selected pipeline encasements.
- Replace existing primary pipeline leak detectors with an operationally testable system in selected DST farms and 244-S DCRT transfer pits.
- Verify waste transfer routing through the use of pipeline pressure and/or valve position, and/or pipeline flow monitoring as required on routing between the DST farms and 244-S DCRT.
- If flow meters are not provided as part of the waste transfer routing verification system, install flowmeters for incoming and outgoing transfer lines of selected DSTs.
- Install waste transfer valve position indicators on selected valves in selected pits.
- Modify the new MPS system that is installed in Phase 1 to accommodate any changes that occur in Phase 2.
- Install raw water flow measurements for selected DST's and DCRT service pits.
- Install raw water radiation measurement capability (backflow detection) at the 244-S DCRT service pits.
- Upgrade tank waste temperature in selected DST's and 244-S DCRT (upgrades performed by other activities won't be included).
- Upgrade liquid level measurement in selected DST's and 244-S DCRT (upgrades performed by other activities won't be included).
- Upgrade the liquid level monitoring systems for the DST Leak Detection Pit wells.
- Upgrade tank primary vapor space pressure measurement in selected DST's and 244-S DCRT.
- Upgrade primary ventilation train pre-filter and HEPA filter differential pressures, exhaust temperature, and exhaust heater differential pressure for the 244-S DCRT, and all DST farms except AY and AZ.

- Install a new "Gaseous Effluent Monitoring System" at the AW, AN and AP primary ventilation exhaust stack and connect existing SY tank farm "Gaseous Effluent Monitoring System" to a remote monitor.

- Input existing DST farm annunciated signals ("Panalarm") into the centralized Temperature Monitoring and Control System (TMACS).

- Replace the existing "Game-Well" remote alarm monitoring system with alarm displays in the DST farms.

- Connect selected existing alarms from miscellaneous hazardous facilities and SST farms for input to the TMACS.

- Move selected monitor and controls from the 242-S control room.

2.2.2.4 Electrical Scope

- Replacement of existing motor control centers (MCC's) and vent and heater control panels with new units in the 241-AY and 241 AZ Tank Farms.

- Upgrade and/or provide backup power capability for the primary ventilation system and stack monitors for Tank Farms 241-AN, AP, and AW.

- Provide a new pad-mounted 13.8 kV transformer and system to supply power to 244-S.

- Bring SST power systems to code with standardized grounding to support existing lights, service outlets, and miscellaneous instrumentation such as TMACS.

- Install spare main circuit breakers for 241-AN and 241-AW Tank Farms.

- Provide cathodic protection for new transfer piping.

- Provide freeze protection for piping (if required), seal pots and drainage systems for the ventilation systems installed by W-314.

2.2.3 Assumptions

2.2.3.1 Phase 1

- The pit leak detection systems, transfer line encasements, and cover blocks are designated as "Safety Class". All other systems are assumed to be "General Services".

  Note: it is expected that the Master Pump Shutdown system will be upgraded to Safety Class and the project implementation of that will be through formal change control procedures.

- Electrical power that is fed to the pit leak detection systems is designated as Safety Class

and as such, a new breaker, conduit and wiring that meets applicable Safety Class requirements shall be provided. It is assumed the power system that feeds the new breaker provided by W-314 meets safety class requirements. Electrical power that is provided to the encasement leak detection systems is designated as General Services.

- It is assumed Project W-314 will remove and demolition all debris and items removed by the project.

- New cover blocks will not be provided for 241-AY-01A and -02A, 241-AZ-01A and -02A, and 241-AN-01A and -04A Central Pump Pits. It is assumed the core drills to these cover blocks will not compromise the integrity of the cover blocks.

- Any time a pit is entered and work is performed, all debris (i.e., excess jumpers, etc.) shall be disposed of accordingly.

- When any pit is entered, the pit shall be decontaminated to a level necessary to support the required work.

- Provisions shall be made for testing of the transfer line (WT-SLL-3160) that enters riser 12A on tank 241-AN-104.

- The existing cover blocks that are modified are not required to meet the shielding requirements of Project W-314 but a shielding calculation will be performed to indicate what the radiation levels will be around the pit with Project W-314 source terms.

- In pits the Project W-314 enters to do work, all nozzles will be connected to a jumper or a process blank or vapor seal will be provided.

- It is assumed that line SN-271 between 241-AW-A and -B Valve Pits will not be connected to the jumper/valve manifolds in those two pits.

- Spare conduit shall be provided for 241-AY-01A and -02A and 241-AZ-01A and -02A Central Pump Pits for future retrieval projects use (i.e., for manifold position sensors, flow meters, etc.).

- The existing flush system for 241-AN-A and -B Valve Pits shall not be connected to the jumper/valve manifolds provided in those two pits.

- It is assumed that the new transfer line from the 241-AY Tank Farm to the new AZ Valve Pit will come from 241-AY-02A Central Pump Pit. The alternative of the new line coming from 241-AY-01A shall be evaluated for possible cost savings at the start of definitive design for the new line.

2.2.3.2 Phase 2

Ventilation

- The design will be modular to the extent that special effluent treatment devices (such as absorbers for organics and/or ammonia control) can be easily connected in the future to support possible waste storage and/or transfer situations.

- The ventilation design will assume that existing equipment that is taken out of service will be removed, where practicable, and the new equipment located in a nearby area.
- A standardized design will be used for the new primary ventilation equipment for AN, AP, and AW Tank Farms; capacity may be adjusted to suit each individual farm.
- A new design will be required for the DCRT.
- The primary ventilation systems is assumed to be Safety Class.
- Cooling systems needed during tank waste retrieval are not in the scope of W-314 and will be installed by other projects.
- Upgraded systems will utilize existing ducting where possible.
- The ventilation systems will be identified as major stacks and will meet NESHAP requirements.

Piping

- Line SL-180 (transfer line from SY-A valve pit to SY-B valve pit) is being replaced by other efforts. (Project W-211).
- Line SL-503 is being replaced by a current activity.
- The SY valve pits do not require valve manifolds due to jumper arrangements provided by another activity (Project W-211).
- SY Tank Farm piping encasement/pit interface issues are not within the scope of W-314.

Instrumentation and Control

- The WHC developed/supplied stack monitor specification shall be utilized for each installation where required.
- Pit leak detection systems are designated as Safety Class and all other instrumentation systems are designated as General Services.
- Scope of 242-S control room demolition is based on 76 points found on the control room instrumentation panel drawing H-2-46436. The 76 points identified do not include any signals pertaining to the 242-S building and does not include any "Gamewell" or "CASS" signals that remain to be identified. The signals moved will only be those associated with the Tank Farms (i.e., buildings are excluded). W-314 will not ensure the associated equipment is operational.
- TMACS will continue to be utilized.
- A separate Information Management System (IMS) will not be provided. Any IMS functions required can be accommodated by TMACS and SACS.

- All signals from the Tank Farms will be monitored in the local instrument building as well as at 2750E building by TMACS.
- Assume the existing signals to be connected to the TMACS (Section 1, Item 22) are connected to a "Panalarm" annunciator.
- Leak detection of waste disposal privatization tanks is a TWRS responsibility.

Electrical

- All electrical power systems for the pit leak detection systems are designated as Safety Class and all other electrical power systems are designated as General Services.
- The existing 13.8 KV utility feeders for the Tank Farm facilities have enough capacity to meet the demands for existing and future power requirements.

