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

Document number: SD-W314-CDR-001

Section 1 **of** 2

Title: CONCEPTUAL DESIGN REPORT for TANK FARM RESTORATION + SAFE OPERATIONS PROJECT W-314

Date: 5/03/96 **Revision:** 0

Originator: S.R. BRIGGS
Co: WHC

Recipient:
Co:

References: EDT-614745

MAY 03 1996

ENGINEERING DATA TRANSMITTAL

Page 1 of 1

1. EDT № 614745

2. To: (Receiving Organization) DISTRIBUTION	3. From: (Originating Organization) Tank Farm Projects/8K530	4. Related EDT No.: n/a
5. Proj./Prog./Dept./Div.: W-314/TFTPIP/TWRS	6. Cog. Engr.: S. R. Briggs	7. Purchase Order No.: n/a
8. Originator Remarks: This Conceptual Design Report presents an approved design approach that satisfies the established technical requirements for Project W-314, Tank Farm Restoration and Safe Operations." This report also addresses the areas of project risk/uncertainty, and establishes the Project W-314 cost and schedule baselines.		9. Equip./Component No.: n/a
		10. System/Bldg./Facility: 200E/W Tank Farms
11. Receiver Remarks:		12. Major Assm. Dwg. No.: n/a
		13. Permit/Permit Application No.: n/a
		14. Required Response Date:

15. DATA TRANSMITTED

(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	(F) Approval Designator	(G) Reason for Transmittal	(H) Originator Disposition	(I) Receiver Disposition
1	WHC-SD-W314-CDR-001	-	0	Conceptual Design Report for Tank Farm Restoration and Safe Operations, Project W-314	SQD	1	1	

16. KEY

Approval Designator (F)	Reason for Transmittal (G)	Disposition (H) & (I)
E, S, Q, D or N/A (see WHC-CM-3-5, Sec.12.7)	1. Approval 2. Release 3. Information 4. Review 5. Post-Review 6. Dist. (Receipt Acknow. Required)	1. Approved 2. Approved w/comment 3. Disapproved w/comment 4. Reviewed no/comment 5. Reviewed w/comment 6. Receipt acknowledged

17. SIGNATURE/DISTRIBUTION (See Approval Designator for required signatures)

(G) Reason	(H) Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN	(J) Name	(K) Signature	(L) Date	(M) MSIN	(G) Reason	(H) Disp.
1	1	Cog.Eng.: S.R. Briggs	KA Boes for SRB	3-20-96	R3-25	TWRS Eng.: R.W. Mattichak	R Mattichak	3/18/96	R3-25	1	1
1	1	Cog. Mgr.: W.W. Rutherford	WW Rutherford	3-19-96		TWRS Eng.: C.C. Scaief	C.C. Scaief			1	1
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1	2	TWRS Eng.: R.L. Golberg	R Golberg	3/19/96	R3-25						

18.	19.	20.	21. DOE APPROVAL (if required)
KA Boes 3-19-96 Signature of EDT Originator Date	Authorized Representative Date for Receiving Organization	WW Rutherford 3/20/96 Cognizant Manager Date	Ctrl. No. [X] Approved [] Approved w/comments [] Disapproved w/comments see page i

BD-7400-172-2 (04/94) GEF097

BD-7400-172-1

Conceptual Design Report for Tank Farm Restoration and Safe Operations, Project W-314

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U.S. Department of Energy Contract DE-AC06-87RL10930

EDT/ECN: EDT 614745 UC: 2030
Org Code: 8K530 Charge Code: N14PL
B&R Code: EW3130010 Total Pages: 345

Key Words: Project W-314, Tank Farm Restoration and Safe Operations, Conceptual Design Report, Tank Farm Upgrades, Tank Waste Remediation System, Waste Transfer Systems, Double-Shell Tanks, Single-Shell Tanks, Double Contained Receiver Tanks

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.

DATE: HANFORD RELEASE
STA: 4 ID:
MAY 03 1996
2

5/2/96

Release Approval Date Release Stamp

Approved for Public Release

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

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Safety Engineering	4/24/96 Date	Technical Documents	4-24-96 Date
HVAC Lead Engineer	4/25/96 Date	Instrumentation Lead Engineer	4/24/96 Date
Electrical Lead Engineer	4/25/96 Date	Civil/Environmental Lead Engineer	4/25/96 Date
Piping Lead Engineer	4/24/96 Date	Quality Engineering	4/24/96 Date
Principal Lead Engineer	4/24/96 Date	Project Manager	4/24/96 Date

Westinghouse Hanford Company

Projects Department — 4/25/96 Date

U.S. Department of Energy

JEN 4/29/96

Richland Operations Office — 4/30/96 Date

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APPENDICES

ACRONYMS/ABBREVIATIONS

ACD	advanced conceptual design
AF	ampere frame
A-E	architect-engineer
ALARA	as low as reasonably achievable
ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AT	ampere trip
BNFL	British Nuclear Fuels, Ltd.
BOA	basic ordering agreement
CAM	continuous air monitor
CASS	computer automated surveillance system
CCS	clean, control, and stable
CDR	conceptual design report
CFR	Code of Federal Regulations
DCBL	design configuration baseline
DCRT	double-contained receiver tank
DCS	digital control system
DOE	United States Department of Energy
DST	double-shell tank
D&D	decontamination and decommissioning
EA	Environmental Assessment
E/C	Engineer/Constructor Contractor
F&R	functions and requirements
FONSI	finding of no significant impact
GEMS	gaseous effluent monitoring system
GND	ground
HEPA	high-efficiency particulate air
HPT	health physics technician
HVAC	heating, ventilating, and air conditioning
I/O	input/output
ICE	instrumentation/control/electrical
ICF KH	ICF Kaiser Hanford Company
IEEE	Institute of Electrical and Electronic Engineers
ISA	Instrument Society of America
JMN	justification of mission need
KD	key decision

ACRONYMS/ABBREVIATIONS (cont.)

LATA	Los Alamos Technical Associates
MCC	motor control center
MMI	man-machine interface
MPS	master pump shutdown
NEMA	National Electric Manufacturer's Association
NEPA	National Environmental Policy Act
OC	operating contractor
OPC	other project cost
OSHA	Occupational Safety and Health Administration
OTP	operational test procedure
PDRD	preliminary design requirements document
PLC	programmable logic controller
QAPP	Quality Assurance Program Plan
RCRA	Resource Conservation and Recovery Act
RL	U.S. Department of Energy, Richland Operations Office
RTD	resistive temperature device
SACS	Surveillance Analysis Computer System
SCR	silicon controlled rectifier
SE	systems engineering
SEPA	State Environmental Policy Act
SSPP	System Safety Program Plan
SEMP	systems engineering management plan
SST	single-shell tank
TFLAN	tank farm local area network
TFRSO	Tank Farm Restoration and Safe Operations
TPC	total project cost
TMACS	tank monitor and control system
TWRS	Tank Waste Remediation System
USQ	unreviewed safety question
USSR	Upgrade Scope Summary Report
WAC	Washington Administrative Code
WBS	work breakdown structure
WHC	Westinghouse Hanford Company

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)

<u>Electrical Service</u>

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 I-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 I-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

TFLAN I/O box. 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 1

AN TANK FARM - MPS SIGNALS	
Signal Type	**Description**
Input	Pit leak detectors
Input	Cleanout box leak detectors
Input	Transfer pipe encasement leak detectors
Output	Supernatant pumps

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. <u>Piping</u>

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. <u>Instrumentation and Control</u>

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. <u>Ventilation Systems</u>
   - The existing primary ventilation equipment will be removed and disposed of after the new ventilation equipment is in operation.

3. <u>Electrical</u>
   - The feeders of the existing primary fan motors will be disconnected and removed.

4. <u>Piping</u>
   - 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

AP TANK FARM - MPS SIGNALS	
Signal Type	**Description**
Input	Pit leak detectors
Input	Pipe encasement leak detectors
Input	Service and flush pit instrumentation
Input	AP MPS hand switch in 242-A
Output	Supernatant pumps

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. <u>Primary Ventilation System</u>

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

AW TANK FARM - MPS SIGNALS	
Signal Type	**Description**
Input	Pit leak detectors
Output	Supernatant pumps
Output	Tank 102 feed pump

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. <u>Primary Ventilation System</u>

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:

- Pump pits 241-AW-01A, -02A, -03A, -04A, -05A, -06A, and -02E
- 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. <u>Ventilation Systems</u>

- 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

AY TANK FARM - MPS SIGNALS	
Signal Type	**Description**
Input	Pit leak detectors
Input	Transfer pipe encasement leak detectors
Output	Transfer pumps
Output	Sluice pumps
Output	Waste recovery pump

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. <u>Instrumentation and Control</u>

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

AZ TANK FARM - MPS SIGNALS	
Signal Type	**Description**
Input	Pit leak detectors
Input	Transfer pipe encasement leak detectors
Output	Diverter station pump
Output	Condensate pump
Output	Annulus pumps
Output	Transfer pumps
Output	Sluice pumps
Output	Waste recovery pumps

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. <u>Electrical</u>

   - Demolition is as described for AY Tank Farm.

3. <u>Piping</u>

   - 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

SY TANK FARM - MPS SIGNALS	
Signal Type	**Description**
Input	Pit leak detectors
Input	Transfer pipe encasement leak detectors
Input	241-SY-271 hand switch
Input	Miscellaneous from outside farm
Output	Supernatant, leak detect pit, and annulus pumps
Output	Slurry pump

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. <u>Instrumentation and Control</u>

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)

<u>Electrical Service</u> (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

244-A DCRT - MPS SIGNALS	
Signal Type	**Description**
Input	200-East MPS circuit
Input	244-A drain valve "V1" position
Input	244-A leak detector
Output	Transfer pump P-244-A1

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. <u>Ventilation System</u>

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. <u>Instrumentation and Control</u>

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. <u>Ventilation Systems</u>

   - The existing ventilation equipment and piping will be removed and disposed of after the new ventilation systems are in operation.

3. <u>Electrical</u>

   - 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):

- V456 (1)
- V522 (1)
- V560 (1)
- V561 (1)
- V562 (1)
- Flush pit drain (1)
- WT-SNL-5350-M17 (3)

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. <u>Ventilation System</u>

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. <u>Instrumentation and Control</u>

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. <u>Ventilation Systems</u>

   - Similar to the 244-A DCRT description.

3. <u>Electrical</u>

   - 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:

- Valve pits 241-A-A and -B and 241-AX-A and -B

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

- **Valve Positioning:** Similar to the AN Tank Farm description for valve pits 241-A-A, 241-A-B, 241-AX-A, and 241-AX-B. Position signals will be wired to the TFLAN PLC in the 241-A-271 Building.

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 I-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 I-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. <u>Piping</u>

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 USQ 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

1. U.S. Department of Energy Order 4700.1, "Project Management System."

2. Upgrade Scope Summary Report (USSR), "Tank Farm Restoration and Safety Operations (TFRSO)," Project W-314, prepared by Westinghouse Hanford Company, Document No. WHC-SD-W314-RPT-003, Rev. 0, February 1996.

3. Engineering Report, "241-AW Tank Farm Upgrades," Project W-314G, prepared by ICF Kaiser Hanford Company, Document No. WHC-SD-W314-ER-002, Rev. 0, August 1995.

4. Supporting Document, "Systems Engineering SOW Approach Review for Project W-314, Tank Farm Restoration and Safe Operations," Project W-314, prepared by Westinghouse Hanford Company, Document No. WHC-SD-W314-SOW-003, Rev. 0, June 1995.

5. Engineering Study, "Project W-314 DST and DCRT Instrument and Control Systems, Initial Assessment," Project W-314, prepared by Westinghouse Hanford Company, Document No. WHC-SD-W314-ES-018, Rev. 0, January 1996.

6. Engineering Study, "DST and DCRT Tank Farm Electrical Distribution Systems Initial Assessment," Project W-314, prepared by Westinghouse Hanford Company, Document No. WHC-SD-W314-ES-020, Rev. 0, January 1996.

7. Engineering Study, "Initial Assessment Report for Mechanical Systems Upgrade," Project W-314, prepared by Westinghouse Hanford Company, Document No. WHC-SD-W314-ES-021, Rev. 0, February 1996.

8. Preliminary Design Requirements Document, "Tank Farm Restoration and Safe Operations," Project W-314, Document No. WHC-SD-W314-DRD-001, Rev. 2, March 1996 (draft).

9. Supporting Document, "System Safety Program Plan for Project W-314, Tank Farm Restoration and Safe Operations," Project W-314, prepared by Westinghouse Hanford Company, Document No. WHC-SD-W314-PAP-001, Rev. 0, February 1996.

10. Letter of Instruction Number 1 for Conceptual Design Report Planning, Project W-314, Document No. 8K530-95-SRB-007, October 24, 1995.

11. Letter of Instruction Number 2 for Conceptual Design Report, Project W-314, Document No. 8K530-95-SRB-008, November 9, 1995.

12. Letter of Instruction Number 3 for Conceptual Design Report, Project W-314, Document No. 8K530-96-SRB-001, January 15, 1996.

13. Department of Energy Letter for Project 96L-EWW-314, "Waiver of the Metrication Transition Plan for Hanford," Document No. 94-PRJ-033, April 20, 1994.

14. Document Transmittal, "Engineering Work Plan for Conceptual Design Report," Project W-314, Document No. TR-W-314-108, January 15, 1996.

15. Report, "Criteria for the Modification of the Master Pump Shutdown System," Document No. WHC-SD-WM-TI-142, Rev. 0, July 19, 1984.

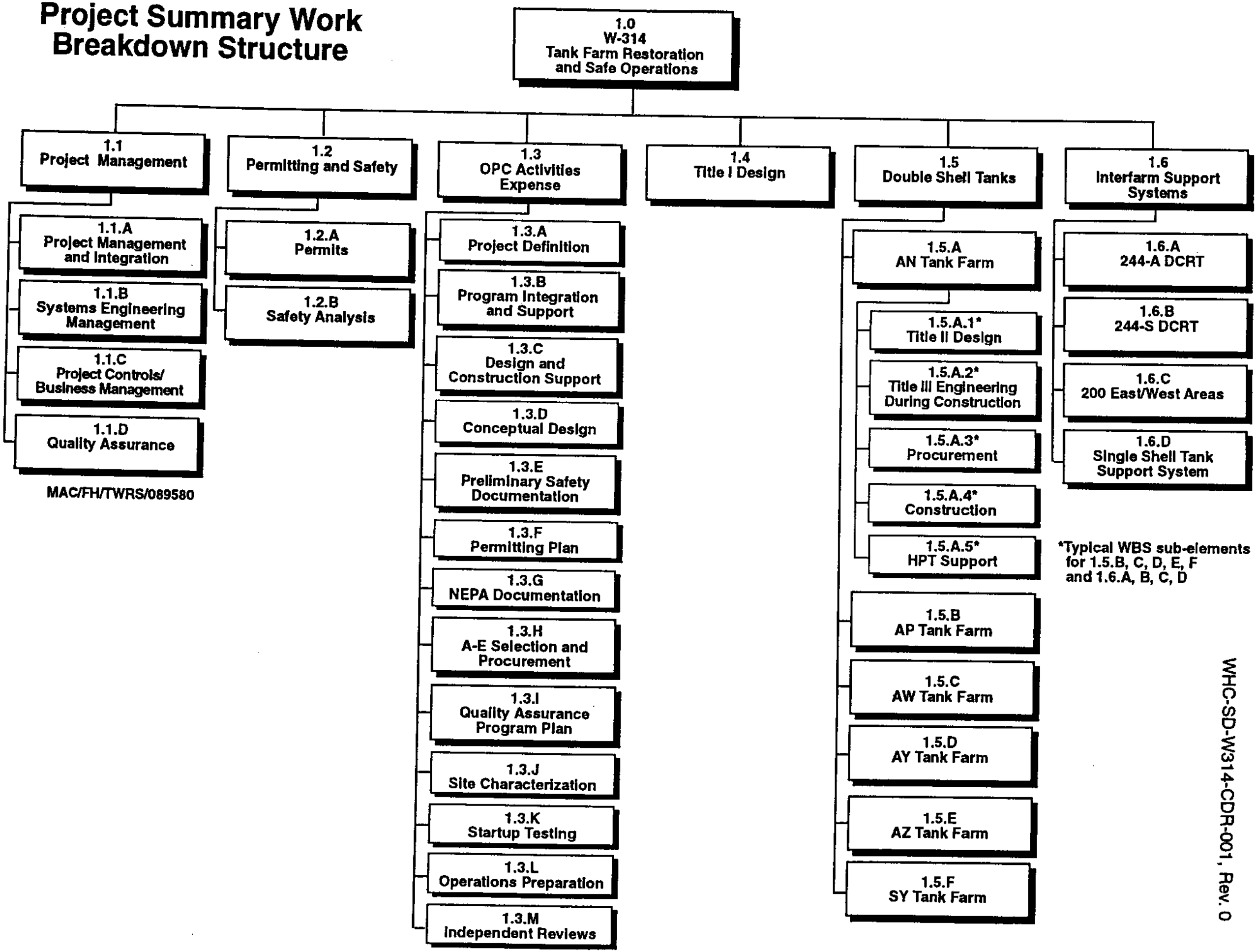
16. Report, "Gaseous Effluent Monitoring System Design Criteria," Document No. WHC-SE-WM-CR-058, March 28, 1995.

17. Report, "Tank Farm Potential Ignition Sources," Document No. WHC-SD-WM-ES-362, Rev. 1, January 30, 1996.

APPENDIX A

Work Breakdown Structure

Project Summary Work Breakdown Structure



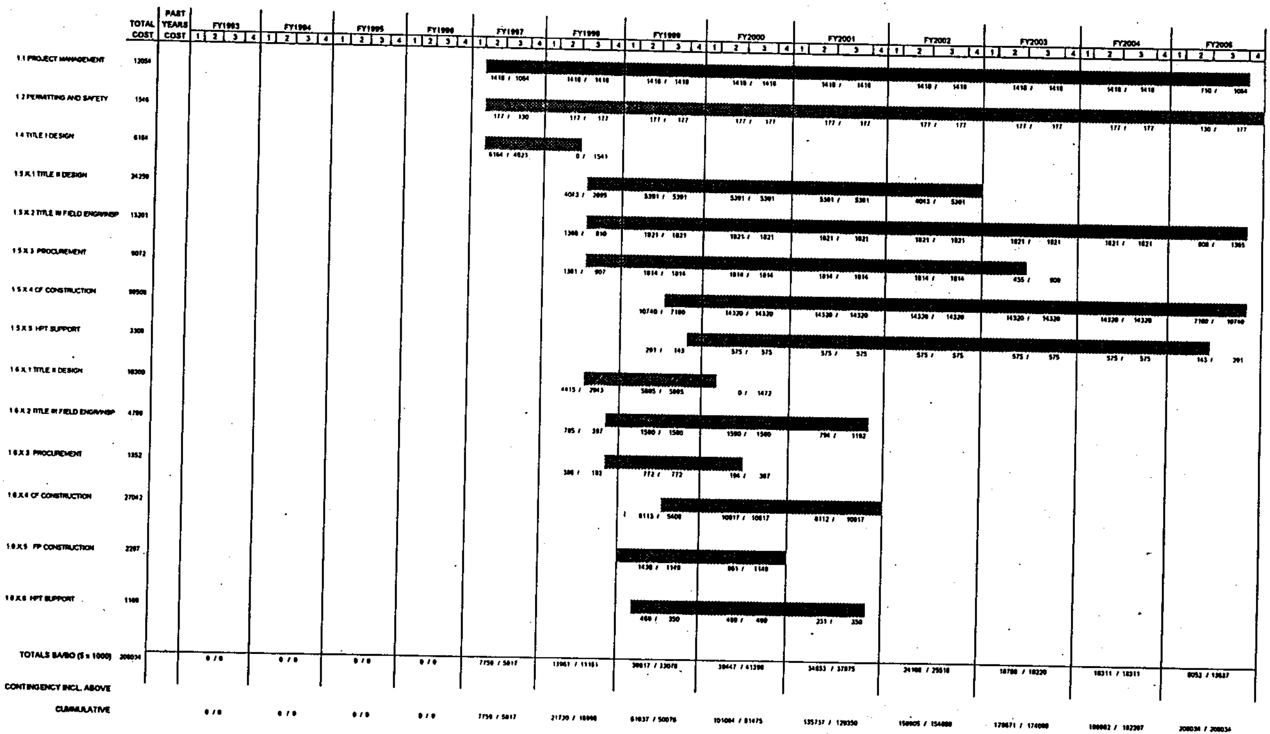
MAC/FH/TWRS/089580

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

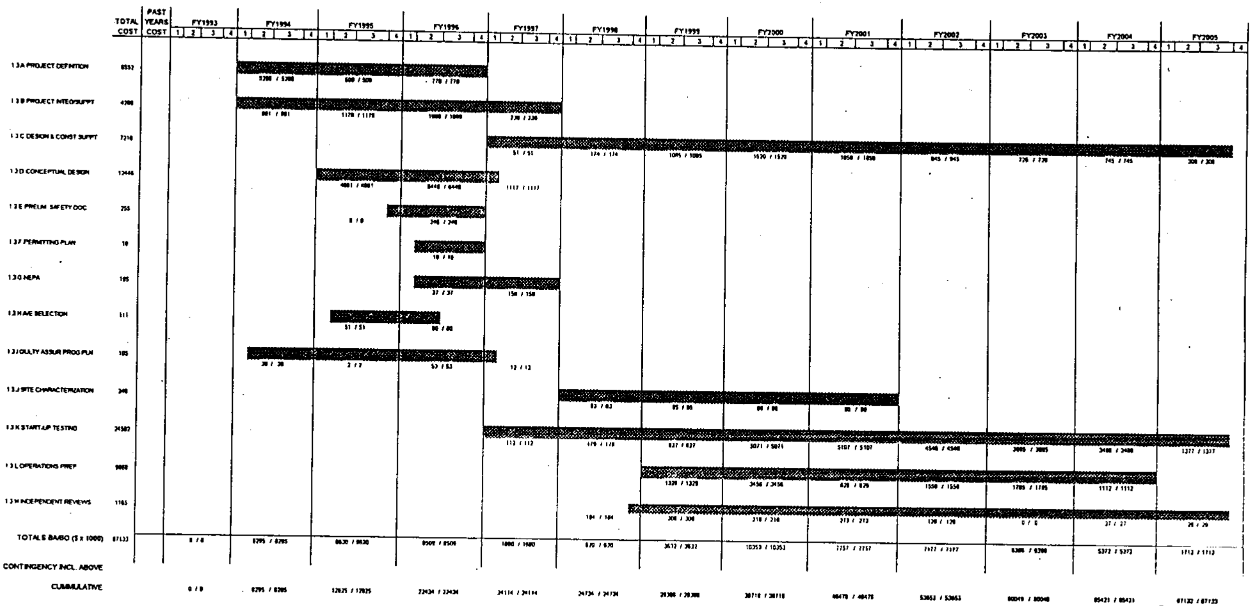
APPENDIX B

Budget Authorized/Budget Outlay Schedule

PROJECT W-314
TANK FARM UPGRADES
BABO SCHEDULE (CAPITAL DOLLARS)



PROJECT W-314
TANK FARM UPGRADES
BABO SCHEDULE (EXPENSE DOLLARS)



APPENDIX C

Cost Estimate Summary

KAISER ENGINEERS HANFORD
WESTINGHOUSE HANFORD COMPANY
JOB NO. W314BAC2

** IEST - INTERACTIVE ESTIMATING **
TANK FARM RESTORATION AND SAFE OPERATIONS
W - 3 1 4 CONCEPTUAL ESTIMATE REV.1
DOE_R01 - PROJECT COST SUMMARY

PAGE 1 OF 84
DATE 04/23/96
BY TLW RDP DKH JJN

COST CODE	DESCRIPTION	ESCALATED TOTAL COST	CONTINGENCY %	CONTINGENCY TOTAL	TOTAL DOLLARS
010	ENGINEERING - TITLE I	5,360,000	15	800,000	6,160,000
020	ENGINEERING - TITLE II	28,800,000	20	5,760,000	34,560,000
030	ENGINEERING - TITLE III	14,980,000	20	2,990,000	17,970,000
060	PROJECT MANAGEMENT	12,370,000	10	1,240,000	13,610,000
	(ADJUSTED TO MEET DOE 5100.4)	(10,000)		(90,000)	(100,000)
TOTAL DESIGN & MANAGEMENT		61,500,000	18	10,700,000	72,200,000
600	UTILITIES	1,880,000	21	390,000	2,270,000
700	SPECIAL EQUIP/PROCESS SYSTEMS	97,190,000	30	29,130,000	126,320,000
810	DEMOLITION	3,880,000	33	1,270,000	5,150,000
		(50,000)		10,000	(40,000)
TOTAL CONSTRUCTION COST		102,900,000	30	30,800,000	133,700,000
TOTAL ESTIMATED CONSTRUCTION COST (TECC)		164,400,000	26	41,500,000	205,900,000
900	OTHER PROJECT COSTS	63,070,000	6	4,060,000	67,130,000
	(ADJUSTED TO MEET DOE 5100.4)	30,000		(60,000)	(30,000)
TOTAL OTHER PROJECT COSTS (OPC)		63,100,000	6	4,000,000	67,100,000
TOTAL PROJECT COST (TPC)		227,500,000	20	45,500,000	273,000,000

TYPE OF ESTIMATE	CONCEPTUAL-REV.1 4/24/96	REMARKS: W314BAC1 REV.0 (3/20/96)
ARCHITECT ENGINEER	G Chadwick JLT Kay	
OPERATING CONTRACTOR	Kirk A Boss 4/25/96	

(ROUNDED/ADJUSTED TO THE NEAREST " 10,000 / 100,000 " - PERCENTAGES NOT RECALCULATED TO REFLECT ROUNDING)

KAISER ENGINEERS HANFORD
WESTINGHOUSE HANFORD COMPANY
JOB NO. W314BAC2

** IEST - INTERACTIVE ESTIMATING **
TANK FARM RESTORATION AND SAFE OPERATIONS
W - 3 1 4 CONCEPTUAL ESTIMATE REV.1
DOE_R02 - WORK BREAKDOWN STRUCTURE SUMMARY

