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T PLANT SECONDARY CONTAINMENT & LEAK DETECTION
UPGRADES

OCT 19 1995

Station 35

ENGINEERING DATA TRANSMITTAL

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10/19/95

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ENGINEERING EVALUATION

**T PLANT SECONDARY CONTAINMENT AND
LEAK DETECTION UPGRADES**

PROJECT W-259

Prepared for

Westinghouse Hanford Company

October 1995

For Westinghouse Hanford Company
Subcontract 380393

Prepared by

ICF Kaiser Hanford Company
Richland, Washington

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ENGINEERING EVALUATION
FOR
T PLANT SECONDARY CONTAINMENT AND
LEAK DETECTION UPGRADES
PROJECT W-259

Prepared by

ICF Kaiser Hanford Company
Richland, Washington

for

Westinghouse Hanford Company

Principal Lead Engineer	10/12/95 Date	Technical Documents	10-18-95 Date
Project Manager	10/17/95 Date	Environmental Engineering	10-17-95 Date

Westinghouse Hanford Company

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ABBREVIATIONS

ACDR	advanced conceptual design report
ALARA	as low as reasonably achievable
ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
AWWA	American Water Works Association
CDR	conceptual design report
CFR	Code of Federal Regulations
DOE	U.S. Department of Energy
DST	double-shell tank
EPA	Environmental Protection Agency
FDC	functional design criteria
FHA	fire hazards analysis
HEPA	high-efficiency particulate air
HPS	Hanford Plant Standard
ICF KH	ICF Kaiser Hanford Company
I/O	input/output
IEEE	Institute of Electrical and Electronics Engineers
MCC	motor control center
MOV	motor operated valve
MRP	Management Requirements and Procedures
NEC	National Electrical Code
NEPA	National Environmental Policy Act
NESC	National Electric Safety Code
OSHA	Occupational Safety and Health Administrator
PLC	programmable logic controller
PSAR	preliminary safety analysis report
PSE	preliminary safety evaluation
PUREX	plutonium-uranium extraction
QAP	Quality Assurance Plan
RL	U.S. Department of Energy, Richland Operations Office
RLIP	U.S. Department of Energy, Richland Operations Office Implementing Procedure

ABBREVIATIONS (Continued)

SDC	Standard Design Criteria
SEPA	State Environmental Policy Act
U.S.C.	United States Code
VCP	video control panel
WAC	Washington Administrative Code
WHC	Westinghouse Hanford Company
WBS	work breakdown structure
WSDOH	Washington State Department of Health

ENGINEERING EVALUATION

T PLANT SECONDARY CONTAINMENT AND LEAK DETECTION UPGRADES

PROJECT W-259

I. INTRODUCTION

This Engineering Evaluation supersedes the ACDR for Project W-259, "2706-T/2706-TA Facility Secondary Containment and Leak Detection Upgrades," (Ref. 3). The Evaluation specifically addresses only the changes required for 2706-T and 2706-TA (2706-T/TA) Facility to provide environmental containment and leak detection (reference FDC ECN 621104). Decontamination process capabilities are also provided.

The T Plant facilities in the 200-West Area of the Hanford Site were constructed in the early 1940s to produce nuclear materials in support of national defense activities. The facilities have served a variety of missions including direct nuclear material production, waste management operations, and current decontamination support activities. T Plant includes the 271-T Facility, the 221-T Facility, and several support facilities (e.g., 2706-T, 211-T Sump), utilities, and tanks/piping systems.

The 2706-T/TA Facility has been recommended as the primary interim decontamination facility for the Hanford Site. The decontamination activities planned for this facility support the environmental restoration mission and waste management operation for the Hanford Site. Project W-259 will provide capital upgrades to the 2706-T/TA Facility to comply with Federal and State of Washington environmental regulations for secondary containment and leak detection.

II. SUMMARY

Capital upgrades would be required for this facility to ensure that operations are in compliance with the regulatory standards for secondary containment and leak detection. The decontamination activities planned for the T Plant facilities support the environmental restoration mission and waste management operations for the Hanford Site.

The Functional Design Criteria for Project W-259, "T Plant Secondary Containment and Leak Detection Upgrades," (Ref. 7) is the technical baseline for providing the upgrades necessary to allow the 2706-T/TA Facilities to perform these decontamination activities. The latest FDC revision eliminates the use of non-compliant storage tanks for decontamination processes in 221-T.

The actual operation of the decontamination systems will be performed by 2706-T/TA Facility operations and is not within the scope of project W-259.

Project W-259 was previously validated as a fiscal year 1996 Line Item (total estimated cost: \$18.6M). The total estimated construction cost for this revised project scope is \$9,600,000; other project cost is \$2,600,000. The revised total project cost is \$12,200,000.

The existing 2706-T/TA Facility configuration does not meet the requirements of secondary containment and leak detection (Ref. State/Federal Regulations).

III. JUSTIFICATION

Project W-259 will provide 2706-T/TA Facility upgrades to perform decontamination activities in support of the waste management and environmental restoration programs on the Hanford Site. The 2706-T/TA Facilities must be upgraded to meet EPA and Washington State Department of Ecology requirements for treatment of hazardous liquid waste.

Failure to validate project W-259 will result in delays of a functional on-line facility to support major decontamination activities and will jeopardize Tri-Party Agreement milestones M-32-03, "Complete T Plant Tank Action," and M-32-03-T06, "Complete Scheduled Upgrades to T Plant Tank System (project W-259)."

IV. DESCRIPTION OF PROJECT SCOPE

Project W-259 includes the design, procurement, and installation of the following items as required for each particular decontamination/transfer system.

2706-T/TA Facility

- Systems for collection, filtration, transfer, and storage of mixed decontamination waste at the 2706-T/TA Facility include one automotive pit and one railroad pit sump; mixed waste transfer and filtration system to/from a storage tank; and a liquid waste load-out facility above the railroad pit inside the 2706-T/TA Facility.
- A concrete pad and building to provide secondary containment of the radioactive decontamination waste activities at the 2706-T/TA Facility.
- A concrete catch basin, two storage tanks, and building to provide decontamination waste storage and secondary containment.
- Microprocessor-based system to monitor, alarm, and control the level and transfer of waste for each tank location.
- Valve stations for connection to decontamination agents from the existing systems.
- New 13.8 kV electrical service, utility transformer and vault, and metering at the 2706-T/TA Facility.

- New 480 V switchgear for 2706-T and 2706-TA, and a power distribution system for 2706-TA similar to the power system for 2706-T.
- Site preparation and modifications for the installation of equipment and radioactive decontamination waste collection/storage system.
- Transfer pump and process piping flush capabilities.
- Air-cooled air compressors.
- Leak detection systems for the transfer piping, storage tank, basin sump, and pit sump liners.
- Waste transfer pipe from 221-T canyon to 2706-T/TA decontamination waste collection system.
- Fire protection features are to be incorporated into new facilities and will be modified in the existing 2706-T/TA Facilities as required to comply with applicable codes and standards.

A. IMPROVEMENTS TO LAND (460)

Civil/Structural

The area around the 2706-T/TA Facility and the new tank area will be regraded so that storm water can be collected and disposed of properly. Disposal will be to the correctly sized storm water collection sump.

2706-T/TA Facility Yard Storage Tank Pad

Two new storage tanks with catch basin and building will be located adjacent to the 2706-T/TA Facility on the north side. The existing grading will be modified to allow drainage around the catch basin. A soil sample test will be required to determine soil design parameters. Excavation and

backfill requirements will be determined after the soil is tested and the pad is designed.

Piping and Vessels

2706-T/TA Facility

Pumps, piping and associated and associated wiring/conduit inside the existing automotive and railroad pits will be removed and disposed.

The existing transfer routes between the automotive pit and the railroad pit will be plugged and abandoned in place.

Piping that is located in the pipe trenches will be removed.

The 211T Sump will be abandoned and buried. All equipment in the sump and all piping entering or leaving the sump will be capped. Above ground piping will be removed.

Electrical

General Site

A new poleline and underground service will be added from the existing overhead line C8-L4 to the 2706-T/TA Facility.

