ENGINEERING CHANGE NOTICE

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2. ECN Category (mark one) Supplemental ☐ Direct Revision ☒ Change ECN ☐ Temporary ☐ Standby ☐ Supersedeure ☐ Cancel/Void ☐	3. Originator's Name, Organization, MSIN, and Telephone No. R.W. Jacobson, TF Projects Integration, R1-09, 376-2957 6. Project Title/No./Work Order No. Tank Farm Restoration and Safe Operations, Project W-314, "Upgrade Scope Summary Report" (USSR) 9. Document Numbers Changed by this ECN (includes sheet no. and rev.) WHC-SD-W314-RPT-003, Rev 0	4. USQ Required? ☐ Yes ☒ No 7. Bldg./Sys./Fac. No. Tank Farms 10. Related ECN No(s). N/A	5. Date January 7, 1996 8. Approval Designator N/A 11. Related PO No. N/A	
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17. Cost Impact			18. Schedule Impact (days)

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

SOP/DP				Stress/Design Report				Tank Calibration Manual				
Functional Design Criteria				Interface Control Drawing				Health Physics Procedure				
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				
Vendor Information				Operating Instruction				Computer Software				
OM Manual				Operating Procedure				Electric Circuit Schedule				
FSAF/SAR				Operational Safety Requirement				ICRS Procedure				
Safety Equipment List				I/EFD Drawing				Process Control Manual/Plan				
Radiation Work Permit				Cell Arrangement Drawing				Process Flow Chart				
Environmental Impact Statement				Essential Material Specification				Purchase Requisition				
Environmental Report				Fac. Proc. Samp. Schedule				Inspection Plan				
Environmental Permit				Inventory Adjustment Request				Tickler File				

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Document Number/Revision	Document Number/Revision	Document Number/Revision

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21. Approvals

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Date _____

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ENGINEERING DATA TRANSMITTAL

Page 4 of 12

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NO 615286

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

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Abstract: This revision of the Project W-314 Upgrade Scope Summary Report (USSR) represents a refinement of the project scope and supporting justification from which the Conceptual Design Report (CDR) was developed. It defines the actual upgrades and provides traceability to the requirement or driver for the activity.

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TANK FARM RESTORATION
AND SAFE OPERATIONS (TFRSO)

PROJECT W-314

UPGRADE SCOPE SUMMARY REPORT

June 18, 1996

Prepared for:

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

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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 (including systems, subsystems, and/or components) to be within the W-314 project scope. The W-314 Project USSR is specifically designed to define the scope on which to base development of a Conceptual Design Report. The upgrades defined in this document support the infrastructure necessary for the TWRS mission of managing tank waste, while addressing known and defined future requirements.

Section 1 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. A synopsis of the initial risk assessment efforts for this task are presented in Section 3. Section 4 is the Summary and Conclusions, which describes the interface with the subsequent Detailed Assessment, 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.

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

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 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, and support known future requirements. 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 compliance 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 document required for defining the scope of Project W-314. An initial draft of the USSR was issued in November 1995 providing the scoping basis for development of the W-314 Conceptual Design Report (CDR), WHC-SD-W314-CDR-001, Rev. 0. The completed USSR (Rev. 0), with DOE-RL comments incorporated, was officially released as a supporting document in May 1996. Subsequent to this release, additional information has been identified to help clarify the Project W-314 scope and justification. Revision 1 of the USSR represents a refinement of the project scope and supporting justification from which the CDR was developed.

1.3 Document Interfaces

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

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 could fall within the W-314 project. 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 facility/system/component upgrades and provides the basis for cost and schedule baselines.

2.0 UPGRADE SCOPE SUMMARY

The systems inspections and assessments conducted for the TFRSO Project 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 additional scope 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 (PDRD) and to determine if the life expectancy of the existing systems would be sufficient for the mission duration. The PDRD defines the system functionality required to meet the mission for a duration of 35 years. Tank Farm infrastructure systems addressed by the PDRD 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.

As future requirements, trade study results, and evaluation of emergent data became understood, additional activities in the four categories were identified. This USSR includes the additional items that are to be included in the W-314 Project scope.

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 and Tri-Party Agreement (TPA) milestones. 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 PDRD).
4. Systems shall be capable of performing requirements for the duration of the mission.
5. Systems shall comply with legal/regulatory constraints as documented in the PDRD
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 Piping Scope

The Project W-314 scope of work for piping covers the following:

- All central pump pits and valve pits/diversion boxes along the waste transfer routes for double-shell tanks will be 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): Valve pits AN-A, AN-B, A-A, A-B, AX-A, AX-B, Sluice pit AZ-02B.
- 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. ICF KH will consider alternate valve operating systems (i.e., "Teleflex") over current practices. Pits receiving manifold jumper arrangements will include: Valve pits AN-A, AN-B, A-A, A-B, AX-A, AX-B; and Sluice pit AZ-02B.