3.0 RISK ASSESSMENT

A preliminary Risk Assessment was conducted in support of the initial assessment activities. The assessment was conducted to fulfill the requirements of the SE- SOW. The risk assessment is concerned with the credibility of the system assessment, particularly as it relates to the determination of the scope of the Project W-314. Key factors in evaluating the credibility of the assessment include the methodology of the assessment, the degree of confidence in the conclusions of the assessment for specifying the condition of the tank farms, and the risk these conditions pose to the project. The risk to the project would be manifested as scope change later in the design, with attendant cost and schedule impacts.

The system assessment is to be conducted in two phases, initial and detailed. Therefore, the risk assessment is also conducted in two phases.

3.1 Initial Risk Assessment

The risk assessment methodology used to develop the Risk Report was generally based on expert opinion, augmented by consideration of key risk indicators. Information acquired in response to the questions posed by the risk indicators is a direct indication of the credibility of the process being examined. For example, a process that commences with a well documented, thorough plan which has been promulgated to all participants is more likely to produce credible results than one which develops as the action is conducted. This does not stipulate that the latter approach is not without some value. The risk assessment for the TFRSO initial assessment was conducted in a manner that maintains cognizance of the fact that the material condition of the tank farm is generally well known. Thus the primary purpose of the system assessment, as it relates to the Project W-314, is to assess the condition of the tank farm systems, structures, and components specifically as to their capability to satisfy requirements of the DRD.

3.2 Final Risk Assessment

The second phase of Risk Assessment will be performed utilizing the Tank Farm and TWRS Risk Management Plans. Documentation of the results will be in accordance with approved procedures.

4.0 SUMMARY AND CONCLUSIONS

The scope definition summarized in this document represents the preliminary determination of which upgrades are required within the scope of the W-314 Project. The results of this scoping effort will support Detailed Assessment and the subsequent master planning activities.

4.1 Summary

The USSR provides the basis for subsequent assessments and detailed design activities. The information provided in Section 2 identifies the scope elements for the W-314 Project. Additional information will be developed (via studies, engineering analyses, etc.) during the Detailed Assessment to further define and clarify scope elements to support definitive design activities.

4.2 Conclusions

Based on an evaluation of the information contained in the DRD and presented in the FASR, and information developed after the FASR, the following have been concluded:

1. The DRD provides the upper level requirements that define the scope for the W-314 Project.

2. The scope defined in this USSR is necessary to support the TWRS Manage Tank Waste mission, initial privatization activities, and initiation of detailed design activities.

3. The scope of the W-314 Project may be further defined during the Detailed Assessment process. This is not expected to significantly affect the conceptual design of the project.

APPENDIX A
ACRONYMS AND ABBREVIATIONS

CAM	Constant Air Monitor
CDR	Conceptual Design Report
DCRT	Double Contained Receiver Tank
DOE-RL	Department of Energy, Richland Operations Office
DRD	Design Requirements Document
DST	Double Shell Tank
FASR	Facility Assessment Summary Report
FAT	Functions Assessment Table
IMS	Information Management System
LDP	Leak Detection Pit
MAR	Missions Analysis Report
MCC	Motor Control Center
MTW	Manage Tank Waste
PDC	Project Design Criteria
PDS	Project Development Specification
RAS	Resource Allocation Sheets
SACS	Surveillance Automated Computer System
SE	Systems Engineering
SOW	Statement of Work
SSC	Structure/System/or Component
SST	Single Shell Tank
TFRSO	Tank Farm Restoration and Safe Operations
TMACS	Temperature Monitoring and Control System
TPA	Tri-Party Agreement
TWRS	Tank Waste Remediation System
USSR	Upgrade Scope Summary Report

APPENDIX B
REFERENCES

- WHC-SD-W314-ES-023, Rev 0, "Facility Assessment Summary Report" (FASR)
- WHC-SD-W314-ES-018, Rev 0, "DST and DCRT Instrument and Control Systems, Initial Assessment" (Acree 1995)
- WHC-SD-W314-ES-020, Rev 0, "DST and DCRT Rank Farm Electrical Distribution Systems Initial Assessment" (Golberg 1995)
- WHC-SD-W314-ES-021, Rev 0, "Initial Assessment Report for Mechanical Systems Upgrade" (Mattichak 1995)
- WHC-SD-W314-ES-022, Rev 0, "Initial Assessment Report, HVAC Systems" (Kriskovich 1995)
- WHC-SD-W314-DRD-002, "Design Requirements Document" (DRD)
- WHC-SD-W314-ANAL-005, Rev 0, "Alternative Generation and Analysis Report for Pit Lining Systems", dated March 1, 1996
- WHC-SD-W314-AGA-006, Rev 0, "Alternative Generation and Analysis Report for 244-A DCRT Utilization", dated September 26, 1996
- WHC-SD-WM-TI-750, Rev 0, "Alternative Generation and Analysis for Phase I Privatization Transfer System Needs", Dated May 1, 1996
- Letter, J. E. Kinzer, RL, to M. Wilson, Ecology, "Discontinuing Leak Detection Pit (LDP) Equipment monitoring for Double-Shell Tanks (DST)," 96-WSD-150, dated September 26, 1996
- Letter, J. E. Kinzer, RL, to H. J. Hatch, FDH, "Project W-314, Tank Farm Restoration and Safe Operations (TFRSO), Project Scope Direction for Fluor Daniel Hanford, Inc. Contract Number DE-AC106-96RL13200," 96-WSD-244, dated October 11, 1996
- HNF-2500, "W-314 Waste Transfer Alternative Piping System Description", dated April 1998.

APPENDIX C
TFRSO PROJECT W-314
UPGRADE SCOPE SUMMARY TABLE

APPENDIX C
TFRSO PROJECT W-314
UPGRADE SCOPE SUMMARY TABLE

Section	Category	Description	Requirement
USSR 2.2.1 TWRS SE 4.2.1 W-314 SE 4.2.1.3	Piping	All central pump pits and valve pits/diversion boxes along the waste transfer routes for double-shell tanks will be cleaned decontaminated and upgraded with a protective coating in order to meet all decontaminability and/or regulatory compliance criteria. The protective coating will be applied to (as a minimum): Pump pits AN-01A, AN-02A, AN-03A, AN-05A, AN-06A, AN-07A Valve pits AN-A. AN-B, AW-A, AW-B	Safety Not required for safety. Compliance 10CFR61.41, ALARA. If secondary containment has been breached, a liner or repair is required. Specific tasks will be determined by inspection of each unit. Privatization Valve Pits AN-A and AN-B and Sluice Pit AZ-02B support Privatization. Conduct of Operations Reduce personnel exposure, operating, and maintenance costs by shortening decontamination time.

Additional Information

1. Ref: WHC-SD-W314-ANAL-005, Rev. 0 (Draft), "Alternative Generation and Analysis Report for Pit Lining System," dated March 1, 1996. Discussion: The life expectancy of a coating system without maintenance is estimated to be around 10 years. The existing pits have all been in operation for over 10 years, and, therefore, require new coatings. In addition, the analysis showed that the coating system was the preferred option for existing waste transfer pit upgrades.

2. Ref: WHC-SD-WM-TI-750, Rev. 0, "Alternative Generation and Analysis for Phase I Privatization Transfer System Needs." Discussion: The preferred options for the Privatization transfer system will utilize the 241-AN Valve Pits (VP) and Pump Pits (PP), the 241-AZ PP, the 241-AX-B VP, the 241-AY-102 PP and Sluice Pits, and the 241-A-B VP. In addition, transfers from the 241-AW and 241-AP will utilize the VPs and PPs in those tank farms.