2706-T Building

The main 2400-480 V transformer will be removed.

2706-TA Building

A new main 13.8 kV-480/277 V transformer and vault will be installed next to the new electrical room.

B. BUILDINGS (501)**Piping**

Piping between the 2706-T/TA Facility and the new 15,000-gal and 6,000 gal storage tanks, will be above ground. The process piping will be encased in a secondary containment pipe as required. The piping will be installed at an elevation that will not interfere with normal operations of the facility.

Fire Protection

The existing automatic fire alarm system and automatic sprinkler systems provide adequate fire protection for the current occupancy and configuration of the 2706-T/TA Facility. The 2706-T/TA Facility is classified as a Special Purpose Industrial Occupancy per NFPA 101 and an H-7 occupancy per the UBC due to health hazards presented by radionuclides in the facility. Use of organic solvents is not anticipated. Fire protection features to be incorporated into the scope of Project W-259 will be provided to comply with applicable requirements of DOE Orders, the Uniform Fire Code (UFC), Uniform Building Code (UBC), Factory Mutual (FM) Loss Prevention Data Sheets, and the National Fire Protection Association (NFPA) Codes and Standards. Fire protection features include the following.

- Transformer fluid will be an FMRC approved or equivalent less flammable fluid. Transformer installation shall comply with the NEC and FM Loss Prevention Data Sheet 5-4/14-8, "Transformers." Space separation between the building and transformer will comply with FM Loss Prevention Data Sheet 5-4/14-8.
- The tank storage facility and additions to the 2706-T/TA Facility will have exiting that meet requirements of the UBC and NFPA-101. The tank storage building, the new electrical room, and the new HEPA

filter room will each require a minimum of one exit. Emergency exit path lighting and illuminated EXIT signs will also be provided within the scope of this project.

- Automatic sprinkler protection will be provided as follows.
 - 1) Throughout the new tank storage building, the new electrical room, the new HEPA filter room, and for protection under the new maintenance platform roof that form a connection between the filter buildings.
 - 2) Sprinkler protection will be provided by connections to and extension/modification of the existing sprinkler system protecting the 2706-T/TA Facility to provide a system designed for an ordinary hazard group 2 occupancy classification. Modifications to the existing sprinkler systems will include conversion of the existing dry pipe portion to a wet pipe system and replacement of existing non-rising stem control valves for the reduced pressure backflow prevention assembly with OS&Y valves. A hydraulic analysis of the sprinkler system will be performed to determine design requirements for new installations and requirements for modifications of the existing systems. Sprinkler system modifications will comply with NFPA-13.
- A fixed automatic water deluge spray extinguishing system will be provided inside the final filter plenum upstream of prefilters for protection of the HEPA filters. Fire screens shall also be installed upstream of the prefilters. Installation of the waterspray system and associated detection devices for initiation will follow guidance contained in the DOE Fire Protection Resource Manual.

- Modifications to the existing fire alarm system will include relocation and reconnection of alarm devices in HazMat storage facilities HS-030 and HS-032; installation of zone flow switches for the tank storage building and HEPA filter/electrical room sprinkler systems; installation and supervision of detection and alarm devices for the HEPA filter water deluge spray system, installation of additional alarm bells, new manual pull stations, and installation or revision of sprinkler system control valve supervisory devices as required. Fire alarm system modifications will comply with NFPA-72.
- New construction will be noncombustible or fire resistive rated assemblies.
- Vents to the exterior of the Tank Storage Building will be provided for liquid storage tanks. (Anticipated quantities of organic solvents in solution will be less than 20% of the total volume and are not considered to be a sufficient hazard to require flash arresters on tank vents or classified electrical equipment within the tank storage building.)
- Duct smoke detection will be installed in the exhaust ducting and will be interlocked with the HVAC system to shut down fans.

C. OTHER STRUCTURES (550)

2706-T/TA Facility Decontamination Waste Collection System

The railroad and automotive pits will be provided with special protective coating on walls, columns, and floor. The sumps below the railroad and automotive pits will be a double shell with leak detection and grating over the top of the pit. In the existing railroad pit, concrete in the bottom of the pit will be removed and the new sump installed below the existing grade. The concrete bottom of the railroad pit will be resloped to allow

water to flow to the sump. In the existing automotive pit the elevation of the bottom will be raised to four feet or less below grade such that the automotive pit will no longer be a confined space. The sump will be sized to fit in the space which will be filled.

The floor of the 2706-T/TA Facility will be sloped resulting in diversion of all liquids to the two new sumps. The floor, existing pipe trenches, and the walls of the railroad and automotive pits will be grouted to provide a smooth surface. A polymer-type coating (e.g., epoxy) will be applied to all exposed interior concrete surfaces (see Appendix E for special protective coatings).

2706-T/TA Yard Storage Tanks

Two new storage tanks, one 15,000-gal and one 6,000-gal, will be located adjacent to the 2706-T/TA Facility. Both tanks are provided with a concrete secondary containment catch basin. Tanks and basin are provided with cover.

The tanks will be fabricated from stainless steel. Each tank will be designed to accommodate the following features:

- One vertical pump mounted at the top of the tank.
- One agitator mounted at the top of the tank.
- Leak detection at the low point of the basin.
- Access for sludge grab sampling.
- Concrete catch basin is sized for 110% of the tank volume.

- Level monitoring and control for the tanks shall interlock to prevent filling over 90%.
- Waste stream sample return connection.
- Vent with HEPA filter.
- Waste stream inlet connection.
- Sump pit in the catch basin with sump pump to deliver sump water to 15,000 gal tank.

2706-T/TA Loadout Station

The loadout station (i.e., rail car loading arm) for the 2706-T/TA Facility will be located inside the 2706-T/TA Facility above the existing railroad pits (see sketch ES-W259-M02). The design and construction of the new 2706-T/TA radioactive decontamination waste water loadout station will comply with DOE Order 6430.1A.

Heating, Ventilating, and Air Conditioning

HEPA filtration will be installed in the vents on the 15,000-gal and 6,000-gal storage tanks located next to the 2706-TA Building. The HEPA filters will be self-contained, fire- and moisture-resistant, high temperature and high humidity nuclear grade filters.

The existing ventilation system that provides exhaust from the existing 2706-T automotive and railroad pits will be modified to ventilate the primary containment region of the new double-walled sump containment liners being installed in the pits. The existing underfloor exhaust ducts (i.e., one duct serving the automotive pit and one duct serving the railroad pit) will be extended and connected to the double-walled sump

containment liners (see sketch). Demisters will be installed in the proposed additions.

Exhaust fans will be interlocked with the fire alarm system and arranged to shut down upon activation of a fire alarm.

A new HEPA filtration exhaust system will be installed for the 2706-TA Building. The system will consist of exhaust ducting inside 2706-TA, a new filter room on the south side of 2706-TA, a single HEPA filter train, and an exhaust stack.

The duct system will consist of five inlets located at floor level along the north wall. The branch ducts will take the air to the ceiling of the building where it will be collected in a header. The duct will cross the building at the ceiling to the south side where it will enter the filter building. The new filter will have an inlet plenum, a demister, heater, test section, HEPA filter section, test section, and fan section. The filter housing will be a purchased unit fabricated of stainless steel and will have three rows of four filters. The filters will be bag-in/bag-out type with access from both sides of the housing for filter removal and installation.

The fan will discharge from the filter building into a new exhaust stack located adjacent to the building. The stack will be monitored by an exhaust monitoring system.

New heat pumps will be installed to maintain the interior temperature of the 2706-TA Building. The heat pumps will be split systems with the condensers located outside the building and separate fan/coils inside the building.

The storage tank building will be heated during the winter for freeze protection and ventilated during the summer. Heat will be provided by

electric resistance unit heaters. Roof ventilators will provide air flow during the summer.

D. UTILITIES (600)

Electrical System Design

Project W-259 will install equipment that requires 480 V, 3-phase; 208 V, 3-phase; 277 V, single-phase; and 120 V, single-phase power. All electrical systems will be fail-safe in the event of a power failure. Interlocks and alarms will be provided on systems or components to prevent operation in a manner that may affect safety or be detrimental to the equipment. The electrical and lighting systems will be designed according to IEEE recommendations, the IES Lighting Handbook, NEC, NESC, and DOE Order 6430.1A requirements.