DATE 04/23/96 14:56:21
BY TLW RDP DKH JJM

WBS	DESCRIPTION	ESTIMATE SUBTOTAL	ONSITE INDIRECTS	SUB TOTAL	ESCALATION %	ESCALATION TOTAL	SUB TOTAL	CONTINGENCY %	CONTINGENCY TOTAL	TOTAL DOLLARS
1A01	PM & INTEGRATION TITLE - I	427746.	0	427746	2.89	12375	440121	10	44012	484133
1A02	PM & INTEGRATION TITLE - II	2239150	0	2239150	10.43	233582	2472732	10	247273	2720006
1A03	PM & INTEGRATION - CONST.	2320133	0	2320133	17.15	397838	2717971	10	271797	2989769
SUBTOTAL 1A	PROJECT MGMT. & INTEGRATION	4987029	0	4987029	12.91	643795	5630824	10	563082	6193908
1B01	SYSTEMS ENG. MGMT. - TITLE I	471240	0	471240	2.67	12563	483803	10	48380	532183
1B02	SYSTEMS ENG. MGMT. - TITLE II	793968	0	793968	10.37	82369	876337	10	87633	963971
1B03	SYSTEMS ENG. MGMT. - CONST	573750	0	573750	21.54	123560	697310	10	69731	767042
SUBTOTAL 1B	SYSTEMS ENG. MGMT.	1838958	0	1838958	11.88	218492	2057450	10	205744	2263196
1C01	PC/BUSINESS MGMT - TITLE I	248799	0	248799	2.67	6633	255432	10	25543	280975
1C02	PC/BUSINESS MGMT - TITLE II	846564	0	846564	10.43	88288	934852	10	93485	1028338
1C03	PC/BUSINESS MGMT - CONST	585178	0	585178	21.54	126069	711247	10	71125	782372
SUBTOTAL 1C	PROJ CNTRLS/BUSINESS MGMT	1680541	0	1680541	13.15	220990	1901531	10	190153	2091685
1D01	QUALITY ASSURANCE - TITLE I	220742	0	220742	2.94	6490	227232	10	22723	249955
1D02	QUALITY ASSURANCE - TITLE II	551855	0	551855	10.10	55726	607581	10	60758	668339
1D03	QUALITY ASSURANCE - CONST.	441484	0	441484	20.82	91928	533412	10	53341	586753
SUBTOTAL 1D	QUALITY ASSURANCE	1214081	0	1214081	12.70	154144	1368225	10	136822	1505047
SUBTOTAL 1	PROJECT MANAGEMENT	9720609	0	9720609	12.73	1237421	10958030	10	1095801	12053836
2A01	AIR PERMITTING	81043	0	81043	4.31	3493	84536	10	8454	92990
2A02	PART B DANGEROUS WASTE PERMITS	60534	0	60534	13.09	7926	68460	10	6846	75307
2A03	PRE-OP DETERMINATION	3077	0	3077	4.32	133	3210	10	321	3531
2B00	SAFETY ANALYSIS	1151886	0	1151886	8.96	103167	1255053	10	125506	1380557
SUBTOTAL 2	PERMITTING & SAFETY	1296540	0	1296540	8.85	114719	1411259	10	141127	1552385
3A00	PROJECT DEFINITION	6552000	0	6552000	0.00	0	6552000	0	0	6552000
3B00	PROJECT MANAGEMENT SUPPORT	4244885	0	4244885	0.08	3232	4248117	0	20912	4269029
3C10	DESIGN & CONSTR. SUPPORT	91390	0	91390	2.94	2686	94076	10	9407	103485

KAISER ENGINEERS HANFORD
WESTINGHOUSE HANFORD COMPANY
JOB NO. W314BAC2

** IEST - INTERACTIVE ESTIMATING **
TANK FARM RESTORATION AND SAFE OPERATIONS
W - 3 1 4 CONCEPTUAL ESTIMATE REV.1
DOE_R02 - WORK BREAKDOWN STRUCTURE SUMMARY

DATE 04/23/96 14:56:21
BY TLW RDP DKH JJM

WBS	DESCRIPTION	ESTIMATE SUBTOTAL	ONSITE INDIRECTS	SUB TOTAL	ESCALATION %	ESCALATION TOTAL	SUB TOTAL	CONTINGENCY %	CONTINGENCY TOTAL	TOTAL DOLLARS
3C20	DESIGN & CONSTR. SUPPORT	925324	0	925324	12.07	111717	1037041	10	103703	1140744
3C30	DESIGN & CONSTR. SUPPORT	4735055	0	4735055	14.53	687960	5423015	10	542302	5965317
3D10	ENGINEERING REPORT	208000	0	208000	0.00	0	208000	0	0	208000
3D20	DCBL	9535000	0	9535000	0.00	0	9535000	0	0	9535000
3D30	CONCEPTUAL DESIGN	560000	0	560000	0.00	0	560000	0	0	560000
3D40	ACDR	2026000	0	2026000	0.77	15700	2041700	5	101570	2143270
3E00	PRELIM SAFETY DOC	255000	0	255000	0.00	0	255000	0	0	255000
3F00	PERMITTING PLAN	18000	0	18000	0.00	0	18000	0	0	18000
3G00	NEPA DOCUMENTATION	178346	0	178346	1.24	2219	180565	8	14357	194922
3H00	A/E SELECTION & PROCUREMENT	111000	0	111000	0.00	0	111000	0	0	111000
3I00	QAPP	104133	0	104133	0.17	175	104308	1	1131	105439
3J00	SITE CHARACTERIZATION	289228	0	289228	8.61	24909	314137	10	31413	345552
3K01	STARTUP SUPPORT - AN	1522147	0	1522147	19.70	299883	1822030	10	182203	2004231
3K02	STARTUP ENGINEERING - AN	982443	0	982443	18.77	184423	1166866	10	116686	1283552
	SUBTOTAL 3K0 STARTUP - AN	2504590	0	2504590	19.34	484306	2988896	10	298889	3287783
3K11	STARTUP SUPPORT - AP	1505042	0	1505042	22.87	344141	1849183	10	184920	2034102
3K12	STARTUP ENGINEERING - AP	1005290	0	1005290	21.53	216465	1221755	10	122175	1343931
	SUBTOTAL 3K1 STARTUP - AP	2510332	0	2510332	22.33	560606	3070938	10	307095	.3378033
3K21	STARTUP SUPPORT - AW	1510634	0	1510634	11.42	172584	1683218	10	168321	1851539
3K22	STARTUP ENGINEERING - AW	999609	0	999609	10.12	101205	1100814	10	110081	1210895
	SUBTOTAL 3K2 STARTUP - AW	2510243	0	2510243	10.91	273789	2784032	10	278402	3062434
3K31	STARTUP SUPPORT - AY	524897	0	524897	15.87	83322	608219	10	60821	669040
3K32	STARTUP ENGINEERING - AY	845358	0	845358	17.25	145842	991200	10	99120	1090320
	SUBTOTAL 3K3 STARTUP - AY	1370255	0	1370255	16.72	229164	1599419	10	159941	1759360
3K41	STARTUP SUPPORT - AZ	524897	0	524897	15.87	83322	608219	10	60821	669040
3K42	STARTUP ENGINEERING - AZ	845358	0	845358	17.25	145842	991200	10	99120	1090320
	SUBTOTAL 3K4 STARTUP - AZ	1370255	0	1370255	16.72	229164	1599419	10	159941	1759360
3K51	STARTUP SUPPORT - SY	1403058	0	1403058	13.01	182480	1585538	10	158554	1744091

KAISER ENGINEERS HANFORD
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JOB NO. W314BAC2

** IEST - INTERACTIVE ESTIMATING **
TANK FARM RESTORATION AND SAFE OPERATIONS
W - 3 1 4 CONCEPTUAL ESTIMATE REV.1
DOE_R02 - WORK BREAKDOWN STRUCTURE SUMMARY

DATE 04/23/96 14:56:21
BY TLW RDP DKH JJM

WBS	DESCRIPTION	ESTIMATE SUBTOTAL	ONSITE INDIRECTS	SUB TOTAL	ESCALATION %	ESCALATION TOTAL	SUB TOTAL	CONTINGENCY %	CONTINGENCY TOTAL	TOTAL DOLLARS
3K52	STARTUP ENGINEERING - SY	936748	0	936748	13.07	122453	1059201	10	105920	1165121
SUBTOTAL 3K5	STARTUP - SY	2339806	0	2339806	13.03	304933	2644739	10	264474	2909212
3K61	STARTUP SUPPORT - 244 A	879835	0	879835	11.13	97916	977751	10	97775	1075527
3K62	STARTUP ENGINEERING - 244 A	485540	0	485540	5.64	27370	512910	10	51291	564201
SUBTOTAL 3K6	STARTUP - 244 A	1365375	0	1365375	9.18	125286	1490661	10	149066	1639728
3K71	STARTUP SUPPORT - 244 S	879835	0	879835	11.13	97916	977751	10	97775	1075527
3K72	STARTUP ENGINEERING - 244 S	485540	0	485540	5.64	27370	512910	10	51291	564201
SUBTOTAL 3K7	STARTUP - 244 S	1365375	0	1365375	9.18	125286	1490661	10	149066	1639728
3K81	STARTUP SUPPORT - 200 E/W	382865	0	382865	10.02	38363	421228	10	42123	463351
3K82	STARTUP ENGINEERING - 200 E/W	285594	0	285594	6.57	18752	304346	10	30435	334781
SUBTOTAL 3K8	STARTUP - 200 E/W	668459	0	668459	8.54	57115	725574	10	72558	798132
3K91	STARTUP SUPPORT - SST	211510	0	211510	9.86	20864	232374	10	23237	255610
3K92	STARTUP ENGINEERING - SST	97133	0	97133	5.97	5798	102931	10	10293	113223
SUBTOTAL 3K9	STARTUP - SST	308643	0	308643	8.64	26662	335305	10	33530	368833
3KA0	STARTUP ADMINISTRATION	3136015	0	3136015	15.63	490293	3626308	10	362630	3988939
SUBTOTAL 3KA	STARTUP ADMINISTRATION	3136015	0	3136015	15.63	490293	3626308	10	362630	3988939
SUBTOTAL 3K	STARTUP	19449348	0	19449348	14.94	2906604	22355952	10	2235592	24591542
3L01	READINESS REVIEW - AN	1010884	0	1010884	21.60	218376	1229260	10	122926	1352186
3L11	READINESS REVIEW - AP	1009247	0	1009247	24.53	247617	1256864	10	125686	1382550
3L21	READINESS REVIEW - AW	1036140	0	1036140	11.90	123304	1159444	10	115944	1275387
3L31	READINESS REVIEW - AY	811210	0	811210	14.55	118007	929217	10	92922	1022138
3L41	READINESS REVIEW - AZ	811865	0	811865	14.54	118072	929937	10	92994	1022931

KAISER ENGINEERS HANFORD
WESTINGHOUSE HANFORD COMPANY
JOB NO. W314BAC2

** IEST - INTERACTIVE ESTIMATING **
TANK FARM RESTORATION AND SAFE OPERATIONS
W - 3 1 4 CONCEPTUAL ESTIMATE REV.1
DOE_R02 - WORK BREAKDOWN STRUCTURE SUMMARY

DATE 04/23/96 14:56:22
BY TLW RDP DKH JJM

WBS	DESCRIPTION	ESTIMATE SUBTOTAL	ONSITE INDIRECTS	SUB TOTAL	ESCALATION %	ESCALATION TOTAL	SUB TOTAL	CONTINGENCY %	CONTINGENCY TOTAL	TOTAL DOLLARS
3L51	READINESS REVIEW - SY	994009	0	994009	15.44	153427	1147436	10	114744	1262180
3L61	READINESS REVIEW - 244 A	763701	0	763701	8.06	61549	825250	10	82525	907775
3L71	READINESS REVIEW - 244 S	763701	0	763701	9.01	68844	832545	10	83255	915799
3L81	READINESS REVIEW - 200 E/W	484599	0	484599	10.02	48557	533156	10	53316	586471
3L91	READINESS REVIEW - SST	120423	0	120423	6.88	8282	128705	10	12870	141576
SUBTOTAL 3L	READINESS REVIEW	7805779	0	7805779	14.94	1166035	8971814	10	897182	9868993
3M01	IND REV. SYSTEMS ENG. MGMT. - FY 98	160000	0	160000	4.31	6896	166896	10	16690	183586
3M02	IND. REV.SYSTEMS ENG. MGMT. - FY 99	260000	0	260000	7.13	18538	278538	10	27854	306392
3M03	IND. REV.SYSTEMS ENG. MGMT. - FY 00	180000	0	180000	10.02	18036	198036	10	19804	217840
3M04	IND. REV.SYSTEMS ENG. MGMT. - FY 01	220000	0	220000	12.99	28578	248578	10	24858	273436
3M05	IND. REV.SYSTEMS ENG. MGMT. - FY 02	100000	0	100000	16.04	16040	116040	10	11604	127644
3M06	IND. REV.SYSTEMS ENG. MGMT. - FY 04	20000	0	20000	25.69	5138	25138	10	2514	27652
3M07	IND. REV.SYSTEMS ENG. MGMT. - FY 05	20000	0	20000	30.00	6000	26000	10	2600	28600
SUBTOTAL 3M	INDEPENDENT REVIEWS	960000	0	960000	10.34	99226	1059226	10	105924	1165150
SUBTOTAL 3	OPC ACTIVITIES	58048488	0	58048488	8.65	5020463	63068951	6	4063493	67132443
41AN	TITLE I - AN FARM	379273	0	379273	3.93	14905	394178	15	59126	453304
41AP	TITLE I - AP FARM	187687	0	187687	3.93	7375	195062	15	29259	224323
41AW	TITLE I - AW FARM	148321	0	148321	3.93	5829	154150	15	23122	177272
41AY	TITLE I - AY FARM	83586	0	83586	3.93	3284	86870	15	13032	99901
41AZ	TITLE I - AZ FARM	101538	0	101538	3.93	3990	105528	15	15830	121357
41SY	TITLE I - SY FARM	139864	0	139864	3.93	5496	145360	15	21802	167164
42DA	TITLE I - 244A DCRT	145457	0	145457	3.93	5717	151174	15	22676	173851
42DS	TITLE I - 244S DCRT	99218	0	99218	3.93	3900	103118	15	15466	118586
43EW	TITLE I - EAST/WEST	179284	0	179284	3.93	7045	186329	15	27948	214280
44SS	TITLE I - SINGLE SHELL TANKS	49867	0	49867	3.93	1960	51827	15	7774	59600
4500	TITLE I - SUPPORT	2537884	0	2537884	3.49	88489	2626373	15	393954	3020330
4710	TITLE I - PLANNING	1116246	0	1116246	3.93	43867	1160113	15	174017	1334131
SUBTOTAL 4	TITLE I DESIGN	5168225	0	5168225	3.71	191857	5360082	15	804006	6164099
5A11	TITLE II - AN FARM	2785094	0	2785094	15.68	436704	3221798	20	644358	3866157
5A12	DISC 35-65 SUPPORT ACTIVITIES	963857	0	963857	15.68	151131	1114988	20	222998	1337987
SUBTOTAL 5A1	TITLE II - AN	3748951	0	3748951	15.68	587835	4336786	20	867356	5204144

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WBS	DESCRIPTION	ESTIMATE SUBTOTAL	ONSITE INDIRECTS	SUB TOTAL	ESCALATION %	ESCALATION TOTAL	SUB TOTAL	CONTINGENCY %	CONTINGENCY TOTAL	TOTAL DOLLARS
5A21	TITLE III AN	2429600	0	2429600	20.93	508515	2938115	20	587625	3525739
	SUBTOTAL 5A2 TITLE III - AN	2429600	0	2429600	20.93	508515	2938115	20	587625	3525739
5A3A	ADVANCE PROCUREMENT INSTRUMENTATION	741394	0	741394	17.41	129077	870471	25	217618	1088088
5A3B	PRIMARY VENT SYS ADVANCED PRCMT	710675	0	710675	17.41	123729	834404	25	208601	1043004
	SUBTOTAL 5A3 ADVANCED PROCUREMENT	1452069	0	1452069	17.41	252806	1704875	25	426219	2131092
5A4A	TANK 101	717979	0	717979	22.13	158890	876869	30	263060	1139929
5A4B	TANK 102	688709	0	688709	22.13	152412	841121	30	252336	1093457
5A4C	TANK 103	566071	0	566071	22.13	125272	691343	30	207404	898748
5A4D	TANK 104	566567	0	566567	22.13	125383	691950	30	207586	899535
5A4E	TANK 105	565954	0	565954	22.13	125245	691199	30	207360	898562
5A4F	TANK 106	672716	0	672716	22.13	148872	821588	30	246476	1068066
5A4G	TANK 107	689039	0	689039	22.13	152486	841525	30	252456	1093981
5A4I	GENERAL REQUIREMENTS	3187789	0	3187789	22.13	705460	3893249	30	1167975	5061221
5A4J	SITE WORK	3534871	0	3534871	22.13	782267	4317138	28	1198082	5515217
5A4K	TANK 101 - VALVE PIT AN-A	590195	0	590195	22.13	130611	720806	35	250403	971210
5A4L	TANK 101 - VALVE PIT - AN-B	606871	0	606871	22.13	134301	741172	35	257935	999107
	SUBTOTAL 5A4 CONSTRUCTION FORCES	12386761	0	12386761	22.13	2741199	15127960	30	4511073	19639033
5A61	HPT SUPPORT - FY 02	64820	0	64820	16.04	10397	75217	10	7522	82739
5A62	HPT SUPPORT - FY 03	259185	0	259185	19.17	49686	308871	10	30887	339758
5A63	HPT SUPPORT - FY 04	259185	0	259185	22.39	58032	317217	10	31722	348938
	SUBTOTAL 5A6 HPT SUPPORT AN	583190	0	583190	20.25	118115	701305	10	70131	771435
	SUBTOTAL 5A AN TANK FARM	20600571	0	20600571	20.43	4208470	24809041	26	6462404	31271443
5B11	TITLE II - AP FARM	2293977	0	2293977	17.12	392727	2686704	20	537338	3224050
5B12	DISC 35-65 SUPPORT ACTIVITIES	931337	0	931337	17.12	159446	1090783	20	218156	1308937
	SUBTOTAL 5B1 TITLE II - AP	3225314	0	3225314	17.12	552173	3777487	20	755494	4532987

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5B21	TITLE III AP	1778622	0	1778622	22.73	404282	2182904	20	436580	2619482
	SUBTOTAL 5B2 TITLE III AP	1778622	0	1778622	22.73	404282	2182904	20	436580	2619482
5B3A	ADVANCE PROCUREMENT INSTRUMENTATION	1355706	0	1355706	18.86	255686	1611392	25	402848	2014240
5B3B	PRIMARY VENT SYS ADVANCED PRCMT	710675	0	710675	18.86	134033	844708	25	211177	1055885
	SUBTOTAL 5B3 ADVANCE PROCUREMENT	2066381	0	2066381	18.86	389719	2456100	25	614025	3070125
5B4A	TANK 101	621669	0	621669	23.64	146964	768633	30	230590	999220
5B4B	TANK 102	911302	0	911302	23.64	215433	1126735	30	338022	1464753
5B4C	TANK 103	699941	0	699941	23.64	165469	865410	30	259623	1125030
5B4D	TANK 104	620430	0	620430	23.64	146672	767102	30	230130	997229
5B4E	TANK 105	693750	0	693750	23.64	164005	857755	30	257326	1115080
5B4F	TANK 106	624074	0	624074	23.64	147533	771607	30	231482	1003087
5B4G	TANK 107	617632	0	617632	23.64	146010	763642	30	229092	992732
5B4H	TANK 108	617859	0	617859	23.64	146065	763924	30	229177	993096
5B4I	GENERAL REQUIREMENTS	2367628	0	2367628	23.64	559707	2927335	35	1022161	3949495
5B4J	SITE WORK	4893232	0	4893232	23.64	1156759	6049991	28	1675078	7725069
5B4K	VALVE PIT AP	631213	0	631213	23.64	149221	780434	35	271659	1052089
	SUBTOTAL 5B4 CONSTRUCTION FORCES	13298730	0	13298730	23.64	3143838	16442568	30	4974340	21416880
5B61	HPT SUPPORT - FY 02	21622	0	21622	16.04	3468	25090	10	2509	27599
5B62	HPT SUPPORT - FY 03	259185	0	259185	19.17	49686	308871	10	30887	339758
5B63	HPT SUPPORT - FY 04	259185	0	259185	22.39	58032	317217	10	31722	348938
5B64	HPT SUPPORT - FY 05	194412	0	194412	25.69	49944	244356	10	24436	268792
	SUBTOTAL 5B6 HPT SUPPORT AP	734404	0	734404	21.94	161130	895534	10	89554	985087
	SUBTOTAL 5B AP FARM	21103451	0	21103451	22.04	4651142	25754593	27	6869993	32624561
5C11	TITLE II - AW FARM	2398717	0	2398717	6.75	161911	2560628	20	512128	3072757
5C12	DISC 35-65 SUPPORT-ACTIVITIES	1010033	0	1010033	6.75	68178	1078211	20	215641	1293852
	SUBTOTAL 5C1 TITLE II - AW	3408750	0	3408750	6.75	230089	3638839	20	727769	4366609

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5C21	TITLE III AW	1700770	0	1700770	10.72	182323	1883093	20	376620	2259713
	SUBTOTAL 5C2 TITLE III AW	1700770	0	1700770	10.72	182323	1883093	20	376620	2259713
5C3A	ADVANCE PROCUREMENT INSTRUMENTATION	744522	0	744522	6.99	52042	796564	25	199141	995705
5C3B	PRIMARY VENT SYS ADVANCED PRCMT	762960	0	762960	6.99	53331	816291	25	204073	1020364
	SUBTOTAL 5C3 PROCUREMENT AW	1507482	0	1507482	6.99	105373	1612855	25	403214	2016069
5C4A	TANK 101	633663	0	633663	12.59	79781	713444	30	214035	927472
5C4B	TANK 102	1009575	0	1009575	12.59	127110	1136685	30	341005	1477684
5C4C	TANK 103	675599	0	675599	12.59	85061	760660	30	228200	988853
5C4D	TANK 104	635935	0	635935	12.59	80066	716001	30	214802	930798
5C4E	TANK 105	669408	0	669408	12.59	84281	753689	30	226109	979792
5C4F	TANK 106	677753	0	677753	12.59	85332	763085	30	228928	992007
5C4I	GENERAL REQUIREMENTS	2174422	0	2174422	12.59	273762	2448184	35	856864	3305043
5C4J	SITE WORK	5652186	0	5652186	12.59	711610	6363796	27	1744393	8108188
5C4K	VALVE PIT AW	421717	0	421717	12.59	53093	474810	35	164625	639437
5C4L	TANK 101 - VALVE PIT - AW-B	423455	0	423455	12.59	53312	476767	35	165310	642079
5C4V	NEW VENT PITS	282214	0	282214	12.59	35530	317744	35	111210	428956
	SUBTOTAL 5C4 CONSTRUCTION FORCES	13255927	0	13255927	12.59	1668938	14924865	30	4495481	19420309
5C61	HPT SUPPORT - FY 99	21622	0	21622	7.13	1542	23164	10	2316	25480
5C62	HPT SUPPORT - FY 00	259185	0	259185	10.02	25970	285155	10	28516	313671
5C63	HPT SUPPORT - FY 01	259185	0	259185	12.99	33668	292853	10	29285	322138
5C64	HPT SUPPORT - FY 02	21622	0	21622	16.04	3468	25090	10	2509	27599
	SUBTOTAL 5C6 HPT SUPPORT AW	561614	0	561614	11.51	64648	626262	10	62626	688888
	SUBTOTAL 5C AW TANK FARM	20434543	0	20434543	11.02	2251371	22685914	27	6065710	28751588
5D11	TITLE II - AY FARM	1497662	0	1497662	12.31	184361	1682023	20	336404	2018430
5D12	DISC 35-65 SUPPORT ACTIVITIES	843261	0	843261	12.31	103806	947067	20	189413	1136480
	SUBTOTAL 5D1 TITLE II - AY FARM	2340923	0	2340923	12.31	288167	2629090	20	525817	3154910

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5D21	TITLE III AY	1109078	0	1109078	15.40	170797	1279875	20	255973	1535853
	SUBTOTAL 5D2 TITLE III - AY FARM	1109078	0	1109078	15.40	170797	1279875	20	255973	1535853
5D3A	ADVANCE PROCUREMENT INSTRUMENTATION	275594	0	275594	13.43	37012	312606	25	78152	390758
	SUBTOTAL 5D3 ADVANCED PROCUREMENT	275594	0	275594	13.43	37012	312606	25	78152	390758
5D4A	TANK 101	1525387	0	1525387	16.83	256719	1782106	30	534635	2316750
5D4B	TANK 102	1468392	0	1468392	16.83	247129	1715521	30	514659	2230187
5D4I	GENERAL REQUIREMENTS	638032	0	638032	16.83	107381	745413	35	260895	1006307
5D4J	SITE WORK	2682461	0	2682461	16.83	451459	3133920	34	1067968	4201887
	SUBTOTAL 5D4 CONSTRUCTION FORCES	6314272	0	6314272	16.83	1062688	7376960	32	2378157	9755131
5D61	HPT SUPPORT - FY 01	43198	0	43198	12.99	5611	48809	10	4881	53690
5D62	HPT SUPPORT - FY 02	129593	0	129593	16.04	20787	150380	10	15038	165418
	SUBTOTAL 5D6 HPT SUPPORT AY	172791	0	172791	15.28	26398	199189	10	19919	219108
	SUBTOTAL 5D AY TANK FARM	10212658	0	10212658	15.52	1585062	11797720	28	3258018	15055760
5E11	TITLE II - AZ FARM	1538459	0	1538459	12.31	189382	1727841	20	345568	2073412
5E12	DISC 35-65 SUPPORT ACTIVITIES	845453	0	845453	12.31	104076	949529	20	189906	1139434
	SUBTOTAL 5E1 TITLE II - AZ	2383912	0	2383912	12.31	293458	2677370	20	535474	3212846
5E21	TITLE III AZ	1117151	0	1117151	15.40	172039	1289190	20	257838	1547029
	SUBTOTAL 5E2 TITLE III - AZ	1117151	0	1117151	15.40	172039	1289190	20	257838	1547029
5E3A	ADVANCE PROCUREMENT INSTRUMENTATION	263354	0	263354	13.99	36843	300197	25	75049	375247
	SUBTOTAL 5E3 ADVANCE PROCUREMENT	263354	0	263354	13.99	36843	300197	25	75049	375247

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5E4A	TANK 101	1087273	0	1087273	16.83	182986	1270259	30	381079	1651343
5E4B	TANK 102	851681	0	851681	16.83	143337	995018	30	298507	1293526
5E4I	GENERAL REQUIREMENTS	566747	0	566747	16.83	95383	662130	35	231745	893875
5E4J	SITE WORK	2495631	0	2495631	16.83	420015	2915646	34	993942	3909589
5E4M	SLUICE PIT 02B	342031	0	342031	16.83	57563	399594	35	139857	539453
	SUBTOTAL 5E4 CONSTRUCTION FORCES	5343363	0	5343363	16.83	899284	6242647	33	2045130	8287786
5E61	HPT SUPPORT - FY 01	43198	0	43198	12.99	5611	48809	10	4881	53690
5E62	HPT SUPPORT - FY 02	129593	0	129593	16.04	20787	150380	10	15038	165418
	SUBTOTAL 5E6 HPT SUPPORT AZ	172791	0	172791	15.28	26398	199189	10	19919	219108
	SUBTOTAL 5E AZ TANK FARM	9280571	0	9280571	15.39	1428022	10708593	27	2933410	13642016
5F11	TITLE II - SY FARM	1996241	0	1996241	9.67	193040	2189281	20	437857	2627134
5F12	DISC 35-65 SUPPORT ACTIVITIES	882032	0	882032	9.67	85292	967324	20	193464	1160789
	SUBTOTAL 5F1 TITLE II - SY FARM	2878273	0	2878273	9.67	278332	3156605	20	631321	3787923
5F21	TITLE III SY	1262030	0	1262030	13.15	165955	1427985	20	285597	1713585
	SUBTOTAL 5F2 TITLE III - SY FARM	1262030	0	1262030	13.15	165955	1427985	20	285597	1713585
5F3A	ADVANCE PROCUREMENT INSTRUMENTATION	128306	0	128306	11.25	14434	142740	25	36139	178880
5F3B	ADVANCE PROCUREMENT INSTRUMENTATION	231064	0	231064	11.25	25995	257059	25	64265	321323
5F3C	ADVANCE PROCUREMENT INSTRUMENTATION	422960	0	422960	11.25	47583	470543	25	117636	588179
	SUBTOTAL 5F3 ADVANCE PROCUREMENT	782330	0	782330	11.25	88012	870342	25	218040	1088382
5F4A	TANK 101	669597	0	669597	14.55	97428	767025	30	230103	997133
5F4B	TANK 102	967354	0	967354	14.55	140751	1108105	30	332425	1440538
5F4C	TANK 103	635289	0	635289	14.55	92436	727725	30	218313	946043
5F4I	GENERAL REQUIREMENTS	1183145	0	1183145	14.55	172147	1355292	35	477611	1832905