Section	Category	Description	Requirement
USSR 2.2.1 TWRS SE 4.2.1 W-314 SE 4.2.1.3	Piping	Install new manifold jumper arrangements in selected valve and pump pits to provide a greater degree of flexibility in transfer routes, reduce jumper change out and maintenance requirements, and minimize personnel exposure. Values utilized in the manifolds shall lend themselves to both manual operation and atheistic operation via motors outside the p.t. Valve pits AN-A, AN-B, AW-A, AW-B, AP	Safety Not required for safety. Compliance 10CFR61.41, ALARA. Privatization Supports AN and AP privatization requirements. In order to meet TPA milestones the Arena Model shows the need for simultaneous, multiple transfers and the ability to quickly setup new transfer routes. Conduct of Operations Reduce personnel exposure, operating, and maintenance costs by eliminating pit entry for jumper change out. Support privatization and accelerate the tank farms closure by about three years.

Additional Information

1. Ref: WHC-SD-W454-CDLR-001, Rev. 0 (Draft), Conceptual Design Letter Report for Project W-454, AW Jumper Manifold Upgrade, dated January 1996. Discussion: Jumper manifolds in the AW Valve Pits were shown to provide ALARA benefits by reducing worker radiation exposure due to changing transfer routes. In addition, a Life-Cycle Cost Analysis showed a payback of the costs associated with Project W-454 in approximately five years.

Section	Category	Description	Requirement
USSR 2.2.1 TWRS SE 4.2.1 W-314 SE 4.2.1.3	Piping	Install new 3" transfer lines compatible with the new cross-site transfer lines to support projected waste transfer operations between the following locations: Pump Pit AZ-02A to Pump Pit AZ-01A	Safety Not required for safety. Compliance Addresses 244-A DCRT and SN-216 compliance issues. Privatization Supports AN and AP privatization requirements. Conduct of Operations Add waste routing flexibility. Allow transfer lines to operate at full capacity and avoid premature line failure due to pipe erosion. Support accelerated tank farms closure.

Additional Information

1. Ref: WHC-SD-WM-TI-750, Rev. 0, "Alternative Generation and Analysis for Phase I Privatization Transfer System Needs."
   Discussion: The preferred options for the Privatization transfer system require the replacement and upgrade of 2" SL-502 to 3-inch, and replacement of 3"SN-213/200. The upgrade of SL-502 is required to obtain acceptable head requirements for transfers from the 241-AY Farm to the Privatization tanks AP-106 and 108. The replacement of SN-213/200 is required to increase the design pressure limit of the transfers from the 241-AN and 241-AZ Farms. The existing SN-213/200 has a design pressure limit of 230 psi, which is below the pressure required to transfer waste from the 241-AN Farm to the 241-AP Farm, and from the 241-AZ Farm to the Privatization contractor's site.

2. Ref: WHC-SD-RE-TI-148, Rev. 0, "Metallurgical Analysis of Leak Failure of 241-A-B Valve Pit Jumper".
   Discussion: The same transfer that caused the failure of the 241-A-A Valve Pit Jumper and line SN-233 is believed to have reduced the wall thickness on transfer lines SN-216. Transfer line SL-503 has already failed and is currently being replaced. Controlled photographs numbered 8501893-6CN, 8503999-6CN, and 850399-4CN provide visual affirmation of piping degradation due to corrosion along the route serviced by these lines.

3. Ref: HNF-SD-W314-AGA-006, Rev. 0, "Alternative Generation and Analysis Report for 244-A DCRT Utilization".
   Discussion: This AGA reached the conclusion that relocating the termination point for the cross-site transfer line to AN Tank Farm and taking the 244-A DCRT and line SN-216 out of service was the preferred alternative for routing of cross-site transfers from compliance, life cycle cost, and operational perspectives.

4. Ref: Letter, J.K. McClusky, RL, to H.J. Hatch, FDH, "Decision Document for 244-A Double Contained Receiver Tank (DCRT) Utilization," 96-WSD-319, dated November 27, 1997.
   Discussion: This letter directs implementation of HNF-SD-W314-AGA-006, and refines the guidance to include over pressure protection and a new diversion box in AN farm with lines going to Valve Pits AN-A and AN-B.

Section	Category	Description	Requirement
USSR 2.2.1 TWRS SE 4.2.1 W-314 SE 4.2.1.3	Piping	Permanently cap all waste transfer lines going to 244-A DCRT.	Safety Not required for safety. Compliance No compliance issues identified. Privatization No privatization issues identified. Conduct of Operation Provide safe condition for 244-A DCRT in preparation for future de-activation.

Additional Information

1. Ref: WHC-SD-W314-AGA-006, Rev. 0: Alternative Generation and Analysis Report for 244-A-DCRT Utilization."
   Discussion: This AGA reached the conclusion that relocating the termination point for the cross-site transfer line to AN Tank Farm and taking the 244-A DCRT and line SN-216 out of service was the preferred alternative for routing of cross-site transfers from compliance, life cycle cost, and operational perspectives.

2. Ref: Letter, J.K. McClusky, RL, to H.J. Hatch, FDH, "Decision Document for 244-A Double Contained Receiver Tank (DCRT) Utilization," 96-WSD-319, dated November 27, 1997.
   Discussion: This letter directs implementation of HNF-SD-W314-AGA-006, and refines the guidance to include over pressure protection and a new diversion box in AN farm with lines going to Valve Pits AN-A and AN-B.

Section	Category	Description	Requirement
USSR 2.2.1 TWRS SE 4.2.1 W-314 SE 4.2.1.3	Piping	Provide a bypass transfer system that connects to the cross-site transfer line to the AN Tank Farm, with connections to the AP, AY, and AZ Tank Farms.	Safety Not required for safety. Compliance Addresses 244-A DCRT and SN-216 compliance issues. Privatization Supports AN and AP privatization requirements. Conduct of Operations Add waste routing flexibility. Allow transfer lines to operate at full capacity and avoid using the transfer lines in the A-complex corridor.

Additional Information

1. Ref: HNF-2500, "W-314 Waste Transfer Alternative Piping System Description", dated April, 1998 describes an alternative system of waste transfer lines that bypasses the A-Farm complex and allows waste transfer routing from the existing cross-site transfer line to the AP Tank Farm. This system of transfer lines will provide greater flexibility and realibilty for supporting the TWRS Privatization mission.

Section	Category	Description	Requirement
USSR 2.2.1 TWRS SE 4.2.1 W-314 SE 4.2.1.3	Piping	Provide a new valve pit located east of the AZ Tank Farm that will facilitate route of the new bypass transfer lines from the AY, AZ, and AN Tank farms to the AP Tank Farm.	Safety Not required for safety. Compliance Addresses 244-A DCRT and SN-216 compliance issues. Privatization Supports AN and AP privatization requirements. Conduct of Operations Add waste routing flexibility. Allow transfer lines to operate at full capacity and avoid using the transfer lines in the A-complex corridor.
Additional Information 1. Ref: HNF-2500, "W-314 Waste Transfer Alternative Piping System Description", dated April, 1998 describes an alternative system of waste transfer lines that bypasses the A-Farm complex and allows waste transfer routing from the existing cross-site transfer line to the AP Tank Farm. This system of transfer lines will provide greater flexibility and realibilty for supporting the TWRS Privatization mission.			