A new 13.8 kV overhead and underground service will be provided to the 2706-T/TA facilities from the existing overhead power line C8-L4. A new 13.8 kV-480/277 V, 1000 kVA maximum, oil filled, pad-mounted transformer was used for estimating purposes to serve the 2706-T/TA Facilities. Metering of the transformer will be installed. The actual size and type of transformer and metering specifications will be determined by the A/E engineering and onsite electrical utilities group.

A new 2,500 A switchboard, with a minimum of 25,000 A interrupting current bracing, will be installed in the new electrical room 2706-TA. The new switchboard will include a 2,500 A main circuit breaker and 2 feeder 1,200 A circuit breakers. The main circuit breaker and feeder circuit breakers will be provided with grounded fault protection. A new 1,200 A, main lug only, distribution panelboard, similar to 2706-T's main panelboard, will be provided. A new MCC with a minimum 25,000 A interrupting current bracing will be installed in the 2706-TA electrical room. The MCC and distribution panelboard will be oversized

approximately 20% to allow for additional expansion. Two new MCCs, 480-208 V/120 V transformers, and single-phase panelboards will be installed near the outdoor storage tank located by the 2706-TA Facility.

Electrical power conductors and control conductors will not be routed in the same conduit. All 480 V, 3-phase power wiring will be routed in conduits separate from the 120 V, single-phase wiring.

A one-line diagram and details and a site plan for the 2706-T/TA Facility have been included to illustrate the electrical system explained in this report (see sketch).

The need for standby and/or backup power for tank heaters, heat tracing, motorized valves, pumps, and agitators has been evaluated and is not required at this time.

Compressed Air

Compressed air will be used for decontamination processes, waste water transfer pump, and agitation inside storage vessels. A single stage vertical air compressor will be installed to provide compressed air through the existing compressed air system. New piping will be routed from the existing compressed air line to the decontamination supply station, waste water transfer pump, and tank sparge systems.

Steam

Steam for decontamination activities will be supplied at the 2706-T/TA Facility through portable steam generators (furnished by others).

Pressurized Water

Pressurized water will be used for decontamination processes. Pressurized (service) water will be supplied through the existing service water system. New piping will be routed from the existing service water line to the

decontamination supply station. Backflow protection will be installed as required.

E. SPECIAL EQUIPMENT AND PROCESS SYSTEMS (700)

Piping

2706-T/TA Facility

Two electrically driven diaphragm pumps will be installed for each pit sump within the 2706-T/TA Facility. These pumps will be used to transfer decontamination waste from the pit to the new tanks located adjacent to the 2706-T/TA Facility and are designed to prevent liquid from reaching the top of the sump liners. Outdoor piping between the 2706-T/TA Facility and storage tank building will be provided with an encasement to meet containment requirements.

One vertical turbine-style pump will be installed in each new 15,000-gal and 6,000-gal storage tank. The pump transfers decontamination waste from the tank to the loadout station in the 2706-T/TA Facility.

One agitator will be installed in each new 15,000-gal and 6,000-gal storage tank to provide sludge mixing. The agitator will be mounted at the top of the tank, and positioned so that the blade has appropriate clearance from the lower unit of the pump and other tank internals. Pumps and agitators will be provided with high-efficiency motors.

The storage tanks will have a HEPA filter on the tank vent.

The wash water in the 2706-T/TA Facility is collected in the railroad pit sump and the automotive pit sump. After two stages of filtration to remove solid particles, the wash water is then transferred to the holding tanks prior to disposal to the Tank Farm.

The filtration system is designed for removal of up to 90% of the solids contained in the decontamination waste water. The solid removal in each pit sump is accomplished in two stages. The first stage is in each of the pit sumps where a multiple filter is located to catch larger particles. The liquid in the pit sump is then pumped by an air operated diaphragm pump into a common second stage duplex filter. Wash water after the second stage duplex filter is discharged to 15,000- and 6,000-gal holding tanks for disposal to the Tank Farm. The air operated diaphragm pump has liquid lifting and solid handling capabilities. The solid removal system after two stages of filtration is capable of removing better than 90% of solid. The solids collected by the first and second stage filters are to be transferred to a solid waste disposal facility. The mesh of the filters can be changed, if necessary, to a larger or a smaller size depending on future considerations. The filter media will be designed for easy removal using the overhead crane.

The wash water transfer piping inside the 2706-T/TA Facility and inside the holding tank building is single piping, the outdoor piping between the buildings is provided with an encasement to meet double-containment requirements. The encasement will be provided with low-point drains and a leak detection system as required.

Piping for transferring liquid waste from 221-T canyon to 2706-T/TA Facility is discharged to the 2706-T/TA filtration system by-passing the existing 211-T sump.

All outdoor process piping will be provided with encasements with low-point drain connections to facilitate system drainage and, thereby, reduce the potential for freezing the liquid accumulation in those regions.

Electrical heat trace freeze protection will be provided and installed on the outdoor piping.

Liquid sampling connections (i.e., valves and associated piping) will be provided at the 15,000-gal storage tank. The sampling station (connection) will be provided from a recirculation line as shown on sketch ES-W259-I3A.

All valves and associated non-encased piping located above the storage tank, will be inside of a cabinet enclosure that will serve as secondary containment. The cabinet vent will be provided with HEPA filtration, and the cabinet will drain to the storage tank, as well as have leak detection.

The loadout arm in the 2706-T/TA Facility will be designed to include retraction capabilities (multiple swivel planes of rotation, as required) to facilitate continued normal operations of the crane within the building.

221-T Canyon

A SST pipe encased overhead pipe line shall be installed from 221-T canyon to the liquid waste collection system in 2706-T/TA. Penetrations through fire-rated walls shall be sealed with a UL-listed or FM-approved material in accordance with a UL-classified or FM-approved configuration.

Control and Instrumentation

Microprocessor-Based System

A programmable logic controller (PLC) will be centrally located in the Electrical Room to provide control, monitoring and alarms for the new 2706-T waste collection, storage and loadout systems, and the new ventilating system. The PLC will be provided with a man-machine interface (MMI) to provide a human factors based system for the operator.

2706-T/TA Waste Collection, Storage and Loadout Systems

Controls and instrumentation will include pump and valve controls, pit and tank level monitoring and alarms, leak detection for pit and tank basin

sumps, and leak detection for waste transfer piping (see sketches in Appendix K). This equipment and instrumentation will interface with the PLC.

Ventilating System

Fan and damper controls, HEPA filter monitoring, and alarms will be provided to interface with the PLC. Fan controls will also be interlocked with the fire alarm system.

Ventilating System Exhaust Monitoring System

The exhaust radiation isokinetic monitoring system will be located in the new HVAC filter room to monitor the exhaust stack to warn the operator of the potential radioactive releases to the atmosphere. The system may consist of the following major subcomponents: isokinetic probe, sample/return lines, vacuum pump system with flow control, beta/gamma exhaust monitor, record sampler and system cabinet. The stack will be of sufficient height to meet system vendor stack straight run requirements. Local controls, monitoring and alarms will be provided including a radiation high strobe light. Alarms will also be provided to the PLC.

F. OTHER PROJECT COSTS (900)

Other project costs are the expense funded activities directly associated with the implementation of project W-259 that are not included with the capital costs encompassing the total estimated construction costs. The advanced design activities to be performed by the operating contractor include, but are not limited to, permitting; project documentation and integration; design reviews; and operations planning, training, and support.