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5F4J	SITE WORK	2977063	0	2977063	14.55	433162	3410225	34	1144505	4554728
5F4K	VALVE PIT SY-A	385757	0	385757	14.55	56127	441884	35	154660	596544
5F4L	VALVE PIT SY-B	396403	0	396403	14.55	57676	454079	35	158928	613007
SUBTOTAL 5F4	CONSTRUCTION FORCES	7214608	0	7214608	14.55	1049727	8264335	33	2716545	10980898
5F61	HPT SUPPORT - FY 00	17279	0	17279	10.02	1731	19010	10	1901	20911
5F62	HPT SUPPORT - FY 01	259185	0	259185	12.99	33668	292853	10	29285	322138
5F63	HPT SUPPORT - FY 02	64820	0	64820	16.04	10397	75217	10	7522	82739
SUBTOTAL 5F6	HPT SUPPORT SY	341284	0	341284	13.42	45796	387080	10	38708	425788
SUBTOTAL 5F	SY TANK FARM	12478525	0	12478525	13.04	1627822	14106347	28	3890211	17996576
SUBTOTAL 5	DOUBLE SHELL TANKS	94110319	0	94110319	16.74	15751889	109862208	27	29479746	139341944
6A11	TITLE II - 244-A DCRT	1437084	0	1437084	8.66	124452	1561536	20	312309	1873845
6A12	DISC 35-65 SUPPORT ACTIVITIES	498886	0	498886	8.66	43203	542089	20	108418	650509
SUBTOTAL 6A1	TITLE II - 244-A DCRT	1935970	0	1935970	8.66	167655	2103625	20	420727	2524354
6A21	244-A DCRT-A & SST SUPPPORT	711971	0	711971	10.72	76324	788295	20	157660	945954
SUBTOTAL 6A2	TITLE III - 244-A DCRT	711971	0	711971	10.72	76324	788295	20	157660	945954
6A3A	ADVANCE PROCUREMENT INSTRUMENTATION	187740	0	187740	9.67	18154	205894	25	51474	257368
6A3B	ADVANCE PROCUREMENT VENT SYSTEM	136986	0	136986	9.67	13247	150233	25	37558	187791
SUBTOTAL 6A3	PROCUREMENT	324726	0	324726	9.67	31401	356127	25	89032	445159
6A4A	GENERAL REQUIREMENTS	1115220	0	1115220	11.78	131374	1246594	34	429727	1676320
6A4B	244-A DCRT	959020	0	959020	11.78	112973	1071993	26	282973	1354963
6A4C	242-A BLDG.	16303	0	16303	11.78	1920	18223	28	5101	23324
6A4D	SITE WORK	62083	0	62083	11.78	7315	69398	25	17652	87050
6A4I	OFFICIAL ACCEPTANCE OF CONST.	98401	0	98401	11.78	11591	109992	30	32998	142990
SUBTOTAL 6A4	CONSTRUCTION FORCES	2251027	0	2251027	11.78	265173	2516200	31	768451	3284647

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** IEST - INTERACTIVE ESTIMATING **
TANK FARM RESTORATION AND SAFE OPERATIONS
W - 3 1 4 CONCEPTUAL ESTIMATE REV.1
DOE_R02 - WORK BREAKDOWN STRUCTURE SUMMARY

DATE 04/23/96 14:56:24
BY TLW RDP DKH JJM

WBS	DESCRIPTION	ESTIMATE SUBTOTAL	ONSITE INDIRECTS	SUB TOTAL	ESCALATION %	ESCALATION TOTAL	SUB TOTAL	CONTINGENCY %	CONTINGENCY TOTAL	TOTAL DOLLARS
6A61	HPT SUPPORT - FY 00	86395	0	86395	10.02	8657	95052	10	9505	104557
6A62	HPT SUPPORT - FY 01	21622	0	21622	12.99	2809	24431	10	2443	26874
	SUBTOTAL 6A6 HPT SUPPORT 244-A	108017	0	108017	10.62	11466	119483	10	11948	131431
	SUBTOTAL 6A 244-A DCRT	5331711	0	5331711	10.35	552019	5883730	25	1447818	7331545
6B11	TITLE II - 244-S DCRT	1322890	0	1322890	7.23	95643	1418533	20	283707	1702237
6B12	DISC 35-65 SUPPORT ACTIVITIES	440034	0	440034	7.23	31814	471848	20	94369	566218
	SUBTOTAL 6B1 TITLE II - 244-S DCRT	1762924	0	1762924	7.23	127457	1890381	20	378076	2268455
6B21	244-S DCRT-S	862125	0	862125	9.15	78884	941009	20	188201	1129212
	SUBTOTAL 6B2 TITLE III - 244-S DCRT	862125	0	862125	9.15	78884	941009	20	188201	1129212
6B3A	INSTRUMENTATION	265322	0	265322	8.18	21703	287025	25	71756	358782
6B3B	VENTILATION SYSTEM	126106	0	126106	8.18	10315	136421	25	34105	170527
	SUBTOTAL 6B3 PROCUREMENT	391428	0	391428	8.18	32018	423446	25	105861	529309
6B4A	GENERAL REQUIREMENTS	1028268	0	1028268	9.67	99433	1127701	34	388240	1515944
6B4B	244-S DCRT	943671	18830	962501	9.67	93076	1055577	26	273504	1329083
6B41	OFFICIAL ACCEPTANCE OF CONST.	98401	0	98401	9.67	9516	107917	30	32375	140292
	SUBTOTAL 6B4 CONSTRUCTION FORCES	2070340	18830	2089170	9.67	202025	2291195	30	694119	2985319
6B61	HPT SUPPORT - FY 99	21622	0	21622	7.13	1542	23164	10	2316	25480
6B62	HPT SUPPORT - FY 00	86395	0	86395	10.02	8657	95052	10	9505	104557
6B63	HPT SUPPORT - FY 01	5417	0	5417	13.00	704	6121	10	612	6733
	SUBTOTAL 6B6 HPT SUPPORT 244-S	113434	0	113434	9.61	10903	124337	10	12433	136770
	SUBTOTAL 6B 244-S DCRT	5200251	18830	5219081	8.65	451287	5670368	24	1378690	7049065

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W - 3 1 4 CONCEPTUAL ESTIMATE REV.1
DOE_R02 - WORK BREAKDOWN STRUCTURE SUMMARY

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WBS	DESCRIPTION	ESTIMATE SUBTOTAL	ONSITE INDIRECTS	SUB TOTAL	ESCALATION %	ESCALATION TOTAL	SUB TOTAL	CONTINGENCY %	CONTINGENCY TOTAL	TOTAL DOLLARS
6C11	TITLE II - 200 E/W	2668788	0	2668788	6.52	174005	2842793	20	568561	3411350
6C12	DISC 35-65 SUPPORT ACTIVITIES	843857	0	843857	6.52	55020	898877	20	179776	1078651
	SUBTOTAL 6C1 TITLE II - 200 E/W	3512645	0	3512645	6.52	229025	3741670	20	748337	4490001
6C21	TITLE III - 200 E/W	1333463	0	1333463	10.72	142945	1476408	20	294629	1771037
	SUBTOTAL 6C2 TITLE III - 200 E/W	1333463	0	1333463	10.72	142945	1476408	20	294629	1771037
6C3A	ADVANCED PROCUREMENT INSTRU.	290671	0	290671	8.18	23777	314448	20	62890	377337
	SUBTOTAL 6C3 PROCUREMENT	290671	0	290671	8.18	23777	314448	20	62890	377337
6C4A	GENERAL REQUIREMENTS	849060	0	849060	11.51	97727	946787	35	331374	1278162
6C4B	GENERAL REQUIREMENTS	10239919	0	10239919	11.51	1178613	11418532	35	3984279	15402812
6C4C	VALVE PIT 241-A-A	624768	0	624768	11.51	71910	696678	34	235141	931819
6C4D	VALVE PIT 241-A-B	625130	0	625130	11.51	71953	697083	34	235747	932829
6C4E	VALVE PIT 241-AX-A	721971	0	721971	11.51	83098	805069	33	262083	1067154
6C4F	VALVE PIT 241-AX-B	619208	0	619208	11.51	71271	690479	34	233435	923915
6C4I	OFFICIAL ACCEPTANCE OF CONST.	123066	0	123066	11.51	14165	137231	30	41169	178400
	SUBTOTAL 6C4 CONSTRUCTION FORCES	13803122	0	13803122	11.51	1588737	15391859	35	5323228	20715091
6C61	HPT SUPPORT FY 99	43198	0	43198	7.13	3080	46278	10	4628	50906
6C62	HPT SUPPORT FY 00	172790	0	172790	10.02	17314	190104	10	19010	209114
6C63	HPT SUPPORT FY 01	172790	0	172790	12.99	22445	195235	10	19524	214759
6C64	HPT SUPPORT FY 02	10788	0	10788	16.04	1730	12518	10	1252	13770
	SUBTOTAL 6C6 HPT SUPPORT 2E/2W	399566	0	399566	11.15	44569	444135	10	44414	488549
	SUBTOTAL 6C 200 EAST/WEST AREA	19339467	0	19339467	10.49	2029053	21368520	30	6473498	27842015
6D11	TITLE II - SST	354475	0	354475	6.06	21483	375958	20	75191	451146
6D12	DISC 35-65 SUPPORT ACTIVITIES	444958	0	444958	6.06	26965	471923	20	94384	566308

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DOE_R02 - WORK BREAKDOWN STRUCTURE SUMMARY

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WBS	DESCRIPTION	ESTIMATE SUBTOTAL	ONSITE INDIRECTS	SUB TOTAL	ESCALATION %	ESCALATION TOTAL	SUB TOTAL	CONTINGENCY %	CONTINGENCY TOTAL	TOTAL DOLLARS
	SUBTOTAL 6D1 TITLE II - SST	799433	0	799433	6.06	48448	847881	20	169575	1017454
6D21	TITLE III ENG. DURING CONST.	702620	0	702620	9.41	66117	768737	20	153747	922484
	SUBTOTAL 6D2 TITLE III SST - ENG. DURING	702620	0	702620	9.41	66117	768737	20	153747	922484
6D4A	GENERAL REQUIREMENTS	39785	0	39785	9.67	3847	43632	30	13090	56722
	SUBTOTAL 6D4 CONSTRUCTION FORCES	39785	0	39785	9.67	3847	43632	30	13090	56722
6D5A	GENERAL REQUIREMENTS	68223	8404	76627	9.40	7203	83830	20	17075	100906
6D5B	A FARM	109440	37545	146985	9.40	13816	160802	20	32768	193570
6D5C	AX FARM	109447	22546	131993	9.40	12407	144401	21	30309	174709
6D5D	B FARM	109447	22546	131993	9.40	12407	144401	21	30309	174709
6D5E	BX FARM	109447	22546	131993	9.40	12407	144401	21	30309	174709
6D5F	BY FARM	109447	22546	131993	9.40	12407	144401	21	30309	174709
6D5G	C FARM	120531	24830	145361	9.40	13664	159024	21	33229	192253
6D5H	T FARM	109447	22546	131993	9.40	12407	144401	21	30309	174709
6D5I	TX FARM	147947	30477	178424	9.40	16772	195197	22	43008	238203
6D5J	TY FARM	109447	22546	131993	9.40	12407	144401	21	30309	174709
6D5K	S FARM	109447	22546	131993	9.40	12407	144401	21	30309	174709
6D5L	SY FARM	109447	22546	131993	9.40	12407	144401	21	30309	174709
6D5M	U FARM	109447	22546	131993	9.40	12407	144401	21	30309	174709
	SUBTOTAL 6D5 FIXED PRICE CONSTRUCTION	1431164	304170	1735334	9.40	163118	1898462	21	398861	2297313
6D61	HPT SUPPORT FY 99	172790	0	172790	7.13	12320	185110	10	18511	203621
6D62	HPT SUPPORT FY 00	172790	0	172790	10.02	17314	190104	10	19010	209114
	SUBTOTAL 6D6 HPT SUPPORT SST	345580	0	345580	8.58	29634	375214	10	37521	412735
	SUBTOTAL 6D SST SUPPORT SYSTEMS	3318582	304170	3622752	8.59	311164	3933926	20	772794	4706708
	SUBTOTAL 6 INTERFARM SUPPORT SYSTEMS	33190011	323000	33513011	9.98	3343523	36856544	27	10072800	46929333

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WBS	DESCRIPTION	ESTIMATE SUBTOTAL	ONSITE INDIRECTS	SUB TOTAL	ESCALATION %	ESCALATION TOTAL	SUB TOTAL	CONTINGENCY %	CONTINGENCY TOTAL	TOTAL DOLLARS
	PROJECT TOTAL	201,534,192	323,000	201,857,192	12.71	25,659,872	227,517,074	20	45,656,973	273,174,040

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FILE NO. W314BAC2

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DOE_R03 - ESTIMATE BASIS SHEET

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1. DOCUMENTS AND DRAWINGS
=====================
DOCUMENTS: CONCEPTUAL DESIGN REPORT, TANK FARM RESTORATION AND SAFE OPERATIONS, DATED (MARCH/96) AND SKETCHES AS PROVIDED BY THE ENGINEER. @RCR COMMENTS BY @MACTEC.

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

3. LABOR RATES
===========
A.) @ICF-@KH HOURLY RATES ARE BASED ON THE 1996 FISCAL YEAR BUDGET LIQUIDATION RATES AS ISSUED BY KEH FINANCE (EFFECTIVE 03-18-96). SEE ALSO THE @FY 1996 PLANNING RATES * (REPORT @BGHB7012).
B.) BASE CRAFT RATES ARE AS ISSUED BY KEH FINANCE (EFFECTIVE 10-01-95). RATES INCLUDE FRINGE BENEFITS, LABOR INSURANCE, TAXES DEPARTMENTAL OVERHEADS, G&A AND @SWS, AND TRAVEL.
* SEE HANFORD SOFT REPORTING, @FDS BUDGET GUIDELINE HANDBOOK, SECTION 2 - COMPANY INFORMATION, FY 1996 PLANNING RATES.
C.) WHC HOURLY RATES ARE BASED UPON THE FY 1996 PLANNING RATES * (REPORT BGHB2001).

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 (BGHB) LOCATED ON HANFORD SOFT REPORTING. FDS BUDGET GUIDELINE HANDBOOK. THE PERCENTAGE APPLIED TO @ONSITE CONSTRUCTION FORCES LABOR. FOR THIS PROJECT, IS 52% FOR SHOP WORK AND FIELD WORK, WHICH IS REFLECTED IN THE "OH&P/B&I" COLUMN OF THE ESTIMATE DETAIL.
B.) ONSITE CONTRACT ADMINISTRATION AND CONSTRUCTION MANAGEMENT COSTS, ASSOCIATED WITH THE OVERALL MANAGEMENT OF THE FIXED PRICE CONTRACTS, ARE INCLUDED AS A COMPOSITE PERCENTAGE AND LUMP SUM ALLOWANCE)FOR BID PACKAGE PREP) BASED ON THE ESTIMATING FACTOR/BILLING SCHEDULE. THE TOTAL COMPOSITE PERCENTAGE AND LUMP SUM ALLOWANCE ARE APPLIED AGAINST THE TOTAL FIXED PRICE CONTRACT AMOUNT WHICH IS REFLECTED ON THE KEH SUMMARY REPORT DOE_R07, INCLUDED WITH THIS ESTIMATE, (FINAL ESTIMATES MAY BE PARTIALLY MANLOADED AND INCLUDED WITHIN THE ESTIMATE DETAIL).
C.) FIXED PRICE CONTRACTOR OVERHEAD, PROFIT, BOND AND INSURANCE COSTS HAVE BEEN APPLIED AT THE FOLLOWING PERCENTAGES AND ARE REFLECTED IN THE "OH&P/B&I" COLUMN OF THE ESTIMATE DETAIL:
LABOR - 30%, MATERIAL - 30%, EQUIPMENT USE - 10%, EQUIPMENT - 0% AND SUBCONTRACTS - 10%

5. ESCALATION
==========
ESCALATION PERCENTAGES WERE CALCULATED FROM THE AUGUST, 1995 UPDATE OF THE ECONOMIC ESCALATION PRICE CHANGE INDICES FOR DOE CONSTRUCTION PROJECTS AS PUBLISHED BY THE "OFFICE OF INFRASTRUCTURE ACQUISITION" FM-50.

6. ROUNDING
=====================
U.S. DEPARTMENT OF ENERGY - DOE ORDER 5100.4 PAGE I-32 SUBPARAGRAPH (M), REQUIRES ROUNDING OF ALL GENERAL PLANT PROJECTS (@GPP'S) AND LINE ITEM (LI) COST ESTIMATES. REFERENCE: DOE 5100.4, FIGURE I-11, DATED 10-31-84.

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W - 3 1 4 CONCEPTUAL - REV.1
TANK FARM RESTORATION AND SAFE OPERATIONS
DOE_R03 - ESTIMATE BASIS SHEET

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 15@mr (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 2@EA 30T GROVES AND 1EA @MANITOWOC 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-AZ WASTE RETRIEVAL SYSTEM.
6. PROJECTS W-211 AND W-030 "LESSONS LEARNED" WERE INCORPORATED INTO THE COST ESTIMATE FOR JUMPERS AND EXCAVATION.
7. PER WHC 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. THE EXISTING PIPING IS ABANDONED IN PLACE.
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 @HPT'S AND OPERATORS, ACCESS THROUGH THE @WRAM SYSTEMS, LARGE CREW (CHANGE TRAILER LIMITATIONS), CONFLICTS WITH WHC OPERATIONS, INITIAL PREJOB BRIEFINGS WHICH CAN TAKE UP TO ONE HOUR, REASSIGNMENT OF PERSONNEL WHICH WILL CAUSE A REVIEW OF 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.

KAISER ENGINEERS HANFORD
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DOE_R04 - COST CODE ACCOUNT SUMMARY

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COST CODE/WBS	DESCRIPTION	ESTIMATE SUBTOTAL	ONSITE INDIRECTS	SUB TOTAL	ESCALATION %	ESCALATION TOTAL	SUB TOTAL	CONTINGENCY %	CONTINGENCY TOTAL	TOTAL DOLLARS
010	ENGINEERING - TITLE I									
41AN	TITLE I - AN FARM	379273	0	379273	3.93	14905	394178	15	59126	453304
41AP	TITLE I - AP FARM	187687	0	187687	3.93	7375	195062	15	29259	224323
41AW	TITLE I - AW FARM	148321	0	148321	3.93	5829	154150	15	23122	177272
41AY	TITLE I - AY FARM	83586	0	83586	3.93	3284	86870	15	13032	99901
41AZ	TITLE I - AZ FARM	101538	0	101538	3.93	3990	105528	15	15830	121357
41SY	TITLE I - SY FARM	139864	0	139864	3.93	5496	145360	15	21802	167164
42DA	TITLE I - 244A DCRT	145457	0	145457	3.93	5717	151174	15	22676	173851
42DS	TITLE I - 244S DCRT	99218	0	99218	3.93	3900	103118	15	15466	118586
43EW	TITLE I - EAST/WEST	179284	0	179284	3.93	7045	186329	15	27948	214280
44SS	TITLE I - SINGLE SHELL TANKS	49867	0	49867	3.93	1960	51827	15	7774	59600
4500	TITLE I - SUPPORT	2537884	0	2537884	3.49	88489	2626373	15	393954	3020330
4710	TITLE I - PLANNING	1116246	0	1116246	3.93	43867	1160113	15	174017	1334131
TOTAL 010	ENGINEERING - TITLE I	5168225	0	5168225	3.71	191857	5360082	15	804006	6164099
020	ENGINEERING - TITLE II									
5A11	TITLE II - AN FARM	2785094	0	2785094	15.68	436704	3221798	20	644358	3866157
5A12	DISC 35-65 SUPPORT ACTIVITIES	963857	0	963857	15.68	151131	1114988	20	222998	1337987
5B11	TITLE II - AP FARM	2293977	0	2293977	17.12	392727	2686704	20	537338	3224050
5B12	DISC 35-65 SUPPORT ACTIVITIES	931337	0	931337	17.12	159446	1090783	20	218156	1308937
5C11	TITLE II - AW FARM	2398717	0	2398717	6.75	161911	2560628	20	512128	3072757
5C12	DISC 35-65 SUPPORT ACTIVITIES	1010033	0	1010033	6.75	68178	1078211	20	215641	1293852
5D11	TITLE II - AY FARM	1497662	0	1497662	12.31	184361	1682023	20	336404	2018430
5D12	DISC 35-65 SUPPORT ACTIVITIES	843261	0	843261	12.31	103806	947067	20	189413	1136480
5E11	TITLE II - AZ FARM	1538459	0	1538459	12.31	189382	1727841	20	345568	2073412
5E12	DISC 35-65 SUPPORT ACTIVITIES	845453	0	845453	12.31	104076	949529	20	189906	1139434
5F11	TITLE II - SY FARM	1996241	0	1996241	9.67	193040	2189281	20	437857	2627134
5F12	DISC 35-65 SUPPORT ACTIVITIES	882032	0	882032	9.67	85292	967324	20	193464	1160789
6A11	TITLE II - 244-A DCRT	1437084	0	1437084	8.66	124452	1561536	20	312309	1873845
6A12	DISC 35-65 SUPPORT ACTIVITIES	498886	0	498886	8.66	43203	542089	20	108418	650509
6B11	TITLE II - 244-S DCRT	1322890	0	1322890	7.23	95643	1418533	20	283707	1702237
6B12	DISC 35-65 SUPPORT ACTIVITIES	440034	0	440034	7.23	31814	471848	20	94369	566218
6C11	TITLE II - 200 E/W	2668788	0	2668788	6.52	174005	2842793	20	568561	3411350
6C12	DISC 35-65 SUPPORT ACTIVITIES	843857	0	843857	6.52	55020	898877	20	179776	1078651
6D11	TITLE II - SST	354475	0	354475	6.06	21483	375958	20	75191	451146
6D12	DISC 35-65 SUPPORT ACTIVITIES	444958	0	444958	6.06	26965	471923	20	94384	566308

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** IEST - INTERACTIVE ESTIMATING **
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W - 3 1 4 CONCEPTUAL ESTIMATE REV.1
DOE_R04 - COST CODE ACCOUNT SUMMARY

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BY TLW RDP DKH JJM

COST CODE/WBS	DESCRIPTION	ESTIMATE SUBTOTAL	ONSITE INDIRECTS	SUB TOTAL	ESCALATION %	ESCALATION TOTAL	SUB TOTAL	CONTINGENCY %	CONTINGENCY TOTAL	TOTAL DOLLARS
TOTAL 020	ENGINEERING - TITLE II	25997095	0	25997095	10.78	2802639	28799734	20	5759946	34559683
030	ENGINEERING - TITLE III									
5A21	TITLE III AN	2429600	0	2429600	20.93	508515	2938115	20	587625	3525739
5B21	TITLE III AP	1778622	0	1778622	22.73	404282	2182904	20	436580	2619482
5C21	TITLE III AW	1700770	0	1700770	10.72	182323	1883093	20	376620	2259713
5D21	TITLE III AY	1109078	0	1109078	15.40	170797	1279875	20	255973	1535853
5E21	TITLE III AZ	1117151	0	1117151	15.40	172039	1289190	20	257838	1547029
5F21	TITLE III SY	1262030	0	1262030	13.15	165955	1427985	20	285597	1713585
6A21	244-A DCRT-A & SST SUPPPORT	711971	0	711971	10.72	76324	788295	20	157660	945954
6B21	244-S DCRT-S	862125	0	862125	9.15	78884	941009	20	188201	1129212
6C21	TITLE III - 200 E/W	1333463	0	1333463	10.72	142945	1476408	20	294629	1771037
6D21	TITLE III ENG. DURING CONST.	702620	0	702620	9.41	66117	768737	20	153747	922484
TOTAL 030	ENGINEERING - TITLE III	13007430	0	13007430	15.13	1968181	14975611	20	2994470	17970088
060	PROJECT MANAGEMENT									
1A01	PM & INTEGRATION TITLE - I	427746	0	427746	2.89	12375	440121	10	44012	484133
1A02	PM & INTEGRATION TITLE - II	2239150	0	2239150	10.43	233582	2472732	10	247273	2720006
1A03	PM & INTEGRATION - CONST.	2320133	0	2320133	17.15	397838	2717971	10	271797	2989769
1B01	SYSTEMS ENG. MGMT. - TITLE I	471240	0	471240	2.67	12563	483803	10	48380	532183
1B02	SYSTEMS ENG. MGMT. - TITLE II	793968	0	793968	10.37	82369	876337	10	87633	963971
1B03	SYSTEMS ENG. MGMT. - CONST	573750	0	573750	21.54	123560	697310	10	69731	767042
1C01	PC/BUSINESS MGMT - TITLE I	248799	0	248799	2.67	6633	255432	10	25543	280975
1C02	PC/BUSINESS MGMT - TITLE II	846564	0	846564	10.43	88288	934852	10	93485	1028338
1C03	PC/BUSINESS MGMT - CONST	585178	0	585178	21.54	126069	711247	10	71125	782372
1D01	QUALITY ASSURANCE - TITLE I	220742	0	220742	2.94	6490	227232	10	22723	249955
1D02	QUALITY ASSURANCE - TITLE II	551855	0	551855	10.10	55726	607581	10	60758	668339
1D03	QUALITY ASSURANCE - CONST.	441484	0	441484	20.82	91928	533412	10	53341	586753
2A01	AIR PERMITTING	81043	0	81043	4.31	3493	84536	10	8454	92990
2A02	PART B DANGEROUS WASTE PERMITS	60534	0	60534	13.09	7926	68460	10	6846	75307
2A03	PRE-OP DETERMINATION	3077	0	3077	4.32	133	3210	10	321	3531
2B00	SAFETY ANALYSIS	1151886	0	1151886	8.96	103167	1255053	10	125506	1380557
TOTAL 060	PROJECT MANAGEMENT	11017149	0	11017149	12.27	1352140	12369289	10	1236928	13606221

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W - 3 1 4 CONCEPTUAL ESTIMATE REV.1
DOE_R04 - COST CODE ACCOUNT SUMMARY