Section	Category	Description	Requirement
USSR 2.2.2 TWRS SE 4.2.1 W-314 SE 4.2.1.1 4.2.1.3	HVAC	Upgrade the primary ventilation systems to include seal pot, drainage, and filtration systems. AN Farm AP Farm AW Farm	Safety Safety Class. Compliance 10CFR61.41, ALARA. Provide compliant ventilation system with stack monitoring. Privatization Filtration upgrades support potential transfers in support of privatization. Conduct of Operations Reduce personnel exposure, operating, and maintenance cost by minimizing farm entry and replacing unreliable equipment.

Additional Information

1. Ref: WHC-SD-W314-ES-022 Rev.0, "Initial Assessment Report, HVAC Systems," dated April 16, 1996. Discussion: The reference points out the following deficiencies associated with the ventilation systems:

   a) Filter housing corrosion and/or seal leakage has caused contamination of the concrete pad supporting the unit (AW and AN).
   b) Stack sampling systems are not in compliance with NESHAP (AN and AP).
   c) Electric heaters have questionable reliability (AN).
   d) Pressure controls are inadequate (AN and AP).
      1) No air inlet filters or control valves.
      2) No pressure relief.
   e) No provision in system for future addition of organic or toxic air pollutant control equipment.
   f) Ventilation system is not capable of removing potential excess heat and moisture during waste retrieval.
   g) System flow capacity is inadequate for potential flammable gas release and AW system is marginal to support current 242-A evaporator operation.
   h) Exhaust fans and heaters have unreliable electrical circuits (AW system only).

1. Ref: WHC-SD-W314-AGA-006, Rev. 0: Alternative Generation and Analysis Report for 244-A-DCRT Utilization."

Section	Category	Description	Requirement
USSR 2.2.2 TWRS SE 4.2.1 W-314 SE 4.2.1.1 4.2.1.3	HVAC	Upgrade the annulus ventilation system for SY farm. The ventilation systems will include seal pot, drainage, and filtration systems.	Safety Safety Class. Compliance 10CFR61.41, ALARA. Provide organic compliant ventilation system with stack monitoring. Privatization No privatization requirements identified. Conduct of Operations Reduce personnel exposure, operating, and maintenance cost by minimizing farm entry and replacing unreliable equipment.

Additional Information

1. Ref: WHC-SD-W314-022 Rev. 0, "Project W-314 HVAC Systems, Initial Assessment," dated April 16, 1996.
   Discussion: Annulus exhaust filtration system is not in compliance with section 10.5 of ASME N510. Annulus inlet HEPA filters do not comply with ASME N509 and are difficult to aerosol test. Annulus exhaust steam heating coil is not in service and is not in compliance with ASME N509. The annulus ventilation system exhaust fan reliability is questionable.

2. Discussion: The present ventilation system was installed in 1976, and is approaching the end of it's useful life. The system is difficult to maintain and there is corrosion evident in the system's plenums. The 241-SY Tank Farm will support all the transfers from the 200 West area to the 200 East area. Since 241-SY will receive all wastes to be transferred, the ventilation system must be in proper working condition and should be flexible enough to address any situation that could be created by the different wastes (e.g. flammable gas, organics, etc.) coming to the tank farm.

Section	Category	Description	Requirement
USSR 2.2.2 TWRS SE 4.2.1 W-314 SE 4.2.1.1 4.2.1.3	HVAC	Upgrade the ventilation systems for 244-S DCRT. The ventilation system will include seal pot, drainage, and filtration systems.	Safety Not required for safety. Compliance 10CFR61.41, ALARA. Provide compliant ventilation system with stack monitoring. Privatization No privatization requirements identified. Conduct of Operations Reduce personnel exposure, operating, and maintenance costs by minimizing farm entry and replacing unreliable equipment.

Additional Information

1. Ref: WHC-SD-W314-ES-022 Rev. 0, "initial Assessment Report, HVAC Systems," dated April 16, 1996.
   Discussion: The reference points out the following items:
   - a) The existing HEPA filter systems do not meet aerosol uniformity test criteria.
   - b) Exhaust fans and electric heaters have questionable reliability.
   - c) Pressure controls are inadequate because there are no inlet filters or control valves and no pressure relief.
   - d) Location of ventilation equipment in pit makes maintenance difficult and hazardous.
   - e) No provisions in systems for future addition of organic or toxic air pollutant control equipment.
   - f) Ventilation systems are not capable of removing potential excess heat and moisture during retrieval.
   - g) System flow capacity is inadequate for potential flammable gas release.
   - h) The DCRT is required to support DST waste transfer operations.

Section	Category	Description	Requirement
USSR 2.2.3 TWRS SE 4.2.1 W-314 SE 4.2.1.1 4.2.1.3	Instrumentation and Control	Replace the existing method of annulus leak detection in DSTs with better technology.	Safety Not required for safety. Compliance 40CFR265.193, detection of leaks to secondary containment within 24 hours. Privatization No privatization requirements identified. Conduct of Operations Reduce personnel exposure, operating, and maintenance costs by minimizing farm entry for data collection and eliminating unreliable instruments.

Additional Information

1. Ref: WHC-SD-W314-ES-018 Rev. 0, "Project W-314 DST and DCRT Instrument and Control Systems, Initial Assessment," dated November 17, 1995.
   Discussion: the flake box housings for the manual tapes are deteriorated. The housings are constructed of plastic which has been affected by sunlight and has o-ring seals which require frequent replacement. The o-ring replacement requires work inside the housing which is installed on a tank riser. The wiring for the 'multi-point conductivity' probes is direct buried cable which is degrading.

2. Ref: WHC-SD-W314-ER-002, Rev. 0, "241-AW Tank Farm Upgrades," dated August 1995.
   Discussion: The 'manual tape' method is not fully compatible with *40CFR265* and *WAC-173-303*, and neither the 'manual tape' or the 'multi-point conductivity' methods can detect small leaks or detect leaks in a timely manner. Additionally, the 'manual tape' is manually operated as to positioning as close to the annulus floor as possible. This positioning make the measurement subject to operator interpretation, which causes repeatability errors. The remaining expected life of the 'manual tapes' is 5-10 years.

3. Discussion: The 'manual tape' housing is purged with instrument air. Minimizing or eliminating the use of instrument air reduces maintenance requirements. Additionally, the frequency with which the 'manual tape' leak detectors are monitored suggests a need for automatic monitoring and recording and use of the 'manual tape' leak detectors requires an operator to enter the farm which increases operator exposure.

Section	Category	Description	Requirement
USSR 2.2.3 TWRS SE 4.2.1 W-314 SE 4.2.1.1 4.2.1.3	Instrumentation and Control	Replace the SpG-WF method of annulus leak detection in the 244-S DCRT with better technology.	Safety Not required for safety. Compliance 40CFR265.193, detection of leaks to secondary containment within 24 hours. Privatization No privatization requirements identified. Conduct of Operations Reduce personnel exposure, operating, and maintenance costs by minimizing farm entry for data collection and eliminating unreliable instruments.

Additional Information

1. Ref: WHC-SD-W314-ES-018 Rev. 0, "DST and DCRT Instrument and Control Systems, Initial Assessment."
   Discussion: The SpG-WF method uses instrument air. The use of instrument air needs to be minimized or eliminated. Maintaining a liquid in the annulus sump when the objective is to detect a leak doesn't seem to make sense, might interfere with the annulus CAM by trapping particulate out of the annulus ventilation air, and requires an operator to monitor and add the makeup water on a regular basis. The existing pneumatic technology performance is affected by the instrument air quality.