G. DESIGN COMPLIANCE

The design and construction of project W-259 will be performed in accordance with the following design criteria:

- **American Society of Mechanical Engineers**
 ASME B31.1, "Power Piping"
 ASME B31.3, "Chemical Plant and Petroleum Refinery Piping"
- **American National Standards Institute/American Water Works Association**
 ANSI/AWWA D100, "Welded Steel Tanks"
 ANSI C2-1993, "National Electrical Safety Code"
- **Washington Administrative Code**
 WAC 173-303, "Dangerous Waste Regulations"
 WAC 173-400, "Air Pollution Sources"
 WAC 173-802, "SEPA Procedures"
 WAC 246-221, "Radiation Protection Standards"
 WAC 246-247, "Radiation Protection - Air Emissions"
 WAC 286-45, "Safety Standards for Electrical Workers"
- **Code of Federal Regulations**
 10 CFR 830, "Nuclear Safety Management."
 10 CFR 835, "Occupational Radiation Protection."
 10 CFR 835/B2, "Implementation Guide for Occupational ALARA Program."
 40 CFR 61, "National Emission Standards for Hazardous Air Pollutants."
 40 CFR 260, "Hazardous Waste Management System: General."
 40 CFR 264, "Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities."

40 CFR 265, "Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities."

- **U.S. Department of Energy Orders**

DOE 4700.1, "Project Management System."

DOE 5400.1, "General Environmental Protection Program."

DOE 5400.2A, "Environmental Compliance Issue Coordination."

DOE 5400.3, "Hazardous and Radioactive Mixed Waste Program."

DOE 5400.5, "Radiation Protection of the Public and the Environment."

DOE N5480.6, "Radiological Control Manual."

DOE 5480.7A, "Fire Protection."

DOE 5480.11, "Radiation Protection for Occupational Workers."

DOE 5484.1, "Environmental Protection, Safety, and Health Protection Information Reporting Requirements."

DOE 5820.2A, "Radioactive Waste Management."

DOE 6430.1A, "General Design Criteria."

- **U.S. Department of Energy, Richland Operations Office Orders**

RL 5440.1A, "Implementation of the National Environmental Policy Act at the Richland Operations Office."

RL 5480.11A, "Requirements for Radiation Protection."

RL 6430.1C, "General Design Criteria."

RL 5820.2A, "Radioactive Waste Management."

RLID 5480.7, "Fire Protection."

- **General Environmental Regulations**

Hanford Federal Facility Agreement and Consent Order (Tri-Party Agreement).

United States Code, U.S.C. 6601-6610, "Pollution Prevention Act of 1980."

- **International Conference of Building Officials**
Uniform Building Code - 1994 Edition
- **International Fire Code Institute**
Uniform Fire Code - 1994 Edition

V. METHODS OF PERFORMANCE

A. ONSITE ARCHITECT-ENGINEER WORK (WBS 1.1 and WBS 1.2)

The engineer/constructor contractor will perform the definitive design, engineering during construction, and acceptance inspection, prepare as-built drawings, and perform project turnover for the secondary containment and leak detection design.

B. PROCUREMENT (WBS 2.0)

The engineer/constructor contractor will procure long-lead items such as engineered equipment, burial boxes, and instrumentation. The construction contractor will procure and install the balance of equipment for this project.

C. CONSTRUCTION WORK BY ONSITE CONTRACTOR (WBS 3.1)

Construction of the secondary containment and leak detection will be within radiation zones. The engineer/constructor contractor will perform construction services for work that occurs within the T Plant and 2706-T/TA boundaries, utility tie-ins, and contaminated areas.

D. WORK BY OPERATING CONTRACTOR (WBS 3.3 and WBS 4.0)

The operating contractor will support the project by providing input to the review of the design and by providing oversight of construction activities. Included in this WBS are input to design; review of design media for operability, maintainability, quality assurance, safety, and environmental compliance considerations; review of procurement and construction

submittals for engineered items; operations, safety, and quality assurance support to the construction effort; and T Plant operator support to construction. The operating contractor will provide for the burial of contaminated soil, equipment, and debris removed during construction.

The operating contractor will provide overall project management during design, procurement, and construction.

VI. REQUIREMENTS AND ASSESSMENTS

A. SAFEGUARDS AND SECURITY

Project W-259 will take place within the 200-West Controlled Area and will require appropriate clearances and badging for access. Existing safeguards and security measures at T Plant will not be impacted by this project. No new measures beyond the current site practices will be required as a result of this project.

B. HEALTH AND SAFETY

Project W-259 will support remediation of safety concerns that exist at T Plant by providing storage of low- and high-level radioactive decontamination fluids for transport.

Project W-259 is not anticipated to add new safety requirements to the 2706-T/TA Facility for splash and spill prevention during loadout operations.

Accommodations for the physically handicapped will not be provided (see Appendix I).

Construction contractors will comply with State of Washington, ICF KH, and WHC standards in performance of work, and will ensure that all applicable OSHA standards are enforced during the project. These

measures include providing continuous access to construction areas by emergency vehicles and personnel, and ensuring that emergency evacuation routes are unobstructed.

No increase in the release of radiation from the area or site is anticipated by the construction or operation of this project. Exposure to personnel resulting from the operation of this project will also be minimized through the use of engineered/administrative controls, and personal protective equipment.

C. DECONTAMINATION AND DECOMMISSIONING

Project W-259 will add a minimal amount of additional equipment to the 2706-T/TA Facility. This equipment has been reviewed against requirements for the ease of decontamination and decommissioning at the closure of T Plant in accordance with section 2.4 of the FDC. The additional equipment and facilities include the 2706-T/TA storage tanks; the decontamination fluid transfer system; the transfer pumps; filters; miscellaneous piping connectors, valves, instrumentation, and controls; and the MCC with buckets, an uninterruptible power supply, a panelboard, motors, and transformers. Decontamination and decommissioning of the additional equipment and the closure of T Plant are not within the project scope. The new system components will be installed with lifting lugs as required. Lifting lug locations will be determined during definitive design.

D. PROVISIONS FOR FALLOUT SHELTERS

No provisions for fallout shelters will be made as part of this project. No additional manned facilities or permanent staffing is envisioned as a result of this project.

E. MAINTENANCE AND OPERATION REQUIREMENTS

Project W-259 will result in significant reductions in the maintenance requirements for T Plant due to reduction of the safety concern regarding

contamination fluid accumulation. The successful completion of this project will result in the elimination of the current mitigation program.

All new facilities will be designed to allow access for maintenance. Equipment and instruments will be designed to operate in the environment in which they are located and will be maintained with standard tools whenever practical.

The operating contractor will verify the accuracy of existing facility drawings with current site conditions in support of design and construction.

The operating contractor will provide soil sampling and characterization to identify special requirements during construction and to classify waste for disposal.

F. AUTOMATED DATA PROCESSING EQUIPMENT

No automated data processing equipment will be provided for this project.

G. QUALITY ASSURANCE/SAFETY CLASSIFICATION

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 QAPP. Based upon a graded approach, the QAPP will implement applicable quality assurance requirements identified in 10 CFR 830.120, "Quality Assurance Requirements." 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.

For project W-259, the 2706-T/TA loadout station storage tanks will be designed in accordance with DOE Order 6430.1A, Division 13. The radioactive waste decontamination solution storage tanks have been determined to meet applicable special requirements under Section 1323, "Radioactive Liquid Waste Facilities."

Safety Classification

The PSE for project W-259 has been completed (ref 7). The maximum safety class category due to direct exposure of the offsite public or the onsite worker is Safety Class 3. The maximum safety class category due to adverse environmental impact was determined to be Safety Class 3. The evaluation of the safety classification is provided in the PSE.

H. ENVIRONMENTAL COMPLIANCE

Decontamination activities at T Plant generate hazardous and radioactive waste. Project W-259 will provide the upgrades required by State and Federal regulations for containment of hazardous wastes and leak detection. The upgrade designs will provide containment of liquid waste spills during waste transfers or releases from tank systems.

The materials used for containment will be compatible with the mixtures and concentrations of wastes. The hazardous wastes expected from decontamination activities are caustics and acids. Calculations will support the choice of materials (e.g., type of stainless steel) for the primary and containment. The coatings chosen to provide secondary containment will be tested physically prior to construction using nonradioactive simulated waste. If the actual waste differs appreciably from the simulated waste after construction, coupons from the installed coatings will be tested.