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600	UTILITIES									
6B4B	244-S DCRT	40252	18830	59082	9.67	5713	64795	20	12959	77754
6D5A	GENERAL REQUIREMENTS	40798	8404	49202	9.40	4625	53827	15	8074	61902
6D5B	A FARM	109440	37545	146985	9.40	13816	160802	20	32768	193570
6D5C	AX FARM	109447	22546	131993	9.40	12407	144401	21	30309	174709
6D5D	B FARM	109447	22546	131993	9.40	12407	144401	21	30309	174709
6D5E	BX FARM	109447	22546	131993	9.40	12407	144401	21	30309	174709
6D5F	BY FARM	109447	22546	131993	9.40	12407	144401	21	30309	174709
6D5G	C FARM	120531	24830	145361	9.40	13664	159024	21	33229	192253
6D5H	T FARM	109447	22546	131993	9.40	12407	144401	21	30309	174709
6D5I	TX FARM	109447	22546	131993	9.40	12407	144401	21	30309	174709
6D5J	TY FARM	109447	22546	131993	9.40	12407	144401	21	30309	174709
6D5K	S FARM	109447	22546	131993	9.40	12407	144401	21	30309	174709
6D5L	SY FARM	109447	22546	131993	9.40	12407	144401	21	30309	174709
6D5N	U FARM	109447	22546	131993	9.40	12407	144401	21	30309	174709
TOTAL 600	UTILITIES	1405491	315069	1720560	9.41	161888	1882458	21	390120	2272569
700	SPECIAL EQUIP/PROCESS SYSTEMS									
5A3A	ADVANCE PROCUREMENT INSTRUMENTATION	741394	0	741394	17.41	129077	870471	25	217618	1088088
5A3B	PRIMARY VENT SYS ADVANCED PRCMT	710675	0	710675	17.41	123729	834404	25	208601	1043004
5A4A	TANK 101	673305	0	673305	22.13	149004	822309	30	246692	1069001
5A4B	TANK 102	644035	0	644035	22.13	142526	786561	30	235968	1022529
5A4C	TANK 103	551093	0	551093	22.13	121958	673051	30	201916	874968
5A4D	TANK 104	551589	0	551589	22.13	122069	673658	30	202098	875755
5A4E	TANK 105	550976	0	550976	22.13	121931	672907	30	201872	874782
5A4F	TANK 106	627873	0	627873	22.13	138949	766822	30	230046	996870
5A4G	TANK 107	644365	0	644365	22.13	142600	786965	30	236088	1023053
5A4I	GENERAL REQUIREMENTS	2827376	0	2827376	22.13	625700	3453076	30	1035923	4488997
5A4J	SITE WORK	3500755	0	3500755	22.13	774718	4275473	28	1183499	5458968
5A4K	TANK 101 - VALVE PIT AN-A	589719	0	589719	22.13	130506	720225	35	250200	970425
5A4L	TANK 101 - VALVE PIT - AN-B	606395	0	606395	22.13	134196	740591	35	257732	998322
5A61	HPT SUPPORT - FY 02	64820	0	64820	16.04	10397	75217	10	7522	82739
5A62	HPT SUPPORT - FY 03	259185	0	259185	19.17	49686	308871	10	30887	339758
5A63	HPT SUPPORT - FY 04	259185	0	259185	22.39	58032	317217	10	31722	348938
5B3A	ADVANCE PROCUREMENT INSTRUMENTATION	1355706	0	1355706	18.86	255686	1611392	25	402848	2014240
5B3B	PRIMARY VENT SYS ADVANCED PRCMT	710675	0	710675	18.86	134033	844708	25	211177	1055885

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5B4A	TANK 101	578563	0	578563	23.64	136773	715336	30	214601	929934
5B4B	TANK 102	868024	0	868024	23.64	205201	1073225	30	321970	1395191
5B4C	TANK 103	654926	0	654926	23.64	154826	809752	30	242927	1052676
5B4D	TANK 104	577152	0	577152	23.64	136440	713592	30	214078	927667
5B4E	TANK 105	648735	0	648735	23.64	153362	802097	30	240630	1042726
5B4F	TANK 106	580796	0	580796	23.64	137301	718097	30	215430	933525
5B4G	TANK 107	574354	0	574354	23.64	135778	710132	30	213040	923170
5B4H	TANK 108	574581	0	574581	23.64	135833	710414	30	213125	923534
5B4I	GENERAL REQUIREMENTS	1982757	0	1982757	23.64	468724	2451481	35	855612	3307092
5B4J	SITE WORK	4854898	0	4854898	23.64	1147697	6002595	28	1658489	7661084
5B4K	VALVE PIT AP	630737	0	630737	23.64	149108	779845	35	271453	1051294
5B61	HPT SUPPORT - FY 02	21622	0	21622	16.04	3468	25090	10	2509	27599
5B62	HPT SUPPORT - FY 03	259185	0	259185	19.17	49686	308871	10	30887	339758
5B63	HPT SUPPORT - FY 04	259185	0	259185	22.39	58032	317217	10	31722	348938
5B64	HPT SUPPORT - FY 05	194412	0	194412	25.69	49944	244356	10	24436	268792
5C3A	ADVANCE PROCUREMENT INSTRUMENTATION	744522	0	744522	6.99	52042	796564	25	199141	995705
5C3B	PRIMARY VENT SYS ADVANCED PRCMT	762960	0	762960	6.99	53331	816291	25	204073	1020364
5C4A	TANK 101	618685	0	618685	12.59	77895	696580	30	208976	905548
5C4B	TANK 102	964901	0	964901	12.59	121485	1086386	30	325916	1412295
5C4C	TANK 103	630584	0	630584	12.59	79393	709977	30	212995	922965
5C4D	TANK 104	601300	0	601300	12.59	75705	677005	30	203103	880103
5C4E	TANK 105	624393	0	624393	12.59	78613	703006	30	210904	913904
5C4F	TANK 106	632738	0	632738	12.59	79664	712402	30	213723	926119
5C4I	GENERAL REQUIREMENTS	1804452	0	1804452	12.59	227182	2031634	35	711072	2742702
5C4J	SITE WORK	5619282	0	5619282	12.59	707467	6326749	27	1731427	8058175
5C4K	VALVE PIT AW	420529	0	420529	12.59	52943	473472	35	164157	637631
5C4L	TANK 101 - VALVE PIT - AW-B	422267	0	422267	12.59	53162	475429	35	164842	640273
5C4V	NEW VENT PITS	282214	0	282214	12.59	35530	317744	35	111210	428956
5C61	HPT SUPPORT - FY 99	21622	0	21622	7.13	1542	23164	10	2316	25480
5C62	HPT SUPPORT - FY 00	259185	0	259185	10.02	25970	285155	10	28516	313671
5C63	HPT SUPPORT - FY 01	259185	0	259185	12.99	33668	292853	10	29285	322138
5C64	HPT SUPPORT - FY 02	21622	0	21622	16.04	3468	25090	10	2509	27599
5D3A	ADVANCE PROCUREMENT INSTRUMENTATION	275594	0	275594	13.43	37012	312606	25	78152	390758
5D4A	TANK 101	1483631	0	1483631	16.83	249692	1733323	30	519999	2253331
5D4B	TANK 102	1453414	0	1453414	16.83	244608	1698022	30	509409	2207438
5D4I	GENERAL REQUIREMENTS	435812	0	435812	16.83	73347	509159	35	178206	687364
5D4J	SITE WORK	2636393	0	2636393	16.83	443706	3080099	34	1049131	4129229
5D61	HPT SUPPORT - FY 01	43198	0	43198	12.99	5611	48809	10	4881	53690
5D62	HPT SUPPORT - FY 02	129593	0	129593	16.04	20787	150380	10	15038	165418
5E3A	ADVANCE PROCUREMENT INSTRUMENTATION	263354	0	263354	13.99	36843	300197	25	75049	375247
5E4A	TANK 101	1042258	0	1042258	16.83	175410	1217668	30	365301	1582974

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5E4B	TANK 102	836703	0	836703	16.83	140816	977519	30	293257	1270777
5E4I	GENERAL REQUIREMENTS	456585	0	456585	16.83	76843	533428	35	186700	720127
5E4J	SITE WORK	2463246	0	2463246	16.83	414564	2877810	34	980701	3858511
5E4M	SLUICE PIT 02B	342031	0	342031	16.83	57563	399594	35	139857	539453
5E61	HPT SUPPORT - FY 01	43198	0	43198	12.99	5611	48809	10	4881	53690
5E62	HPT SUPPORT - FY 02	129593	0	129593	16.04	20787	150380	10	15038	165418
5F3A	ADVANCE PROCUREMENT INSTRUMENTATION	128306	0	128306	11.25	14434	142740	25	36139	178880
5F3B	ADVANCE PROCUREMENT INSTRUMENTATION	231064	0	231064	11.25	25995	257059	25	64265	321323
5F3C	ADVANCE PROCUREMENT INSTRUMENTATION	422960	0	422960	11.25	47583	470543	25	117636	588179
5F4A	TANK 101	654619	0	654619	14.55	95249	749868	30	224957	974828
5F4B	TANK 102	922680	0	922680	14.55	134251	1056931	30	317074	1374011
5F4C	TANK 103	620311	0	620311	14.55	90257	710568	30	213167	923738
5F4I	GENERAL REQUIREMENTS	913463	0	913463	14.55	132909	1046372	35	369489	1415862
5F4J	SITE WORK	2954512	0	2954512	14.55	429880	3384392	34	1135463	4519855
5F4K	VALVE PIT SY-A	384331	0	384331	14.55	55920	440251	35	154088	594339
5F4L	VALVE PIT SY-B	394977	0	394977	14.55	57469	452446	35	158356	610802
5F61	HPT SUPPORT - FY 00	17279	0	17279	10.02	1731	19010	10	1901	20911
5F62	HPT SUPPORT - FY 01	259185	0	259185	12.99	33668	292853	10	29285	322138
5F63	HPT SUPPORT - FY 02	64820	0	64820	16.04	10397	75217	10	7522	82739
6A3A	ADVANCE PROCUREMENT INSTRUMENTATION	187740	0	187740	9.67	18154	205894	25	51474	257368
6A3B	ADVANCE PROCUREMENT VENT SYSTEM	136986	0	136986	9.67	13247	150233	25	37558	187791
6A4A	GENERAL REQUIREMENTS	1022251	0	1022251	11.78	120422	1142673	34	393355	1536027
6A4B	244-A DCRT	907943	0	907943	11.78	106955	1014898	26	262991	1277887
6A4C	242-A BLDG.	12252	0	12252	11.78	1443	13695	27	3743	17437
6A4D	SITE WORK	61399	0	61399	11.78	7234	68633	25	17384	86018
6A4I	OFFICIAL ACCEPTANCE OF CONST.	98401	0	98401	11.78	11591	109992	30	32998	142990
6A61	HPT SUPPORT - FY 00	86395	0	86395	10.02	8657	95052	10	9505	104557
6A62	HPT SUPPORT - FY 01	21622	0	21622	12.99	2809	24431	10	2443	26874
6B3A	INSTRUMENTATION	265322	0	265322	8.18	21703	287025	25	71756	358782
6B3B	VENTILATION SYSTEM	126106	0	126106	8.18	10315	136421	25	34105	170527
6B4A	GENERAL REQUIREMENTS	1028268	0	1028268	9.67	99433	1127701	34	388240	1515944
6B4B	244-S DCRT	861331	0	861331	9.67	83293	944624	26	244390	1189016
6B4I	OFFICIAL ACCEPTANCE OF CONST.	98401	0	98401	9.67	9516	107917	30	32375	140292
6B61	HPT SUPPORT - FY 99	21622	0	21622	7.13	1542	23164	10	2316	25480
6B62	HPT SUPPORT - FY 00	86395	0	86395	10.02	8657	95052	10	9505	104557
6B63	HPT SUPPORT - FY 01	5417	0	5417	13.00	704	6121	10	612	6733
6C3A	ADVANCED PROCUREMENT INSTRU.	290671	0	290671	8.18	23777	314448	20	62890	377337
6C4A	GENERAL REQUIREMENTS	663825	0	663825	11.51	76406	740231	35	259080	999312
6C4B	GENERAL REQUIREMENTS	10232788	0	10232788	11.51	1177792	11410580	35	3981496	15392077
6C4C	VALVE PIT 241-A-A	623580	0	623580	11.51	71773	695353	34	234677	930031
6C4D	VALVE PIT 241-A-B	623942	0	623942	11.51	71816	695758	34	235283	931041

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6C4E	VALVE PIT 241-AX-A	720783	0	720783	11.51	82961	803744	33	261619	1065366
6C4F	VALVE PIT 241-AX-B	618020	0	618020	11.51	71134	689154	34	232971	922127
6C4I	OFFICIAL ACCEPTANCE OF CONST.	123066	0	123066	11.51	14165	137231	30	41169	178400
6C61	HPT SUPPORT FY 99	43198	0	43198	7.13	3080	46278	10	4628	50906
6C62	HPT SUPPORT FY 00	172790	0	172790	10.02	17314	190104	10	19010	209114
6C63	HPT SUPPORT FY 01	172790	0	172790	12.99	22445	195235	10	19524	214759
6C64	HPT SUPPORT FY 02	10788	0	10788	16.04	1730	12518	10	1252	13770
6D4A	GENERAL REQUIREMENTS	39785	0	39785	9.67	3847	43632	30	13090	56722
6D5A	GENERAL REQUIREMENTS	27425	0	27425	9.40	2578	30003	30	9001	39004
6D5I	TX FARM	38500	7931	46431	9.40	4365	50796	25	12699	63494
6D61	HPT SUPPORT FY 99	172790	0	172790	7.13	12320	185110	10	18511	203621
6D62	HPT SUPPORT FY 00	172790	0	172790	10.02	17314	190104	10	19010	209114
TOTAL 700	SPECIAL EQUIP/PROCESS SYSTEM	83597981	7931	83605912	16.24	13579465	97185377	30	29133085	126318435
810	DEMOLITION									
5A4A	TANK 101	44674	0	44674	22.13	9886	54560	30	16368	70928
5A4B	TANK 102	44674	0	44674	22.13	9886	54560	30	16368	70928
5A4C	TANK 103	14978	0	14978	22.13	3314	18292	30	5488	23780
5A4D	TANK 104	14978	0	14978	22.13	3314	18292	30	5488	23780
5A4E	TANK 105	14978	0	14978	22.13	3314	18292	30	5488	23780
5A4F	TANK 106	44843	0	44843	22.13	9923	54766	30	16430	71196
5A4G	TANK 107	44674	0	44674	22.13	9886	54560	30	16368	70928
5A4I	GENERAL REQUIREMENTS	360413	0	360413	22.13	79760	440173	30	132052	572224
5A4J	SITE WORK	34116	0	34116	22.13	7549	41665	35	14583	56249
5A4K	TANK 101 - VALVE PIT AN-A	476	0	476	22.06	105	581	35	203	785
5A4L	TANK 101 - VALVE PIT - AN-B	476	0	476	22.06	105	581	35	203	785
5B4A	TANK 101	43106	0	43106	23.64	10191	53297	30	15989	69286
5B4B	TANK 102	43278	0	43278	23.64	10232	53510	30	16052	69562
5B4C	TANK 103	45015	0	45015	23.64	10643	55658	30	16696	72354
5B4D	TANK 104	43278	0	43278	23.64	10232	53510	30	16052	69562
5B4E	TANK 105	45015	0	45015	23.64	10643	55658	30	16696	72354
5B4F	TANK 106	43278	0	43278	23.64	10232	53510	30	16052	69562
5B4G	TANK 107	43278	0	43278	23.64	10232	53510	30	16052	69562
5B4H	TANK 108	43278	0	43278	23.64	10232	53510	30	16052	69562
5B4I	GENERAL REQUIREMENTS	384871	0	384871	23.64	90983	475854	35	166549	642403
5B4J	SITE WORK	38334	0	38334	23.64	9062	47396	35	16589	63985
5B4K	VALVE PIT AP	476	0	476	23.74	113	589	35	206	795
5C4A	TANK 101	14978	0	14978	12.59	1886	16864	30	5059	21924

KAISER ENGINEERS HANFORD
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** IEST - INTERACTIVE ESTIMATING **
TANK FARM RESTORATION AND SAFE OPERATIONS
W - 3 1 4 CONCEPTUAL ESTIMATE REV.1
DOE_R04 - COST CODE ACCOUNT SUMMARY

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COST CODE/WBS	DESCRIPTION	ESTIMATE SUBTOTAL	ONSITE INDIRECTS	SUB TOTAL	ESCALATION %	ESCALATION TOTAL	SUB TOTAL	CONTINGENCY %	CONTINGENCY TOTAL	TOTAL DOLLARS
5C4B	TANK 102	44674	0	44674	12.59	5625	50299	30	15089	65389
5C4C	TANK 103	45015	0	45015	12.59	5668	50683	30	15205	65888
5C4D	TANK 104	34635	0	34635	12.59	4361	38996	30	11699	50695
5C4E	TANK 105	45015	0	45015	12.59	5668	50683	30	15205	65888
5C4F	TANK 106	45015	0	45015	12.59	5668	50683	30	15205	65888
5C4I	GENERAL REQUIREMENTS	369970	0	369970	12.59	46580	416550	35	145792	562341
5C4J	SITE WORK	32904	0	32904	12.59	4143	37047	35	12966	50013
5C4K	VALVE PIT AW	1188	0	1188	12.63	150	1338	35	468	1806
5C4L	TANK 101 - VALVE PIT - AW-B	1188	0	1188	12.63	150	1338	35	468	1806
5D4A	TANK 101	41756	0	41756	16.83	7027	48783	30	14636	63419
5D4B	TANK 102	14978	0	14978	16.83	2521	17499	30	5250	22749
5D4I	GENERAL REQUIREMENTS	202220	0	202220	16.83	34034	236254	35	82689	318943
5D4J	SITE WORK	46068	0	46068	16.83	7753	53821	35	18837	72658
5E4A	TANK 101	45015	0	45015	16.83	7576	52591	30	15778	68369
5E4B	TANK 102	14978	0	14978	16.83	2521	17499	30	5250	22749
5E4I	GENERAL REQUIREMENTS	110162	0	110162	16.83	18540	128702	35	45045	173748
5E4J	SITE WORK	32385	0	32385	16.83	5451	37836	35	13241	51078
5F4A	TANK 101	14978	0	14978	14.55	2179	17157	30	5146	22305
5F4B	TANK 102	44674	0	44674	14.55	6500	51174	30	15351	66527
5F4C	TANK 103	14978	0	14978	14.55	2179	17157	30	5146	22305
5F4I	GENERAL REQUIREMENTS	269682	0	269682	14.55	39238	308920	35	108122	417043
5F4J	SITE WORK	22551	0	22551	14.55	3282	25833	35	9042	34873
5F4K	VALVE PIT SY-A	1426	0	1426	14.52	207	1633	35	572	2205
5F4L	VALVE PIT SY-B	1426	0	1426	14.52	207	1633	35	572	2205
6A4A	GENERAL REQUIREMENTS	92969	0	92969	11.78	10952	103921	35	36372	140293
6A4B	244-A DCRT	51077	0	51077	11.78	6018	57095	35	19982	77076
6A4C	242-A BLDG.	4051	0	4051	11.77	477	4528	30	1358	5887
6A4D	SITE WORK	684	0	684	11.84	81	765	35	268	1032
6B4B	244-S DCRT	42088	0	42088	9.67	4070	46158	35	16155	62313
6C4A	GENERAL REQUIREMENTS	185235	0	185235	11.51	21321	206556	35	72294	278850
6C4B	GENERAL REQUIREMENTS	7131	0	7131	11.51	821	7952	35	2783	10735
6C4C	VALVE PIT 241-A-A	1188	0	1188	11.53	137	1325	35	464	1788
6C4D	VALVE PIT 241-A-B	1188	0	1188	11.53	137	1325	35	464	1788
6C4E	VALVE PIT 241-AX-A	1188	0	1188	11.53	137	1325	35	464	1788
6C4F	VALVE PIT 241-AX-B	1188	0	1188	11.53	137	1325	35	464	1788
TOTAL 810	DEMOLITION	3292333	0	3292333	17.72	583239	3875572	33	1274925	5150502

900 OTHER PROJECT COSTS

KAISER ENGINEERS HANFORD
WESTINGHOUSE HANFORD COMPANY
JOB NO. W314BAC2

** IEST - INTERACTIVE ESTIMATING **
TANK FARM RESTORATION AND SAFE OPERATIONS
W - 3 1 4 CONCEPTUAL ESTIMATE REV.1
DOE_R04 - COST CODE ACCOUNT SUMMARY

DATE 04/23/96 14:56:46
BY TLW RDP DKH JJM

COST CODE/WBS	DESCRIPTION	ESTIMATE SUBTOTAL	ONSITE INDIRECTS	SUB TOTAL	ESCALATION %	ESCALATION TOTAL	SUB TOTAL	CONTINGENCY %	CONTINGENCY TOTAL	TOTAL DOLLARS
3A00	PROJECT DEFINITION	6552000	0	6552000	0.00	0	6552000	0	0	6552000
3B00	PROJECT MANAGEMENT SUPPORT	4244885	0	4244885	0.08	3232	4248117	0	20912	4269029
3C10	DESIGN & CONSTR. SUPPORT	91390	0	91390	2.94	2686	94076	10	9407	103485
3C20	DESIGN & CONSTR. SUPPORT	925324	0	925324	12.07	111717	1037041	10	103703	1140744
3C30	DESIGN & CONSTR. SUPPORT	4735055	0	4735055	14.53	687960	5423015	10	542302	5965317
3D10	ENGINEERING REPORT	208000	0	208000	0.00	0	208000	0	0	208000
3D20	DCBL	9535000	0	9535000	0.00	0	9535000	0	0	9535000
3D30	CONCEPTUAL DESIGN	560000	0	560000	0.00	0	560000	0	0	560000
3D40	ACDR	2026000	0	2026000	0.77	15700	2041700	5	101570	2143270
3E00	PRELIM SAFETY DOC	255000	0	255000	0.00	0	255000	0	0	255000
3F00	PERMITTING PLAN	18000	0	18000	0.00	0	18000	0	0	18000
3G00	NEPA DOCUMENTATION	178346	0	178346	1.24	2219	180565	8	14357	194922
3H00	A/E SELECTION & PROCUREMENT	111000	0	111000	0.00	0	111000	0	0	111000
3I00	QAPP	104133	0	104133	0.17	175	104308	1	1131	105439
3J00	SITE CHARACTERIZATION	289228	0	289228	8.61	24909	314137	10	31413	345552
3K01	STARTUP SUPPORT - AN	1522147	0	1522147	19.70	299883	1822030	10	182203	2004231
3K02	STARTUP ENGINEERING - AN	982443	0	982443	18.77	184423	1166866	10	116686	1283552
3K11	STARTUP SUPPORT - AP	1505042	0	1505042	22.87	344141	1849183	10	184920	2034102
3K12	STARTUP ENGINEERING - AP	1005290	0	1005290	21.53	216465	1221755	10	122175	1343931
3K21	STARTUP SUPPORT - AW	1510634	0	1510634	11.42	172584	1683218	10	168321	1851539
3K22	STARTUP ENGINEERING - AW	999609	0	999609	10.12	101205	1100814	10	110081	1210895
3K31	STARTUP SUPPORT - AY	524897	0	524897	15.87	83322	608219	10	60821	669040
3K32	STARTUP ENGINEERING - AY	845358	0	845358	17.25	145842	991200	10	99120	1090320
3K41	STARTUP SUPPORT - AZ	524897	0	524897	15.87	83322	608219	10	60821	669040
3K42	STARTUP ENGINEERING - AZ	845358	0	845358	17.25	145842	991200	10	99120	1090320
3K51	STARTUP SUPPORT - SY	1403058	0	1403058	13.01	182480	1585538	10	158554	1744091
3K52	STARTUP ENGINEERING - SY	936748	0	936748	13.07	122453	1059201	10	105920	1165121
3K61	STARTUP SUPPORT - 244 A	879835	0	879835	11.13	97916	977751	10	97775	1075527
3K62	STARTUP ENGINEERING - 244 A	485540	0	485540	5.64	27370	512910	10	51291	564201
3K71	STARTUP SUPPORT - 244 S	879835	0	879835	11.13	97916	977751	10	97775	1075527
3K72	STARTUP ENGINEERING - 244 S	485540	0	485540	5.64	27370	512910	10	51291	564201
3K81	STARTUP SUPPORT - 200 E/W	382865	0	382865	10.02	38363	421228	10	42123	463351
3K82	STARTUP ENGINEERING - 200 E/W	285594	0	285594	6.57	18752	304346	10	30435	334781
3K91	STARTUP SUPPORT - SST	211510	0	211510	9.86	20864	232374	10	23237	255610
3K92	STARTUP ENGINEERING - SST	97133	0	97133	5.97	5798	102931	10	10293	113223
3KA0	STARTUP ADMINISTRATION	3136015	0	3136015	15.63	490293	3626308	10	362630	3988939
3L01	READINESS REVIEW - AN	1010884	0	1010884	21.60	218376	1229260	10	122926	1352186
3L11	READINESS REVIEW - AP	1009247	0	1009247	24.53	247617	1256864	10	125686	1382550
3L21	READINESS REVIEW - AW	1036140	0	1036140	11.90	123304	1159444	10	115944	1275387
3L31	READINESS REVIEW - AY	811210	0	811210	14.55	118007	929217	10	92922	1022138
3L41	READINESS REVIEW - AZ	811865	0	811865	14.54	118072	929937	10	92994	1022931

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** IEST - INTERACTIVE ESTIMATING **
TANK FARM RESTORATION AND SAFE OPERATIONS
W - 3 1 4 CONCEPTUAL ESTIMATE REV.1
DOE_R04 - COST CODE ACCOUNT SUMMARY

DATE 04/23/96 14:56:46
BY TLW RDP DKH JJM

COST CODE/WBS	DESCRIPTION	ESTIMATE SUBTOTAL	ONSITE INDIRECTS	SUB TOTAL	ESCALATION %	ESCALATION TOTAL	SUB TOTAL	CONTINGENCY %	CONTINGENCY TOTAL	TOTAL DOLLARS
3L51	READINESS REVIEW - SY	994009	0	994009	15.44	153427	1147436	10	114744	1262180
3L61	READINESS REVIEW - 244 A	763701	0	763701	8.06	61549	825250	10	82525	907775
3L71	READINESS REVIEW - 244 S	763701	0	763701	9.01	68844	832545	10	83255	915799
3L81	READINESS REVIEW - 200 E/W	484599	0	484599	10.02	48557	533156	10	53316	586471
3L91	READINESS REVIEW - SST	120423	0	120423	6.88	8282	128705	10	12870	141576
3M01	IND REV. SYSTEMS ENG. MGMT. - FY 98	160000	0	160000	4.31	6896	166896	10	16690	183586
3M02	IND. REV.SYSTEMS ENG. MGMT. - FY 99	260000	0	260000	7.13	18538	278538	10	27854	306392
3M03	IND. REV.SYSTEMS ENG. MGMT. - FY 00	180000	0	180000	10.02	18036	198036	10	19804	217840
3M04	IND. REV.SYSTEMS ENG. MGMT. - FY 01	220000	0	220000	12.99	28578	248578	10	24858	273436
3M05	IND. REV.SYSTEMS ENG. MGMT. - FY 02	100000	0	100000	16.04	16040	116040	10	11604	127644
3M06	IND. REV.SYSTEMS ENG. MGMT. - FY 04	20000	0	20000	25.69	5138	25138	10	2514	27652
3M07	IND. REV.SYSTEMS ENG. MGMT. - FY 05	20000	0	20000	30.00	6000	26000	10	2600	28600
TOTAL 900	OTHER PROJECT COSTS	58048488	0	58048488	8.65	5020463	63068951	6	4063493	67132443
PROJECT TOTAL		201,534,192	323,000	201,857,192	12.71	25,659,872	227,517,074	20	45,656,973	273,174,040

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** IEST - INTERACTIVE ESTIMATING **
TANK FARM RESTORATION AND SAFE OPERATIONS
W - 3 1 4 CONCEPTUAL ESTIMATE REV.1
DOE_R05 - ESTIMATE SUMMARY BY CSI DIVISION

DATE 04/23/96 14:57:05
BY TLW RDP DKH JJM

CSI	DESCRIPTION	ESTIMATE SUBTOTAL	ONSITE INDIRECTS	SUB TOTAL	ESCALATION %	ESCALATION TOTAL	SUB TOTAL	CONTINGENCY %	CONTINGENCY TOTAL	TOTAL DOLLARS
CONSTRUCTION										
01	GENERAL REQUIRMENTS	32796220	7931	32804151	17.11	5612537	38416688	32	12168232	50584895
02	SITEWORK	13363860	79428	13443288	14.71	1977104	15420392	32	4873481	20293884
03	CONCRETE	1103856	0	1103856	15.38	169749	1273605	29	372510	1646109
05	METALS	604224	0	604224	19.45	117542	721766	25	180441	902207
06	WOOD AND PLASTICS	417589	0	417589	16.27	67951	485540	34	163245	648788
07	MOISTURE AND THERMAL	1010970	0	1010970	17.88	180802	1191772	27	327056	1518821
09	FINISHES	2590332	0	2590332	18.17	470671	3061003	32	970733	4031744
11	EQUIPMENT	4080	0	4080	11.25	459	4539	35	1589	6128
15	MECHANICAL	13792932	0	13792932	15.53	2141374	15934306	29	4685265	20619543
16	ELECTRICAL	19079071	235641	19314712	15.78	3047346	22362068	30	6648405	29010488
21	CIVIL	2650585	0	2650585	9.91	262730	2913315	19	558848	3472179
22	ENVIRON ENGRG	259844	0	259844	12.33	32048	291892	20	58379	350269
27	PIPING/VESSEL	4305781	0	4305781	9.05	389792	4695573	19	883612	5579193
28	HVAC	2261131	0	2261131	9.96	225313	2486444	19	469609	2956050
29	INSTRUMENT	10920034	0	10920034	10.96	1196669	12116703	20	2373806	14490508
31	ELECTRICAL	4002134	0	4002134	9.33	373560	4375694	19	835976	5211666
32	SPECIF	148784	0	148784	11.04	16431	165215	20	33044	198261
35	DESIGN ADMIN	3190778	0	3190778	11.65	371829	3562607	20	702316	4264921
40	PROJECT MANAGER	8061086	0	8061086	13.00	1047604	9108690	20	1798451	10907138
41	WORD PROCESSING	78722	0	78722	12.31	9693	88415	20	17350	105766
44	ACCEPTNCE INSPECTION	1113853	0	1113853	18.28	203589	1317442	20	263433	1580873
45	PROJECT PLANNING	2315857	0	2315857	11.69	270630	2586487	20	508585	3095073
46	ESTIMATES	1318441	0	1318441	10.39	137043	1455484	20	284026	1739514
48	PUBLICTN/EDIT/ASSEMB	23390	0	23390	3.93	919	24309	15	3646	27956
49	SUB/PROC	424379	0	424379	3.81	16175	440554	17	72998	513554
60	CF ADMINISTRATION	286078	0	286078	9.97	28524	314602	19	61277	375880
61	CM ADMINISTRATION	2834	0	2834	3.92	111	2945	15	442	3387
62	SURVEY	279533	0	279533	8.37	23405	302938	18	55732	358672
63	CONSTR ENGRG	431296	0	431296	11.19	48267	479563	20	95912	575476
65	RECORDS MGMT/TURNOVER	377115	0	377115	13.40	50536	427651	20	85199	512848
66	AS-BUILTING	1721095	0	1721095	14.98	257809	1978904	20	395781	2374686
99	WHC LABOR	72598308	0	72598308	9.52	6911660	79509968	7	5707594	85217563
TOTAL CONSTRUCTION		201,534,192	323,000	201,857,192	12.71	25,659,872	227,517,074	20	45,656,973	273,174,040
PROJECT TOTAL		201,534,192	323,000	201,857,192	12.71	25,659,872	227,517,074	20	45,656,973	273,174,040

WESTINGHOUSE HANFORD COMPANY
KAISER ENGINEERS HANFORD
JOB NO. W314@BAC2
FILE # W314BAC2

** IEST - INTERACTIVE ESTIMATING **
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W - 3 1 4 CONCEPTUAL ESTIMATE REV.1
DOE_R06 - CONTINGENCY ANALYSIS BASIS SHEET

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REFERENCE:	ESTIMATE BASIS SHEET	PAGE 15 OF 84
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THE U.S. DEPARTMENT OF ENERGY - @RICHLAND 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.