Section	Category	Description	Requirement
USSR 2.2.3 TWRS SE 4.2.1 W-314 SE 4.2.1.1 4.2.1.3	Instrumentation and Control	Upgrade the CAM annulus leak detectors in DST's and the DCRT with new models.	Safety Not required for safety. Compliance 40CFR265.193, detection of leaks to secondary containment within 24 hours. Privatization No privatization requirements identified. Conduct of Operations Reduce personnel exposure, operating, and maintenance costs by minimizing farm entry for data collection and eliminating unreliable instruments.

Additional Information

1. Ref: WHC-SD-W314-ES-018 Rev. 0, "Project W-314 DST and DCRT Instrument and Control Systems, Initial Assessment," dated November 17, 1995.
   Discussion: The existing CAM's are too sensitive to radon gas which results in false alarms. The maintenance and calibration is difficult because the weight of the unit is greater than 100 lbs., and the CAM is hard to access, and i typically hard bolted into a weather cabinet. The three (3) open chart recorders used to record the CAM signal are in continual need of repair. The new Hanford Standard CAM is the AMS-4 which is replacing these AMS-3 sitewide. The CAM signal wiring is direct buried in all farms except AP and in some cases the wire is already 25 years old and deteriorating.

2. Discussion: The DCRT leak detection system is not reliable, is not protected from the environment, and is not a good design for monitoring the annulus air for radioactive particulate.

1. Ref: WHC-SD-W314-ES-018 Rev. 0, "DST and DCRT Instrument and Control Systems, Initial Assessment."
   Discussion: The SpG-WF method uses instrument air. The use of instrument air needs to be minimized or eliminated. Maintaining a liquid in the annulus sump when the objective is to detect a leak doesn't seem to make sense, might interfere with the annulus CAM by trapping particulate out of the annulus ventilation air, and requires an operator to monitor and add the makeup water on a regular basis. The existing pneumatic technology performance is affected by the instrument air quality.

Section	Category	Description	Requirement
USSR 2.2.3 TWRS SE 4.2.1 W-314 SE 4.2.1.1 4.2.1.3	Instrumentation and Control	Replace the SpG-WF method of determining DST leak detection pit leak liquid level with better technology. This method will be applied to a dry pit.	Safety Not required for safety. Compliance 40CFR265.193, detection of leaks to secondary containment within 24 hours. Privatization No privatization requirements identified. Conduct of Operations Reduce personnel exposure, operating, and maintenance costs by minimizing farm entry for data collection and eliminating unreliable instruments.

Additional Information

1. Ref: WHC-SD-W314-ES-018 Rev. 0, "Project W-314 DST and DCRT Instrument and Control Systems, Initial Assessment," dated November 17, 1995.
   Discussion: In some instances (AN farm) the system alarms without any detectable reason. The system is calibrated in pressure units which need to be manually converted to inches of water and specific gravity. The pneumatic technology used makes for a complex system comprised of multiple components which must be calibrated an maintained. The buried pneumatic signal tubing is in some cases is 25 years old.

2. Ref: WHC-SD-W314-ER-002, Rev. 0, "241-AW Tank Farm Upgrades," August 1995, Page 6.
   Discussion: The SpG-WF is a high used of instrument air. The use of instrument air should be minimized or eliminated to reduce maintenance requirements. The design is 50 years old, spare parts are becoming more difficult and costly to obtain. The installed equipment is in some cases 18 years old with a limited remaining life of 5-10 years.

3. Discussion: Instrumentation problems will develop as the old pneumatic piping degrades.

Section	Category	Description	Requirement
USSR 2.2.3 TWRS SE 4.2.1 W-314 SE 4.2.1.1 4.2.1.3	Instrumentation and Control	Alarm high liquid level in DSTs	Safety Not required for safety. Compliance 40CFR265.193, appropriate controls required to eliminate tank overfill. Privatization No privatization requirements identified. Conduct of Operations Provide an engineered barrier to eliminate operating errors which could result in tank overfill nad spillage of waste.

Additional Information

1. Discussion: The existing system is not intrinsically safe (sealed and spark free) which makes it unsuitable for use in a hazardous atmosphere. The existing system is not operationally testable and it is required to have this capability for systems that have a contact exposure greater than 50 mrem/hr. The signal wire is a direct buried cable. The system uses current sensitive relays which cannot be calibrated to the sensor.
1. Discussion: See leak detection pit SpG-WF section above for leak detection pit discussion.

2. Discussion: Per the PDRD, high leak detection pit level alarm indicates a warning that the secondary tank is about to be over stressed by a high hydraulic head in the leak detection pit. (Note that the outside wall of the secondary containment is connected to the leak detection pit by open drain pipes).

Section	Category	Description	Requirement
USSR 2.2.3 TWRS SE 4.2.1 W-314 SE 4.2.1.1 4.2.1.3	Instrumentation and Control	Replace selected existing clean out box leak detectors systems with an operationally testable system.	Safety Not required for safety. Compliance 40CFR265.193, detection of leaks to secondary containment within 24 hours. Privatization No privatization requirements identified. Conduct of Operations Reduce personnel exposure, operating, and maintenance costs by improving control of waste transfers and eliminating shutdowns due to false alarms.

Additional Information

1. Ref: WHC-SD-W314-ES-018 Rev. 0, "Project W-314 DST and DCRT Instrument and Control Systems, Initial Assessment," dated November 17, 1995.
   Discussion: Clean out boxes used direct buried "SO" cord, which is degrading and is in violation of the NEC.

2. Discussion: See Master Pump Shutdown discussion below for leak detectors in general.

Section	Category	Description	Requirement
USSR 2.2.3 TWRS SE 4.2.1 W-314 SE 4.2.1.1 4.2.1.3	Instrumentation and Control	Replace existing transfer system leak detectors with an operationally testable system in: DST Farms (all valve/pump pits, diversion boxes, etc.) DCRT Transfer Pits Pipeline Encasements	Safety Not required for safety. Compliance 40CFR265.193, detection of leaks to secondary containment within 24 hours. Privatization No privatization requirements identified. Conduct of Operations Reduce personnel exposure, operating, and maintenance costs by improving control of waste transfers and eliminating shutdowns due to false alarms.

Additional Information

1. Ref: WHC-SD-W314-ES-018 Rev. 0, "Project W-314 DST and DCRT Instrument and Control Systems, Initial Assessment," dated November 17, 1995.
   Discussion: Clean out boxes used direct buried "SO" cord, which is degrading and is in violation of the NEC.

2. Discussion: See Master Pump Shutdown discussion below for leak detectors in general.

Section	Category	Description	Requirement
USSR 2.2.3 TWRS SE 4.2.1 W-314 SE 4.2.1.1 4.2.1.3	Instrumentation and Control	Verify waste transfer routing as required on routing between the DST farms and the DCRT through the use of: Valve position indication Flow monitoring	Safety Not required for safety. Compliance 40CFR265.193, eliminate spills due to mis-routing. Privatization Supports AN and AP privatization requirements. Conduct of Operations Reduce personnel exposure and cleanup costs by assuring transfers are executed as planned.

Additional Information

1. Discussion: Adequate "status of the route isolation" using pipeline pressure is not presently provided for all transfer routes. Transfer route identification cannot be verified without entering a tank farm. Remote route verification reduces operator entries into the tank farms resulting in operations cost savings and compliance with ALARA principles by reducing the radiation exposure. In later years when waste transfers increase, remote verifications will make high volume waste transfers more manageable. Existing valve position limit switches are problematic. Route verification assists compliance with DOE 5280.2A.13.B, which requires control and maintaining chemical composition of the DSTs, makes compliance with DOE 5280.2A.13.b very difficult, if not impossible, to achieve. Reestablishing the waste compositions is expensive since a sample from each DST that received waste will need to be extracted and analyzed. Quick route verification eliminates this problem if, immediately upon detecting a mis-routing, the waste transfer is shutdown, and the mis-routing is corrected.