Stainless steel tanks installed within concrete catch basins will provide primary and secondary containment for liquids collected from the decontamination waste outside the 2706-T/TA Facility. The concrete pit

sumps and surrounding floors in the decontamination areas of the 2706-T/TA Facility will be coated with a special protective coating to provide a gap-free surface to direct liquids to collection sumps. The collection sumps will have double-walled stainless steel liners as primary and secondary containment. The liners are considered as tank systems according to WAC 173-303-640. Secondary containment systems will have the following features:

- The secondary containment system will be capable of detecting and collecting spills and releases.
- The leak detection system will be designed to detect the failure of the primary containment structure within 24 hours.
- The secondary containment structure will be sloped to drain and remove the collected liquids within 24 hours, or in as timely a manner as possible, to protect human health and the environment.

All secondary containment systems will be tested and certified after installation.

Ancillary equipment such as piping and pumps will have secondary containment.

Before construction of each tank system, a certification of design integrity will be produced by a qualified, independent registered professional engineer. A qualified installation inspector will inspect the tank system prior to enclosing or placing the system in use. All tanks and ancillary equipment will be tested for tightness prior to being enclosed or placed in service.

Waste minimization and pollution prevention will be addressed during definitive design to ensure the minimization, proper control, and disposal of any hazardous construction materials.

A Construction Quality Assurance Plan will be prepared for this project following release of the PSE. The plan may require identification of a Construction Quality Assurance Officer.

I. PERMITS

The operating contractor will prepare all required permit applications for DOE submittals. The following environmental reviews, permits, and approvals will be required prior to construction and/or operation of the facilities included within the project.

National Environmental Policy Act

Federal agencies are required to assess the potential environmental impact associated with their projects. The DOE will determine what level of NEPA documentation is required for the project. NEPA CX has been approved for W-259 revised scope (Ref. Gary Wells letter).

State Environmental Policy Act

A SEPA environmental checklist will be prepared if required by a State or local agency. Based on information in the checklist, the agency will determine if a State environmental impact statement is required or issue a determination of no significance.

Dangerous Waste Permit - WAC 173-303

Hanford facility units that treat, store, and dispose of dangerous waste are being permitted in accordance with the requirements of WAC 173-303 and the Resource Conservation and Recovery Act of 1976 as amended.

Permitting Strategy

Air permitting and proper notifications to the WSDOH for this project are estimated to take up to 52 weeks. Construction activities, including long-lead procurement, are not to proceed without all required permits. Permitting will be initiated by the operating contractor.

VII. IDENTIFICATION AND ANALYSIS OF UNCERTAINTIES

The following uncertainties were evaluated to determine the proper contingency to be used in the conceptual cost estimate. Each of the uncertainties has resulted in the inclusion of additional contingency on a percentage basis. However, the contingency allowance does not assume the worst case impact from all the uncertainties. Including the costs for all worst case impacts would not be economically feasible or justified based on the historical costs and contingency usage of other projects.

Fire Protection

The Tank Storage Building is a Group H, Division 7 occupancy per the UBC due to storage of liquids having radiation contamination. Although, the majority of the 2706-T/TA Facility is similar to a Group F, Division 1 occupancy per the UBC, it is classified as an H-7 occupancy due to the presence of radionuclides. Per NFPA 101, this facility is considered to be an ordinary hazard special purpose industrial occupancy.

The quantity of additional fire alarm notification devices (gongs, bells, and/or strobes) is to be determined based upon review of existing fire alarm arrangements and evaluation of ambient background noise levels.

The quantity of manual pull stations required is dependent upon the locations of existing pull stations and new exits from the building.

DOE Order 6430.1A specifies: "Each building shall be protected by a minimum of two [fire] hydrants." (0266-4) and "Hydrants shall be provided so that hose

lays from hydrants to all exterior portions of a protected building are no more than 300 feet." (1530-9). Although there appears to be sufficient hydrants, the fire hose lay from hydrants, around obstructions (fences, storage, etc.) to the exterior portions of the building should be evaluated to determine if additional fire hydrants and underground mains will be required.

HEPA filters to be used will each have a leading filter surface area of 4 ft². These 12 inch thick, 2 ft by 2 ft filters will be arranged in a 6 ft by 8 ft array having a total leading filter surface area of 48 ft². Since this is a new installation, protection is required and shall be from an automatic water deluge spray system in the final filter plenum. The existing HEPA filters for the building are not currently protected. Guidance contained in the DOE Fire Protection Resource Manual (FPRM) permits existing installations to remain unprotected unless there is a significant hazard that endangers building occupants. A waiver or exemption from the requirement to provide a deluge water spray system for protection of the HEPA filters may be possible.

Collection/containment of fire protection water discharge is required by the UFC and DOE Orders. The containment basin should be sized to collect the anticipated sprinkler system discharge for a period of 20 minutes plus contain the volume of the largest tank. Sprinkler discharge is estimated to be 7,344 gal (0.20 gpm/ft² density over the area of the tank building [currently 1,836 ft²] or a 2,000 ft² design area, whichever will be smaller).

The solid waste fire protection SRID may take precedence over portions of DOE Orders 6430.1A, 5480.7A, RLID 5480.7, and the DOE Fire Protection Resource Manual, including the DOE Filter Plenum Protection Standard and the Hanford Chapter of the Resource Manual. Per the solid waste SRID, the UBC is the code of record for design issues. This design effort is based on DOE orders requirements and does not include solid waste fire protection SRID requirements. Compliance with the fire protection SRID and use of the UBC as the code of record may impact construction, fire protection, and exiting features that are

required for the facility. Applicability of the fire protection SRID needs to be identified in criteria documents.

This design effort does not propose utility upgrades in support of the fire protection system additions and improvements. Additional fire hydrants are not required per requirements of the DOE orders and NFPA codes. However, if the UBC becomes the code of record and is the basis for the fire protection design, additional fire hydrants and underground main improvements may be required.

In compliance with fire protection requirements of DOE 5480.7A, proposed protection for the new HEPA filters will consist of a fixed automatic water spray system with detection arranged in accordance with requirements of the draft Filter Plenum Protection Standard contained in the DOE Fire Protection Resource Manual. The existing HEPA filter units for the 2706-T Facility currently do not have any fire protection in the filter plenum or enclosure. Addition of this required protection may be added to the scope of project W-259.

Although not required per NFPA 90A or FDC direction, interlocks between the fire alarm system and HVAC fans are proposed for consistency with the existing 2706-T Facility exhaust system and to prevent smoke from plugging the HEPA filter units.

This design input is based upon the assumption that there will be no organic solvents used in the decontamination process and organic solvents will not be in the waste stream. If organic solvents are to be used or contained in the waste stream, the design will require additional fire protection features that may include: fire-rated separations, electrical equipment classified for hazardous locations, additional tank venting, explosion relieving construction for the tank building, revisions of the mechanical ventilation systems, and other fire protection system improvements as needed depending upon properties and quantities of the organic solvents.

A revision of or an amendment/supplement to the approved T-Plant Fire Hazards Analysis (FHA) is required prior to finalizing fire protection design and specifications. The FHA revisions shall address facility modifications and additions that are within the scope of this project.

Decontamination Chemical Characteristics

Certain design concept limitations have been assumed because of requirements to control tank temperatures, tank stresses, tank and piping life, and operating conditions. A major limitation is the material corrosion resistance requirement for the expected 20-year life of project W-259. The 1/16-in. total corrosion limitation over 20 years equates to a yearly average allowance of about 3 mils/yr in the stainless steel components of the piping, transfer, and storage system.

Phosphoric acid and sulfuric acid should not be used as decontamination chemicals because of the corrosion effects they have on stainless steel. The corrosion rate will be kept below 1/16 in. and will be verified periodically to ensure the 20-year life of the project W-259 components. Changes in these requirements could cause significant changes in the design concept and construction sequencing. Common practice has been to apply more restrictive operating parameters as the systems progress in age and service.

In addition to the chemical resistivity requirements, the piping and equipment will accommodate silicate solids of 20% by volume.