010 TITLE I

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

020 TITLE II

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, (@EG. 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.

030 TITLE III

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.

060 PROJECT MANAGEMENT

AN AVERAGE OF 10% CONTINGENCY WAS APPLIED DUE TO UNCERTAINTIES IN PERMITTING @ACTIV- @ITIES 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.

WESTINGHOUSE HANFORD COMPANY
KAISER ENGINEERS HANFORD
JOB NO. W314BAC2
FILE # W314BAC2

** IEST - INTERACTIVE ESTIMATING **
TANK FARM RESTORATION AND SAFE OPERATIONS
W - 3 1 4 CONCEPTUAL ESTIMATE REV.1
DOE_R06 - CONTINGENCY ANALYSIS BASIS SHEET

DATE 04/23/96
BY T.L. WALDO

CONSTRUCTION

600	UTILITIES	21%	SITE PLANS FOR TANK FARMS WERE NOT AVAILABLE AND ALLOWANCES WERE USED FOR FOR CONDUIT AND WIRE LENGTHS.
700	SPECIAL EQUIP/PROCESS SYSTEMS	30%	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 @HPT'S; CURRENT PROCEDURES THAT ARE IN EFFECT NOW BUT MAY BE DIFFERENT AT THE TIME OF CONSTRUCTION;
810	DEMOLITION	33%	THE TYPES OF BURIED MATERIAL FOR @LLW, RADIOLOGICAL MIXED WASTE AND @TRU 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.
900	OTHER PROJECT COSTS	6%	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 @STARTUP TESTING.

AVERAGE CONSTRUCTION CONTINGENCY 30%

AVERAGE PROJECT CONTINGENCY 20%

KAISER ENGINEERS HANFORD
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** IEST - INTERACTIVE ESTIMATING **
TANK FARM RESTORATION AND SAFE OPERATIONS
W - 3 1 4 CONCEPTUAL ESTIMATE REV.1
DOE_R07 - ONSITE INDIRECT COSTS BY WBS

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WBS	DESCRIPTION	ESTIMATE SUBTOTAL	CONTRACT %	ADMINISTRATION TOTAL	BID PACK PREP.	OTHER INDIRECTS	TOTAL INDIRECTS
1A01	PM & INTEGRATION TITLE - I	427746	0.00	0	0	0	0
1A02	PM & INTEGRATION TITLE - II	2239150	0.00	0	0	0	0
1A03	PM & INTEGRATION - CONST.	2320133	0.00	0	0	0	0
1B01	SYSTEMS ENG. MGMT. - TITLE I	471240	0.00	0	0	0	0
1B02	SYSTEMS ENG. MGMT. - TITLE II	793968	0.00	0	0	0	0
1B03	SYSTEMS ENG. MGMT. - CONST	573750	0.00	0	0	0	0
1C01	PC/BUSINESS MGMT - TITLE I	248799	0.00	0	0	0	0
1C02	PC/BUSINESS MGMT - TITLE II	846564	0.00	0	0	0	0
1C03	PC/BUSINESS MGMT - CONST	585178	0.00	0	0	0	0
1D01	QUALITY ASSURANCE - TITLE I	220742	0.00	0	0	0	0
1D02	QUALITY ASSURANCE - TITLE II	551855	0.00	0	0	0	0
1D03	QUALITY ASSURANCE - CONST.	441484	0.00	0	0	0	0
2A01	AIR PERMITTING	81043	0.00	0	0	0	0
2A02	PART B DANGEROUS WASTE PERMITS	60534	0.00	0	0	0	0
2A03	PRE-OP DETERMINATION	3077	0.00	0	0	0	0
2B00	SAFETY ANALYSIS	1151886	0.00	0	0	0	0
3A00	PROJECT DEFINITION	6552000	0.00	0	0	0	0
3B00	PROJECT MANAGEMENT SUPPORT	4244885	0.00	0	0	0	0
3C10	DESIGN & CONSTR. SUPPORT	91390	0.00	0	0	0	0
3C20	DESIGN & CONSTR. SUPPORT	925324	0.00	0	0	0	0
3C30	DESIGN & CONSTR. SUPPORT	4735055	0.00	0	0	0	0
3D10	ENGINEERING REPORT	208000	0.00	0	0	0	0
3D20	DCBL	9535000	0.00	0	0	0	0
3D30	CONCEPTUAL DESIGN	560000	0.00	0	0	0	0
3D40	ACDR	2026000	0.00	0	0	0	0
3E00	PRELIM SAFETY DOC	255000	0.00	0	0	0	0
3F00	PERMITTING PLAN	18000	0.00	0	0	0	0
3G00	NEPA DOCUMENTATION	178346	0.00	0	0	0	0
3H00	A/E SELECTION & PROCUREMENT	111000	0.00	0	0	0	0
3I00	QAPP	104133	0.00	0	0	0	0
3J00	SITE CHARACTERIZATION	289228	0.00	0	0	0	0
3K01	STARTUP SUPPORT - AN	1522147	0.00	0	0	0	0
3K02	STARTUP ENGINEERING - AN	982443	0.00	0	0	0	0
3K11	STARTUP SUPPORT - AP	1505042	0.00	0	0	0	0
3K12	STARTUP ENGINEERING - AP	1005290	0.00	0	0	0	0
3K21	STARTUP SUPPORT - AW	1510634	0.00	0	0	0	0
3K22	STARTUP ENGINEERING - AW	999609	0.00	0	0	0	0
3K31	STARTUP SUPPORT - AY	524897	0.00	0	0	0	0
3K32	STARTUP ENGINEERING - AY	845358	0.00	0	0	0	0
3K41	STARTUP SUPPORT - AZ	524897	0.00	0	0	0	0
3K42	STARTUP ENGINEERING - AZ	845358	0.00	0	0	0	0

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WBS	DESCRIPTION	ESTIMATE SUBTOTAL	CONTRACT %	ADMINISTRATION TOTAL	BID PACK PREP.	OTHER INDIRECTS	TOTAL INDIRECTS
3K51	STARTUP SUPPORT - SY	1403058	0.00	0	0	0	0
3K52	STARTUP ENGINEERING - SY	936748	0.00	0	0	0	0
3K61	STARTUP SUPPORT - 244 A	879835	0.00	0	0	0	0
3K62	STARTUP ENGINEERING - 244 A	485540	0.00	0	0	0	0
3K71	STARTUP SUPPORT - 244 S	879835	0.00	0	0	0	0
3K72	STARTUP ENGINEERING - 244 S	485540	0.00	0	0	0	0
3K81	STARTUP SUPPORT - 200 E/W	382865	0.00	0	0	0	0
3K82	STARTUP ENGINEERING - 200 E/W	285594	0.00	0	0	0	0
3K91	STARTUP SUPPORT - SST	211510	0.00	0	0	0	0
3K92	STARTUP ENGINEERING - SST	97133	0.00	0	0	0	0
3KA0	STARTUP ADMINISTRATION	3136015	0.00	0	0	0	0
3L01	READINESS REVIEW - AN	1010884	0.00	0	0	0	0
3L11	READINESS REVIEW - AP	1009247	0.00	0	0	0	0
3L21	READINESS REVIEW - AW	1036140	0.00	0	0	0	0
3L31	READINESS REVIEW - AY	811210	0.00	0	0	0	0
3L41	READINESS REVIEW - AZ	811865	0.00	0	0	0	0
3L51	READINESS REVIEW - SY	994009	0.00	0	0	0	0
3L61	READINESS REVIEW - 244 A	763701	0.00	0	0	0	0
3L71	READINESS REVIEW - 244 S	763701	0.00	0	0	0	0
3L81	READINESS REVIEW - 200 E/W	484599	0.00	0	0	0	0
3L91	READINESS REVIEW - SST	120423	0.00	0	0	0	0
3M01	IND REV. SYSTEMS ENG. MGMT. - FY 98	160000	0.00	0	0	0	0
3M02	IND. REV.SYSTEMS ENG. MGMT. - FY 99	260000	0.00	0	0	0	0
3M03	IND. REV.SYSTEMS ENG. MGMT. - FY 00	180000	0.00	0	0	0	0
3M04	IND. REV.SYSTEMS ENG. MGMT. - FY 01	220000	0.00	0	0	0	0
3M05	IND. REV.SYSTEMS ENG. MGMT. - FY 02	100000	0.00	0	0	0	0
3M06	IND. REV.SYSTEMS ENG. MGMT. - FY 04	20000	0.00	0	0	0	0
3M07	IND. REV.SYSTEMS ENG. MGMT. - FY 05	20000	0.00	0	0	0	0
41AN	TITLE I - AN FARM	379273	0.00	0	0	0	0
41AP	TITLE I - AP FARM	187687	0.00	0	0	0	0
41AW	TITLE I - AW FARM	148321	0.00	0	0	0	0
41AY	TITLE I - AY FARM	83586	0.00	0	0	0	0
41AZ	TITLE I - AZ FARM	101538	0.00	0	0	0	0
41SY	TITLE I - SY FARM	139864	0.00	0	0	0	0
42DA	TITLE I - 244A DCRT	145457	0.00	0	0	0	0
42DS	TITLE I - 244S DCRT	99218	0.00	0	0	0	0
43EW	TITLE I - EAST/WEST	179284	0.00	0	0	0	0
44SS	TITLE I - SINGLE SHELL TANKS	49867	0.00	0	0	0	0
4500	TITLE I - SUPPORT	2537884	0.00	0	0	0	0
4710	TITLE I - PLANNING	1116246	0.00	0	0	0	0
5A11	TITLE II - AN FARM	2785094	0.00	0	0	0	0

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DOE_R07 - ONSITE INDIRECT COSTS BY WBS

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BY TLW RDP DKH JJM

WBS	DESCRIPTION	ESTIMATE SUBTOTAL	CONTRACT %	ADMINISTRATION TOTAL	BID PACK PREP.	OTHER INDIRECTS	TOTAL INDIRECTS
5A12	DISC 35-65 SUPPORT ACTIVITIES	963857	0.00	0	0	0	0
5A21	TITLE III AN	2429600	0.00	0	0	0	0
5A3A	ADVANCE PROCUREMENT INSTRUMENTATION	741394	0.00	0	0	0	0
5A3B	PRIMARY VENT SYS ADVANCED PRCMT	710675	0.00	0	0	0	0
5A4A	TANK 101	717979	0.00	0	0	0	0
5A4B	TANK 102	688709	0.00	0	0	0	0
5A4C	TANK 103	566071	0.00	0	0	0	0
5A4D	TANK 104	566567	0.00	0	0	0	0
5A4E	TANK 105	565954	0.00	0	0	0	0
5A4F	TANK 106	672716	0.00	0	0	0	0
5A4G	TANK 107	689039	0.00	0	0	0	0
5A4I	GENERAL REQUIREMENTS	3187789	0.00	0	0	0	0
5A4J	SITE WORK	3534871	0.00	0	0	0	0
5A4K	TANK 101 - VALVE PIT AN-A	590195	0.00	0	0	0	0
5A4L	TANK 101 - VALVE PIT - AN-B	606871	0.00	0	0	0	0
5A61	HPT SUPPORT - FY 02	64820	0.00	0	0	0	0
5A62	HPT SUPPORT - FY 03	259185	0.00	0	0	0	0
5A63	HPT SUPPORT - FY 04	259185	0.00	0	0	0	0
5B11	TITLE II - AP FARM	2293977	0:00	0	0	0	0
5B12	DISC 35-65 SUPPORT ACTIVITIES	931337	0.00	0	0	0	0
5B21	TITLE III AP	1778622	0.00	0	0	0	0
5B3A	ADVANCE PROCUREMENT INSTRUMENTATION	1355706	0.00	0	0	0	0
5B3B	PRIMARY VENT SYS ADVANCED PRCMT	710675	0.00	0	0	0	0
5B4A	TANK 101	621669	0.00	0	0	0	0
5B4B	TANK 102	911302	0.00	0	0	0	0
5B4C	TANK 103	699941	0.00	0	0	0	0
5B4D	TANK 104	620430	0.00	0	0	0	0
5B4E	TANK 105	693750	0.00	0	0	0	0
5B4F	TANK 106	624074	0.00	0	0	0	0
5B4G	TANK 107	617632	0.00	0	0	0	0
5B4H	TANK 108	617859	0.00	0	0	0	0
5B4I	GENERAL REQUIREMENTS	2367628	0.00	0	0	0	0
5B4J	SITE WORK	4893232	0.00	0	0	0	0
5B4K	VALVE PIT AP	631213	0.00	0	0	0	0
5B61	HPT SUPPORT - FY 02	21622	0.00	0	0	0	0
5B62	HPT SUPPORT - FY 03	259185	0.00	0	0	0	0
5B63	HPT SUPPORT - FY 04	259185	0.00	0	0	0	0
5B64	HPT SUPPORT - FY 05	194412	0.00	0	0	0	0
5C11	TITLE II - AW FARM	2398717	0.00	0	0	0	0
5C12	DISC 35-65 SUPPORT ACTIVITIES	1010033	0.00	0	0	0	0
5C21	TITLE III AW	1700770	0.00	0	0	0	0

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WBS	DESCRIPTION	ESTIMATE SUBTOTAL	CONTRACT %	ADMINISTRATION TOTAL	BID PACK PREP.	OTHER INDIRECTS	TOTAL INDIRECTS
5C3A	ADVANCE PROCUREMENT INSTRUMENTATION	744522	0.00	0	0	0	0
5C3B	PRIMARY VENT SYS ADVANCED PRCMT	762960	0.00	0	0	0	0
5C4A	TANK 101	633663	0.00	0	0	0	0
5C4B	TANK 102	1009575	0.00	0	0	0	0
5C4C	TANK 103	675599	0.00	0	0	0	0
5C4D	TANK 104	635935	0.00	0	0	0	0
5C4E	TANK 105	669408	0.00	0	0	0	0
5C4F	TANK 106	677753	0.00	0	0	0	0
5C4I	GENERAL REQUIREMENTS	2174422	0.00	0	0	0	0
5C4J	SITE WORK	5652186	0.00	0	0	0	0
5C4K	VALVE PIT AW	421717	0.00	0	0	0	0
5C4L	TANK 101 - VALVE PIT - AW-B	423455	0.00	0	0	0	0
5C4V	NEW VENT PITS	282214	0.00	0	0	0	0
5C61	HPT SUPPORT - FY 99	21622	0.00	0	0	0	0
5C62	HPT SUPPORT - FY 00	259185	0.00	0	0	0	0
5C63	HPT SUPPORT - FY 01	259185	0.00	0	0	0	0
5C64	HPT SUPPORT - FY 02	21622	0.00	0	0	0	0
5D11	TITLE II - AY FARM	1497662	0.00	0	0	0	0
5D12	DISC 35-65 SUPPORT ACTIVITIES	843261	0.00	0	0	0	0
5D21	TITLE III AY	1109078	0.00	0	0	0	0
5D3A	ADVANCE PROCUREMENT INSTRUMENTATION	275594	0.00	0	0	0	0
5D4A	TANK 101	1525387	0.00	0	0	0	0
5D4B	TANK 102	1468392	0.00	0	0	0	0
5D4I	GENERAL REQUIREMENTS	638032	0.00	0	0	0	0
5D4J	SITE WORK	2682461	0.00	0	0	0	0
5D61	HPT SUPPORT - FY 01	43198	0.00	0	0	0	0
5D62	HPT SUPPORT - FY 02	129593	0.00	0	0	0	0
5E11	TITLE II - AZ FARM	1538459	0.00	0	0	0	0
5E12	DISC 35-65 SUPPORT ACTIVITIES	845453	0.00	0	0	0	0
5E21	TITLE III AZ	1117151	0.00	0	0	0	0
5E3A	ADVANCE PROCUREMENT INSTRUMENTATION	263354	0.00	0	0	0	0
5E4A	TANK 101	1087273	0.00	0	0	0	0
5E4B	TANK 102	851681	0.00	0	0	0	0
5E4I	GENERAL REQUIREMENTS	566747	0.00	0	0	0	0
5E4J	SITE WORK	2495631	0.00	0	0	0	0
5E4M	SLUICE PIT 02B	342031	0.00	0	0	0	0
5E61	HPT SUPPORT - FY 01	43198	0.00	0	0	0	0
5E62	HPT SUPPORT - FY 02	129593	0.00	0	0	0	0
5F11	TITLE II - SY FARM	1996241	0.00	0	0	0	0
5F12	DISC 35-65 SUPPORT ACTIVITIES	882032	0.00	0	0	0	0
5F21	TITLE III SY	1262030	0.00	0	0	0	0

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WBS	DESCRIPTION	ESTIMATE SUBTOTAL	CONTRACT %	ADMINISTRATION TOTAL	BID PACK PREP.	OTHER INDIRECTS	TOTAL INDIRECTS
5F3A	ADVANCE PROCUREMENT INSTRUMENTATION	128306	0.00	0	0	0	0
5F3B	ADVANCE PROCUREMENT INSTRUMENTATION	231064	0.00	0	0	0	0
5F3C	ADVANCE PROCUREMENT INSTRUMENTATION	422960	0.00	0	0	0	0
5F4A	TANK 101	669597	0.00	0	0	0	0
5F4B	TANK 102	967354	0.00	0	0	0	0
5F4C	TANK 103	635289	0.00	0	0	0	0
5F4I	GENERAL REQUIREMENTS	1183145	0.00	0	0	0	0
5F4J	SITE WORK	2977063	0.00	0	0	0	0
5F4K	VALVE PIT SY-A	385757	0.00	0	0	0	0
5F4L	VALVE PIT SY-B	396403	0.00	0	0	0	0
5F61	HPT SUPPORT - FY 00	17279	0.00	0	0	0	0
5F62	HPT SUPPORT - FY 01	259185	0.00	0	0	0	0
5F63	HPT SUPPORT - FY 02	64820	0.00	0	0	0	0
6A11	TITLE II - 244-A DCRT	1437084	0.00	0	0	0	0
6A12	DISC 35-65 SUPPORT ACTIVITIES	498886	0.00	0	0	0	0
6A21	244-A DCRT-A & SST SUPPPORT	711971	0.00	0	0	0	0
6A3A	ADVANCE PROCUREMENT INSTRUMENTATION	187740	0.00	0	0	0	0
6A3B	ADVANCE PROCUREMENT VENT SYSTEM	136986	0.00	0	0	0	0
6A4A	GENERAL REQUIREMENTS	1115220	0.00	0	0	0	0
6A4B	244-A DCRT	959020	0.00	0	0	0	0
6A4C	242-A BLDG.	16303	0.00	0	0	0	0
6A4D	SITE WORK	62083	0.00	0	0	0	0
6A4I	OFFICIAL ACCEPTANCE OF CONST.	98401	0.00	0	0	0	0
6A61	HPT SUPPORT - FY 00	86395	0.00	0	0	0	0
6A62	HPT SUPPORT - FY 01	21622	0.00	0	0	0	0
6B11	TITLE II - 244-S DCRT	1322890	0.00	0	0	0	0
6B12	DISC 35-65 SUPPORT ACTIVITIES	440034	0.00	0	0	0	0
6B21	244-S DCRT-S	862125	0.00	0	0	0	0
6B3A	INSTRUMENTATION	265322	0.00	0	0	0	0
6B3B	VENTILATION SYSTEM	126106	0.00	0	0	0	0
6B4A	GENERAL REQUIREMENTS	1028268	0.00	0	0	0	0
6B4B	244-S DCRT	943671	0.00	0	0	0	0
6B4I	OFFICIAL ACCEPTANCE OF CONST.	98401	1.52	14330	4500	0	18830
6B61	HPT SUPPORT - FY 99	21622	0.00	0	0	0	0
6B62	HPT SUPPORT - FY 00	86395	0.00	0	0	0	0
6B63	HPT SUPPORT - FY 01	5417	0.00	0	0	0	0
6C11	TITLE II - 200 E/W	2668788	0.00	0	0	0	0
6C12	DISC 35-65 SUPPORT ACTIVITIES	843857	0.00	0	0	0	0
6C21	TITLE III - 200 E/W	1333463	0.00	0	0	0	0
6C3A	ADVANCED PROCUREMENT INSTRU.	290671	0.00	0	0	0	0
6C4A	GENERAL REQUIREMENTS	849060	0.00	0	0	0	0

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WBS	DESCRIPTION		ESTIMATE SUBTOTAL	CONTRACT %	ADMINISTRATION TOTAL	BID PACK PREP.	OTHER INDIRECTS	TOTAL INDIRECTS
6C4B	GENERAL REQUIREMENTS		10239919	0.00	0	0	0	0
6C4C	VALVE PIT 241-A-A		624768	0.00	0	0	0	0
6C4D	VALVE PIT 241-A-B		625130	0.00	0	0	0	0
6C4E	VALVE PIT 241-AX-A		721971	0.00	0	0	0	0
6C4F	VALVE PIT 241-AX-B		619208	0.00	0	0	0	0
6C41	OFFICIAL ACCEPTANCE OF CONST.		123066	0.00	0	0	0	0
6C61	HPT SUPPORT	FY 99	43198	0.00	0	0	0	0
6C62	HPT SUPPORT	FY 00	172790	0.00	0	0	0	0
6C63	HPT SUPPORT	FY 01	172790	0.00	0	0	0	0
6C64	HPT SUPPORT	FY 02	10788	0.00	0	0	0	0
6D11	TITLE II - SST		354475	0.00	0	0	0	0
6D12	DISC 35-65 SUPPORT ACTIVITIES		444958	0.00	0	0	0	0
6D21	TITLE III ENG. DURING CONST.		702620	0.00	0	0	0	0
6D4A	GENERAL REQUIREMENTS		39785	0.00	0	0	0	0
6D5A	GENERAL REQUIREMENTS		68223	12.32	8404	0	0	8404
6D5B	A FARM		109440	20.60	22545	15000	0	37545
6D5C	AX FARM		109447	20.60	22546	0	0	22546
6D5D	B FARM		109447	20.60	22546	0	0	22546
6D5E	BX FARM		109447	20.60	22546	0	0	22546
6D5F	BY FARM		109447	20.60	22546	0	0	22546
6D5G	C FARM		120531	20.60	24830	0	0	24830
6D5H	T FARM		109447	20.60	22546	0	0	22546
6D5I	TX FARM		147947	20.60	30477	0	0	30477
6D5J	TY FARM		109447	20.60	22546	0	0	22546
6D5K	S FARM		109447	20.60	22546	0	0	22546
6D5L	SY FARM		109447	20.60	22546	0	0	22546
6D5M	U FARM		109447	20.60	22546	0	0	22546
6D61	HPT SUPPORT	FY 99	172790	0.00	0	0	0	0
6D62	HPT SUPPORT	FY 00	172790	0.00	0	0	0	0
PROJECT TOTAL			201,534,192		303,500	19,500	0	323,000

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 Drawing
- 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

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

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

SY Tank Farm
- 1 Annulus Flow Diagram
- 1 Annulus Supply Equipment Arrangement Drawing
- 1 Annulus Exhaust Equipment Arrangement Drawing
- Preliminary calculations
- Input to the Title I Design Report

244-A DCRT
- 1 System Flow Diagram
- 1 Equipment Arrangement Drawing
- Preliminary calculations
- Input to the Title I Design Report

244-S DCRT
- 1 System 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.
  b. Prepare Engineering Work Plan.
  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:

AN Tank Farm	Start	March 2001
	Complete	March 2002
AP Tank Farm	Start	August 2001
	Complete	August 2002
AW Tank Farm	Start	April 1998
	Complete	May 1999
AY Tank Farm	Start	March 2000
	Complete	March 2001
AZ Tank Farm	Start	March 2000
	Complete	March 2001
SY Tank Farm	Start	May 1999
	Complete	May 2000

244-A DCRT	Start	March 1999
	Complete	October 1999
244-S DCRT	Start	September 1998
	Complete	March 1999
200E/200W	Start	April 1998
	Complete	March 1999
SST	Start	April 1998
	Complete	October 1998

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;

stack and related support structural analysis; pit modification structural analysis; and instrument rack structural analysis; process flow diagrams.

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

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

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

- 1 Power/Control/Instrumentation Conduit Layout Plan
- 2 Plan, Sections, and Details
- 1 Panelboard Schedule
- 2 Wire Run Lists

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.
- 1 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

- 1 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 Valve Pit Leak Detection Installation - 241-A-A/241-A-B and 241-AX-A/241-AX-B
- 2 Pipeline Leak Detector
- 2 Instrument Building Alarm

- 1 TFLAN I/O Box Assembly
- 31 Loop Diagrams
- 50 Transfer Line Master Pump Shutdown Logic Diagrams
- 12 A/AX Farm Master Pump Shutdown Logic Diagrams
- 10 242-A TFLAN Logic Diagrams
- 17 Instrument Lists

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.

