This document was too large to scan as a whole document, therefore it required breaking into smaller sections.

Document number: SD-W314-CMR-001

Section 1 of 2

Title: Conceptual Design Report At Tank Farm Restoration & Safe Operations project W-314

Date: 5/03/96  Revision: 0

Originator: S.R. Briggs
Co: WHC

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7. Purchase Order No.:  
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10. System/Bldg./Facility:  
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Conceptual Design Report for Tank Farm Restoration and Safe Operations, Project W-314

S. R. Briggs
Westinghouse Hanford Company, Richland, WA 99352
U.S. Department of Energy Contract DE-AC06-87RL10930

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Abstract: This Conceptual Design Report (CDR) presents the conceptual-level design approach that satisfies the established technical requirements for Project W-314, "Tank Farm Restoration and Safe Operations." The CDR also addresses the initial cost and schedule baselines for performing the proposed Tank Farm infrastructure upgrades. The scope of this project includes capital improvements to Hanford's existing tank farm facilities (primarily focused on Double-Shell Tank Farms) in the areas of instrumentation/control, tank ventilation, waste transfer, and electrical systems.
CONCEPTUAL DESIGN REPORT

TANK FARM RESTORATION AND SAFE OPERATIONS

PROJECT W-314

Prepared for

Westinghouse Hanford Company

April 1996

Subcontract WHC-380393

Prepared by

ICF Kaiser Hanford Company
Richland, Washington

W314CDR
W314CDR

CONCEPTUAL DESIGN REPORT

TANK FARM RESTORATION AND SAFE OPERATIONS

PROJECT W-314

Prepared by

ICF Kaiser Hanford Company
Richland, Washington

for

Westinghouse Hanford Company

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HVAC Lead Engineer

Electrical Lead Engineer

Piping Lead Engineer

Principal Lead Engineer

Technical Documents

Instrumentation Lead Engineer

Civil/Environmental Lead Engineer

Quality Engineering

Principal Project Manager

Westinghouse Hanford Company

Projects Department

U.S. Department of Energy

Richland Operations Office
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Reference: DOE Order 4700.1
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<td>advanced conceptual design</td>
</tr>
<tr>
<td>AF</td>
<td>ampere frame</td>
</tr>
<tr>
<td>A-E</td>
<td>architect-engineer</td>
</tr>
<tr>
<td>ALARA</td>
<td>as low as reasonably achievable</td>
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<tr>
<td>ANSI</td>
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<td>American Society for Testing and Materials</td>
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<td>AT</td>
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<td>basic ordering agreement</td>
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<td>computer automated surveillance system</td>
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<td>clean, control, and stable</td>
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<td>CDR</td>
<td>conceptual design report</td>
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<td>CFR</td>
<td>Code of Federal Regulations</td>
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<tr>
<td>DCBL</td>
<td>design configuration baseline</td>
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<tr>
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<td>digital control system</td>
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<td>DST</td>
<td>double-shell tank</td>
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<tr>
<td>D&amp;D</td>
<td>decontamination and decommissioning</td>
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<td>EA</td>
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<td>I/O</td>
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<td>instrumentation/control/electrical</td>
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<td>ICF KH</td>
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<td>ISA</td>
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<td>JMN</td>
<td>justification of mission need</td>
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<td>LATA</td>
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<td>OTP</td>
<td>operational test procedure</td>
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<tr>
<td>PDRD</td>
<td>preliminary design requirements document</td>
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<td>PLC</td>
<td>programmable logic controller</td>
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<tr>
<td>QAPP</td>
<td>Quality Assurance Program Plan</td>
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<tr>
<td>RCRA</td>
<td>Resource Conservation and Recovery Act</td>
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<tr>
<td>RL</td>
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<tr>
<td>RTD</td>
<td>resistive temperature device</td>
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<tr>
<td>SACS</td>
<td>Surveillance Analysis Computer System</td>
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<tr>
<td>SCR</td>
<td>silicon controlled rectifier</td>
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<tr>
<td>SE</td>
<td>systems engineering</td>
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<td>SEPA</td>
<td>State Environmental Policy Act</td>
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<td>systems engineering management plan</td>
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<td>SST</td>
<td>single-shell tank</td>
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<tr>
<td>TFLAN</td>
<td>tank farm local area network</td>
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<td>Tank Farm Restoration and Safe Operations</td>
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<td>tank monitor and control system</td>
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<td>Washington Administrative Code</td>
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<td>work breakdown structure</td>
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CONCEPTUAL DESIGN REPORT

TANK FARM RESTORATION AND SAFE OPERATIONS

PROJECT W-314

I. INTRODUCTION

Underground tanks have stored radioactive liquid waste on the Hanford Site since the 1940s. There are 149 single-shell tanks (SSTs) and 28 double-shell tanks (DSTs) in 200-East and 200-West Areas containing these wastes (see Figures C-1, C-2, and C-3). (All figures are shown in Appendix K.) The Tank Waste Remediation System (TWRS) program was established to resolve tank safety issues and dispose of the tank wastes. Project W-314, "Tank Farm Restoration and Safe Operations" (TFRSO), provides essential tank farm infrastructure upgrades to support continued safe storage of existing tank wastes until the wastes can be retrieved and disposed of through follow-on TWRS program efforts. The SSTs are essentially stable and have been placed in a non-operational configuration awaiting future retrieval of their remaining wastes. Project W-314 focuses on capital improvements necessary to allow continued safe operation of the existing DST facilities, double-contained receiver tanks (DCRTs), and selected SST systems.

This report was prepared using the conceptual design report (CDR) format defined in U.S. Department of Energy (DOE) Order 4700.1 (ref 1). The CDR provides the conceptual-level project scope and cost and schedule data needed to support validation of project W-314, a Major System Acquisition. Key Decision 0 (KD-0), "Approval of Mission Need," for project W-314 was approved by DOE in February 1995. The U.S. Department of Energy, Richland Operations (RL) request for KD-1, "Approval of New Start," is planned to be submitted following completion of the conceptual design.

Project W-314 includes instrumentation replacement, ventilation system replacement, piping additions, pit modifications, and electrical power upgrades.
The upgrades focus on the DST system in 200-East Area, but also include SY Tank Farm in 200-West Area, 244-A and 244-S DCRTs, new transfer lines in 200-East Area, and minor improvements in the SST farms.

The scope of the project W-314 CDR effort is defined by the Upgrade Scope Summary Report (USSR) (ref 2). The USSR was prepared as part of a systems engineering process. It identifies the scope items (including systems, subsystems, and/or components) to be upgraded. The USSR was included in the project W-314 baseline as a key element to define the scope on which to develop this CDR.

An engineering report for project W-314G describes the conceptual design, cost estimate, and schedule for upgrades to the 241-AW Tank Farm (ref 3). The report was used to determine a technical, cost, and schedule basis from which to develop a reliable baseline for project W-314. Project W-314G upgrades for the AW Tank Farm are similar to those discussed in this CDR. Project W-314G was used to establish fiscal year (FY) 97 budgets for project W-314. This CDR supersedes the project W-314G engineering report.

A systems engineering (SE) based approach is underway, concurrently with this CDR, to prepare a detailed and fully integrated conceptual design for project W-314. The conceptual design will be documented in the form of a Design Configuration Baseline (DCBL) package, as defined by the project systems engineering statement of work (SE-SOW) (ref 4). The design solutions in this CDR are to be confirmed or superseded upon completion of the project W-314 DCBL. Any differences in scope, cost, or schedule between this CDR and the completed DCBL will be reconciled prior to KD-1 and the start of definitive design. This CDR allows the project to proceed through the FY98 validation process while the DCBL package is being completed.

A description of the scope and requirements for the project W-314 upgrades is presented starting in Section IV of this report. The cost estimate summary and conceptual project schedule are shown in Appendices C and D, respectively.
II. SUMMARY

Project W-314 will provide upgrades to the ventilation systems, instrumentation and control system (including master pump shutdown circuitry), electrical support systems, and waste transfer systems support structure for identified double-shell tank (DST) farms, double-contained receiver tanks (DCRTs), and single-shell tank (SST) farms.

The existing primary ventilation systems for Tank Farms 241-AP, -AN, and -AW will be upgraded. New high capacity exhaust air clean-up trains, a new stack, stack monitoring and control equipment, and electric power will be provided. Concrete shielding walls will be constructed around the perimeter of the tank exhaust trains. These new systems will also be designed to allow for future installation of additional effluent control equipment. The existing primary tank exhaust trains will be removed and properly disposed. All existing underground annulus and primary ventilation piping will be reused.

New annulus ventilation equipment will be provided for the SY Tank Farm, and new ventilation systems will be provided for the 244-A and 244-S DCRTs.

New seal pots and associated encased piping will be installed in Tank Farms 241-AP, -AN, and -AW to collect condensate from the ventilation systems and return it to the primary tank collection system.

The existing primary tank monitoring will be modified and upgraded for level, temperature, and vapor pressure measurement. The waste transfer system will be upgraded for route verification and waste transfer verification. The leak detection system will be upgraded for the annulus, leak detection pit, and process and other support pits. The master pump shutdown system will be upgraded. The existing alarm systems will be upgraded.

Primary ventilation instrumentation for all DSTs will be upgraded. New ventilation systems and associated instrumentation will be provided.
Existing power for the primary ventilation system will be modified and upgraded to provide backup power capabilities for Tank Farms 241-AP, -AN, and -AW. Existing electrical equipment will be upgraded and/or replaced to support the primary/annulus ventilation system of the DSTs, DCRTs, and electrical power for SSTs for clean, control, and stable operation.

New valve manifold assemblies will be provided to identified pits used for waste transfer operations. New transfer piping will be added to the A Tank Farm complex in 200-East Area and three existing transfer lines will be replaced.

Pits used for waste transfer operations associated with DST farms will have a special protective coating applied to the walls, floor, and underside of the cover blocks of each pit. This coating will provide a decontaminable surface and bring the pits into regulatory compliance.

Project W-314 will interface with on-going and future projects. On-going projects (i.e., projects W-211, W-030, and W-058) have been utilized for input into the design, estimate, and schedule.

The total project cost for this fiscal year 1997 Major System Acquisition project is estimated to be $273,000,000.

III. JUSTIFICATION

Project W-314 was established to upgrade various systems in the tank farms on the Hanford Site. Many of the existing systems are not adequate enough to support continued safe management of the tank waste until the end of the Hanford TWRS mission (i.e., the year 2028). The discrepancies in the various systems include lack of compliance with current codes and regulations, equipment degradation, and operational inadequacy as listed in Appendix C of the USSR.

To determine the scope of this project, a systems assessment was performed on the tank farm systems. The assessments are documented in references 5,
6, and 7. The systems were assessed against the technical requirements in the Preliminary Design Requirements Document (PDRD) (ref 8) to determine if the systems can fulfill current requirements. The systems were assessed for material condition and verification of operational performance for the remaining life of the tank farms. The systems and components that failed the systems assessment criteria were identified as being in the scope of project W-314 for upgrade and/or replacement. The identified scope of project W-314 is documented in the USSR.

This CDR provides descriptions of system enhancements that will provide continued safe operation, greater reliability, operational flexibility, and compliance to applicable codes and regulations for tank farm operations.

IV. DESCRIPTION OF PROJECT SCOPE FOR AN TANK FARM

This section describes the electrical, instrumentation and control, ventilation, valve manifold, and protective coating upgrades to be provided for the AN Tank Farm. Specific material and equipment information is in the outline specification (see Appendix E).

A. UTILITIES (600)

**Electrical Service**

The electrical upgrades for the AN Tank Farm include the following (see Figure E-1):

- A 480 Vac, 3-phase, 3-wire, 60 Hz power system shall be provided to the primary ventilation system from the existing motor control center (MCC) EDS-MCC-102 which is fed from the existing MCC EDS-MCC-101 in the 241-AN-271 Building. A new circuit breaker will be installed in EDS-MCC-102 (compartment C1) rated 100 Ampere Frame (AF)/100 Ampere Trip (AT), 3-pole, 600 Vac to feed two enclosed combination magnetic starters and mini-power centers for the primary ventilation system. A mini-power center will
be installed to supply 120 Vac power to a new instrumentation and control panel.

- A new power receptacle will be provided for connection of an existing portable diesel generator set as a backup power source to the primary ventilation system to allow preventative maintenance on electrical equipment as needed.

- A main circuit breaker for switchgear 241-AN-US rated for 1200AF/1000AT, 3-pole, 600 Vac, 42 kAIC RMS symmetrical amperes will be procured as a backup spare breaker so that the existing breaker can be maintained, tested, and calibrated to ensure acceptable performance of the device. This power circuit breaker will be a drawout type with time/current characteristics of a long delay time pickup range from 0.5 to 1.25 times sensor rating and a short delay time pickup range from 2.0 to 10.0 times sensor rating.

- The existing cathodic protection system will be modified to accommodate and protect new underground ventilation and process piping against galvanic corrosion. New anodes, test stations, anode distribution and junction boxes, permanent reference electrodes, and cables will be provided as required.

- The new primary ventilation system will be bonded to a new ground grid that will be connected from the existing tank farm ground grid.

- Freeze protection for the primary ventilation drainage system will be provided. The 120 Vac power for the freeze protection will be supplied from the mini-power center.
B. SPECIAL EQUIPMENT AND PROCESS SYSTEMS (700)

1. Instrumentation and Control

Primary Tank

- **Liquid Level:** Displacement liquid level gages have been installed on Tanks 241-AN-103, -104, and -105. The analog output transmitter cards on these tanks will be replaced by a digital transmitter card. The signal will connect to a multiplexer/interface box in the 241-AN-271 Building. The level signals will be input to the tank farm local area network (TFLAN) programmable logic controller (PLC). Displacement liquid level gages will be installed on Tanks 241-AN-102, -106, and -107 with a digital transmitter card and will be connected to the 241-AN-271 multiplexer/interface box and the TFLAN PLC. A displacement level gage will be installed on Tank 241-AN-101 by the A-101 stabilization project.

- **Liquid Level High Alarm:** The current/conductivity high liquid level probe will be replaced with a system similar to the resistive/conductivity liquid presence detectors in the annulus. A fixed probe will sense a high tank liquid level. The high liquid level alarm will be an intrinsically safe system. The high-level alarm signal will be connected to a local TFLAN input/output (I/O) box.

- **Waste Temperature:** A new waste temperature measurement device will be installed on Tanks 241-AN-101, -102, -106, and -107. Temperature measurement devices for Tanks 241-AN-103, -104, and -105 have been or will be installed by other projects. A local terminal box will be installed at the device to collect the signal wires which will be wired in parallel to the tank monitor and control system (TMACS) and to a local TFLAN I/O box.
• **Vapor Space Pressure:** The high and low range pneumatic transmitters located in the transmitter enclosures next to the leak detection pit for each tank will be replaced by electronic indicating pressure transmitters. Analog signals will be wired to a local TFLAN I/O box.

**Waste Transfer**

• **Valve Positioning:** To provide verification of the waste transfer route prior to the initiation of a transfer, valve position indicators will be added to the new and existing valves located throughout the waste transfer system. The indicators will provide a position indication locally and a signal to a local TFLAN I/O box allowing operations to confirm proper valve positioning. The upgrade is required in valve pits 241-AN-A and -B, and pump pits AN-01A through -07A.

• **Monitoring:** Waste transfer will be measured for flow using magnetic flowmeters on the incoming and outgoing transfer lines associated with each DST. The incoming and outgoing lines are located within the central pump pits on top of each tank.

• **Raw Water Flow Measurement:** The flow meter in the service pit will be replaced by a turbine flowmeter. The signal will be wired to an AN Farm TFLAN I/O box and transmitted over the TFLAN network to the new TFLAN PLC in the 242-A Evaporator Building (242-A) where the signal will be output to the existing 242-A digital control system (DCS) input.

**Leak Detection**

• **Tank Annulus Liquid Presence Detectors:** Three resistive/conductivity leak detectors will replace existing detectors on each tank. The liquid presence detector will be an intrinsically
safe system. The new leak detection signals will be connected to a local TFLAN I/O box.

- **Tank Annulus Exhaust Air Leak Detector:** The existing continuous air monitor (CAM) radiation detectors installed in each tank annulus exhaust ventilation system will be replaced with updated instrumentation of the same type. The CAM radiation level signal will be connected to a local TFLAN I/O box.

- **Leak Detection Pit, Gamma Radiation Monitor:** Submersible gamma probes will replace the existing non-submersible probes for each leak detection pit guide tube (see Figure 1-2). The probe electronics and transmitter will be located in the transmitter enclosure. The system will detect, transmit to a local TFLAN I/O box, and alarm a specified rise in the gamma radiation field above the observed background.

- **Leak Detection Sump, Liquid Leak Detector:** A resistive/conductivity leak detector will be installed in each dry sump (see Figure 1-2). A pump will be placed in the sump with tubing extending to the surface. If a leak is detected, the pump will be run manually to obtain a liquid sample for determination of liquid density by laboratory analysis. The leak alarm signal will be input to a local TFLAN I/O box.

- **Process Pits:** The existing current/conductivity leak detectors in the following pits will be replaced with new resistive/conductivity leak detectors. The leak detector assemblies will be designed for permanent installation in a fixed location. The leak detection in the central pump pits will be an intrinsically safe system. New leak detectors will be connected to a local
Leak detectors will be installed in the following pits:

- Central (tank) pump pits 01A-07A
- Tank annulus pump pits 01B-07B
- Leak detection pit 01C-07C
- Valve pits 241-AN-A and -B
- Flush pit
- Service pit
- Condensate receiver pit 241-AN-01D
- Supernatant receiver pit 241-AN-01E
- Drain pit (W-314 installed)

**Cleanout Boxes:** New resistive/conductivity type leak detectors will be installed in the nine AN Tank Farm cleanout boxes to replace the existing current/conductivity leak detectors. The leak detector assemblies will be designed for permanent installation in a fixed location (see Figures P-1, P-6, and P-14). The new leak detection signals will be input to a local TFLAN I/O box.

**Pipeline Leak Detectors** (see Figure I-3): Transfer line encasement pipe will be monitored for leaks at the test riser or in the encasement drain as appropriate. If existing test risers (i.e., swab risers) are used, they will have a permanent leak detector installed. If the drain pipe encasement is used, it will have a valve added (if needed) and a leak detector installed in the drain pipe located inside the connected process pit. New resistive/conductivity type leak detectors will be installed and the leak detection signals will be input to a local TFLAN I/O box. Pipeline leak detectors will be replaced or installed at the...
following pipeline encasement terminations (the numbers shown are totals for the tank farm):

- Tank annulus pump pits (7)
- Leak detection pit pump pits (7)
- Valve pit 241-AN-A (2)
- Valve pit 241-AN-B (existing) (2)
- Valve pit 241-AN-B (project W-314 installed encasement drain) (1)
- Drain pit (project W-314 installed drain lines) (3)
- Primary exhaust duct encasement (existing exhaust duct to train) (1)

Master Pump Shutdown (MPS)
Reference section XIII.C.1, "Instrumentation and Control," for a complete discussion of the TFLAN and MPS. Inputs to the MPS are made locally through remote TFLAN I/O boxes distributed throughout the tank farm or directly to the PLC in the Instrument Building. These MPS input signals are available to any connected TFLAN and the TMACS. The existing tank farm inputs and outputs to and from the MPS are listed in Table 1.

<table>
<thead>
<tr>
<th>Signal Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input</td>
<td>Pit leak detectors</td>
</tr>
<tr>
<td>Input</td>
<td>Cleanout box leak detectors</td>
</tr>
<tr>
<td>Input</td>
<td>Transfer pipe encasement leak detectors</td>
</tr>
<tr>
<td>Output</td>
<td>Supernatant pumps</td>
</tr>
</tbody>
</table>

Ventilation, Primary Exhaust (see Figure H-1)
- Inlet Pressure: The exhaust train inlet manifold pressure will be measured with respect to atmosphere. The pressure sense
tap will be a fitting on the duct. The sensing tubing will be routed to a local instrumentation rack (one near each exhaust train) for connection to an indicating transmitter. The analog signal from the transmitter will be wired to the local TFLAN I/O box.

- **Differential Pressure Measurements**: The demisters (one for each train), HEPA filters (two for each train), and exhaust fan (one for each train) differential pressures will be measured. The sensing taps will consist of a fitting on the exhaust train housing on each side of the device measured and taps will be provided for the future equipment. The sensing tubing will be routed to a local instrument rack for connection to the indicating transmitter. The analog signals from the transmitters will be wired to the local TFLAN I/O box.

- **Exhaust Train Temperatures**: Train inlet, heater outlet, and train outlet temperatures will be measured. Temperature elements will be installed in wells mounted on the exhaust train housing in front of the demister, immediately downstream of the heater, and downstream of the last filter. The temperature element will be wired to temperature indicating transmitters (three for each train/rack) on the local instrument rack. The analog signals from the transmitters will be wired to the local TFLAN I/O box.

- **Exhaust Heater**: A silicon controlled rectifier (SCR) unit will be installed next to the exhaust train heater in a National Electric Manufacturer's Association (NEMA) 4 enclosure. The heater controller will be a solid state device, controlled by an analog signal from the local TFLAN I/O box. Power to the heater controller will be interrupted, both locally or remotely, by either operating a manual on/off switch or deactivating a permissive interlock wired from the local TFLAN I/O box.
- **Valves**: Exhaust train valve motors (three for each train) will be wired to a switched (open/closed) signal from the local TFLAN I/O box through an interposing relay.

- **Fan Inlet Damper Motor**: The damper motor controller will be wired to an analog control signal from the TFLAN I/O box.

- **Seal Pot Level (see Figure H-5)**: The condensate drain pit seal pot liquid level will be measured. Three resistive/conductivity probes will be installed at different levels in the seal pot: one for low level, one for fill level, and one for high level. The signal will be displayed locally and will be wired to a local TFLAN I/O box.

- **Stack Monitor**: A new exhaust stack radiation monitoring system will be procured and installed for the tank farm primary ventilation stack. Design and construction will consist of installing the specified sample and stack flow and temperature measurement probes in the stack, a stack mounted equipment box, and an electronics cabinet on a concrete pad near the stack. Stack flow and temperature, all sample flows, and all radiation measurement signals and alarms will be transmitted to a local TFLAN I/O box.

**Alarms**

- **General Local**: All project specified AN Tank Farm signals are input directly to a TFLAN PLC or through an associated I/O box. Analog signals and alarms are displayed locally on the man-machine interface (MMI).

- **Gamewell Alarms**: All necessary Gamewell alarms originating in the AN Tank Farm will be connected to the TFLAN PLC. The leak detection and MPS system is discussed in Section XIII.
242-A DCS: The AN Tank Farm instruments that are scheduled for upgrade and are currently input to the 242-A DCS will be transmitted over the TFLAN network from the AN Tank Farm PLC to a new 242-A TFLAN PLC where they will be output to the 242-A DCS.

TMACS: The TMACS-connected primary waste temperature signals will remain connected to the TMACS system and will also be connected to a TFLAN I/O box.

Miscellaneous Signal Inputs
Alarms, such as the 241-AN-271 Building general alarm, that are wired to the 242-A DCS will be rewired to the TFLAN PLC. The signals will be transmitted over the TFLAN network to the new 242-A TFLAN PLC where they will be output to the existing 242-A DCS.

TFLAN System Components
• PLC: The PLC, which will be located in the 241-AN-271 Building, will receive input and output signals from field devices, communicate with other devices using various digital protocols, and control outputs based on inputs and algorithms.

The PLC will contain hardware for analog signals such as current loop (4-20 mA) voltage, thermocouples, and resistive temperature devices (RTDs), and discrete signals such as relays and on/off voltage devices.

The PLC will communicate with remote located I/O boxes, the MMI, and other PLCs. Communication to the I/O boxes will be via a serial digital transmission protocol that passes simple signal information. Communication with the MMI will be with an RS-232 or similar serial protocol for sending signal
information to the MMI on demand. The PLC will communicate with the other PLCs using a communications protocol to share field signals and MPS data.

The PLC uses inputs and programmable functions such as averaging, totalizing, and timing to control outputs.

- **MMI:** The MMI will be an industrial quality computer with a display, limited capability front panel keypad, and hard disk drive. The MMI will input selected data from the PLC, perform calculations on and/or store the data, and communicate the data on demand to the TMACS using a modem. The MMI will display alarms and signal data on its display for the tank farm it is located in or for any data available on the TFLAN network. The MMI will be located in the 241-AN-271 Building.

- **I/O Box:** The I/O box will be a field located device that functions to extend the PLC input and output capability to field instrumentation. It will contain the hardware for analog and discrete input and output signals. Unlike the PLC, it cannot perform any other function and its communications will be limited to digital serial transmissions to the PLC over coaxial wire or through the TFLAN network. As often as possible, the I/O boxes will be located in the existing instrument enclosures at the leak detection pits. The enclosures will require the addition of heaters. Additional I/O boxes will be located as needed to minimize conduit runs.

2. **Primary Ventilation System**

The existing ventilation system will be replaced to provide a new high capacity exhaust filter train, new fans, a new stack, stack monitoring and control systems, and provisions for possible future
hazardous effluent mitigation equipment. Enhanced features of the new systems are as follows (see Figure H-1):

- The new dual exhaust trains will consist of isolation valves, electric heaters, demisters with flush capability, two stages of HEPA filters, test sections, adsorber housing, automatic control dampers, and exhaust fans.

- Provisions for future equipment will be blanked flanges in the ventilation piping for a dry scrubber and empty housings in the filter trains for future carbon adsorbers.

- The new dual exhaust trains will be shielded by concrete walls and a removable metal roof. The new structure will not create an enclosure requiring ventilation.

- The new exhaust stack will be designed to enhance maximum dispersion of effluents, and will be provided with monitoring and sampling equipment required for regulatory compliance.

- Unfiltered leakage paths into the tanks will be sealed to reduce the potential for fugitive emissions and to improve pressure control of the primary tank air inlet stations (existing or by others). The extent of sealing will be similar to that provided for Tanks 241-AY and -AZ by Project W-030, "Tank Farm Ventilation Upgrade."

- A seal pot will be located in a new drain pit adjacent to the primary exhaust train. Condensate from the primary ventilation line and drains between the various exhaust filter housing sections will be routed to the seal pot. Condensate overflow from the seal pot will gravity drain back to an appropriate tank (see Figure H-5).
• The utilities (raw water) required for the seal pot and ventilation equipment will be provided from existing tank farm infrastructure.

• Existing underground ventilation piping will direct the flow from the tanks to the new equipment. The new equipment will be located as shown on Figure P-1.

• Primary air intake stations, one for each of the tanks, will consist of an air intake hood, a prefilter, a HEPA filter, HEPA filter test sections, connecting piping from the primary tank to the station, balancing valve, and pressure vacuum relief devices. This additional equipment will be provided by another project.

3. Piping

Valve Manifolds
Valve manifold assemblies (consisting of multiple jumpers) will be provided to support waste transfer operations in valve pits 241-AN-A and -B. The manifold will be constructed of stainless steel valves and piping to facilitate decontamination and to ensure long-term reliability. The manifold assembly will provide all necessary waste routing configurations by manual operation of valve handles that will extend through the pit cover blocks. See Figure P-18 for a typical representation of a valve pit manifold assembly.
Manifold design will provide specifically for the following:

- Two-valve isolation from piping outside the desired flow path.
- Avoid trapping of liquids.
- The ability to cross-connect the slurry and supernatant transfer piping lines.
- The ability to flush all flow paths.
- Jumpers will utilize the Hanford integral seal block connection assembly.

The valve manifold will utilize valve designs that include the following:

- Manual operation of all valves through the use of extension handles that extend through the pit cover blocks.
- Position indication to provide verification of flow route alignment.

Each pit will be individually modified to provide access for the position indication signal provided with the valves. The signal connection to the valve position indicators is expected to be a plug and receptacle system that will allow removal of the individual jumpers while allowing the fixed conductor to remain in the pit (see Figure P-2 for a typical representation).

**Cover Blocks**

New cover blocks will be provided on valve pits 241-AN-A and -B receiving the new valve manifolds. The new cover blocks will accept the valve operating extension handles. The new jumper
arrangements will be painted on the cover blocks to show the possible flow paths.

**Special Protective Coating**

The pits used in waste transfer operations will be lined. A special protective coating will be applied to the floors, the walls and the underside of the coverblocks of the pits. The procedure for coating requires the cleaning of the surfaces (without removing sound existing coating), filling all existing cracks with a grout material, priming the surface with a 5-mil thick coat of high solids epoxy, and finishing the surface with two 10-mil thick coats of an elastomeric coating. The following pits require this upgrade:

- Pump pits 241-AN-01A, -02A, -03A, -04A, -05A, -06A, and -07A
- Valve pits 241-AN-A and -B

**C. DEMOLITION (810)**

The existing seal pot and all underground electrical systems, process piping, and ventilation piping that are to be replaced by project W-314 will be placed in a safe configuration and abandoned in place unless otherwise noted.

1. **Instrumentation and Control**

**Primary Tank**

- **Liquid Level:** For Tanks 241-AN-103, -104, and -105, the analog transmitter card in the liquid level instrument enclosure (on the tank riser) will be removed. For Tanks 241-AN-102, -106, and -107, the existing level measurement system will be removed.

- **Liquid Level High Alarm:** The probes will be removed from the tank risers. The associated relays and annunciators in the 241-AN-271 Building will be removed.
- **Temperature Trees**: The existing trees and terminal boxes that are to be replaced will be removed. The instrument panel readouts will be removed in the 241-AN-271 Building.

- **Tank Vapor Space Pressure**: Both the low and high range pneumatic pressure transmitters and associated pneumatics will be removed (14 total). The instrument panel mounted pneumatic chart recorders and pneumatic to electrical alarm switches and the annunciators located in the 241-AN-271 Building will be removed.

**Waste Transfer**
- **Raw Water Flow Measurement**: The existing flow meter and associated readouts will be removed.

**Leak Detection**
- **Tank Annulus Liquid Presence Detectors**: Three liquid level tapes (i.e., flake boxes), the alarm switches, and the annunciator panel alarms in the 241-AN-271 Building will be removed.

- **Tank Annulus Exhaust Air Leak Detector**: The existing CAM system will be removed. The instrument panel annunciators and gages will be removed from the 241-AN-271 Building.

- **Leak Detection Pit, Gamma Radiation Monitor**: The existing Geiger-Mueller detector will be removed from the leak detection pit radiation well. The "power, pre-amp, count rate meter, and low count alarm" modules; the panel display; and the annunciator in the 241-AN-271 Building will be removed. The gamma monitor radiation detection well at the leak detection pit will be pumped dry.
- Leak Detection Sump, Liquid Leak Detector: The leak detection pit transmitter cabinet contents (transmitter and tubing) will be removed from the instrument enclosure near the leak detection pit. The pneumatic alarm switches, the instrument panel weight factor and specific gravity readouts, and the annunciators located in the 241-AN-271 Building will be removed. The leak detection pump will be pumped dry.

- Process Pits Leak Detector: The leak detector, the service operating electrical cord, and the local relay/alarm box will be removed.

- Cleanout Box Leak Detectors: The leak detector, the service operating electrical cord, and the associated relay/alarm box will be removed.

- Pipeline Leak Detectors: The leak detector, the service operating electrical cord, and the current sensitive relay at the leak detection control station will be removed.

Master Pump Shutdown
Switches and wiring will be removed.

Ventilation, Primary Exhaust
All instrumentation associated with the primary exhaust ventilation train will be demolished with the ventilation train, including field-located aboveground equipment, conduit, and tubing. All associated relays, indicators, alarms, and recorders in the 241-AN-271 Building will be removed.

Alarms
- General Local: All instrumentation that has been replaced but is still wired to the TFLAN PLC will have its annunciator,
indicator, and recorder removed from the main instrumentation panel in the 241-AN-271 Building.

- **Gamewell**: All relays and above ground wiring and conduit associated with the Gamewell signals that have been replaced will be removed. The Gamewell box will be removed from the 241-AN-271 Building.

**Miscellaneous Signal Inputs**
Relays, aboveground wiring and conduit, and annunciators will be removed.

2. **Ventilation Systems**
- The existing primary ventilation equipment will be removed and disposed of after the new ventilation equipment is in operation.

3. **Electrical**
- The feeders of the existing primary fan motors will be disconnected and removed.

4. **Piping**
- The existing jumpers and cover blocks located in the AN Valve Pits will be removed and disposed of accordingly.
- Debris will require disposal when the pits requiring special protective coating are examined and prepared for the upgrade.

V. DESCRIPTION OF PROJECT SCOPE FOR AP TANK FARM

This section describes the electrical, instrumentation and control, ventilation, and protective coating upgrades to be provided for the AP Tank Farm. Specific material and equipment information is in the outline specification.
NOTE: For all references stating "Similar to the AN Tank Farm description" in this section, the AN text referring to the 241-AN-271 Building is changed to the 241-AP-271 Building.

A. UTILITIES (600)

Electrical Service
The electrical service upgrades for the AP Tank Farm are the same as described for the AN Tank Farm with the following differences (see Figure E-2):

- A main circuit breaker for the existing 1,000-kVA loadcenter unit substation will not be provided.

- A 120 V ground fault duplex receptacle in a weatherproof enclosure for the diesel generator battery charger will be provided. The receptacle will be fence-mounted outside at the southeast corner of the AP Tank Farm where the existing support equipment is stored. The receptacle will be fed from an existing panelboard EDS-DP-304 located inside the 241-AP-801 Water Service Building. A new 100 AF/20 AT, 120 Vac, single-pole circuit breaker will be installed in space 7 of the panelboard.

B. SPECIAL EQUIPMENT AND PROCESS SYSTEMS (700)

1. Instrumentation and Control

Primary Tank
- Liquid Level: Similar to the AN Tank Farm description for replacement in all tanks.

- Liquid Level High Alarm: Similar to the AN Tank Farm description for all tanks.
• Waste Temperature: Similar to the AN Tank Farm description for new installation in all tanks.

• Vapor Space Pressure: The pressure measurement 4-20 mA signal will be disconnected from the 241-AP-271 Building instrument panel chart recorder and reconnected to a local TFLAN I/O box.

Waste Transfer

• Valve Positioning: Similar to the AN Tank Farm description for valve pit 241-AP and the pump pits 01A-08A and -02D.

• Monitoring: Similar to the AN Tank Farm description.

• Raw Water Flow Measurement: Similar to the AN Tank Farm description for the service pit located within Service Building 241-AP-801.

Leak Detection

• Tank Annulus Liquid Presence Detectors: Similar to the AN Tank Farm description.

• Tank Annulus Exhaust Air Leak Detector: Similar to the AN Tank Farm description.

• Leak Detection Pit, Gamma Radiation Monitor: Similar to the AN Tank Farm description for leak detection pits 03C and 05C (see Figure I-2).

• Leak Detection Sump, Liquid Leak Detector: Same as AN Tank Farm description for leak detection pits 03C and 05C (see Figure I-2).
- **Process Pits:** Similar to the AN Tank Farm description for the following locations:

  - Central (tank) pump pits 01A-08A
  - Pump pit 02D
  - Tank annulus pump pits 01B-08B
  - Leak detection pit 03C and 05C
  - Valve pit 241-AP
  - Mixer pump pits 07D, 07E, and 07F
  - Jumper storage
  - Flush pit
  - Service pit in Service Building 241-AP-801.
  - Drain pit 03D
  - Drain pit (W-314 installed)

- **Pipeline Leak Detectors:** Similar to the AN Tank Farm description for the following (the numbers shown are totals for the tank farm):

  - Central (tank) pump pits (8)
  - Tank annulus pump pits (8)
  - Leak detection pit (2)
  - Drain pit (W-314 installed drain lines) (3)

The valve pit has four existing risers outside the pit with current/conductivity leak detectors that will be replaced with resistive/conductivity leak detectors. The leak detection signals will be connected to a local TFLAN I/O box.

The encasement for pipeline SN-650 (on top of Tank 241-AP-102) will have the existing current/conductivity leak detector and relay replaced with a resistive/conductivity leak detector. The leak detection signal will be connected to a local TFLAN I/O box.
Master Pump Shutdown
Similar to the AN Tank Farm description except for those shown in Table 2.

### TABLE 2

<table>
<thead>
<tr>
<th>Signal Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input</td>
<td>Pit leak detectors</td>
</tr>
<tr>
<td>Input</td>
<td>Pipe encasement leak detectors</td>
</tr>
<tr>
<td>Input</td>
<td>Service and flush pit instrumentation</td>
</tr>
<tr>
<td>Input</td>
<td>AP MPS hand switch in 242-A</td>
</tr>
<tr>
<td>Output</td>
<td>Supernatant pumps</td>
</tr>
</tbody>
</table>

Ventilation, Primary Exhaust
Similar to the AN Tank Farm description.

Alarms
- **General Local:** Similar to the AN Tank Farm description.
- **Gamewell Alarms:** Similar to the AN Tank Farm description.

Miscellaneous Signal Inputs
Similar to the AN Tank Farm description.

TFLAN and MPS System Components
Similar to the AN Tank Farm description.

2. **Primary Ventilation System**
The primary ventilation system upgrades for the AP Tank Farm are the same as described for the AN Tank Farm (see Figures H-1 and P-3).
3. **Piping**

**Special Protective Coating**
The coating upgrade for the AP Tank Farm is the same as described for the AN Tank Farm for the following pits:

- Pump pits 241-AP-01A, -02A, -03A, -04A, -05A, -06A, -07A, -08A, and -02D.
- Valve pit 241-AP.

**C. DEMOLITION (810)**
The existing seal pot and all underground electrical systems, process piping, and ventilation piping that are to be replaced by project W-314 will be placed in a safe configuration and abandoned in place unless otherwise noted.

1. **Instrumentation and Control**

**Primary Tank**
- **Liquid Level**: Similar to the AN Tank Farm description for removal of the existing level measurement system for each tank riser.
- **Liquid Level High Alarm**: Similar to the AN Tank Farm description.
- **Temperature Trees**: Similar to the AN Tank Farm description except that the shared hardware and displays for the tank structure temperature will remain. The displays will be on the instrument panel in the 241-AP-271 Building.
- **Tank Vapor Space Pressure**: The 241-AP-271 Building chart recorder and high and low annunciator alarms will be removed.
Waste Transfer

- **Service Pit Raw Water**: The existing flowmeter and transmitter will be removed from the service pit. The flow indicator/totalizer will be removed from the 241-AP-271 Building panel.

Leak Detection

- **Tank Annulus Liquid Presence Detectors**: Similar to the AN Tank Farm description.

- **Tank Annulus Exhaust Air Leak Detector**: Similar to the AN Tank Farm description.

- **Leak Detection Pit, Gamma Radiation Monitor**: Similar to the AN Tank Farm description.

- **Leak Detection Sump, Liquid Leak Detector**: Similar to the AN Tank Farm description except that the added panel mounted level readout in the 241-AP-271 Building will be removed.

- **Process Pits Leak Detectors**: The service operating cord and element from the pit and the relay from the "LDK" relay enclosure in the 241-AP-271 Building will be removed. The leak detection and leak detection fail alarm annunciators from the instrument panel in the 241-AP-271 Building will be removed.

- **Pipeline Leak Detectors**: Similar to AN Tank Farm description including line SN-650.

Master Pump Shutdown

Similar to the AN Tank Farm description.
Ventilation, Primary Exhaust and Stack Monitor
Similar to the AN Tank Farm description.

Alarms
- **General Local**: Similar to the AN Tank Farm description
- **Gamewell**: Similar to the AN Tank Farm description
- **242-A**: Similar to the AN Tank Farm description

Miscellaneous Signal INPUTS
Similar to the AN Tank Farm description.

2. **Ventilation Systems**
   - Demolition will be as described for the AN Tank Farm.

3. **Electrical**
   - Demolition will be as described for AN Tank Farm.

4. **Piping**
   - As described for the AN Tank Farm, debris is expected to be found in the pits needing special protective coating that will require disposal.

VI. **DESCRIPTION OF PROJECT SCOPE FOR AW TANK FARM**

This section describes the electrical, instrumentation and control, ventilation, and protective coating upgrades to be provided for the AW Tank Farm. Specific material and equipment information is in the outline specification.

**NOTE:** For all references stating "Similar to the AN Tank Farm description" used in this section, the AN text referring to the 241-AN-271 Building is changed to the 241-AW-271 Building.
A. UTILITIES (600)

Electrical Service
The electrical service upgrades for the AW Tank Farm are the same as described for the AN Tank Farm with the following differences (see Figure E-3):

- A wire gutter, 100AF/100AT, 3-pole, 600 V enclosed circuit breaker, and a 3 kVA mini-power center with 120 V ground fault receptacles will be installed on the diesel generator set. These items will be fed from the existing diesel generator set 600 A main breaker. At least 150 ft of power cord (3/C#2 and 1 #8 GND) with a 100 A plug will be installed to provide power to the new primary ventilation backup power system. A minimum of four 120 V ground fault duplex receptacles will be installed on separate 20 A, 1-pole, 120 Vac circuit breakers for maintenance of power tools. These receptacles will be fed from the mini-power center.

- The main circuit breaker for loadcenter unit substation C8S35 is rated for 600AF/600AT, 3-pole, 600 Vac, 22 kAIC RMS symmetrical amperes.

- Three new single-pole, 100 AF/20 AT, 600 Vac circuit breakers will be installed in existing panelboard "A" located in the 241-AW-271 Building for instrumentation power requirements.

B. SPECIAL EQUIPMENT AND PROCESS SYSTEMS (700)

1. Instrumentation and Control

Primary Tank
- Liquid Level: Tanks 242-AW-101 and -104 have a displacement gage installed. New gages will be provided for Tanks 241-AW-102, -103, -105, and -106. A new multiplexer/
interface box that will connect the level signals to the TFLAN PLC will be provided in the 241-AW-271 Building.

- **Liquid Level High Alarm:** Similar to the AN Tank Farm description.

- **Waste Temperature:** Similar to the AN Tank Farm description for Tanks 241-AW-102, -103, -104, and -106. The temperature measurement device for Tanks 241-AW-101 and -105 will be installed by project W-211.

- **Vapor Space Pressure:** Similar to the AN Tank Farm description.

**Waste Transfer**

- **Valve Positioning:** Similar to the AN Tank Farm description for pits 241-AW-A and -B and pump pits 01A through 06A. For pit 02E, the existing indicators will be utilized and the signals will be fed to the PLC.

- **Monitoring:** Similar to the AN Tank Farm description.

- **Raw Water Flow Measurement:** Similar to the AN Tank Farm description.

**Leak Detection**

- **Tank Annulus Liquid Presence Detectors:** Similar to the AN Tank Farm description.

- **Tank Annulus Exhaust Air Leak Detector:** Similar to the AN Tank Farm description.

- **Leak Detection Pit, Gamma Radiation Monitor:** Similar to the AN Tank Farm description.
• **Leak Detection Sump, Liquid Leak Detector:** Similar to the AN Tank Farm description.

• **Process Pits:** Similar to the AN Tank Farm description except for the following process pits:

  - Central (tank) pump pits 01A-06A
  - Tank annulus pump pits 01B-06B
  - Leak detection pit 01C-06C
  - Valve pits 241-AW-A and -B
  - Flush pit
  - Service pit
  - Feed pump pit 02E
  - Drain pit 02D
  - Drain pit (W-314 installed)

• **Cleanout Boxes:** Similar to the AN Tank Farm description for 12 cleanout boxes (see Figures P-4 and P-16).

• **Pipeline Leak Detectors:** Similar to the AN Tank Farm description for the following (the numbers shown are totals for the tank farm):

  - Feed pump pit 02E (2)
  - Central pump pit 02D (2)
  - Valve pit 241-AW-A (2)
  - Valve pit 241-AW-A (W314 pipeline) (1)
  - Valve pit 241-AW-B (2)
  - Drain pit 02D (3)
  - Drain pit (W-314 installed drain lines) (3)
Master Pump Shutdown
Similar to the AN Tank Farm description except for those listed in Table 3.

### TABLE 3

<table>
<thead>
<tr>
<th>Signal Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input</td>
<td>Pit leak detectors</td>
</tr>
<tr>
<td>Output</td>
<td>Supernatant pumps</td>
</tr>
<tr>
<td>Output</td>
<td>Tank 102 feed pump</td>
</tr>
</tbody>
</table>

Ventilation, Primary Exhaust
Similar to the AN Tank Farm description.

Alarms
- **General Local**: Similar to the AN Tank Farm description.
- **Gamewell Alarms**: Similar to the AN Tank Farm description.

Miscellaneous Signal Inputs
Similar to the AN Tank Farm description.

TFLAN and MPS System Components
Similar to the AN Tank Farm description.

2. **Primary Ventilation System**
The primary ventilation system upgrades for the AW Tank Farm are the same as described for the AN Tank Farm (see Figures H-1 and P-4).
3. **Piping**

**Special Protective Coating**

The coating upgrade for the AW Tank Farm is the same as described for the AN Tank Farm for the following pits:

- Valve pits 241-AW-A and -B

**C. DEMOLITION (810)**

The existing seal pot and all underground electrical systems, process piping, and ventilation piping that are to be replaced by project W-314 will be placed in a safe configuration and abandoned in place unless otherwise noted.

1. **Instrumentation and Control**

   **Primary Tank**

   - **Liquid Level**: Similar to the AN Tank Farm description for removal of the existing level measurement for each tank riser.

   - **Liquid Level High Alarm**: Similar to the AN Tank Farm description.

   - **Waste Temperature**: Similar to the AN Tank Farm description except for Tank 241-AW-101 and -105.

   - **Vapor Space Pressure**: Similar to the AN Tank Farm description.

**Waste Transfer**

- **Raw Water Flow Measurement**: Similar to the AN Tank Farm description.
Leak Detection
- Tank Annulus Liquid Presence Detectors: Similar to the AN Tank Farm description.
- Tank Annulus Exhaust Air Leak Detector: Similar to the AN Tank Farm description.
- Leak Detection Pit, Gamma Radiation Monitor: Similar to the AN Tank Farm description.
- Leak Detection Sump, Liquid Leak Detector: Similar to the AN Tank Farm description.
- Process Pits: Similar to the AN Tank Farm description.
- Cleanout Boxes: Similar to the AN Tank Farm description.
- Pipeline Leak Detectors: Similar to the AN Tank Farm description.