VIII. REFERENCES

1. Conceptual Design Report, "T Plant Secondary Containment and Leak Detection Upgrades," Project W-259, prepared by Westinghouse Hanford Company, Document No. WHC-SD-W259-CDR-001, Rev. 0, April 1994.
2. Letter of Instruction No. 7, K. M. Quigley (Westinghouse Hanford Company) to T. L. Watson (ICF Kaiser Hanford Company), "T Plant Secondary Containment and Leak Detection Upgrades - Engineering Evaluation."
3. Advanced Conceptual Design Report, "T Plant Secondary Containment and Leak Detection Upgrades," Project W-259, prepared by ICF Kaiser Hanford Company for Westinghouse Hanford Company, Document No. WHC-SD-W259-ACDR-001, Rev. 0.
4. Engineering Study, "T Plant Engineering Study 2706-T System Upgrades," prepared by Westinghouse Hanford Company, Document No. WHC-SD-DD-ES-013, Rev. 0, December 2, 1992.
5. Safety Analysis Report, "T Plant Safety Analysis Report," prepared by Rockwell Hanford Operations, Document No. RHO-SD-CP-SAR-007, Rev. 1, May 1993.
6. Preliminary Safety Evaluation, "T Plant Secondary Containment and Leak Detection Upgrades," prepared by Westinghouse Hanford Company, Document No. WHC-SD-W259-PSE-001, Rev. 0, April 1, 1994.
7. Functional Design Criteria, "T Plant Secondary Containment and Leak Detection Upgrades," Project W-259, prepared by Westinghouse Hanford Company, Document No. WHC-SD-W259-FDC-001, Rev. 2, DRAFT.

8. Value Engineering Study, "T Plant Secondary Containment and Leak Detection Upgrades," Project W-259, September 23, 1994.

APPENDIX A

Work Breakdown Structure

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WORK BREAKDOWN STRUCTURE

- 1.0 ENGINEERING
 - 1.1 Definitive Design (Engineer/Constructor Contractor)
 - 1.2 Engineering and Inspection (Engineer/Constructor Contractor)
 - 1.3 Safety Analysis Support (Operating Contractor)
- 2.0 PROCUREMENT (Engineer/Constructor Contractor)
- 3.0 CONSTRUCTION
 - 3.1 Force Account Construction (Engineer/Constructor Contractor)
 - 3.3 Plant Forces Construction (Operating Contractor)
- 4.0 PROJECT INTEGRATION (Operating Contractor)
- 5.0 OTHER PROJECT COSTS

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APPENDIX B

Budget Authorized/Budget Outlay Schedule

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**KAISER
ENGINEERS
HANFORD**

**PROJECT W-259
SOLID WASTE T-PLANT FACILITIES**

BA/BO SCHEDULE

DESCRIPTION	(\$000) Total Cost	Calender 95				96				97				98			
		PRIOR YEAR				FY 1996				FY 1997				FY 1998			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1.1 Definitive Design	1200					1200/1200											
1.2 E/I During Constr.	600									450/400				150/200			
2.0 Procurement	800							450/400		350/400							
3.1 CF Construction	6300									6000/5500				300/800			
3.2 Unit Price Construction																	
3.3 OC Construction																	
1.3 WHC Safety Support	400						300/250			100/150							
4.0 OC Project Mgt	300						150/100			100/100				50/100			
Total Estimated Cost	9600	0/0				2100/1950				7000/6550				500/1100			
Other Project Costs	2600	1000/1000				530/530				640/640				430/430			
Total Project Cost	12200	1000/1000				2630/2480				7640/7190				930/1530			

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APPENDIX C

Cost Estimate Summary

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WESTINGHOUSE HANFORD COMPANY
JOB NO. W-259 / P48B10
FILE NO. W259PAA2

** TEST - INTERACTIVE ESTIMATING **
T-PLANT SECONDARY CONTAINMENT & LEAK DETECTION
CURRENT WORKING ESTIMATE
DOE_R01 - PROJECT COST SUMMARY

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COST CODE	DESCRIPTION	ESCALATED TOTAL COST	CONTINGENCY %	TOTAL	TOTAL DOLLARS
020	TITLE II ENGINEERING	1,110,000	10	110,000	1,220,000
030	TITLE III ENGINEERING	510,000	15	80,000	590,000
060	PROJECT MANAGEMENT (ADJUSTED TO MEET DOE 5100.4)	610,000	19	120,000	730,000
		-30,000		-10,000	-40,000
		=====		=====	=====
	TOTAL DESIGN & MANAGEMENT	2,200,000	14	300,000	2,500,000
460	IMPROVEMENTS TO LAND	0	0	0	0
501	BUILDINGS	2,210,000	22	490,000	2,700,000
600	UTILITIES	220,000	18	40,000	260,000
700	SPECIAL EQUIP/PROCESS SYSTEMS	3,000,000	22	660,000	3,660,000
810	DEMOLITION (ADJUSTED TO MEET DOE 5100.4)	330,000	25	80,000	410,000
		40,000		30,000	70,000
		=====		=====	=====
	TOTAL CONSTRUCTION	5,800,000	22	1,300,000	7,100,000
		8,000,000	20	1,600,000	9,600,000
900	OTHER PROJECT COSTS (ADJUSTED TO MEET DOE 5100.4)	2,570,000	0	0	2,570,000
		30,000			30,000
		=====		=====	=====
		2,600,000	0	0	2,600,000
		10,600,000	15	1,600,000	12,200,000
	TOTAL PROJECT COST (TPC)				

REMARKS:

TYPE OF ESTIMATE: CURRENT WORKING ESTIMATE SEPTEMBER 29, 1995

ARCHITECT/ENGINEER

OPERATING CONTRACTOR

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

KAISER ENGINEERS HANFORD
WESTINGHOUSE HANFORD COMPANY
JOB NO. W-259 / P48B10
FILE NO. W259PAA2

** IEST - INTERACTIVE ESTIMATING **
T-PLANT SECONDARY CONTAINMENT & LEAK DETECTION
CURRENT WORKING ESTIMATE
DOE_R02 - WORK BREAKDOWN STRUCTURE SUMMARY

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WBS	DESCRIPTION	ESTIMATE SUBTOTAL	ONSITE INDIRECTS	SUB TOTAL	ESCALATION % TOTAL	SUB TOTAL	CONTINGENCY % TOTAL	TOTAL DOLLARS
=====	=====	=====	=====	=====	=====	=====	=====	=====
110000	DEFINITIVE DESIGN-ONSITE E/C	1095998	0	1095998	1.59	17428	1113426	1224767
120000	ENGINEERING/INSPECTION-ONSITE E/C	489000	0	489000	4.91	24010	513010	589961
	SUBTOTAL 12 ENGINEERING/INSPECTION	489000	0	489000	4.91	24010	513010	589961
130000	WHC SAFETY SUPPORT (96)	260000	0	260000	1.49	3874	263874	303455
131000	WHC SAFETY SUPPORT (97)	100000	0	100000	4.53	4530	104530	120210
	SUBTOTAL 1 ENGINEERING	1944998	0	1944998	2.56	49842	1994840	2238393
311000	2706-T DECON BUILDING	1613578	0	1613578	4.91	79227	1692805	2116006
312000	2706-T/A RECEIVING BUILDING	2061001	0	2061001	4.91	101195	2162196	2702745
313000	2706-T/A TANK STORAGE BUILDING	1014770	0	1014770	4.91	49824	1064594	1224283
314000	2706-T BREEZEWAY BTWN DECON/REC	52458	0	52458	4.91	2576	55034	63290
315001	ELECTRIC UTILITIES TO SITE	142927	0	142927	4.91	7018	149945	172436
315002	RELOCATE HAZMAT CONNEX BOXES	74481	0	74481	4.91	3657	78138	93766
316000	NEW LINE FROM TANK 5-7 TO 2706-T	325290	0	325290	4.91	15972	341262	392451
	SUBTOTAL 31 FA CONST-ONSITE E/C	5284505	0	5284505	4.91	259469	5543974	6764977
330000	BURIAL FEE - O/C	209341	0	209341	4.91	10279	219620	274525
331000	CONSTRUCTION - O/C	1959	0	1959	4.90	96	2055	2569
	SUBTOTAL 33 CONSTRUCTION-O/C	211300	0	211300	4.91	10375	221675	277094
	SUBTOTAL 3 CONSTRUCTION	5495805	0	5495805	4.91	269844	5765649	7042071
400000	PROJECT INTEGRATION	233000	0	233000	3.42	7969	240969	301211
	SUBTOTAL 4 PROJECT INTEGRATION	233000	0	233000	3.42	7969	240969	301211
500094	OPC PRIOR YEARS	1000900	0	1000900	0.00	0	1000900	1000900
500096	OPC FY 1996	520000	0	520000	1.49	7748	527748	527748
500097	OPC FY 1997	580000	0	580000	4.53	26274	606274	606274
500098	OPC FY 1998	400000	0	400000	7.67	30680	430680	430680
	SUBTOTAL 5 OTHER PROJECT COST	2500900	0	2500900	2.59	64702	2565602	2565602