- New transfer lines compatible with the new cross site transfer line and the waste disposal privatization needs (3" lines recommended) will be provided to support projected waste transfer operations between the following locations:
 - (1) Valve pit AN-B to Sluice pit AZ-02B
 - (2) Sluice pit AZ-02B to Valve pit AX-A
 - (3) 101-AZ to 102-AZ
- Replace the following existing transfer piping:
 - (1) Line SN-216
 - (2) Line SN-213/200
 - (3) Line SL-502
 - (4) Line SL-504

2.2.1.1. Piping Assumptions

1. Fabricated pit liners are not required since the special protective coating to be used in the identified pits meets all applicable regulatory compliance issues for containment.
2. Jumper manifold upgrades for the AW Tank Farm valve pits are provided by other activities (Project W-454).
3. Line SL-180 (transfer line from SY-A valve pit to SY-B valve pit) is being replaced by other efforts. (Project W-211).
4. The new transfer lines will provide the required transfer routing and volume capacity as defined in the waste volume projections for MTW and known Privatization needs.
5. Line SL-503 is being replaced by a current activity.
6. The new transfer lines will not require heat tracing.
7. The SY Valve pits do not require valve manifolds due to jumper arrangements provided by another activity (Project W-211).

2.2.2 Ventilation Scope

The scope of work includes upgrading the primary ventilation systems for AN, AP, and AW Tank Farms, the annulus ventilation systems for SY farm, and the complete ventilation systems for double contained receiver tanks (DCRT's) 244-A and 244-S. 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 PDRD.

The specification of a modular type system was derived from the preliminary results of the architectural development process currently in progress for W-314.

2.2.2.1 Ventilation Assumptions

1. 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.
2. 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.
3. 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.
4. A new design will be required for the DCRT's.
5. The primary ventilation systems are assumed to be safety class 2 for confinement and safety class 3 for operation. The annulus ventilation system is assumed safety class 3 for confinement and safety class 2 for operations.
6. Cooling systems needed during tank waste retrieval are not in the scope of W-314 and will be installed by other projects.
7. Upgraded systems will utilize existing ducting where possible.

2.2.3 Instrumentation and Control Scope

The scope of work includes new and/or upgraded instrumentation for tank monitoring for all double shelled tanks (DST's), the 244-A and 244-S DCRTs, tank and waste transfer leak detection system upgrade, an information management system, the master pump shutdown system upgrade, and selected single shell tank (SST) signals. Some instrumentation and control upgrades will be, or have been, performed by other activities and won't be included in W-314 scope.

The following upgrades provide the monitoring and control functions required by the PDRD:

1. Replace the existing method of annulus leak detection in DST's with better technology.
2. Replace the specific gravity-weight factor (SpG-WF) method of annulus leak detection in the DCRT's with better technology.
3. Upgrade the constant air monitor (CAM) annulus leak detectors in DST's and DCRT's with new models.
4. Replace the SpG-WF method of determining DST leak detection pit leak with better technology. This method will be applied to a dry pit.
5. Upgrade the DST leak detection pit radiation monitoring system to withstand the physical environment.
6. Alarm DST leak detection pit high liquid level.

7. Alarm high liquid level in DST's.
8. Replace existing clean out box leak detection systems with an operationally testable system.
9. Replace existing primary pipeline leak detectors with an operationally testable system in the DST farms and DCRT's transfer pits and pipeline encasements.
10. 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 the DCRT's.
11. If flow meters are not provided as part of the waste transfer routing verification system, install magnetic flowmeters for incoming and outgoing transfer lines for tanks AN-101, 102, 103, 104, 105, 106, 107; AP-101, 102, 104; AW-101, 104, 105; AZ-101, 102; AY-102; and SY-101, 102 in support of waste disposal privatization.
12. Install waste transfer valve position indicators on Valve Pits AN-A, AN-B, 241-AP, AW-A, AW-B; Pump Pits AN-01A through 07A, AP-01A, AP-04A, AP-02A, AP-02D, AW-01A, AW-04A, AW-05A, AY-02A, AZ-01A, AZ-02A; Sluice Pit AZ-02B; and SY Pits 241-SY-A, 241-SY-B, SY-01A, and SY-02A in support of waste disposal privatization.
13. Upgrade the master pump shutdown system to use operationally testable components and to replace the relay-based approach in the DST farms and SST farms as specified.
14. Upgrade the master pump shutdown relay panel in the 242-A facility and upgrade and move the panel out of the 242-S evaporator building.
15. Install raw water flow measurements for DST's and DCRT's service pits, including turbine flowmeters in the AN, AP, AW, AY, and SY service pits to support waste disposal privatization.
16. Install raw water radiation measurement capability (backflow detection) at the 244-A and 244-S DCRT's service pits.
17. Provide leak detection for new piping.
18. Upgrade tank waste temperature, and liquid level measurement in selected DST's and the DCRT's (upgrades performed by other activities won't be included).
19. Upgrade tank primary vapor space pressure measurement in DST's and the DCRT's.
20. Upgrade primary ventilation train pre-filter and HEPA filter differential pressures, exhaust temperature, and exhaust heater differential pressure for the 244-A and 244-S DCRTs, and all DST farms except AY and AZ.
21. 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.
22. Input existing DST farm annunciated signals ("Panalarm") into the centralized Temperature Monitoring and Control System (TMACS).