Primary Ventilation
Similar to the AN Tank Farm description.

Alarms
- General Local: Similar to the AN Tank Farm description.
- Gamewell Alarms: Similar to the AN Tank Farm description.

Miscellaneous Signal Inputs
Similar to the AN Tank Farm description.

2. Ventilation Systems
- Demolition will be as described for the AN Tank Farm.
3. Electrical
   • Demolition will be as described for the AN Tank Farm.

4. Piping
   • As described for the AN Tank Farm, debris is expected to be found in the pits needing special protective coating that will require disposal.

VII. DESCRIPTION OF PROJECT SCOPE FOR AY TANK FARM

This section describes the electrical, instrumentation and control, piping, and protective coating upgrades to be provided for the AY Tank Farm. Specific material and equipment information is in the outline specification.

NOTE: For all references stating "Similar to the AN Tank Farm" in this section, the AN text referring to the 241-AN-271 Building is changed to the 241-A-271 Building.

A. UTILITIES (600)

Electrical Service
The MCC-AY1 will be upgraded as follows:

• The existing MCC will be replaced with a new one to accommodate the existing load as shown on Figure E-4.

• The trip setting of the feeder breaker in compartment B1 in the existing switchgear feeding the MCC-AY1 will be changed from 600AT to 350AT to provide overcurrent protection to the existing feeder to MCC-AY1. The switchgear is located at Substation 241-A.

• Spare starters and spaces will be provided only in the assigned compartments as shown on Figure E-4.
A new mini-power center will be provided to supply 120 Vac power to the new instrumentation equipment and control panel. This mini-power center will be fed from the new MCC-AY1.

An existing impressed current cathodic protection will be modified to protect new process underground piping against galvanic corrosion.

The existing HVAC control panels will be upgraded as follows (see Figure E-4):

- The existing HVAC control panel for Tank 241-AY-101 will be replaced.
- The existing HVAC control panel for Tank 241-AY-102 will be replaced.
- The existing heater controllers will be replaced with a new SCR unit.

B. SPECIAL EQUIPMENT AND PROCESS SYSTEMS (700)

1. Instrumentation and Control

Primary Tank

- Liquid Level: Similar to the AN Tank Farm description for replacement of instruments on Tank 241-AY-101 and -102. A multiplexer/interface box will be provided in the 241-AY-801 Building. The signal will connected to the TFLAN PLC.
Liquid Level High Alarm: Similar to the AN Tank Farm description except that the signal transmits to the 241-AY-801 Building.

Waste Temperature: Similar to the AN Tank Farm description for Tanks 241-AY-101 and -102. The signals will be connected to the 241-AY-801 Building.

Vapor Space Pressure: Similar to the AN Tank Farm description except that the signal transmits to the 241-AY-801 Building.

Waste Transfer

Valve Positioning: Similar to the AN Tank Farm description for the central pump pits. The PLC and MMI are in the 241-AY-801 Building.

Monitoring: Similar to the AN Tank Farm description.

Raw Water Flow Measurement: Similar to the AN Tank Farm description for replacement at the 241-AX service pit.

Leak Detection

Tank Annulus Liquid Presence Detectors: Similar to the AN Tank Farm description. The new detectors will be installed in spare risers.

Tank Annulus Exhaust Air Leak Detector: Similar to the AN Tank Farm description.

Leak Detection Pit, Gamma Radiation Monitor: Similar to the AN Tank Farm description for two leak detection pits.
- **Leak Detection Sump, Liquid Leak Detector**: Similar to the AN Tank Farm description for two leak detection pits.

- **Encasement Drain Pit, Gamma Radiation Monitor**: Similar to the leak detection pit, except for the encasement drain pit. The encasement drain pit will have the same design as the leak detection pits.

- **Encasement Drain Pit Sump, Liquid Leak Detectors**: Similar to the leak detection pit except for the encasement drain pit sump. The encasement drain pit sump will have the same design as the leak detection sump.

- **Process Pits**: Similar to the AN Tank Farm description except for the following process pits:
  - Central (tank) pump pits 01A and 02A
  - Sluice pits 01B, 01C, 01D, 01E and 02B, 02C, 02D, 02E
  - Tank annulus pump pits 01F and 02F
  - Leak detection pits 101 and 102
  - Encasement drain pit

- **Cleanout Box**: Similar to the AN Tank Farm description for one cleanout box (see Figure P-5).

- **Pipeline Leak Detectors**: Similar to the AN Tank Farm description for encasement leak detectors on risers, except that these leak detection signals will need to be transmitted parallel to the AY and AZ Tank Farms MICON DCS installed by project W-030. There are four AY Tank Farm encasement leak detectors on risers. An encasement leak detector is located at 241-AY-02A on the new W-314 transfer line from 241-AY-01D.
Master Pump Shutdown
Similar to the AN Tank Farm description except for those listed in Table 4.

### TABLE 4

<table>
<thead>
<tr>
<th>Signal Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input</td>
<td>Pit leak detectors</td>
</tr>
<tr>
<td>Input</td>
<td>Transfer pipe encasement leak detectors</td>
</tr>
<tr>
<td>Output</td>
<td>Transfer pumps</td>
</tr>
<tr>
<td>Output</td>
<td>Sluice pumps</td>
</tr>
<tr>
<td>Output</td>
<td>Waste recovery pump</td>
</tr>
</tbody>
</table>

Alarms
- **General Local**: Similar to the AN Tank Farm description.
- **Gamewell Alarms**: Similar to the AN Tank Farm description except that the instrument building is 241-A-271.

Miscellaneous Signal Inputs
Similar to the AN Tank Farm description.

**TFLAN and MPS System Components**
Similar to the AN Tank Farm description except:

- The PLC and MMI will be installed in the 241-AY-801 Building.
- The signals will be forwarded to the 241-AY-271 Building PLC/MMI.
- The "MICON" system installed by project W-030 for the AY/AZ ventilation system will be modified to output selected...
primary ventilation signals to TMACS by the addition of a modem interface and programming.

- **242-A DCS**: Similar to the AN Tank Farm description.

2. **Piping**

   **Waste Transfer**

   Waste transfer line SL-504 will be replaced with an identical line (2-in. primary encased in 4-in. secondary) to support future waste transfer operations. SL-504 completes the waste transfer route from pit 241-AY-02A to pit 241-AY-01D. The new line is expected to parallel the existing slurry line and use the location of the wall nozzles currently used by SL-504 (see Figure P-5).

   The wall nozzle connections for the replaced line will be upgraded to meet compliance criteria. The encasement currently stops on the outside of the pit wall and will be upgraded by extending the encasement to the inside wall of the pit.

   **Special Protective Coating**

   The coating upgrade for the AY Tank Farm is the same as described for the AN Tank Farm for the following pits:

   - Pump pits 241-AY-01A and -02A.
   - Sluice pits 241-AY-01B, -01C, -01D, -01E, -02B, -02C, -02D, and -02E.

C. **DEMOLITION (810)**

   All underground electrical systems and process piping will be replaced by project W-314 and will be placed in a safe configuration and abandoned in place unless otherwise noted.
1. **Instrumentation and Control**

**Primary Tank**
- **Liquid Level**: Similar to the AN Tank Farm description for the level gages that are removed.
- **Liquid Level High Alarm**: Similar to the AN Tank Farm description except that the annunciators from the 241-AY-801 and 241-A-271 Buildings will be removed.
- **Waste Temperature**: Similar to the AN Tank Farm description except that the terminal box selector switch from the 241-AY-801 Building will be removed.
- **Vapor Space Pressure**: Similar to the AN Tank Farm except that the pneumatic to electronic signal converters and recorders to be removed are in the 241-AY-801 Building and the annunciators to be removed are in the 241-A-271 Building.

**Waste Transfer**
- **Raw Water Flow Measurement**: Similar to the AN Tank Farm description.

**Leak Detection**
- **Tank Annulus Liquid Presence Detectors**: Leak detector elements inside the annulus will be abandoned. Alarm relays and annunciators in the 241-AY-801 and 241-A-271 Buildings will be removed.
- **Tank Annulus Exhaust Air Leak Detector**: Similar to the AN Tank Farm description.
- **Leak Detection Pit, Gamma Radiation Monitor**: Similar to the AN Tank Farm description.
- **Leak Detection Sump, Liquid Leak Detector**: Similar to the AN Tank Farm description except that the pneumatic to electric alarm switches and recorders are in the 241-AY-801 Building and the annunciators are in the 241-A-271 Building.

- **Encasement Drain Pit, Gamma Radiation Monitor**: Similar to the AN Tank Farm description for the leak detection pit.

- **Encasement Drain Pit Sump, Liquid Leak Detectors**: Similar to the AN Tank Farm description for the leak detection sump except that the pneumatic to electric alarm switches and recorders are in the 241-AY-801 Building and the annunciators are in the 241-A-271 Building.

- **Process Pits**: Similar to the AN Tank Farm description.

- **Cleanout Box**: Similar to the AN Tank Farm description.

- **Pipeline Leak Detectors**: Similar to the AN Tank Farm description.

**Master Pump Shutdown**
Similar to the AN Tank Farm description.

**Alarms**
- **General Local**: Similar to the AN Tank Farm description except for the 241-AY-801 and the 241-A-271 Buildings.

- **Gamewell Alarms**: Similar to the AN Tank Farm description for the 241-A-271 Building.

**Miscellaneous Signal Inputs**
Similar to the AN Tank Farm description.
2. **Electrical**
   - The existing MCC-AY1 in the 241-AY-801 Building will be removed and disposed of accordingly. Existing conduit and wiring that do not require reconnection to the new MCC will be abandoned in place.
   - The existing HVAC control panel for Tanks 241-AY-101 and -102 will be removed and disposed of accordingly.
   - The existing heater controllers for Tanks 241-AY-101 and -102 will be removed and disposed of accordingly.

3. **Piping**
   - As described for the AN Tank Farm, debris is expected to be found in the pits needing the special protective coating that will require disposal.
   - Upgrading the pit wall nozzles will require minor modification of the pit wall to facilitate extension of the piping encasement.
   - The existing slurry line SL-504 will be abandoned in place except for that portion required for placement of the new transfer line.

**VIII. DESCRIPTION OF PROJECT SCOPE FOR AZ TANK FARM**

This section describes the electrical, instrumentation and control, valve manifold, and protective coating upgrades to be provided for the AZ Tank Farm. Specific material and equipment information is in the outline specification.

**NOTE:** For all references stating "Similar to the AN Tank Farm description" in this section, the AN text referring to the 241-AN-271 Building is changed to the 241-A-271 Building.
A. UTILITIES (600)

Electrical Service

The electrical upgrades for the AZ Tank Farm include the following:

- The existing EDS-MCC-704 will be replaced with a new MCC located inside the 241-AZ-801A Building as shown on Figure E-5.

- A new mini-power center will be provided to supply 120 Vac power to the instrumentation equipment and control panel. This mini-power center will be fed from the new EDS-MCC-704.

- The existing EDS-MCC-703 and heater controllers will be replaced with new units as shown on Figure E-5A.

- An existing impressed current cathodic protection will be modified to protect new process underground piping against galvanic corrosion.

B. SPECIAL EQUIPMENT AND PROCESS SYSTEMS (700)

1. Instrumentation and Control

Primary Tank

- Liquid Level: Tank 241-AZ-101 has a displacement gage installed. A new gage will be provided for Tank 241-AZ-102. A new multiplexer/interface box will be provided in the 241-AZ-801A Building that will connect the level signals to the TFLAN PLC.

- Liquid Level High Alarm: Similar to the AN Tank Farm description except that the signal transmits to the 241-AZ-801A Building.
• **Waste Temperature:** Similar to the AN Tank Farm description for Tank 241-AZ-101. A waste temperature device for Tank 241-AZ-102 will be installed by project W-211. The signals are connected to the 241-AZ-801A Building.

• **Vapor Space Pressure:** Similar to the AN Tank Farm description except that the signal transmits to the 241-AZ-801A Building.

**Waste Transfer**

• **Valve Positioning:** Similar to the AN Tank Farm description for sluice pit AZ-02B and the central pump pits. The PLC/MMI is in the 241-AZ-801A Building.

• **Monitoring:** Similar to the AN Tank Farm description.

**Leak Detection**

• **Tank Annulus Liquid Presence Detectors:** Similar to the AN Tank Farm description. The new detectors will be installed in spare risers.

• **Tank Annulus Exhaust Air Leak Detector:** Similar to the AN Tank Farm description.

• **Leak Detection Pit, Gamma Radiation Monitor:** Similar to the AN Tank Farm description for two leak detection pits.

• **Leak Detection Sump, Liquid Leak Detector:** Similar to the AN Tank Farm description for two leak detection pits.

• **Encasement Leak Detection Pit 101/102, Gamma Radiation Monitor:** Similar to the leak detection pit except for pit 101/102. Pit 101/102 will have the same design as the leak detection pits.
- **Encasement Leak Detection Pit 101/102 Sump, Liquid Leak Detectors:** Similar to the leak detection sump except for pit 101/102. Pit 101/102 will have the same design as the leak detection pits.

- **Process Pits:** Similar to the AN Tank Farm description except for the following process pits:
  - Central (tank) pump pits 01A and 02A
  - Sluice pits 01B, 01C, 02B, and 02C
  - Annulus pump pits 01F and 02F
  - Leak detection pits 101 and 102
  - Encasement leak detection pit 101/102

- **Cleanout Boxes:** Similar to the AN Tank Farm description for ten cleanout boxes (see Figures P-6 and P-15).

- **Pipeline Leak Detectors:** Similar to the AN Tank Farm description for encasement leak detectors on risers, except that the leak detection signals will need to be transmitted parallel to the AY/AZ Tank Farm MICON DCS installed by project W-030. The signals are as follows (the numbers shown are totals for the tank farm):
  - AZ Tank Farm encasement leak detectors (on risers) (4)
  - Sluice Pit 241-AZ-02B (project W-314 pipeline from 241-AX-A) (1)
Master Pump Shutdown
Similar to the AN Tank Farm description except for those shown in Table 5.

### TABLE 5

<table>
<thead>
<tr>
<th>Signal Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input</td>
<td>Pit leak detectors</td>
</tr>
<tr>
<td>Input</td>
<td>Transfer pipe encasement leak detectors</td>
</tr>
<tr>
<td>Output</td>
<td>Diverter station pump</td>
</tr>
<tr>
<td>Output</td>
<td>Condensate pump</td>
</tr>
<tr>
<td>Output</td>
<td>Annulus pumps</td>
</tr>
<tr>
<td>Output</td>
<td>Transfer pumps</td>
</tr>
<tr>
<td>Output</td>
<td>Sluice pumps</td>
</tr>
<tr>
<td>Output</td>
<td>Waste recovery pumps</td>
</tr>
</tbody>
</table>

Alarms
- **General Local**: Similar to the AN Tank Farm description.
- **Gamewell Alarms**: Similar to the AN Tank Farm description except that the building is 241-A-271.

Miscellaneous Signal Inputs
Similar to the AN Tank Farm description.

**TFLAN and MPS System Components**
Similar to the AN Tank Farm description except:

- The PLC and MMI will be installed in the 241-AZ-801A Building.
- The signals will be forwarded to the 241-A-271 Building PLC/MMI.
• The "MICON" system installed by project W-030 for the AY/AZ ventilation system will be modified to output selected primary ventilation signals to TMACS by the addition of a modem interface and programming.

• 242-A DCS: Similar to the AN Tank Farm description.

2. Piping

Valve Manifold
The valve manifold assembly upgrade for the AZ Tank Farm is the same as described for the AN Tank Farm and applies to sluice pit 241-AZ-02B (see Figure P-7).

Cover Blocks
As described for the AN Tank Farm, new cover blocks will be provided for sluice pit 241-AZ-02B.

Special Protective Coating
The coating upgrade for the AZ Tank Farm is the same as described for the AN Tank Farm for the following pits:

• Pump pits 241-AZ-01A and -02A
• Sluice pits 241-AZ-01B, -01C, -02B, and -02C

C. DEMOLITION (810)
All underground electrical systems and process piping will be replaced by project W-314 and will be placed in a safe configuration and abandoned in place unless otherwise noted.

1. Instrumentation and Control

Primary Tank
• Liquid Level: Similar to the AN Tank Farm description except for the removal of annunciators at the 241-A-271 Building.
• **Liquid Level High Alarm:** Similar to the AN Tank Farm description.

• **Waste Temperature:** Similar to the AN Tank Farm description except the terminal box selector switch in the 241-AZ-801A Building will be removed.

• **Vapor Space Pressure:** Similar to the AN Tank Farm description except that the pneumatic to electronic signal converters and recorders to be removed are in the 241-AZ-801A Building and the annunciators to be removed are in the 241-A-271 Building.

**Leak Detection**

• **Tank Annulus Liquid Presence Detectors:** Leak detector elements inside the annulus will be abandoned. Alarm relays and annunciators in the 241-AZ-801A and 241-A-271 Buildings will be removed.

• **Tank Annulus Exhaust Air Leak Detector:** Similar to the AN Tank Farm description.

• **Leak Detection Pit, Gamma Radiation Monitor:** Similar to the AN Tank Farm description.

• **Leak Detection Sump, Liquid Leak Detector:** Similar to the AN Tank Farm description except that the pneumatic to electric alarm switches and recorders are in the 241-AZ-801A Building and the annunciators are in the 241-A-271 Building.

• **Encasement Leak Detection Pit 101/102, Gamma Radiation Monitor:** Similar to the AN Tank Farm description.
• **Encasement Leak Detection Pit 101/102 Sump, Liquid Leak Detectors**: Similar to the AN Tank Farm description except that the pneumatic to electric alarm switches and recorders are in the 241-AZ-801A Building and the annunciators are in the 241-A-271 Building.

• **Process Pits**: Similar to the AN Tank Farm description.

• **Cleanout Boxes**: Similar to the AN Tank Farm description.

• **Pipeline Leak Detectors**: Similar to the AN Tank Farm description.

**Master Pump Shutdown**
Similar to the AN Tank Farm description.

**Alarms**
• **General Local**: Similar to the AN Tank Farm description except for the 241-AZ-801A and 241-A-271 Buildings.

• **Gamewell Alarms**: Similar to the AN Tank Farm description for the 241-A-271 Building.

**Miscellaneous Signal Inputs**
Similar to the AN Tank Farm description.

2. **Electrical**
   • Demolition is as described for AY Tank Farm.

3. **Piping**
   • As described for the AN Tank Farm, debris is expected to be found in the pits needing special protective coating that will require disposal.
The existing jumpers located in the AZ sluice pit will be removed and disposed of accordingly.

The existing cover blocks used for the AZ sluice pit will be removed and disposed of accordingly.

**IX. DESCRIPTION OF PROJECT SCOPE FOR SY TANK FARM**

This section describes the electrical, instrumentation and control, ventilation, and protective coating upgrades to be provided for the SY Tank Farm. Specific material and equipment information is in the outline specification.

**NOTE:** For all references in this section stating, "similar to the AN Tank Farm description," the AN text referring to the 241-AN-271 Building is changed to the project W-211 Instrumentation/Control/Electrical (ICE) Building at the SY Tank Farm.

**A. UTILITIES (600)**

**Electrical Service**

The electrical service upgrades for the SY Tank Farm are the same as described for the AN Tank Farm with the following differences (see Figure E-6):

- The spare main circuit breaker for the existing loadcenter substation will not be provided.

- Power for the annulus ventilation system will be upgraded as follows:
  - Power to the two new 3-hp fans will be supplied for the annulus exhaust which will replace the existing 2-hp exhaust fans.
— Power to the annulus supply heaters (two 1-kW heaters/tank) will be supplied for each of the three SY tanks.

— The existing circuit breaker in the C3A compartment of MCC-241-SY-271 in the 241-SY-271 Building will be replaced with a new circuit breaker rated at 100AF and 80AT.

— The existing #8 AWG cable feeder from compartment C3A of MCC-241-SY-271 Building to the ventilation equipment power panel will be replaced with a #4 AWG cable to support the upgraded load.

— A new mini-power center will be provided to supply 120 Vac power to the instrumentation equipment and control panel. This mini-power center will be fed from the new ventilation equipment power panel.

B. SPECIAL EQUIPMENT AND PROCESS SYSTEMS (700)

1. Instrumentation and Control

Primary Tank

• Liquid Level: Displacement gages exist on all tanks. A new multiplexer/interface box that will connect the level signals to the TFLAN PLC will be added in the 241-SY-271 Building.

• Liquid Level High Alarm: Similar to the AN Tank Farm description.

• Waste Temperature: New thermocouple trees will not be installed in the 241-SY Tank Farm. A new terminal will be installed near the TMACS terminals to allow for paralleling the existing temperature signal to the TFLAN PLC.
• **Vapor Space Pressure:** Similar to the AN Tank Farm description.

**Waste Transfer**

• **Valve Positioning:** Similar to the AN Tank Farm description for pits 241-SY-A, -B, and the central pump pits.

• **Monitoring:** Similar to the AN Tank Farm description.

• **Raw Water Flow Measurement:** Similar to the AN Tank Farm description for the 241-SY-A flush pit. The signal will go to the TFLAN PLC in the 241-SY-271 Building.

**Leak Detection**

• **Tank Annulus Liquid Presence Detectors:** Similar to the AN Tank Farm description except that new detectors will not replace those existing at the same location.

• **Tank Annulus Exhaust Air Leak Detector:** Similar to the AN Tank Farm description.

• **Leak Detection Pit, Gamma Radiation Monitor:** Similar to the AN Tank Farm description.

• **Leak Detection Sump, Liquid Leak Detector:** Similar to the AN Tank Farm description.

• **Process Pits:** Similar to the AN Tank Farm description for the following process pits (the numbers shown are totals for the tank farm):
  - Central (tank) pump pits 01A through 03A
  - Tank annulus pump pits 01B through 03B
  - Leak detection pits 01C-03C
- Valve pits 241-SY-A and -B
- Flush pits 241-SY-A, -B, and -02E
- Drain pit 241-SY-02D

- **Cleanout Boxes:** Similar to the AN Tank Farm description for six boxes (see Figure P-8).

- **Pipeline Leak Detectors:** Similar to the AN Tank Farm description for the following leak detectors (the numbers shown are totals for the tank farm):
  
  - **Pump Pits:** Two encasement drain line valves and two leak detectors per pit will be added (6).
  
  - **Annulus Pump Pits:** A valve and leak detector will be added on the encasement (3).
  
  - **Leak Detection Pits:** A valve and leak detector will be added on the encasement (3).
  
  - **Valve Pits:** A valve and leak detector will be added for six encasements (6).
Master Pump Shutdown
Similar to the AN Tank Farm description except for those listed for 200-West Area in Table 6.

### TABLE 6

<table>
<thead>
<tr>
<th>Signal Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input</td>
<td>Pit leak detectors</td>
</tr>
<tr>
<td>Input</td>
<td>Transfer pipe encasement leak detectors</td>
</tr>
<tr>
<td>Input</td>
<td>241-SY-271 hand switch</td>
</tr>
<tr>
<td>Input</td>
<td>Miscellaneous from outside farm</td>
</tr>
<tr>
<td>Output</td>
<td>Supernatant, leak detect pit, and annulus pumps</td>
</tr>
<tr>
<td>Output</td>
<td>Slurry pump</td>
</tr>
</tbody>
</table>

Ventilation, Primary
The following existing instrumentation signals will be inputted to a local TFLAN I/O box.

- Inlet train pressure.

- Differential Pressure Measurements: The demister, prefilter, HEPA filters, and system pressure analog signals (5 total).

- Duct Heater Differential Temperature: The temperature indicator will be replaced with a temperature indicating transmitter.

- Primary ventilation stack monitor.

Ventilation, Annulus Supply (see Figure H-3)

- Differential Pressure Measurements: The prefilter (one for each train) and HEPA filter (one for each train) differential pressures will be measured. The sensing taps will be fittings on the exhaust train housing on each side of the device
measured and taps will be provided for the future equipment. The sensing tubing will be routed to a local instrument rack for connection to the indicating transmitter. The analog signal from the transmitter will be wired to the local TFLAN I/O box.

- **Inlet Train Temperatures:** Train inlet, heater outlet, and train outlet temperatures will be measured. Temperature elements will be installed in wells mounted on the housing in front of the prefilter, immediately downstream of the heater, and downstream of the last filter. The temperature element will be wired to temperature indicating transmitters (3 each train/rack) on the local instrument rack. The analog signals from the transmitters will be wired to the local TFLAN I/O box.

- **Heater:** A heater controller will be installed next to the inlet train heater in a NEMA 4 or 12 enclosure. The heater element controller will be a solid state device controlled by an analog input from the local TFLAN I/O box. Power to the heater controller will be interrupted, both locally or remotely, by either operating a manual on/off switch or deactivating a permissive interlock wired from the local TFLAN I/O box.

**Ventilation, Annulus Exhaust (see Figure H-2)**

- **Inlet Pressure:** The inlet pressure will be measured with respect to atmosphere at the inlet of the exhaust train manifold. The pressure sensing tap will be a fitting on the duct. The sensing tubing will be routed to a local instrumentation rack (one near each exhaust train) for connection to an indicating transmitter. The analog signal from the transmitter will be wired to the local TFLAN I/O box.

- **Differential Pressure Measurements:** The prefilters (one each train) and the HEPA filters (one each train) differential pressures will be measured. The sensing taps will be a fitting...
on the exhaust train housing on each side of the device measured. The sensing tubing will be routed to a local instrument rack for connection to the indicating transmitter. The analog signal from the transmitter will be wired to the local TFLAN I/O box.

- **Valves**: Exhaust train valve motors (three each train) will be wired to a switched (open/closed) signal from the local TFLAN I/O box through an interposing relay.

- **Fan Inlet Damper Motor**: The damper motor controller will be wired to an analog control signal from the TFLAN I/O box.

- **Stack Monitor**: Similar to the primary exhaust for the AN Tank Farm description.

**Alarms**

- **General Local**: Similar to the AN Tank Farm description.

- **Gamewell Alarms**: Similar to the AN Tank Farm description except the signals connect to CASS.

- **242-S**: Alarms and signals normally sent to the 242-S control room will be transmitted to the project W-211 ICE Building at the SY Tank Farm.

**Miscellaneous Signal Inputs**
Similar to the AN Tank Farm description.

**TFLAN and MPS System Components**
Similar to the AN Tank Farm description.
2. **Annulus Ventilation System**
   The existing annulus ventilation system equipment will be replaced with an improved system. The following upgrades will be included:
   - The new annulus exhaust system will have a higher capacity and will be divided into two units to allow backup capability during filter changeout or in the case of fan failure.
   - The new equipment will consist of isolation valves, control valves, prefilters, HEPA filters, test sections, and fans with radial vane inlet dampers. A new stack and monitoring system will be provided (see Figure H-2).
   - The new annulus supply system will provide redundant air intake stations for each individual tank. Each station will incorporate an electric heater for frost protection, a prefilter, a HEPA filter, and an isolation valve. The air intake stations will replace the existing alternate annulus supply filter units connected to 8-in. risers at each tank (see Figures H-3 and P-8).

3. **Piping**

   **Special Protective Coating**
   The coating upgrade for the SY Tank Farm is the same as described for the AN Tank Farm for the following pits:
   - Pump pits 241-SY-01A, -02A, -02E, and -03A
   - Valve pits 241-SY-A and -B

C. **DEMOLITION (810)**
   All underground electrical systems and ventilation piping will be replaced by project W-314 and will be placed in a safe configuration and abandoned in place unless otherwise noted.
1. **Instrumentation and Control**

**Primary Tank**
- **Vapor Space Pressure:** Similar to the AN Tank Farm description.

**Waste Transfer**
- **Raw Water Flow Measurement:** Similar to the AN Tank Farm description.

**Leak Detection**
- **Tank Annulus Liquid Presence Detectors:** Similar to the AN Tank Farm description.
- **Tank Annulus Exhaust Air Leak Detector:** Similar to the AN Tank Farm description.
- **Leak Detection Pit, Gamma Radiation Monitor:** Similar to the AN Tank Farm description.
- **Leak Detection Sump, Liquid Leak Detector:** Similar to the AN Tank Farm description.
- **Process Pits:** Similar to the AN Tank Farm description.
- **Cleanout Boxes:** Similar to the AN Tank Farm description.
- **Pipeline Leak Detectors:** Similar to the AN Tank Farm description.

**Master Pump Shutdown**
Similar to the AN Tank Farm description.

**Ventilation, Primary**
- **Duct Heater Differential Temperature:** The existing temperature indicator will be removed for replacement.
Ventilation, Annulus
All instrumentation associated with the annulus exhaust ventilation train will be demolished with the ventilation train, including field located equipment, above ground wiring, conduit, tubing, and all associated equipment in the 241-SY-271 Building.

Alarms
- General Local: Similar to the AN Tank Farm description.
- Gamewell Alarms: Similar to the AN Tank Farm description.

Miscellaneous Signal Inputs
Similar to the AN Tank Farm description.

2. Ventilation Systems
- The existing annulus exhaust equipment and supply filter units (where new filter trains will be installed) will be removed and demolished.

3. Electrical
- The existing feeder circuit breaker of the MCC located in the 241-SY-271 Building will be removed.
- The existing feeder of the ventilation power panel will be disconnected and removed. The underground section of conduit and wiring will be abandoned in place.

4. Piping
- As described for the AN Tank Farm, debris is expected to be found in the pits needing the special protective coating that will require disposal.
X. DESCRIPTION OF PROJECT SCOPE FOR THE SST FARMS

This section describes the electrical upgrades to be provided for SST Farms 241-A, -AX, -B, -BX, -BY, -C, -T, -TX, -TY, -S, -SX, and -U. Specific material and equipment information is in the outline specification.

A. UTILITIES (600)

**Electrical Service** (see Figure E-7, P-9, and P-10)

- A new pad-mounted transformer rated at 75 kVA (225 kVA for 241-C Tank Farm), 13.8 kV-480Y/277 Vac, 3-phase, 4-wire, 60 Hz will be provided to support a controlled, clean, and stable SST farm. This new transformer will be connected from the existing 13.8 kV overhead line and will feed a new service distribution panelboard clean, control, and stable (CCS).

- A 480 Vac, 3-phase, 3-wire, 60 Hz power system will be provided from the new panelboard to refeed existing tank farm lighting and for maintenance and miscellaneous needs as required. A new mini-power center will be provided to supply 120/240 Vac power for miscellaneous instrumentations such as the TMACS. The mini-power center will be fed from the new panelboard CCS.

- The new panelboard, power receptacle switches, and mini-power center will be mounted on a steel rack located in non-radiological zone inside the fence of the tank farm.

- A new enclosed circuit breaker rated 225AF/200AT, 600 Vac, 3-pole in a NEMA 4 enclosure will be provided to feed the existing C-LTG panel for C-Farm lighting.
XI. DESCRIPTION OF PROJECT SCOPE FOR 244-A DCRT

This section describes the electrical, instrumentation and control, and ventilation upgrades to be provided for the 244-A DCRT. Specific material and equipment information is in the outline specification.

NOTE: For all references stating "Similar to the AN Tank Farm description" used in this section, the AN text referring to the 241-AN-271 Building is changed to the 244-A instrument enclosure.

A. UTILITIES (600)

**Electrical Service** (see Figure E-8 and P-12)

- A new panelboard will be provided to replace the existing power distribution center located inside the 244-A instrument enclosure. This new panelboard will be fed from the existing MCC1 located at 242-A Building and will provide power to the new ventilation system; the existing load of the power distribution center; and the existing 244-A agitator, sump, and transfer pumps.

- A new mini-power center will be provided to supply 120 Vac power to the instrumentation and control panel. This mini-power center will be fed from the new panelboard.

- The existing feeder of the power distribution center will be disconnected and removed from the existing 100AF/50AT circuit breaker (compartment D5) of the MCC-2 located in 244-AR Building. The existing loads of the power distribution center will be disconnected, removed, and then reconnected to the new panelboard.

- A new 225AF/125AT, 3-pole, 600 Vac circuit breaker will be installed in compartment B5 of the existing MCC1 located in the
242-A Building. A new feeder for the new panelboard will be installed.

- The existing feeders of the 244-A agitator, sump, and transfer pumps will be disconnected and removed from the existing MCC1 located in the 242-A Building. New feeders from the new panelboard will be installed.

B. SPECIAL EQUIPMENT AND PROCESS SYSTEMS (700)

1. Instrumentation and Control

Primary Tank
- Liquid Level: An existing spare riser on the 244-A DCRT tank will be extended through the pump pit cover block for installation of a displacement level gage. A multiplexer/interface box will be installed in the instrument enclosure that will connect the level signal to the TFLAN PLC.

- Waste Temperature: Similar to the AN Tank Farm description.

- Vapor Space Pressure: The pressure transmitter will be replaced and the signal will be connected to the TFLAN PLC.

Waste Transfer
- Raw Water Flow Measurement: The flowmeter in the service pit will be replaced with a turbine flowmeter. The signal will be connected to the TFLAN PLC.

- Raw Water Radiation (Backflow) Detection: An "on line" liquid effluent radiation monitor in the service pit and an associated rate/count meter in the annulus enclosure assembly will be installed. An analog signal and fail alarms will be connected to the TFLAN.
Leak Detection

- **Tank Annulus Pump Pit Level**: Similar to the AN Tank Farm description except that only one leak detector will be in the annulus.

- **Tank Annulus Exhaust Air Leak Detector**: Similar to the AN Tank Farm description except that the CAM will be inside the existing annulus enclosure assembly.

- **Process Pits**: Similar to the AN Tank Farm description for one pump pit.

- **Pipeline Leak Detectors**: Similar to the AN Tank Farm description for the following (the numbers shown are totals for the tank farm):
  - 3-in. drain from flush pit to DCRT 244-A (1)
  - 3-in. drain from diversion box 241-ER-153 to DCRT 244-A (1)
  - SN-215 encasement (1)
  - SN-216 encasement (1)
  - WT-SNL-3150 encasement (1)
  - WT-SLL-3160 encasement (1)

Master Pump Shutdown

Similar to the AN Tank Farm description for those in Table 7.

**TABLE 7**

<table>
<thead>
<tr>
<th>Signal Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input</td>
<td>200-East MPS circuit</td>
</tr>
<tr>
<td>Input</td>
<td>244-A drain valve &quot;V1&quot; position</td>
</tr>
<tr>
<td>Input</td>
<td>244-A leak detector</td>
</tr>
<tr>
<td>Output</td>
<td>Transfer pump P-244-A1</td>
</tr>
</tbody>
</table>
Ventilation, Supply System
Similar to the SY Tank Farm description (see Figure H-4 for exceptions).

Ventilation, Exhaust System (see Figure H-4)
Similar to the SY Tank Farm description except that no demister differential pressure and inlet pressure instruments will be provided, and a stack monitor will not be installed by this project.

Alarms
- **General Local**: Similar to the AN Tank Farm description except that the existing Project W-058, "Replacement of Cross-site Transfer Pipelines," PLC will be used for connecting signals to the TFLAN.

- **242-A DCS**: Similar to the AN Tank Farm description except that the existing project W-058 PLC will be used to connect signals to the TFLAN.

Miscellaneous Signal Inputs
Similar to the AN Tank Farm description.

TFLAN and MPS System Components
Similar to the AN Tank Farm description except that the existing PLC installed by project W-058 will have a communications interface card added to connect to the TFLAN network. No TFLAN I/O boxes will be provided.

2. **Ventilation System**
The ventilation system will be replaced with new equipment and located above grade. The upgrades will be as follows:

- Outside air supply to the annulus will be provided through a system consisting of an intake plenum, an electric heater, a
prefilter, a testable HEPA filter, and isolation valves. The equipment will be connected to the existing 6-in. inlet pipe supplying the annulus (see Figure H-4).

- Exhaust equipment presently located in the filter pits will be removed and replaced with a new 4-in. jumper. The new above grade exhaust system will be connected to the existing 4-in. pipe exiting the pit. The new dual exhaust system will have 100% backup and will consist of motorized isolation valves, an electric heater, testable HEPA filters, housings for future carbon adsorbers, variable speed exhaust fans, and a stack with the provision of adding flow and record sample devices.

- The new dual exhaust trains will be protected by concrete shield walls and a removable metal roof (see Figure P-11).

C. DEMOLITION (810)

All underground electrical systems and ventilation piping will be replaced by project W-314 and will be placed in a safe configuration and abandoned in place unless otherwise noted.

1. Instrumentation and Control

Primary Tank

- **Liquid Level:** The sensing legs into the tank that are fed by flow valves F1-TK-1 and F1-TK-2 will be removed. The specific gravity and weight factor transmitters and all associated aboveground tubing will be removed.

- **Waste Temperature:** The existing probe and associated transmitter will be removed.

- **Vapor Pressure:** The transmitter will be removed.
Waste Transfer

- **Raw Water Flow Measurement**: The existing flowmeter will be removed.

- **Raw Water Backflow Radiation Detector**: The radiation detector, shielding and pig from the flush pit, associated electronics from the annulus enclosure assembly will be removed.

Leak Detection

- **Tank Annulus Pump Pit Level**: The three sensing legs into the annulus, the specific gravity and weight factor transmitters and their readouts will be removed.

- **Tank Annulus Exhaust Air Leak Detector**: The CAM, local electronics, and alarms from the annulus enclosure assembly will be removed.

- **Process Pits**: Similar to the AN Tank Farm description.

- **Pipeline Leak Detectors**: Similar to the AN Tank Farm description.

Master Pump Shutdown

Similar to the AN Tank Farm description.

Ventilation, Inlet Train, Primary Exhaust Train

All instrumentation associated with the existing inlet train and primary exhaust ventilation train will be demolished with the ventilation train, including field located equipment, above ground wiring, conduit and tubing, and all associated equipment in the instrument enclosure.
Alarms
• **General Local**: Similar to the AN Tank Farm description.

• **242-A DCS**: Similar to the AN Tank Farm description.

Miscellaneous Signal Inputs
Similar to the AN Tank Farm description.

2. **Ventilation Systems**
• The existing ventilation equipment and piping will be removed and disposed of after the new ventilation systems are in operation.

3. **Electrical**
• The existing power distribution center located inside the 244-A instrument enclosure will be removed and disposed of as required.

• The feeder of the existing distribution center will be disconnected from the existing MCC-2 located in the 244-AR Building. Exposed conduit and wiring will be removed, and underground conduit and wiring will be abandoned.

• The feeders of the existing 244-A agitator, sump, and transfer pumps will be disconnected from the existing MCC1 located in the 242-A Building. Exposed conduit and wiring will be removed, and underground conduit and wiring will be abandoned.
XII. DESCRIPTION OF PROJECT SCOPE FOR 244-S DCRT

This section describes the electrical, instrumentation and control, and ventilation upgrades to be provided for the 244-S DCRT. Specific material and equipment information is in the outline specification.

NOTE: For all references stating "Similar to the 244-A DCRT description" used in this section, the 244-A text referring to the 244-A instrument enclosure is changed to the 244-S instrument enclosure.

A. UTILITIES (600)

**Electrical Service** (see Figure E-9)

- A new pad-mounted transformer rated at 75 kVA, 13.8 kV-480Y/277 Vac, 4-wire, 60 Hz will be provided to replace the existing 3-25 kVA, single-phase, pole-mounted transformers that are connected to the existing overhead 2.4 kV line E8-L115. This new transformer will be connected to the existing overhead 13.8 kV line C8L4 and will feed the existing service distribution panelboard "A" located inside the 244-S instrument enclosure.

- A new service metering and disconnect switch will be provided for the new service feeder to the existing panelboard.

- The existing 2.4 kV lightning arresters, fuse cutouts, and existing feeder conductors to the existing panelboard will be removed.

- A 480 Vac, 3-phase, 3-wire, 60 Hz power system to the new DCRT ventilation system from the existing service distribution panelboard "A" will be provided. A new mini-power center will be provided to supply 120 Vac power for the instrumentation and control panel. The mini-power center will be fed from the existing service distribution panelboard A.
A new enclosed circuit breaker rated 100AF/60AT, 600 Vac, 3-pole in a NEMA 4 enclosure will be provided to feed an existing panel in the 241-S-271 instrumentation and electrical control house.

B. SPECIAL EQUIPMENT AND PROCESS SYSTEMS (700)

1. Instrumentation and Control

Primary Tank
- **Liquid Level**: Similar to the 244-A DCRT description.
- **Waste Temperature**: Similar to the 244-A DCRT description.
- **Vapor Space Pressure**: Similar to the 244-A DCRT description.

Waste Transfer
- **Raw Water Flow Assessment**: Similar to the 244-A DCRT description for the flush pit.
- **Raw Water Radiation (Backflow) Detection**: Similar to the 244-A DCRT description for the flush pit.

Leak Detection
- **Tank Annulus Pump Pit Level**: Similar to the 244-A DCRT description.
- **Tank Annulus Exhaust Air Leak Detector**: Similar to the 244-A DCRT description.
- **Process Pits**: Similar to the 244-A DCRT description.
- **Pipeline Leak Detectors**: Similar to the 244-A DCRT description for the following encasements (the numbers shown are totals for the tank farm):
Master Pump Shutdown
Similar to the 244-A DCRT description.

Ventilation, Supply System
Similar to the 244-A DCRT description.

Ventilation, Exhaust System
Similar to the 244-A DCRT description.

Alarms

• General Local: Similar to the 244-A DCRT description.

• Gamewell Alarms: Similar to the AN Tank Farm description except the signals are connected to the Gamewell in the 241-SY-271 Building.

• 242-S Control Room: All signals to the 242-S control room will be rerouted to the TFLAN MMI in the project W-211 ICE Building at the SY Tank Farm.

Miscellaneous Signal Inputs
Similar to the 244-A DCRT description.
TFLAN and MPS System Components
Similar to the 244-A DCRT description except that a TFLAN PLC/MMI will be installed by project W-314 in the instrument enclosure.

2. Ventilation System
The upgrades to the 244-S DCRT are similar to those described for the 244-A DCRT (see Figures H-4 and P-13).

C. DEMOLITION (810)
All underground electrical systems and ventilation piping will be replaced by project W-314 and will be placed in a safe configuration and abandoned in place unless otherwise noted.

1. Instrumentation and Control

Primary Tank
- Liquid Level: Similar to the 244-A DCRT description.

- Waste Temperature: Similar to the 244-A DCRT description.

- Vapor Pressure: Similar to the 244-A DCRT description.

Waste Transfer
- Raw Water Flow Measurement: The existing flowmeter will be removed.

- Raw Water Backflow Radiation Detector: Similar to the 244-A DCRT description.

Leak Detection
- Tank Annulus Pump Pit Level: Similar to the 244-A DCRT description.
• Tank Annulus Exhaust Air Leak Detector: Similar to the 244-A DCRT description.

• Process Pits: Similar to the 244-A DCRT description.

• Pipeline Leak Detectors: Similar to the 244-A DCRT description.

Master Pump Shutdown
Similar to the 244-A DCRT description.

Ventilation, Inlet Train, Primary Exhaust Train
Similar to the 244-A DCRT description.

Alarms
• General Local: Similar to the 244-A DCRT description.

• Gamewell Alarms: Similar to the 244-A DCRT description.

• 242-S Control Room: The annunciators, displays, and recorders in the 242-S control room will be abandoned in place for the demolition of the 242-S Building.

Miscellaneous Signal Inputs
Similar to the 244-A DCRT description.

2. Ventilation Systems
• Similar to the 244-A DCRT description.

3. Electrical
• The existing three 25 kVA, single-phase, pole-mounted transformers including lightning arresters, fused cutouts, hardware, wires, and conduit will be disconnected and removed.
XIII. DESCRIPTION OF PROJECT SCOPE FOR 200-EAST/200-WEST AREAS

This section describes the electrical, instrumentation and control, piping, valve manifold, and protective coating upgrades to be provided for the 200-East and 200-West Areas. Specific material and equipment information is in the outline specification.

A. OTHER STRUCTURES (550)

Special Protective Coating
The coating upgrade for the 200-East Area is the same as described for the AN Tank Farm for the following pits:


B. UTILITIES (600)

Electrical

Cathodic Protection
The existing rectifiers in Tank Farms 241-A, -AX, -AY, and -AZ will be modified to accommodate and protect the new process piping lines against galvanic corrosion. New anodes, test stations, anode distribution and junction boxes, permanent reference electrodes, and cables will be provided as required.

C. SPECIAL EQUIPMENT AND PROCESS SYSTEMS (700)

1. Instrumentation and Control

Waste Transfer
Leak Detection

- **A and AX Tank Farm Pit and Encasement Leak Detectors:**
  Similar to the AN Tank Farm description for 20 pit and pipeline leak detectors in the A and AX Tank Farms. Signals will be wired to the TFLAN in the 241-A-271 Building.

Tank Farm Local Area Network (see Figure 1-4)

TFLAN is the name of the project W-314 PLC/MMI/workstation network that will gather all specified tank farm data, display the data locally and at specified remote locations, interface with other projects and systems, and replace the MPS hardware. The system is made up of multiple PLCs located in existing structures at the A, AN, AP, AW, AY, AZ, and SY Tank Farms; the 242-A evaporator; the 272-AW Building; the 244-A and 244-S DCRTs; and the project W-211 ICE Building at the SY Tank Farm. Signal inputs and outputs will be made directly to the PLC or through I/O boxes distributed throughout a monitored local area. The I/O boxes communicate to the PLC through digital transmission of data using twisted shielded pair wiring. Each PLC has an associated MMI used for local information query, display, and communication to the TMACS. The PLCs are connected into a TFLAN network that communicates using twisted shielded pair wiring or the phone line between the 200-East and 200-West Areas. Programming by an authorized system administrator determines the activities of each PLC/MMI pair with respect to data input, algorithms, alarms, displays, interlocks, control outputs, and communications.

Master Pump Shutdown

- **General:** The MPS is a subset function of the TFLAN system (see Figure 1-4). This TFLAN-networked TFLAN PLC system will replace the hardware of the existing MPS of the same name and function in the 200-East Area.
An "approved program" at the source pump MMI/PLC can use any specified TFLAN connected device signal to control the pump. The approved program is an operating contractor (OC)-supplied item specifically written for each transfer type.

Signal inputs to the TFLAN are via the PLCs and are transmitted over the TFLAN communications link to the PLC controlling the waste transfer source pump.