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WHC-SD-W259-ER-001, Rev. 0

KAISER ENGINEERS HANFORD
 WESTINGHOUSE HANFORD COMPANY
 JOB NO. W-259 / P48810
 FILE NO. W259PAA2

** TEST - INTERACTIVE ESTIMATING **
 T-PLANT SECONDARY CONTAINMENT & LEAK DETECTION
 CURRENT WORKING ESTIMATE
 DOE_R02 - WORK BREAKDOWN STRUCTURE SUMMARY

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WBS	DESCRIPTION	ESTIMATE SUBTOTAL	ONSITE INDIRECTS	SUB TOTAL	ESCALATION % TOTAL	SUB TOTAL	CONTINGENCY % TOTAL	TOTAL DOLLARS
=====								

PROJECT TOTAL		10,174,703	0	10,174,703	3.86	10,567,060	15	12,147,277

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WESTINGHOUSE HANFORD COMPANY
JOB NO. W-259 / P48B10
FILE NO. W259PAA2

** TEST - INTERACTIVE ESTIMATING **
T-PLANT SECONDARY CONTAINMENT & LEAK DETECTION
CURRENT WORKING ESTIMATE
DOE_R03 - ESTIMATE BASIS SHEET

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1. DOCUMENTS AND DRAWINGS

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DOCUMENTS: DRAFT W259EE ENGINEERING EVALUATION AUG.1995

DRAWINGS: ES-W259-11A,12A,13A,C1,C2,C3,C4,C5,C6,C7,M01,M02,S1,S2,S3

2. MATERIAL PRICES

=====

UNIT COSTS REPRESENT CURRENT PRICES FOR SPECIFIED MATERIAL.

3. LABOR RATES

=====

A.) ICF-KH HOURLY RATES ARE BASED ON THE 1995 FISCAL YEAR BUDGET LIQUIDATION RATES AS ISSUED BY KEH FINANCE (EFFECTIVE 10-01-94). SEE ALSO THE FY 1995 PLANNING RATES (REPORT BGHB7012).

4. GENERAL REQUIREMENTS/TECHNICAL SERVICES/OVERHEADS

=====

(WHC FUNDED EXPENSE)

A.) ONSITE CONSTRUCTION FORCES GENERAL REQUIREMENTS, TECHNICAL SERVICES AND CRAFT OVERHEAD COSTS ARE INCLUDED AS A COMPOSITE PERCENTAGE BASED ON THE ICF-KH ESTIMATING FACTOR, REVISION 1, FY95, DATED 1/18/94. THE TOTAL COMPOSITE PERCENTAGE APPLIED TO ONSITE CONSTRUCTION FORCES LABOR, FOR THIS PROJECT, IS 111% FOR FIELD WORK, WHICH IS REFLECTED IN THE "OH&P/B&I" COLUMN OF THE ESTIMATE DETAIL.

5. ESCALATION

=====

ESCALATION PERCENTAGES WERE CALCULATED FROM THE FEBRUARY 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 1-32 SUBPARAGRAPH (M), REQUIRES ROUNDING OF ALL GENERAL PLANT PROJECTS (GPP'S) AND LINE ITEM (LI) COST ESTIMATES. REFERENCE: DOE 5100.4, FIGURE 1-11, DATED 10-31-84.

7. REMARKS

=====

- A.) ASSUME REWRITE MODIFICATIONS WILL BE MADE TO ENG EVALUATION REGARDING RELOCATION OF TANK STORAGE BUILDING.
- B.) ASSUME THIS PROJECT WILL BE CAPITAL FUNDED BY ON SITE OPERATING CONTRACTOR.
- C.) ASBESTOS REMOVAL HAS NOT BEEN ADDRESSED IN ESTIMATE.
- D.) ASSUME BUILDINGS 2706T AND 2706 T/A WILL BE VACATED DURING CONSTRUCTION.

C-4

KAISER ENGINEERS HANFORD
WESTINGHOUSE HANFORD COMPANY
JOB NO. W-259 / P48B10
FILE NO. W259PAA2

** TEST - INTERACTIVE ESTIMATING **
T-PLANT SECONDARY CONTAINMENT & LEAK DETECTION
CURRENT WORKING ESTIMATE
DOE_R03 - ESTIMATE BASIS SHEET

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- E.) BURNOUT WAS NOT ANTICIPATED. THEREFORE COSTS FOR BURNOUT HAVE NOT BEEN INCLUDED IN ESTIMATE
- F.) ASSUME EXISTING FIRE PROTECTION, AIR, CHEMICAL & HIGH PRESSURE WATER PIPING ARE IN CLOSE PROXIMITY AND OF ADEQUATE SIZE.
- G.) E & I IS A PERCENTAGE (9.3%) OF CONSTRUCTION
- H.) CAP & ABANDON LINES FROM 211 T. INCLUDE SHORT LINE AT I FOR THE TRANSFER (VALVE, CONNECTION, AND PIPE) LINE.
- I.) SEPERATE THE TANK BUILDING AND THE EXISTING BUILDING WITH A CONNECTED SPACE FOR PIPES & COVERED PARKING FOR THE FORK LIFT.

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** TEST - INTERACTIVE ESTIMATING **
T-PLANT SECONDARY CONTAINMENT & LEAK DETECTION
CURRENT WORKING ESTIMATE
DOE_R04 - COST CODE ACCOUNT SUMMARY

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COST CODE/MS	DESCRIPTION	ESTIMATE SUBTOTAL	ONSITE INDIRECTS	SUB TOTAL	ESCALATION %	TOTAL	SUB TOTAL	CONTINGENCY %	TOTAL	TOTAL DOLLARS
020	TITLE II ENGINEERING									
110000	DEFINITIVE DESIGN-ONSITE E/C	1095998	0	1095998	1.59	17428	1113426	10	111341	1224767
	TOTAL 020	1095998	0	1095998	1.59	17428	1113426	10	111341	1224767
030	TITLE III ENGINEERING									
120000	ENGINEERING/INSPECTION-ONSITE E/C	489000	0	489000	4.91	24010	513010	15	76951	589961
	TOTAL 030	489000	0	489000	4.91	24010	513010	15	76951	589961
060	PROJECT MANAGEMENT									
130000	WHC SAFETY SUPPORT (96)	260000	0	260000	1.49	3874	263874	15	39581	303455
131000	WHC SAFETY SUPPORT (97)	100000	0	100000	4.53	4530	104530	15	15680	120210
400000	PROJECT INTEGRATION	233000	0	233000	3.42	7969	240969	25	60242	301211
	TOTAL 060	593000	0	593000	2.76	16373	609373	19	115503	724876
460	IMPROVEMENTS TO LAND									
311000	2706-T DECON BUILDING	1200	0	1200	4.92	59	1259	25	315	1574
	TOTAL 460	1200	0	1200	4.92	59	1259	25	315	1574
501	BUILDINGS									
311000	2706-T DECON BUILDING	1505	0	1505	4.92	74	1579	25	395	1974
312000	2706-T/A RECEIVING BUILDING	1297185	0	1297185	4.91	63692	1360877	25	340219	1701096
313000	2706-T/A TANK STORAGE BUILDING	600661	0	600661	4.91	29492	630153	15	94523	724675
314000	2706-T BREEZEWAY BTWN DECON/REC	2149	0	2149	4.93	106	2255	15	338	2593
330000	BURIAL FEE - O/C	206650	0	206650	4.91	10147	216797	25	54199	270996
	TOTAL 501	2108150	0	2108150	4.91	103511	2211661	22	489674	2701334