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.
  b. Prepare Engineering Work Plan.
  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)
  a. Provide independent assessment verification of certain critical construction processes required by WAC-173-303-640.
  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 capitally-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 enure an orderly and efficient transition into Title 1 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 walkdowns 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).

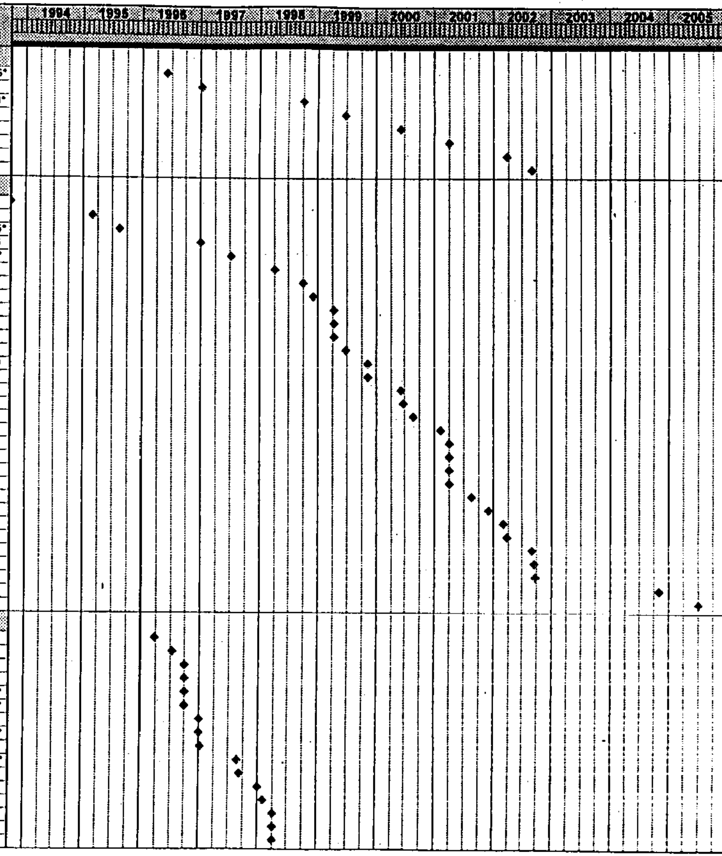
WBS 1.5.x.5 and 1.6.x.6 HPT Support

- Provide dedicated HPT support during construction.

APPENDIX D

Conceptual Project Schedule

Activity ID	Activity description	Original Duratio	Early Start	Early Finish
TPA MILESTONES				
M-43-09	COMPLETE CONCEPTUAL DESIGN REPORT FOR W-314	0		31MAY96*
M-43-10	START DEFINITIVE DESIGN FOR PROJECT W-314	0	02JAN97	
M-43-11	PROVIDE W-314 PROJECT CONST. SCHEDULE TO	0		30SEP98*
M-43-12	START CONSTRUCTION FOR U.G. IN FIRST FARM	0	28JUN99	
M-43-13	START CONSTRUCTION FOR U.G. IN SECOND TANK	0	08JUN00	
M-43-14	START CONSTRUCTION FOR U.G. IN THIRD FARM	0	30MAR01	
M-43-15	START CONSTRUCTION FOR U.G. IN FOURTH FARM	0	29MAR02	
M-43-16	START CONSTRUCTION FOR U.G. IN FIFTH FARM	0	30AUG02	
RL MILESTONES				
O3A01	START W-314	0	01OCT93	
O3B03	OBTAIN KD0	0	01MAR95	
O3D01	FY 97 VALIDATION	0		15AUG95*
O3B02	OBTAIN KD1	0		27DEC96
O3G02	RL REVIEW COMPLETE (NEPA)	0		10JUL97*
T2C-97-	KD2	0		01APR98
RL-01	SUBMIT NOC TO EPA/DOH	0	01OCT98	
6D01	START SST CONSTRUCTION (RL-MS)	0	27NOV98	
6C105	KD3 (200E/W)	0		06APR99
6B01	START 244-S CONSTRUCTION (RL-MS)	0	08APR99	
6B105	KD3 (244S)	0	08APR99	
5C105	KD3 (AW FARM)	0		25JUN99
6A105	KD3 (244A DCRT)	0		08NOV99
6A01	START 244-A CONSTRUCTION (RLMS)	0	09NOV99	
5F105	KD3 (SY FARM)	0	08JUN00	
O3244S	KD4 (244S)	0		15JUN00
O3SSTK	KD4 (SST)	0		22AUG00
O3C244	KD4 (244A DCRT)	0		08FEB01
5E105	KD3	0		27MAR01
5E01	START AZ FARM CONSTRUCTION (RL-MS)	0	28MAR01	
5D105	KD3	0		29MAR01
5D01	START AY FARM CONSTRUCTION (RL-MS)	0	30MAR01	
O3200E	KD4 (200 E/W)	0		17AUG01
O3AWK	KD4 (AW FARM)	0		30NOV01
O3SYKD	KD4 (SY FARM)	0		01MAR02
5A105	KD3 (AN)	0	29MAR02	
5B105	KD3 (AP)	0	30AUG02	
O3AZKD	KD4 (AZ FARM)	0		09SEP02
O3AYKD	KD4 (AY FARM)	0		18SEP02
O3ANKD	KD4 (AN FARM)	0		29OCT04
O3ADKD	KD4 (AP FARM)	0		29JUN05
OTHER MILESTONES				
O3D04	SUBMIT CDR	0		29MAR96
O3D02	COMPLETE DCBL	0		15JUL96*
O3F02	COMPLETE PERMITTING PLAN	0		26SEP96
O3D03	COMPLETE SDR	0		30SEP96
O3E01	COMPLETE INITIAL USQ PREPARATION	0		30SEP96*
O3I01	ISSUE QAPP	0		30SEP96*
O3G01	COMPLETE EA PREP	0		30DEC96
O3D05	VE COMPLETE	0		31DEC96*
T1001	START TITLE I DESIGN	0	02JAN97	
O3G03	NEPA PUBLIC RELEASE	0		22AUG97*
O3G04	ISSUE FONSI	0		05SEP97
T1004	ISSUE TITLE I REPORT FOR APPROVAL	0		30DEC97
O3C01	ISSUE TITLE I REVIEW REPORT	0		30JAN98*
O3J01	COMPLETE SAMPLING/ANALYSIS & ISSUE RESULTS	0		01APR98
O3J05	COMPLETE SAMPLING/ANALY. ISSUE RESULTS (2E/W)	0		01APR98
O3J07	COMPLETE SAMPLING/ANALYSIS & ISSUE RESULTS	0		01APR98



Project Start	01OCT93	Early Bar	W314
Project Finish	02AUG05	Progress Bar	
Data Date	01OCT93	Critical Activity	
Plot Date	24APR98		

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Sheet 1 of 4

ICF KAISER HANFORD
W-314 CDR SCHEDULE
Classic Schedule Layout

ICF KAISER HANFORD			
Date	Revision	Checked	Approved
[illegible]	0	[illegible]	[illegible]
[illegible]	0	[illegible]	[illegible]

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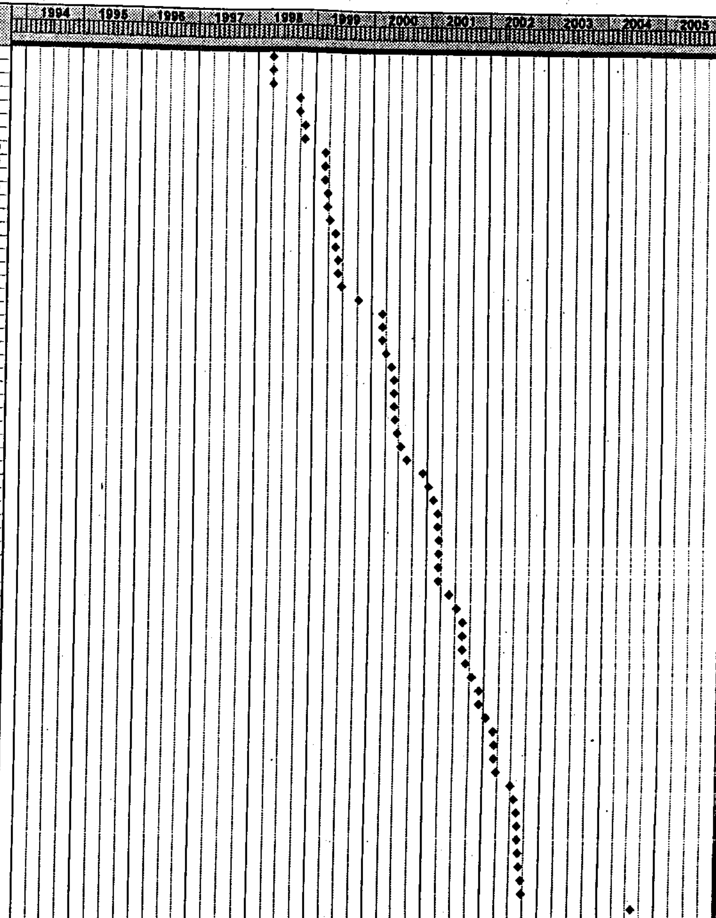
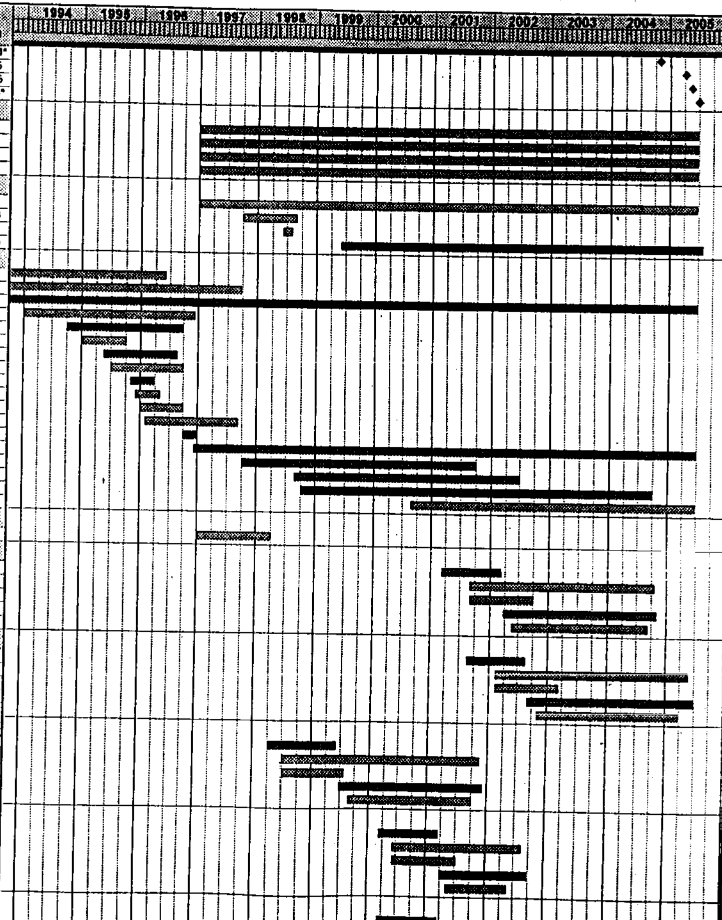
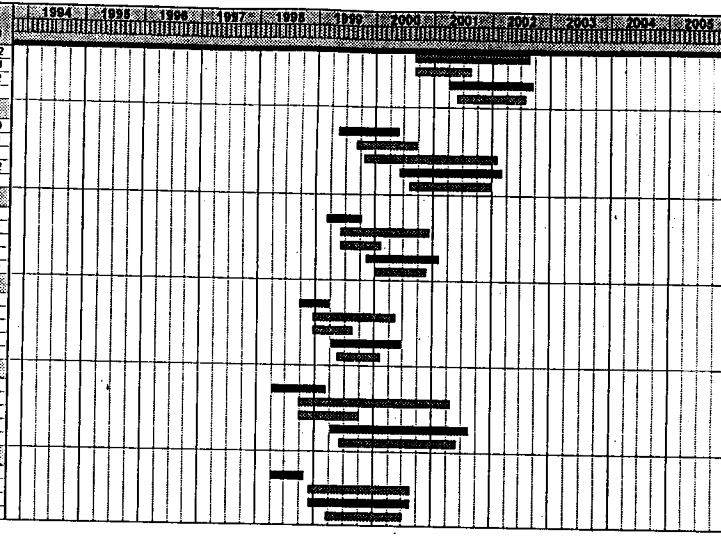
Activity ID	Activity description	Original duration	Early Start	Early Finish
5C101	START TITLE II DESIGN (AW FARM)	0	02APR98	
6C101	START TITLE II DESIGN (200 E/W)	0	02APR98	
6D101	START TITLE II DESIGN (SST)	0	02APR98	
O3J06	COMPLETE SAMPLING/ANALY. & ISSUE RESULTS	0		18SEP98
6B101	START TITLE II 244S	0	21SEP98	
2B06	COMPLETE USQ/SA ON TITLE II (SST)	0		27OCT98
6D104	COMPLETE SST TITLE II DESIGN	0		27OCT98
2B10	COMPLETE USQ/SA ON TITLE II (200 E/W FARM)	0		09MAR99
6C104	COMPLETE 200 E/W TITLE II DESIGN	0		09MAR99
6A101	START TITLE II DESIGN (244A)	0	10MAR99	
2B08	COMPLETE USQ/SA ON TITLE II (244S-DCRT)	0		24MAR99
6B104	COMPLETE TITLE II DESIGN (244S)	0		24MAR99
6C01	START 200 E/W CONSTRUCTION	0	07APR99	
O3J02	COMPLETE SAMPLING/ANALYSIS & ISSUE RESULTS	0		14MAY99
5F101	START TITLE II SY FARM	0	17MAY99	
2B01	COMPLETE USQ/SA ON TITLE II DESIGN (AW)	0		28MAY99
5C104	COMPLETE AW TITLE II DESIGN	0		28MAY99
5C01	START AW FARM CONSTRUCTION	0	28JUN99	
2B07	COMPLETE USQ/SA ON TITLE II (244A-DCRT)	0		11OCT99
O3J03	COMPLETE SAMPLING/ANAL. ISSUE RESULTS (AY/AZ)	0		14MAR00
5D101	START TITLE II DESIGN (AY FARM)	0	15MAR00	
5E101	START TITLE II (AZ FARM)	0	15MAR00	
6B03	OAC1 (244S)	0		05APR00
6B04	OAC2 (244S)	0		10MAY00
2B05	COMPLETE USQ/SA ON TITLE II (SY FARM)	0		24MAY00
5F104	COMPLETE TITLE II DESIGN (SY FARM)	0		24MAY00
6D09	OAC1 (SST)	0		26MAY00
5F01	START SY FARM CONSTRUCTION	0	08JUN00	
6B5	OAC3 (244S)	0		15JUN00
6D10	OAC2 (SST)	0		11JUL00
6D11	OAC3 (SST)	0		22AUG00*
6A03	OAC1 (244A)	0		27NOV00
6A04	OAC2 (244A)	0		04JAN01
6A05	OAC3 (244A)	0		08FEB01*
O3J04	COMPLETE SAMPLING/ANALYSIS & ISSUE RESULTS	0		09MAR01
5A101	START TITLE II DESIGN (AN FARM)	0	12MAR01	
2B04	COMPLETE USQ/SA ON TITLE II (AZ FARM)	0		13MAR01
5E104	COMPLETE TITLE II (AZ FARM)	0		13MAR01
2B03	COMPLETE USQ/SA ON TITLE II (AY FARM)	0		15MAR01
5D104	COMPLETE TITLE II DESIGN (AY FARM)	0		15MAR01
6C03	OAC1 (200 E/W)	0		23MAY01
6C04	OAC2 (200 E/W)	0		06JUL01
O3J08	COMPLETE SAMPLING/ANALYSIS & ISSUE RESULTS	0		14AUG01
5B101	START TITLE II DESIGN (AP FARM)	0	15AUG01	
6C05	OAC3 (200 E/W)	0		17AUG01
5C09	OAC1 (AW)	0		05SEP01
5C10	OAC2 (AW)	0		17OCT01
5C11	OAC3 (AW)	0		30NOV01*
5F06	OAC1 (SY)	0		03DEC01
5F07	OAC2 (SY)	0		17JAN02
5F08	OAC3 (SY)	0		01MAR02*
2B02	COMPLETE USQ/SA ON TITLE II (AN FARM)	0		14MAR02
5A104	COMPLETE TITLE II DESIGN (AN FARM)	0		14MAR02
5A02	START AN FARM CONSTRUCTION	0	29MAR02	
5E05	OAC1 (AZ)	0		26JUN02
5D04	OAC1 (AY)	0		23JUL02
5E06	OAC2 (AZ)	0		02AUG02
2B09	COMPLETE USQ/SA ON TITLE II (AP FARM)	0		15AUG02
5B104	COMPLETE TITLE II DESIGN (AP FARM)	0		15AUG02
5D05	OAC2 (AY)	0		20AUG02
5B01	START AP FARM CONSTRUCTION	0	30AUG02	
5E07	OAC3 (AZ)	0		09SEP02*
5D06	OAC3 (AY)	0		18SEP02*
5A10	OAC1 (AN)	0	05AUG04	
5A11	OAC2 (AN)	0		16SEP04



Activity ID	Activity description	Original Duration	Early Start	Early Finish
5A12	OAC3 (AN)	0		29OCT04*
5B10	OAC1 (AP)	0		05APR05
5B11	OAC2 (AP)	0		17MAY05
5B12	OAC3 (AP)	0		29JUN05*
PROJECT MANAGEMENT				
11A	PROJECT MANAGEMENT AND INTEGRATION	2,131*	02JAN97	27JUN05
11B	SYSTEMS ENGINEERING MANAGEMENT	2,131*	02JAN97	27JUN05
11C	PROJECT CONTROLS/BUSINESS MANAGEMENT	2,131*	02JAN97	27JUN05
11D	QUALITY ASSURANCE	2,131*	02JAN97	27JUN05
PERMITTING AND SAFETY				
12B	SAFETY ANALYSIS	2,131*	02JAN97	27JUN05
12A1	AIR PERMITS	227*	01OCT97	26AUG98
12A3	PRE OPERATIONAL DETERMINATION	43*	01JUN98	31JUL98
12A2	DANGEROUS WASTE PERMITS	1,552*	31MAY99	02AUG05
OPC ACTIVITIES EXPENSE				
13A	PROJECT DEFINITION	700*	01OCT93	06JUN96
13B	PROJECT INTEGRATION AND SUPPORT	1,035*	01OCT93	26SEP97
13C	DESIGN AND CONSTRUCTION SUPPORT	2,981*	01OCT93	29JUN05
13I	QUALITY ASSURANCE PROGRAM PLAN	760*	05JAN94	03DEC96
13D2	DCBL	522*	30SEP94	30SEP96
13H1	A-E SELECTION AND PROCUREMENT	194*	02JAN95	28SEP95
13D1	W-314 ENGINEERING REPORT	329*	15MAY95	15AUG96
13E	PRELIMINARY SAFETY DOCUMENTATION	324*	03JUL95	26SEP96
13D3	CDR	108*	01NOV95	29MAR96
13H2	A-E SELECTION AND PROCUREMENT (2)	109*	30NOV95	30APR96
13F	PERMITTING PLAN	194*	01JAN96	26SEP96
13G	NEPA DOCUMENTATION	414*	30JAN96	08SEP97
13D4	ADVANCED CONCEPTUAL DESIGN	65*	01OCT96	30DEC96
13K	STARTUP TESTING	2,155*	02DEC96	29JUN05
13J	SITE CHARACTERIZATION	1,003*	01OCT97	28SEP01
13M1	INDEPENDENT REVIEWS (CRITICAL DESIGN REVIEWS)	968*	18AUG98	25JUN02
13L	OPERATIONS PREPARATION	1,506*	01OCT98	30SEP04
13M2	INDEPENDENT REVIEWS (CONSTRUCTION ORR'S)	1,216*	23AUG00	27JUN05
W-314 TITLE I DESIGN				
4.0	TITLE I DESIGN	313*	02JAN97	31MAR98
AN FARM				
5A1	AN FARM TITLE II DESIGN	254*	12MAR01	14MAR02
5A2	AN FARM TITLE III ENGINEERING DURING CONST	784*	30AUG01	13OCT04
5A3	AN FARM PROCUREMENT	270*	30AUG01	26SEP02
5A4	AN FARM CONSTRUCTION	652*	29MAR02	29OCT04
5AH6	HPT SUPPORT	571*	24MAY02	01SEP04
AP FARM				
5B1	AP FARM TITLE II DESIGN	252*	15AUG01	15AUG02
5B2	AP FARM TITLE III ENGINEERING DURING CONST	830*	07FEB02	27MAY05
5B3	AP FARM PROCUREMENT	270*	07FEB02	06MAR03
5B4	AP FARM CONSTRUCTION	711*	30AUG02	29JUN05
5BH6	HPT SUPPORT	600*	28OCT02	21MAR05
AW FARM TITLE II DESIGN				
5C1	AW FARM TITLE II DESIGN	291*	02APR98	28MAY99
5C2	AW FARM TITLE III ENGINEERING DURING CONST.	850*	26JUN98	13NOV01
5C3	AW FARM PROCUREMENT	270*	26JUN98	26JUL99
5C4	AW FARM CONSTRUCTION	610*	28JUN99	30NOV01
5CH6	AW FARM-HPT SUPPORT	530*	25AUG99	03OCT01
AY FARM				
5D1	AY FARM TITLE II DESIGN	252*	15MAR00	15MAR01
5D2	AY FARM TITLE III ENGINEERING DURING CONST.	550*	08JUN00	16AUG02
5D3	AY FARM PROCUREMENT	270*	08JUN00	06JUL01
5D4	AY FARM CONSTRUCTION	370*	30MAR01	18SEP02
5DH6	AY FARM-HPT SUPPORT	259*	11MAY01	22MAY02
AZ FARM				
5E1	AZ FARM TITLE II DESIGN	250*	15MAR00	13MAR01



Activity ID	Activity description	Original Duration	Early Start	Early Finish
5E2	AZ FARM TITLE III ENGINEERING DURING CONST.	493*	05SEP00	21AUG02
5E3	AZ FARM PROCUREMENT	240*	05SEP00	17AUG01
5E4	AZ FARM CONSTRUCTION	365*	28MAR01	09SEP02
5EH6	HPT SUPPORT	294*	24MAY01	25JUL02
SY FARM				
5F1	SY FARM TITLE II DESIGN	257*	17MAY99	24MAY00
5F3	SY FARM PROCUREMENT	261*	09SEP99	21SEP00
5F2	SY FARM TITLE III ENGINEERING DURING CONST.	569*	22OCT99	30JAN02
5F4	SY FARM CONSTRUCTION	433*	08JUN00	01MAR02
5FH6	HPT SUPPORT	350*	07AUG00	26DEC01
244-A DCRT				
6A1	244A-DCRT TITLE II DESIGN	150*	10MAR99	11OCT99
6A2	244-A DCRT TITLE III ENGINEERING DURING CONST.	380*	03JUN99	06DEC00
6A3	ADVANCED PROCUREMENT	170*	03JUN99	07FEB00
6A4	244A-DCRT CONSTRUCTION	313*	09NOV99	08FEB01
6AH6	244-A HPT SUPPORT	220*	11JAN00	20NOV00
244-S DCRT				
6B1	244S-DCRT TITLE II DESIGN	127*	21SEP98	24MAR99
6B2	244S-DCRT TITLE III ENGINEERING DURING CONST.	350*	16DEC98	08MAY00
6B3	ADVANCED PROCUREMENT	170*	16DEC98	19AUG99
6B4	244S-DCRT CONSTRUCTION	300*	08APR99	15JUN00
6BH6	244-S HPT SUPPORT	179*	20MAY99	07FEB00
200 EAST/WEST AREA				
6C1	200 EAST/WEST TITLE II DESIGN	234*	02APR98	09MAR99
6C2	200 EAST/WEST AREA TITLE III ENG. DURING CONST.	650*	23SEP98	25APR01
6C3	ADVANCED PROCUREMENT	260*	23SEP98	05OCT99
6C4	200 EAST WEST CONSTRUCTION	595*	07APR99	17AUG01
6CH6	200 E/W - HPT SUPPORT	500*	03JUN99	30MAY01
SINGLE SHELL TANK SUPPORT SYSTEMS				
6D1	SST TITLE II DESIGN	145*	02APR98	27OCT98
6D2	SST TITLE III ENGINEERING DURING CONST.	434*	27NOV98	18AUG00
6D4	SINGLE SHELL TANKS CONSTRUCTION	436*	27NOV98	22AUG00
6DH6	SST-HPT SUPPORT	328*	19MAR99	07JUL00



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APPENDIX E

Outline Specification

OUTLINE SPECIFICATION APPLICATION MATRIX

SPECIFICATION DIVISION/SECTION	Tank Farms							DCRTs		
	AN	AZ	AY	AW	AP	SY	SST	244-A	244-S	200 E/W
DIVISION 2 - SITEWORK										
Section 02050 Demolition										
1. Reinforced Concrete										
a. Core Drill	X	X	X	X	X	X		X		
b. Partial Removal	X	X	X		X			X		
2. Cover Blocks	X	X			X					X
3. Asphaltic Concrete										X
4. Utilities										
a. Electrical & Signal Wire/Cable	X	X	X	X	X	X	X	X	X	X
b. Electrical Equipment	X	X	X	X	X	X		X		X
5. Instruments & Controls										
a. Tank Level Measurement Devices	X	X	X	X	X	X		X		X
b. Tank High Level Alarms	X	X	X	X	X					
c. Tank & Waste Temp. Devices	X	X	X	X	X	X		X		X
d. Vapor Space Pressure Devices	X	X	X	X	X	X		X		X
e. Raw Water Flow Meter	1	1	1	1	1	1		1		1
f. Tank Annulus Liquid Detectors	X	X	X	X	X	X		X		X
g. Annulus Air Detectors (CAMs)	X	X	X	X	X	X		X		X
h. Leak Detection Pit Rad Monitors	X	X		X	X	X				
i. Leak Detection Pit Leak Detectors	X	X	X	X	X	X				X
j. Process Pit Leak Detectors	X	X	X	X	X	X		X	X	X
k. Clean Out Box Leak Detectors	X	X	X	X		X				
l. Pipeline Leak Detectors	X	X	X	X	X	X		X	X	X
m. Master Pump Shutdown Switches	X	X	X		X	X		X	X	X
n. Alarms & Related Circuitry	X	X	X	X	X	X		X	X	X
o. Tank Primary Vent. Equipment	X			X	X			X	X	
p. Tank Annulus Vent. Equipment						X				
q. Primary Vent. Stack Monitor	X			X	X	X		X		X
r. Seal Pot Level Alarms						X				