An alarm condition of any MPS program specified input or by failure of the TFLAN communications link can cause the PLC controlling the source pump to activate an output. This output will control the pump MCC causing the pump and transfer to stop.

Immediate identification of the fault will be available through any TFLAN PLC and the TMACS. An interface will be established with the cross-site transfer (project W-058) at the 244-A DCRT. Project W-058 controls the MPS for the 200-West Area cross-site transfer pumps, and project W-314 controls the MPS for the 200-East Area pumps. Applicable data will be shared between the systems to allow controlled waste transfer between the areas.

- **242-A Building MPS:** The five MPS relays in the 242-A evaporator relay cabinet number 1 will be replaced with outputs from the TFLAN PLC in 242-A for the pumps in the 242-A local area. Remote pumps will be controlled by outputs from the TFLAN PLC in that farm. The inputs to the MPS circuit have been covered by the individual descriptions for the AP, AN, AW, AY, and AZ Tank Farms.

- **A and AX Tank Farm MPS:** There are 25 inputs to the MPS circuit in pipelines, pits in the A and AX Tank Farms, and
surrounding areas. These inputs will be wired to a TFLAN PLC in a 241-A-271 Building.

- **242-S Building MPS:** The 200-West Area MPS has been replaced by the SY Tank Farm, the 244-S TFLAN PLCs, and the 242-S control room abandonment effort. All necessary signals to the 200-West Area MPS (except SST Farm inputs) will be available on the TFLAN PLC in the project W-211 ICE Building at the 241-SY Tank Farm.

- **MPS Operation:** The TFLAN system with the project W-314 connected signals provides the hardware and software infrastructure to allow MPS programming. Due to the large variety unspecified transfer routings available, the MPS programming for specific waste transfer routes will be done by the OC.

**Selected Signal Inputs**

In addition to the DST farms and associated facilities, selected signals will be input to the TMACS from the A, BY, C, and U Tank Farms; and the CR-271, 242-T, 244-AR, and 204-AR facilities. The signals are presently connected to a "Panalarm" annunciator panel that will be modified by the addition of a telephone modem interface to transmit the signals through the telephone modem and to the TMACS.

**TMACS Interface**

The TMACS data interface is a subset function of the TFLAN network. TFLAN communicates all inputs to the TMACS through a modem interface on the MMI (see Figure I-4). The TMACS will perform the display, recording, and alarming functions required of the central monitoring station, and will communicate to the SACS.
242-S Control Room
Applicable signals alarmed and displayed in the 242-S control room will be relocated to the TFLAN PLC in the project W-211 ICE Building at the SY Tank Farm. Signals entering the control room from the northwest or southwest sides of the 242-S Building will be connected to terminal boxes at those respective locations for routing to the TFLAN PLC. Signals from the east of the 242-S Building (including the SY Tank Farm) will be routed directly to the TFLAN PLC. All signals will be available at the TFLAN PLC/MMI at the manned 278-WA facility over the TFLAN network.

2. Piping

New Transfer Lines
Three new transfer lines will be provided to support waste transfer operations. Each line will consist of a 3-in. primary line encased within a 6-in. secondary line. The new transfer lines essentially will follow existing transfer routes and are located as follows:

- From valve pit 241-AN-B to sluice pit 241-AZ-02B (see Figure P-14).

- From sluice pit 241-AZ-02B to valve pit 241-AX-A (see Figure P-15).

- From valve pit 241-A-A to valve pit 241-AW-A (see Figure P-16).

The new transfer lines will be sloped to prevent fluid accumulation and provide leak detection capability. Each transfer line will be provided with an encasement drain at its termination pit and a test riser to allow for future pressure testing of the secondary line.
Replacement of Existing Transfer Lines

Along with new waste transfer lines, three transfer lines will be replaced:

- SN-216 (from the 244-A DCRT to valve pit 241-A-B)
- SN-213/200 (from valve pit 241-A-B to valve pit 241-AX-B)
- SL-502 (from valve pit 241-AX-B to the 241-AY-02D)

NOTE: SL-502 consists of a 2-in. primary line encased by a 4-in. secondary. SN-216 and SN-213/200 are 3-in. primary lines encased by 6-in. secondary lines.

The replacement transfer lines will be designed as described for the new transfer lines and will parallel the existing transfer routes. The new lines will use the wall nozzle locations currently used by the existing lines to minimize any jumper modifications (see Figure P-17).

The wall nozzle connections will be upgraded to meet compliance criteria. The encasement stops on the outside of the pit wall and will be upgraded by extending the encasement to the inside wall of the pit.

Valve Manifolds

The valve manifold assembly upgrade for 200-East Area is the same as described for the AN Tank Farm and applies to valve pits 241-A-A, 241-A-B, 241-AX-A, and 241-AX-B (see Figure P-18 for a typical valve pit representation).

Cover Blocks

New cover blocks will be provided for pits 241-A-A, 241-A-B, 241-AX-A, and 241-AX-B receiving the new valve manifolds. The new cover blocks will accept the valve operating extension handles. The new jumper arrangements will be painted on the cover blocks to show the possible flow paths.
D. DEMOLITION (810)

All underground electrical systems and process piping will be replaced by project W-314 and will be placed in a safe configuration and abandoned in place unless otherwise noted.

1. Instrumentation and Control
   - Leak Detection: The existing A and AX Tank Farm pit and encasement leak detectors will be removed. Similar to the AN Tank Farm description for 20 pit and pipeline leak detectors in the A and AX Tank Farms.

2. Piping
   - As described for AN Tank Farm, debris expected to be found in the pits needing the special protective coating will require disposal.

   - The existing jumpers located in the upgraded pits will be removed and disposed of accordingly.

   - The existing cover blocks used for the upgraded pits will be removed and disposed of accordingly.

   - Upgrading the pit wall nozzles will require minor modification of the pit wall to facilitate the extension of the piping encasement.

   - The existing transfer lines will be abandoned in place except for the portion that must be removed for placement of the new transfer lines.

3. 242-A Gamewell

The 242-A Gamewell alarm system will be demolished. Necessary Gamewell alarm signals originating in the tank farms that have been connected to the PLC at each farm (as discussed in previous
sections) and transmitted over the TFLAN network to the 242-A TFLAN PLC where they will be alarmed and displayed on that MMI.

XIV. METHODS OF PERFORMANCE

A. PROJECT MANAGEMENT (WBS 1.1)

The operating contractor (OC) will provide overall project management and integration services as required to manage the project effectively. The work breakdown structure (WBS) includes overall systems engineering management and coordination, and project controls/business management functions (see Appendix A). The OC project management organization will prepare and maintain required project baseline documentation; interface with DOE, architect-engineer(s) (A-E), the onsite engineer/constructor contractor (E/C), and other subcontractors and OC personnel; provide coordination/integration with other TWRS activities and projects; manage project funds and schedule; provide regular performance and variance reporting; and utilize value engineering in support of definitive design and construction. Quality assurance support is included for the project design and construction activities.

B. PERMITTING AND SAFETY (WBS 1.2)

Permitting

The OC will prepare and obtain approval of environmental permits required for the project as identified in Appendix I.

Safety Analysis

The OC is responsible for coordinating development and approval of any safety analysis documentation required to support the project definitive design and construction efforts. As detailed in the project W-314 System Safety Program Plan, unreviewed safety question (USQ) determinations
and/or analyses, and revisions to existing tank farm safety basis documentation will be prepared, as required (ref 9).

C. OTHER PROJECT COST ACTIVITIES (WBS 1.3)

Project Definition
The OC is responsible for providing the definition of project requirements, and preparing the project requirements baseline documentation.

Program Integration and Support
The OC will perform and coordinate system assessments (including field inspections), program planning, and management of program interfaces.

Design and Construction Support
The OC will provide technical and logistical support to, and review of, the project design media. Operations support for construction activities and site and facility-specific training services for offsite personnel will be included as needed.

Conceptual Design
- **Engineering Report (Project W-314G):** The onsite E/C was responsible for preparing the project W-314G engineering report and other applicable information to support the project W-314 FY97 validation process in August 1995. Technical and management support was provided by the OC.

- **Design Configuration Baseline:** The OC has overall responsibility for developing the projects DCBL documentation with support from the onsite E/C and other subcontractors. The DCBL package is being prepared using the Systems Engineering (SE) methodology defined in the project W-314 Systems Engineering Approach Review Document (WHC-SD-W314-SOW-003), Statement of Work (SE-SOW), and other DOE guidance. This effort will develop a
requirements-based and fully integrated conceptual design for project W-314 to support the initiation of definitive design.

- **Conceptual Design Report**: This CDR was developed in support of the FY98 validation process by the onsite E/C, in conjunction with the O/C.

- **Advanced Conceptual Design (ACD)**: Upon completion of the conceptual design, the OC will identify any follow-up conceptual-level refinements and/or new tasks needed to further define the project systems engineering basis before Title I design, and perform detailed planning in support of ACD deliverables. Work packages are anticipated to be identified for ACD work to be performed by the onsite E/C as well as offsite subcontractor(s).

**Preliminary Safety Documentation**

The OC will be responsible for the preparation of initial US0 evaluations. This provides the process by which the project installations will be examined and compared against existing tank farm safety documentation to ensure that the existing documentation bounds any accident scenarios related to project upgrades or identifies the need for additional specific safety analyses through the safety assessment (SA) process.

**Permitting Plan**

The OC will prepare a plan to identify and provide the regulatory permitting requirements. The plan identifies the constraints the permits have on project activities, and provides a schedule and resources required to prepare and obtain approval of the permits.

**NEPA Documentation**

The OC will prepare all NEPA documentation associated with the project. An environmental assessment (EA) will address the impacts of the instrumentation, ventilation, and electrical upgrades included in this project. It is expected that the assessment will lead to a formal finding of
no significant impact (FONSI) prior to initiating Title II definitive design. The waste transfer systems upgrades are addressed in the TWRS Environmental Impact Statement.

**A-E Selection and Procurement**

If necessary, and as determined by the forthcoming acquisition strategy as discussed in Section XV, the OC will be responsible for offsite A-E selection and procurement in support of the definitive design efforts. Administration of the offsite A-E contract(s) will also be performed by the OC.

**Quality Assurance Program Plan**

The OC TWRS Quality Assurance organization will be responsible for QAPP development based on the conceptual design and preliminary safety documentation.

**Site Characterization**

The OC will provide soil sampling and characterization as needed during design and construction to identify any special requirements or conditions during construction and to classify waste for disposal.

**Startup Testing**

The OC provides the startup management and engineering support necessary to transcend the project installations from the construction phase to the operating phase through testing and calibration. This includes the preparation of necessary operating and maintenance procedures required for operation. An initial complement of spare parts will be provided.

**Operation Preparation**

The OC will perform activities necessary to prepare the project installations for operation by planning for and conducting an OC Readiness Review and Self Assessment. This review and assessment provides verification that all required design, construction, inspection, testing, and documentation
are complete and that the systems are fully operable. Support to the independent operational readiness review (ORR) will also be provided.

D. DEFINITIVE DESIGN
For this CDR, the following methods of performance were assumed for project definitive design. The methods are consistent with other ongoing and proposed tank farm upgrade projects. The methods will be revisited upon development of a project acquisition plan, contained within the Project Plan, and will be submitted during the KD-1 process.

Title I (WBS 1.4)
The onsite E/C will develop the preliminary design (Title I) documentation in accordance with the completed CDR effort. This effort will culminate in the issuance of a Title I report containing drawings, outline specifications, and narrative descriptions of the planned upgrades.

Title II (WBS 1.5.A.1)*
The onsite E/C will also provide detailed design (Title II) services for the project in accordance with the approved Title I baselines. Design packages will be developed during Title II to allow for construction on a farm-by-farm basis. Definitive design drawings and specifications, and other supporting engineering documentation, will be developed during Title II.

Title III (WBS 1.5.A.2)
The onsite E/C will perform the engineering during construction, prepare project as-built drawings, and support project documentation turnover. In process construction, inspection will be performed by construction contractor personnel with final acceptance inspections the responsibility of the onsite E/C.

E. PROCUREMENT (WBS 1.5.A.3)
The OC will procure long-lead engineered equipment.

*Typical WBS sub-elements for 1.5.B, C, D, E, F and 1.6.A, B, C, D)
F. CONSTRUCTION (WBS 1.5.A.4)

Onsite E/C Contractor
The onsite E/C will perform construction services for radiologically contaminated work inside/outside the tank farm; utility tie-ins; and demolition/removal of structures, systems, and components that are taken out of service as a result of the project upgrades.

Offsite Construction Contractor
Fixed-price construction contracts will be utilized whenever possible for the construction work based on contamination levels and the interfaces with new and existing systems.

Operating Contractor
The OC will provide for the burial of contaminated soil, equipment, and debris removed during construction.

G. HPT SUPPORT (WBS 1.5.A.5)
The OC will provide health physics technicians (HPTs) to support construction and other field work as needed, as well as personnel protective equipment and monitoring devices.

XV. ACQUISITION PLANNING

Mission Need
In accordance with DOE Order 4700.1, "Project Management System," the mission need for project W-314 was documented in a formal Justification of Mission Need (JMN) that was submitted to DOE in support of the request for KD-0. KD-0 was approved by DOE in February 1995.

Systems Engineering Management
There is a recognized need for the tank farm facilities, as well as all other TWRS elements, to be managed and operated as one fully integrated system. The DOE has placed a strong emphasis on ensuring that all TWRS work be fully supported by sound technical information and adequately defined functions and
requirements. To support this objective, DOE has directed all new TWRS projects, as well as certain ongoing projects and activities, to utilize an integrated SE approach for planning and execution of work scope. Based on this DOE direction, a dedicated effort has been, and continues to be, made during the conceptual design phase to establish the project W-314 objectives and design requirements based upon continued lower-level SE development of the TWRS program functions and requirements (F&R) and other applicable work.

**Research and Development Requirements**
Project W-314 will provide upgrades and renovations to existing process support systems. There is no known research and development work required to support the project.

**Conceptual Design Approach**
An integrated onsite team developed the project W-314 conceptual design using the prescribed SE methodology. The SE approach and planning were presented to RL and were approved in May 1995. The SE approach utilized during the conceptual design phase will result in a detailed DCBL that contains the necessary conceptual-level design specifications, project interface documentation, and supporting decision criteria and analyses (all traceable back to the higher-level TWRS functions and requirements) to support the start of Title I engineering. Since the initial planning in May 1995, it became apparent that a CDR consistent with DOE Order 4700.1 requirements was required prior to the DCBL becoming available to support the FY98 budget validation process. This CDR utilizes the preliminary DCBL products that were available when the CDR was initiated to develop a feasible conceptual approach and design to functional requirements and provides reliable cost and schedule baselines by which to validate an FY98 budget request.

To support the DCBL development, the OC is utilizing several existing contracts to obtain technical and other support services to meet the needs of the project. This includes the use of an existing basic ordering agreement (BOA) contract with the strong team comprised of Los Alamos Technical Associates (LATA), British Nuclear Fuels, Ltd. (BNFL) and TRW Systems Integration Group team
members. Also, the onsite E/C contractor, ICF Kaiser Hanford Company (ICF KH), and other BOA subcontractors available through ICF KH are being utilized in support of the conceptual design effort.

Cost, Schedule, and Performance Management
Management practices will be employed in accordance with DOE Order 4700.1 and applicable procedures to review, monitor, and evaluate total project costs (TPC), schedule, and performance throughout the project acquisition process and to provide assessments for consideration at key decision points or when significant baseline variances occur.

Reporting on the accomplishment and status of the acquisition process will be provided as required. Of particular importance will be the reporting of any potential cost, schedule, or performance threshold breaches before corrective actions are foreclosed.

Acquisition Strategy
The acquisition strategy for project W-314 will reflect the management concepts that will be used to direct and control the project to ensure that the systems being acquired satisfy the approved mission need. The project W-314 Acquisition Strategy, including a description of the contractual basis for the project, will be in the Project Plan as a KD-1 submittal.

XVI. REQUIREMENTS AND ASSESSMENTS

A. SAFEGUARDS AND SECURITY
Proposed upgrades will be constructed within the 200-East/West Area security fence boundaries.
B. HEALTH AND SAFETY

Radiation Protection
Adequate shielding is provided by cover blocks, shielding walls, and/or earthcover and reduces exposure to as low as reasonably achievable (ALARA) for personnel safety.

Tank risers and pits are shielded by earth, concrete plugs, cover blocks, or a combination thereof.

Industrial Safety
The design of project W-314 will comply with Occupational Safety and Health Administration (OSHA) regulations, DOE health and safety standards regulations, the Tank Farm Health and Safety Plan, and WHC controlled manuals.

Risk Prevention During Construction
During construction, contractors will be required to take all reasonable precautions in their work to protect the health and safety of their employees, subcontractors, the operating contractor, and DOE personnel.

A 24-hr advance notice of any excavation work disrupting roadways or other services will be required to ensure that emergency personnel (i.e., patrol and fire department) receive adequate notification.

DOE health and safety standards and regulations will be followed to minimize risks during construction. Removing, packing, and disposing of any contaminated (radiological, hazardous, or both) soil radioactive or dangerous waste (or both) and materials found during excavation will comply with appropriate safety standards and procedures. At all times, the construction contractor will ensure that the construction area is accessible to emergency vehicles or personnel and that emergency evacuation routes are not obstructed.
C. **DECONTAMINATION AND DECOMMISSIONING**

Project W-314 will be designed to minimize contamination and release of hazardous materials. Process system components can be isolated, packaged, and removed for further decontamination or disposal. Confinement systems that come into contact with waste, or have the potential to become contaminated, will be constructed to minimize absorption of waste and facilitate decontamination.

During definitive design, consideration will be given to the decontamination and disposal of each component installed in the facility.

D. **MAINTENANCE REQUIREMENTS**

Project W-314 will be designed to allow access for maintenance work. The use of a bag-in/bag-out method during HEPA filter changes will minimize the spread of contamination and personnel exposure.

The location of instrumentation and electrical equipment will allow crane access to the process pits. Space is provided adjacent to the process pits so that cover blocks can be stacked without moving the crane.

Equipment, instrumentation, detectors, and systems located in the process pits will be capable of being removed and replaced remotely. Rotating equipment not readily accessible will be lubricated remotely.

E. **QUALITY ASSURANCE**

Quality Assurance Activities:

Quality assurance activities for all contractors involved in the design, procurement, construction, inspection, and testing of the proposed project will be formulated and executed in accordance with the project-specific Quality Assurance Program Plan (QAPP). Minimum quality attributes are included in the project functions and requirements document which is the PDRD for project W-314, and will be incorporated in the project-specific QAPP. Based upon a graded approach, the QAPP will implement...
applicable quality assurance requirements identified in Code of Regulations (CFR) 10 CFR 830.120, "Quality Assurance Requirements for Nuclear Facilities." The QAPP will provide a format for establishing the scope of the quality-related activities and the specific quality assurance requirements and responsibilities based upon assigned safety classifications. The QAPP will indicate the project critical characteristics, corresponding safety classification assignments, and programmatic controlling documents. The specific technical and quality programmatic requirements, material certifications, qualification and certification of personnel, inspections, examinations and testing, and applicable quality assurance records will be established during definitive design and included in design documents. Specifications will require controls to exclude misrepresented products.

Safety Classification

Safety classifications have been documented for the existing tank farm structures, systems and components. For this report, the existing safety classifications have been used as a planning and estimating basis for the project W-314 work. The validity of this approach has been confirmed by the initial USQ screening process. During the project W-314 conceptual and definitive design development efforts, the safety classifications for all affected tank farm structures, systems, and components will continue to be reviewed and revised, if needed, to ensure that appropriate safety-related considerations are placed on design, procurement, construction, testing, operation, maintenance, and future modifications.

Safety classification criteria and methodology are defined in WHC Management and Requirements and Procedures Manual WHC-CM-1-3, MRP 5.46. Safety classifications are determined through analysis and consequences of failure, and the safety class designations form the basis for the design and quality assurance requirements applied to the project. Safety Class 2 is the highest level anticipated for any project W-314 elements.
NOTE: The safety class classification has changed recently due to revisions to WHC-CM-4-46. For this CDR, Safety Class 2 and 3 should be considered equivalent to "safety significant" under the new standard.

The safety documentation specific to this CDR effort is in the SSPP and includes interim safety equipment lists for DSTs (WHC-SD-WM-SEL-026, Rev. 1), for SSTS (WHC-SD-WM-SEL-027, Rev. 1), and for aging waste tanks (WHC-SD-WM-SEL-020, Rev. 2). The safety classifications are considered to be conservative in their assignments and were used as general guidance. Exceptions to the ISEL safety classifications are noted in the associated USQ screening forms.

F. ENVIRONMENTAL COMPLIANCE

Proposed designs will comply with federal and state regulations applicable to waste management units for storage and treatment of hazardous wastes. Existing enclosures for access, vents and instrumentation will not be upgraded except as noted in this CDR.

Exhaust air filtering systems will be provided for the contaminated air streams to control particulate matter. Design and selection of air treatment trains and the stack will be based on Best Available Radionuclide Control Technology (BARCT) to minimize the release of radionuclides in accordance with WAC 246-247.

Fugitive dust generated during construction or related activities shall be minimized in accordance with WAC 173-400.

G. ENVIRONMENTAL DOCUMENTATION AND PERMITS

National Environmental Policy Act (NEPA)

NEPA documentation will be prepared for this project pursuant to the National Environmental Policy Act (NEPA) of 1969 and as implemented by DOE in 10 CFR 1021. The environmental impacts reasonably expected
from the tank farm instrumentation and controls, ventilation, and electrical upgrades will be evaluated in an environmental assessment (EA). Project W-314 transfer system upgrades are addressed in the TWRS environmental impact statement.

**State Environmental Policy Act (SEPA)**

A SEPA review is required for project W-314, and a SEPA checklist will be prepared and submitted to the Washington State Department of Ecology with permit applications. However, based on past history with the Washington State Department of Ecology, it is anticipated that the DOE NEPA documentation will satisfy the SEPA documentation requirements.

**Permitting**

As a part of the conceptual design activities for project W-314, all permits required to initiate/complete construction and start of operations have been identified. This information has been developed into a permitting plan indicating the constraints that permits may have on project activities and identifies responsibility for obtaining the necessary permits. The plan addresses recommended methods for obtaining the necessary regulatory permits needed to support the project design, construction, and startup phases (see Appendix I).

**H. DESIGN COMPLIANCE**

The design and construction of project W-314 will comply with the criteria listed in the PDRD (ref 8).

**XVII. IDENTIFICATION AND ANALYSIS OF UNCERTAINTIES/DESIGN ASSUMPTIONS**

**A. GENERAL**

The interim tank farm safety basis was used as the design planning and estimating basis for safety classifications for project W-314 installations. The classifications were developed to comply with the criteria in
WHC CM-1-3, MRP 5.46. The manual was replaced on February 26, 1996 via issuance of Rev. 2 of WHC-M-4-46, "Safety Analysis Manual," concurrent with finalization of this CDR effort. A formal analysis of the change in the definitions of safety classification designations has not been made; therefore, it is assumed that this change from Safety Class 1, 2 and 3, to designation of safety class by safety significant structures, systems, and components will not impact the cost or schedule baseline within this CDR. It is not envisioned that the new classifications will require safety features beyond those currently in place for either design or operation of the existing tank farm facilities. A change in safety class definition alone could require additional safety related design and operating features, such as redundancies in power supply or instrumentation, which could impact the project cost baseline. The existing TWRS facilities have not been reclassified and, therefore, it is not possible at this time to quantify this uncertainty to the project.

- A recent $3 million reduction in FY96 expense funding will result in a departure from the original SE approach as defined in the SE-SOW (ref 4). The budget reduction will significantly curtail the SE activities planned to be performed in FY96. A more graded approach for the application of SE to project W-314 will be applied. Lower level functions, requirements, and architectures will be developed in FY97 during the advanced conceptual and/or early definitive design phase of the project. This change in approach was incorporated into the budget and design planning of the CDR.

- The conceptual project schedule reflects the receipt of KD2 on April 1, 1998. DOE Milestone T2C-97-512 requires receipt of KD2 for project W-314 on December 31, 1997. Based on a review of the detailed planning in the schedule, a change to this milestone is warranted. The change request is being developed and will be submitted to RL upon approval of the CDR.
• All equipment (instrumentation, electrical, and mechanical) will be designed to operate in the environment intended for its use.

B. PITS AND PIPING

• The special protective coating is expected to provide the lining that provides containment required by regulatory agencies. This assumption is consistent with other ongoing tank farm pit modification efforts. Discussions related to this approach will be conducted with WDOE in the very near future. Coating existing pits appears to be a cost effective way of achieving performance requirements for these ancillary facilities as well as supporting operations ALARA objectives.

• The preparation of the pit surfaces for coating application is uncertain at this time (i.e., sandblasting, water blasting, and dry-ice). The method will be determined during the design phase. Any method will require mask work within a greenhouse in a radiologically-contaminated environment. Therefore, the exact method to be utilized is not expected to be a significant cost driver in comparison to the costs for set-up, special work permit (SWP) work, and disposal of contaminated materials.

• During coating operation, the transfer/process lines will be removed from operation.

• The transfer line routes are appropriate and available for the installation. These routes can be constructed with minimum slopes as required and will not have major obstructions or interferences. New transfer lines are selected based on the current waste volume projections for waste transfer schedule and tank designations for planned retrieval activities including in-tank sludge washing. The proposed locations of the future low-level (east of the AP Tank Farm) and high-level (southwest of the 244-A DCRT) vitrification facilities were considered in approximating the locations of the new
transfer lines. Since many of the new pipeline installations parallel existing routes, it is foreseen that routing and minimum slope requirements can be achieved.

- The valve manifold design is based on one valve pit and one sluice pit. Until further investigation is performed during design, the level of modification that may be required in specific pits is uncertain. However, the total cost to do all pits should be adequate since the valve and sluice pits generally are representative of all the pits.

- The design of the valve manifolds will provide transfers from any DST to any other DST. The valve manifolds will allow simultaneous transfers; however, some limitations, but not beyond those that currently exist, will apply when performing multiple transfers through the same pit.

- Project W-314 upgrades will utilize existing flushing capabilities of the transfer system and no additional flushing capabilities will be needed. If additional flushing capabilities are required, some cost increase will be incurred.

- The plan to use a plug and receptacle system for the valve positioning signal may not be optimum. During design, other less costly methods for providing position indication such as locating them outside the pit environment, will be investigated.

C. ELECTRICAL

- The existing 13.8 kV utility feeders have adequate capacity to supply power for SST tank farms' limited "operations" during controlled, clean, and stable conditions.
D. INSTRUMENTATION

- TMACS is capable of handling the additional input points proposed by project W-314. A separate Information Management System (IMS) will not be needed. Any IMS functions required can be accommodated by the existing TMACS and SACS.

- The existing signals to be input to the TMACS from the A, BY, C, and U Tank Farms, and the CR-271, 242-T, 244-AR, and 204-AR facilities are presently connected to an existing "Panalarm" annunciator according to discussions with tank farm engineering. Design verification of this configuration has not been performed. If the signals aren’t connected, additional funds would be required to relay them to TMACS.

- Systems provided by on-going project W-058 will control and shut down the 200-West to 200-East Area waste transfer pumps. Project W-058 design is complete and the project is in the construction phase.

- The 242-S control room annunciators and readouts will be abandoned in place.

- The WHC-developed/supplied "GEMS" stack monitor specification will be used. The GEMS system includes the capability to transmit exhaust air flow volume and temperature, sampled air volume, measured radiation, and radiation equipment fail alarms.

- Project W-211 provides adequate temperature measurement capabilities to support tank retrieval operations. Project W-314 will not be required to replace the temperature measurement devices installed by project W-211.

- Displacement gages for the primary tank liquid level have been installed at DSTs discussed in this report.
• The central pump pit in each tank should have space for installation of the waste transfer flow meters. If space is not available, an alternate location for the meter would be required at an additional cost to the project.

• The leak detection pit will be dry. The density measurement requirement for liquids discovered in these pits will be met by sampling and analysis. The leak detection pit pump riser can be used for installation of a sample pump for obtaining liquid samples for specific gravity determination by laboratory analysis.

• The existing transfer lines in 200-East Area do not have continuous leak detection. The pipelines that project W-314 will install in 200-East Area are not significantly longer than the existing lines which use low-point leak detection systems, therefore, the project assumes that continuous pipeline leak detection will not be required. However, if it is required, the cost for pipeline installations would increase.

• The leak detector design using a single conductivity element placed up to 1 inch from the surface to be monitored (e.g., pit floor, annulus floor, leak detection pit floor, or encasement bottom) is adequate for determining a leak within 24 hours.

• Where necessary, drains that require plugs or other suitable methods for water holdup to allow the leak detectors to operate are assumed to be installed and operable. If the existing plugs are not in place, they will be installed by operations or by the project at a minimal additional cost.
E. VENTILATION

- Tank vapor space characterization of toxic air pollutants and flammable vapors is not well defined. The need for special treatment devices, such as carbon adsorbers, is uncertain. Therefore, project W-314 will provide the capability for future installation of treatment devices.

- The proposed location of the new ventilation equipment is adjacent to the existing equipment to minimize overall installation costs. If interferences are identified during Title I design, the location and/or orientation may need to be modified. This may moderately lengthen the run of new ductwork between the existing duct and the new ventilation equipment at an additional project cost.

- The tank farms currently have no identified ammonia release hazard. Temporary ammonia monitoring equipment will be utilized during future mixer pump operation during retrieval to determine if the pumps cause significant ammonia release. Ammonia control equipment is not part of the project W-314 scope, but the design has the capability of adding it at a later date.

- Ventilation airflow rates will be adequate for waste cooling during storage and transfer and, therefore, condensers and chillers are not required as part of project W-314.

- Very low flows (below existing capacity) in primary ventilation systems are acceptable as long as required tank negative pressures and flows determined necessary for flammable gas control and/or tank cooling are maintained.

- The existing scaffolding and other support equipment used at the existing primary exhaust stacks can be relocated and reused at the new stacks.
• It is assumed that airflows from individual tanks can be adjusted to achieve the desired operations via existing valves and/or future engineered inlets.

XVIII. REFERENCES


APPENDIX A

Work Breakdown Structure
APPENDIX B

Budget Authorized/Budget Outlay Schedule
## Project W-314
### Tank Farm Upgrades
#### Babo Schedule (Capital Dollars)

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**Contingency incl. above (5% of\$1200)**: $60

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### Project W-314

**Tank Farm Upgrades**

**BABO Schedule (Expense Dollars)**

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**TOTAL**

### Project Definition

### Project Definition Milestones

### Design Conceptual Design

### Permitting Plan

### M&EA

### Plume Selection

### Radiological Monitors

### Site Characterization

### Startup Testing

### Operations Prep

### Lead Abatement

### Total Began (X 1000)

### Contingency Incl. Above

### Cumulative
APPENDIX C

Cost Estimate Summary
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** Remarks:**

- Type of estimate: Conceptual - Rev. 1
- Date: 4/24/96
- Architect/Engineer: Chadwick
- Contractor: Kirk A. Bass
- Remarks: W314BAC1 Rev. 0 (3/20/96)

(Rounded/adjusted to the nearest "$ 10,000 / 100,000 $" - percentages not recalculated to reflect rounding)
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### Work Breakdown Structure Summary

**EST - Interactive Estimating**

**Tank Farm Restoration and Safe Operations**

**W - 314 Conceptual Estimate Rev. 1**

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## Kaiser Engineers Hanford

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**Date 04/23/96 14:36:21**

**By TLY ROP DKH JJM**

**EST - Interactive Estimating**

**Tank Farm Restoration and Safe Operations**

**Con 3.14 Conceptual Estimate Rev.1**

**DOE_R02 - Work Breakdown Structure Summary**

**Estimate Total**

**Onsite Indirects**

**Sub Total**

**Escalation**

**Sub Contingency**

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- **PAGE 5 OF 84**
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- **version:** Rev. 1
- **dimensions:** 540.7x422.6
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## Interactive Estimating Report

**Tank Farm Restoration and Safe Operations Work Breakdown Structure Summary**

**Page 9 of 64**

### Breakdown Structure Summary

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The table above shows the breakdown of costs for various projects and activities, with estimates, onsite indirects, and total dollars. Each project or activity is listed with its respective cost and percentage allocation. The total dollars for each category are also provided, giving a comprehensive view of the costs associated with different aspects of the project.
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** IEST - INTERACTIVE ESTIMATING **
TANK FARM RESTORATION AND SAFE OPERATIONS
U - 3 14 - CONCEPTUAL ESTIMATE REV.1
DOE_RO2 - WORK BREAKDOWN STRUCTURE SUMMARY

** Estimate Onsite Subtotal Indirects Subtotal Escalation % Total Subtotal Contingency % Total Total Dollars **

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** PAGE 14 OF 84 **

** DATE 04/23/96 14:56:24 **

** BY TLW RDP DKH JJM **
** IEST - INTERACTIVE ESTIMATING **
TANK FARM RESTORATION AND SAFE OPERATIONS
W - 3 14 CONCEPTUAL ESTIMATE REV.1
DOE-R02 - WORK BREAKDOWN STRUCTURE SUMMARY

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PROJECT TOTAL

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DATE 04/23/96 14:56:24
BY TLW RDP DKH JJM
1. DOCUMENTS AND DRAWINGS

DOCUMENTS: CONCEPTUAL DESIGN REPORT, TANK FARM RESTORATION AND SAFE OPERATIONS, DATED (MARCH/96) AND SKETCHES AS PROVIDED BY THE ENGINEER. QRCR COMMENTS BY QMTEC.

2. MATERIAL PRICES

UNIT COSTS REPRESENT CURRENT PRICES FOR SPECIFIED MATERIAL. VENDOR INFORMATION WAS OBTAINED FOR THE FOLLOWING ITEMS:
- AMERON PRODUCTS - PIT COATING
- AIR CONTROL, QCINC. - QHEPA FILTER HOUSINGS
- BSES - TYPE A BURIAL BOXES
- UNIT PROCESS CO. - ISOLATION BUTTERFLY VALVES
- BECHTEL - WOODEN BURIAL BOXES
- ELECTRICAL RESOURCES - DATA BASE

3. LABOR RATES

B.) BASE CRAFT RATES ARE AS ISSUED BY KGH FINANCE (EFFECTIVE 10-01-95). RATES INCLUDE FRINGE BENEFITS, LABOR INSURANCE, TAXES, DEPARTMENTAL OVERHEADS, G&A AND BSMS, AND TRAVEL.

4. GENERAL REQUIREMENTS/TECHNICAL SERVICES/OVERHEADS

A.) ON SITE CONSTRUCTION FORCES GENERAL REQUIREMENTS AND TECHNICAL SERVICES COSTS ARE INCLUDED AS A COMPOSITE PERCENTAGE BASED ON THE ICF-KH ESTIMATING FACTORS FOUND IN SECTION 2 OF THE BUDGET GUIDELINE HANDBOOK (BGH) LOCATED IN HANFORO REPORTING, BDS BUDGET GUIDELINE HANDBOOK, SECTION 2 - COMPANY INFORMATION, FY 1996 PLANNING RATES.
C.) FIXED PRICE CONTRACTOR OVERHEAD, PROFIT, BOND AND INSURANCE COSTS HAVE BEEN APPLIED AT THE FOLLOWING PERCENTAGES AND ARE REFLECTED IN THE "OHAP/B&I" COLUMN OF THE ESTIMATE DETAIL:
- LABOR - 30%
- MATERIAL - 30%
- EQUIPMENT USE - 10%
- EQUIPMENT - 0%
- SUBCONTRACTS - 10%

5. ESCALATION


6. ROUNCING

U.S. DEPARTMENT OF ENERGY - DOE ORDER 5100.4 PAGE 1-32 SUBPARAGRAPH (N), REQUIRES ROUNCING OF ALL GENERAL PLANT PROJECTS (GPP'S) AND LINE ITEM (LI) COST ESTIMATES. REFERENCE: DOE 5100.4, FIGURE 1-11, DATED 10-31-84.
7. REMARKS

1. METHOD OF PERFORMANCE:
   A. DESIGN BY ONSITE A/E.
   B. CONSTRUCTION INSIDE OF THE TANK FARM FENCES IS BY THE ONSITE CONSTRUCTION FORCES.
   C. CONSTRUCTION OUTSIDE OF THE TANK FARM FENCES IS BY FIXED PRICE CONTRACT.
   D. PROJECT MANAGEMENT IS BY THE OPERATING CONTRACTOR.
   E. OTHER PROJECT COSTS IS PERFORMED BY THE OPERATING CONTRACTOR.

2. RADIATION ALLOWANCES OF 15mSv (SAME BASIS AS W-211, INITIAL TANK RETRIEVAL SYSTEM) IS FOR BOTH INSIDE AND OUTSIDE OF PITS FOR REMOVAL AND REPLACEMENT OF JUMPERS ONLY. BURNOUT IS ONLY INCLUDED FOR PIT MODIFICATIONS.

3. CRANE ALLOWANCES ARE FOR 2EA 30T GROVES AND 1EA GRANITOPAC 100T.

4. NEW JUMPER ALLOWANCES: A.) 6EA INSIDE DESIGNATED VALVE PITS, B.) 2EA INSIDE DESIGNATED PUMP PITS.
   BURIAL FOR EXISTING JUMPERS IS FOR THE REPLACEMENTS AND THOSE LISTED BY ENGINEERING.

5. NEW COVER BLOCK COSTS ARE BASED UPON PROJECT W-151, TANK 101-A1 WASTE RETRIEVAL SYSTEM.

6. PROJECTS W-211 AND W-030 "LESSONS LEARNED" WERE INCORPORATED INTO THE COST ESTIMATE FOR JUMPERS AND EXCAVATION.

7. PER WEC DIRECTIONS, THIS COST ESTIMATE DOES NOT INCLUDE MASK WORK ON ALL FIELD WELDS (PER 1/31/96 MEETING).

8. SEALING OF PITS IS INCLUDED FOR THOSE THAT WERE OPENED.

9. FRESH AIR SUPPORT IS SHOWN SEPARATELY FROM MASK WORK.

10. TRANSFER PIPING BETWEEN TANK FARMS IS BASED UPON THE WORK BEING PERFORMED BY CONSTRUCTION FORCES.

11. VERIFICATION OF EXISTING INSTRUMENTATION OPERATION, IN ALL FARMS, IS ASSUMED TO BE PERFORMED BY THE OPERATING CONTRACTOR.

12. COVER BLOCK BURIAL INCLUDES WRAPPING IN PLASTIC, IN ONE PIECE, AND TRANSPORTATION TO THE BURIAL GROUNDS. IT WAS ASSUMED THAT BURIAL IN BOXES IS NOT NECESSARY.

13. LEAK DETECTOR INSTALLATION ASSUMES THAT EACH PIT WILL ALREADY BE OPENED FOR OTHER WORK. IN OTHER WORDS COVER BLOCK REMOVAL IS PROVIDED WITH PIT MODIFICATIONS SUCH AS NEW COATINGS AND JUMPER REPLACEMENTS, ETC.

14. ASBESTOS ABATEMENT ON PIPING TIE-INS IS ASSUMED TO NOT BE A PROBLEM.

15. REWORK OF EXISTING PIPING, UNDERGROUND UTILITIES, ETC. FOR EASE OF PIPE AND CONDUIT INSTALLATION IS NOT INCLUDED IN THE COST ESTIMATE. AN ALLOWANCE FOR THIS IS HAS BEEN ADDRESSED IN THE CONTINGENCY ANALYSIS.

16. JUMPER CUTUP WILL BE PERFORMED BY USING AN EXISTING ON SITE MECHANICAL SHEAR.

17. SPECIAL WORK PROCEDURE (SWP) MARKUP FOR THIS PROJECT HAS BEEN APPLIED AT 40%. THIS IS USED TO COMPENSATE FOR PRODUCTIVITY LOST DUE TO WORKING IN THE TANK FARM. PRODUCTIVITY IS LOST FOR SAFETY MEETINGS, PREJOB REVIEW, DRESS, SURVEY OUT, TRANSPORT TO AND FROM FARM, AND LOADING OF TOOLS FOR TRANSPORT. ALONG WITH THESE ACTIVITIES, THERE ARE OTHER DELAYS THAT ARE NOT ACCOUNTED FOR BY THIS PERCENTAGE: LATE ARRIVALS OF WPT'S AND OPERATORS, ACCESS THROUGH THE WRAM SYSTEMS, LARGE CREW (CHANGE TRAILER LIMITATIONS), CONFLICTS WITH WEC OPERATIONS, INITIAL PREJOB BRIEFING AND QUESTIONS, LACK OF TRANSPORTATION, CHANGES IN FARM CONDITIONS, SAFETY CONCERNS AND WEATHER. THESE DELAYS OR IMPACTS HAVE BEEN ADDRESSED THROUGH CONTINGENCY APPLICATION.

18. ASSUME ALL WORK WILL BE DONE DURING THE NORMAL WORK DAY, 7:30AM-4:30PM, THERE ARE NO ALLOWANCES MADE FOR SHIFT WORK OR OVERTIME.

19. W314BAC2, REV.1 INCORPORATES THE RCR ESTIMATING COMMENTS THAT WAS PROVIDED BY MACTEC.
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### KAISER ENGINEERS MANHATTAN WESTINGHOUSE HANFORD COMPANY

**JOB NO. W314BAC2**

**TANK FARM RESTORATION AND SAFE OPERATIONS**

**W-314 CONCEPTUAL ESTIMATE REV.1**

**DOE R04 - COST CODE ACCOUNT SUMMARY**

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| 5A3B         | PRIMARY VENT SYS ADVANCED PRCMT                 | 71675             | 71675           | 123729    | 834404       | 206861 | 25 1043040       |
| 5A4A         | TANK 101                                         | 673505            | 673505          | 149004    | 822309       | 246692 | 30 1069001       |
| 5A4B         | TANK 102                                         | 644035            | 644035          | 142526    | 786561       | 233968 | 30 1022529       |
| 5A4C         | TANK 103                                         | 551093            | 551093          | 121958    | 673051       | 201916 | 30 874968        |
| 5A4D         | TANK 104                                         | 551589            | 551589          | 122069    | 673585       | 202098 | 30 875755        |
| 5A4E         | TANK 105                                         | 550976            | 550976          | 121931    | 672907       | 201872 | 30 874782        |
| 5A4F         | TANK 106                                         | 627873            | 627873          | 138499    | 766822       | 230046 | 30 996870        |
| 5A4G         | TANK 107                                         | 445365            | 445365          | 14207     | 786705       | 236088 | 30 1023050       |
| 5A4I         | GENERAL REQUIREMENTS                             | 2827376           | 2827376         | 625700    | 343076       | 108303 | 30 440797         |
| 5A4J         | SITE WORK                                        | 3500755           | 3500755         | 774718    | 4275473      | 1128349 | 28 5459869      |
| 5A4K         | TANK 101 - VALVE PIT AN-A                       | 589719            | 589719          | 130536    | 726225       | 250200 | 36 970425        |
| 5A4L         | TANK 101 - VALVE PIT - AN-B                      | 606395            | 606395          | 134196    | 740591       | 257732 | 35 998322        |
| 5A61         | HPT SUPPORT - FY 02                              | 66820             | 66820           | 1604      | 10997       | 79217  | 10 7522          |
| 5A62         | HPT SUPPORT - FY 03                              | 259185            | 259185          | 19.17     | 49666       | 308871  | 10 308871       |
| 5A63         | HPT SUPPORT - FY 04                              | 259185            | 259185          | 22.39     | 58032       | 317217  | 10 31722         |
| 5A64         | ADVANCE PROCUREMENT INSTRUMENTATION              | 1355706           | 1355706         | 18.86     | 255086      | 161192  | 25 402846        |
| 5A65         | PRIMARY VENT SYS ADVANCED PRCMT                 | 710675            | 710675          | 18.86     | 134033      | 844708  | 21 21177         |

PAGE 19 OF 84
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FY 00
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HPT SUPPORT
F Y 02
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T A N K 102
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### Tank Farm Restoration and Safe Operations

**Conceptional Safe Operations**

**3-1-4 Conceptual Safe Operations**

**22.01.14 Conceptual Safe Operations**

**REV.1**

**DOE-RO4 - Cost Code Account Summary**

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**Sub Total**

| Special Equipment/Process System | 384871 | 0 | 384871 | 22.13 | 90983 | 475854 | 35 | 166549 | 642403 |

**Total Dollars**

97185377 | 0 | 97185377 | 22.13 | 17314 | 913662 | 30 | 29133085 | 126318435
### WESTINGHOUSE HANFORD COMPANY

**TANK FARM RESTORATION AND SAFE OPERATIONS**

**W-374 CONCEPTUAL ESTIMATE**

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**EST- INTERACTIVE ESTIMATING**  
**TANK FARM RESTORATION AND SAFE OPERATIONS**  
**REV. 1**  
DOE-R05 - ESTIMATE SUMMARY BY CSI DIVISION  

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**TOTAL CONSTRUCTION**  323,000  25,659,872  45,656,973

**PROJECT TOTAL**  323,000  25,659,872  45,656,973
THE U.S. DEPARTMENT OF ENERGY - BRICKLAND ORDER 5700.3 "COST ESTIMATING, ANALYSIS AND STANDARDIZATION" DATED 3-27-85, PROVIDES GUIDELINES FOR ESTIMATE CONTINGENCIES. THE GUIDELINE FOR A CONCEPTUAL ESTIMATE SHOULD HAVE AN OVERALL RANGE OF 15 TO 40%.

CONTINGENCY IS EVALUATED AT THE THIRD COST CODE LEVEL AND SUMMARIZED AT THE PRIMARY AND SECONDARY COST CODE LEVEL OF THE DETAILED COST ESTIMATE.

A 15% CONTINGENCY WAS APPLIED DUE TO UNCERTAINTIES IN THE LEVEL OF DETAIL THAT WILL BE PROVIDED IN THE DESIGN CONFIGURATION BASELINE DOCUMENT.