Section	Category	Description	Requirement
USSR 2.2.3 TWRS SE 4.2.1 W-314 SE 4.2.1.1 4.2.1.3	Instrumentation and Control	Upgrade the master pump shutdown system to use operationally testable components, and to replace the relay based approach in the DST farms, 242-A Evaporator, and SST farms as specified.	Safety Not required for safety. Compliance 40CFR265.193, detection of leaks and shutdown of transfer. Privatization No privatization requirements identified. Conduct of Operations Reduce personnel exposure, operating, and maintenance costs by improving control of waste transfers and eliminating shutdowns due to false alarms.

Additional Information

1. Ref: WHC-SD-W314-ES-018 Rev. 0; "DST and DCRT Instrument and Control Systems, Initial Assessment," dated November 17, 1995.
   Discussions: The hardwired MPS system requires an engineering change notice and field hardware modifications to add or delete a sensor. The MPS push-button control panels in the 242-A, 242-S, and the 271-A do not appear to be in accordance with NUREG 7000. Signal wiring in the tank farms to the 242-A MPS control panel is direct buried, not maintainable, and is reaching the end of its design life.
2. Ref: WHC-SD-W314-ER-002, Rev. 0; 241-AW Tank Farm Upgrades; August 1995.
   Discussions: Individual leak detectors cannot be readily or remotely identified resulting in time consuming tank farm field walkdowns to determine the cause of the alarm. Greater versatility and reliability will be required in the future when the number of waste transfers increase.
3. Discussion: Any leak detector, even if it is not associated with the current active transfer route, will shut down all transfers. This increases the number of spurious waste transfer shutdowns which severely degrades the Waste Transfer System reliability.

GENERAL LEAK DETECTOR DISCUSSION FOR CLEAN OUT BOX, PIT, AND PIPELINE SECTIONS.

4. Ref: Whc-SD-W314-ES-018 Rev. 0; "DST and DCRT Instrument and Control Systems, Initial Assessment," dated November 17, 1995.
   Discussion: The current sensitive relays fail. Leak detectors in the pits are not secured in place allowing them to be moved from the low point or knocked over. The field electronics stations have terminal box enclosures with indicator lights installed in such a way that the weatherproof rating of the enclosure is nullified.
5. Discussion: Pit leak detectors cannot detect small leaks due to the detector installation one inch off the pit floor.l The leak detector signal wiring is badly deteriorated and does not comply with NEC. Leak detector electrical boxes are no longer capable of NEMA rating due to improper modification and maintenance. Leak detector calibration is not possible. Pit leak detectors are subject to false alarms caused by rain and melting snow infiltration. The pump pit leak detector could be subjected to a flammable atmosphere and needs to be of an intrinsically safe design.
6. Ref: WHC-SD-W314-ER-002, Rev. 0; 241-AW Tank Farm Upgrades; August 1995.
   Discussion: The pit leak detectors are not fully compliant with 40CFR265 and WAC-173-303. Leak detection non-commercial design makes part replacement difficult and costly.

Section	Category	Description	Requirement
USSR 2.2.3 TWRS SE 4.2.1 W-314 SE 4.2.1.1 4.2.1.3	Instrumentation and Control	Make provisions for the privatization contractors to interface with the master pump shutdown system to facilitate shutdown of their pumps if a leak scenario develops while returning waste to the tank farms.	Safety Not required for safety. Compliance 40CFR265.193, detection of leaks and shutdown of transfer. Privatization Supports return of waste from private contractor facilities. Conduct of Operations Reduce personnel exposure, operating, and maintenance costs by improving control of waste transfers and eliminating shutdowns due to false alarms.
Additional Information 1. Discussion: Waste transfers into tank farm facilities must have the same protective features and actions as inter-farm transfers.			

Section	Category	Description	Requirement
USSR 2.2.3 TWRS SE 4.2.1 W-314 SE 4.2.1.1 4.2.1.3	Instrumentation and Control	Upgrade the master pump shutdown relay panel in the 242-A, and upgrade and move the panel out of the 242-S Evaporators.	Safety Not required for safety. Compliance 40CFR265.193, detection of leaks and shutdown of transfer. Privatization No privatization requirements identified. Conduct of Operations Reduce personnel exposure and cleanup costs by improving control of waste transfers and eliminating shutdowns due to false alarms.
Additional Information 1. Discussion: The existing panels do not allow interlock versatility resulting in inappropriate shutdowns. The 242-S functions need to be moved in anticipation of the 242-S demolition.			

Section	Category	Description	Requirement
USSR 2.2.3 TWRS SE 4.2.1 W-314 SE 4.2.1.1 4.2.1.3	Instrumentation and Control	Raw water flow for the AN, AP, AW, AY and DST's, 244-S, and 244-S DCRT service pits.	Safety Not required for safety. Compliance No compliance issues identified. Privatization Supports AN and AP privatization requirements. Conduct of Operations Reduce operating costs by minimizing tank waste.

Additional Information

1. Ref: WHC-SD-W314-ES-018, Rev. 0, "DST and DCRT Instrument and Control Systems, Initial Assessment," dated November 17, 1995.
   Discussion: The existing flow meters pulsed flow signal is not compatible with a computer input. Remote monitoring of these devices is desired.

2. Discussion: The existing flow meters have a low end measuring limit of 5 gpm which is not low enough for operating purposes.

Section	Category	Description	Requirement
USSR 2.2.3 TWRS SE 4.2.1 W-314 SE 4.2.1.1 4.2.1.3	Instrumentation and Control	Raw water radiation (backflow detection) at the 244-S DCRT service pit.	Safety Not required for safety. Compliance 40CFR265.193, detection of leaks to secondary containment within 24 hours. Privatization No privatization requirements identified. Conduct of Operations Reduce operating costs by minimizing tank waste.

Additional Information

1. Ref: WHC-SD-W314-ES-018, Rev. 0, "DST and DCRT Instrument and Control Systems, Initial Assessment," dated November 17, 1995.
   Discussion: This is a unique Hanford designed item which makes obtaining spare parts a problem.

2. Discussion: The system is not reliable and the equipment is not protected from environment. The design is not optimum for detecting radiation in the pipe.

Section	Category	Description	Requirement
USSR 2.2.3 TWRS SE 4.2.1 W-314 SE 4.2.1.1 4.2.1.3	Instrumentation and Control	Provide leak detection of new piping.	Safety Not required for safety. Compliance 40CFR265.193, detection of leaks to secondary containment within 24 hours. Privatization Supports AN and AP privatization requirements. Conduct of Operations Reduce personnel exposure and operating costs by improving control of waste transfers and eliminating shutdowns due to false alarms.
Additional Information 1. Although this equipment is required for compliance, see MPS and existing pipeline sections above for the general leak detection discussion.			

Section	Category	Description	Requirement
USSR 2.2.3 TWRS SE 4.2.1 W-314 SE 4.2.1.1 4.2.1.3	Instrumentation and Control	Tank waste temperature, and liquid level in selected DST's and the DCRT.	Safety Not required for safety. Compliance DOE5820.2A, monitoring system requirements. Privatization No privatization requirements identified. Conduct of Operations Appropriate tank parameters are monitored to assure conduct of operations and adherence to OSR and other operating procedures.

Additional Information

TEMPERATURE:

1. Discussion: The individual elements need to be field replaceable to preclude operating without data or having to pull and replace the entire temperature tree assembly. Not all existing temperature tree designs can withstand mixer pump forces.