OUTLINE SPECIFICATION APPLICATION MATRIX

SPECIFICATION DIVISION/SECTION	Tank Farms							DCRTs		
	AN	AZ	AY	AW	AP	SY	SST	244-A	244-S	200 E/W
s. Jumper Assemblies	x	x	x	x	x	x				x
t. Drain Pit Rad. Monitor		x	x							
u. Drain Pit Leak Detectors		x	x							
Section 02220 Excavating, Backfilling, and Compacting										
1. Backfill and Fill										
a. Common Backfill & Fill	x	x	x	x	x	x	x	x	x	x
b. Structural Backfill & Fill	x	x	x	x	x	x	x	x	x	x
2. Bedding	x	x	x	x	x	x	x	x	x	x
3. Gravel Stabilization	x	x	x	x	x	x	x	x	x	x
4. Excavation	x	x	x	x	x	x	x	x	x	x
5. Shoring	x	x	x	x	x	x	x	x	x	x
6. Contaminated Soils	x	x	x	x	x	x	x	x	x	x
7. Compaction	x	x	x	x	x	x	x	x	x	x
Section 02237 Controlled Density Fill										
1. Controlled Density Fill	x	x	x	x	x	x	x	x	x	x
DIVISION 3 - CONCRETE										
Section 03300 Cast-In-Place Concrete										
1. Ready Mix Concrete	x	x		x	x		x	x	x	x
2. Reinforcing Steel	x	x		x	x		x	x	x	x
3. Bonding Agents	x	x	x	x	x	x	x	x	x	x
4. Non-Shrink Grout	x	x	x	x	x	x	x	x	x	x
Section 03400 Precast Concrete										
1. Precast Concrete	x	x		x	x			x	x	x
DIVISION 5 - METALS										
Section 05055 Expansion Anchor Installations										
1. Expansion Anchors	x	x	x	x	x	x	x	x	x	x
Section 05120 Structural Steel										
1. Structural Steel ASTM A-36	x			x	x			x	x	x
2. Fasteners	x			x	x			x	x	x
Section 05300 Metal Decking										
1. Roof Panels	x			x	x			x	x	x

OUTLINE SPECIFICATION APPLICATION MATRIX										
SPECIFICATION DIVISION/SECTION	Tank Farms							DCRTs		
	AN	AZ	AY	AW	AP	SY	SST	244-A	244-S	200 E/W
Section 05500 Metal Fabrications										
1. Miscellaneous Steel Items	x	x	x	x	x	x	x	x	x	x
DIVISION 9 - FINISHES										
Section 09855 Chemical Resistant Decontaminable Coatings										
1. Decontaminable Coatings	600 ft^2/p.p. 744 ft^2/v.p.	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				
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	1	3
k. Communication Card	1	1	1	1	1	1		1	1	3
l. TCP/IP interface card	1	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	5	5	14	19	7		1	1	
2. Man-Machine Interface terminals										
a. CRT	1	1	1	1	1	1		1	1	3
b. Processor	1	1	1	1	1	1		1	1	3
c. Hard Disk	1	1	1	1	1	1		1	1	3
d. Operator Interface	1	1	1	1	1	1		1	1	3

OUTLINE SPECIFICATION APPLICATION MATRIX										
SPECIFICATION DIVISION/SECTION	Tank Farms							DCRTs		
	AN	AZ	AY	AW	AP	SY	SST	244-A	244-S	200 E/W
a. Software	1	1	1	1	1	1		1	1	3
3. Tank Level Measurement										
a. Displacement level gage	3	1	2	4	8					
b. Communications interface unit	1	1	1	1	1	1		1	1	
4. Liquid Conductivity Probes	95	37	30	82	88	54		10	10	20
5. Tank Temperature Tree	4	1	1	4	8			1	1	
6. Tank Pressure transmitter	14	4	4	12	16	6		2	2	
7. Waste monitoring flowmeter	14	4	4	12	16	6		2	2	
8. Raw water monitoring flowmeter	1	1	1	1	1	1		1	1	
9. Annulus CAM (leak detector)	7	2	2	6	8	3		1	1	
10. Primary exhaust pressure	9			9	9	12				
11. Primary exhaust temperature	6			6	6	18				
12. Exhaust stack monitoring	1			1	1	1				
13. Enclosures and Accessories										
a. Instrument enclosure	5	2	2	6	4	2				
b. Heater	5	2	2	6	4	2				
14. Limit Switches	21	9	9	14	12	14				3
Section 13460 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 Ratemeter								1	1	
DIVISION 15 - MECHANICAL										
Section 15493 Chemical Process Piping Systems										
A. Process and Service Piping										
1. Process piping	X	X	X	X	X	X				X
2. Support material	X	X	X	X	X	X				X

OUTLINE SPECIFICATION APPLICATION MATRIX										
SPECIFICATION DIVISION/SECTION	Tank Farms							DCRTs		
	AN	AZ	AY	AW	AP	SY	SST	244-A	244-S	200 E/W
3. Cathodic protection	X									
4. Protective coating										
a. Carbon steel piping	X	X	X	X	X	X				X
b. Carbon steel sections	X	X	X	X	X	X				X
c. Stainless steel pipe	X			X	X					
B. Equipment										
1. Seal pot	1			1	1					
2. Seal pot pit sump pump	1			1	1					
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	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										
1. Exhaust fans	2			2	2	2		2	2	
2. HEPA filter housings	4			4	4	4		5	5	
3. HEPA filters	8			8	8	4		5	5	
4. Heating coils	2			2	2	2		3	3	
5. Prefilters						2		1	1	
6. Carbon adsorber housings	2			2	2			2	2	
7. Mist Eliminators	2			2	2					

OUTLINE SPECIFICATION APPLICATION MATRIX

SPECIFICATION DIVISION/SECTION	Tank Farms							DCRTs		
	AN	AZ	AY	AW	AP	SY	SST	244-A	244-S	200 E/W
DIVISION 16 - ELECTRICAL										
Section 16300 Medium Voltage Distribution										
A. Materials										
1. Underground conduit							X		X	
2. Primary cable							X		X	
a. Conductor							X		X	
b. Conductor shield							X		X	
c. Insulation							X		X	
d. Insulation shield							X		X	
e. Jacket							X		X	
B. Equipment										
1. Equipment enclosures										
2. Distribution power fuse							36		3	
3. Lightning arrestor							36		3	
4. Distribution transformers							12		1	
Section 16400 Service and Distribution										
A. Materials										
1. Conduit										
a. Conduit below grade	X			X	X	X	X	X	X	
b. Exposed conduit	X			X	X	X	X	X	X	
c. Conduit concealed in concrete	X			X	X	X	X	X	X	
2. Conductors	X			X	X	X	X	X	X	
B. Equipment										
1. Equipment enclosures										
2. Motor control centers		1	1							
a. Motor controllers(combination)		14	18							
b. Feeder circuit breakers	1	6	6	1	1	1				
3. Panelboards		1	2				12	1		
a. Branch circuit breakers		3	4			4	98	16	6	

OUTLINE SPECIFICATION APPLICATION MATRIX										
SPECIFICATION DIVISION/SECTION	Tank Farms							DCRTs		
	AN	AZ	AY	AW	AP	SY	SST	244-A	244-S	200 E/W
4. Combination motor controllers		2	2			2				
5. Safety switches								2	3	
6. Enclosed combination magnetic starter	2			2	2			3		
7. Variable speed drive								2	2	
8. Mini-power center	1	1	1	2	1	1	12	1	1	
9. Manual transfer switch	1			1	1					
10. Wire gutter	1			2	1					
11. Power receptacle	2			6	3					
12. Receptacle switch	1			1	1		36			
13. Enclosed circuit breaker				1			1		1	
14. SCR unit		2	2							
15. Circuit breaker (main/incoming)	1	1	2	1	1			2		
16. Receptacles	2			6	3					
17. Heat trace cable	X			X	X					
18. Heat tracing control panel	1			1	1					
Section 16640 Cathodic Protection										
1. Anodes	X	X	X	X	X					X
2. Permanent reference electrode	4	2	2	4	4					X
3. Test stations	4	2	2	4	4					X
4. Anode distribution box	2			2	2					X
5. Conduit	X	X	X	X	X					X
6. Conductors	X	X	X	X	X					X
7. Exothermic weld mold	X	X	X	X	X					X
8. Exothermic weld metal	X	X	X	X	X					X
9. Conductor splice kit	X	X	X	X	X					X
10. Wiremarkers	X	X	X	X	X					X
11. Cable marker	X	X	X	X	X					X
12. Nameplate	X	X	X	X	X					X

DIVISION 2 - SITEWORK

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.

   b. Fly ash: ASTM C 618, Class F in accordance with recommendations of 40 CFR 249.12 and 249.13.

   c. Aggregates: ASTM C 33, 3/8 inch maximum.

   d. Air-entraining admixtures: ASTM C 260.

   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

   c. Aggregates: ASTM C 33, 1-1/2 inch maximum size.

   d. Air-entraining admixture: ASTM C 260.

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.

b. Welded wire fabric: ASTM A 185.

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 "Concresive 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.

b. Welded wire fabric: ASTM A 185.

c. Tie wire: ASTM A 853 carbon steel, 16-gage minimum, annealed.

<u>DIVISION 5 - METALS</u>

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/in^2, maximum carbon content 0.35%.

3. Steel tubing: ASTM A 500, Grade B, or ASTM A 501.

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.

   c. Washers: ASTM F 436, circular.

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.

<u>DIVISION 9 - FINISHES</u>

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:

Product	Manufacturer Ameron
Steel Primer	Amerlock 400
Concrete Surfacer	Nu-Klad 114A
Concrete Primer (walls)	Nu-Klad 105A or Amerlock 400
Concrete Primer (floors)	Nu-Klad 105A
Base Coating	Amerlock 400
Intermediate & Finish Coating (except floors)	Amerthane 487
Self-Leveling base (floors only)	PSX 756 Siloxane
Top Coat (floors only)	PSX 756 Siloxane

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).

j. Communication network: Modbus Plus.

k. Communication card: AM-SA85-002 IBM PC/AT Adaptor.

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.

9. Annulus CAM leak detector: Eberline AMS-4.

10. Primary exhaust pressure: Differential Pressure Indicating/Transmitter (PDIT): Bailey Model BCN-11 or BCN-12.

11. Primary exhaust temperature: Temperature Indicating Transmitter (TIT): Foxboro 893 series RTD with integrally mounted element and local display.

12. Exhaust stack monitoring: A Gaseous Effluent Monitoring System (GEMS) stack monitor specification for multiple tank farms is under development by WHC (see WHC Specification WHC-S-0400).

13. Enclosures and accessories:

    a. Hoffman, instrument enclosure Model A-36H30FLP; NEMA 4.

    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.

    b. Digital ratemeter, Victoreen model 942A-200.

<u>DIVISION 15 - MECHANICAL</u>

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.

   a. Carbon steel: ASTM A 36.

   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:

a. Carbon steel shapes: ASTM A 36.

b. Stainless steel shapes: ASTM A 276, Type 304 or 304L.

4. Insulation: UL listed in the Building Materials Directory, and carry UL mark.

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/ft^3 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)

8. Underground pipe trenching: Excavate, backfill, and compact.

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.

EQUIPMENT SCHEDULE					
Tank Farm System	Fans			HEPA Filters	Elec. Heaters
	Flow (cfm)	ΔP (in. wc)	Motor (hp)	Configuration	Capacity (kW)
AN (Pri.)	1500	10	7.5	2x1, 24x24x11½	10
AP (Pri.)	2000	11	7.5	2x1, 24x24x11½	10
AW (Pri.)	2000	11	7.5	2x1, 24x24x11½	10
SY (An. Ex.)	600 (2 ea)	12.5	3	1x1, 24x24x11½	
SY (An. Sup.)				1x1, 24x24x11½	1 (2 ea. Tank)
244-A DCRT	175	12	1	1x1, 12x12x11½	2 (supply), 1.5 (exh)
244-S DCRT	175	12	1	1x1, 12x12x11½	2.5 (supply), 2 (exh)

C. Pipe Codes

The pipe codes are as follows:

PIPE CODE M-9		
Service	**Max. Operating Pressure**	**Max. Operating Temp**
Waste Transfer	400 psig	200°F
Ventilation	+60/-6inH_2O	200°F
Drains	20 psig	200°F
Sizes	10" and smaller	12" and larger
Pipe	ASTM A 312 Grade TP 304L Seamless	
Wall Thickness	Schedule 40S	Standard Weight
Fittings	Stainless steel, ASTM A 403 Grade WP-S 304L, buttwelding in accordance with ASME B16.9. Wall thickness to match pipe	
Flanges	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)	
Bolting	Alloy steel bolts, ASTM A 193 Grade B7, and heavy hex nuts, ASTM A 194 Grade 2H.	
Gaskets	Compressed carbon fiber, nonasbestos, 1/16" thick sheet; Garlock HTC 9850, or Anchor Packing 495C. Use full face gaskets with flat face flanges.	
Valves	Class 300, stainless steel body, ASTM A 351 Gr. CF8M, butt-weld ends, UHMWPE seats and seals. 2-Way: PBM SP-H-39-BW-S-6 3-Way: PBM MP-H-19-BW-S-6	
Installation: ASME B31.3, Normal Service NDE Requirements: No requirement in addition to ASME B31.3, except radiograph 100% of all buttwelds.		

PIPE CODE M-26		
Service	Max. Operating Pressure	Max. Operating Temp
Encasement	Same as encased line	Same as encased line
Sizes	10" and smaller	12" and larger
Pipe	ASTM A 106 Grade B	
Wall Thickness	Schedule 40	Standard Weight
Fittings	Wrought steel, ASTM A 234 Grade WPB, buttwelding in accordance with ASME B16.9. Wall thickness to match pipe.	
Flanges	None	
Bolting	None	
Gaskets	None	
Installation: ASME B31.3, Normal Service NDE Requirements: No requirement in addition to ASME B31.3.		

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.

   b. Conductor shield: Extruded semi-conducting thermosetting compound, 15-mils thick minimum.

   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.

   a. Motor controllers: Horsepower rated with 2 NO and 2 NC auxiliary contacts. Provide compartments with equipment shown on the Drawings.

   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.

2. Permanent reference electrode: Saturated gelled copper-copper sulfate with 20 feet of No. 8 AWG lead wire with HMW/PE insulation, 30 year minimum design life. Electrochemical Devices, Inc., Model UL-CUG-LW020.

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.

12. Nameplate: Survey marker type, brass, 2-inch diameter (for use with test stations). Surveyors Service Company No. 2132.

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:

<u>241-AN Tank Farm</u>
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 Description: VENTILATION UPGRADE	
Project Location: 241-AN 200E	Start Date:	End Date:
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): N/A	Total Energy Usage (million Btu/yr): 82.4	
Estimated Project Budget (thousand $): TBD		

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.)

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 ECM-BEC-3.11 Complete Form ECM-BEU-3. Complete Form ECM-LCCA-3.14

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: [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.

Project Title: TANK FARM RESTORATION & SAFE OPERATIONS	Project Description: VENTILATION UPGRADE
Project Location: 241-AP 200E	Start Date: / End Date:
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): N/A	Total Energy Usage (million Btu/yr): 56.4
Estimated Project Budget (thousand $): TBD	
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.)	
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 ECM-BEC-3.11 Complete Form ECM-BEU-3. Complete Form ECM-LCCA-3.14	
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: [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.	

Project Title: TANK FARM RESTORATION & SAFE OPERATIONS	Project Description: VENTILATION UPGRADE
Project Location: 241-AW 200E	Start Date: / End Date:
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): N/A	Total Energy Usage (million Btu/yr): 127.6
Estimated Project Budget (thousand $): TBD	

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.)

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 ECM-BEC-3.11 Complete Form ECM-BEU-3. Complete Form ECM-LCCA-3.14

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: [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.

Project Title: TANK FARM RESTORATION & SAFE OPERATIONS	Project Description: VENTILATION UPGRADE
Project Location: 241-SY 200E	Start Date: / End Date:
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): N/A	Total Energy Usage (million Btu/yr): (0.46)
Estimated Project Budget (thousand $): TBD	

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.)

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 ECM-BEC-3.11 Complete Form ECM-BEU-3. Complete Form ECM-LCCA-3.14

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: [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.

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 (area) BUILDING 241AP/AN/AW/SY/AY/AZ244SA/SSTs

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:

DOE Order 6430.1A, "General Design Criteria," General Requirements 0101-4, "Handicapped Provisions."

41 CFR, Public Contracts and Property Management, Subtitle C, 101-19.6, "Accommodations for the Physically Handicapped."

- ☐ All Regulations
- ☐ Limited Application (indicate in comments section)

Exceptions:

DOE Order 6430.1A, "General Design Criteria," General Requirements 0101-4, "Handicapped Provisions."

- ☒ 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 loctaions 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.

S R Briggs 3/11/96

Signature Date

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 (Per WHC-IP-0842)	Page 1 of 1

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 W-314

Yes/Maybe

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-ISB-001.

B. Does the PROPOSED CHANGE represent a change to procedures as described in the AUTHORIZATION BASIS?

[] N/A [] No [xx] 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?

[xx] 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 [xx] No [] Yes/Maybe
- Approved IOSR Compliance Implementation Plans? [] N/A [xx] 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 LCO 3.6.3, COB, 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 need to be performed for this change* [xx] DOES [] DOES NOT

*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

Confinement Attribute	Existing Design (WHC-SD-WM-SAR-016)	Proposed Change (WHC-SD-W314-CDR-001)
Pipe Diameter	varies	no change
Operating Pressure	varies	no change
Safety Class	nc	Safety Significant (equiv. to SC-2)
Material	carbon steel	stainless steel
Method of Operation	manual, reconnect jumpers	valve manifolds, reach rod operated

A-6001-202 (12/95) GEF288 ANPIPES.USQ

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) 1. WHC-SD-W314-CDR-001

TITLE: AW 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 [xx] No [] Yes/Maybe

Basis: Change consists of providing epoxy coating in pump pits 241-AW-01A, 02A, 03A, 04A, 05A, 06A, 02E, and valve pits 241-AW-A and -B; installing electric valve position indicators in valve pits 241-AW-A and -B, and in pump pits 241-AW-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-WM-SAR-016, or WHC-SD-WM-ISB-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 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?

[xx] 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 [xx] No [] Yes/Maybe
- Approved IOSR Compliance Implementation Plans? [] N/A [xx] No [] Yes/Maybe

Basis: DST IOSRs (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

Confinement Attribute	Existing Design (WHC-SD-WM-SAR-016)	Proposed Change (WHC-SD-W314-CDR-001)
Pipe Diameter	varies	no change
Operating Pressure	varies	no change
Safety Class	nc	Safety Significant (equiv. to SC-2)
Material	carbon steel	no change
Method of Operation	manual	no change

UNREVIEWED SAFETY QUESTION SCREENING FORM (Per WHC-IP-0842)	Page 1 of 1

USQ Tracking No.: Rev. No.:

REFERENCE DOCUMENT(S):

ECN No. PCA No.

Work Pkg No. Other (Specify) 1. WHC-SD-W314-CDR-001

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 [XX] 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 [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: 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: 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 [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. This is verified by the information in the attached table.

Safety Related Piping Confinement Features

Confinement Attribute	Existing Design (WHC-SD-WM-SAR-016)	Proposed Change (WHC-SD-W314-CDR-001)
Pipe Diameter	varies	no change
Operating Pressure	varies	no change
Safety Class	nc	Safety Significant (equiv. to SC-2)
Material	carbon steel	stainless steel
Method of Operation	manual	no change

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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) 1. WHC-SD-W314-CDR-001

TITLE: AZ 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 [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-ISB-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?

[xx] 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: Aging Waste Facility IOSRs (WHC-SD-WM-OSR-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 need to be performed for this change* [xx] DOES [] DOES NOT

*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 assessmet 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

Confinement Attribute	Existing Design (WHC-SD-WM-SAR-016)	Proposed Change (WHC-SD-W314-CDR-001)
Pipe Diameter	varies	no change
Operating Pressure	varies	no change
Safety Class	nc	Safety Significant (equiv. to SC-2)
Material	carbon steel	stainless steel
Method of Operation	manual	no change

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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: AP 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 [xx] No [] Yes/Maybe

Basis: Change consists of providing epoxy coating in pump pits 241-AP-01A, 02A, 03A, 04A, 05A, 06A, 07A, 08A, 02D, and valve pit 241-AP; installing electric valve position indicators in valve pit 241-AP, and in pump pits 241-AP-08A and 02D; 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, WHC-SD-WM-ISB-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 (WHC-SD-OSR-WM-OSR-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 [xx] DOES NOT need to be performed for this change*

*Safety Related Piping Confinement Features

Confinement Attribute	Existing Design (WHC-SD-WM-SAR-016)	Proposed Change (WHC-SD-W314-CDR-001)
Pipe Diameter	varies	no change
Operating Pressure	varies	no change
Safety Class	nc	Safety Significant (equiv. to SC-2)
Material	carbon steel	no change
Method of Operation	manual	no change

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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) 1. WHC-SD-W314-CDR-001

TITLE: 2E/2W 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 [XX] 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-AN-B valve pit to the 241-AZ-02b sluice pit, the 241-AZ-02B sluice pit to the 241-AX-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-B valve pit to the 244-A DCRT, line SN-213/200 from the 241-A-B valve pit to the 241-AX-B valve pit, and the line SL-502 from the 241-AX-B valve pit to the 241-AY-02D pit. These changes will require updating the facility and process descriptions in WHC-SD-WM-SAR-016, and WHC-SD-WM-ISB-001.

B. Does the PROPOSED CHANGE represent a change to procedures as described in the AUTHORIZATION BASIS?

[] N/A [] No [xx] 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?

[xx] 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-SD-OSR-WM-OSR-016) applicable to the 2E/2W Area tank farm piping system upgrade 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 COB, 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 need to be performed for this change* [xx] DOES [] DOES NOT

*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

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UNREVIEWED SAFETY QUESTION SCREENING FORM
(Continued)

Confinement Attribute	Existing Design (WHC-SD-WM-SAR-016)	Proposed Change (WHC-SD-W314-CDR-001)
Pipe Diameter	varies	no change
Operating Pressure	varies	no change
Safety Class	nc	Safety Significant (equiv. to SC-2)
Material	carbon steel	stainless steel
Method of Operation	manual, reconnect jumpers	valve manifolds, reach rod operated

UNREVIEWED SAFETY QUESTION SCREENING FORM (Per WHC-IP-0842)	Page 1 of 1

USQ Tracking No.: Rev. No.:

REFERENCE DOCUMENT(S):

ECN No. PCA No.

Work Pkg No. Other (Specify) 1. 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 [xx] No [] Yes/Maybe

Basis: Change consists of providing epoxy coating in pump pits 241-SY-01A, 02A, 03A, 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-ISB-001.

B. Does the PROPOSED CHANGE represent a change to procedures as described in the AUTHORIZATION BASIS?

[] N/A [xx] No [] Yes/Maybe

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?

[xx] 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: DST IOSRs (WHC-SD-OSR-WM-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

Confinement Attribute	Existing Design (WHC-SD-WM-SAR-016)	Proposed Change (WHC-SD-W314-CDR-001)
Pipe Diameter	varies	no change
Operating Pressure	varies	no change
Safety Class	nc	Safety Significant (equiv. to SC-2)
Material	carbon steel	no change
Method of Operation	manual	no change

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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) Project W-314 CDR-001

TITLE: SY Annulus Ventilation System Upgrade (Supply)

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 redundant air intake stations for each individual tank replacing the existing alternate annulus supply filter units. These changes will incorporate electric heaters, prefilters, HEPA filters, and isolation valves.

B. Does the PROPOSED CHANGE represent a change to procedures as described in the AUTHORIZATION BASIS?

[] N/A [] No [X] 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?

[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

SCCS.3

UNREVIEWED SAFETY QUESTION SCREENING FORM
(Per WHC-IP-0842)

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USQ Tracking No.: Rev. No.:

REFERENCE DOCUMENT(S):

ECN No. PCA No.

Work Pkg No. Other (Specify) Project W-314 CDR-001

TITLE: 244-A DCRT Ventilation System Upgrade (Supply)

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

SCCS.5

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-W314-001, 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-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 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 [] 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

SST2-23

UNREVIEWED SAFETY QUESTION SCREENING FORM
(Per WHC-IP-0842)

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USQ Tracking No.: Rev. No.:

REFERENCE DOCUMENT(S):

ECN No. PCA No.

Work Pkg No. Other (Specify) Project W-314 CDR-001

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, contol valves, prefilters, 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

SCCS.4

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) 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 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)	Page 1 of 1

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: 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 unwarrented 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 activiated 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 opereation. 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.CJN

UNREVIEWED SAFETY QUESTION SCREENING FORM
(Per WHC-IP-0842)

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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: 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?

[] N/A [X] No [] Yes/Maybe

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?

[] 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

ICPT-A.CJN

UNREVIEWED SAFETY QUESTION SCREENING FORM (Per WHC-IP-0842)	Page 1 of 1

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: AN-, AP-, AW-, AY-, AZ-, SY-, 244-A-DCRT, & 244-S-DCRT Tank Farm Waste Transfer 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 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(sluce pit AZ-02B and central pump pits)-, and 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 [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

ICWT-A.CJN

UNREVIEWED SAFETY QUESTION SCREENING FORM
(Per WHC-IP-0842)

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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: 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 the 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 a 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 thee 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?

[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

ICPEV-A.CJN

UNREVIEWED SAFETY QUESTION SCREENING FORM (Per WHC-IP-0842)	Page 1 of 1

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: 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

ICLD-A.CJN

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-W314-001, Rev. 0

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 [] **DOES** [X] **DOES NOT** need to be performed for this change

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UNREVIEWED SAFETY QUESTION SCREENING FORM
(Per WHC-IP-0842)

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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: 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 [X] 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-ISB-001 will be necessary.

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 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?

[X] 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 [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

AY2-22

UNREVIEWED SAFETY QUESTION SCREENING FORM
(Per WHC-IP-0842)

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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: 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?

[] N/A [X] No [] Yes/Maybe

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 a diesel 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.

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B. Does the PROPOSED CHANGE represent a change to procedures as described in the AUTHORIZATION BASIS?

[] N/A [X] No [] Yes/Maybe

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?

[X] N/A [] No [] Yes/Maybe

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 [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

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UNREVIEWED SAFETY QUESTION SCREENING FORM
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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: 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 D5) 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-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: 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 [X] DOES NOT

244DCRT.-A

UNREVIEWED SAFETY QUESTION SCREENING FORM
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USQ Tracking No.: Rev. No.:

REFERENCE DOCUMENT(S):

ECN No. PCA No.

Work Pkg No. Other (Specify) W314-CDR-001

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] No [] Yes/Maybe
- Approved IOSR Compliance Implementation Plans? [] N/A [X] No [] Yes/Maybe

Basis: DST IOSRs apllicable 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.

USSC.2

UNREVIEWED SAFETY QUESTION SCREENING FORM
(Per WHC-IP-0842)

Page 1 of 1

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: 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 min-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? [] 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

244DCRT.-S

UNREVIEWED SAFETY QUESTION SCREENING FORM
(Per WHC-IP-0842)

Page 1 of 1

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: 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-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 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] 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

200E-W.USQ

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:

National Environmental Policy Act of 1969 - U.S. Department of Energy-Headquarters

- 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

- National Emission Standards for Hazardous Air Pollutants (40 Code of Federal Regulations 61 Subpart H)
- 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
- *Endangered Species Act of 1972* Approval - 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.

CONTENTS

APPENDICES

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.

Milestones M-43-09 through M-43-16 established in the *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement) require that Project W-314 will design and construct Tank Farm upgrades. Milestone M-43-09 requires completion of a conceptual design report by May 31, 1996. Milestone M-43-10 requires the start of definitive design by January 31, 1997. The project construction schedule (due September 30, 1998) and individual Tank Farms' construction milestones are listed as M-43-11 through M-43-16 (due between June 30, 1999 and June 30, 2003).

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 alternative 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

Ecology, 1995, *Dangerous Waste Permit Application Requirements*, 95-402, Washington State Department of Ecology, Olympia, Washington.