23. Replace the existing "Game-Well" remote alarm monitoring system with alarm displays in the DST farms.
24. Connect selected existing alarms from miscellaneous hazardous facilities and SST farms for input to the TMACS.
25. Move selected monitor and controls from the 242-S control room.

2.2.3.1 Instrumentation and Control Assumptions

1. The WHC developed/supplied stack monitor specification shall be utilized for each installation where required.
2. All instrumentation will be safety class 3.
3. 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.
4. TMACS will continue to be utilized.
5. A separate Information Management System (IMS) will not be provided. Any IMS functions required can be accommodated by TMACS and SACS.
6. All signals from the Tank Farms will be monitored in the local instrument building as well as at 2750E building by TMACS.
7. Assume the existing signals to be connected to the TMACS (Section 1, Item 22) are connected to a "Panalarm" annunciator.
8. Leak detection of waste disposal privatization tanks is a TWRS responsibility.

2.2.4 Electrical Scope

The scope of work for electrical includes upgrades to electrical equipment and wiring as required throughout the DST farms and the 244-A and 244-S DCRT's. These upgrades will include the following:

1. 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 and the existing panelboard with the vent and heater control units for the 244-A DCRT with a new unit.
2. Upgrade and/or provide backup power capability for the primary ventilation system and stack monitors for Tank Farms 241-AN, AP, and AW.
3. Provide a new pad-mounted 13.8 kV transformer and system to supply power to 244-S.

4. Bring SST power systems to code with standardized grounding to support existing lights, service outlets, and miscellaneous instrumentation such as TMACS.
5. Install spare main circuit breakers for AN, and AW Tank Farms.
6. Provide cathodic protection for new transfer piping.
7. Provide freeze protection for seal pots and drainage systems installed by W-314.

2.2.4 Electrical assumptions

1. All electrical power systems and components will be safety class 3.
2. 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 PDRD.

3.2 Final Risk Assessment

The second phase of Risk Assessment will be performed utilizing the Transition Projects 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 the subsequent Detailed Assessment and conceptual design activities. The information provided in Section 2 and Appendix C identifies the scope elements for the W-314 Project. Additional information will be developed (via trade 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 PDRD and presented in the FASR, and information developed after the FASR, the following have been concluded:

1. The PDRD 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 and is adequate to support the initiation of conceptual 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
DCRT	Double Contained Receiver Tank
DOE-RL	Department of Energy, Richland Operations Office
DST	Double Shell Tank
FASR	Facility Assessment Summary Report
FAT	Functions Assessment Table
IMS	Information Management System
MAR	Missions Analysis Report
MCC	Motor Control Center
MTW	Manage Tank Waste
PDRD	Preliminary Design Review Document
RAS	Resource Allocation Sheets
SACS	Surveillance Automated Computer System
SE	Systems Engineering
SOW	Statement of Work
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, "Preliminary Design Requirements Document" (PDRD)

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	<p>All central pump pits and valve pits/diversion boxes along the waste transfer routes for double-shell tanks will be 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):</p> <ul style="list-style-type: none"> • Pump pits AN-01A, AN-02A, AN-03A, AN-04A, AN-05A, AN-06A, and AN-07A. • Valve pits AN-A, AN-B, A-A, A-B, AX-A, AX-B • Sluice pit AZ-02B 	<p><u>Safety</u> Not required for safety.</p> <p><u>Compliance</u> 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.</p> <p><u>Privatization</u> Valve Pits AN-A & AN-B and Sluice Pit AZ-02B support Privatization</p> <p><u>Conduct of Operations</u> Reduce personnel exposure, operating, and maintenance costs by shortening decontamination time.</p>
<p><u>Additional Information</u></p> <p>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.</p> <p>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.</p>			