A 20% CONTINGENCY WAS APPLIED DUE TO UNCERTAINTIES IN THE IDENTITY AND SEQUENCE OF THE TEN TANKS; CHANGES IN TECHNOLOGY OVER THE LIFE OF THE PROJECT; UTILIZATION OF UNPROVEN EQUIPMENT TO BE INSTALLED BY OTHER PROJECTS, (E.G. W-151, W-320); TANK WASTE CHARACTERIZATION (I.E. DOME LOADING, TANK TEMPERATURES, CHEMICAL AND PHYSICAL PROPERTIES, OPERATING CONDITIONS ETC.); AND CHANGES IN TITLE II COST WHEN DETAILED PLANNING IS PERFORMED.

A 20% CONTINGENCY WAS APPLIED DUE TO UNCERTAINTIES IN TITLE II DESIGN (ABOVE); QUALITY, COMPLETENESS AND TIMELINESS OF RECEIPT OF VENDOR SUBMITTALS; AVAILABILITY AND ACCURACY OF EXISTING TANK FARM DRAWINGS; NEED FOR REVISED CONSTRUCTION METHODS TO MINIMIZE DOSE; REQUIREMENTS FOR H-14 ESSENTIAL DRAWINGS; AND SCOPE OF ACCEPTANCE/INSPECTION AND AS-BUILDING WORK.

AN AVERAGE OF 10% CONTINGENCY WAS APPLIED DUE TO UNCERTAINTIES IN PERMITTING ACTIVITIES AND SAFETY ANALYSIS; MULTIPLE TIER REVIEWS OF PERMITTING AND SAFETY DOCUMENTS; DEVELOPMENT OF DOCUMENTATION TO SUPPORT KEY DECISIONS; AND POTENTIAL DELAYS IN RECEIPT OF KEY DECISIONS.
SITE PLANS FOR TANK FARMS WERE NOT AVAILABLE AND ALLOWANCES WERE USED FOR CONDUIT AND WIRE LENGTHS.

THE PERCENTAGES NOTED REFLECT UNCERTAINTIES IN: RADIOLOGICAL CONDITION AT THE PUMP AND VALVE PITS AND DURING EXCAVATION; CONGESTION OF EXISTING PIPING, ELECTRICAL LINES, Etc. AND THE ASSOCIATED DIFFICULTIES IN WORKING AROUND THESE; AVAILABILITY AND RELIABILITY OF EQUIPMENT FROM OTHER PROJECTS; WEATHER; REQUIREMENT FOR MOCK-UP TESTING, SPECIAL TOOLS AND TEMPORARY SHIELDING; AVAILABILITY OF ESSENTIAL SUPPORT PERSONNEL SUCH AS QMP'S; CURRENT PROCEDURES THAT ARE IN EFFECT NOW BUT MAY BE DIFFERENT AT THE TIME OF CONSTRUCTION;

THE TYPES OF BURIED MATERIAL FOR DLLW, RADIOLOGICAL MIXED WASTE AND DTU IS AN ESTIMATING ALLOWANCE. OTHER TYPES (I.E. HAZARDOUS WASTE) WERE NOT ADDRESSED IN THE CDR.

VERY LITTLE INFORMATION WAS PROVIDED FOR REMOVAL OF THERMOCOUPLE TREES AND OTHER PIECES OF EQUIPMENT.

A CONTINGENCY OF 10% WAS APPLIED TO ALLOW FOR COST GROWTH DUE TO SCHEDULE SLIPPAGE OR EXTENSION; ACCEPTABILITY OF GRADED APPROACH TO OPERATIONAL READINESS REVIEW; AND ADDITIONAL TECHNICAL SUPPORT FOR QSTARTUP TESTING.

AVERAGE CONSTRUCTION CONTINGENCY 30%

AVERAGE PROJECT CONTINGENCY 20%
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TANK FARM RESTORATION AND SAFE OPERATIONS
W - 3 14 CONCEPTUAL ESTIMATE REV.1

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**PROJECT TOTAL**

- **ESTIMATE SUBTOTAL**: 201,534,192
- **CONTRACT ADMINISTRATION TOTAL**: 303,500
- **BID PACK PREP.**: 19,500
- **TOTAL INDIRECTS**: 0
ENGINEERING STATEMENT OF WORK
FOR TITLE I DESIGN

PROJECT: W-314, TANK FARM RESTORATION AND SAFE OPERATIONS

PREPARED BY: ICF KAISER HANFORD COMPANY

DATE: APRIL 23, 1996

1.0 SCOPE

This statement of work addresses the engineering and management activities to be performed by ICF Kaiser Hanford Company in the design of the Tank Farm Restoration and Safe Operations Project. The scope of the upgrades focus on the DST system (AN, AP, AW, AY, and AZ Tank Farms) in the 200 East Area, and also includes the SY Tank Farm in the 200 West Area, the 244-A and 244-S DCRTs, new transfer lines in the 200 East Area, and minor electrical improvements in the SST Tank Farms (A, AX, B, BX, BY, C, S, SX, T, TY, TX, and U Tank Farms).

Sufficient design will be performed during the Title I phase to firmly fix the project scope and features of the project, and further develop costs and schedules. Title I design will generally include the following:

- Development of P&ID's and flow diagrams
- Further definition of project design criteria
- Expansion of conceptual design drawings
- Further development of outline specifications
- Identification of long-lead materials/equipment
- Improvement in the accuracy of the cost estimate
- Preparation of the Title I Design Report

2.0 BASIS

This engineering statement of work and engineering estimate were prepared using the W-314 Conceptual Design Report (WHC-SD-W314-CDR-001) as a basis.

This engineering statement of work and engineering estimate were prepared considering that the Title I design will be performed by the onsite engineer/constructor.

The schedule to perform the Title I design is as follows:

Start January 1997
Complete January 1998
3.0 DESIGN ACTIVITIES

3.1 Civil/Structural/Environmental

AN Tank Farm
- 1 Site Plan Drawing
- 2 Equipment Pads and Shielding Walls Drawings
- 1 Ventilation Equipment Roof Drawing
- 1 Seal Pot Pit Drawing
- 1 Pit Modification and Cover Block Drawing
- Preliminary calculations
- Input to the Title I Design Report

AP Tank Farm
- 1 Site Plan Drawing
- 1 Pit Modification and Cover Block Drawing
- Input to the Title I Design Report

AW Tank Farm
- 1 Site Plan Drawing
- Input to the Title I Design Report

AY Tank Farm
- 1 Site Plan Drawing
- Input to the Title I Design Report

AZ Tank Farm
- 1 Site Plan Drawing
- 1 Pit Modification and Cover Block Drawing
- Input to the Title I Design Report

SY Tank Farm
- 1 Site Plan Drawing
- Input to the Title I Design Report

244-A DCRT
- 1 Site Plan Drawing
- 1 Equipment Pads and Shielding Wall Drawing
- 1 Ventilation Equipment Roof Drawing
- Preliminary calculations
- Input to the Title I Design Report

244-S DCRT
- 1 Site Plan Drawing
- Input to the Title I Design Report

200 East/West Areas
- 4 Site Plan Drawings
- 1 Pit Modification and Cover Block Drawing
- Input to the Title I Design Report

3.2 Piping

AN Tank Farm
- 3 Process Flow Diagrams
- 8 P&ID's
- 6 Plan/Arrangement Drawings
- 2 Section/Detail Drawings
- Input to the Title I Design Report
AP Tank Farm
- 1 Process Flow Diagram
- 5 P&ID's
- 2 Plan/Arrangement Drawings
- 1 Section/Detail Drawing
- Input to the Title I Design Report

AW Tank Farm
- 1 Process Flow Diagram
- 4 P&ID's
- 2 Plan/Arrangement Drawings
- 1 Section/Detail Drawing
- Input to the Title I Design Report

AY Tank Farm
- 2 P&ID's
- 1 Plan/Arrangement Drawing
- 1 Section/Detail Drawing
- Input to the Title I Design Report

AZ Tank Farm
- 3 P&ID's
- 1 Plan/Arrangement Drawing
- 2 Section/Detail Drawings
- Input to the Title I Design Report

SY Tank Farm
- 2 P&ID's
- 1 Plan/Arrangement Drawing
- 1 Section/Detail Drawing
- Input to the Title I Design Report

244-A DCRT
- 1 P&ID
- 1 Plan/Arrangement Drawing
- Input to the Title I Design Report

244-S DCRT
- 1 P&ID
- 1 Plan/Arrangement Drawing
- Input to the Title I Design Report

200E/200W Infrastructure
- 4 P&ID's
- 12 Plan/Arrangement Drawings
- 2 Section/Detail Drawings
- Input to the Title I Design Report

3.3 HVAC

AN Tank Farm
- 1 Primary Flow Diagram
- 1 Annulus Flow Diagram
- 1 Equipment Arrangement Drawing
- Preliminary calculations
- Input to the Title I Design Report
3.4 Instrumentation

AN Tank Farm
- 4 Primary Ventilation Exhaust Instrument Engineering Flow Diagrams
  - Input to the Title I Design Report

AP Tank Farm
- 4 Primary Ventilation Exhaust Instrument Engineering Flow Diagrams
  - Input to the Title I Design Report

AW Tank Farm
- 4 Primary Ventilation Exhaust Instrument Engineering Flow Diagrams
  - Input to the Title I Design Report

AY Tank Farm
- Input to the Title I Design Report

AZ Tank Farm
- Input to the Title I Design Report

SY Tank Farm
- 1 Annulus Air Inlet Instrument Engineering Flow Diagram
- 3 Annulus Air Exhaust Instrument Engineering Flow Diagrams
Input to the Title I Design Report

244-A DCRT
- 3 Ventilation Inlet Air and Exhaust Air Instrument Engineering Flow Diagrams
- Input to the Title I Design Report

244-S DCRT
- 3 Ventilation Inlet Air and Exhaust Air Instrument Engineering Flow Diagrams
- Input to the Title I Design Report

200E/200W Infrastructure
- Input to the Title I Design Report

3.5 Electrical

AN Tank Farm
- 1 One-Line Diagram
- 1 Electrical/Instrumentation Site Plan Drawing
- 1 Building Modifications/Equipment Location Drawing
- 1 Panelboard Schedule Drawing
- Input to the Title I Design Report

AP Tank Farm
- 1 One-Line Diagram
- 1 Electrical/Instrumentation Site Plan Drawing
- 1 Building Modifications/Equipment Location Drawing
- 1 Panelboard Schedule Drawing
- Input to the Title I Design Report

AW Tank Farm
- 1 One-Line Diagram
- 1 Electrical/Instrumentation Site Plan Drawing
- 1 Building Modifications/Equipment Location Drawing
- 1 Panelboard Schedule Drawing
- Input to the Title I Design Report

AY Tank Farm
- 1 One-Line Diagram
- 1 Electrical/Instrumentation Site Plan Drawing
- 1 Building Modifications/Equipment Location Drawing
- 1 Panelboard Schedule Drawing
- Input to the Title I Design Report

AZ Tank Farm
- 2 One-Line Diagrams
- 1 Electrical/Instrumentation Site Plan Drawing
- 1 Building Modifications/Equipment Location Drawing
- 1 Panelboard Schedule Drawing
- Input to the Title I Design Report

SY Tank Farm
- 1 One-Line Diagram
- 1 Electrical/Instrumentation Site Plan Drawing
- 1 Building Modifications/Equipment Location Drawing
- 1 Panelboard Schedule Drawing
- Input to the Title I Design Report
244-A DCRT
- 1 One-Line Diagram
- 1 Electrical/Instrumentation Site Plan Drawing
- 1 Building Modifications/Equipment Location Drawing
- 1 Panelboard Schedule Drawing
- Input to the Title I Design Report

244-S DCRT
- 1 One-Line Diagram
- 1 Electrical/Instrumentation Site Plan Drawing
- 1 Building Modifications/Equipment Location Drawing
- 1 Panelboard Schedule Drawing
- Input to the Title I Design Report

200E/200W Infrastructure
- 1 One-Line Diagram
- Input to the Title I Design Report

Single Shell Tanks
- 2 One-Line Diagrams
- 1 Electrical Site Plan Drawing
- 1 Panelboard Schedule Drawing
- Input to the Title I Design Report

3.6 Systems Engineering Activities
- Continuation of requirements development, starting from specifications generated during conceptual design and ending with lower-level specifications suitable for detailed design.
- Continuation of architectural development, starting with the Baseline System Description (BSD) generated during conceptual design and completing with a BSD to the level of the detailed design specifications.
- Continuation of management interfaces defined during conceptual design and updating interface documentation as changes are generated.
- Continuation of logistics support analysis to develop the system support and maintenance requirements; and ensure system supportability in a cost-effective manner.
- Continuation of training requirements analysis, evaluating need for specialized training equipment and programs.
- Continuation of installation requirements analysis, developing an installation concept, equipment needs, costs and specifications for specialized installation equipment.
- Continuation of test requirements analysis and system verification in accordance with the Test and Evaluation Plan.
- Continuation of D&D analysis, developing concepts and feeding these back into design.
3.7 Pre-Title II Studies

- Perform engineering studies on items that are identified upon completion of the conceptual design which will facilitate the start of Title II design.

3.8 Title I Design Support

The disciplines listed above will require other engineering, supervision, and administration support as listed below:

- **ENVIRONMENTAL ENGINEERING (22)**
  a. Review and approve the design documents for compliance with appropriate environmental regulatory requirements.

- **DESIGN ADMINISTRATION (35)**
  a. Provide design supervision and interdiscipline coordination.
  b. Make engineering personnel assignments (DM).
  c. Provide discipline technical oversight (DM).
  d. Coordinate design basis inputs with the discipline lead engineers (PLE).
  e. Plan/coordinate/approve engineering estimates/schedules prepared by the discipline lead engineers (PLE).
  f. Ensure the design tasks are completed in accordance with all quality requirements and procedures (PLE).

- **PROJECT MANAGEMENT (40)**
  a. Provide single point interface between ICF KH and WHC.
  c. Provide daily management of project activities.
  d. Ensure the project technical, budget, and schedule objectives are met.
  e. Disposition client comments.
  f. Hold bi-weekly status meetings with client and prepare meeting minutes.
  g. Hold weekly design team meetings.
  h. Perform definitive design planning.
  i. Develop design and construction schedules.
  j. Input to, review and comment on the Title II SOW, estimate and schedules.

- **WORD PROCESSING (41)**
  a. Provide word processing services for Title I Design Report.

- **ACCEPTANCE INSPECTION (44)**
  a. Provide input to the Title I to assure compliance with the appropriate criteria and procedures.
b. Review and comment on Title I and sketches as required.

- **PROJECT CONTROLS (45)**
  a. Provide a cost and scheduling services for the Title I work.
  b. Status Work Plan schedule on monthly basis.
  c. Track changes to the Work Plan basis.
  d. Develop definitive design and construction schedules.

- **COST ESTIMATING (46)**
  a. Prepare definitive design and construction cost estimate.

- **PUBLICATIONS (48)**
  a. Prepare and issue the Title I Design Report.
  b. Prepare outline specifications.
  c. Make reproductions and assemble documents.
  d. Prepare advance Procurement Specifications.

- **SUBCONTRACTS/PROCUREMENT (49)**
  a. Provide procurement review and input to procurement schedule.

- **CONSTRUCTION FORCE ADMINISTRATION (60)**
  a. Input to construction schedule.
  b. Review and comment on cost estimate.
  d. Perform constructability review of concept.

- **CONSTRUCTION MANAGEMENT ADMINISTRATION (61)**
  a. Provide input to the advance Procurement Specifications.

- **SURVEY (62)**
  a. Provide survey services to support route planning for underground piping and conduit.
  b. Provide scanning services of valve pits to support valve manifold designs.

- **RECORDS MANAGEMENT (65)**
  a. Maintain project records.
  b. Perform transmittals.

### 4.0 ASSUMPTIONS

4.1 The Upgrade Scope Summary Report (provided by WHC) will be the basis for what has to be replaced/upgraded for Project W-314.

4.2 Information that has been or will be developed during the system engineering process will be used to the greatest extent possible.
4.3 Economies of scale have been employed in this estimate by assuming the tank farm details will be common throughout all the upgrades, which reduces the number of drawings and calculations required.

4.4 Many Title I design activities are common to several farms. A reduction in project scope may not proportionately reduce the engineering cost.

4.5 The estimate assumes the deliverables will only show the upgrades covered under this project and necessary interfaces with existing equipment. There is no allowance for incorporating all existing infrastructure (i.e., as-built drawings).

4.6 The design for the HVAC system 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.

4.7 The HVAC design will assume that upgraded ventilation equipment will be removed with the new equipment located in a nearby area.

4.8 The new primary ventilation equipment will be generic to AN, AP, and AW Tank Farms; the capacity may be adjusted to suit each individual farm. The DCRT's require new designs.

4.9 The primary ventilation systems are assumed safety class 2 for confinement and safety class 3 for operation. The annulus ventilation system is assumed safety class 3.
ENGINEERING STATEMENT OF WORK
FOR TITLE II DESIGN

PROJECT: W-314, TANK FARM RESTORATION AND SAFE OPERATIONS

PREPARED BY: ICF KAISER HANFORD COMPANY

DATE: APRIL 23, 1996

1.0 SCOPE

The engineering work performed during Title II will utilize the approved Title I design and design criteria that have been prepared for the project as a design basis. Design performed during the Title II phase will produce drawings and specifications which will be used for procurement and construction activities. Title II design will generally include:

- Completion of design media developed in the Title I design phase
- Development of final drawings and specifications which will be used for procurement and construction
- Development of detailed estimates of construction costs, procurement schedules, construction schedules, methods of performance, and identification of work packages

2.0 BASIS

2.1 This engineering statement of work and engineering estimate were prepared using the W-314 Conceptual Design Report (WHC-SD-W314-CDR-001) as a basis.

2.2 This engineering statement of work and engineering estimate were prepared considering that the Title II design will be performed by the onsite engineer/constructor.

2.3 The schedule to perform the Title II design is as follows:

<table>
<thead>
<tr>
<th>Tank Farm</th>
<th>Start</th>
<th>Complete</th>
</tr>
</thead>
<tbody>
<tr>
<td>AN Tank Farm</td>
<td>March 2001</td>
<td>March 2002</td>
</tr>
<tr>
<td>AP Tank Farm</td>
<td>August 2001</td>
<td>August 2002</td>
</tr>
<tr>
<td>AW Tank Farm</td>
<td>April 1998</td>
<td>May 1999</td>
</tr>
<tr>
<td>AY Tank Farm</td>
<td>March 2000</td>
<td>March 2001</td>
</tr>
<tr>
<td>AZ Tank Farm</td>
<td>March 2000</td>
<td>March 2001</td>
</tr>
<tr>
<td>SY Tank Farm</td>
<td>May 1999</td>
<td>May 2000</td>
</tr>
</tbody>
</table>
3.0 DESIGN ACTIVITIES (AN TANK FARM)

3.1 Civil/Structural/Environmental

3.1.1 Drawings

- 1 Drawing List
- 1 Civil Site Plan
- 1 Equipment Pads and Shielding Walls - drawing will give orientation, various size and thickness factors for concrete pads, shielding walls, and foundations for the ventilation units
- 2 Shielding Wall Sections and Details - expansion of detail of previous drawing
- 1 Ventilation Equipment Roof - drawing will provide framing orientation and size of members for removable roof and stack support
- 1 Roof Frame Details - expansion of details from previous drawing
- 1 Drain Pit - drawing will provide detail dimensions of the drain pit and related cover blocks
- 2 Drain Pit Sections and Details - expansion of detail from previous drawing
- 1 Pit Modifications and Cover Blocks - drawing will depict new cover blocks for 2 pits

3.1.2 Specifications

- Construction Specification - Prepare the following sections: Demolition; Asphaltic Concrete Paving; Fencing; Metal Fabrications; Earthwork; Concrete; Structural Steel; and Special Protective Coating.
- Procurement Specification - Provide input to the HVAC ventilation equipment procurement specification

3.1.3 Calculations

- Shielding wall structural analysis; shielding wall connection/detail structural analysis; ventilation equipment roof structural analysis; ventilation equipment roof connection detail structural analysis; drain pit structural analysis; cover block structural analysis; equipment support pad structural analysis;
3.2 Piping

3.2.1 Drawings

- 3 Piping Plans - locations of piping provided for HVAC drains and seal pot drains
- 2 Piping Sections - section view of previous drawing
- 2 Piping Support - support details for new piping
- 4 Pit Arrangements - new jumper arrangements of pits receiving new valve manifolds
- 7 Pit Sections and Details - sections and details of previous drawings
- 27 Jumper Assemblies and Details - individual assemblies of each new jumper (spools, valves, flow elements, remote connectors, etc.)
- 1 Cathodic Protection Plan - plan view of new piping locating elements requiring modification to the existing cathodic protection system
- 2 Seal Pot Plan and Details - details of new seal pot for use in procurement specification
- 2 Heat Trace Plans and Details - location and details of any required heat trace added to equipment
- 1 Thermocouple Tree - outline and details of new thermocouple tree
- 1 Service/Utilities Plans and Details - location and details of service piping required for tie-in to the new seal pot and HVAC system

3.2.2 Specifications

- Construction Specification - Prepare the chemical process piping system section; develop pipe codes which outline service conditions, size and thickness values, material requirements, fitting classifications, gasket materials, and valve selections for all new piping systems
- Procurement Specification - Prepare the Seal Pot Specification, which will include drawings, design details, quality requirements, and fabrication requirements

3.2.3 Calculations

- 3 pipe stress analysis; 2 pipe support analysis; 1 seal pot design analysis; 4 shielding analysis; 1 in-tank component analysis
3.3 HVAC

3.3.1 Drawings

- 1 Primary System Flow Diagram - a schematic of the ventilation system design, showing individual components, simplified instrumentation, airflows, and system operation.
- 5 Primary Exhaust Equipment Elevation, Plan, Sections and Details - the physical equipment arrangement, to scale, and include enough detail for a fabricator to build the equipment.

3.3.2 Specifications

- Construction Specification - Prepare the heating, ventilation, and air conditioning section
- Procurement Specification - Prepare a specification for the ventilation equipment

3.3.3 Calculations

- Primary system airflows; pressure drops; heat and mass transfer; demister; energy conservation; shielding analysis.

3.4 Instrumentation

3.4.1 Drawings

- 1 General Plan - depict the general equipment/instrumentation locations
- 2 Plan and Elevation - for installation of PLC/MMI and support equipment in existing instrument building
- 3 Tank Primary Waste Temperature Assembly - these drawings will be included in the procurement specification
- 1 TMACS Assembly - TMACS cabinet modification to allow parallel TFLAN inputs
- 1 Temperature Tree Installation - Temperature tree and RTD signal box installation in a riser
- 1 Instrument Cabinet Demolition - existing cabinet located next to leak detection pit
- 1 Instrument Cabinet Assembly - cabinet to house vapor pressure transmitters, leak detection pit gamma radiation monitor, heater
- 1 Valve Positioning Indication - modify existing leak detector relay/alarm box to show local indication of valve positions
- 2 Leak Detection Assembly - typical drawing showing installation of floor mounted detectors. Drawings will be used for procurement specification
1 Tank Annulus Liquid Presence Detector Installation - installation of detector in riser
1 Tank Annulus Exhaust Air Leak Detector - modification of existing cabinet for new CAM
1 Leak Detection Pit/Gamma Radiation Monitor - installation of leak detector in pit and sump and gamma probe in radiation well
6 Process Pit Leak Detection Installation - installation of leak detectors in central pump pit, annulus pump pit, valve pits, service pit/flush pit, supernate receiver pit, condensate receiver pit
1 Raw Water Flow Meter Installation - installation of flow meter in raw water line in service pit.
1 Waste Level High Installation - installation of high level instrument in a riser
1 Clean Out Box Installation - installation of leak detectors, connectors, Junction box
2 Pipeline Leak Detector - pipe encasement leak detectors on risers, and pipe encasement leak detectors on drain lines inside a pit
1 Seal Pot Instrumentation Installation - installation of level, pit and pipe leak detection instruments in seal pot
1 Stack Monitor Installation - show necessary detail to install the GEMS specified stack monitor
1 TFLAN I/O Box Assembly - typical I/O box with enclosure, heater, terminal strip
24 Loop Diagrams - loop diagrams showing connections from sensors to display devices for 24 loops
10 HVAC Logic Diagrams - loop diagrams showing connections from sensors to display devices for 10 HVAC loops
77 Master Pump Shutdown Logic Diagrams - logic diagrams showing logic configuration for selectable permissives from MPS for each of the 7 tank pumps
12 AN Tank Farm Master Pump Shutdown Logic Diagrams - logic diagrams for AN Tank Farm permissive
33 Instrument Lists - list will reference the appropriate drawing, specification, and I/O point number

3.4.2 Specifications

- Construction Specification - Prepare the instrumentation sections
- Procurement Specifications - Prepare 5 specifications as follows: General (instruments/equipment); Stack Monitor; Programmable Logic Controller, Man-Machine Interface, I/O Boxes; Temperature Tree; Leak Detector. Provide input to the HVAC ventilation equipment, and the piping seal pot procurement specifications.
3.5 Electrical

3.5.1 Drawings

- 1 One-Line Diagram - ampere, voltage, phase, and power ratings of electrical equipment/devices; feeder conductor sizes and provisions required for backup power to upgrade the primary vent system
- 3 Elementary Diagrams - motor control center schematics showing control/interlocking devices for motors, heaters, and dampers; ladder diagrams for annunciator alarms and master pump shutdown circuit
- 1 Power/Control/Instrumentation Conduit Layout Plan - locations of electrical and instrumentation equipment/devices as well as conduit layout
- 2 Plan, Sections, and Details - enlarged plan of primary vent system and associated details
- 1 Panelboard Schedule - panelboard voltage, ampere, phase, and power ratings; number and type of circuit breakers
- 2 Wire Run Lists - conduit and wire/cable numbering system and associated routing
- 2 Cathodic Protection Plan and Details - location of existing rectifier, new cathodic protection equipment, and devices and conduit layout

3.5.2 Specifications

- Construction Specification - Prepare the service and distribution and cathodic protection sections
- Acceptance Test Procedure - Cathodic Protection

3.5.3 Calculations

- 1 Load analysis and voltage drop; 1 cathodic protection

4.0 DESIGN ACTIVITIES (AP TANK FARM)

4.1 Civil/Structural/Environmental

4.1.1 Drawings

- 1 Drawing List
- 1 Civil Site Plan
- 1 Equipment Pads and Shielding Walls
- 2 Shielding Wall Sections and Details
- 1 Ventilation Equipment Roof
- 1 Roof Framing Details
- 1 Drain Pit
- 2 Drain Pit Sections and Details
- 1 Pit Modifications and Cover Blocks
4.1.2 Specifications

- Construction Specification - Prepare the following sections: Demolition; Asphaltic Concrete Paving; Fencing; Metal Fabrications; Earthwork; Concrete; Structural Steel; and Special Protective Coating.
- Procurement Specification - provide input to the HVAC ventilation procurement specification

4.1.3 Calculations

- Shielding wall; vent equipment roof; drain pit; cover block; equipment support pad; stack; pit modification; instrument rack; process flow diagrams

4.2 Piping

4.2.1 Drawings

- 3 Piping Plans
- 2 Piping Sections
- 2 Piping Support
- 3 Pit Arrangements
- 6 Pit Sections and Details
- 13 Jumper Assemblies and Details
- 1 Cathodic Protection Plan
- 2 Seal Pot and Details
- 2 Heat Trace Plans and Details
- 1 Thermocouple Tree
- 1 Service/Utilities Plan and Details

4.2.2 Specifications

- Construction Specification - prepare the chemical process piping section and associated pipe codes
- Procurement Specification - Seal Pot

4.2.3 Calculations

- 3 pipe stress analysis; 1 pipe support analysis; 1 seal pot design analysis; 2 shielding analysis; 1 in-tank component analysis

4.3 HVAC

4.3.1 Drawings

- 1 Primary System Flow Diagram
- 5 Primary Exhaust Equipment Elevation, Plan, Sections and Details
4.3.2 Specifications

- Construction Specification - prepare the HVAC sections
- Procurement Specification - prepare the ventilation equipment specification

4.3.3 Calculations

- Primary system air flows; pressure drops; heat and mass transfer; demister; energy conservation; shielding analysis

4.4 Instrumentation

4.4.1 Drawings

- 1 General Plan
- 2 Plans and Elevations
- 3 Tank Primary Waste Temperature Assembly
- 1 TMACS Assembly
- 1 Temperature Tree Installation
- 1 Instrument Cabinet Demolition
- 1 Instrument Cabinet Assembly
- 1 Valve Positioning Indication
- 2 Leak Detection Assembly
- 1 Tank Annulus Liquid Presence Detector Installation
- 1 Tank Annulus Exhaust Air Leak Detector
- 1 Leak Detection Pit/Gamma Radiation Monitor
- 7 Process Pit Leak Detection Installation - installation of leak detectors in central pump pit, annulus pump pit, valve pits, service pit/flush pit, pump pit 02D, drain pit, mixer pump pit
- 1 Raw Water Flow Meter Installation
- 1 Waste Level High Installation
- 1 Leak Detection SN-650 Pipeline - installation of leak detector for line SN-650
- 2 Pipeline Leak Detector
- 1 Seal Pot Instrumentation Installation
- 1 Stack Monitor Installation
- 1 TFLAN I/O Box Assembly
- 23 Loop Diagrams
- 10 HVAC Logic Diagrams
- 88 Master Pump Shutdown Logic Diagrams
- 10 AP Tank Farm Master Pump Shutdown Logic Diagrams
- 33 Instrument Lists

4.4.2 Specifications

- Construction Specification - prepare the instrumentation sections
- Procurement Specifications - Prepare 5 specifications as follows: General (equipment/instruments); Stack
Monitor; PLC/MMI/I/O Boxes; Temperature Tree; Leak Detector. Provide input to the ventilation equipment specification.

4.5 Electrical

4.5.1 Drawings
- 1 One-Line Diagram
- 3 Elementary Diagrams
- 1 Power/Control/Instrumentation Conduit Layout Plan
- 2 Plan, Sections, and Details
- 1 Panelboard Schedule
- 2 Wire Run Lists
- 2 Cathodic Protection Plan and Details

4.5.2 Specifications
- Construction Specification - Prepare the service and distribution and cathodic protection sections
- Acceptance Test Procedure - Cathodic Protection

4.5.3 Calculations
- 1 load analysis and voltage drop; 1 cathodic protection

5.0 DESIGN ACTIVITIES (AW TANK FARM)

5.1 Civil/Structural/Environmental

5.1.1 Drawings
- 1 Drawing List
- 1 Site Plan
- 1 Equipment Pads and Shielding Wall
- 2 Shielding Wall Sections and Details
- 1 Ventilation Equipment Roof
- 1 Roof Framing Details
- 1 Drain Pit
- 2 Drain Pit Sections and Details
- 1 Pit Modification and Cover Block

5.1.2 Specifications
- Construction Specification - prepare the following sections: Demolition; Asphaltic Concrete Paving; Fencing; Metal Fabrications; Earthwork; Concrete; Structural Steel; Special Protective Coating
- Procurement Specification - Input to the ventilation equipment procurement specification
5.1.3 Calculations

- Shielding wall; vent equipment roof; drain pit; cover block; equipment support pad; stack; pit modification; instrument rack; process flow diagrams

5.2 Piping

5.2.1 Drawings

- 3 Piping Plans
- 2 Piping Sections
- 1 Piping Support
- 4 Pit Arrangements
- 6 Pit Sections and Details
- 13 Jumper Assemblies and Details
- 1 Cathodic Protection Plan
- 2 Seal Pot and Details
- 2 Heat Trace Plans and Details
- 1 Thermocouple Tree
- 1 Service/Utilities Plans and Details

5.2.2 Specifications

- Construction Specification - prepare the chemical process piping section and associated pipe codes
- Procurement Specification - Seal Pot

5.2.3 Calculations

- 3 pipe stress analysis; 2 pipe support analysis; 1 seal pot design analysis; 4 shielding analysis; 1 in-tank component analysis

5.3 HVAC

5.3.1 Drawings

- 1 Primary System Flow Diagram
- 5 Primary Exhaust Equipment Plan, Sections and Details

5.3.2 Specifications

- Construction Specification - prepare the HVAC sections
- Procurement Specification - ventilation equipment

5.3.3 Calculations

- Primary system air flows; pressure drops; heat and mass transfer; demister; energy conservation; shielding analysis
5.4 Instrumentation

5.4.1 Drawings

- 1 General Plan
- 2 Plans and Elevations
- 3 Tank Primary Waste Temperature Assembly
- 1 TMACS Assembly
- 1 Temperature Tree Installation
- 1 Instrument Cabinet Demolition
- 1 Instrument Cabinet Assembly
- 1 Valve Positioning Indication
- 2 Leak Detection Assembly
- 1 Tank Annulus Liquid Presence Detector Installation
- 1 Tank Annulus Exhaust Air Leak Detector
- 1 Leak Detection Pit/Gamma Radiation Monitor
- 6 Process Pit Leak Detection Assembly - installation of leak detectors in central pump pit, annulus pump pit, valve pits, service pit/flush pit, drain pit, feed pump pit
- 1 Raw Water Flow Meter Installation
- 1 Waste Level High Installation
- 1 Clean Out Box Installation
- 2 Pipeline Leak Detector
- 1 Seal Pot Instrumentation Installation
- 1 Stack Monitor Installation
- 1 TFLAN I/O Box Assembly
- 23 Loop Diagrams
- 10 HVAC Logic Diagrams
- 77 Master Pump Shutdown Logic Diagrams
- 10 AW Tank Farm Master Pump Shutdown Logic Diagrams
- 30 Instrument Lists

5.4.2 Specifications

- Construction Specification - prepare the instrumentation sections
- Procurement Specifications - Prepare 5 specifications: General (equipment/instruments); Stack Monitor; PLC/MMI/I/O Boxes; Temperature Tree; Leak Detector. Provide input to the ventilation equipment specification.

5.5 Electrical

5.5.1 Drawings

- 1 One-Line Diagram
- 3 Elementary Diagram
- 1 Power/Control/Instrumentation Conduit Layout Plan
- 2 Plan, Sections, and Details
- 1 Panelboard Schedule
2 Wire Run Lists
2 Cathodic Protection Plan and Details

5.5.2 Specifications
- Construction Specification - Prepare the service and distribution and cathodic protection sections
- Acceptance Test Procedure - Cathodic Protection

5.5.3 Calculations
- 1 load analysis and voltage drop; 1 cathodic protection

6.0 DESIGN ACTIVITIES (AY TANK FARM)

6.1 Civil/Structural/Environmental

6.1.1 Drawings
- 1 Drawing List
- 1 Site Plan

6.1.2 Specifications
- Construction Specification - Prepare the following sections: Demolition; Asphaltic Concrete Paving; Fencing; Metal Fabrications; Earthwork; Concrete; Structural Steel; Special Protective Coating.

6.1.3 Calculations
- Pit modification structural analysis; instrument rack structural analysis.

6.2 Piping

6.2.1 Drawings
- 1 Piping Plan
- 1 Piping Section
- 1 Piping Support
- 1 Pit Arrangement
- 3 Pit Sections and Details
- 5 Jumper Assemblies and Details
- 1 Cathodic Protection Plan
- 1 Thermocouple Tree
- 1 Service/Utilities Plan and Details
6.2.2 Specifications

- Construction Specification - prepare the chemical process piping section and associated pipe codes

6.2.3 Calculations

- 2 pipe stress analysis; 2 pipe support analysis; 1 seal pot design analysis; 4 shielding analysis; 1 in-tank component analysis

6.4 Instrumentation

6.4.1 Drawings

- 1 General Plan
- 2 Plans and Elevations
- 3 Tank Primary Waste Temperature Assembly
- 1 TMACS Assembly
- 1 Temperature Tree Installation
- 1 Instrument Cabinet Demolition
- 1 Instrument Cabinet Assembly
- 1 Valve Positioning Indication
- 2 Leak Detection Assembly
- 1 Tank Annulus Liquid Presence Detector Installation
- 1 Tank Annulus Exhaust Air Leak Detector
- 1 Leak Detection Pit/Gamma Radiation Monitor
- 4 Process Pit Leak Detection Installation - installation of leak detectors in central pump pit, annulus pump pit, sluice pit, drain pit
- 1 Raw Water Flow Meter Installation
- 1 Waste Level High Installation
- 1 Clean Out Box Installation
- 2 Pipeline Leak Detectors
- 1 TFLAN I/O Box Assembly
- 9 Loop Diagrams
- 33 Master Pump Shutdown Logic Diagrams
- 10 AY Tank Farm Master Pump Shutdown Logic Diagrams
- 10 Instrument Lists

6.4.2 Specifications

- Construction Specification - Prepare the instrumentation sections
- Procurement Specifications - Prepare 4 specifications as follows: General (instruments/equipment); Programmable Logic Controller, Man Machine Interface, I/O Boxes; Temperature Tree; Leak Detector.
6.5 Electrical

6.5.1 Drawings

- 1 One-Line Diagram - shows the new motor control center complete with feeder circuit breakers, combination starters, and devices to replace the existing motor control center; will also show existing loads and the front elevation of the motor control center
- 3 Elementary Diagrams
- 1 Power/Control/Instrumentation Conduit Layout Plan
- 2 Plan, Sections, and Details
- 1 Panelboard Schedule
- 2 Wire Run Lists
- 2 Cathodic Protection Plan and Details

6.5.2 Specifications

- Construction Specification - Prepare the service and distribution and cathodic protection sections
- Acceptance Test Procedure - Cathodic Protection

6.5.3 Calculations

- 1 load analysis and voltage drop; 1 cathodic protection

7.0 DESIGN ACTIVITIES (AZ TANK FARM)

7.1 Civil/Structural/Environmental

7.1.1 Drawings

- 1 Drawing List
- 1 Pit Modification and Cover Block

7.1.2 Specifications

- Construction Specification - Prepare the following sections: Demolition; Asphaltic Concrete Paving; Fencing; Metal Fabrications; Earthwork; Concrete; Structural Steel; Special Protective Coating.

7.1.3 Calculations

- Cover block structural analysis; pit modification structural analysis; instrument rack structural analysis.
7.2 Piping

7.2.1 Drawings

- 2 Pit Arrangements
- 2 Pit Sections and Details
- 10 Jumper Assemblies and Details
- 1 Thermocouple Tree

7.2.2 Specifications

- Construction Specification – prepare the chemical process piping sections and associated pipe codes

7.2.3 Calculations

- 1 pipe stress analysis; 1 shielding analysis;
  1 in-tank component analysis

7.4 Instrumentation

7.4.1 Drawings

- 1 General Plan
- 2 Plans and Elevations
- 3 Tank Primary Waste Temperature Assembly
- 1 TMACS Assembly
- 1 Temperature Tree Installation
- 1 Instrument Cabinet Demolition
- 1 Instrument Cabinet Assembly
- 1 Valve Positioning Indication
- 2 Leak Detection Assembly
- 1 Tank Annulus Liquid Presence Detector Installation
- 1 Tank Annulus Exhaust Air Leak Detector
- 1 Leak Detection Pit/Gamma Radiation Monitor
- 5 Process Pit Leak Detection Installation – installation of leak detectors in central pump pit, annulus pump pit, service pit/flush pit, sluice pit, drain pit
- 1 Waste Level High Installation
- 1 Clean Out Box Installation
- 2 Pipeline Leak Detector
- 1 TFLAN I/O Box Assembly
- 9 Loop Diagrams
- 33 Master Pump Shutdown Logic Diagrams
- 10 AZ Tank Farm Master Pump Shutdown Logic Diagrams
- 10 Instrument Lists

7.4.2 Specifications

- Construction Specification – prepare the instrumentation sections
7.5 Electrical

7.5.1 Drawings

- 1 One-Line Diagram - will show the new motor control center and their respective loads and front elevation
- 3 Elementary Diagrams
- 1 Power/Control/Instrumentation Conduit Layout Plan
- 2 Plan, Sections, and Details
- 1 Panelboard Schedule
- 2 Wire Run Lists
- 2 Cathodic Protection Plan and Details

7.5.2 Specifications

- Construction Specification - Prepare the service and distribution and cathodic protection sections
- Acceptance Test Procedure - Cathodic Protection

7.5.3 Calculations

- 1 load analysis and voltage drop; 1 cathodic protection

8.0 DESIGN ACTIVITIES (SY. TANK FARM)

8.1 Civil/Structural/Environmental

8.1.1 Drawings

- 1 Drawing List
- 1 Site Plan
- 1 Equipment Pads
- 1 Sections and Details

8.1.2 Specifications

- Construction Specification - Prepare the following sections: Demolition; Asphaltic Concrete Paving; Fencing; Metal Fabrications; Earthwork; Concrete; Structural Steel; Special Protective Coating.
- Procurement Specification - Input to the ventilation equipment specification
8.1.3 Calculations

- Structural analysis of concrete pads and supports; pit modification structural analysis; instrument rack structural analysis.

8.2 Piping

8.2.1 Drawings

- 2 Pit Arrangements
- 4 Pit Sections and Details
- 6 Jumper Assemblies and Details
- 1 Thermocouple Tree
- 1 Service/Utilities Plan and Details

8.2.2 Specifications

- Construction Specification – prepare the chemical process piping section and associated pipe codes

8.2.3 Calculations

- 1 pipe stress analysis; 1 shielding analysis; 1 in-tank component analysis

8.3 HVAC

8.3.1 Drawings

- 1 Annulus System Flow Diagram – a schematic of the ventilation system design, showing individual components, simplified instrumentation, air flows, and system operation.
- 5 Annulus Exhaust Equipment Elevation, Plan, Sections and Details – the physical equipment arrangement, to scale, and include enough detail for a fabricator to build the equipment.
- 4 Annulus Supply Equipment Plan, Sections and Details – the physical equipment arrangement, to scale, and include enough detail for a fabricator to build the equipment.

8.3.2 Specifications

- Construction Specification – prepare the HVAC sections
- Procurement Specification – Ventilation Equipment

8.3.3 Calculations

- Annulus system air flows; pressure drops; heat and mass transfer; energy consumption
8.4 Instrumentation

8.4.1 Drawings

- 1 General Plan
- 2 Plans and Elevations
- 3 Primary Tank Waste Temperature Assembly
- 1 TMACS Assembly
- 1 Temperature Tree Installation
- 1 Instrument Cabinet Demolition
- 1 Instrument Cabinet Assembly
- 1 Valve Positioning Indication
- 2 Leak Detection Assembly
- 1 Tank Annulus Liquid Presence Detector Installation
- 1 Tank Annulus Exhaust Air Leak Detector
- 1 Leak Detection Pit/Gamma Radiation Monitor
- 6 Process Pit Leak Detection Installation - installation of leak detectors in central pump pit, annulus pump pit, valve pits, service pit/flush pit, drain pit #1, drain pit #2
- 1 Raw Water Flow Meter Installation
- 1 Waste Level High Installation
- 1 Clean Out Box Installation
- 2 Pipeline Leak Detector
- 1 Seal Pot Instrumentation Installation
- 1 Stack Monitor Installation
- 1 TFLAN I/O Box Assembly
- 22 Loop Diagrams
- 13 HVAC Logic Diagrams
- 44 Master Pump Shutdown Logic Diagrams
- 10 SY Tank Farm Master Pump Shutdown Logic Diagrams
- 17 Instrument Lists

8.4.2 Specifications

- Construction Specification - prepare the instrumentation sections
- Procurement Specifications - prepare 5 specifications as follows: General (equipment/instruments); Stack Monitor; PLC/MMI/I/O Boxes; Temperature Tree; Leak Detector. Input to the Ventilation Equipment Specification.

8.5 Electrical

8.5.1 Drawings

- 1 One-Line Diagram - will show existing ventilation equipment power panel which will feed the load of the new primary ventilation system and the existing loads fed by the panel
- 3 Elementary Diagrams
8.5.2 Specifications
- Construction Specification - Prepare the service and distribution section

8.5.3 Calculations
- 1 load analysis and voltage drop

9.0 DESIGN ACTIVITIES (244-A DCRT)

9.1 Civil/Structural/Environmental

9.1.1 Drawings
- 1 Drawing List
- 1 Site Plan
- 1 Equipment Pads and Shielding Walls
- 2 Shielding Wall Sections and Details
- 1 Ventilation Equipment Roof
- 1 Roof Framing Details

9.1.2 Specifications
- Construction Specification - prepare the following sections: demolition; asphaltic concrete paving; fencing; metal fabrications; earthwork; concrete; structural steel; special protective coating.
- Procurement Specification - input to the ventilation equipment specification

9.1.3 Calculations
- Shielding wall; vent equipment roof; stack; pit modification; instrument rack; process flow diagram

9.3 HVAC

9.4.1 Drawings
- 1 Ventilation System Flow Diagram - a schematic of the ventilation system design, showing individual components, simplified instrumentation, airflows, and system operation.
- 5 Equipment Arrangement Elevation, Plan, Sections and Details - the physical equipment arrangement, to
scale, and include enough detail for a fabricator to build the equipment.

- **Equipment Schedule** - a list of equipment

### 9.4.2 Specifications

- **Construction Specification** - prepare the HVAC section

### 9.4.3 Calculations

- Air flows; pressure drops; heat and mass transfer; shielding analysis.