SURFACE LEVEL

1. Ref: WHC-SD-W314-ES-018 Rev. 0; "DST and DCRT Instrument and Control Systems, Initial Assessment," dated November 17, 1995.
   Discussion: Existing 'manual tapes' require frequent maintenance and repair. The 'manual tapes' were recommended for replacement with the Enraf-Nonius Model 854 by Battelle-PNL technical report PNL-8839. The tank riser provides no means to isolate the device from the tank vapor space. The 'manual tape' gage is obsolete and no longer manufactured making spare parts or replacement in kind difficult. The 'manual' type uses direct buried signal cable which is deteriorating. The 'manual' tape signal is connected to the existing CASS, the interface is obsolete and being replace by TMACS.

2. Discussion: It is desired that the level device have the capability to satisfy mass balance and tank inventory requirements. The existing 'manual tape' gauges have poor resolution making them subject to operator interpretation resulting in poor repeatability of measurements, and require extensive maintenance inside the tank farm fence line. The existing Enraf-Nonius gauges that have been installed need to be modified to allow coverage of the full tank range. The DCRT level measurement system uses dip tubes which are subject to plugging.

Section	Category	Description	Requirement
USSR 2.2.3 TWRS SE 4.2.1 W-314 SE 4.2.1.1 4.2.1.3	Instrumentation and Control	Upgrade Primary Tank primary vapor space pressure in DSTs and the DCRT.	Safety Not required for safety. Compliance DOE5820.2A, monitoring system requirements. Privatization No privatization requirements identified. Conduct of Operations The tank ventilation systems are monitored to assure conduct of operations and adherence to OSR and other operating procedures.

Additional Information

1. Ref: WHC-SD-W314-ES-018 Rev. 0; "DST and DCRT Instrument and Control Systems, Initial Assessment," dated November 17, 1995.
   Discussion: The existing exhaust trains do not use a single integrated system to input and/or control vapor pressure, damper position, fan speed and pressure, temperature, heater, and filter pressures. There is no run time or motor current reading for the exhaust fans for use in scheduling maintenance or monitoring fan performance.

2. Discussion: The existing pneumatic system uses instrument air which needs to be minimized or eliminated to decrease maintenance requirements. The equipment is obsolete and future parts replacement may be difficult. The instrument air system has quality problems which interfere with the performance of this system. The chart recorders do not connect to an electronic database. The field transmitter enclosure needs to be upgraded because it has been modified in such a way that it's weatherproof status is suspect.

Section	Category	Description	Requirement
USSR 2.2.3 TWRS SE 4.2.1 W-314 SE 4.2.1.1 4.2.1.3	Instrumentation and Control	Primary ventilation train pre-filter and HEPA filter differential pressures, exhaust temperature, and exhaust heater differential pressure for the 244-S DCRT, and all DST farms except AY and AZ.	Safety Not required for safety. Compliance DOE5820.2A, pressure monitoring requirements. Privatization No privatization requirements identified. Conduct of Operations The tank ventilation systems are monitored to assure conduct of operations and adherence to OSR and other operating procedures.

Additional Information

1. Ref: WHC-SD-W314-ES-018 Rev. 0; "DST and DCRT Instrument and Control Systems, Initial Assessment," Dated November 17, 1995.
   Discussion: The existing exhaust trains do not use a single integrated system to input and/or control vapor pressure, damper position, fan speed and pressure, temperature, heater, and filter pressures. There is no run time or motor current recording for the exhaust fans for use in scheduling maintenance or monitoring fan performance.

2. Discussion: It is desired to have the system connected to remote monitoring so operators do not have to enter the tank farm to gather exhaust train status data. The heater controls require extensive maintenance, cannot be calibrated, and the heater thermostats have high failure rates. The AP tank farm heater control enclosures have been modified so extensively that they are no longer weatherproof.

Section	Category	Description	Requirement
USSR 2.2.3 TWRS SE 4.2.1 W-314 SE 4.2.1.1 4.2.1.3	Instrumentation and Control	Install the WHC "Gaseous Effluent Monitoring System" at the AW, AN and AP primary ventilation exhaust stack and connect existing SY tank farm "Gaseous Effluent Monitoring System" to a remote monitor.	Safety Not required for safety. Compliance 40CFR60, regulated stack monitoring. Privatization No privatization requirements identified. Conduct of Operations Effluents from the tank ventilation systems are monitored to assure adherence to OSR and other operating procedures.

Additional Information

1. Ref: WHC-SD-W314-ES-018 Rev. 0; "DST and DCRT Instrument and Control Systems, Initial Assessment," Dated November 17, 1995.
   Discussion: Data is recorded on electrical/mechanical 3 pen recorders which need continual maintenance and repair and are not connected to an electronic data base. Signal cable from the field cabinet to the instrument building 3 pen recorder is direct buried. The field cabinet is not dust or moisture proof. The CAM is 100 pounds and is hard bolted inside a cramped cabinet making access for maintenance and calibration awkward. The CAM is old technology which is being replaced sitewide by a new, more capable model.

2. Ref: WHC-SD-W314-ER-002, Rev. 0; 241-AW Tank Farm Upgrades; August 1995.
   Discussion: Because the AW farm stack monitoring installation does not meet 40CFR52 Appendix E the stack flow measurement must be taken manually. Because the AW farm stack flow varies by more than 10% the stack flow must be measured more frequently than 40CFR61.93,b.1.iii requires; as this is not done the stack is out of compliance with NESHAP's Subpart H. The AW farm sample probes are out of compliance with 40CFR61.93.b.2.ii and ANSI N13.1 Appendix A figure A5. The AW farm sample lines are too long which reduces the amount of particulate that reaches the monitors. AW farm does not maintain near-isokinetic sampling conditions to 40CFR61.93b.2.ii, ANSI N13.1 section 4.2.2.3.

Section	Category	Description	Requirement
USSR 2.2.3 TWRS SE 4.2.1 W-314 SE 4.2.1.1 4.2.1.3	Instrumentation and Control	Input DST farm annunciated signals "("Panalarm") into a centralized monitoring system.	Safety Not required for safety. Compliance DOE5820.2A, alarm and monitoring system requirements. Privatization No privatization requirements identified. Conduct of Operations Appropriate alarms are assigned to selected tank parameters to assure adherence to OSR and other operating procedures as specified by conduct of operations.

Additional Information

1. Discussion: The existing alarm panels do not appear to comply with NUREG-0700 for alarm identification. Not all the tank farm systems and instruments are monitored on the existing alarm panels. Selected tank farm instrumentation should be monitored at a central location.

Section	Category	Description	Requirement
USSR 2.2.3 TWRS SE 4.2.1 W-314 SE 4.2.1.1 4.2.1.3	Instrumentation and Control	Replace the existing "Game-Well" remote alarm monitoring with alarm displays in the DST farms.	Safety Not required for safety. Compliance No compliance issues identified. Privatization No privatization requirements identified. Conduct of Operations Supports the development of enhanced, centralized TMAC operation.

Additional Information

1. Ref: WHC-SD-W314-ES-018 Rev. 0, "DST and DCRT Instrument and Control Systems, Initial Assessment," dated November 17, 1995.
   Discussion: The Gamewell system design and hardware is based on a 50 year old building fire alarm system which was modified to interface leak and radiation alarms to CASS. The 200 West Gamewell system is not functional. The Gamewell uses a mechanical "code wheel" to identify an alarm loop (grouping of leak and radiation alarm elements) which must be manually reset after each event. The Gamewell system interfaces to the CASS uses unique Hanford designed hardware of which there are no spare, and which has maintenance problems.