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Section	Category	Description	Requirement
USSR 2.2.1 TWRS SE 4.2.1 W-314 SE 4.2.1.3	Piping	<p>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. The manifold jumper arrangements will include:</p> <ul style="list-style-type: none"> Valve pits AN-A, AN-B, A-A, A-B, AX-A, and AX-B Sluice pit AZ-02B. 	<p><u>Safety</u> Not required for safety.</p> <p><u>Compliance</u> 10CFR61.41, ALARA.</p> <p><u>Privatization</u> 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.</p> <p><u>Conduct of Operations</u> 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.</p>
<p><u>Additional Information</u></p> <p>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.</p> <p>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.</p>			

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Section	Category	Description	Requirement
USSR 2.2.1 TWRS SE 4.2.1 W-314 SE 4.2.1.3	Piping	Install new transfer lines compatible with the new cross site transfer line (3" lines recommended) to support projected waste transfer operations between the following locations: <ul style="list-style-type: none"> Valve pit AN-B to Sluice pit AZ-02B Sluice pit AZ-02B to Valve pit AX-A 101-AZ tank to 102-AZ tank 	<u>Safety</u> Not required for safety. <u>Compliance</u> No compliance issues identified. <u>Privatization</u> Supports AN and AP privatization requirements. <u>Conduct of Operation</u> Add waste routing flexibility, and support accelerated tank farms closure.
<u>Additional Information</u> <ol style="list-style-type: none"> Ref: WHC-SD-W314-ES-027, Rev. 0, "Pump Head Requirements Engineering Study for Project W-314". Discussion: The Functions and Requirements for Project W-314 requires the transfer waste system to be able to transfer from a double-shell tank (DST) to any other DST. This requirement is to satisfy the flexibility and contingency action requirements of DOE Order 6430.1A and 5820.2A. This study concluded that in order to stay within the design capabilities of the New Generation Transfer Pump and to stay below the design pressure limits of the existing transfer lines, new 3-inch transfer lines are required. A new 3-inch transfer line is required between the 241-AN valve pits and the 241-AZ farm, and between the 241-AZ Farm and the 241-AX valve pits. Ref: WHC-SD-W314-ES-026, Rev. 0, "Existing Piping System Engineering Study for Project W-314". Discussion: The purpose of this engineering study was to determine if the existing A-Farm Complex waste transfer system could support the future waste transfers required by the ARENA dynamic simulation model. Shortfalls in the inter-farm system were identified in the transfer routes between the 241-AN valve pits and the 241-AZ pump pit and sluice pit, and between the 241-AZ pump pit and the 241-AX valve pits. Ref: WHC-SD-WM-TI-750, Rev 0, "Alternative Generation and Analysis for the Phase I Privatization Transfer System Needs". Discussion: The preferred transfer routes for Phase I Privatization utilize piping upgrades as defined for project W-314. This document identifies the desirability for an additional new line between 101-AZ and 102-AZ. W-314 is the appropriate vehicle for this pipe since the work is in the same geographical area of the Tank Farms. 			

Section	Category	Description	Requirement
USSR 2.2.1 TWRS SE 4.2.1 W-314 SE 4.2.1.3	Piping	Replace the following transfer piping: <ul style="list-style-type: none"> ● Line SN-216 ● Line SN-213/200 ● Line SL-502 ● Line SL-504 	<u>Safety</u> Not required for safety. <u>Compliance</u> No compliance issues identified. <u>Privatization</u> Supports AN and AP privatization requirements. <u>Conduct of Operation</u> Allow transfer lines to operate at full capacity and avoid premature line failure due to pipe erosion. Support accelerated tank farms closure.
<u>Additional Information</u> <ol style="list-style-type: none"> 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. Ref: 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, SN-213/200, SL-502, and SL-504. Transfer line SL-503 has already failed and is currently being replaced. Controlled photographs numbered 8503980-(xx)CN and 8503999-(xx)CN provide visual affirmation of piping degradation due to corrosion along the route serviced by these lines. An examination of the SN-216 is planned that will determine the extent of damage and if the replacement of these lines is actually required. Until then, it is assumed that the study will show that the lines would be questionable for operation through the TWRS 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 for AN, AP, and AW Tank Farms. The ventilation systems will include seal pot, drainage, and filtration systems.	<p><u>Safety</u> Not required for safety.</p> <p><u>Compliance</u> 10CFR61.41, ALARA. Provide compliant ventilation system with stack monitoring.</p> <p><u>Privatization</u> Filtration upgrades support potential transfers in support of privatization.</p> <p><u>Conduct of Operations</u> Reduce personnel exposure, operating, and maintenance costs by minimizing farm entry and replacing unreliable equipment.</p>
<p><u>Additional Information</u></p> <p>1. Ref: WHC-SD-W314-ES-022 Rev. 0, "Initial Assessment Report, HVAC Systems", dated 4/16/96.</p> <p>Discussion: The reference points out the following deficiencies associated with the ventilation systems:</p> <ul style="list-style-type: none"> a) Filter housing corrosion and/or seal leakage has caused contamination of the concrete pad supporting the unit (AW & AN). b) Stack sampling systems are not in compliance with NESHAP (AN & AP). c) Electric heaters have questionable reliability (AN). d) Pressure controls are inadequate (AN & AP). <ul style="list-style-type: none"> 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). 			