### 9.4 Instrumentation

#### 9.4.1 Drawings

- **1 General Plan**
- **2 Plans and Elevations**
- **3 Tank Primary Waste Temperature Assembly**
- **1 TMACS Assembly**
- **1 Temperature Tree Installation**
- **1 Instrument Cabinet Demolition**
- **1 Instrument Cabinet Assembly**
- **2 Leak Detection Assembly**
- **1 Tank Annulus Liquid Presence Detector Installation**
- **1 Tank Annulus Exhaust Air Leak Detector**
- **2 Process Pit Leak Detection Installation** - installation of leak detectors in central pump pit, service pit/flush pit
- **2 Pipeline Leak Detector**
- **1 Seal Pot Instrumentation Installation**
- **1 Waste Level Installation** - installation of waste level instrument in the DCRT
- **1 Waste Level High Installation**
- **1 Raw Water Backflow Installation**
- **1 Raw Water Flow Installation**
- **12 Loop Diagrams**
- **12 HVAC Logic Diagrams**
- **11 Master Pump Shutdown Logic Diagrams**
- **12 244-A DCRT Master Pump Shutdown Logic Diagrams**
- **7 Instrument Lists**

#### 9.4.2 Specifications

- **Construction Specification** - prepare the instrumentation sections
- **Procurement Specifications** - prepare 4 specifications as follows: General (equipment/instrument); PLC/MMI/I/O Boxes; Temperature Tree; Leak Detector. Provide input to the ventilation equipment specification.
9.5 Electrical

9.5.1 Drawings

- One-Line Diagram - will show the new panelboard that will feed the new vent system; the loads of the existing power distribution center which will be replaced by the new panelboard; schedule of the new panelboard
- 3 Elementary Diagrams
- 1 Power/Control/Instrumentation Conduit Layout Plan
- 2 Plan, Sections, and Details
- 1 Panelboard Schedule
- 2 Wire Run Lists

9.5.2 Specifications

- Construction Specification - prepare the service and distribution section

9.5.3 Calculations

- Load analysis and voltage drop

10.0 DESIGN ACTIVITIES (244-S DCRT)

10.1 Civil/Structural/Environmental

10.1.1 Drawings

- 1 Drawing List
- 1 Site Plan
- 1 Equipment Pads and Shielding Walls
- 2 Shielding Wall Sections and Details
- 1 Ventilation Equipment Roof
- 1 Roof Framing Details

10.1.2 Specifications

- Construction Specification - prepare the following sections: demolition; asphaltic concrete paving; fencing; metal fabrications; concrete; earthwork; structural steel; special protective coating.
- Procurement Specification - provide input to the ventilation equipment specification

10.1.3 Calculations

- Shielding wall; vent equipment roof; stack; pit modification; instrument rack; process flow diagrams
10.3 HVAC

10.3.1 Drawings
- 1 Ventilation System Flow Diagram
- 5 Equipment Arrangement Elevation, Plan, Sections and Details
- 1 Equipment Schedule

10.3.2 Specifications
- Construction Specification – prepare the HVAC sections

10.3.3 Calculations
- Air flows; pressure drops; heat and mass transfer; shielding analysis

10.4 Instrumentation

10.4.1 Drawings
- 1 General Plan
- 2 Plans and Elevations
- 3 Tank Primary Waste Temperature Assembly
- 1 TMACS Assembly
- 1 Temperature Tree Installation
- 1 Instrument Cabinet Demolition
- 1 Instrument Cabinet Assembly
- 2 Leak Detection Assembly
- 1 Tank Annulus Liquid Presence Detector Installation
- 1 Tank Annulus Exhaust Air Leak Detector
- 2 Process Pit Leak Detection Assembly – installation of leak detectors in central pump pit, service pit/flush pit
- 2 Pipeline Leak Detector
- 1 Seal Pot Installation
- 1 Waste Level Installation
- 1 Waste Level High Installation
- 1 Raw Water Backflow Installation
- 1 Raw Water Flow Installation
- 12 Loop Diagrams
- 12 HVAC Logic Diagrams
- 11 Master Pump Shutdown Logic Diagrams
- 12 244-S DCRT Master Pump Shutdown Logic Diagrams
- 7 Instrument Lists
10.4.2 Specifications

- Construction Specification - prepare the instrumentation sections
- Procurement Specifications - prepare 4 specifications as follows: General (equipment/instrument); PLC/MMI/I/O Boxes; Temperature Tree; Leak Detection. Provide input to the ventilation equipment specification.

10.5 Electrical

10.5.1 Drawings

- 1 One-Line Diagram - will show the new pad mounted transformer, lightning arresters, and fused cutouts connected to the existing 13.8kV overhead line; existing service distribution (panelboard A) that feeds the new vent system
- 3 Elementary Diagrams
- 1 Power/Control/Instrumentation Conduit Layout Plan
- 2 Plan, Sections, and Details - will show pole line and hardware connection to the existing 13.8kV line, metering, and the pad mounted transformer
- 1 Panelboard Schedule
- 2 Wire Run Lists

10.5.2 Specifications

- Construction Specification - prepare the service and distribution section

10.5.3 Calculations

- 1 load analysis and voltage drop

11.0 DESIGN ACTIVITIES (200E/200W AREA INFRASTRUCTURE)

11.1 Civil/Structural/Environmental

11.1.1 Drawings

- 1 Drawing List
- 4 Site Plans (AN to AZ; AZ to AX; A to AW; 244-A to A to AY)
- 3 Plan and Profiles (AN to AZ to AX; 244-A to A; A to AY and A to AW)
- 2 Cover Block Modifications and Details
11.1.2 Specifications
- Construction Specification - prepare the following sections: demolition; asphaltic concrete paving; fencing; metal fabrications; earthwork; concrete; structural steel; special protective coating.

11.1.3 Calculations
- Cover block structural analysis; pit modification structural analysis; instrument rack structural analysis.

11.2 Piping
11.2.1 Drawings
- 6 Piping Plans
- 6 Piping Sections
- 4 Piping Support
- 4 Pit Arrangements
- 6 Pit Sections and Details
- 33 Jumper Assemblies and Details
- 5 Cathodic Protection Plans

11.2.2 Specifications
- Construction - prepare the chemical process piping section and associated pipe codes

11.2.3 Calculations
- 9 pipe stress analysis; 4 pipe support analysis; 6 shielding analysis

11.4 Instrumentation
11.4.1 Drawings
- 4 General Plans - A/AX/241-A-271; 242-S/W-211 ICE; 200E TFLAN/TMACS; 200W TFLAN/TMACS
- 5 Programmable Logic Controller/Man Machine Interface Installation - 241-A-271; 242-A; 272-AW; W-211 ICE at SY Tank Farm; WA-278
- 1 Terminal Box Assembly - for 242-S demolition
- 1 Valve Positioning Assembly
- 2 Leak Detection Assembly
- 2 Pipeline Leak Detector
- 2 Instrument Building Alarm
11.4.2 Specifications

- Construction Specification - Prepare the instrumentation sections
- Procurement Specifications - Prepare 3 specifications as follows: General (instruments/equipment); Programmable Logic Controller, Man Machine Interface, I/O Boxes; Leak Detector.

11.5 Electrical

11.5.1 Drawings

- 3 Elementary Diagrams
- 1 Power/Control/Instrumentation Conduit Layout Plan
- 2 Plan, Sections, Details
- 1 Panelboard Schedule
- 2 Wire Run Lists
- 2 Cathodic Protection Plan and Details

11.5.2 Specifications

- Construction Specification - prepare the service distribution and cathodic protection sections
- Acceptance Test Procedures - Cathodic Protection

11.5.3 Calculations

- 1 cathodic protection

12.0 DESIGN ACTIVITIES (Single Shell Tanks)

12.1 Civil/Structural/Environmental

12.1.2 Specifications

- Construction Specification - Prepare the following sections: Earthwork; Concrete.

12.1.3 Calculations

- Concrete foundation structural analysis.

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12.5 Electrical

12.5.1 Drawings
- 1 One-Line Diagram - will show the pad mounted transformer, lightning arresters, and fused cutouts connected to the existing 13.8kV overhead line; new panelboard and associated equipment
- 3 Elementary Diagrams
- 1 Power/Control Conduit Layout Plan
- 2 Plan, Sections, and Details - pole line and hardware connection to the existing 13.8kV overhead line, metering, and pad mounted transformer
- 1 Panelboard Schedule
- 2 Wire Run Lists

12.5.2 Specifications
- Construction Specification - prepare the service and distribution section

12.5.3 Calculations
- 1 load analysis and voltage drop

13.0 TITLE II DESIGN SUPPORT

The disciplines listed above will require other engineering, supervision, and administrative support as listed below:

- ENVIRONMENTAL ENGINEERING (22)
  a. Review and approve the design documents for compliance with appropriate environmental regulatory requirements.

- SPECIFICATIONS (32)
  a. Prepare Construction and Procurement Specifications

- DESIGN ADMINISTRATION (35)
  a. Provide design supervision and interdiscipline coordination.
  b. Make engineering personnel assignments (DM).
  c. Provide discipline technical oversight (DM).
  d. Coordinate design basis inputs with the discipline lead engineers (PLE).
  e. Ensure the design tasks are completed in accordance with all quality requirements and procedures (PLE).
• **PROJECT MANAGEMENT (40)**
a. Provide single point interface between ICF KH and WHC.
c. Provide daily management of project activities.
d. Ensure the project technical, budget, and schedule objectives are met.
e. Disposition client comments.
f. Hold bi-weekly status meetings with client and prepare meeting minutes.
g. Hold weekly design team meetings.

• **WORD PROCESSING (41)**
a. Provide word processing services for the Construction and Procurement Specifications.

• **ACCEPTANCE INSPECTIONS (44)**
a. Provide independent engineering assessment of the project design as required by WAC-173-303-640.
b. Prepare Acceptance Inspection Plans for early procurement and construction.
c. Provide vendor surveillances on early procurement contracts as required.

• **PROJECT CONTROLS (45)**
a. Provide a cost and scheduling services.
b. Provide weekly/monthly schedule and cost analysis and variance reporting.

• **SUBCONTRACT/PROCUREMENT (49)**
a. Provide procurement review and input to procurement schedule.

• **CONSTRUCTION FORCE ADMINISTRATION (60)**
a. Perform constructability review of concept.
b. Assist in job walks by engineering.

• **SURVEY (62)**
a. Provide survey services to support route planning for underground piping and conduit.
b. Provide scanning services of valve pits to support valve manifold designs.

• **CONSTRUCTIBILITY (63)**
a. Perform a Constructibility Review of the Definitive Design documents prepared by ICF KH.

• **RECORDS MANAGEMENT (65)**
a. Establish and maintain project records.
b. Provide document distribution support services.
14.0 ASSUMPTIONS

14.1 Civil/Structural/Environmental

14.1.1 Safety classifications - the valve pits and associated cover blocks and waste transfer lines are assumed to be SC 2 using SC 1 seismic loads. The primary vent system are assumed to be SC 2. Shielding walls, roof structures, and stack supports are assumed to be SC 3 over SC 2. All other items, as related to the civil/structural/environmental discipline, are assumed to be either SC 3 or SC 4.

14.1.2 The engineering estimate accounts for similarities between the various tank farms and planned equipment upgrades, with the estimates reduced for subsequent items of similar design as an economy of scale.

14.2 Piping

14.2.1 The engineering estimate assumes the deliverables will only show the upgrades covered under this project and necessary interfaces with existing equipment. There is no allowance for incorporating all existing infrastructure (i.e., as-built drawings).

14.2.2 Title I design provides completed, approved P&ID's and flow diagrams before commencing Title II design activities.

14.2.3 Each valve pit manifold design will require 8 jumper assemblies while the drain pit will require 7 jumper assemblies.

14.3 HVAC

14.3.1 The design will be modular to the extent that special effluent treatment devices (such as absorbers for organic and/or ammonia control) can be easily connected in the future.

14.3.2 The existing underground ventilation piping is in good condition and does not require replacement.

14.3.3 The design will assume that existing ventilation equipment will be removed with the new equipment located in a nearby area.

14.3.4 The new primary ventilation equipment will be generic to AN, AP, and AW Tank Farms; the capacity may be adjusted to suit each individual farm. The DCRT's will require new designs.

14.3.5 The primary ventilation systems are assumed SC 2 for confinement and SC 3 for operation. The annulus ventilation system is assumed SC 3 for confinement and SC 3 for operation.
14.4 Instrumentation

14.4.1 Includes no allowance for interferences or disagreements with devices and methods selected by the systems engineering effort.

14.4.2 P&ID's and IEFD's are approved in Title I and require no additional effort in Title II.

14.4.3 No demolition drawings, including red-lined existing drawings, are intended to be released for construction (except where noted).

14.4.4 ECNs or ECN incorporation of existing drawings is included in Title III.

14.4.5 All instrumentation will be SC 3.

14.4.6 Primary tank liquid level: The existing drawing H-2-817634 is sufficient for installation of the "Enraf" displacement level gage in all DSTs.

14.4.7 Primary tank waste temperature: The primary tank temperature measurement design described by existing drawings H-2-815181 and H-2-817863 is an adequate design for all identified tanks and requires no extensive redesign. Only minor modifications are required to use drawings as part of the procurement specification. These aforementioned drawings are the sole drawings contained in the procurement specification.

14.4.8 Waste transfer valve positioning: Position switches/elements are a supplied item on the valves. The valves are supplied with a cable, connector, and mating connector for transmitting position information outside the pit.

14.4.9 Waste transfer monitoring: Flow meters can be installed inside all central pump pits. Magnetic or ultrasonic flow meters can be used.

14.4.10 Tank annulus liquid presence detectors: Existing riser is usable for standard "floor mount" leak detector design.

14.4.11 Tank annulus exhaust air leak detector: Modification of existing cabinet to install new CAM is adequate and no new cabinet or sample line is required.

14.4.12 Leak detection pit, gamma radiation monitor: A commercially available "off the shelf" probe and transmitter will cover entire operating range.

14.4.13 Leak detection pit, liquid lead detector: The pit will be dry and sampling with lab analysis is sufficient for density.

14.4.14 Pipeline leak detectors: End (low) point leak detection is sufficient as opposed to continuous.

14.4.15 Master pump shutdown for AY and AZ Tank Farms controls not only a pump in each central pump pit but also one pump for the sluice pits.

14.4.16 Ventilation, primary exhaust: No buried duct or vent pits require leak detection.
14.4.17 Ventilation, primary exhaust stack monitor: The GEMS specification is adequate for procuring the stack monitor and requires minimal text changes before issuance. The specification requires no new drawings and contains sufficient information to install the pieces on the construction plan and elevation installation drawing. The GEMS specified system has outputs adequate to transmit all signals to the TFLAN I/O box over the required range, speed, accuracy, etc.

14.4.18 242-A DCS alarms: Forty signals need to be connected (replicated) from the TFLAN PLC/MMI to the existing DCS.

14.4.19 TMACS miscellaneous signal inputs: The 8 "Panalarm" to TMACS modem installations assumes a capable "Panalarm" already in place. No logic diagrams are required.

14.4.20 TFLAN system component: MMI faceplate is necessary for each tank, each exhaust train, two for the tank farm overview, and faceplates for the area (1 for 200W and 2 for 200E).

14.4.21 TFLAN system component: TMACS programming is done by experienced TMACS personnel.

14.4.22 TFLAN system component: All signals from the tank farms will be monitored in the local instrument building as well as at 2750E by TMACS.

14.4.23 The scope of the 242-S control room demolition is based on 76 points found on 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. Project W-314 will not ensure the associated equipment is operational.

14.5 Electrical

14.5.1 All electrical power will be SC 3.
14.5.2 The existing 13.8 kV utility feeders have enough capacity to meet the demands for existing and future power requirements.
ENGINEERING STATEMENT OF WORK

FOR TITLE III ENGINEERING/INSPECTION ACTIVITIES

PROJECT: W-314, TANK FARM RESTORATION AND SAFE OPERATIONS

PREPARED BY: ICF KAISER HANFORD COMPANY

DATE: APRIL 23, 1996

ICF KH will provide engineering and inspection services during the construction of this project. For the main design disciplines of Civil/Structural, Piping, HVAC, Instrumentation, and Electrical, that support will include:

a. Review and disposition of Fixed Price Contractor submittals.
b. Prepare and issue Engineering Change Notices (ECNs).
c. Disposition Nonconformance Reports (NCRs).
d. Attend construction meetings.
e. Be available to assist construction personnel in resolving technical issues.

The above engineering efforts during construction and construction itself will be supported by the following disciplines:

- ENVIRONMENTAL ENGINEERING (22)
  a. Perform overview and approval of all project ECNs and NCRs for compliance with appropriate environmental regulatory requirements.
  b. Attend meetings and field trips as required to support construction activities.

- DESIGN ADMINISTRATION (35)
  a. Coordinate and provide administration for engineering activities.
  b. Support the Principle Lead Engineer (PLE) on the project.
  c. PLE to perform field walkdowns and safety inspections of the construction work.

- PROJECT MANAGEMENT (40)
  a. Provide overall coordination of all Engineering/Inspection and Construction activities.
  b. Responsible for cost and schedule performance and reporting.
  c. Coordinate project completion and turnover to the Operating Contractor.
  d. Perform field walkdowns and safety inspections of the construction work.
e. Provide single point of contact for the client.

- WORD PROCESSING (41)
  a. Provide word processing services for Acceptance Test Procedures (ATPs).

- ACCEPTANCE INSPECTIONS (44)
  b. Provide acceptance inspection services for all project construction.
  c. Provide weekly inspection reports.
  d. Prepare NCRs as necessary.
  e. Conduct acceptance performance testing.

- PROJECT CONTROLS (45)
  a. Provide a cost and scheduling services.
  b. Provide weekly/monthly schedule and cost analysis and variance reporting.

- SUBCONTRACT/PROCUREMENT (49)
  a. Provide procurement review and input to procurement schedule.

- RECORDS MANAGEMENT (65)
  a. Maintain project records.
  b. Provide document distribution support services.

- AS-BUILTING (66)
  a. As-built the drawings, specifications and ATPs at the completion of the project.
  b. Update existing drawings to reflect changes the project has made.
OPERATING CONTRACTOR STATEMENT OF WORK

PROJECT: W-314, TANK FARM RESTORATION AND SAFE OPERATIONS
PREPARED BY: WESTINGHOUSE HANFORD COMPANY
DATE: APRIL 23, 1996

1.0 OBJECTIVES

The Operating Contractor shall perform those activities required to support the Tank Farm Restoration and Safe Operations (TFRSO) effort, Project W-314, from initial project development through completion of construction and turnover to operations. These activities include overall project management (WBS 1); permitting and safety (WBS 2); and OPC activities (WBS 3).

With the exception of the expense-funded WBS 3 activities, all activities addressed in this SOW are capital-funded, in accordance with DOE Cost Estimating Manual, Volume 6.

2.0 CAPITAL (PACE) FUNDED SCOPE

WBS 1.1A - Project Management and Integration

- Provide overall, day-to-day management and oversight of project activities and ensure that appropriate project support is obtained as needed to meet the project objectives
- Prepare and maintain required project documentation and records
- Interface with DOE, A-E(s), construction/construction management subcontractors, onsite Engineer/Constructor, and Operating Contractor personnel (Program Office, Tank Farm Operations, etc.) to ensure good communication concerning project activities and needs, and to facilitate integration with other TWRS activities
- Coordinate configuration management activities in accordance with the project Configuration Management Plan
- Coordinate risk identification/analysis/mitigation activities in accordance with the project Risk Management Plan
- Support budget validations, Key Decisions, and major reviews
- Provide technical direction to the design and construction subcontractors
Support project closeout activities

**WBS 1.1B - Systems Engineering (SE) Management**

- Update/maintain project Systems Engineering Management Plan (SEMP) during design/construction phases
- Monitor project activities to ensure conformance to the project SEMP and other applicable SE requirements
- Provide SE guidance to the Project Manager and subcontractor personnel as required to support the design activities
- Interface with TWRS and Site SE organizations to ensure consistency of SE applications
- Support project design reviews

**WBS 1.1C - Project Controls/Business Management**

- Provide progress reporting and maintain budgetary documentation for project activities
- Coordinate development of project cost and schedule input to programmatic work plans
- Prepare and manage project cost account plans, schedules, and supporting documentation
- Maintain/update required project administration and management documentation (Project Plan, Project Management Plan, etc.)
- Coordinate the Operating Contractor's project-related TPA milestone tracking/reporting to support DOE's commitments with the State

**WBS 1.1D - Quality Assurance**

- Conduct reviews, surveys, interviews, and spot inspections, as required, to ensure that the W-314 Quality Assurance Program Plan (QAPP) is appropriately implemented by all parties during the design and construction phases
- Document any deviations or deficiencies in QAPP implementation, and work with appropriate parties to resolve/correct these deficiencies
- Maintain the project QAPP to reflect current requirements and conditions throughout the life of the project
WBS 1.2A - Permits

- Prepare Notice of Construction and supporting documentation to meet Clean Air Act permit requirements
- Prepare and submit a modification to the Hanford Site Double-Shell Tank RCRA Part B permit application, if required
- Prepare pre-operational monitoring determination report for affected facilities prior to construction.
- See Appendix J for further permitting details

WBS 1.2B - Safety Analysis

- Perform Unreviewed Safety Question (USQ) determinations and safety analyses, as needed, to support the definitive design and to ensure that project activities have been appropriately assessed for impacts to the existing Tank Farm safety envelope
- Develop updates for tank farm safety analysis documentation (Safety Analysis Report, Safety Equipment List, etc.), if required based on USQ determinations

3.0 EXPENSE-FUNDED (OPC) SCOPE

The following Operating Contractor activities are included as Other Project Costs (OPC), as defined in Table 4-1, "TPC and TEC Guidance and Clarification, Inclusion in Detailed Activities in TPC and/or TEC," Volume 6 of the draft DOE Cost Estimating Manual:

WBS 1.3A - Project Definition

- Prepare draft Justification of Mission Need (JMN) documentation to support RL's request for Key Decision 0, and assist RL in resolving any comments
- Prepare and issue Engineering Studies in support of the TFRSO project definition effort (e.g., ROM scoping, cost estimates, and schedule information)
- Prepare initial Systems Engineering (SE) documentation to support the TFRSO project's Conceptual Design Phase activities, including:
  - Functions and Operational Requirements (F&OR)
  - Mission Analysis Report (MAR)
  - Requirement Allocation Sheets (RASs)
  - Design Constraint Sheets (DCSs)
  - Identification of required Trade Studies
  - Preliminary Design Requirements Document (PDRD)
Provide program/project management, planning, coordination and oversight for the project definition tasks

WBS 1.3B – Program Integration and Support

- Develop planning to support system assessments of existing Tank Farm structures, systems, and components
- Perform Condition Assessment Survey (CAS) field walk downs and inspections to evaluate/document the physical condition of existing structures, systems, and components
- Evaluate performance capabilities of the existing structures, systems, and components in terms of meeting the established function-based requirements and constraints (PDRD)
- Prepare and submit Facility Assessment Report(s) to support programmatic planning and W-314 Conceptual Design tasks
- Develop weighted need/value added checklist using criteria by which programmatic planning decisions can be based for the Tank Farm work scope.
- Evaluate all required work scope against the weighted need/value added criteria
- Develop preliminary "Master Plan" documentation to specifically identify the scope of work for Project W-314
- Complete Tank Farm Upgrades "Master Plan" which addresses all of the programmatic planning for the Tank Farm activities, including Project W-314
- Provide general project management support for all Conceptual Design Phase tasks, including detailed planning; coordination/integration management; oversight of design and technical liaison with RL, A-Es and subcontractors; and project status tracking/reporting
- Coordinate the Operating Contractor's project-related TPA milestone tracking/reporting to support DOE's commitments with the State
- Develop and issue "Late Validation" documentation, including engineering report, cost estimate, etc., for the W-314G (AW Tank Farm) scope, and support presentation to DOE-HQ validator (August 1995)
- Identify follow-up conceptual-level refinements and/or new tasks needed to further define the project's Systems Engineering basis before Title I Design (i.e., Advanced Conceptual Design), and
perform detailed planning in support of ACD deliverables (currently TBD)

- Develop offsite A-E utilization strategies for use during ACD, Title I, Title II, Title III, and procurement/construction, and provide support to A-E Selection and Procurement, WBS 1.3.H.

- Perform ACD tasks as identified in detailed planning and integrate the results of this work with existing documentation, including updates to the DCBL documentation and project baseline.

- Perform and document detailed planning in support of Title I Design activities.

**WBS 1.3C - Design and Construction Support**

- Provide technical and logistical support to Title I and II design efforts, as required.

- Review the Title I and II design media for operability, maintainability, quality, safety, and environmental considerations.

- Review project design documentation to ensure that applicable regulatory requirements, and other environmental considerations, have been appropriately addressed.

- Support Project Manager in reconciliation of design review comments and issues.

- Provide review of procurement and construction submittals.

- Provide technical and logistical support to Title III engineering effort, as required.

- Review Engineering Change Notices, Nonconformance Reports, and other documentation, as required, for operability, maintainability, quality, safety, and environmental considerations.

**WBS 1.3D - Conceptual Design**

**WBS 1.3D1 - W-314G Engineering Report**

Develop engineering report similar to CDR to be utilized during FY 97 validation process for establishment of cost and schedule baselines.

**WBS 1.3D2 - Design Configuration Baseline (DCBL)**

Continue Systems Engineering planning and development of project requirements documentation, based on the approved W-314 Systems
Engineering Approach Review package (WHC-SD-W314-XX-002), including:

- IBDs
- Mass and Energy Flowsheets
- FFBDs
- DCSs
- Function Decompositions
- Trade Studies
- Policies and design parameters
- Design Requirements Document (DRD)
- Specifications

- Develop and issue interface control documentation addressing all project interfaces, including both internal project interfaces (between facilities, and system/subsystem elements) and external interfaces (with other programs/activities/projects)

- Support RL Decision Point Reviews (DPRs) and System Design Review (SDR) in accordance with RL's Systems Engineering Statement of Work (SE-SOW) and other applicable guidance

- Issue Design Configuration Baseline (DCBL) package, containing the completed W-314 Conceptual Design documentation, to RL and support the field office review and approval process

WBS 1.3D3 - Conceptual Design Report (CDR)

Activity provides for development of a CDR consistent with RL 4700 requirements for the purpose of supporting a successful FY 98 full project validation.

WBS 1.3D4 - Advanced Conceptual Design

Upon completion of CDR/DCBL, an advanced conceptual design effort will be initiated in order to confirm significant assumptions and address any significant uncertainties identified during conceptual design activities. This activity will ensure an orderly and efficient transition into Title I definitive design. A value engineering session will be conducted to evaluate alternate methods of achieving project objectives.

WBS 1.3E - Preliminary Safety Documentation

- Prepare safety evaluations and other safety documentation to support W-314 Conceptual Design activities

- Perform initial Unreviewed Safety Question (USQ) determinations and safety analyses to ensure that project activities have been
appropriately assessed for impacts to the existing Tank Farm safety envelope

- Develop planning for any follow-up safety analyses or documentation updates that may be required for existing Tank Farm safety analysis reports (WBS 1.2.B), based on the USQ/safety analysis activities, and integrate with the project's Title I/II planning

**WBS 1.3F - Permitting Plan**

- Prepare and issue a regulatory compliance POC checklist for the project, based on the DCBL package documentation
- Prepare and issue a Permitting Plan for the W-314 project, identifying the specific permitting requirements, permitting strategy, schedule, and resources required for the acquiring applicable permits

**WBS 1.3G - NEPA Documentation**

- Provide planning and guidance to ensure that all project activities are conducted in accordance with the National Environmental Policy Act (NEPA) as required by 10 CFR 1021, "National Environmental Policy Act; Implementation Procedures and guidelines Revocation; Final Rule and Notice," and applicable DOE policies
- Coordinate project NEPA strategy and planning with appropriate RL and Operating Contractor organizations
- Advise W-314 Project Manager on alternatives with regard to NEPA documentation development and provide recommendations that will ensure an adequate assessment of environmental impacts is performed and documented
- Prepare and submit to RL documentation to support RL's NEPA Action Description Memorandum to DOE-HQ, and assist in resolving any DOE-HQ comments
- Prepare and submit a NEPA Environmental Assessment (EA) for the W-314 upgrades to RL, and support RL's review and approval process
- Support RL's submittal of this documentation to DOE-HQ, and assisting resolving DOE-HQ comments as required

**WBS 1.3H - A-E Selection and Procurement**

- Select appropriately qualified personnel and convene the Architect-Engineer Evaluation Board
• Develop A-E evaluation and procurement documentation (evaluation criteria, statement of work, request for qualifications, etc.)

• Review and evaluate A-E proposals and submittals, conduct interviews, and perform site visits, as required, to select offsite A-E(s) to perform the Advanced Conceptual Design and subsequent engineering services

• Prepare and approve offsite A-E contractual documents and issue Notice to Proceed

WBS 1.3I – Quality Assurance Program Plan

• Support project engineering and systems engineering staff in identification of appropriate quality requirements and considerations during DCBL development

• Prepare and issue the Project W-314 QAPP based on the project's conceptual design documentation (DCBL), preliminary safety documentation, and other appropriate requirements

WBS 1.3J – Site Characterization

• Determine the representative sampling basis for characterization of current site conditions, and extract soil samples

• Conduct analysis of samples and issue results to support Title I and Title II Design

WBS 1.3K Start-up Testing

• Provide/coordinate startup spare parts, consumable and equipment

• Support pre-operational testing after turnover to Startup/Operations

• Support pre-operational testing

• Prepare operating, maintenance, calibration and surveillance procedures.

• Prepare test specification to support pre-operational and operational test procedure development.

• Provide reviews of design, procurement specifications, ATPs and contractor submittals

• Witness and/or verification of factory acceptance testing and construction acceptance testing.
- Participate in project completion walkthroughs and deficiency punchlist generation, turnover package reviews and startup custody.
- Develop and provide support to Operational Test Procedures including performance and deficiency resolution during initial operations.
- Prepare maintenance plans and verify the inventory of critical spares.
- Develop operating procedures.
- Develop operator training programs and conduct training for operations personnel.
- Conduct readiness reviews and issue ORR reports.
- Resolve DOE readiness review comments, as required.

**WBS 1.3L Operation Preparations**
- Provide for ORR preparation and support execution.
- Perform OC Readiness Review prior to ORR.

**WBS 1.3M Independent Reviews**
- Perform Preliminary Design Review (PDR) for Project W-314 Title I design.
- Perform Critical Design Reviews (CDRs) for each Title II design package (10 total).
- Perform Operational Readiness Review (ORR) for each Construction Work Package (10 total).

**WBS 1.5.x.5 and 1.6.x.6 HPT Support**
- Provide dedicated HPT support during construction.
APPENDIX D

Conceptual Project Schedule
<table>
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<th>Activity ID</th>
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**Notes:**
- The table represents a project schedule with activities and their corresponding start and finish dates.
- The chart on the right visualizes the timeline with key events marked.
- The dates are in the format DDMMMYY.
- The project appears to be related to construction or engineering activities.
APPENDIX E

Outline Specification

Application Matrix

E-1 - E-7

Specification Divisions

E-8 - E-26
## DIVISION 2 - SITEWORK

### Section 02050 Demolition

1. Reinforced Concrete
   - a. Core Drill
     - Tank Farms: X X X X X X X
     - DCRTs: X
   - b. Partial Removal
     - Tank Farms: X X X X
     - DCRTs: X
   - 2. Cover Blocks
     - Tank Farms: X X
     - DCRTs: X
   - 3. Asphaltic Concrete
     - Tank Farms: X
     - DCRTs: X
   - 4. Utilities
     - a. Electrical & Signal Wire/Cable
       - Tank Farms: X X X X X X X X X X
       - DCRTs: X
     - b. Electrical Equipment
       - Tank Farms: X X X X X X X X
       - DCRTs: X
     - 5. Instruments & Controls
       - a. Tank Level Measurement Devices
         - Tank Farms: X X X X X X X
         - DCRTs: X
       - b. Tank High Level Alarms
         - Tank Farms: X X X X X
         - DCRTs: X
       - c. Tank & Waste Temp. Devices
         - Tank Farms: X X X X X X
         - DCRTs: X
       - d. Vapor Space Pressure Devices
         - Tank Farms: X X X X X X
         - DCRTs: X
       - e. Raw Water Flow Meter
         - Tank Farms: 1 1 1 1 1 1
         - DCRTs: 1
       - f. Tank Annulus Liquid Detectors
         - Tank Farms: X X X X X X
         - DCRTs: X
       - g. Annulus Air Detectors (CAMs)
         - Tank Farms: X X X X X X
         - DCRTs: X
       - h. Leak Detection Pit Rad Monitors
         - Tank Farms: X X X X
         - DCRTs: X
       - i. Leak Detection Pit Leak Detectors
         - Tank Farms: X X X X X X
         - DCRTs: X
       - j. Process Pit Leak Detectors
         - Tank Farms: X X X X X X
         - DCRTs: X X X
       - k. Clean Out Box Leak Detectors
         - Tank Farms: X X X X X
         - DCRTs: X
       - l. Pipeline Leak Detectors
         - Tank Farms: X X X X X X
         - DCRTs: X X X
       - m. Master Pump Shutdown Switches
         - Tank Farms: X X X X X X
         - DCRTs: X X X
       - n. Alarms & Related Circuitry
         - Tank Farms: X X X X X X
         - DCRTs: X X X
       - o. Tank Primary Vent. Equipment
         - Tank Farms: X X X
         - DCRTs: X
       - p. Tank Annulus Vent. Equipment
         - Tank Farms: X
         - DCRTs: X
       - q. Primary Vent. Stack Monitor
         - Tank Farms: X X X X X
         - DCRTs: X X X
       - r. Seal Pot Level Alarms
         - Tank Farms: X
         - DCRTs: X

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Section 02220 Excavating, Backfilling, and Compacting

1. Backfill and Fill

a. Common Backfill & Fill

b. Structural Backfill & Fill

2. Bedding

3. Gravel Stabilization

4. Excavation

5. Shoring

6. Contaminated Soils

7. Compaction

Section 02237 Controlled Density Fill

1. Controlled Density Fill

DIVISION 3 - CONCRETE

Section 03300 Cast-in-Place Concrete

1. Ready Mix Concrete

2. Reinforcing Steel

3. Bonding Agents

4. Non-Shrink Grout

Section 03400 Precast Concrete

1. Precast Concrete

DIVISION 5 - METALS

Section 05056 Expansion Anchor Installations

1. Expansion Anchors

Section 05120 Structural Steel

1. Structural Steel ASTM A-36

2. Fasteners

Section 05300 Metal Decking

1. Roof Panels
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**DIVISION 9 - FINISHES**

Section 08855 Chemical Resistant Decontaminable Coatings

| 1. Decontaminable Coatings          | 600 ft²/p.p. | X | X | X | X | X | X | X | X | X |

**DIVISION 13 - SPECIAL CONSTRUCTION**

Section 13440 Instrumentation

| 1. Programmable Logic controller    |   |   |   |   |   |   |   |   |   |   |
| a. PLC                              | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 |
| b. PLC Backplane                    | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 |
| c. PLC Power Supply                 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 |
| d. Remote I/O controller            | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 |
| e. Remote I/O drop card             | 5 | 2 | 2 | 6 | 4 | 2 |   |   |
| f. Remote I/O cable tap             | 5 | 2 | 2 | 6 | 4 | 2 |   |   |
| g. Remote Backplane                  | 5 | 2 | 2 | 6 | 4 | 2 |   |   |
| h. Remote I/O power supply          | 5 | 2 | 2 | 6 | 4 | 2 |   |   |
| i. PLC Software Program             | 1 |   |   |   |   |   |   |   |
| j. Communication Network            | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 |
| k. Communication Card               | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 |
| l. TCP/IP interface card            | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 |
| m. Analog Input Card                | 23 | 8 | 7 | 19 | 21 | 16 | 9 | 9 | 4 |
| n. Discrete Output Card             | 3 | 2 | 3 | 4 | 18 | 5 | 1 | 1 | 1 |
| o. Discrete Input Card              | 5 | 1 | 1 | 2 | 9 | 2 | 1 | 1 | 1 |
| p. RTD Input Card                   | 7 | 6 | 5 | 14 | 19 | 7 | 1 | 1 |   |

<p>| 2. Man-Machine Interface terminals  |   |   |   |   |   |   |   |   |   |   |
| a. CRT                              | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 |
| b. Processor                        | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 |
| c. Hard Disk                        | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 |
| d. Operator Interface               | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 |</p>
<table>
<thead>
<tr>
<th>SPECIFICATION DIVISION/SECTION</th>
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<th>DCRTs</th>
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<tr>
<td></td>
<td>AN</td>
<td>AZ</td>
</tr>
<tr>
<td>a. Software</td>
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<tr>
<td>3. Tank Level Measurement</td>
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</tr>
<tr>
<td>a. Displacement level gage</td>
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<td>b. Communications Interface unit</td>
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<tr>
<td>4. Liquid Conductivity Probes</td>
<td>85</td>
<td>37</td>
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<tr>
<td>5. Tank Temperature Tree</td>
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<tr>
<td>6. Tank Pressure transmitter</td>
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</tr>
<tr>
<td>7. Waste monitoring flowmeter</td>
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<td>4</td>
</tr>
<tr>
<td>8. Raw water monitoring flowmeter</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>9. Annulus CAM (leak detector)</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>10. Primary exhaust pressure</td>
<td>9</td>
<td>9</td>
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<td>11. Primary exhaust temperature</td>
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<tr>
<td>12. Exhaust stack monitoring</td>
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<tr>
<td>13. Enclosures and Accessories</td>
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</tr>
<tr>
<td>a. Instrument enclosure</td>
<td>5</td>
<td>2</td>
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<tr>
<td>b. Heater</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>14. Limit Switches</td>
<td>21</td>
<td>9</td>
</tr>
</tbody>
</table>

Section 13480 Gamma Radiation Monitoring System

1. Leak Detection Pit
   a. Gamma Probe
      7  2  2  6  8  3  1  1
   b. Gamma Meter
      7  2  2  6  8  3  1  1

2. Raw Water Backflow
   a. Radiation Monitor
      1  1
   b. Digital Retemeter
      1  1

DIVISION 15 - MECHANICAL

Section 15483 Chemical Process Piping Systems

A. Process and Service Piping

1. Process piping
   X  X  X  X  X  X  X
2. Support piping
   X  X  X  X  X  X  X

E-4
## OUTLINE SPECIFICATION APPLICATION MATRIX

<table>
<thead>
<tr>
<th>SPECIFICATION DIVISION/SECTION</th>
<th>Tank Farms</th>
<th>DCRTs</th>
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<tr>
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<td>AZ</td>
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<td>4. Protective coating</td>
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</tr>
<tr>
<td>a. Carbon steel piping</td>
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<td>X</td>
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<tr>
<td>b. Carbon steel sections</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>c. Stainless steel pipe</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>B. Equipment</td>
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<td></td>
</tr>
<tr>
<td>1. Seal pot</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2. Seal pot sump pump</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Section 15500 Heating, Ventilating, and Air Conditioning

| A. Materials                   |   |   |   |   |   |   |   |   |   |   |   |
| 1. Plenums                     | X | X | X | X |   | X | X |   |   |   |   |
| 2. Plenum reinforcement        | X | X | X | X |   | X | X |   |   |   |   |
| 3. Supports                    | X | X | X | X |   | X | X |   |   |   |   |
| 4. Insulation                  | X |   | X | X |   |   |   |   |   |   |   |
| 5. Ventilation Piping          | X | X | X | X |   | X | X |   |   |   |   |
| 6. Fabrication                 | X | X | X | X |   | X | X |   |   |   |   |
| 7. Protective coating          | X |   | X | X |   |   |   |   |   |   |   |
| a. Carbon steel piping         | X |   | X | X |   |   |   |   |   |   |   |
| b. Special sections            | X |   | X | X |   |   |   |   |   |   |   |
| c. Stainless Steel pipe        | X |   | X | X |   |   |   |   |   |   |   |
| 8. Underground pipe trenching  | X |   | X | X |   |   |   |   |   |   |   |

B. Equipment

<p>| 1. Exhaust fans                | 2 | 2 | 2 | 2 | 2 | 2 |   |   |   |   |   |
| 2. HEPA filter housings       | 4 | 4 | 4 | 4 | 5 | 5 |   |   |   |   |   |
| 3. HEPA filters               | 8 | 8 | 4 | 4 | 5 | 5 |   |   |   |   |   |
| 4. Heating coils              | 2 | 2 | 2 | 2 | 3 | 3 |   |   |   |   |   |
| 5. Prefilters                 | 2 |   | 2 | 2 | 1 | 1 |   |   |   |   |   |
| 6. Carbon adsorber housings   | 2 | 2 | 2 | 2 | 2 | 2 |   |   |   |   |   |
| 7. Mist Eliminators           | 2 | 2 | 2 |   |   |   |   |   |   |   |   |</p>
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<thead>
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<td>2. Primary cable</td>
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<tr>
<td>a. Conductor</td>
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<tr>
<td>b. Conductor shield</td>
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<tr>
<td>c. Insulation</td>
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<tr>
<td>d. Insulation shield</td>
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<tr>
<td>e. Jacket</td>
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<td>B. Equipment</td>
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<td>1. Equipment enclosures</td>
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<td>2. Distribution power fuse</td>
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<td>3. Lightning arrester</td>
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<tr>
<td>4. Distribution transformers</td>
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<tr>
<td><strong>Section 16400 Service and Distribution</strong></td>
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<tr>
<td>A. Materials</td>
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<tr>
<td>1. Conduit</td>
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<tr>
<td>a. Conduit below grade</td>
</tr>
<tr>
<td>b. Exposed conduit</td>
</tr>
<tr>
<td>c. Conduit concealed in concrete</td>
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<tr>
<td>2. Conductors</td>
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<tr>
<td>B. Equipment</td>
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<tr>
<td>1. Equipment enclosures</td>
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<td>2. Motor control centers</td>
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<tr>
<td>a. Motor controllers(combination)</td>
</tr>
<tr>
<td>b. Feeder circuit breakers</td>
</tr>
<tr>
<td>3. Panelboards</td>
</tr>
<tr>
<td>a. Branch circuit breakers</td>
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<td>SPECIFICATION DIVISION/SECTION</td>
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<td>-------------------------------</td>
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<tr>
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<tr>
<td>4. Combination motor controllers</td>
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<tr>
<td>5. Safety switches</td>
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<tr>
<td>6. Enclosed combination magnetic starter</td>
</tr>
<tr>
<td>7. Variable speed drive</td>
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<tr>
<td>8. Mini-power center</td>
</tr>
<tr>
<td>9. Manual transfer switch</td>
</tr>
<tr>
<td>10. Wire gutter</td>
</tr>
<tr>
<td>11. Power receptacle</td>
</tr>
<tr>
<td>12. Receptacle switch</td>
</tr>
<tr>
<td>13. Enclosed circuit breaker</td>
</tr>
<tr>
<td>14. SCR unit</td>
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<tr>
<td>15. Circuit breaker (main/incoming)</td>
</tr>
<tr>
<td>16. Receptacles</td>
</tr>
<tr>
<td>17. Heat trace cable</td>
</tr>
<tr>
<td>18. Heat tracing control panel</td>
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Section 16640 Cathodic Protection

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<tr>
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<th>DCRTs</th>
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<tbody>
<tr>
<td>1. Anodes</td>
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</tr>
<tr>
<td>2. Permanent reference electrode</td>
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<td>2</td>
</tr>
<tr>
<td>3. Test stations</td>
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</tr>
<tr>
<td>4. Anode distribution box</td>
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</tr>
<tr>
<td>5. Conduit</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>6. Conductors</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>7. Exothermic weld mold</td>
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<td>X</td>
</tr>
<tr>
<td>8. Exothermic weld metal</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>9. Conductor splice kit</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>10. Wire markers</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>11. Cable markers</td>
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<td>X</td>
</tr>
<tr>
<td>12. Nameplate</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
DIVISION 2 - SITWORK

Section 02050 Demolition

1. Reinforced concrete: Remove portions of existing pits, cover blocks, and other structures where shown on the Drawings by means noted in this Specification. Rubble may be contaminated with mixed waste and shall be handled and disposed of in accordance with procedures.
   a. Core drilling.
   b. Partial removal including use of saws, core drills, impact tools, and high pressure water blasting equipment to create large openings. Extreme care shall be taken to prevent cracking of structure beyond limits of opening being created.

2. Cover blocks: Remove, decontaminate, and dispose of cover blocks in accordance with procedures.

3. Asphaltic concrete paved surfaces to be disturbed by excavation activities shall be saw cut at the limits of the excavation prior to demolition and removal.

4. Utilities: Disconnect and remove electrical equipment where shown on the Drawings and as noted in this Specification. Dispose of, or stockpile for recycling, as directed.
   a. Above ground electrical and signal wire and cable shown on the Drawings to be removed shall be cut at the entrance to conduits or just below grade. Wire, cable, and conduit ends shall be covered or otherwise sealed. Below grade portions of the wire and cable shall be abandoned in place.
   b. Electrical equipment.

5. Disconnect and remove instruments and control devises where shown on the drawings and as noted in this Specification. Dispose of, or stockpile for recycling, as directed.
   a. Tank level measurement devices.
   b. Tank high level alarms.
   c. Waste temperature reading devices.
   d. Vapor space pressure reading devices.
   e. Raw water flow meter.
   f. Tank annulus liquid detectors.
   g. Annulus air detectors (CAMs).
h. Leak detection pit radiation monitors.
i. Leak detection pit leak detectors.
j. Process pit leak detectors.
k. Cleanout box leak detectors.
l. Pipeline leak detectors.
m. Master pump shutdown switches.
n. Alarms and related circuitry.
o. Tank primary ventilation equipment.
p. Tank annulus ventilation equipment.
q. Primary ventilation stack monitor.
r. Seal pot level alarms.
s. Jumper assemblies.
t. Drain pit radiation monitor.
u. Drain pit leak detector.

Section 02220 Excavating, Backfilling, and Compacting

1. Backfill and Fill

a. Common: Well graded and uniformly mixed soil with largest particle being 3 inches in greatest dimension and constituting not more than 40% in volume.

b. Structural: Well graded and uniformly mixed soil with largest particle being 3 inches in greatest dimension and constituting not more than 20% in volume.

c. Controlled density: See Section 02237. Material may be used as common and structural backfill and fill if approved by ICF KH.

2. Bedding for utility lines: Sand as defined in ASTM D 653 or excavated sandy material having less than 20% gravel particles. Gravel particles shall have a maximum dimension of 1/2 inch.

3. Gravel stabilization: Crushed rock with maximum fragment size of 3/4 inch for walkways and 2 inches for other areas.
4. Excavation: Excavate deep enough to allow laying utility lines at line and grade shown on Drawings after placement and compaction of bedding.

5. Shoring: Provide shoring as required meeting requirements of ICF KH CESH 20.

6. Contaminated soils: Manage and dispose of contaminated soils in accordance with approved Waste Management Plan and applicable procedures.

7. Compaction: For structural fill and bedding, uniformly compact each layer to 95% of maximum density as determined by specified compaction tests.

Section 02237 Controlled Density Fill

1. Control density fill mixture:
   a. Cement: ASTM C 150, Type II, low alkali.
   e. Measure and mix specified materials and deliver mixture in accordance with ASTM C 94 or WSDOT M 41-10, Section 6-02.3.
   f. Provide fill compressive strength of 50 to 100 psi at 28 days.