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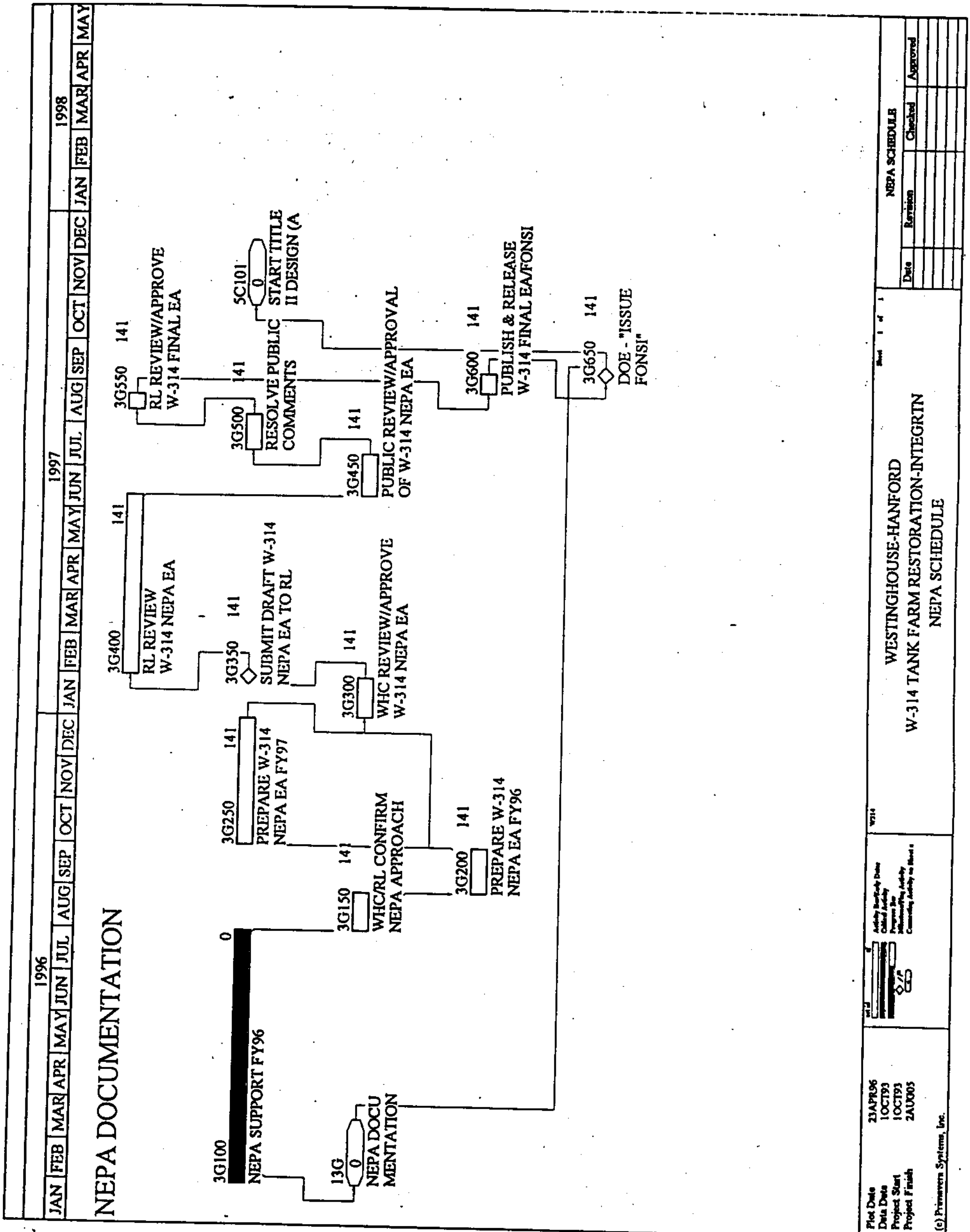
APPENDIX A

PROJECT W-314 TANK FARM RESTORATION AND SAFE OPERATIONS PERMITTING SCHEDULE


1996
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1998
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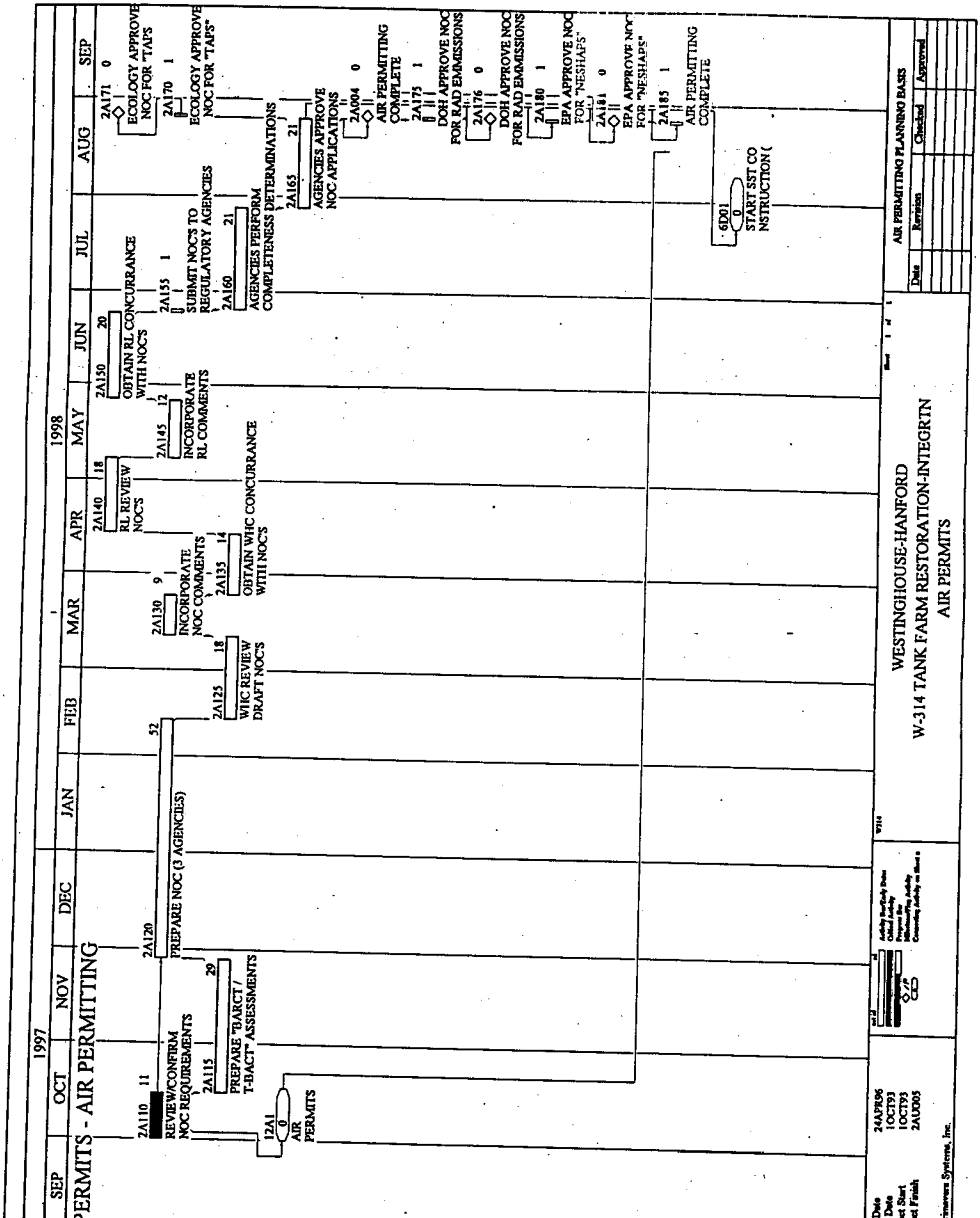
NEPA DOCUMENTATION
3G100 NEPA SUPPORT FY96 0
13G 0 NEPA DOCU MENTATION
3G150 WHC/RL CONFIRM NEPA APPROACH 141
3G200 PREPARE W-314 NEPA EA FY96 141
3G250 PREPARE W-314 NEPA EA FY97 141
3G300 WHC REVIEW/APPROVE W-314 NEPA EA 141
3G350 SUBMIT DRAFT W-314 NEPA EA TO RL 141
3G400 RL REVIEW W-314 NEPA EA 141
3G450 PUBLIC REVIEW/APPROVAL OF W-314 NEPA EA 141
3G500 RESOLVE PUBLIC COMMENTS 141
3G550 RL REVIEW/APPROVE W-314 FINAL EA 141
5C101 0 START TITLE II DESIGN (A
3G600 PUBLISH & RELEASE W-314 FINAL EA/FONSI 141
3G650 DOE - "ISSUE FONSI" 141
Plot Date 23APR96
Data Date 1OCT93
Project Start 1OCT93
Project Finish 2AU005
(c) Primavera Systems, Inc.
W314
WESTINGHOUSE-HANFORD
W-314 TANK FARM RESTORATION-INTEGRTN
NEPA SCHEDULE
Sheet 1 of 1
NEPA SCHEDULE
Date
Revision
Checked
Approved


PERMITS - AIR PERMITTING
1997
1998
SEP
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
2A110 11
REVIEW/CONFIRM NOC REQUIREMENTS
2A115 29
PREPARE "BARCT / T-BACT" ASSESSMENTS
12A1 0
AIR PERMITS
2A120 52
PREPARE NOC (3 AGENCIES)
2A125 18
WHC REVIEW DRAFT NOC'S
2A130 9
INCORPORATE NOC COMMENTS
2A135 14
OBTAIN WHC CONCURRANCE WITH NOC'S
2A140 18
RL REVIEW NOC'S
2A145 12
INCORPORATE RL COMMENTS
2A150 20
OBTAIN RL CONCURRANCE WITH NOC'S
2A155 1
SUBMIT NOCS TO REGULATORY AGENCIES
2A160 21
AGENCIES PERFORM COMPLETENESS DETERMINATIONS
2A165 21
AGENCIES APPROVE NOC APPLICATIONS
2A171 0
ECOLOGY APPROVE NOC FOR "TAPS"
2A170 1
ECOLOGY APPROVE NOC FOR "TAPS"
2A004 0
AIR PERMITTING COMPLETE
2A175 1
DOH APPROVE NOC FOR RAD EMMISSIONS
2A176 0
DOH APPROVE NOC FOR RAD EMMISSIONS
2A180 1
EPA APPROVE NOC FOR "NESHAPS"
2A181 0
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AIR PERMITTING COMPLETE
6D01 0
START SST CONSTRUCTION (
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Data Date 1OCT93
Project Start 1OCT93
Project Finish 2AUG05
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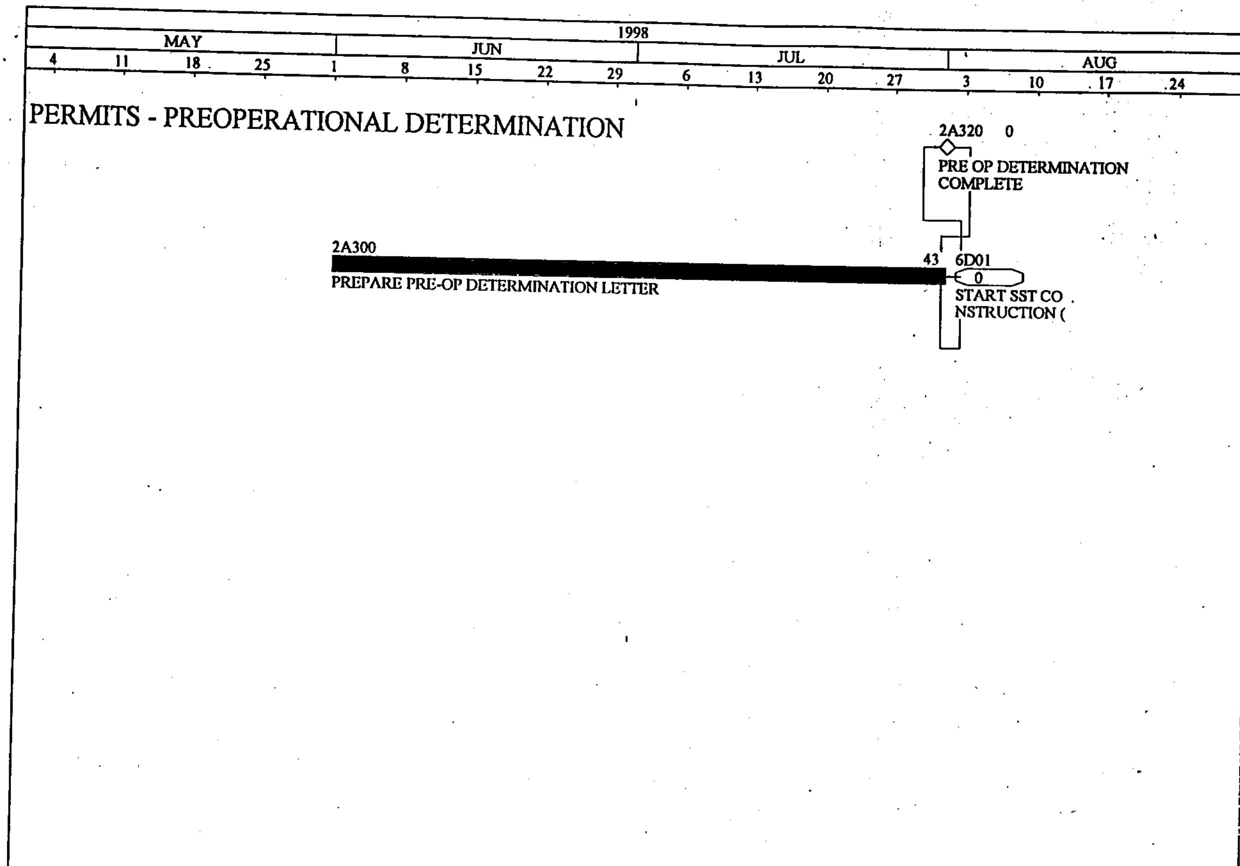
W314
Sheet 1 of 1
WESTINGHOUSE-HANFORD
W-314 TANK FARM RESTORATION-INTEGRTN
AIR PERMITS
AIR PERMITTING PLANNING BASIS
Date
Revision
Checked
Approved



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Project Finish	2AU005

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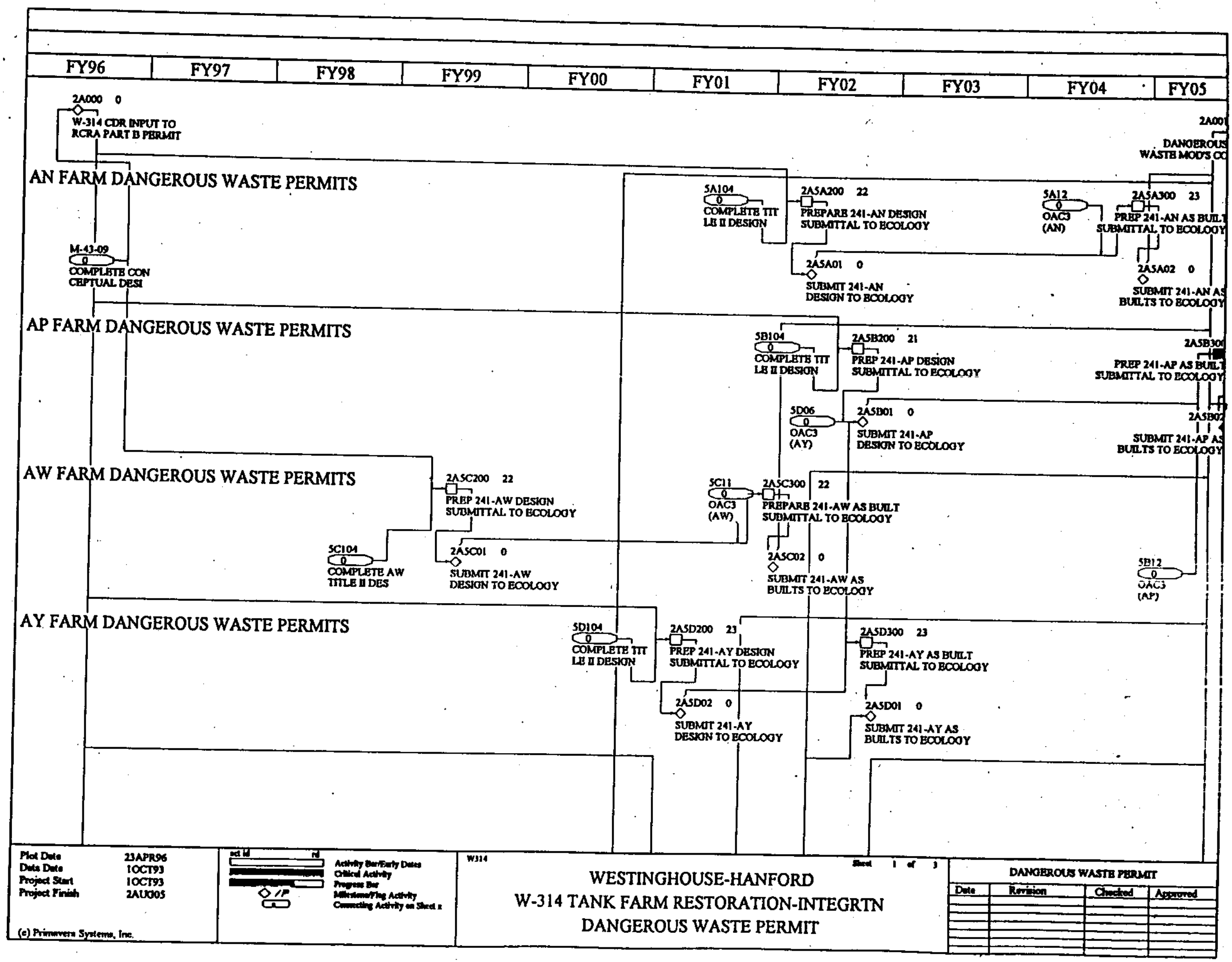
WESTINGHOUSE-HANFORD
W-314 TANK FARM RESTORATION-INTEGRTN
PRE OPERATIONAL DETERMINATION

Sheet 1 of 1

PRE OPERATIONAL DETERMINATION

Date	Revision	Checked	Approved


FY96
FY97
FY98
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FY01
FY02
FY03
FY04
FY05
2A000 0
W-314 CDR INPUT TO RCRA PART B PERMIT
AN FARM DANGEROUS WASTE PERMITS
M-43-09 0
COMPLETE CONCEPTUAL DESI
5A104 0
COMPLETE TITLE II DESIGN
2A5A200 22
PREPARE 241-AN DESIGN SUBMITTAL TO ECOLOGY
2A5A01 0
SUBMIT 241-AN DESIGN TO ECOLOGY
5A12 0
OAC3 (AN)
2A5A300 23
PREP 241-AN AS BUILT SUBMITTAL TO ECOLOGY
2A5A02 0
SUBMIT 241-AN AS BUILTS TO ECOLOGY
2A001
DANGEROUS WASTE MOD'S CO
AP FARM DANGEROUS WASTE PERMITS
5B104 0
COMPLETE TITLE II DESIGN
2A5B200 21
PREP 241-AP DESIGN SUBMITTAL TO ECOLOGY
5D06 0
OAC3 (AY)
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SUBMIT 241-AP DESIGN TO ECOLOGY
2A5B300
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2A5B02
SUBMIT 241-AP AS BUILTS TO ECOLOGY
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2A5C200 22
PREP 241-AW DESIGN SUBMITTAL TO ECOLOGY
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AY FARM DANGEROUS WASTE PERMITS
5D104 0
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2A5D200 23
PREP 241-AY DESIGN SUBMITTAL TO ECOLOGY
2A5D02 0
SUBMIT 241-AY DESIGN TO ECOLOGY
2A5D300 23
PREP 241-AY AS BUILT SUBMITTAL TO ECOLOGY
2A5D01 0
SUBMIT 241-AY AS BUILTS TO ECOLOGY
Plot Date 23APR96
Data Date 1OCT93
Project Start 1OCT93
Project Finish 2AUG05
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act id
Activity Bar/Early Dates
Critical Activity
Progress Bar
Milestone/Flag Activity
Connecting Activity on Sheet x
W314
Sheet 1 of 3
WESTINGHOUSE-HANFORD
W-314 TANK FARM RESTORATION-INTEGRTN
DANGEROUS WASTE PERMIT
DANGEROUS WASTE PERMIT
Date
Revision
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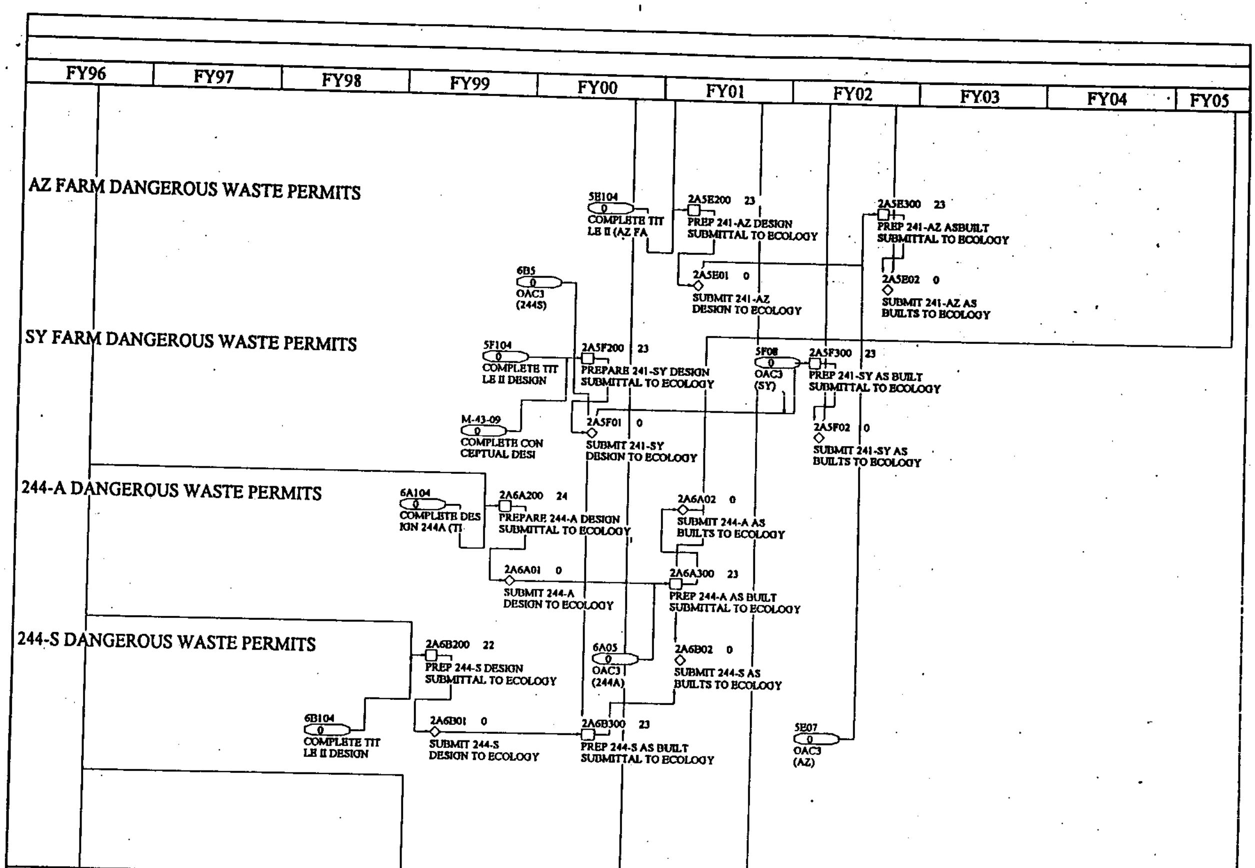

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Project Finish	2AUG05

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Activity Bar/Early Dates
Critical Activity
Progress Bar
Milestone/Flag Activity
Connecting Activity on Sheet x

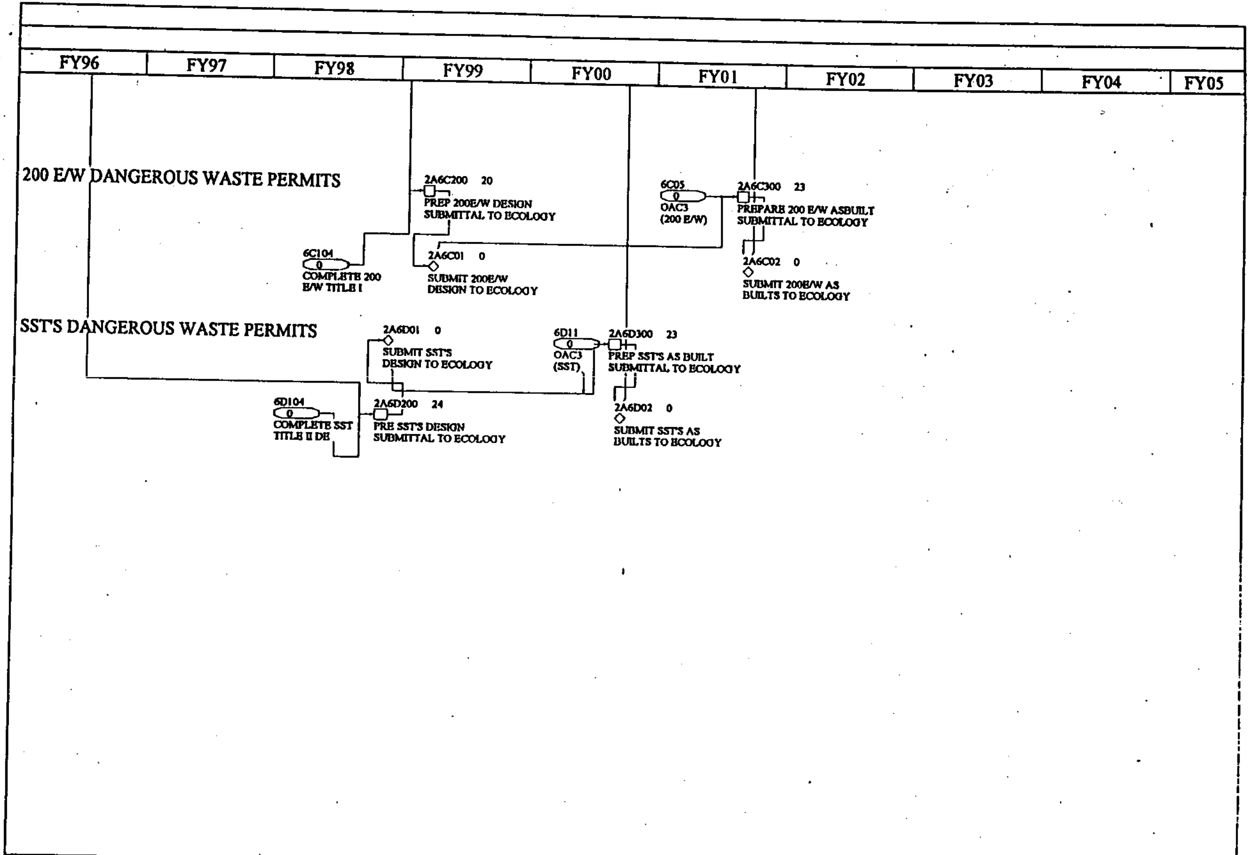
W314

Sheet 2 of 3

WESTINGHOUSE-HANFORD
W-314 TANK FARM RESTORATION-INTEGRTN
DANGEROUS WASTE PERMIT

DANGEROUS WASTE PERMIT

Date	Revision	Checked	Approved



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Data Date	1OCT93
Project Start	1OCT93
Project Finish	2AUG05

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Activity Bar/Early Dates
Critical Activity
Progress Bar
Milestone/Flag Activity
Connecting Activity on Sheet #

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Sheet 3 of 3

WESTINGHOUSE-HANFORD
W-314 TANK FARM RESTORATION-INTEGRTN
DANGEROUS WASTE PERMIT

DANGEROUS WASTE PERMIT

Date	Revision	Checked	Approved

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.)