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.	<u>Safety</u> Not required for safety. <u>Compliance</u> 10CFR61.41, ALARA. Provide organic compliant ventilation system with stack monitoring. <u>Privatization</u> No privatization requirements identified. <u>Conduct of Operations</u> Reduce personnel exposure, operating, and maintenance costs by minimizing farm entry and replacing unreliable equipment.
<u>Additional Information</u> 1. Ref: WHC-SD-W314-022 Rev. 0, "Project W-314 HVAC Systems, Initial Assessment", dated 4/16/96. 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 DCRT's 244-A and 244-S. The ventilation systems will include seal pot, drainage, and filtration systems.	<u>Safety</u> Not required for safety. <u>Compliance</u> 10CFR61.41, ALARA. Provide compliant ventilation system with stack monitoring. <u>Privatization</u> No privatization requirements identified. <u>Conduct of Operations</u> Reduce personnel exposure, operating, and maintenance costs by minimizing farm entry and replacing unreliable equipment.
<u>Additional Information</u> 1. Ref: WHC-SD-W314-ES-022 Rev. O, "Initial Assessment Report, HVAC Systems", dated 4/16/96. Discussion: The reference points out the following items: <ul style="list-style-type: none"> 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 air 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 DCRTs are 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 DST's with better technology.	<p><u>Safety</u> Not required for safety.</p> <p><u>Compliance</u> 40CFR265.193, detection of leaks to secondary containment within 24 hours.</p> <p><u>Privatization</u> No privatization requirements identified.</p> <p><u>Conduct of Operations</u> Reduce personnel exposure, operating, and maintenance costs by minimizing farm entry for data collection and eliminating unreliable instruments.</p>
<p><u>Additional Information</u></p> <ol style="list-style-type: none"> Ref: WHC-SD-W314-ES-018 Rev. 0, "Project W-314 DST and DCRT Instrument and Control Systems, Initial Assessment", dated 11/17/95. 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. 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 makes the measurement subject to operator interpretation, which causes repeatability errors. The remaining expected life of the 'manual tapes' is 5-10 years. 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. 			

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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 DCRT's with better technology.	<u>Safety</u> Not required for safety. <u>Compliance</u> 40CFR265.193, detection of leaks to secondary containment within 24 hours. <u>Privatization</u> No privatization requirements identified. <u>Conduct of Operations</u> Reduce personnel exposure, operating, and maintenance costs by minimizing farm entry for data collection and eliminating unreliable instruments.
<u>Additional Information</u> 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 DCRT's with new models.	<u>Safety</u> Not required for safety. <u>Compliance</u> 40CFR265.193, detection of leaks to secondary containment within 24 hours. <u>Privatization</u> No privatization requirements identified. <u>Conduct of Operations</u> Reduce personnel exposure, operating, and maintenance costs by minimizing farm entry for data collection and eliminating unreliable instruments.
<u>Additional Information</u> 1. Ref: WHC-SD-W314-ES-018 Rev. 0, "Project W-314 DST and DCRT Instrument and Control Systems, Initial Assessment"; dated 11/17/95. 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 is typically hard bolted into a weather cabinet. The 3 pen 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 lek 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.			