2. Placement: Place mixture in accordance with ASTM C 94 or WSDOT M 41-10, Section 6-02.3. Discharge directly from truck by pumping or other approved methods.

DIVISION 3 - CONCRETE

Section 03300 Cast-In-Place Concrete

1. Ready mixed concrete mixture
   a. Cement: ASTM C 150, Type II, low alkali.
   b. Fly ash: In accordance with recommendations of 40 CFR 249.12 and 249.13
e. Minimum allowable compressive strength: 3000 lb/in\(^2\) at 28 days.

f. Proportions: In accordance with ACI 301, Sections 3.8 and 3.9, and ASTM C 94.

2. Reinforcing steel

a. Steel bars: ASTM A 615, deformed, Grade 60.


c. Tie wire: ASTM A 853 carbon steel, 16-gage minimum, annealed.

3. Bonding agents: Epoxy resin in accordance with WSDOT M 41-10, Section 9-26, Type II, Grade 2, Class B or C; QCM Company EAS8 Class A, Adhesive Engineering "Concreseive 1001 LPL," or Protex Industries "Probond 822."

4. Non-shrink grout: ASTM C 1107; Sika Corporation "Sika Grout 212," or Master Builders "Masterflow 713."

Section 03400 Precast Concrete

1. Precast concrete

a. Mix in accordance with ASTM C 94 (Alternate 2).

b. Proportion in accordance with ACI 301, Section 3.8.

c. Minimum allowable compressive strength: 5000 lb/in\(^2\) at 28 days.

2. Reinforcing steel

a. Steel bars: ASTM A 615, deformed, Grade 60.


c. Tie wire: ASTM A 853 carbon steel, 16-gage minimum, annealed.

DIVISION 5 - METALS

Section 05055 Expansion Anchor Installation

1. Expansion anchors (Safety Classes 1 and 2): Hilti Fastening Systems "Kwik-Bolt II."

2. Expansion anchors (Safety Classes 3 and 4): Industry standard wedge type, having a published evaluation report (by International Conference of Building Officials), with anchor descriptions, tables of allowable tension and shear loads, and test findings.
Section 05120 Structural Steel

1. Rolled steel shapes and plates: ASTM A 36.

2. Steel bars and rods: ASTM A 108, minimum yield 36,000 lb/in², maximum carbon content 0.35%.


4. Steel Pipe: ASTM A 53, Type E or S, Grade B.

5. Fasteners: Class 2 fit.
   a. Bolts: ASTM A 325, Type 1 or 2, plain (noncoated) or galvanized; or ASTM A 490, Type 1 or 2.
   b. Nuts: ASTM A 563, Grade C, plain, heavy hex, or for galvanized bolts, ASTM A 563, Grade DH, galvanized, heavy hex.

Section 05300 Metal Decking

1. Roof panels: Standard wide rib, Type WR20 in accordance with SDI Publication No. 26 and manufactured from zinc-coated steel sheets.

Section 05500 Metal Fabrications

1. Miscellaneous steel items: Fabricate parts from standard structural sections or shapes, to sizes required. Shop paint parts except those to be embedded in concrete or masonry, or those which require other specific finishes.

2. Performance: Verify measurements and take field measurements necessary before fabrication. Provide miscellaneous bolts and anchors, supports, braces, and connections necessary for completion of metal fabrications. Wherever miscellaneous parts are exposed, grind edges, corners, and rough cuts smooth and free of snags. Cut, reinforce, drill, and tap metal fabrications shown to receive finish hardware and similar items. Weld or bolt connections as shown on Drawings.

DIVISION 9 - FINISHES

Section 09855 Chemical Resistant Decontaminable Coatings

1. Decontaminable coatings (service level II as defined in ASTM D 5144):
   a. Finish coating applied at the specified thicknesses shall demonstrate decontaminability to radioactive solutions by having a minimum decontamination factor (DF) of 50 as
determined by ASTM D 4256, Method A, or ANSI N512 Section 4. Test samples shall be prepared in accordance with ASTM D 5139 or ANSI N512 Section 7.

b. Chemical resistance: Coating shall be resistant to the standard decontamination solutions listed in ASTM D 3912, Figure 1. Chemical resistance testing shall be in accordance with ASTM D 3912, or an equivalent standard except test samples coating shall be prepared in accordance with ASTM D 5139 or ANSI N512 Section 7.

c. Coating shall be 'VOC' compliant with a maximum volatile organic content of 2.9 lb/gallon.

d. Primers, thinners, and coating accessory materials shall be produced and/or approved for use by the same manufacturer as the finish coating system. Representative products:

<table>
<thead>
<tr>
<th>Product</th>
<th>Manufacturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel Primer</td>
<td>Amerlock 400</td>
</tr>
<tr>
<td>Concrete Surfacer</td>
<td>Nu-Klad 114A</td>
</tr>
<tr>
<td>Concrete Primer (walls)</td>
<td>Nu-Klad 105A or Amerlock 400</td>
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<tr>
<td>Concrete Primer (floors)</td>
<td>Nu-Klad 105A</td>
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<tr>
<td>Base Coating</td>
<td>Amerlock 400</td>
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<tr>
<td>Intermediate &amp; Finish Coating (except floors)</td>
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<tr>
<td>Self-Leveling base (floors only)</td>
<td>PSX 756 Siloxane</td>
</tr>
<tr>
<td>Top Coat (floors only)</td>
<td>PSX 756 Siloxane</td>
</tr>
</tbody>
</table>

DIVISION 13 - SPECIAL CONSTRUCTION

Section 13440 Instrumentation

1. Programmable Logic Controller (PLC): Series TSX Quantum Automation, Modicon/Square D.
   a. PLC: 140 CPU 424 02 Controller.
   b. PLC backplane: 140 XBP 016 00 sixteen slot backplane.
   c. PLC power supply: 140 CPS 214 00 DC power supply.
   d. Remote I/O controller: 140 CRP 932 00 remote I/O head.
e. Remote I/O drop card: 140 CRA 932 00 remote drop input.
f. Remote I/O cable tap: MA 0185 000.
g. Remote backplane: 140 XBP 016 00 sixteen slot backplane.
h. Remote I/O power supply: 140 CPS 214 00 DC power supply.
i. PLC software program: SW-MSID-9LA (site license Modsoft).
l. TCP/IP interface card: SW-EMBP-000 Ethernet to Modbus Plus Gateway.
m. Analog input card: 140 AVI 030 00 (8 channels, unipolar).
n. Discrete output card: 140 DRC 830 00 relay (NO/NC) 8 output points form C.
o. Discrete input card: 140 DAI 540 00 115 Vac isolated input module; 16 points.
p. RTD input card: 140 ARI 030 00 8 channels.

2. Man-Machine-Interface (MMI): Modicon Modular FactoryMate Plus Series; industrial PC.
   a. CRT: 19 inch 1280x1024 resolution (with ISA SVGA video board).
   b. Processor: 80486DX; 66 MHz, 16 MB RAM.
   c. Hard disk: 240 MB.
   d. Operator interface: Basic keypad with industrially sealed mouse installed.
   e. Software: FactoryLink.

3. Tank level measurement:
   a. ENRAF displacement level gauge Model 854ATG.
   b. ENRAF communications interface unit Model CIU 858.

4. Liquid conductivity probes: Double metallic probe used for conductivity measurement.

5. Tank temperature: Temperature tree, see Hanford Drawings H-2-815180, H-2-815781, and H-2-817863.
6. Tank pressure: Differential pressure transmitter, Rosemount 3051C.

7. Waste monitoring: Magnetic flowmeter, Fischer and Porter, Model 10D1475, Class 1, Division 2 approved.

8. Raw water monitoring: Turbine flowmeter, EG&G series FT with 100:1 turndown and series "RI5x" rate indicator/transmitter. 1-1/2 inch range = 1.6 to 160 gpm or 2 inch range = 2.5 to 250 gpm.


11. Primary exhaust temperature: Temperature Indicating Transmitter (TIT): Foxboro 893 series RTD with integrally mounted element and local display.


13. Enclosures and accessories:
   b. Hoffman heater Model D-AH4001B; 400 watt, 115 V.

Section 13460 Gamma Radiation Monitoring System

1. Leak detection pit:
   a. Submersible gamma probe, Series DT-616W, Nuclear Research Corp.
   b. Gamma radiation meter, Model ADM-610, Nuclear Research Corp; NEMA 4.

2. Raw water backflow:
   a. Liquid radiation monitor, Victoreen model 940-3.

DIVISION 15 - MECHANICAL

Section 15493 Chemical Process Piping Systems

A. Process and Service Piping

1. Process piping shall meet the requirements for design, materials, fabrication, erection, testing, and inspection as prescribed by ASME B31.3. Material requirements, piping categories (ASME B31.3
categories), inspection/testing, non-destructive examination (NDE) and material documentation requirements are listed on the pipe code descriptions. Valves shall be consistent with the ratings of the fittings.

2. Support material shall be as follows.
   b. Stainless steel: ASTM A 276, Type 304 or 304L.

3. Cathodic protection system shall be provided on buried metallic process, drain, and ventilation piping.

4. Protective coating for piping in contact with earth or concrete shall be as follows:
   a. Carbon steel piping: Factory-applied exterior protective coating in accordance with AWWA C2.3.
   b. Carbon steel piping special sections, connections and fittings: Field applied liquid epoxy coatings and hot melt patch compound, SCOTCHKOTE 312 and 206N, respectively.
   c. Stainless steel pipe: Extruded polyethylene, by Encoat a Lukens Company. (Thickness based on pipe size, 25-40 mil)

5. Flush piping with water after installation.

6. Identify exposed piping as to fluid carried and direction of flow in accordance with ANSI A13.1.

7. The following piping systems will be installed to withstand natural forces requirements for nonreactor facilities as specified in Hanford Plant Standard SDC 4.1.
   a. Moderate Hazard (Safety Class 2)
      Primary Ventilation piping (M-9)
      Waste Transfer piping (M-9)
      Drain piping (M-9)
      Piping Encasement (M-26)
   b. Low Hazard/Important (Safety Class 3)
      Annulus Ventilation piping (M-9)
      Piping not identified above.

8. Jumpers will be designed in accordance with WHC-SD-RE-DGS-002, Rev. 3, to connect each active pit nozzle to the valve manifolds. Jumpers will use Integral Seal Block-type connectors and satisfy Safety Class 3 requirements.
B. Equipment

1. Seal pot
   a. 180 gallon capacity stainless steel (304L) tank, 42 inches diameter by 30 inches tall. The tank will be designed, fabricated and code stamped in accordance with ASME Section VIII, Division 1.
   b. Tank liquid level will be monitored with a level element which will be removed remotely and installed with a jumper assembly.
   c. Liquid level will be maintained by manually adding water through a fill funnel and shutoff valve located adjacent to the pit.

2. Seal pot pit sump pump
   a. Self priming centrifugal pump, 1/3 horsepower, 1-phase, 60 Hz, 115/230V.

Section 15500 Heating, Ventilating, and Air Conditioning

A. Materials

1. Plenums: Stainless steel sheet - ASTM A 240, Type 304 or 304L.

2. Plenum reinforcement:
   a. Stainless steel sheet: ASTM A 240, Type 304 or 304L.
   b. Stainless steel shapes: ASTM A 276, Type 304 or 304L.

3. Supports:
   b. Stainless steel shapes: ASTM A 276, Type 304 or 304L.

   a. Insulation and adhesive shall have UL fire hazard classifications of 25 maximum for flame spread and 50 maximum for smoke developed.
   b. Insulation for exterior surfaces of plenums and filter housings: 1-1/2 inch thick glass fiberboard, 6 lb/ft² minimum density; Schuller Spin-Glas board.

5. Ventilation piping: Exhaust piping will be in accordance with pipe code M-9. Primary ventilation underground ductwork will be double contained in accordance with pipe code M-26. Fabrication and
testing will be in accordance with ASME N509/N510 or ASME AG-1 as applicable.

6. Fabricate and install piping in accordance with ASME B31.3.

7. Protective coating for piping in contact with earth or concrete.
   a. Carbon steel piping: Factory applied exterior protective coating; AWWA C203.
   b. Carbon steel piping special sections, connections, and fittings: Field applied exterior protection system, AWWA C203, Section 3; Tapecoat Company "Tapecoat 20" and primer.
   c. Stainless steel pipe: Extruded polyethylene, by Encoat a Lukens Company. (Thickness based on pipe size, 25-40 mil)


B. Equipment

1. Exhaust fans: Centrifugal, stainless steel, non-sparking wheel, arrangement 9. Fans will be designed in accordance with ASME N509 and furnished with radial vane inlet dampers or variable speed drives (as shown), back-draft dampers, and vibration isolation mounts. Motors will be furnished in accordance with NEMA MG-1 and have a premium efficiency classification. See equipment schedule.

2. HEPA filter housings will be bag-in/bag-out arrangement with HEPA filter test sections or test ports as shown. HEPA filter housings will be capable of meeting test requirements of ASME N510. Housings will meet the requirements of ASME N509. See equipment schedule.

3. HEPA filters will have metal frames and meet the requirements of ASME AG-1.

4. Heating coils at the filter trains will be fin-tubular construction, non-sparking design, with proportional solid state controllers that hold a constant temperature or temperature rise with varying air flows. The heating element to flange penetrations will be sealed, meeting the pressure decay test requirements of ASME N510. Heating coils will meet the requirements of ASME N509. SCR unit with fused disconnect switch shall be outdoor type in NEMA 4 enclosure. See equipment schedule.

5. Prefilters will be 50 percent ASHRAE Standard 52 rated, UL Class 1. Prefilter housings will be a bag-in/bag-out arrangement.

6. Carbon adsorber housings will be located in the air clean-up trains between the HEPA filters. Housings will be bag-in/bag-out arrangement, meeting the requirements of ASME N 509 and N 510.
7. Mist eliminators: Designed for horizontal airflow at velocities not to exceed 600 fpm. The mist eliminators shall consist of a blade deentrainment section followed by a 4 inch thick sst fine mesh pad, followed by an array of spray nozzles (for pad cleaning), followed by a downstream blade deentrainment section.

<table>
<thead>
<tr>
<th>Equipment Schedule</th>
<th>Tank Farm System</th>
<th>Fans</th>
<th>HEPA Filters</th>
<th>Elec. Heaters</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Flow (cfm)</td>
<td>ΔP (in. wc)</td>
<td>Motor (hp)</td>
<td>Configuration</td>
</tr>
<tr>
<td>AN (Pri.)</td>
<td>1500</td>
<td>10</td>
<td>7.5</td>
<td>2x1, 24x24x11½</td>
</tr>
<tr>
<td>AP (Pri.)</td>
<td>2000</td>
<td>11</td>
<td>7.5</td>
<td>2x1, 24x24x11½</td>
</tr>
<tr>
<td>AW (Pri.)</td>
<td>2000</td>
<td>11</td>
<td>7.5</td>
<td>2x1, 24x24x11½</td>
</tr>
<tr>
<td>SY (An. Ex.)</td>
<td>600 (2 ea)</td>
<td>12.5</td>
<td>3</td>
<td>1x1, 24x24x11½</td>
</tr>
<tr>
<td>SY (An. Sup.)</td>
<td></td>
<td></td>
<td></td>
<td>1x1, 24x24x11½</td>
</tr>
<tr>
<td>244-A DCRT</td>
<td>175</td>
<td>12</td>
<td>1</td>
<td>1x1, 12x12x11½</td>
</tr>
<tr>
<td>244-S DCRT</td>
<td>175</td>
<td>12</td>
<td>1</td>
<td>1x1, 12x12x11½</td>
</tr>
</tbody>
</table>
C. Pipe Codes

The pipe codes are as follows:

<table>
<thead>
<tr>
<th>Service</th>
<th>Max. Operating Pressure</th>
<th>Max. Operating Temp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waste Transfer</td>
<td>400 psig</td>
<td>200°F</td>
</tr>
<tr>
<td>Ventilation</td>
<td>+60/-6 inH₂O</td>
<td>200°F</td>
</tr>
<tr>
<td>Drains</td>
<td>20 psig</td>
<td>200°F</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sizes</th>
<th>10&quot; and smaller</th>
<th>12&quot; and larger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipe</td>
<td>ASTM A 312 Grade TP 304L Seamless</td>
<td></td>
</tr>
<tr>
<td>Wall Thickness</td>
<td>Schedule 40S</td>
<td>Standard Weight</td>
</tr>
<tr>
<td>Fittings</td>
<td>Stainless steel, ASTM A 403 Grade WP-S 304L, buttwelding in accordance with ASME B16.9. Wall thickness to match pipe</td>
<td></td>
</tr>
<tr>
<td>Flanges</td>
<td>Class 300 forged stainless steel, ASTM A 182 Grade F 304L, raised face, weld neck in accordance with ASME B16.5. Bore to match pipe ID. (No buried flanges)</td>
<td></td>
</tr>
<tr>
<td>Bolting</td>
<td>Alloy steel bolts, ASTM A 193 Grade B7, and heavy hex nuts, ASTM A 194 Grade 2H.</td>
<td></td>
</tr>
<tr>
<td>Gaskets</td>
<td>Compressed carbon fiber, nonasbestos, 1/16&quot; thick sheet; Garlock HTC 9850, or Anchor Packing 495C. Use full face gaskets with flat face flanges.</td>
<td></td>
</tr>
<tr>
<td>Valves</td>
<td>Class 300, stainless steel body, ASTM A 351 Gr. CF8M, butt-weld ends, UHMWPE seats and seals.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3-Way: PBM MP-H-19-BW-S-6</td>
<td></td>
</tr>
<tr>
<td>Installation</td>
<td>ASME B31.3, Normal Service</td>
<td></td>
</tr>
<tr>
<td>NDE Requirements: No requirement in addition to ASME B31.3, except radiograph 100% of all buttwelds.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## PIPE CODE M-26

<table>
<thead>
<tr>
<th>Service</th>
<th>Max. Operating Pressure</th>
<th>Max. Operating Temp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Encasement</td>
<td>Same as encased line</td>
<td>Same as encased line</td>
</tr>
<tr>
<td>Sizes</td>
<td>10&quot; and smaller</td>
<td>12&quot; and larger</td>
</tr>
<tr>
<td>Pipe</td>
<td>ASTM A 106 Grade B</td>
<td></td>
</tr>
<tr>
<td>Wall Thickness</td>
<td>Schedule 40</td>
<td>Standard Weight</td>
</tr>
<tr>
<td>Fittings</td>
<td>Wrought steel, ASTM A 234 Grade WPB, buttwelding in accordance with ASME B16.9. Wall thickness to match pipe.</td>
<td></td>
</tr>
<tr>
<td>Flanges</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Bolting</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Gaskets</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Installation:</td>
<td>ASME B31.3, Normal Service</td>
<td></td>
</tr>
<tr>
<td>NDE Requirements:</td>
<td>No requirement in addition to ASME B31.3.</td>
<td></td>
</tr>
</tbody>
</table>
DIVISION 16 - ELECTRICAL

Section 16300 Medium Voltage Distribution

A. Material

1. Underground conduit: Rigid steel or PVC in concrete duct bank; or PVC coated rigid steel or Schedule 80 PVC direct buried.

2. Primary cable: 15 kV single conductor for wet and dry conditions at normal operating temperature of 90°C maximum.
   a. Conductor: Copper, annealed, class B concentric stranding.
   c. Insulation: Ethylene-propylene-rubber, 220-mils thick minimum.
   d. Insulation shield: Minimum 30-mil extruded nonmetallic covering over insulation with minimum 5-mil nonmagnetic metal component directly over or embedded in covering.
   e. Jacket: Black polyethylene, 80-mils average minimum thickness.

B. Equipment

1. Equipment enclosures: NEMA ICS 6 Type 3R minimum.

2. Distribution power fuse: Drop out, 45 degree open power fuse disconnect, Extra-heavy-duty minimum 22,400 amperes asymmetrical interrupting rating at 14.4 kV. Fuse-unit rating as shown on the drawings. Fuses will be furnished and installed by Operating Contractor.

3. Lightning arresters: Metal-oxide distribution type rated 18 kV, 125 bil, for use on 13.8 kV grounded-neutral system. Porcelain bodies, wet porcelain with uniform color glaze. Galvanized cap and base hardware with bolted clamps for both line and ground connections. Galvanized mounting bolts.

4. Distribution transformers: Outdoor type, ratings as shown on the figures, and have two 2-1/2% above and below normal high-voltage taps, pad-mounted with less flammable cooling and insulating fluid. Transformers shall have outdoor type non-fused 3-phase gang-operated load break switch for incoming 13.8 kV lines.
Section 16400 Service and Distribution

A. Materials

1. Conduit:
   a. Conduit below grade: PVC coated rigid steel or schedule 80 PVC buried 12 inches minimum inside tank farms and 24 inches minimum outside tank farms.
   b. Exposed conduit: Rigid steel, intermediate metal conduit (IMC), or electrical-metallic tubing (EMT).
   c. Conduit concealed in concrete: PVC

2. Conductors: 600-V insulated, type THHN/THWN or XHHW stranded copper.

B. Equipment

1. Equipment enclosures: NEMA ICS 6, Type 12 inside building and Type 4 outside building.

2. Motor control centers (MCC): 20-inch deep enclosure for control equipment, assembled to provide dead-front unit. Incoming feeders shall enter from bottom. Size feeder terminal lugs to accept conductors specified.
   b. Locate master terminal boards in bottom of sections.
   c. Provide neutral bus sized to 100% of the phase buses.
   d. Feeder circuit breakers: Molded case circuit breakers, 3-phase, individually mounted in a drawout type cubicle, trip free, rated for use at 600 V ac. Interrupting rating: 50,000 AIC symmetrical at 480 V ac. For ampere frame and trip ratings for the individual breakers see one-line diagram.

3. Panelboards: UL labeled, surface mounting, rated as shown on the Figures with main circuit breaker.
   a. Provide doors with flush-type combination catch and locks, keyed alike and furnished with 2 keys for each panelboard. Provide each panelboard with directory card holder and card for branch circuit load identification.
b. Branch circuit breakers: Molded case bolt-on type, with thermal magnetic trips. Number, rating, and arrangement are shown on the Figures.

1) Permanently number branch circuits. Number tabs shall not be attached to, or be part of, circuit breaker.

2) Branch circuit breaker positions marked "space": Bussed for future circuit breakers. Provide removable single pole filler plates for spaces shown on the Figures.

4. Combination motor controllers: Horsepower rated, with 2 NO and 2 NC auxiliary contacts. Bimetallic type overload elements are acceptable. Overload relay reset in cover. Instantaneous motor circuit protector type circuit breakers. Enclosure NEMA type as shown on Drawings.

5. Safety switches: Outdoor type in NEMA 3R raintight enclosure, Non-fused heavy duty Type with ratings as shown on Drawings complete with ground bus. Surface mounted.

6. Enclosed combination magnetic starter: Outdoor type, NEMA 4 raintight enclosure, rated as shown on Drawing, complete with combination type starter with circuit breaker rated for 600 V ac 3-phase, 60 Hz; control transformer rated 480-120 V, 1-phase, 60 Hz; coil rated 120 V ac, and start/stop pushbuttons and red indicating light wired and mounted on front door. Surface mounted.

7. Variable speed drive: Adjustable frequency controllers to provide continuous speed adjustment for standard 3-phase squirrel cage induction motors, capable of independently controlling the pump between 25 and 100% of full rated speed. Horsepower ratings shown on One-Line Diagrams. Drives enclosure shall be NEMA Type 12 for surface-mounting.

8. Mini-power center: Outdoor type, NEMA 4 raintight enclosure, with primary and secondary main breakers and branch circuit breakers with thermal magnetic trips and ground bus. Suitable for surface mounting. Ratings as shown on Drawings.

9. Manual transfer switch: Outdoor type, NEMA 4 raintight enclosure, heavy duty type, non-fused, 3-pole, double throw with rating as shown on Drawing, complete with grounding lug. Surface mounted.

10. Wire gutter: Outdoor type in NEMA 4 raintight enclosure suitable for surface mounting.

11. Power receptacle: Weatherproof back box and angle adaptor, heavy duty with ratings as shown on Drawing, self-closing spring doors on receptacle and cord connectors with environmental sealing. Surface mounted.
12. Receptacle switch: Outdoor type in NEMA 4 raintight enclosure, fusible with ratings as shown on Drawing. Surface mounted.

13. Enclosed circuit breaker: Outdoor type in NEMA 4 raintight enclosure, molded case with thermal magnetic trip with ratings as shown on Drawing. Surface mounted.

14. SCR unit: Outdoor type in NEMA 4 raintight enclosure, rated for 480 V ac, 3-phase, 60 Hz complete with main disconnect switch, fused control power transformer, 4-20 mA current input/output power "on" pilot light. Heater kW rating as shown on Drawings.

15. Circuit breaker: Molded case circuit breaker with thermal magnetic trip, ratings as shown on Drawing.

16. Receptacles: 120 V ac convenience duplex receptacles in outdoor type raintight enclosure.

17. Heat trace cable: Self-regulating heating cable rated 5 W/ft, 120 V ac, bus wire gauge No. 16 AWG with semi-conductive polymer core and flame-retardant jacket.

18. Heat tracing control panel: Outdoor NEMA Type 4 enclosure with current sensing devices, relays, and indicating lights for 120 V ac application.

Section 16640 Cathodic Protection

1. Anodes: High-silicon chromium iron, 2 inch diameter by 24 inches long, 13 lbs, prepackaged in an 8 by 48-inch steel canister with coke breeze backfill; No. 8 AWG lead wire with HMW/PE insulation, 50 ft in length. Durichlor 51 Anode Co., Type TAB.


3. Test stations: High impact plastic housing, removable 9 point terminal board, removable cover. Street Fink CP Test Station manufactured by Cott Mfg. Co.

4. Anode distribution box: 12 x 12 x 6-inch with 32 solderless pressure type terminals, Goodall, Model No. T-32-A.

5. Conduit:
   a. Rigid steel, PVC coated (anode distribution box).
   b. PVC, Schedule 40, 6-inch (for use with test stations).
6. Conductors:
   a. No. 8 AWG, stranded copper cable, HMW/PE insulation (pipe test conductors).
   b. No. 4 AWG, stranded copper cable, HMW/PE insulation (pipe jumpers).
   c. 2/0 AWG stranded copper cable, HMW/PE insulation (anode feeder, loop and negative return cables).

7. Exothermic weld mold: Low emission type or standard type (for connection of test conductors, jumpers and negative return cables).

8. Exothermic weld metal: Low emission type or standard type.

9. Conductor splice kit: For underground use (anode lead to anode header cable), 3M Scotchcast Brand, Catalog No. 82-B1 or 90-B1.

10. Wiremarkers: Plastic tag type, typewritten.

11. Cable marker: Metal auger flush with grade type, 17 inches long, 6-inch diameter identification area with raised words "CATHODIC PROTECTION"; A.B. Chance Co., Catalog No. C554-0001 with installation tool No. CWFA.

APPENDIX F

Energy Conservation Report and Analysis
ENERGY CONSERVATION REPORT AND ANALYSIS

Energy reporting requirements and equipment designs shall be in accordance with DOE Order 6430.1A.

All energy consumption resulting from project W-314 is due to process equipment. There are no new buildings.

Each tank farm is metered separately for power consumption, and is considered as an individual facility. The increase in energy consumption in each facility is well below 500 million BTU/yr.

Differences in energy consumption due to this project are accounted for in the ventilation systems for Tank Farms 241-AN, -AP, -AW, and -SY. Although the 244-A and -S DCRTs ventilation systems will be replaced, the normal operating loads will be unchanged and therefore the energy consumption will not be noticeably affected.

Changes in system design due to project W-314 will affect the power consumption of the exhaust fan motors and the filter train heaters. All new motors will be specified with premium efficiency motor classification. All new electric heaters will use SCR controls to avoid excessive energy consumption. Following is a summary of energy consumption differences for each facility:

241-AN Tank Farm
An increase in the average flow rate from 600 cfm to 1000 cfm will increase the exhaust fan consumption by 44,588,000 Btu/yr. The filter train heater consumption will increase by 37,843,000 Btu/yr.

Total energy increase = 82,431,000 Btu/yr.
241-AP Tank Farm
An increase in the average flow rate from 1170 cfm to 1500 cfm will increase the exhaust fan consumption by 25,192,000 Btu/yr. The filter train heater consumption will increase by 31,221,000 Btu/yr.

Total energy increase = 56,413,000 Btu/yr.

241-AW Tank Farm
An increase in the average flow rate from 1000 cfm to 1500 cfm will increase the exhaust fan consumption by 80,259,000 BTU/yr. The filter train heater consumption will increase by 47,304,000 BTU/yr.

Total energy increase = 127,563,000 BTU/yr.

241-SY Tank Farm
The annulus system flow will be increased from an average of 600 cfm to 750 cfm, which will increase the fan consumption by 26,753,000 BTU/yr. The new annulus exhaust will not have a heater, however, there will be a heater in the supply where none exists now. The net effect will be a reduction in heater energy consumption of 27,216,000 BTU/yr.

Total energy decrease = 463,000 BTU/yr.
### Project Title:
TANK FARM RESTORATION & SAFE OPERATIONS

### Project Location:
241-AM 200E

### Project Description:
VENTILATION UPGRADE

### Category Type(s)/Category Description(s):

### Projected Base Case Annual Energy Usage (Btu/ft²/yr):

### Projected Modified Energy Usage (Btu/ft²/yr):

### Total Floor Area (ft²):
NA

### Total Energy Usage (million Btu/yr):
82.4

### Estimated Project Budget (thousand $):
TBD

### Reporting Approach:

- Direct
- Integrated, complete Form ECM-S-1
- Phase

### Prescriptive Method:
(See table 2 for checklist and worksheet descriptions.) N/A

- Interior Lighting 3.3.4
- Exterior Lighting 3.3.4
- Building Envelope 3.5.4
- HVAC Systems 3.7.4
- Service Water Heating 3.9.4
- Other Energy-Using Systems 3.13.4

### System Performance Method:
(See table 2 for checklist and worksheet descriptions.) N/A

- Lighting Interior 3.3.4
- Lighting Exterior 3.3.5
- Building Envelope 3.5.5
- Other Energy-Using Systems 3.13.4

### Compliance Alternative Method:
(See table 1 for compliance form descriptions.) N/A

- Building Energy Cost
- Building Energy Use
- Life-Cycle Cost Analysis

### Computer Software Used/Version:
- ENVSTD Version
- LTGSTD Version N/A
- Building Simulation Program (DOE, BLAST, ASEAM, etc.): Version N/A

### Life-Cycle Cost Analysis Program Used:
- BLCC Version 4.11
- Other Version

### Application for Variance Required?
- Yes [X] No If yes, attach Form ECM-V-1 for each.

### Commissioning of HVAC equipment required?
- Yes [X] No If yes, attach commissioning report.

### Acceptance tests been performed?
- Yes [X] No If yes, attach Form ECM-AT.

### Winter performance tests been performed?
- Yes [X] No If yes, attach Form ECM-PT-W.

### Summer performance tests been performed?
- Yes [X] No If yes, attach Form ECM-PT-S.

### Private Sector Energy Experts Design Review Required?
- Yes [X] No If yes, attach Form ECM-R-1.

### Existing Building Energy Survey Required?
- Yes [X] No If yes, attach Form ECM-ES-3.15.
<table>
<thead>
<tr>
<th>Project Title: TANK PARK RESTORATION &amp; SAFE OPERATIONS</th>
<th>Project Description: VENTILATION UPGRADE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Location: 241-AP 200E</td>
<td>Start Date:</td>
</tr>
<tr>
<td>Category Type(s)/Category Description(s):</td>
<td></td>
</tr>
<tr>
<td>Projected Base Case Annual Energy Usage (Btu/ft²/yr):</td>
<td>Projected Modified Energy Usage (Btu/ft²/yr):</td>
</tr>
<tr>
<td>Total Floor Area (ft²): N/A</td>
<td>Total Energy Usage (million Btu/yr): 56.4</td>
</tr>
<tr>
<td>Estimated Project Budget (thousand $): TBD</td>
<td></td>
</tr>
</tbody>
</table>

**Reporting Approach:**

- [ ] Direct (See table 1 for compliance form descriptions.)
- [ ] Short form, complete Form EDM-S-1
- [ ] Integrated, complete Form EDM-I-1
- [ ] Phase (See table 1 for compliance form descriptions.)
- [ ] Prescriptive Method: (See table 2 for checklist and worksheet descriptions.) N/A
  - [ ] Interior Lighting 3.3.4
  - [ ] Exterior Lighting 3.3.4
  - [ ] Building Envelope 3.5.4
  - [ ] HVAC Systems 3.7.4
  - [ ] Service Water Heating 3.9.4
  - [ ] Other Energy-Using Systems 3.13.4
- [ ] System Performance Method: (See table 2 for checklist and worksheet descriptions.) N/A
  - [ ] Lighting Interior 3.3.4
  - [ ] Lighting Exterior 3.3.5
  - [ ] Building Envelope 3.5.5
  - [ ] Other Energy-Using Systems 3.13.4
- [ ] Compliance Alternative Method: (See table 1 for compliance form descriptions.) N/A
  - [ ] Building Energy Cost
  - [ ] Building Energy Use
  - [ ] Life-Cycle Cost Analysis
- [ ] Complete Form EDM-BEC-3.11
- [ ] Complete Form EDM-BEU-2
- [ ] Complete Form EDM-LCCA-3.14

**Computer Software Used/Version:**

- [ ] ENSID Version
- [ ] LIGSTD Version N/A

**Building Simulation Program (DOE, BLAIIT, ASEAN, etc.):**

- [ ] Version N/A

**Life-Cycle Cost Analysis Program Used:**

- [X] BLCC Version 4.11
- [ ] Other Version

**Applications for Variance Required:**

- [ ] Yes
- [ ] No

**Compliance Testing:**

- [ ] Acceptance tests been performed? [X] No
- [ ] If yes, attach Form EDM-AT.
- [ ] Winter performance tests been performed? [X] No
- [ ] If yes, attach Form EDM-PT-W.
- [ ] Summer performance tests been performed? [X] No
- [ ] If yes, attach Form EDM-PT-S.
- [ ] Private Sector Energy Experts Design Review Required? [X] No
  - [ ] If yes, attach Form EDM-R-1.
- [ ] Existing Building Energy Survey Required? [X] No
  - [ ] If yes, attach Form EDM-ES-3.15.
<table>
<thead>
<tr>
<th>Project Title: TANK FARM RESTORATION &amp; SAFE OPERATIONS</th>
<th>Project Description: VENTILATION UPGRADE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Location: 241-AM 200E</td>
<td>Start Date: End Date:</td>
</tr>
<tr>
<td>Category Type(s)/Category Description(s):</td>
<td></td>
</tr>
<tr>
<td>Projected Base Case Annual Energy Usage (Btu/ft²/yr):</td>
<td>Projected Modified Energy Usage (Btu/ft²/yr):</td>
</tr>
<tr>
<td>Total Floor Area (ft²): N/A</td>
<td>Total Energy Usage (million Btu/yr): 127.6</td>
</tr>
<tr>
<td>Estimated Project Budget (thousand $): TBD</td>
<td></td>
</tr>
</tbody>
</table>

**Reporting Approach:**

- [X] Direct
  - ☐ Short form, complete Form ECM-S-1
- ☐ Integrated, complete Form ECM-I-1
  - ☐ Phase (See table 1 for compliance form descriptions.) N/A

**Prescriptive Method:** (See table 2 for checklist and worksheet descriptions.) N/A

- ☐ Interior Lighting 3.3.4
  - ☐ Exterior Lighting 3.3.4
- ☐ Building Envelope 3.5.4
  - ☐ HVAC Systems 3.7.4
- ☐ Service Water Heating 3.9.4
  - ☐ Other Energy-Using Systems 3.13.4

**System Performance Method:** (See table 2 for checklist and worksheet descriptions.) N/A

- ☐ Lighting Interior 3.3.4
  - ☐ Lighting Exterior 3.3.5
- ☐ Building Envelope 3.5.5
  - ☐ Other Energy-Using Systems 3.13.4

**Compliance Alternative Method:** (See table 1 for compliance form descriptions.) N/A

- ☐ Building Energy Cost
  - ☐ Life-Cycle Cost Analysis Complete Form ECM-SEC-3.11
    - ☐ Complete Form ECM-BEU-3. Complete Form ECM-LCCA-3.14

**Computer Software Used/Version:**

- ☐ ENVSTD Version
- ☐ LIGSTD Version N/A

**Building Simulation Program (DOE, BLAST, AISEM, etc.):**

- ☐ Version N/A

**Life-Cycle Cost Analysis Program Used:**

- [X] BLCC Version 4.11
  - ☐ Other Version

**Applications for Variance Required?**

- ☑ Yes [X] No If yes, attach form ECM-V-1 for each.

**Commissioning of HVAC equipment required?**

- ☑ Yes [X] No If yes, attach commissioning report.

**Acceptance tests been performed?**

- ☑ Yes [X] No If yes, attach Form ECM-AT.

**Winter performance tests been performed?**

- ☑ Yes [X] No If yes, attach Form ECM-PT-W.

**Summer performance tests been performed?**

- ☑ Yes [X] No If yes, attach Form ECM-PT-S.

**Private Sector Energy Experts Design Review Required?**

- ☑ Yes [X] No If yes, attach Form ECM-R-1.

**Existing Building Energy Survey Required?**

- ☑ Yes [X] No If yes, attach form ECM-ES-3.15.
<table>
<thead>
<tr>
<th>Project Title: TANK FARM RESTORATION &amp; SAFE OPERATIONS</th>
<th>Project Description: VENTILATION UPGRADE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Location: 241-SY 200E</td>
<td>Projected Base Case Annual Energy Usage (Btu/ft²/yr):</td>
</tr>
<tr>
<td>Category Type(s)/Category Description(s):</td>
<td>Total Floor Area (ft²): N/A</td>
</tr>
<tr>
<td>Projected Modified Energy Usage (Btu/ft²/yr):</td>
<td>Total Energy Usage (million Btu/yr): (0.46)</td>
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<tr>
<td>Estimated Project Budget (thousand $): TBD</td>
<td>Reporting Approach:</td>
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<tr>
<td>(X) Direct</td>
<td>□ Short form, complete Form ECM-5-1</td>
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<tr>
<td>□ Integrated, complete Form ECM-1-1</td>
<td>□ Phase (See table 1 for compliance form descriptions.) N/A</td>
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<tr>
<td>Prescriptive Method: (See table 2 for checklist and worksheet descriptions.)</td>
<td>N/A</td>
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<tr>
<td>□ Interior Lighting 3.3.4</td>
<td>□ Exterior Lighting 3.3.4</td>
</tr>
<tr>
<td>□ Building Envelope 3.5.4</td>
<td>□ HVAC Systems 3.7.4</td>
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<tr>
<td>□ Service Water Heating 3.9.4</td>
<td>□ Other Energy-Using Systems 3.13.4</td>
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<tr>
<td>System Performance Method: (See table 2 for checklist and worksheet descriptions.)</td>
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<tr>
<td>□ Lighting Interior 3.3.4</td>
<td>□ Lighting Exterior 3.3.5</td>
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<tr>
<td>□ Building Envelope 3.5.5</td>
<td>□ Other Energy-Using Systems 3.13.4</td>
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<td>Compliance Alternative Method: (See table 1 for compliance form descriptions.)</td>
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</tr>
<tr>
<td>□ Building Energy Cost</td>
<td>□ Building Energy Use</td>
</tr>
<tr>
<td>□ Life-Cycle Cost Analysis</td>
<td>Complete Form ECM-BEC-3.11</td>
</tr>
<tr>
<td>Complete Form ECM-BEU-3.</td>
<td>Complete Form ECM-LCCA-3.14</td>
</tr>
<tr>
<td>Computer Software Used/Version:</td>
<td>Building Simulation Program (DOE, BLAST, ASEAM, etc.):</td>
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<tr>
<td>□ ENVSTD Version</td>
<td>□ Life-Cycle Cost Analysis</td>
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<tr>
<td>□ LTGSTD Version</td>
<td>Version N/A</td>
</tr>
<tr>
<td>Life-Cycle Cost Analysis Program Used:</td>
<td>Applications for Variance Required? □ Yes [X] No If yes, attach Form ECM-V-1 for each.</td>
</tr>
<tr>
<td>□ Other Version</td>
<td>Acceptance tests been performed? □ Yes [X] No If yes, attach Form ECM-AT.</td>
</tr>
<tr>
<td>Winter performance tests been performed? □ Yes [X] No If yes, attach Form ECM-Pi-W.</td>
<td>Summer performance tests been performed? □ Yes [X] No If yes, attach Form ECM-Pi-S.</td>
</tr>
</tbody>
</table>
APPENDIX G

Physically Handicapped Assessment

(Provided by Operating Contractor)
## ACCOMMODATIONS OF PHYSICALLY HANDICAPPED

**PROJECT NO.** W-314  
**PROJECT TITLE** Tank Farm Restoration and Safe Operations  
**LOCATION** 200 East and West  
**BUILDING** 241AP/AN/AW/SY/AZ/STs  
**Prepared By** S. R. Briggs  
**Title** Project Engineer  
**Date** 03/11/96  

**Type of Project:**  
- ☑ New Building (or Building Addition)  
- ☑ Building Alteration  
- ☑ Site Development (Grading, Walks, Parking Lots)  
- ☑ Other Upgrade of Existing Tank Farm Facilities  

**Application of Regulations:**  
- ☑ All Regulations  
- ☑ Limited Application (indicate in comments section)  

**Exceptions:**  

- ☑ a. Not intended for occupancy or use by the handicapped  
- ☑ b. Alteration not involving existing stairs, doors, elevators, toilets, etc.  
- ☑ c. Not structurally possible  

**General Comments:**  
To support the existing tank farm upgrades, a number of small pre-engineered metal buildings may be installed at the various tank farm facilities. Due to the remote locations of these facilities and the potentially hazardous working conditions, the work requirements and restrictions do not permit handicapped personnel to be assigned to work within the tank farms.
APPENDIX H

Unreviewed Safety Questions Evaluation
(Replaces the Preliminary Safety Evaluation)
(Provided by Operating Contractor)
INITIAL USQ SCREENING EXERCISE FOR PROJECT W-314

INTRODUCTION

A Unreviewed Safety Question (USQ) screening exercise was conducted on the proposed tank farm facility upgrades in anticipation of the formal screens, evaluations, and assessments required by the project W-314 Systems Safety Program Plan (WHC 1996). Since the CDR is the start of a new project, it is appropriate to start the development of the safety basis at this point. The safety basis for project W-314 will be developed via implementation of the USQ process.

The first step in the process is to conduct USQ screening evaluations of each proposed upgrade. The initial screening exercise used the TWRS procedure WHC-IP-0842 (Rev 7). The exercise looked for elements that could be significant cost items during design activities, that would require characterization during conceptual design. None were found.

The screening exercise documented in this report was limited to an evaluation of the upgrades as they will be installed; activities to actually install the items were not considered. Screening of the proposed installation/deployment activities will be performed during Title I and/or Title II design. It is expected that these screenings will identify the need to perform additional USQ evaluations and safety assessments.

The purpose of this report is to document the results of the initial screening exercise, and to provide a degree of confidence that the conceptual design cost estimate has adequately considered potential safety issues. The screening was organized to be consistent with the CDR organization, and with the way the project proposes to conduct the remaining tank farm upgrades design and construction activities. In some cases, the upgrades were grouped into a single screen. In several cases, it was determined that a USQ evaluation will be needed, and the probable outcome of the evaluations are noted on the screening forms. The tank farm safety basis, i.e., the FSAR, and the USQ process currently are being revised substantially. The report aims to provide the foundation for the actual USQ evaluations and screening activities that will take place during the next design phase, taking into account revisions to both the USQ process and the associated safety basis.

METHODOLOGY

The methodology used to conduct the screening was based on the assumption that the safety related design features of the tank farm facilities (albeit in some cases operating in a marginal physical condition) generally are adequate. Therefore, upgrades which are essentially replacement in kind by definition do not represent USQs. The screens were conducted to determine if the proposed upgrades were either literally replacement in kind or represented improvements in the item's ability to perform its safety function. Therefore, for each upgrade category, the proposed new system was compared to the existing system it is intended to replace in terms of the associated safety parameters. For example, piping system safety parameters...
included line size, operating pressure, material of construction, safety classification, method of operation, etc. Ventilation system safety parameters included air flow rates, pressure control, filtration capacity, system reliability, etc.

As the tank farm safety basis definition is further developed and refined, the project W-314 safety program will remain cognizant of changes which may affect the project by:

- Tracking the progress of surrogate projects W-030, "Tank Farm Ventilation Upgrade," and W-058, "Replacement of Cross-Site Transfer Pipe Lines."
- Remaining cognizant of the SARs which are being developed to update the current interim safety basis, and the ongoing FSAR revision.
- Reviewing all tank farm USQs and subsequent resolution for precedents which need to be addressed by project W-314.
- Revising and augmenting the project W-314 USQ screens, evaluations, and safety assessments as appropriate during subsequent design activities.

SUMMARY OF RESULTS

1. Piping

All proposed piping upgrades were determined to represent changes in form and fit but, in no case, a change in function. The changes in system configuration for piping upgrades involving only pit coatings, valve position indicators, and/or flowmeters were judged to be sufficiently within the bounds of the present facility description, therefore, no changes to these descriptions will be needed. However, the screening process showed that safety assessments may be needed to enable operation of the new valve manifold assemblies proposed for installation in several valve pits throughout the tank farm. Safety assessments may be required as a result of the additional pipelines proposed by the project. The results of the assessments are not expected to cause design changes, but will require changes to operating procedures. The replacement piping systems and new valve manifolds showed a discrepancy in safety classifications.

The relevant interim safety equipment lists (ISEL) indicate that the safety classification for the DST and Aging Waste transfer systems is Class 1 due to the need to protect the environment. However, the environmental hazard safety classification criteria that is the basis for the classification has been deleted from the safety classification procedure, therefore, the USQ screening forms indicate that the present safety classification for the transfer systems is "not classified." The safety classification for the pipelines will be established as part of the ongoing safety basis revision activity.
2. **Electrical**

In all cases, the electrical system upgrades were determined to represent changes in form or fit, but not in function. The net effect of these upgrades will be to provide more reliable power to the tank farms. The changes in system configuration were judged to be sufficiently within the bounds of the present facility description so changes to these descriptions will not be needed. Therefore, with one exception, no USQ evaluations are planned for the electrical system upgrades.