2. Ref: WHC-SD-W314-ER-002, Rev. 0; 241-AW Tank Farm Upgrades; August 1995.
   Discussion: Individual leak detectors cannot be readily or remotely identified resulting in time consuming tank farm walkdowns to determine the cause of the alarm. Greater versatility and reliability will be required in the future when the number of waste transfers increases. Additionally, the Gamewell is obsolete, is difficult to maintain an obtain spare parts, and does not adequately support current operations.

3. Discussion: The Gamewell system does not allow identification of individual leak sensing elements.

Section	Category	Description	Requirement
USSR 2.2.3 TWRS SE 4.2.1 W-314 SE 4.2.1.1 4.2.1.3	Instrumentation and Control	Connect selected existing alarms from SST farms and miscellaneous hazardous facilities for input to the TMACS.	Safety Not required for safety. Compliance DOE5820.2A, alarm and monitoring system requirements. Privatization No privatization requirements identified. Conduct of Operations TMACS is a supervisory monitor system which as been installed as part of the tank farms safety initiative. TMACS has significantly improved conduct of operations and has reduced surveillance costs. Since TMACS is installed in most of the tank farms, future work should capitalize on these recent improvements by using it as the basis of the overall central monitoring system.

Additional Information

1. Discussion: SST and other facilities which continue to be monitored should have selected signals connected to a central alarm monitoring system to reduce the man hours required to go to each location to monitor the alarms

Section	Category	Description	Requirement
USSR 2.2.3 TWRS SE 4.2.1 W-314 SE 4.2.1.1 4.2.1.3	Instrumentation and Control	Move selected monitor and controls from the 242-S control room.	Safety Not required for safety. Compliance No compliance issues identified. system requirements. Privatization No privatization requirements identified. Conduct of Operations Relocation of the identified signals from the 242-S control room will allow this Building to be transferred to the D&D contractors, thus reducing operating and other support cost.

Additional Information

1. Discussion: 200 West SST and other facility signals that presently terminate in the 242-S control room and continue to be used should be moved completely out and away from the 242-S control room to facilitate its eventual demolition.

Section	Category	Description	Requirement
USSR 2.2.4 TWRS SE 4.2.1 W-314 SE 4.2.1.1 4.2.1.3	Electrical	Replace existing MCC's and vent and heater control panel with new units in the 241-AY and 241-AZ Tank Farms.	Safety Not required for safety. Compliance No compliance issues identified. system requirements. Privatization No privatization requirements identified. Conduct of Operations Assure electrical systems will meet OSR requirements for the life of the facility.

Additional Information

1. Ref: WHC-SD-W314-ES-020, Rev. 0, DST & DCRT Tank Farm Electrical Distribution System Initial Assessment.
   Discussion: For 241-AY and 241-AZ tank farms, the OSR limits the maximum down time for the operation of the Primary Exhaust Fans and Stack Monitor system. Due to this limitation, maintenance on electrical equipment has not been performed well. As a result, the condition of existing electrical equipment is poor. The replacements, along with modifications under project W-030 to provide backup power will assure meeting the OSR requirements for the life of the facility.

Section	Category	Description	Requirement
USSR 2.2.4 TWRS SE 4.2.1 W-314 SE 4.2.1.1 4.2.1.3	Electrical	Upgrade and/or provide backup power system for the primary ventilation system and stack monitors for Tank Farms 241-AN, AP, and AW.	Safety Not required for safety. Compliance DOE 5820.2A, normal and backup electrical power. Privatization No privatization requirements identified. Conduct of Operations Assure electrical systems will meet OSR requirements for the life of the facility.

Additional Information

1. Ref: WHC-SD-W314-ES-020, Rev. 0, " DST & DCRT Tank Farm Electrical Distribution System Initial Assessment".
   Discussion: The OSR limits the maximum down time for the operation of the primary exhaust fans and stack monitor system. The backup power system is required to allow the primary exhaust fans and stack monitor to operate while maintenance is performed on the tank farm electrical equipment, without affecting the OSR requirement.

Section	Category	Description	Requirement
USSR 2.2.4 TWRS SE 4.2.1 W-314 SE 4.2.1.1 4.2.1.3	Electrical	Replace existing feeder of 244-S by providing a new pad-mounted 13.8kV transformer.	Safety Not required for safety. Compliance DOE 5820.2A, normal and backup electrical power. Privatization No privatization requirements identified. Conduct of Operations Assure electrical systems will meet OSR requirements for the life of the facility.
Additional Information 1. Ref: WHC-SD-W314-ES-020, Rev. 0, " DST & DCRT Tank Farm Electrical Distribution System Initial Assessment". Discussion: The 2.4 kV supply system for this feeder will be discontinued by the utilities to standardize the distribution system voltage to a 13.8 kV system.			

Section	Category	Description	Requirement
USSR 2.2.4 TWRS SE 4.2.1 W-314 SE 4.2.1.1 4.2.1.3	Electrical	Spare main breakers for AN, and AW Tank Farms.	Safety Not required for safety. Compliance No compliance issues identified. Privatization No privatization requirements identified. Conduct of Operations Provide power flexibility in support of preventative maintenance to ensure serviceability for the life of the facility.

Additional Information

1. Ref: WHC-SD-W314-ES-020, Rev. 0, " DST & DCRT Tank Farm Electrical Distribution System Initial Assessment".
Discussion: The spare main breaker for the switchgear is required to allow preventative maintenance on the existing breaker, which will ensure proper trip stting and testing to protect the electrical system.

Section	Category	Description	Requirement
USSR 2.2.4 TWRS SE 4.2.1 W-314 SE 4.2.1.1 4.2.1.3	Electrical	Bring SST power systems to code with standardized grounding to support existing lighting service.	Safety Not required for safety. Compliance DOE 5820.2A, normal and backup electrical power. Privatization No privatization requirements identified. Conduct of Operations Assure electrical systems will meet OSR requirements for the life of the facilities.
Additional Information 1. Ref: WHC-SD-W314-ES-020, Rev. 0, " DST & DCRT Tank Farm Electrical Distribution System Initial Assessment". Discussion: The 2.4 kV supply system for this feeder will be discontinued by the utilities to standardize the distribution system voltage to a 13.8 kV system.			

Section	Category	Description	Requirement
USSR 2.2.4 TWRS SE 4.2.1 W-314 SE 4.2.1.1 4.2.1.3	Electrical	Provide cathodic protection for new piping., as required.	Safety Not required for safety. Compliance DOE 5820.2A, normal and backup electrical power. Privatization No privatization requirements identified. Conduct of Operations Assure electrical systems will meet OSR requirements for the life of the facilities.

Additional Information

1. Ref: WAC 173-303-640, Dangerous Waste Regulations
   Discussion: The WAC requires corrosion protection on tank farm piping systems to maintain integrity.

2. Ref: WHC-SD-WM-ES-160, "Environmental Upgrades for Tank Farms".
   Discussion: Cathodic protection, the preferred way to prevent corrosion has been found successful and cost effective to increase the life expectany.

Section	Category	Description	Requirement
USSR 2.2.4 TWRS SE 4.2.1 W-314 SE 4.2.1.1 4.2.1.3	Electrical	Provide freeze protection for seal pots, drainage systems, and piping (if required) installed by W-314.	Safety Not required for safety. Compliance No compliance issues identified. Privatization No privatization requirements identified. Conduct of Operations Assure piping systems ar protected from seasonal cold weather.
Additional Information N/A			

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