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.	<u>Safety</u> Not required for safety. <u>Compliance</u> 40CFR265.193, detection of leaks to secondary containment within 24 hours. <u>Privatization</u> No privatization requirements identified. <u>Conduct of Operations</u> Reduce personnel exposure, operating, and maintenance costs by minimizing farm entry for data collection and eliminating unreliable instruments.
<u>Additional Information</u> 1. Ref: WHC-SD-W314-ES-018 Rev. 0, "Project W-314 DST and DCRT Instrument and Control Systems, Initial Assessment"; dated 11/17/95 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 and 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 user 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	Upgrade the DST leak detection pit radiation monitoring system to withstand the physical environment.	<p><u>Safety</u> Not required for safety.</p> <p><u>Compliance</u> 40CFR265.193, detection of leaks to secondary containment within 24 hours.</p> <p><u>Privatization</u> No privatization requirements identified.</p> <p><u>Conduct of Operations</u> Reduce personnel exposure, operating, and maintenance costs by minimizing farm entry for data collection and eliminating unreliable instruments.</p>
<p><u>Additional Information</u></p> <ol style="list-style-type: none"> Ref: WHC-SD-W314-ES-018 Rev. 0: "Project W-314 DST and DCRT Instrument and Control Systems, Initial Assessment"; dated 11/17/95, Pages 3.6-2 and 13-4. Discussion: The detector coaxial signal cable fails at the connector and has been field spliced and modified. The detector signal preamplifiers are a Hanford design from the mid-1970's subject to electrical interference. Ref: WHC-SD-W314-ER-002, Rev. 0; 241-AW Tank Farm Upgrades; August 1995, Pages 5 and 6. Discussion: The system is plagued with electrical noise problems which makes the signal and reading unreliable. The system is a Hanford designed, replacement parts are not commercially available. In some places the system is 18 years old with a limited remaining life of 5-10 years. Discussion: The detector element is subject to occasional immersion in water; the detector was not designed to operate submerged. The cable life expectancy is poor due to environmental factors. 			

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 DST leak detection pit high liquid level.	<u>Safety</u> Not required for safety. <u>Compliance</u> No compliance issues identified. <u>Privatization</u> No privatization requirements identified. <u>Conduct of Operations</u> Reduce personnel exposure and minimize farm entry by automatically sensing need for pit pump out.
<u>Additional Information</u> 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	Alarm high liquid level in DST's.	<u>Safety</u> Not required for safety. <u>Compliance</u> 40CFR264.194, appropriate controls required to eliminate tank overfill. <u>Privatization</u> No privatization requirements identified. <u>Conduct of Operations</u> Provide an engineered barrier to eliminate operating errors which could result in tank overfill and spillage of waste.
<u>Additional Information</u> 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.			

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 clean out box leak detectors systems with an operationally testable system.	<u>Safety</u> Not required for safety. <u>Compliance</u> 40CFR265.193, detection of leaks to secondary containment within 24 hours. <u>Privatization</u> No privatization requirements identified. <u>Conduct of Operations</u> Reduce personnel exposure and operating costs by improving control of waste transfers and eliminating shutdowns due to false alarms.
<u>Additional Information</u> 1. Ref: WHC-SD-W314-ES-018 Rev. 0; "Project W-314 DST and DCRT Instrument and Control Systems, Initial Assessment"; dated 11/17/95. Discussion: Clean out boxes use 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 primary pipeline leak detectors with an operationally testable system in the DST farms and DCRT's transfer pits and pipeline encasements.	<p><u>Safety</u> Not required for safety.</p> <p><u>Compliance</u> 40CFR265.193, detection of leaks and removal from service within 24 hours.</p> <p><u>Privatization</u> No privatization requirements identified.</p> <p><u>Conduct of Operations</u> Reduce personnel exposure and operating costs by improving control of waste transfers and eliminating shutdowns due to false alarms.</p>
<p><u>Additional Information</u></p> <ol style="list-style-type: none"> 1. Ref: WHC-SD-W314-ES-018 Rev. 0; Project W-314 DST and DCRT Instrument and Control Systems, Initial Assessment; dated 11/17/95. Discussion: The "pressure method" of pipe encasement leak detection has an unknown measurement sensitivity, the calibration is difficult, and it is a constant user of instrument air. 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 through the use of pipeline pressure and/or valve position, and/or pipeline flow monitoring as required on routing between the DST farms and the DCRT's.	<u>Safety</u> Not required for safety. <u>Compliance</u> 40CFR264.196, eliminate spills due to mis-routing. <u>Privatization</u> Supports AN and AP privatization requirements. <u>Conduct of Operations</u> Reduce personnel exposure and cleanup costs by assuring transfers are executed as planned.
<p><u>Additional Information</u></p> <p>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 in the DSTs. Unknown quantities of mis-routed waste being added to the DSTs, which changes the waste 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 shut down, and the mis-routing is corrected.</p>			