The CDR safety classification for AY/AZ (Aging Waste Facility) electrical power system is at odds with the pertinent ISEL. The CDR designates the new power system, including cathodic protection, a Safety Class 3, whereas the ISEL designates the existing power distribution system as Safety Class 2 and the cathodic protection system as Safety Class 1. The ISEL designations would change to either SS or "NC" if the current safety classification criteria were used to update the ISEL (this is expected to happen during the safety basis revision activity noted above). The electrical power distribution systems design distinctions between Safety Class 2 and 3 are moot since both use the same design criteria. The cathodic protection system was designated as Safety Class 1 for the same reason the transfer piping was and should now be classified as "NC."

3. **Ventilation**

Ventilation upgrades proposed by project W-314 include replacement of selected annulus and primary ventilation (supply and exhaust) systems. The main differences between the existing systems and those that will be provided by the project are enhanced safety features, changes in system configuration (but not in function or operation), backup capabilities, and improvements in system performance.

The screening of the proposed upgrades determined that because of the enhancements and introduction of new backup capabilities, a change to the facility as described in the Authorization Basis was indicated. The screening process also determined the need to perform some safety assessments because of changes in the operating characteristics of the new systems.

The addition of inlet air controls and new higher capacity fans could result in the need for safety assessments following the USQ evaluations. These assessments are not expected to cause changes to the design as it appears in the CDR, but will require changes in operating procedures and additional discussions of the controls associated with dome loading.

4. **Instrumentation**

All proposed changes, with the exception of the master pump shutdown (MPS), to the instrumentation and controls (I&C) systems were determined to represent changes in form and fit, but not changes in
function. The proposed changes are modifications and upgrades to the existing I&C subsystems for the purpose of incorporating current instrumentation technology to replace the antiquated, time-worn, and, in some cases, nonfunctional equipment. For example, the proposed changes include replacing primary tank liquid level gage analog output transmitter cards with digital cards, replacing non-submersible leak detection probes with submersible probes, and replacing existing current/conductivity process pit leak detectors with new resistive/conductivity detectors.

The changes in I&C system configuration, except for the MPS system, were judged to be sufficiently within the Authorization Basis, therefore, changes to these descriptions will not be needed. With the exception of the MPS, no USQ evaluations are planned for the I&C systems. Because the modifications to the MPS system involve changes in pump shutdown logic, a USQ evaluation will be required for the new system.
UNREVIEWED SAFETY QUESTION SCREENING FORM

(REv WHC-IP-0842)

USQ Tracking No.: Rev. No.:

REFERENCE DOCUMENT(S):

ECN No. PCA No.

Work Pkg No. Other (Specify) 1. WHC-SD-W314-CDR-001

TITLE: AN Tank Farm Piping System Upgrades -- Project U-314

Basis: Change consists of providing epoxy coating in pump pits 241-AN-01A, 02A, 03A, 04A, 05A, 06A, 07A, and valve pits 241-AN-A and B; installing electric valve position indicators in valve pits 241-AN-A and B, and in pump pits 241-AN-01A through 07A; providing magnetic flow meters on incoming and outgoing lines at each central pump pit; and replacing the existing jumper arrangements in valve pits 241-AN-A and B with valve manifold assemblies. These changes may require updating the facility and process descriptions in either WHC-SD-WM-SAR-016, or WHC-SD-WM-15B-001.

B. Does the PROPOSED CHANGE represent a change to procedures as described in the AUTHORIZATION BASIS?
   [ ] N/A  [ ] No  [ ] Yes/Maybe
   Basis: Valve manifolds will replace current procedure of jumper manipulations to affect transfers.

C. Does the test or experiment represent a test or experiment not described in the AUTHORIZATION BASIS documentation?
   [ ] N/A  [ ] No  [ ] Yes/Maybe
   Basis: This modification is not considered to be a test or experiment.

D. Does the change, test or experiment impact:
   [ ] Implemented OSRs or IOSRs? [ ] N/A  [ ] No  [ ] Yes/Maybe
   [ ] Approved IOSR Compliance Implementation Plans? [ ] N/A  [ ] No  [ ] Yes/Maybe
   Basis: DST IOSRs (WHC-SD-OSR-WM-OSR-016) applicable to the AN tank farm piping system upgrade include AC 5.29 Flammable Gas Control, which pertains to the explosion proof design of valve position indicators and flow meters, AC 5.21 Spare Tankage, which will limit the amount of time transfers from a tank are prohibited due to work in the valve/pump pits, and LCD 3.6.3, CDR, Pit and Box Covers, which requires that these items be covered at all times while waste transfers are taking place. The proposed upgrade will be fully compliant with these IOSR limitations.

Based on the above, a Safety Evaluation [xx] DOES [ ] DOES NOT need to be performed for this change

*It is further concluded that (with the possible exception of the new valve manifolds) the results of the evaluation will probably be negative, based on the fact that only the form and fit of the piping system is being modified, not its function as a confinement boundary. This is verified by the information in the attached table. The valve manifolds may require a safety assessment to demonstrate that the increased number of potential leak sites during waste transfers does not significantly increase the risk posed by pipe leaks into the covered pits.

### Safety Related Piping Confinement Features

<table>
<thead>
<tr>
<th>Confinement Attribute</th>
<th>Existing Design (WHC-SD-WM-SAR-016)</th>
<th>Proposed Change (WHC-SD-W314-CDR-001)</th>
</tr>
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<tbody>
<tr>
<td>Pipe Diameter</td>
<td>varies</td>
<td>no change</td>
</tr>
<tr>
<td>Operating Pressure</td>
<td>varies</td>
<td>no change</td>
</tr>
<tr>
<td>Safety Class</td>
<td>nc</td>
<td>Safety Significant (equiv. to SC-2)</td>
</tr>
<tr>
<td>Material</td>
<td>carbon steel</td>
<td>stainless steel</td>
</tr>
<tr>
<td>Method of Operation</td>
<td>manual, reconnect jumpers</td>
<td>valve manifolds, reach rod operated</td>
</tr>
</tbody>
</table>
A. Does the PROPOSED CHANGE represent a change to the facility as described in the AUTHORIZATION BASIS documentation?

- [ ] N/A  [ ] No  [ ] Yes/Maybe

**Basis:** Change consists of providing epoxy coating in pump pits 241-AU-01A, 02A, 03A, 04A, 05A, 06A, 02E, and valve pits 241-AU-A and -B; installing electric valve position indicators in valve pits 241-AU-A and -B, and in pump pits 241-AU-01A through 06A and 02E; providing magnetic flow meters on incoming and outgoing lines at each central pump pit. These changes will not require updating the facility and process descriptions in WHC-SD-0M-SAR-016, or WHC-SD-WM-150-001.

B. Does the PROPOSED CHANGE represent a change to procedures as described in the AUTHORIZATION BASIS?

- [ ] N/A  [ ] No  [ ] Yes/Maybe

**Basis:** The proposed modifications are not expected to require changes to the safety aspects of relevant operating procedures.

C. Does the test or experiment represent a test or experiment not described in the AUTHORIZATION BASIS documentation?

- [ ] N/A  [ ] No  [ ] Yes/Maybe

**Basis:** The proposed modifications are not considered to be tests or experiments.

D. Does the change, test or experiment impact:

- [ ] Implemented OSRs or IOSRs? [ ] N/A  [ ] No  [ ] Yes/Maybe
- [ ] Approved IOSR Compliance Implementation Plans? [ ] N/A  [ ] No  [ ] Yes/Maybe

**Basis:** DST OSRs (WHC-SD-OSR-WM-OSR-016) applicable to the AW tank farm piping system upgrade include AC 5.29 Flammable Gas Control, which pertains to the explosion proof design of valve position indicators and flow meters, and AC 5.21 Spare Tankage, which will limit the amount of time transfers from a tank are prohibited due to work in the valve/pump pits. The proposed upgrade will be fully compliant with these IOSR limitations.

Based on the above, a Safety Evaluation [ ] DOES  (x) DOES NOT need to be performed for this change.

*Safety Related Piping Confinement Features

<table>
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<tr>
<th>Confinement Attribute</th>
<th>Existing Design (WHC-SD-WM-SAR-016)</th>
<th>Proposed Change (WHC-SD-W314-CDR-001)</th>
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<td>Pipe Diameter</td>
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</tr>
<tr>
<td>Operating Pressure</td>
<td>varies</td>
<td>no change</td>
</tr>
<tr>
<td>Safety Class</td>
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<td>Safety Significant (equiv. to SC-2)</td>
</tr>
<tr>
<td>Material</td>
<td>carbon steel</td>
<td>no change</td>
</tr>
<tr>
<td>Method of Operation</td>
<td>manual</td>
<td>no change</td>
</tr>
</tbody>
</table>
UNREVIEWED SAFETY QUESTION SCREENING FORM
(Per WBC-IP-0842)

USQ Tracking No.: Rev. No.:  
REFERENCE DOCUMENT(S):  
ECN No. PCA No.  
Work Pkg No. Other (Specify)  

TITLE: AY Tank farm Piping System Upgrades -- Project W-314

A. Does the PROPOSED CHANGE represent a change to the facility as described in the
AUTHORIZATION BASIS documentation?

[ ] N/A  [ ] No  [ ] Yes/Maybe  
Basis: Change consists of providing epoxy coating in pump pits 241-AY-01A, and 02A, and sluice pits 241-AY-01B,C,D,E, 02B,C,D,E; installing electric valve position indicators and magnetic flow meters on incoming and outgoing lines at each central pump pit. A new waste transfer line will also be installed to connect pit 02A to pit 02D (the existing waste transfer line SL-504 will be abandoned in place). These changes may require updating the facility and process descriptions in SD-HS-SAR-010, Rev 2.

B. Does the PROPOSED CHANGE represent a change to procedures as described in the
AUTHORIZATION BASIS?

[ ] N/A  [ ] No  [ ] Yes/Maybe  
Basis: The proposed modification is not expected to require changes to the safety aspects of relevant operating procedures.

C. Does the test or experiment represent a test or experiment not described in the
AUTHORIZATION BASIS documentation?

[ ] N/A  [ ] No  [ ] Yes/Maybe  
Basis: The proposed modification is not considered to be a test or experiment.

D. Does the change, test or experiment impact:
- Implemented OSRs or IOSRs?  [ ] N/A  [ ] No  [ ] Yes/Maybe  
- Approved IOSR Compliance Implementation Plans?  [ ] N/A  [ ] No  [ ] Yes/Maybe  

Basis: Aging Waste Facility IOSRs (WHC-SD-WM-OSR-004) applicable to the AY tank farm piping system upgrade include AC 5.29 Flammable Gas Control, which pertains to the explosion proof design of valve position indicators and flow meters, and AC 5.21 Spare Tankage, which will limit the amount of time transfers from a tank are prohibited due to work in the valve/pump pits. The proposed upgrade will be fully compliant with these IOSR limitations.

Based on the above, a Safety Evaluation [ ] DOES [ ] DOES NOT need to be performed for this change*

*It is further concluded that the results of the evaluation will probably be negative, based on the fact that only the form and fit of the piping system is being modified, not its function as a confinement boundary. This is verified by the information in the attached table.

Safety Related Piping Confinement Features

<table>
<thead>
<tr>
<th>Confinement Attribute</th>
<th>Existing Design (WHC-SD-WM-SAR-016)</th>
<th>Proposed Change (WHC-SD-W314-CDR-001)</th>
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<tbody>
<tr>
<td>Pipe Diameter</td>
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</tr>
<tr>
<td>Operating Pressure</td>
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<td>no change</td>
</tr>
<tr>
<td>Safety Class</td>
<td>nc</td>
<td>Safety Significant (equiv. to SC-2)</td>
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<tr>
<td>Material</td>
<td>carbon steel</td>
<td>stainless steel</td>
</tr>
<tr>
<td>Method of Operation</td>
<td>manual</td>
<td>no change</td>
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</tbody>
</table>

A-6001-202 (12/95) GEF288  AYPIPES.USQ

H-7
**UNREVIEVED SAFETY QUESTION SCREENING FORM**

**(Per WBC-IP-0842)**

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**USQ Tracking No.:** Rev. No.: 

**REFERENCE DOCUMENT(S):** 

**ECN No.** PCA No. 

Work Pkg No. Other: (Specify) 1. WHC-SD-W314-CDR-001

**TITLE:** AZ Tank Farm Piping System Upgrades -- Project Y-314

**A.** Does the PROPOSED CHANGE represent a change to the facility as described in the AUTHORIZATION BASIS documentation?

- N/A
- No
- (xx) Yes/Maybe

**Basis:** Change consists of providing epoxy coating in pump pits 241-AZ-01A, and 02A, and sluice pits 241-AZ-01B,C, 02B,C; installing electric valve position indicators in sluice pit AZ-02B and in each central pump pit, and magnetic flow meters on incoming and outgoing lines at each central pump pit. A valve manifold will be installed in the sluice pit 02B. These changes may require updating the facility and process descriptions in SD-HS-SAR-010, Rev 2, and WHC-SD-WM-158-001.

**B.** Does the PROPOSED CHANGE represent a change to procedures as described in the AUTHORIZATION BASIS?

- N/A
- No
- (xx) Yes/Maybe

**Basis:** Liquid waste transfer procedures will need to incorporate operations with the valve manifold.

**C.** Does the test or experiment represent a test or experiment not described in the AUTHORIZATION BASIS documentation?

- N/A
- No
- (xx) Yes/Maybe

**Basis:** The proposed modification is not considered to be a test or experiment.

**D.** Does the change, test or experiment impact:

- Implemented OSRs or IOSRs? N/A
- No
- (xx) Yes/Maybe

- Approved IOSR Compliance Implementation Plans? N/A
- No
- (xx) Yes/Maybe

**Basis:** Aging Waste Facility IOSRs (WHC-SD-WM-004) applicable to the AZ tank farm piping system upgrade include AC 5.29 Flammable Gas Control, which pertains to the explosion proof design of valve position indicators and flow meters, AC 5.21 Spare Tankage, which will limit the amount of time transfers from a tank are prohibited due to work in the valve/pump pits, and LCO 3.6.3 COB, Pit and Box Covers, which require these items to remain covered during waste transfer operations. The proposed upgrade will be fully compliant with these IOSR limitations.

Based on the above, a Safety Evaluation [xx] DOES [ ] DOES NOT need to be performed for this change.

*It is further concluded that the results of the evaluation will probably be negative, based on the fact that only the form and fit of the piping system is being modified, not its function as a confinement boundary. An exception to this may be a safety assessment to verify that the risk of unconfined leaks into the sluice pit resulting from the new manifold is not increased. These conclusions are verified by the information in the attached table.

**Safety Related Piping Confinement Features**

<table>
<thead>
<tr>
<th>Confinement Attribute</th>
<th>Existing Design (WHC-SD-WM-SAR-016)</th>
<th>Proposed Change (WHC-SD-W314-CDR-001)</th>
</tr>
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<tr>
<td>Pipe Diameter</td>
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</tr>
<tr>
<td>Operating Pressure</td>
<td>varies</td>
<td>no change</td>
</tr>
<tr>
<td>Safety Class</td>
<td>nc</td>
<td>Safety Significant (equiv. to SC-2)</td>
</tr>
<tr>
<td>Material</td>
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<tr>
<td>Method of Operation</td>
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<td>no change</td>
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A-6001-202 (12/95) CEF288 AZPipes.USG

H-8
### A. Does the PROPOSED CHANGE represent a change to the facility as described in the AUTHORIZATION BASIS documentation?

- **N/A** (xx) **No** | **Yes/Maybe**

**Basis:** Change consists of providing epoxy coating in pump pits 241-AP-01A, 02A, 03A, 04A, 05A, 06A, 07A, 08A, 020, and valve pit 241-AP; installing electric valve position indicators in valve pit 241-AP, and in pump pits 241-AP-08A and 020; providing magnetic flow meters on incoming and outgoing lines at each central pump pit. These changes will not require updating the facility and process descriptions in WMC-SD-W314-cdr-001, WMC-SD-W314-001.

### B. Does the PROPOSED CHANGE represent a change to procedures as described in the AUTHORIZATION BASIS?

- **N/A** (xx) **No** | **Yes/Maybe**

**Basis:** The proposed modification is not expected to require changes to the safety aspects of relevant operating procedures.

### C. Does the test or experiment represent a test or experiment not described in the AUTHORIZATION BASIS documentation?

- **(xx) N/A** | **No** | **Yes/Maybe**

**Basis:** This change is not considered to be a test or experiment.

### D. Does the change, test or experiment impact:

- Implemented OSRs or IOSRs? | **N/A** (xx) **No** | **Yes/Maybe**
- Approved IOSR Compliance Implementation Plans? | **N/A** (xx) **No** | **Yes/Maybe**

**Basis:** DST IOSRs (VHC-SD-OSR-W314-016) applicable to the AP tank farm piping system upgrade include AC 5.29 Flammable Gas Control, which pertains to the explosion proof design of valve position indicators and flow meters, and AC 5.21 Spare Tankage, which will limit the amount of time transfers from a tank are prohibited due to work in the valve/pump pits. The proposed upgrade will be fully compliant with these IOSR limitations.

Based on the above, a Safety Evaluation **DOES NOT** need to be performed for this change.

### *Safety Related Piping Confinement Features*

<table>
<thead>
<tr>
<th>Confinement Attribute</th>
<th>Existing Design (WMC-SD-W314-SAR-016)</th>
<th>Proposed Change (WMC-SD-W314-CDR-001)</th>
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<tr>
<td>Pipe Diameter</td>
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<td>no change</td>
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<tr>
<td>Operating Pressure</td>
<td>varies</td>
<td>no change</td>
</tr>
<tr>
<td>Safety Class</td>
<td>nc</td>
<td>Safety Significant (equiv. to SC-2)</td>
</tr>
<tr>
<td>Material</td>
<td>carbon steel</td>
<td>no change</td>
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<td>Method of Operation</td>
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<td>no change</td>
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</tbody>
</table>
TITLE: 2E/2U Area Tank Farm Piping System Upgrades -- Project W-314

A. Does the PROPOSED CHANGE represent a change to the facility as described in the AUTHORIZATION BASIS documentation?

☐ N/A  ☐ No  ☑ Yes/Maybe

Basis: Change consists of providing epoxy coating in and electric valve position indicators for valve pits 241-A-A and B, AX-A and B; and replacing the existing jumper arrangements in these four valve pits with valve manifold assemblies. Three new underground transfer lines will also be provided, including lines connecting the 241-AH-A valve pit to the 241-AZ-O2b sluice pit, the 241-A2-O28 sluice pit to the 241-AH-A valve pit, and the 241-A-A valve pit to the 241-AW-A valve pit. Three transfer lines will also be replaced, including line SN-216 from the 241-A-A valve pit to the 241-A DCRT, line SN-213/200 from the 241-A-B valve pit to the 241-AX-A valve pit, and the line SL-502 from the 241-AX-A valve pit to the 241-AH-A valve pit. These changes will require updating the facility and process descriptions in WHC-WD-30S-3AR-016, and WHC-WD-305-15S-001.

B. Does the PROPOSED CHANGE represent a change to procedures as described in the AUTHORIZATION BASIS?

☐ N/A  ☐ No  ☑ Yes/Maybe

Basis: Additional available waste transfer routes.

C. Does the test or experiment represent a test or experiment not described in the AUTHORIZATION BASIS documentation?

☒ N/A  ☐ No  ☑ Yes/Maybe

Basis: The proposed modification is not considered to be a test or experiment.

D. Does the change, test or experiment impact:

• Implemented OSRs or IOSRs? ☐ N/A  ☑ (xx) No  ☑ Yes/Maybe

• Approved IOSR Compliance Implementation Plans? ☐ N/A  ☑ (xx) No  ☑ Yes/Maybe

Basis: The DST IOSRs (WHC-WD-30S-15S-016) applicable to the 2E/2U Area tank farm piping system upgrades are AC 5.21 "Spare Tankage", which will limit the amount of time transfers from a tank are prohibited due to work in the valve/pump pits, and LCO 3.6.3 CDS, Pit and Box Covers, which require that these items remain covered at all times during waste transfers. The proposed upgrade will be fully compliant with these IOSR limitations.

Based on the above, a Safety Evaluation ☑ DOES ☐ DOES NOT need to be performed for this change*

*It is further concluded that (with the possible exception of the new valve manifolds and pipe lines) the results of the evaluation will probably be negative, based on the fact that only the form and fit of the piping system is being modified, not its function as a confinement boundary. This is verified by the information in the attached table. The valve manifolds may require a safety assessment to demonstrate that the increased number of potential leak sites during waste transfers does not significantly increase the risk posed by pipe leaks into the covered pits. A Safety Assessment may also be required to demonstrate that the increased risk of waste transfer system leaks outside the pits resulting from the additional lines is not significant.

Safety Related Piping Confinement Features
## UNREVIEWED SAFETY QUESTION SCREENING FORM

(Continued)

<table>
<thead>
<tr>
<th>Confinement Attribute</th>
<th>Existing Design (WHC-SD-WK-SAR-016)</th>
<th>Proposed Change (WHC-SD-W314-CDR-001)</th>
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<tbody>
<tr>
<td>Pipe Diameter</td>
<td>varies</td>
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</tr>
<tr>
<td>Operating Pressure</td>
<td>varies</td>
<td>no change</td>
</tr>
<tr>
<td>Safety Class</td>
<td>nc</td>
<td>Safety Significant (equiv. to SC-2)</td>
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<tr>
<td>Material</td>
<td>carbon steel</td>
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</tr>
<tr>
<td>Method of Operation</td>
<td>manual, reconnect jumpers</td>
<td>valve manifolds, reach rod operated</td>
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</tbody>
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**UNREVIEWED SAFETY QUESTION SCREENING FORM**

(Per WHC-IP-0842)

**USQ Tracking No.:**

**Rev. No.:**

**REFERENCE DOCUMENT(S):**

**ECN No.:**

**PCA No.:**

**Work Pkg No.:**

**Other (Specify):** WHC-SD-W314-CDR-001

**TITLE:** SY Tank Farm Piping System Upgrades -- Project W-314

---

A. Does the PROPOSED CHANGE represent a change to the facility as described in the AUTHORIZATION BASIS documentation?

- N/A
- Yes/No

**Basis:** Change consists of providing epoxy coating in pump pits 241-SY-01A, 02A, 03A, and 02E, and valve pits 241-SY-A and B; installing electric valve position indicators in valve pits 241-AP, and in the central pump pits; and providing magnetic flow meters on incoming and outgoing lines at each central pump pit. These changes will not require updating the facility and process descriptions in WHC-SD-WM-SAR-016, or WHC-SD-WM-15H-001.

B. Does the PROPOSED CHANGE represent a change to procedures as described in the AUTHORIZATION BASIS?

- N/A
- Yes/No

**Basis:** Operating procedures, at the safety controls level, are not expected to change.

C. Does the test or experiment represent a test or experiment not described in the AUTHORIZATION BASIS documentation?

- N/A
- Yes/No

**Basis:** The proposed modification is not considered to be a test or experiment.

D. Does the change, test or experiment impact:

- Implemented OSRs or IOSRs? N/A
- Approved IOSR Compliance Implementation Plans?

**Basis:** DST IOSRs (WHC-SD-OSR-LM-OSR-016) applicable to the SY tank farm piping system upgrade include AC 5.29 Flammable Gas Control, which pertains to the explosion proof design of valve position indicators and flow meters, and AC 5.21 Spare Tankage, which will limit the amount of time transfers from a tank are prohibited due to work in the valve/pump pits. The proposed upgrade will be fully compliant with these IOSR limitations.

Based on the above, a Safety Evaluation [ ] DOES [xx] DOES NOT need to be performed for this change.*

*Safety Related Piping Confinement Features

<table>
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<th>Confinement Attribute</th>
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<th>Proposed Change (WHC-SD-W314-CDR-001)</th>
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<td>Pipe Diameter</td>
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<tr>
<td>Safety Class</td>
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<td>Material</td>
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**UNREVIEWED SAFETY QUESTION SCREENING FORM**  
(Per WHC-IP-0842)  

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<td>Other (Specify) Project W-314 CDR-001</td>
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<tr>
<td>TITLE: SY Annulus Ventilation System Upgrade (Supply)</td>
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A. **Does the PROPOSED CHANGE represent a change to the facility as described in the AUTHORIZATION BASIS documentation?**
   - [ ] N/A   - [ ] No   - [ ] Yes/ Maybe
   **Basis:** The change consists of redundant air intake stations for each individual tank replacing the existing alternate annulus supply filter units. These changes will incorporate electric heaters, pre filters, HEPA filters, and isolation valves.

B. **Does the PROPOSED CHANGE represent a change to procedures as described in the AUTHORIZATION BASIS?**
   - [ ] N/A   - [ ] No   - [ ] Yes/ Maybe
   **Basis:** The upgraded changes consists of completely new systems which will necessitate procedural changes if not new procedures.

C. **Does the test or experiment represent a test or experiment not described in the AUTHORIZATION BASIS documentation?**
   - [ ] N/A   - [ ] No   - [ ] Yes/ Maybe
   **Basis:** The upgrades are not considered a test or experiment.

D. **Does the change, test or experiment impact:**
   - [ ] Implemented OSRs or IOSRs?  - [ ] N/A   - [ ] No   - [ ] Yes/Maybe
   - Approved IOSR Compliance Implementation Plans?   - [ ] N/A   - [ ] No   - [ ] Yes/Maybe
   **Basis:** There are no IOSRs applicable to DST Annulus Ventilation Systems.

Based on the above, a Safety Evaluation [ ] DOES [ ] DOES NOT need to be performed for this change.
A. Does the PROPOSED CHANGE represent a change to the facility as described in the AUTHORIZATION BASIS documentation?

[ ] N/A  [ ] No  [X] Yes/Maybe

Basis: The change consists of providing an above grade outside air supply to the Annulus. The supply system includes an intake plenum, electric heater, prefilter, DOP testable HEPA filter, and isolation valves. This equipment will be connected to the existing 6-in. inlet pipe.

B. Does the PROPOSED CHANGE represent a change to procedures as described in the AUTHORIZATION BASIS?

[ ] N/A  [ ] No  [X] Yes/Maybe

Basis: New system/new procedures.

C. Does the test or experiment represent a test or experiment not described in the AUTHORIZATION BASIS documentation?

[X] N/A  [ ] No  [ ] Yes/Maybe

Basis: The upgrades are not considered a test or experiment.

D. Does the change, test or experiment impact:

- Implemented OSRs or IOSRs? [ ] N/A  [X] No  [ ] Yes/Maybe
- Approved IOSR Compliance Implementation Plans? [ ] N/A  [X] No  [ ] Yes/Maybe

Basis: See DST IOSRs.

Based on the above, a Safety Evaluation [X] DOES  [ ] DOES NOT need to be performed for this change.
UNREVIEWSD SAFETY QUESTION SCREENING FORM
(Per WHC-IP-0842)

USQ Tracking No.: 

REFERENCE DOCUMENT(S):
ECN No. PCA No.
Work Pkg No. Other (Specify) WHC-SD-W314-001, Rev. 0

TITLE: ELECTRICAL UPGRADES FOR THE SST FARMS

A. Does the PROPOSED CHANGE represent a change to the facility as described in the AUTHORIZATION BASIS documentation?

[] N/A  [x] No  [] Yes/Maybe

Basis: A new 75 kVA transformer will be installed to feed a new service distribution panel board CCS. The CSS board will feed 480V, 3Φ to existing loads and a new mini-power center to supply 120/240V to miscellaneous instruments. Only facility description changes in WHC-SD-WM-1SB-001, Rev. 0 will be required.

B. Does the PROPOSED CHANGE represent a change to procedures as described in the AUTHORIZATION BASIS?

[] N/A  [x] No  [] Yes/Maybe

Basis: The proposed upgrades will require no change to the authorization basis.

C. Does the test or experiment represent a test or experiment not described in the AUTHORIZATION BASIS documentation?

[x] N/A  [x] No  [] Yes/Maybe

Basis: There are no tests or experiments involved with the electrical upgrades.

D. Does the change, test or experiment impact:

- Implemented OSRs or IOSRs?  [] N/A  [x] No  [] Yes/Maybe
- Approved IOSR Compliance Implementation Plans?  [] N/A  [x] No  [] Yes/Maybe

Basis:

Based on the above, a Safety Evaluation  [] DOES  [x] DOES NOT
need to be performed for this change.
**UNREVIEWED SAFETY QUESTION SCREENING FORM**
(Per WHC-IP-0842)

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<th>Other (Specify) Project W-314 CDR-001</th>
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**TITLE:** SY Annulus Ventilation System Upgrade (Exhaust)

**A.** Does the PROPOSED CHANGE represent a change to the facility as described in the AUTHORIZATION BASIS documentation?

- [ ] N/A
- [ ] No
- [x] Yes/ Maybe

**Basis:** The change consists of a new exhaust system divided into two units of isolation valves, control valves, pre-filters, HEPA filters, test stations, and fans. A new stack and monitoring system will also be added.

**B.** Does the PROPOSED CHANGE represent a change to procedures as described in the AUTHORIZATION BASIS?

- [ ] N/A
- [ ] No
- [x] Yes/ Maybe

**Basis:** Procedure changes will be primarily affected by the introduction of backup capabilities.

**C.** Does the test or experiment represent a test or experiment not described in the AUTHORIZATION BASIS documentation?

- [x] N/A
- [ ] No
- [ ] Yes/ Maybe

**Basis:** The upgrades are not considered a test or experiment.

**D.** Does the change, test or experiment impact:

- Implemented OSRs or IOSRs? [ ] N/A  [x] No  [ ] Yes/ Maybe
- Approved IOSR Compliance Implementation Plans? [ ] N/A  [x] No  [ ] Yes/ Maybe

**Basis:** There are no IOSRs applicable to DST Annulus Ventilation Systems.

Based on the above, a Safety Evaluation [x] DOES  [ ] DOES NOT need to be performed for this change.
**UNREVIEWED SAFETY QUESTION SCREENING FORM**

(Per WHC-IP-0842)

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**REFERENCE DOCUMENT(S):**

- ECN No.  PCA No.
- Work Pkg No.  Other (Specify)  Project W-314  CDR-001

**TITLE:** 244-A DCRT Ventilation System Upgrade (Exhaust)

**A.** Does the PROPOSED CHANGE represent a change to the facility as described in the AUTHORIZATION BASIS documentation?

- [ ] N/A  [ ] No  [x] Yes/Maybe

**Basis:** The change consists of providing an above grade dual exhaust system. The exhaust system includes motorized isolation valves, electric heaters, DOP testable HEPA filters, housing for future carbon adsorbers, variable speed exhaust fans, and a stack. The dual exhaust trains will be protected by concrete shield walls and a removable roof.

**B.** Does the PROPOSED CHANGE represent a change to procedures as described in the AUTHORIZATION BASIS?

- [ ] N/A  [ ] No  [x] Yes/Maybe

**Basis:** New system/new procedure.

**C.** Does the test or experiment represent a test or experiment not described in the AUTHORIZATION BASIS documentation?

- [x] N/A  [ ] No  [ ] Yes/Maybe

**Basis:** The upgrades are not considered a test or experiment.

**D.** Does the change, test or experiment impact:

- Implemented OSRs or IOSRs?  [ ] N/A  [x] No  [ ] Yes/Maybe
- Approved IOSR Compliance Implementation Plans?  [ ] N/A  [x] No  [ ] Yes/Maybe

**Basis:** See DST IOSRs.

Based on the above, a Safety Evaluation [x] DOES  [ ] DOES NOT need to be performed for this change.
### UNREVIEWED SAFETY QUESTION SCREENING FORM

(Per WHC-IP-0842)

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### REFERENCE DOCUMENT(S):

- ECN No.: 
- PCA No.: 
- Work Pkg No.: Other (Specify) WHC-SD-W314-CDR-001, Rev. 0

**TITLE:** AN-, AP-, AW-, AY-, AZ-, SY-, 244-A-DCRT, & 244-S-DCRT Tank Farm Master Pump Shutdown (MPS) I&C Upgrades

#### A. Does the PROPOSED CHANGE represent a change to the facility as described in the AUTHORIZATION BASIS documentation?

- [ ] N/A
- [ ] No
- [x] Yes
- [ ] Maybe

**Basis:** The proposed changes are capital improvements to the existing tank farm master pump shutdown system instrument and control system necessary to the support safe storage and efficient transfer of tank wastes. The proposed upgrades are intended to improve the efficiency of waste transfer operations by eliminating unwarranted pump shutdowns. As presently configured, the MPS will stop all pumps operating in the entire tank farm, as well as those feeding the tank farm, if a leak detector is activated anywhere in the transfer system even if the active detector is not in the system then currently in use. Pumping operations can not be resumed until the leak, if real, is repaired or, if not real, the spurious signal is cleared. The proposed upgrade will modify the logic so that a pump will be shutdown only if a leak detector is activated in the transfer system(s) directly involved in the pumping operation. A conversation with the cognizant I&C engineer indicated the design of the proposed upgrade has not been finalized. Until the design of the MPS is more clearly defined, it was deemed prudent to assume the proposed changes will represent changes to the facility as described in the authorization basis document.

#### B. Does the PROPOSED CHANGE represent a change to procedures as described in the AUTHORIZATION BASIS?

- [ ] N/A
- [x] No
- [ ] Yes
- [ ] Maybe

**Basis:** The functional aspects of the system as it is described in the operating procedures is not expected to change.

#### C. Does the test or experiment represent a test or experiment not described in the AUTHORIZATION BASIS documentation?

- [x] N/A
- [ ] No
- [ ] Yes
- [ ] Maybe

**Basis:** These changes do not represent tests or experiments.

#### D. Does the change, test or experiment impact:

- [ ] Implemented OSRs or IOSRs? [ ] N/A
- [x] No
- [ ] Yes
- [ ] Maybe

- Approved IOSR Compliance Implementation Plans? [ ] N/A
- [x] No
- [ ] Yes
- [ ] Maybe

**Basis:** The purpose of these upgrades is to ensure full compliance with existing IOSRs.

Based on the above, a Safety Evaluation **[x] DOES**  
**[ ] DOES NOT** need to be performed for this change.

ICMPS-A.CIN

H-18
**UNREVIEWED SAFETY QUESTION SCREENING FORM**  
*(Per WHC-IP-0842)*

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<td>Work Pkg No.</td>
<td>Other (Specify) WHC-SD-W314-CDR-001, Rev. 0</td>
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**TITLE:** AN-, AP-, AW-, AY-, AZ, SY, 244-A-DCRT, & 244-S-Tank Farms Primary Tank I&C Upgrades

A. **Does the PROPOSED CHANGE represent a change to the facility as described in the AUTHORIZATION BASIS documentation?**

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</thead>
<tbody>
<tr>
<td></td>
<td>[x]</td>
<td>No</td>
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</tbody>
</table>

*Basis:* The proposed changes are capital improvements to the existing primary tank instrumentation and control system necessary to support continued safe storage of tank wastes. The proposed changes, consisting of modifications and upgrades to existing systems, are for the purpose of incorporating modern measurement equipment to replace antiquated, time-worn equipment now in service. Significant changes include replacing the liquid level gages analog output transmitter cards with a digital transmitter card; the current/conductivity liquid level high alarm probe will be replaced with a resistive/conductivity liquid presence detector; the high and low range vapor space pressure pneumatic transmitters will be replaced by electronic pressure transmitters.

B. **Does the PROPOSED CHANGE represent a change to procedures as described in the AUTHORIZATION BASIS?**

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<tbody>
<tr>
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<td>[x]</td>
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<td></td>
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*Basis:* The functional aspects of the system as it is described in the operating procedures is not expected to change.

C. **Does the test or experiment represent a test or experiment not described in the AUTHORIZATION BASIS documentation?**

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<th>Maybe</th>
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<tr>
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<td>[x]</td>
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<td></td>
</tr>
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*Basis:* These changes do not represent tests or experiments.

D. **Does the change, test or experiment impact:**

- Implemented OSRs or IOSRs? |   | N/A | Yes/No |
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<td></td>
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</tbody>
</table>
- Approved IOSR Compliance Implementation Plans? |   | N/A | Yes/No |
| [x] | No |       |

*Basis:* The purpose of these upgrades is to ensure full compliance with existing IOSRs.

Based on the above, a Safety Evaluation **[x] DOES NOT need to be performed for this change**
# UNREVIEWED SAFETY QUESTION SCREENING FORM

(Per WHC-IP-0842)

**USQ Tracking No.:**

**Rev. No.:**

**REFERENCE DOCUMENT(S):**

**ECN No.:**

**PCA No.:**

**Work Pkg No.:**

**Other (Specify) WHC-SD-W314-CDR-001, Rev. 0**

**TITLE:**

A. Does the PROPOSED CHANGE represent a change to the facility as described in the AUTHORIZATION BASIS documentation?

- [ ] N/A
- [ ] No
- [X] Yes

**Basis:** The proposed changes are capital improvements to the existing waste transfer instrumentation and control system necessary to support continued safe storage of tank wastes. The proposed changes are modifications and upgrades to existing waste transfer system instrumentation. The upgrades will incorporate current instrumentation technology in place of antiquated, time-worn equipment now in place. The proposed upgrades to the waste transfer system instrumentation is as follows. Valve positioning indicators will be added to the new and existing valves in the waste transfer system for the AN-, AP-, AW-, AY-, AZ-, SY(244-SY-A, & -B pits and central pump pits)-Tank Farms. Magnetic flow meters will be installed on each inlet and outlet transfer line for the AN-, AP-, AW-, AY-, AZ-, and SY-Tank Farms. Raw water flow measurements will be provided by a turbine flowmeter installed in the service pit for AN-, AP-, AW-, AZ-, SY(241-SY-A flush pit), 244-A-DCRT, and 244-S-DCRT Tank Farms. A liquid effluent radiation monitor will be installed in the service pit and an associated rate count meter will be installed in the annulus enclosure assembly for 244-A-DCRT and 244-S-DCRT Tank Farms.

B. Does the PROPOSED CHANGE represent a change to procedures as described in the AUTHORIZATION BASIS?

- [ ] N/A
- [ ] No
- [X] Yes

**Basis:** The functional aspects of the system as it is described in the operating procedures is not expected to change.

C. Does the test or experiment represent a test or experiment not described in the AUTHORIZATION BASIS documentation?

- [X] N/A
- [ ] No
- [ ] Yes

**Basis:** These changes do not represent tests or experiments.

D. Does the change, test or experiment impact:

- Implemented OSRs or IOSRs?  
  - [ ] N/A
  - [X] No
  - [ ] Yes

- Approved IOSR Compliance Implementation Plans?  
  - [ ] N/A
  - [X] No
  - [ ] Yes

**Basis:** The purpose of these upgrades is to ensure full compliance with existing IOSRs.

Based on the above, a Safety Evaluation □ DOES □ DOES NOT need to be performed for this change.
UNREVIEWED SAFETY QUESTION SCREENING FORM  
(Per WHC-IP-0842)

USQ Tracking No.: \hspace{1cm} Rev. No.: 

REFERENCE DOCUMENT(S): 

ECN No. \hspace{1cm} PCA No. 

Work Pkg No. \hspace{1cm} Other (Specify) WHC-SD-W314-CDR-001, Rev. 0 

TITLE: AN-, AP-, AW-, SY-, 244-A-DCRT, & 244-S-DCRT Tank Farm Primary Exhaust Ventilation System I&C Upgrades 

A. Does the PROPOSED CHANGE represent a change to the facility as described in the AUTHORIZATION BASIS documentation? 

[ ] N/A [X] No [ ] Yes/Maybe 

Basis: The proposed changes are capital improvements to the existing primary exhaust ventilation instrumentation and control system necessary to support continued safe storage of tank wastes. The proposed changes are modifications and upgrades to existing primary exhaust ventilation system instrumentation. The upgrades will incorporate current instrumentation technology in place of antiquated, time-worn equipment now in place. The proposed upgrades for the AN-, AP-, and AW-Tank Farms are as follows: the exhaust train inlet manifold pressure will be measured with respect to atmosphere; the demister, HEPA filters, and exhaust fan differential pressures will be measured; train inlet, heater outlet, and train outlet temperatures will be measured; a heater controller will be installed next to the exhaust train heater; exhaust train valve motors will be wired to a switched signal from the local TFLAN I/O box through an interposing relay; the damper motor controller will be wired to an analog control signal from the TFLAN I/O box; provisions will be made to measure the condensate drain pit seal liquid level; and an exhaust stack radiation monitoring system will be installed in the tank farm primary ventilation stack. The proposed SY-Tank Farm upgrades are as follows: the exhaust train inlet manifold pressure instrumentation and the primary ventilation stack monitoring system upgrades will be similar to those proposed for the AN-, AP-, and AW-tank Farms; signals from the demister, prefilter, HEPA filters system pressure analog signals, duct heater differential temperature indicating transmitter, and the seal pot high and low liquid level monitor will be input to a local TFLAN I/O box. Upgrades for these 244-A-DCRT and the 244-S-DCRT Tank Farms will be similar to those proposed for the SY-Tank Farm except that no demister differential pressure and inlet pressure instruments will be provided and no stack monitor will be installed by this project (W-314).

B. Does the PROPOSED CHANGE represent a change to procedures as described in the AUTHORIZATION BASIS? 

[ ] N/A [X] No [ ] Yes/Maybe 

Basis: The functional aspects of the system as it is described in the operating procedures is not expected to change.

C. Does the test or experiment represent a test or experiment not described in the AUTHORIZATION BASIS documentation? 

[ ] N/A [X] No [ ] Yes/Maybe 

Basis: These changes do not represent tests or experiments.

D. Does the change, test or experiment impact: 

- Implemented OSRs or IOSRs? [ ] N/A [X] No [ ] Yes/Maybe 
- Approved IOSR Compliance Implementation Plans? [ ] N/A [X] No [ ] Yes/Maybe 

Basis: The purpose of these upgrades is to ensure full compliance with existing IOSRs. 

Based on the above, a Safety Evaluation [ ] DOES [X] DOES NOT need to be performed for this change

ICPEV.A.CIN

H-21
**UNREVIEWED SAFETY QUESTION SCREENING FORM**

(Per WHC-IP-0842)

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**TITLE:** AN-, AP-, AW-, AY-, AZ-, SY, 244-A-DCRT, & 244-S-DCRT-Tank Farms Leak Detection I&C Upgrades

A. Does the PROPOSED CHANGE represent a change to the facility as described in the AUTHORIZATION BASIS documentation?

- N/A  [X] No  [] Yes/Maybe

**Basis:** The proposed changes are capital improvements to the existing tank farms leak detection instrumentation and control system necessary to support safe storage of tank wastes. The proposed changes, consisting of modifications and upgrades to existing systems, are for the purpose of incorporating modern leak detection equipment to replace antiquated, time-worn equipment now in service. Changes of interest include replacing the resistive/conductivity tank annulus liquid presence detectors, replacing the existing tank annulus CAM leak detectors with updated instruments of the same type; replacing the existing leak detection pit non-submersible gamma probes with submersible units; installing a resistive/conductivity liquid leak detector in each dry pit; replacing existing current/conductivity process pit leak detectors with new resistive/conductivity detectors; and installing new resistive/conductivity leak detectors in transfer line encasement pipes and clean out boxes.

B. Does the PROPOSED CHANGE represent a change to procedures as described in the AUTHORIZATION BASIS?

- N/A  [X] No  [] Yes/Maybe

**Basis:** The functional aspects of the system as it is described in the operating procedures is not expected to change.

C. Does the test or experiment represent a test or experiment not described in the AUTHORIZATION BASIS documentation?

- [X] N/A  [] No  [] Yes/Maybe

**Basis:** These changes do not represent tests or experiments.

D. Does the change, test or experiment impact:

- Implemented OSRs or IOSRs? [ ] N/A  [X] No  [] Yes/Maybe

- Approved IOSR Compliance Implementation Plans? [ ] N/A  [X] No  [] Yes/Maybe

**Basis:** The purpose of these upgrades is to ensure full compliance with existing IOSRs.

Based on the above, a Safety Evaluation [] DOES  [X] DOES NOT need to be performed for this change
**UNREVIEWED SAFETY QUESTION SCREENING FORM**

(Per WHC-IP-0842)

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**TITLE:** ELECTRICAL SYSTEM UPGRADES TO THE AZ TANK FARM

A. Does the PROPOSED CHANGE represent a change to the facility as described in the AUTHORIZATION BASIS documentation?

- [ ] N/A  [X] No  [ ] Yes/Maybe

  **Basis:** A new motor control center will replace the existing MCC-2. This MCC will feed a new mini-control center provided to supply 120v to instrumentation equipment and control panel. Existing annulus ventilation panel and heater controllers will be replaced with new components. Existing cathodic protection will be modified to protect new underground process piping.

B. Does the PROPOSED CHANGE represent a change to procedures as described in the AUTHORIZATION BASIS?

- [ ] N/A  [X] No  [ ] Yes/Maybe

  **Basis:** The authorization basis will not be affected by the electrical upgrades.

C. Does the test or experiment represent a test or experiment not described in the AUTHORIZATION BASIS documentation?

- [X] N/A  [ ] No  [ ] Yes/Maybe

  **Basis:** No tests or experiments are involved with the upgrades.

D. Does the change, test or experiment impact:

- [ ] Implemented OSRs or IOSRs?  [ ] N/A  [X] No  [ ] Yes/Maybe
- [ ] Approved IOSR Compliance Implementation Plans?  [ ] N/A  [X] No  [ ] Yes/Maybe

  **Basis:**

  Based on the above, a Safety Evaluation [X] DOES [ ] DOES NOT need to be performed for this change.
**UNREVIEWED SAFETY QUESTION SCREENING FORM**

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**REFERENCE DOCUMENT(S):**

ECN No. | PCA No.  
Work Pkg No. | Other (Specify) WHC-SD-W314-CDR-001, Rev. 0

**TITLE:** ELECTRICAL UPGRADES TO THE AY TANK FARM

A. Does the PROPOSED CHANGE represent a change to the facility as described in the AUTHORIZATION BASIS documentation?

| N/A | ☒ No | ☐ Yes/Maybe |

**Basis:** A new motor control center MCC-AY1 will replace the existing MCC. Trip setting on the feeder breaker for the new MCC will be changed from 650a to 350a to provide overcurrent protection. A new mini-power center to provide 120v to the new instrumentation equipment and control panel will be installed. The new MCC will feed this power center. The existing HVAC control panels for tanks AY-101 and AY-102, along with existing heater controllers will be replaced. Only facility description changes to WHC-SD-WM-IB-001 will be necessary.