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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 and SST farms as specified.	<u>Safety</u> Not required for safety. <u>Compliance</u> 40CFR265.193, detection of leaks and shutdown of transfer. <u>Privatization</u> No privatization requirements identified. <u>Conduct of Operations</u> Reduce personnel exposure and operating costs by improving control of waste transfers and eliminating shutdowns due to false alarms.
<u>Additional Information</u> 1. Ref: WHC-SD-W314-ES-018 Rev. 0; "DST and DCRT Instrument and Control Systems, Initial Assessment"; dated 11/17/95. Discussion: 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 700. 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 Discussion: 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 11/17/95. 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. 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	Upgrade the master pump shutdown relay panel in the 242-A, and upgrade and move the panel out of the 242-S evaporators.	<u>Safety</u> Not required for safety. <u>Compliance</u> 40CFR265.193, detection of leaks and shutdown of transfer. <u>Privatization</u> No privatization requirements identified. <u>Conduct of Operations</u> Reduce personnel exposure and operating costs by improving control of waste transfers and eliminating shutdowns due to false alarms.
<u>Additional Information</u> 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 and DCRT's service pits.	<u>Safety</u> Not required for safety. <u>Compliance</u> No compliance issues identified. <u>Privatization</u> Supports AN and AP privatization requirements. <u>Conduct of Operations</u> Reduce operating costs by minimizing tank waste.
<u>Additional Information</u> 1. Ref: WHC-SD-W314-ES-018, Rev 0, "DST and DCRT Instrument and Control Systems, Initial Assessment"; dated 11/17/95. 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 DCRT's service pit.	<u>Safety</u> Not required for safety. <u>Compliance</u> 40CFR265.193, detection of leaks to secondary containment within 24 hours. <u>Privatization</u> No privatization requirements identified. <u>Conduct of Operations</u> Reduce operating costs by minimizing tank waste.
<u>Additional Information</u> 1. Ref: WHC-SD-W314-ES-018 Rev. 0; "DST and DCRT Instrument and Control Systems, Initial Assessment"; dated 11/17/95. 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.	<u>Safety</u> Not required for safety. <u>Compliance</u> 40CFR265.193, detection of leaks to secondary containment within 24 hours. <u>Privatization</u> Supports AN and AP privatization requirements. <u>Conduct of Operations</u> Reduce personnel exposure and operating costs by improving control of waste transfers and eliminating shutdowns due to false alarms.
<u>Additional Information</u> 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 the DST's and the DCRT's.	<u>Safety</u> Not required for safety. <u>Compliance</u> DOE5820.2A, monitoring system requirements. <u>Privatization</u> No privatization requirements identified. <u>Conduct of Operations</u> Appropriate tank parameters are monitored to assure conduct of operations and adherence to OSR and other operating procedures.
<u>Additional Information</u> 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 11/17/95. 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 tape' uses direct buried signal cable which is deteriorating. The 'manual tape' signal is connected to the existing CASS, the interface is obsolete and being replaced 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	Tank primary vapor space pressure in DST's and the DCRT's.	<u>Safety</u> Not required for safety. <u>Compliance</u> DOE5820.2A, pressure monitoring requirements. <u>Privatization</u> No privatization requirements identified. <u>Conduct of Operations</u> Tank pressures are monitored to assure conduct of operations and adherence to OSR and other operating procedures.
<u>Additional Information</u> 1. Ref: WHC-SD-W314-ES-018 Rev. 0; "DST and DCRT Instrument and Control Systems, Initial Assessment"; dated 11/17/95. Discussion: Some tank farm systems are in a condition such that components (sensor, transmitter, relay, 3 pen recorder, etc) often fail. The pneumatic transmitter design is based on old technology that needs multiple accessory equipment to operate; this could be simplified using an electronic approach which would require less maintenance. Some of the buried pneumatic signal tubing is 25 years old, its condition is unknown and suspected of degradation. 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 its weatherproof status is suspect.			

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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 all DST farms except AY and AZ, the 244-A and 244-S DCRTs.	<p><u>Safety</u> Not required for safety.</p> <p><u>Compliance</u> DOE5820.2A, tank ventilation system monitoring requirements.</p> <p><u>Privatization</u> No privatization requirements identified.</p> <p><u>Conduct of Operations</u> The tank ventilation systems are monitored to assure conduct of operations and adherence to OSR and other operating procedures.</p>
<p><u>Additional Information</u></p> <ol style="list-style-type: none"> Ref: WHC-SD-W314-ES-018 Rev. 0; "DST and DCRT Instrument and Control Systems, Initial Assessment"; dated 11/17/95. 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. 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.	<u>Safety</u> Not required for safety. <u>Compliance</u> 40CFR60, regulated stack monitoring. <u>Privatization</u> No privatization requirements identified. <u>Conduct of Operations</u> Effluents from the tank ventilation systems are monitored to assure adherence to OSR and other operating procedures.
<u>Additional Information</u> 1. Ref: WHC-SD-W314-ES-018 Rev. 0; "DST and DCRT Instrument and Control Systems, Initial Assessment"; dated 11/17/95. 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 monitor 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.	<p><u>Safety</u> Not required for safety.</p> <p><u>Compliance</u> DOE5820.2A, alarm and monitoring system requirements.</p> <p><u>Privatization</u> No privatization requirements identified.</p> <p><u>Conduct of Operations</u> Appropriate alarms are assigned to selected tank parameters to assure adherence to OSR and other operating procedures as specified by conduct of operations.</p>
<p><u>Additional Information</u></p> <p>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.</p>			

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.	<u>Safety</u> Not required for safety. <u>Compliance</u> No compliance issues identified. <u>Privatization</u> No privatization requirements identified. <u>Conduct of Operations</u> Supports the development of enhanced, centralized TMACS operation .
<u>Additional Information</u> 1. Ref: WHC-SD-W314-ES-018 Rev. 0; "DST and DCRT Instrument and Control Systems, Initial Assessment"; dated 11/17/95. 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 interface to the CASS uses unique Hanford designed hardware of which there are no spares 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 and obtain spare parts, and does not adequately support current operations. 3. Discussion: The Gamewell system does not allow identification of individual leak sensing elements.			

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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.	<p><u>Safety</u> Not required for safety.</p> <p><u>Compliance</u> DOE5820.2A, alarm and monitoring system requirements.</p> <p><u>Privatization</u> No privatization requirements identified.</p> <p><u>Conduct of Operations</u> TMACS is a supervisory monitor system which has 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.</p>
<p><u>Additional Information</u></p> <p>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.</p>			

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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.	<u>Safety</u> Not required for safety. <u>Compliance</u> No compliance issues identified. <u>Privatization</u> No privatization requirements identified. <u>Conduct of Operations</u> 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.
<u>Additional Information</u> 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.			

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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 and the existing panelboard with the vent and heater control units for the 244-A DCRT with a new unit.	<u>Safety</u> Not required for safety. <u>Compliance</u> No compliance issues identified. <u>Privatization</u> No privatization requirements identified. <u>Conduct of Operations</u> Assure electrical systems will meet OSR requirements for the life of the facility.
<u>Additional Information</u> 1. Ref: WHC-SD-W314-ES-020, Rev. 0, DST & DCRT Tank Farm Electrical Distribution Systems 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. For 244-A DCRT, the existing power feed is in electrical code violation due to two feeds in 244-A. The replacement is necessary to correct Code Violation, and also to accommodate the HVAC upgrade.			

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.	<u>Safety</u> Not required for safety. <u>Compliance</u> DOE5820.2A, normal and backup electrical power. <u>Privatization</u> No privatization requirements identified. <u>Conduct of Operations</u> Assure electrical systems will meet OSR requirements for the life of the facility.
<u>Additional Information</u> 1. Ref: WHC-SD-W314-ES-020, Rev. 0, DST & DCRT Tank Farm Electrical Distribution Systems 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 13.8 kV transformer.	<u>Safety</u> Not required for safety. <u>Compliance</u> DOE5820.2A, normal and backup electrical power. <u>Privatization</u> No privatization requirements identified. <u>Conduct of Operations</u> Assure electrical systems will meet OSR requirements for the life of the facility.
<u>Additional Information</u> 1. Ref: WHC-SD-W314-ES-020, Rev. 0, DST & DCRT Tank Farm Electrical Distribution Systems 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 13.8 kV system.			

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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 SSTpower systems to code with standardized grounding to support existing lights, service outlets, and miscellaneous instrumentation such as TMACS.	<u>Safety</u> Not required for safety. <u>Compliance</u> DOE5820.2A, normal electrical power. <u>Privatization</u> No privatization requirements identified. <u>Conduct of Operations</u> Assure electrical systems will meet OSR requirements for the life of the facility.
<u>Additional Information</u> 1. To provide normal electrical power for the remaining equipment on SST/CCS.			

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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 circuit breakers for AN, and AW Tank Farms.	<u>Safety</u> Not required for safety. <u>Compliance</u> No compliance issues identified. <u>Privatization</u> No privatization requirements identified. <u>Conduct of Operations</u> Provide power flexibility in support of preventive maintenance to ensure serviceability for the life of the facility.
<u>Additional Information</u> 1. Ref: WHC-SD-W314-ES-020, Rev. 0, DST & DCRT Tank Farm Electrical Distribution Systems Initial Assessment. Discussion: The spare main circuit breaker for the switchgear is required to allow preventive maintenance on the existing breaker, which will ensure the trip units will trip at the required settings to protect the electrical system.			

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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.	<u>Safety</u> Not required for safety. <u>Compliance</u> DOE5820.2A, cathodic protection. <u>Privatization</u> Provides piping protection on privatization transfer routes. <u>Conduct of Operations</u> Assure electrical systems and piping will meet OSR requirements for the life of the facility.
<u>Additional Information</u> 1. Ref: WAC 173-303-640, Dangerous Waste Regulations. Discussion: The WAC requires corrosion protection on tank farm piping system to maintain integrity in order to prevent premature failure. 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 to increase the life expectancy, and cost effective for the piping systems.			

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