B. Does the PROPOSED CHANGE represent a change to procedures as described in the AUTHORIZATION BASIS?

| N/A | ☒ No | ☐ Yes/Maybe |

**Basis:** The upgrades do not involve any changes in the authorization basis.

C. Does the test or experiment represent a test or experiment not described in the AUTHORIZATION BASIS documentation?

| ☒ N/A | ☐ No | ☐ Yes/Maybe |

**Basis:** There are no tests or experiments involved with the upgrades.

D. Does the change, test or experiment impact:

- Implemented OSRs or IOSRs? [N/A] [☒] No [☐] Yes/Maybe
- Approved IOSR Compliance Implementation Plans? [N/A] [☒] No [☐] Yes/Maybe

**Basis:**

Based on the above, a Safety Evaluation ☒ DOES [☒] DOES NOT need to be performed for this change
### UNREVIEWED SAFETY QUESTION SCREENING FORM

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**TITLE:** Electrical Upgrades for the AN, AP, AW, and SY Tank Farms

**A.** Does the PROPOSED CHANGE represent a change to the facility as described in the AUTHORIZATION BASIS documentation?

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**Basis:** Electrical upgrades for the AN Tank Farm consist of installation of two 100a circuit breaker for the ventilation system. A new receptacle and manual transfer switch for connection of diesels generator for backup power for maintenance purposes to primary ventilation electrical equipment. Also, addition of two combination starters and a power panel. A new cathodic protection system will be installed. All changes are replacement to existing systems and will probably represent no change in the safety basis. Changes involve only enhancements to existing systems and involve no procedural changes in WHC-SD-WM-SAR-016. There will necessarily be facility descriptive changes in WHC-SD-WM-ISB-001.

Due to the similarity of AP tank farm to AN tank farm the electrical changes to AP tank farm are the same as those for the AN tank farm with the following exceptions: a main 100a circuit breaker for the existing 1000 kVA transformer will not be provided; the replacement 120v receptacle for diesel generator connection will be fence mounted and be of GFCI configuration; the receptacle will be fed from a new 20a circuit breaker in panelboard EDS-DP-304 located inside 241-AP-801. Changes involve only enhancements to existing systems and involve no procedural changes in WHC-SD-WM-SAR-016. There will necessarily be facility descriptive changes in WHC-SD-WM-ISB-001.

Electrical upgrades to the AW Tank Farm are the same as described for the AN tank farms with the following differences: A 100a circuit breaker, wire gutter, 3kVA power center with four GFCI receptacles will be installed on the existing diesel generator. A 150 ft 100a power cord will installed at the generator on a reel for hookup to the new primary ventilation backup power system. Changes involve only enhancements to existing systems and involve no procedural changes in WHC-SD-WM-SAR-016. There will necessarily be facility descriptive changes in WHC-SD-WM-ISB-001.

Electrical service upgrades to the SY Tank Farm are the same as for the AN Tank Farm with exceptions as follows: The spare circuit breaker for the existing load center substation will not be provided. Power will be supplied to two 3 HP annulus exhaust fans which will replace the two existing 2 HP fans, two annulus supply heaters for each of the three SY tanks, a new mini-power center for 120v to instrumentation and control panel. The existing feeder 30a circuit breaker will be replaced with a 80a breaker and the #8 AWG feeder wires will be replaced with #4 AWG. Changes involve only enhancements to existing systems and involve no procedural changes in WHC-SD-WM-SAR-016. There will necessarily be facility descriptive changes in WHC-SD-WM-ISB-001.

**AN2-21**

**B.** Does the PROPOSED CHANGE represent a change to procedures as described in the AUTHORIZATION BASIS?

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<td>[ ] N/A</td>
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**Basis:** Procedural changes to the authorization basis are not involved with this upgrade.

**C.** Does the test or experiment represent a test or experiment not described in the AUTHORIZATION BASIS documentation?

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**Basis:** There are no tests or experiments that involve the authorization basis documentation.

**D.** Does the change, test or experiment impact:

- Implemented OSRs or IOSRs? | [ ] N/A | [ ] No | [ ] Yes/Maybe |
- Approved IOSR Compliance Implementation Plans? | [ ] N/A | [ ] No | [ ] Yes/Maybe |

**Basis:**

Based on the above, a Safety Evaluation [ ] DOES [ ] DOES NOT need to be performed for this change.

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**AN2-21**

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**H-25**
## UNREVIEWED SAFETY QUESTION SCREENING FORM
(Per WHC-IP-0842)

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### REFERENCE DOCUMENT(S):  
- DCN No.  
- Work Pkg No.  
- PCA No.  
- Other (Specify) WHC-SD-W314-CDR-001, Rev. 0

### TITLE:  
Electrical upgrades to 244-A DCRT

### A. Does the PROPOSED CHANGE represent a change to the facility as described in the AUTHORIZATION BASIS documentation?  

- [ ] N/A  
- [X] No  
- [ ] Yes/Maybe  

**Basis:** A new panelboard will be installed to replace the existing power distribution center located inside the 244-A instrument enclosure. The new panelboard will be fed from the existing MCC1 located at the 244-A building and will provide power to the new ventilation system, the existing load of the power distribution center, and the existing 244-A agitator, sump and transfer pumps. A new mini-power center will be provided to supply 120v AC power to the instrumentation and control panel. This mini-power center will be fed from the new panelboard. The existing feeder of the power distribution center will be disconnected and removed from the existing 50a circuit breaker (compartment DS) of the MCC-2 located in the 244-AR building. The existing loads of the power distribution center will be disconnected, removed and connected to the new panelboard. A new 125a, 3-pole, 600v, AC circuit breaker will be installed in compartment B-5 of the existing MCC1 located in the 242-A building. A new feeder for the new panelboard will be installed. The existing feeders of the 244-A agitator, sump and transfer pumps will be disconnected and removed from the existing MCC1 located in the 244-A building. New feeders from the new panelboard will be installed. Only facility descriptions in WHC-SD-WM-1SB-001, Rev. 0 will be required.

### B. Does the PROPOSED CHANGE represent a change to procedures as described in the AUTHORIZATION BASIS?  

- [ ] N/A  
- [X] No  
- [ ] Yes/Maybe  

**Basis:** No authorization basis documents will be affected by the upgrades.

### C. Does the test or experiment represent a test or experiment not described in the AUTHORIZATION BASIS documentation?  

- [X] N/A  
- [ ] No  
- [ ] Yes/Maybe  

**Basis:** No tests or experiments are involved with the upgrades.

### D. Does the change, test or experiment impact:  
- Implemented OSRs or IOSRs?  
  - [ ] N/A  
  - [X] No  
  - [ ] Yes/Maybe  

- Approved IOSR Compliance Implementation Plans?  
  - [ ] N/A  
  - [X] No  
  - [ ] Yes/Maybe  

**Basis:**  
Based on the above, a Safety Evaluation need to be performed for this change  

- [ ] DOES NOT  
- [X] DOES
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**TITLE:** AN, AP, AW Primary Ventilation System Upgrade

A. Does the PROPOSED CHANGE represent a change to the facility as described in the AUTHORIZATION BASIS documentation?

- [ ] N/A
- [ ] No
- [x] Yes/Maybe

**Basis:** These changes are to replace the existing ventilation systems with new dual high capacity filter trains, new fans, new stacks, stack monitoring/control systems, and enhanced safety features. These changes will require updating the AN, AP, and AW facilities descriptions as described WHC-SD-WM-SAR-016.

B. Does the PROPOSED CHANGE represent a change to procedures as described in the AUTHORIZATION BASIS?

- [ ] N/A
- [ ] No
- [x] Yes/Maybe

**Basis:** New systems coupled with enhanced safety features will change certain operability characteristics in procedures, however the overall function of the new systems will remain the same.

C. Does the test or experiment represent a test or experiment not described in the AUTHORIZATION BASIS documentation?

- [x] N/A
- [ ] No
- [ ] Yes/Maybe

**Basis:** The upgrades are not considered a test or experiment.

D. Does the change, test or experiment impact:

- [ ] Implemented OSRs or IOSRs? [ ] N/A
- [x] Yes/Maybe

- [ ] Approved IOSR Compliance Implementation Plans? [ ] N/A
- [x] Yes/Maybe

**Basis:** DST IOSRs applicable to the AN, AP, and AW tank farms Primary Vent. Systems upgrade are LCOs 3.4.1, 3.4.2, and 3.4.3. The proposed upgrade will be compliant with these IOSRs.

Based on the above, a Safety Evaluation • [x] DOES • [ ] DOES NOT need to be performed for this change

- The proposed upgrades to the Primary Vent. Systems for the above mentioned farms represent additions that may influence certain operability characteristics.
### UNREVIEWED SAFETY QUESTION SCREENING FORM

(Per WHC-IP-0842)

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- **Work Pkg No.:**
  - Other (Specify) WHC-SD-W314-CDR-001, Rev. 0

#### TITLE: Electrical upgrades to 244-S DCRT

**A.** Does the PROPOSED CHANGE represent a change to the facility as described in the AUTHORIZATION BASIS documentation?

- [ ] N/A  [x] No  [ ] Yes/Maybe

  Basis: A new 75kVA, 13.8 kV-480Y/277 VAC, 4-wire, 60Hz will be provided to replace the existing 3-25kVA, 1φ, pole mounted transformers that are connected to the existing overhead 2.4 kV line EB-L115. The new transformer will be connected to the existing overhead 13.8 kV line C8L4 and will feed the existing service distribution panelboard "A" located inside the 244-S instrument enclosure. A new service metering and disconnect switch will be provided for the new service feeder to the existing panelboard. The existing 2.4kV lightning arresters, fused cutouts and existing feeder conductors to the existing panelboard will be removed. A 480V, 3φ, 60 Hz power system to the new DCRT ventilation system from the existing service distribution panel "A" will be provided. A new mini-power center will be provided to supply 120v power for the instrumentation and control panel. The mini-power center will be fed from the existing service distribution panelboard "A". Only facility descriptions in WHC-SD-WM-ISB-001, Rev. 0 will be required.

**B.** Does the PROPOSED CHANGE represent a change to procedures as described in the AUTHORIZATION BASIS?

- [ ] N/A  [x] No  [ ] Yes/Maybe

  Basis: The authorization basis will not be affected by the upgrades.

**C.** Does the test or experiment represent a test or experiment not described in the AUTHORIZATION BASIS documentation?

- [x] N/A  [ ] No  [ ] Yes/Maybe

  Basis: No tests or experiments are involved with the upgrades.

**D.** Does the change, test or experiment impact:
- Implemented OSRs or IOSRs? [x] Yes/Maybe
- Approved IOSR Compliance Implementation Plans? [x] Yes/Maybe

  Basis:

  Based on the above, a Safety Evaluation [x] DOES NOT need to be performed for this change.
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**TITLE:** Electrical upgrades to 200-East/200-West Areas. Cathodic protection.

**A.** Does the PROPOSED CHANGE represent a change to the facility as described in the AUTHORIZATION BASIS documentation?

- [ ] N/A
- [X] No
- [ ] Yes/Maybe

*Basis:* The existing rectifiers in Tank Farms 241-A, -AX and -AY will be modified to accommodate and protect the new process piping lines against galvanic corrosion. New anodes, test stations, anode distribution and junction boxes, permanent reference electrodes and cables will be provided as required. Only facility descriptions in WHC-SD-W314-CDR-001, Rev. 0 will be required.

**B.** Does the PROPOSED CHANGE represent a change to procedures as described in the AUTHORIZATION BASIS?

- [ ] N/A
- [X] No
- [ ] Yes/Maybe

*Basis:* The upgrades will not involve changes to the authorization basis.

**C.** Does the test or experiment represent a test or experiment not described in the AUTHORIZATION BASIS documentation?

- [X] N/A
- [ ] No
- [ ] Yes/Maybe

*Basis:* No tests or experiments are involved with the upgrades.

**D.** Does the change, test or experiment impact:

- [ ] Implemented OSRs or IOSRs? [ ] N/A
- [X] Yes/Maybe

- [ ] Approved IOSR Compliance Implementation Plans? [ ] N/A
- [X] Yes/Maybe

*Basis:*

Based on the above, a Safety Evaluation [ ] DOES [X] DOES NOT need to be performed for this change.
APPENDIX I

Permitting Plan

(Provided by Operating Contractor)
PERMITTING PLAN

FOR

PROJECT W-314

TANK FARM RESTORATION AND SAFE OPERATIONS PROJECT
EXECUTIVE SUMMARY

This document describes the permitting plan for Project W-314, Tank Farm Restoration and Safe Operations Project. The recommended regulatory strategy is included that provides a preferred project approach.

A comprehensive review of environmental regulations has indicated that several environmental reviews (e.g., National Environmental Policy Act of 1969, State Environmental Policy Act of 1971), permits, and approvals are required before construction or operation of the Tank Farm infrastructure upgrades. The environmental reviews, permits, and approvals, as well the regulatory authority, potentially applicable to the upgrades associated with Tank Farm Restoration and Safe Operations Project are as follows:

- Environmental Assessment
- Categorical Exclusion
- Environmental Impact Statement

**State Environmental Policy Act of 1971 - Washington State Department of Ecology**
- Determination of Nonsignificance
- Mitigated Determination of Nonsignificance
- Determination of Significance
- State Environmental Policy Act of 1971 Environmental Checklist

**Air Permitting**
- Prevention of Significant Deterioration standards (40 Code of Federal Regulations 52.21) and (Washington Administrative Code Chapter 173-400)
- Ambient Air Quality Standards for Radionuclides (Washington Administrative Code Chapter 173-480)
- Radiation Protection - Air Emissions (Washington Administrative Code Chapters 246-247)
• Controls for New Sources of Toxic Air Pollutants (Washington Administrative Code Chapter 173-460).

Dangerous Waste Permitting

• Dangerous Waste Permit (Washington Administrative Code Chapter 173-303)

Miscellaneous Reviews, Permits, and/or Approvals

• Preoperation Monitoring of Facilities, Sites and Operations - U.S. Department of Energy, Richland Operations Office

• Cultural Resource Review Clearance - U.S. Department of Energy, Richland Operations Office

• Excavation Permit - U.S. Department of Energy, Richland Operations Office


A summary of data requirements, alternative strategies for completion of upgrade activities, and approval requirements are presented.
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APPENDICES

A  PROJECT W-314 TANK FARM RESTORATION AND SAFE OPERATIONS
PERMITTING SCHEDULE .................................................. I-20

B  SUMMARY OF DATA/INFORMATION REQUIREMENTS FOR PROJECT W-314
TANK FARM RESTORATION AND SAFE OPERATIONS ................ I-30
GLOSSARY

ADM  action description memorandum
BARCT  best available radionuclide control technology
BCCAA  Benton County Clean Air Authority
CAA  Clean Air Act of 1977
CDR  conceptual design report
CFR  Code of Federal Regulations
CX  categorical exclusion
DOE-HQ  U.S. Department of Energy-Headquarters
DOE-RL  U.S. Department of Energy, Richland Operations Office
DOH  State of Washington Department of Health
DS  determination of significance
DNS  determination of nonsignificance
DST  double-shell tank
EA  environmental assessment
Ecology  Washington State Department of Ecology
EIS  environmental impact statement
EPA  U.S. Environmental Protection Agency
FONSI  Finding of No Significant Impact
IB  Information Bulletin
IPM  Initial Pretreatment Module
NAAQS  National Ambient Air Quality Standards
NESHAPs  National Emissions Standards for Hazardous Air Pollutants
NEPA  National Environmental Policy Act of 1969
NOC  notice of construction
NOD  notice of deficiency
NOI  notice of intent
PNNL  Pacific Northwest National Laboratories
PSD  prevention of significant deterioration
PSE  preliminary safety evaluation
RCRA  Resource Conservation and Recovery Act of 1976
SEPA  State Environmental Policy Act of 1971
SEIS  state environmental impact statement
SQE  small quantity emission
TAPs  toxic air pollutants
T-BACT  best available control technology for toxics
TSD  treatment, storage, and/or disposal
VOCs  volatile organic compounds
WAC  Washington Administrative Code
PERMITTING PLAN FOR PROJECT W-314
TANK FARM RESTORATION AND SAFE OPERATIONS PROJECT

1.0 INTRODUCTION

This document describes permitting requirements for design, construction, and operation for Project W-314, Tank Farm Restoration and Safe Operations infrastructure upgrades to ensure that the project activities can support the mission of safe, near-term storage and management of waste.

These infrastructure upgrades are divided into four major areas:

1. Waste transfer systems (e.g., piping/ancillary equipment),
2. Ventilation, (3) instrumentation and/or controls, and (4) electrical.

These upgrades will support Tank Farm operations compliance with applicable federal, state, and local regulations. In addition, equipment downtime and operational costs will be reduced, and risks associated with radioactive and/or hazardous materials releases will be decreased. There will be no liquid effluents released to the environment as part of these upgrades.

The waste transfer system upgrades include affixing new protective coatings within selected valve and pump pits, providing new transfer lines in selected locations, and replacing transfer piping in selected locations. Cathodic protection will be provided for piping as required.

The ventilation systems upgrades include replacement of existing primary tank ventilation systems for the AN, AP and AW Double-Shell Tank (DST) Farms, upgrading the annulus ventilation system for SY Tank Farm, and upgrading the 244-A and 244-S double-contained receiver tank (DCRT) ventilation systems. Included with the ventilation system upgrades are seal pot and/or drainage systems and filtration systems.

The instrumentation and/or controls upgrades include replacement of aging and/or deteriorated DST monitoring instrumentation, upgrades to the 244-A and 244-S DCRTs' monitoring instrumentation, upgrades to DST and waste transfer leak detection/master pump shutdown systems, and enhancements to the information management system.

The electrical upgrades include the DST electrical equipment and wiring, as well as 244-A and 244-S DCRT electrical equipment and wiring.


This permitting plan has been prepared based on the scope of work defined in the Project W-314 Conceptual Design Report (WHC 1996).
2.0 NATIONAL ENVIRONMENTAL POLICY ACT

The NEPA (42 U.S.C. 4321 et seq.) was enacted to ensure that environmental matters are considered before initiation of federal actions that might affect the quality of the human environment. The U.S. Department of Energy (DOE) regulations [10 Code of Federal Regulations (CFR) 1021] promulgated under NEPA were developed to conform with 40 CFR 1500-1508 regulations and to categorize the environmental impacts associated with various DOE proposals or actions.

2.1 INTRODUCTION

If a proposed action appears to be covered under an existing approved environmental impact statement (EIS) or environmental assessment (EA), the relevant record of decision (ROD) or finding of no significant impact (FONSI) should be examined to ensure the proposed action is adequately bounded by existing documentation.

In the event that U.S. Department of Energy, Richland Operations Office (DOE-RL) determines that a proposed action is not covered by existing environmental documentation, an evaluation would be required to determine whether the proposed action falls within one of the categorical exclusions (CX) per 10 CFR 1021. If the proposed action is covered by a CX, a memorandum is prepared that summarizes the proposed action and its background. In addition, an explanation of how the action meets the minimum requirements of a CX is needed.

If the proposed action is not covered by a CX, a decision whether or not the project warrants an EA or EIS must be made by DOE-RL.

Following a decision by the DOE-RL, an EA is developed to discuss the environmental consequences of the proposed action and the alternatives to that action, including the consequences of accidents and routine operations and the cumulative and long-term impacts. The relationship of the proposed action to federal, state, and local land use plans, policies, and regulations also is discussed in the EA. The EAs are submitted to the DOE-RL for final determination. This determination will result in a decision that the proposed action is a major action significantly affecting the environment, requiring an EIS, or issuance of a FONSI.

2.2 SUMMARY OF DATA AND/OR INFORMATION REQUIREMENTS

A summary of the minimum data and/or information needs required for development of the NEPA documentation for the Project W-314 Tank Farm Restoration and Safe Operations is provided in Appendix B.
2.3 DISCUSSION OF ALTERNATIVES

Various NEPA compliance alternatives might be available in an effort to support Tank Farm Restoration and Safe Operations upgrades. The alternatives open for consideration are as follows. The alternatives are listed in order of probability of success.

1. A determination that an EA is required will be made. The desired outcome of the EA would be a FONSI, after which the Title II design effort for Project W-314 could proceed.

2. Alternative 2 is the possibility of NEPA coverage of the Tank Farm Restoration and Safe Operations upgrades under the Tank Waste Remediation System (TWRS) EIS, if the TWRS EIS ROD is delayed until the Spring of 1997. However, if the ROD is delayed until the Winter of 1997, an EA would be prepared.

3. Same as alternative 1 but the outcome of the EA is a requirement to prepare an EIS.

4. This alternative would involve preparation of an EIS without first developing an EA.

2.4 RECOMMENDED PERMITTING STRATEGY

For design and construction activities associated with most of the Tank Farm Restoration and Safe Operations upgrades, an EA will be prepared. The waste transfer upgrades associated with Project W-314 will be covered in the TWRS-EIS. The assumed outcome of this EA is a FONSI, which is needed before initiating Title II design. (Refer to Appendix A for the Project W-314 permitting schedule.)

2.5 PRELIMINARY COST ESTIMATE

Cost estimates for planning purposes have been developed showing a total cost for EA preparation and approval of $178K.

3.0 STATE ENVIRONMENTAL POLICY ACT

The SEPA (Chapter 43.21C Revised Code of Washington) legislation is the Washington State equivalent of NEPA, which requires evaluation of environmental impacts associated with a project or an agency action before approval. The SEPA Rules, Washington Administrative Code (WAC) Chapter 197-11, are the implementing regulations.
3.1 INTRODUCTION

One regulatory agency will be identified as lead agency for each project. The lead agency is responsible for ensuring that SEPA compliance is completed before approving the proposed project. The SEPA compliance is required for any project or proposal that meets the definitions of "action" in the SEPA Rules (WAC 197-11-704), and includes projects that require a permit (e.g., dangerous waste permit, building permit) or other approval from a governmental agency before operation. On the Hanford Site, Washington State Department of Ecology (Ecology) is the lead agency for projects ("Actions") involving permitting of dangerous waste treatment, storage, and/or disposal (TSD) units.

The SEPA compliance is required, in addition to other permits or approvals, for a project and is completed before the lead agency makes a decision to approve the project. On the Hanford Site, a SEPA environmental checklist is prepared and submitted to Ecology. The permit and/or approval may be conditioned or denied based on information contained in the SEPA environmental checklist.

When SEPA compliance is required for a project, the responsible official of the lead agency must make a threshold determination by deciding if a project is likely to have probable significant adverse impacts on the environment. If a project might have significant adverse impacts, a determination of significance (DS) will be issued and a state environmental impact statement (SEIS) would be required. If the project will not have significant adverse impacts, or if the impacts could be mitigated, a determination of nonsignificance (DNS) or mitigated DNS will be issued. The threshold determination normally is based on the environmental checklist completed for the project and any information the lead agency has on file.

The lead agency may adopt a NEPA EA or EIS in lieu of doing a SEPA checklist or additional review under SEPA (WAC 197-11-610) to satisfy SEPA compliance and a determination of nonsignificance (DNS) or mitigated DNS will be issued.

3.2 SUMMARY OF DATA AND/OR INFORMATION REQUIREMENTS

A summary of the minimum data and/or information needs required for development of the SEPA documentation for the Project W-314 Tank Farm Restoration and Safe Operations is provided in Appendix B.
3.3 DISCUSSION OF ALTERNATIVES

Various SEPA avenues might be evaluated in an effort to support the Project W-314 Tank Farm Restoration and Safe Operations upgrades. The alternatives open for consideration are as follows. The alternatives are listed in order of the probability of success.

1. A DNS following adoption of NEPA documentation (EA) by Washington State for the Tank Farm Restoration and Safe Operations upgrades.

2. A mitigated DNS from Washington State.

3. A DS from Washington State and a requirement to prepare separate SEISs.

3.4 RECOMMENDED PERMITTING STRATEGY

It is expected that Ecology will adopt the NEPA EA in lieu of doing additional reviews to satisfy SEPA compliance, and a determination of nonsignificance (DNS) or mitigated DNS would be issued.

This will meet the requirements of SEPA and the appropriate level of documentation needed. (Refer to Appendix A for the Project W-314 NEPA permitting schedule.)

3.5 PRELIMINARY COST ESTIMATE

No additional cost is expected to be incurred for SEPA documentation. The cost is to be incorporated within the NEPA documentation.

4.0 RESOURCE CONSERVATION AND RECOVERY ACT

The RCRA (42 U.S.C. 6901 et seq.) was enacted as a comprehensive national program to mandate that hazardous waste be treated, stored, and disposed to minimize the present and future threat to human health and the environment. Washington State implements RCRA through WAC 173-303, Dangerous Waste Regulations.

4.1 INTRODUCTION

The WAC 173-303 regulations apply to all facilities within Washington State that treat, store, and/or dispose of dangerous waste. These regulations are equivalent to, or more stringent than, the federal hazardous waste regulations. Under the dangerous waste program, all TSD
facilities must obtain a permit. Facilities that were in existence on
November 19, 1980, were granted an interim status permit with the submittal
of a Part A, Form 3, permit application identifying the intent to TSD of
dangerous waste. Interim status ends after final administrative disposition
of Part B permit application documentation is completed, and a final status
permit is granted or denied.

An application for a TSD facility permit consists of three
collective submittals. Each submittal consists of various levels of
detailed information concerning the facility. The three submittals are the
NOI, the Part A permit application (Part A, Form 3), and the Part B permit
application documentation (Part B).

4.1.1 Notice of Intent

A NOI is required for proposed facilities and expansion at an
existing facility. Expansion includes enlargement of land surface area, the
addition of new dangerous waste process, or an increase in overall design
capacity. The NOI contains preliminary information concerning the proposed
facility and/or expansion (WAC 173-303-281). The NOI requires a general
process description, operating capacities, waste type, a topographic map, a
statement of environmental conditions, and could include a
SEPA environmental checklist.

In accordance with WAC 173-303-281, the NOI must be submitted to the
public (public reading rooms), Ecology, and the U.S. Environmental
Protection Agency, Region 10. A public notification is published in a local
daily newspaper for 14 consecutive days. The NOI process normally requires
approximately 11 months to complete. A Part A, Form 3, is submitted no
earlier than 150 days following submittal of the NOI to Ecology and the
public.

4.1.2 Part A

The Part A, Form 3, includes process design capacity, process
description, dangerous waste numbers (WAC 173-303) and estimated annual
quantity, description of dangerous waste, facility diagrams, photographs,
geographic location, and facility owner, operator/co-operator certification.

4.1.3 Part B

The Part B permit application documentation provides a detailed
definition of the processes to be used for treatment, storage, and/or
disposal of dangerous waste; the design capacity of such processes; and the
specific dangerous waste types to be managed. This detailed information is
used by the regulatory agency(s) to prepare a final status permit for the
operation of the TSD facility.
4.2 SUMMARY OF DATA/INFORMATION REQUIREMENTS

A summary of the minimum data and/or information needs required for development of Part B permit application documentation is provided in Appendix B.

4.3 DISCUSSION OF ALTERNATIVES

Various avenues may be evaluated in an effort to support the Tank Farm Restoration and Safe Operations upgrades. The alternatives open for consideration are as follows. The alternatives are listed in order of the probability of success.

1. A revision (working draft) to the DST System Part B permit application documentation that will be prepared in 1997 will be required.

The assumption is that upgrades are not reflected in the DST System Part B, and these upgrades could affect critical systems. (Critical systems are those specific portions of a TSD unit's structure or equipment whose failure could lead to the release of dangerous waste into the environment and/or systems that include processes that treat, transfer, store, or dispose of regulated waste. Ancillary equipment includes devices such as piping, fittings, flanges, valves, and pumps used to distribute, meter, or control the flow of dangerous waste from its point of generation to a point of disposal).

2. A modification to the Hanford Facility RCRA Permit will be required.

The assumptions include the following:

(a) The project design media will not be complete and as-built drawings will not be submitted with the DST System Part B permit application (working draft) to be submitted 1998).

(b) The descriptive Part B text does not reflect the upgrades because information is not available in sufficient detail.

3. A revision to the DST and SST closure documentation will be required.

The assumption is that information concerning upgrades is not available in sufficient detail to be incorporated into closure documents, which are currently being processed.

4. Prepare and submit a NOI and/or revise the Part A, Form 3, applications for the DST and SST Systems.
The assumptions include the following:

(a) Upgrades do not affect expansion (Section 4.1.1).
(b) The upgrades do not increase process capacities.
(c) Dangerous waste numbers are not changed from those identified in the Part A.

4.4 RECOMMENDED PERMITTING STRATEGY

A revision to the DST System Part B permit application will be required and Project W-314 upgrades can be included in that document. The preferred permitting strategy is to reflect the upgrades as future systems in the application before the current working draft document is submitted to Ecology.

Because sufficient design information for Project W-314 may not be available before submittal of the DST System Part B to Ecology, a future permit modification may be required. The objective will be to reflect as much available information in the document to be prepared in 1997 to avoid a modification of the 1999 final status permit. It is anticipated that this approach will require submittal of as-built design media as a condition of final status.

It is assumed that waste transfer systems will be replaced or added but no changes to TSD capacity or process capabilities will occur. (Refer to Appendix A for the Project W-314 permitting schedule.)

4.5 PRELIMINARY COST ESTIMATE

Detailed design information will not be available before March 31, 1997, for submittal to Ecology. Upgrade information that is available will be included in the revision (working draft) to the DST System Part B.

There will be additional costs incurred for future submittals associated with as-built drawings, Title II, and design media at a cost of $3K for each submittal.

5.0 THE CLEAN AIR ACT

The Federal Clean Air Act (42 U.S.C. 7401 et seq.) was enacted in 1970, amended in 1977, and overhauled and expanded in 1990.
5.1 INTRODUCTION

The Tank Farm Restoration and Safe Operations upgrades will require several permits and approvals before construction. These permits and approvals will be issued by several regulatory agencies, including the EPA, Ecology, Washington State Department of Health (WDOH), and the Benton County Clean Air Authority.

Permitting and emission standards administered by these agencies are contained in the following regulations:

- NESHAPs (40 CFR 61 Subpart H)
- Prevention of Significant Deterioration (PSD) standards (40 CFR 52.21 and WAC 173-400)
- Ambient Air Quality Standards for Radionuclides (WAC 173-480)
- Radiation Protection - Air Emissions (WAC 246-247)
- Controls for New Sources of Toxic Air Pollutants (TAPs) (WAC 173-460).

5.1.1 Radioactive Emissions

Radioactive air emissions currently are regulated by both the EPA, pursuant to 40 CFR 61 Subpart H, and the WDOH, pursuant to WAC 246-247. Both regulations require preconstruction approval from the respective agencies. Additionally, the WDOH requires extensive information on the technologies chosen to control radioactive air emissions, including an assessment of all known control technologies. This assessment, referred to as a best available radionuclide control technology (BARCT) assessment, evaluates the universe of available control technologies. For Tank Farm Restoration and Safe Operations upgrades, the 'Best' technology must be installed, as determined by the BARCT assessment. The EPA also requires the sampling and monitoring system to meet specific criteria. These criteria, including requirements on the placement and number of sample probes, are applicable if the estimated dose equivalent from the facility to the maximally exposed offsite individual is greater than 0.1 mrem per year and when, hypothetically, no emissions control equipment is in place but operations are otherwise routine.

The WAC 246-247 regulations require varying degrees of information depending on the quantity of emissions. It is expected that the these upgrades will require the highest level of information for the WAC 246-247 application, and will require preconstruction approval under the NESHAPs regulations.
Before the BARCT assessment, extensive information on the processes and expected emissions from these processes must be developed. This information is required to perform an adequate BARCT assessment. Information normally not available until definitive design (particularly concerning sampling equipment and expected emissions) is crucial to the preparation of the permit applications.

5.1.2 Nonradioactive Emissions

Nonradioactive air emissions of concern are expected to fall into one of two categories: criteria pollutants and TAPs.

Criteria pollutants are those subject to the PSD program, enforced by Ecology. Ecology has incorporated by reference most of the federal PSD requirements. The Tank Farm Restoration and Safe Operations upgrades are not expected to allow emissions exceeding the trigger levels for criteria pollutants (this assumption is based on previous Tank Farm estimates).

The TAPs are a separate class of emissions, regulated by Ecology pursuant to WAC 173-460. Over 500 carcinogenic and toxic pollutants are included in these regulations. Emissions will occur during installation and operation of the ventilation systems associated with the Tank Farm Restoration and Safe Operations upgrades; WAC 173-460 is applicable, and there is no de minimis level below which preconstruction approval is not required. While WAC 246-247 regulations require installation of BARCT, the TAPs regulations require the installation of best available control technology for toxics (T-BACT). Additionally, if emissions of pollutants (after controls) exceed the small quantity emission (SQE) rates included in the regulations, modeling must be performed to demonstrate that the offsite concentration of each pollutant of concern does not exceed the acceptable source impact levels. Some pollutants do not have SQE rates, and modeling is required for any level of emission.

If any criteria pollutant approaches its trigger level, the information required by the PSD process would be included in a single application to Ecology. Ecology refers to these air permit applications as Notice of Constructions (NOCs).

5.2 SUMMARY OF DATA/INFORMATION REQUIREMENTS

A summary of the minimum data and/or information needs required for development of each of the air permit applications is provided in Appendix B.
5.3 DISCUSSION OF ALTERNATIVES

Various avenues may be evaluated in an effort to support the air permitting for the Tank Farm Restoration and Safe Operations upgrades, and all of the following applications may be required. The length of the permitting process depends on the quantity of emissions and the availability of necessary information. The alternatives open for consideration are as follows. The alternatives are listed in order of the probability of success.

1. Obtain WAC 246-247, 40 CFR 61 Subpart H (NESHAPs), and WAC 173-460 (TAPs) approvals for all of Project W-314 when information necessary to complete the applications is available.

2. Obtain WAC 246-247, 40 CFR 61 Subpart H (NESHAPs), and WAC 173-460 (TAPs) approvals separately as information to complete the applications becomes available.

3. Obtain WAC 246-247, 40 CFR 61 Subpart H (NESHAPs), and WAC 173-460 (TAPs) approvals in a phased approach (and separate activities to be approved). The first phase would include obtaining approval for those Tank Farms with ventilation systems that require approval that have sufficient information available to complete the applications. The second phase would obtain approval for the remainder of the activities that require approval.

4. Obtain WAC 246-247, 40 CFR 61 Subpart H (NESHAPs), and WAC 173-460 (TAPs) approvals in a phased approach (and separate activities to be approved). The first phase would include obtaining approval for all Tank Farm construction activities not directly associated with the ventilation systems. The second phase would obtain approval for activities associated with the ventilation systems.

5.4 RECOMMENDED PERMITTING STRATEGY

The recommended strategy for the Tank Farm Restoration and Safe Operations upgrades is to secure the air permits (for applicable activities and affected facilities) before construction. It is expected that an application for approval to construct will be submitted for WAC 246-247, 40 CFR 61 Subpart H (NESHAPs), and WAC 173-460 (TAPs). It is assumed that the upgrades will not result in emissions exceeding significance levels for any criteria pollutants under the PSD program (which is based on previous analyses). Installation of BARCT will be required by WAC 246-247 and T-BACT will be required by the TAPs program. (Refer to Appendix A for the Project W-314 permitting schedule.)
5.5 PRELIMINARY COST ESTIMATE

A preliminary cost estimate of $50K has been developed for the activities associated with securing air permits and approvals. If BARCT and T-BACT assessments need to be prepared, each assessment will be an additional $25K.

6.0 MISCELLANEOUS ASSESSMENTS, PERMITS, AND APPROVALS

In addition to the major regulatory programs, several miscellaneous assessments, permits, and approvals are addressed in the following sections.

6.1 CULTURAL RESOURCE REVIEW

A cultural resource review will be performed before initiating any potential onsite surface disturbing activities (36 CFR 800). The regulatory agency is the DOE-RL. The cultural resource review will be submitted with the EA to the DOE-RL.

The regulatory strategy is based on activities performed within and 150 meters outside of the 18 fenced Tank Farm areas already covered by an existing cultural resource review [e.g., Cultural Resources Exemption of the Tank Farms Area (PNL 1994)]. A review of the existing CRR will be done before construction.

6.2 EXCAVATION PERMIT

An excavation permit will be required before initiating any potential onsite surface disturbing activities (36 CFR 800). The regulatory agency is the DOE-RL. The excavation permit, prepared before upgrade, construction activities will evaluate environmental impacts (e.g., soil and/or groundwater contamination).

6.3 ENDANGERED SPECIES ACT COMPLIANCE

A site assessment should be made to determine whether any planned activities have the potential to disturb any habitat used by wildlife before construction or habitat modification (50 CFR 402.6). The regulatory agency is the State or Federal Fish and Wildlife Service. For onsite construction, a biological survey will be is performed. The survey report must accompany the EA when submitted to the DOE-RL.

The regulatory strategy is that the “1995 Blanket Biological Review of the 200 West and 200 East Tank Farms, 200 West and East Areas” (PNL 1995), dated March 28, 1995, will encompass the upgrade activities within the 200 East and 200 West Area Tank Farm boundaries. This survey report will be required before securing an excavation permit.
6.4 PREOPERATIONAL MONITORING OF FACILITIES, SITES, AND OPERATIONS

An environmental study must be conducted before start up of a new site, facility, or process that has the potential for significant adverse environmental impact (DOE Order 5400.1). The regulatory agency is the DOE-RL. This study will be started at least 1 year before installation of the Tank Farm Restoration and Safe Operations upgrades.

As part of the preoperational monitoring requirements, a document needed for construction will be prepared that will specify the types of monitoring to be performed (e.g., radiation dose, ambient air, and surface radiological surveys).

6.5 PRELIMINARY COST ESTIMATE

It is assumed that there will be no additional cost associated with preparation of the cultural resource review or the Endangered Species Act compliance assessment (blanket assessments already approved).

There will be a cost for Preoperational Monitoring of Facilities, Sites, and Operations documentation of about $3K and about $5K for the excavation permits.

7.0 REFERENCES


PNL, 1994, Cultural Resource Exemption of the Tank Farm Areas, Pacific Northwest Laboratory, Richland, Washington.


APPENDIX A

PROJECT W-314 TANK FARM RESTORATION AND SAFE OPERATIONS
PERMITTING SCHEDULE
NEPA DOCUMENTATION

- NEPA SUPPORT FY96 (3G100)
- PREPARE W-314 NEPA EA FY97 (3G250)
- WHC/RL CONFIRM NEPA APPROACH (3G150)
- PREPARE W-314 NEPA EA TO RL (3G300)
- RL REVIEW W-314 NEPA EA (3G400)
- RESOLVE PUBLIC COMMENTS (3G500)
- PUBLISH & RELEASE W-314 FINAL EA/FONSI (3G600)
- DOE - "ISSUE FONSI" (3G650)

WESTINGHOUSE-HANFORD
W-314 TANK FARM RESTORATION-INTEGRATION
NEPA SCHEDULE
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PERMITS - PREOPERATIONAL DETERMINATION

PREPARE PRE-OP DETERMINATION LETTER

PRE OP DETERMINATION COMPLETE

START SST CONSTRUCTION

WESTINGHOUSE-HANFORD
W-314 TANK FARM RESTORATION-INTEGRATION
PRE OPERATIONAL DETERMINATION
WESTINGHOUSE-HANFORD
W-314 TANK FARM RESTORATION-INTEGRATION
DANGEROUS WASTE PERMIT
APPENDIX B

SUMMARY OF DATA/INFORMATION REQUIREMENTS FOR
PROJECT W-314 TANK FARM RESTORATION AND SAFE OPERATIONS
SUMMARY OF DATA/INFORMATION REQUIREMENTS FOR PROJECT W-314 TANK FARM
RESTORATION AND SAFE OPERATIONS

1.0 National Environmental Policy Act

The minimum data and/or information requirements for NEPA documentation preparation are as follows:

- Conceptual or equivalent design information
- In addition, any other related engineering, safety, or waste evaluation documents would be helpful in NEPA preparation.

2.0 State Environmental Policy Act

The following are minimum data requirements for coordination of the SEPA requirements:

- Conceptual or equivalent design information is needed
- Any NEPA documentation (e.g., EA) that has been prepared or will be prepared for the Tank Farm Restoration and Safe Operations upgrades
- Any other related engineering, safety, or waste evaluation documents.

3.0 Resource Conservation and Recovery Act

The following is required for the revised Part B documentation: description of infrastructure upgrades and design media.

4.0 Clean Air Act

Detailed information on the treatment process, the emissions abatement system, the gaseous effluent monitoring system, and the nature of all gaseous emissions to the atmosphere is required for submissions made pursuant to the Clean Air Act. The appropriate regulations and administrative guidance should be consulted for the detailed requirements.

4.1 Radioactive Emissions

The following information is an abridged summary of the data and/or information needs for the NESHAP and WAC 246-247 permit applications and notice of construction.
NESHAP Permit

The 40 CFR 61.07 requires the application for approval to construct to include the following information:

- Technical description of the facility and its operations
- Size and location of the source
- Design and operating capacity of the source
- Method of operation (include process flow diagram)
- Nature of all gaseous emissions to the atmosphere:
  - If a modification, the precise nature of the modification and estimates of emissions before and after completion.
- Technical description of emissions control system including release rates and offsite doses.

WAC 246-247 Permit

The WAC 246-247 regulations requires the application for approval to construct to include the following information:

- Facility information:
  - Description of facility operations
  - Facility identification must be the same as that appearing on source registration forms.
- Identification and listing of all sources consistent with the source registration identification
- Description of the source(s):
  - System function and area exhausted
  - Effluent system layout
  - Efficiency values of each control device for removal of radioactivity
  - Means and frequency of testing and inspecting effluent treatment system
  - Operating mode (continuous or batch)
  - Chemical and physical nature of the emissions
- Stack or release point data
- Stack diameter and height
- Building height, width, and length
- Annual ambient average stack and ambient air temperatures
- Annual wind rose
- Chi/Q data
- Annual average volumetric flow rate
- Annual average release rates
- Fraction of facility's inventory available for potential release to the air.

- Description of the effluent sampling/monitoring systems:
  - Stack flow measuring system
  - Sample probes (isokinetic)
  - Number and location of sampling points
  - Sample lines
  - Diameters, lengths, materials, bends, entry points into the effluent line, and angle of entry into the effluent
  - Sample flow regulation
  - Sampling media
  - Frequency of sampling (continuous or batch)
  - Frequency of sample collection
  - Calibration and audit schedules.

- Environmental sampling monitoring system:
  - Sampling network (location, number, distance from release points)
  - Media sampled and/or monitored for the air pathway
  - Equipment used for sampling and/or monitoring, including sampler flow rate and collection media
- Frequency of sampling and/or monitoring
- Calibration and audit frequency.

- Hanford Site requirements for effluent sampling and/or monitoring system designs, procedures, and quality assurance standards (appropriate standards and description of how these are used)

- Effluent sample analyses including methodology, procedure references, detection limits, quality assurance (including internal audit schedule and results)

- Environmental sample analysis including methodology, procedure references, detection limits, quality assurance

- Data from effluent and environmental monitoring programs, including background or local control data

- Demonstration of compliance:
  - Methodology used to demonstrate compliance
  - Input data used
  - Source terms, release height, inhalation rate, maximally exposed individual, meteorology
  - Results of method (effective dose equivalent for whole body and relevant organs)
  - Description of internal standards used to ensure compliance with applicable federal and state laws and regulations.

4.2 Nonradioactive Air Emissions

The following information is an abridged summary of the data and/or information needs for the NESHAP and WAC 246-247 permit applications and notice of construction.

PSD Permit

The WAC 173-400 regulations require an application for approval to construct to include such information as the following:

- Project location and emission source(s)
Design and operating parameters:
- Hours of operation
- Normal and maximum production rates
- Fuel requirements
- Raw material requirements
- Emissions control system.

Emissions - Type and Quantity:
- Representative emissions from the existing source (for modification) over the most recent 2 year period of operation
- Projected actual controlled emissions at anticipated production rates and operating schedule for each pollutant at each emission point
- Projected potential controlled emissions; emission rate when equipment is operating at maximum capacity 24 hours per day, 365 days per year, taking air pollution control equipment into account.

BACT/BARCT assessment:
- Literature search
- Control alternatives: comparison of efficiencies; energy, environmental, and economic impact analyses
- Summary.

Analysis of current air quality at the proposed source location including presently existing ambient levels of the constituents being reviewed (from Pacific Northwest National Laboratory data)

Analysis of the impact of the proposed source on ambient air quality:
- Model description
- AIRDOS - EPA 1996
- Meteorological data (windspeed, direction, temperature)
- Modeling results
- Offsite dose.
Demonstration that the proposed emission will not cause a violation of national ambient air quality standards (NAAQS) or state standards using a direct comparison of modeling results with NAAQS

Discussion of potential effects of the proposed upgrades on factors influenced by air quality such as residential or commercial growth, vehicular traffic, vegetation, soils, acid deposition, visibility in sensitive areas, PSD increments, etc.

Construction schedule.

Notice of Construction

The WAC 173-400 and 173-460 regulations require the application for approval to construct to include the following information:

- SEPA
- Notice of construction form
- Description of proposed source:
  - Bid specifications, rated capacity, inputs, outputs, and byproducts generated
  - Bid specifications, control efficiency, and operational requirements of the pollution control equipment
  - Process flow diagram
  - Estimate of stack emissions, including criteria and toxic air pollutants.
- Estimate of fugitive (nonstack) emissions
- BACT/T-BACT analysis
- Modeling.
APPENDIX J

Plant Forces Work Review

(Direct construction activities, including tie-ins or completion of punchlist items, are not anticipated to be performed by the operating contractor. Therefore, in compliance with WHC-CM-6-2, PM-6, Rev. 2, a plant forces work review has not been prepared.)