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** TEST - INTERACTIVE ESTIMATING **
T-PLANT SECONDARY CONTAINMENT & LEAK DETECTION
CURRENT WORKING ESTIMATE
DOE_R04 - COST CODE ACCOUNT SUMMARY

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COST CODE/WBS	DESCRIPTION	ESTIMATE SUBTOTAL	ONSITE INDIRECTS	SUB TOTAL	ESCALATION %	SUB TOTAL	CONTINGENCY %	TOTAL DOLLARS
=====								
600 UTILITIES								
311000	2706-T DECON BUILDING	68850	0	68850	4.91	3381	25	90288
315001	ELECTRIC UTILITIES TO SITE	142927	0	142927	4.91	7018	15	172436
TOTAL 600	UTILITIES	211777	0	211777	4.91	10399	18	262724
=====								
700 SPECIAL EQUIP/PROCESS SYSTEMS								
311000	2706-T DECON BUILDING	1342224	0	1342224	4.91	65903	25	1760159
312000	2706-T/A RECEIVING BUILDING	653197	0	653197	4.91	32072	25	856586
313000	2706-T/A TANK STORAGE BUILDING	414109	0	414109	4.91	20332	15	499608
314000	2706-T BREEZEWAY BTWN DECON/REC	50309	0	50309	4.91	2470	15	60697
315002	RELOCATE HAZMAT CONNEX BOXES	74481	0	74481	4.91	3657	20	93766
316000	NEW LINE FROM TANK 5-7 TO 2706-T	325290	0	325290	4.91	15972	15	392451
330000	BURIAL FEE - O/C	2691	0	2691	4.91	132	25	3529
331000	CONSTRUCTION - O/C	1959	0	1959	4.90	96	25	2569
TOTAL 700	SPECIAL EQUIP/PROCESS SYSTEM	2864260	0	2864260	4.91	140634	22	3669365
=====								
810 DEMOLITION								
311000	2706-T DECON BUILDING	199799	0	199799	4.91	9810	25	262011
312000	2706-T/A RECEIVING BUILDING	110619	0	110619	4.91	5431	25	145063
TOTAL 810	DEMOLITION	310418	0	310418	4.91	15241	25	407074
=====								
900 OTHER PROJECT COSTS								
500094	OPC PRIOR YEARS	1000900	0	1000900	0.00	0	0	1000900
500096	OPC FY 1996	520000	0	520000	1.49	7748	0	527748
500097	OPC FY 1997	580000	0	580000	4.53	26274	0	606274
500098	OPC FY 1998	400000	0	400000	7.67	30680	0	430680
TOTAL 900	OTHER PROJECT COSTS	2500900	0	2500900	2.59	64702	0	2565602
=====								
PROJECT TOTAL		10,174,703	0	10,174,703	3.86	392,357	15	12,147,277
=====								
						1,580,219		

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FILE NO. W259PAA2

** TEST - INTERACTIVE ESTIMATING **
T-PLANT SECONDARY CONTAINMENT & LEAK DETECTION
CURRENT WORKING ESTIMATE
DOE_R05 - ESTIMATE SUMMARY BY CSI DIVISION

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CSI	DESCRIPTION	ESTIMATE SUBTOTAL	ONSITE INDIRECTS	SUB TOTAL	ESCALATION %	TOTAL	CONTINGENCY %	SUB TOTAL	TOTAL DOLLARS
00	TECHNICAL SERVICES	489000	0	489000	4.91	24010	15	513010	589961
01	GENERAL REQUIREMENTS	234126	0	234126	4.91	11495	25	245621	307027
02	SITEWORK	754595	0	754595	4.91	37051	20	791646	951203
03	CONCRETE	201923	0	201923	4.91	9914	20	211837	255002
05	METALS	155984	0	155984	4.91	7659	24	163643	203034
07	MOISTURE AND THERMAL	45502	0	45502	4.91	2234	25	47736	59670
08	DOORS, WINDOWS AND G	20317	0	20317	4.91	998	18	21315	25130
09	FINISHES	85194	0	85194	4.91	4183	25	89377	111569
10	SPECIALTIES	1894	0	1894	4.91	93	25	1987	2484
13	SPECIAL CONSTRUCTION	225199	0	225199	4.91	11057	18	236256	279100
15	MECHANICAL	2844570	0	2844570	4.91	139668	23	2984238	3662817
16	ELECTRICAL	926501	0	926501	4.91	45492	22	971993	1185035
19	PROJECT MANAGEMENT	233000	0	233000	3.42	7969	25	240969	301211
22	ENVIRON ENGRG	17374	0	17374	1.59	276	10	17650	19415
23	ARCHITECTUAL	52212	0	52212	1.59	830	10	53042	58346
24	STRUCTURAL	156370	0	156370	1.59	2486	10	158856	174742
26	FIRE PROT/SAFETY	43735	0	43735	1.59	695	10	44430	48873
27	PIPING/VESSEL	186717	0	186717	1.59	2969	10	189686	208654
28	HVAC	38281	0	38281	1.59	609	10	38890	42779
29	INSTRUMENT	132967	0	132967	1.59	2114	10	135081	148589
31	ELECTRICAL	111753	0	111753	1.59	1777	10	113530	124883
32	SPECIF	17520	0	17520	1.59	279	10	17799	19578
35	DESIGN ADMIN	65700	0	65700	1.59	1045	10	66745	73419
40	PROJECT MANAGER	76500	0	76500	1.59	1216	10	77716	85488
41	WORD PROCESSING	4400	0	4400	1.59	70	10	4470	4917
42	QUALITY ENGINEERING	4560	0	4560	1.60	73	10	4633	5096
44	ACCEPTANCE INSPECTION	7524	0	7524	1.59	120	10	7644	8408
45	PROJECT PLANNING	16500	0	16500	1.59	262	10	16762	18439
46	ESTIMATES	21420	0	21420	1.59	341	10	21761	23937
49	SUB/PROC	3240	0	3240	1.60	52	10	3292	3621
60	CF ADMINISTRATION	2560	0	2560	1.60	41	10	2601	2861
61	CN ADMINISTRATION	2560	0	2560	1.60	41	10	2601	2861
62	SURVEY	5100	0	5100	1.59	81	10	5181	5699
63	CONSTR ENGRG	4104	0	4104	1.58	65	10	4169	4586
65	RECORDS MGMT/TURNOVER	8360	0	8360	1.59	133	10	8493	9342
70	WORK ORDER	5955	0	5955	1.60	95	10	6050	6655
90	OTHER PROJECT COSTS	2860900	0	2860900	2.56	73106	2	2934006	2989267
99	MISC/SUPERV/OVRHD	110586	0	110586	1.59	1758	10	112344	123579

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** TEST - INTERACTIVE ESTIMATING **
T-PLANT SECONDARY CONTAINMENT & LEAK DETECTION
CURRENT WORKING ESTIMATE
DOE_R05 - ESTIMATE SUMMARY BY CSI DIVISION

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CSI	DESCRIPTION	ESTIMATE SUBTOTAL	ONSITE INDIRECTS	SUB TOTAL	ESCALATION %	SUB TOTAL	CONTINGENCY		TOTAL DOLLARS
							%	TOTAL	
		=====	=====	=====	=====	=====	=====	=====	=====
	TOTAL CONSTRUCTION	10,174,703	0	10,174,703	3.86	392,357	15	1,580,219	12,147,277
	PROJECT TOTAL	10,174,703	0	10,174,703	3.86	392,357	15	1,580,219	12,147,277

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** TEST - INTERACTIVE ESTIMATING **
 T-PLANT SECONDARY CONTAINMENT & LEAK DETECTION
 CURRENT WORKING ESTIMATE
 DOE_R06 - CONTINGENCY ANALYSIS BASIS SHEET

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REFERENCE: ESTIMATE BASIS SHEET
 COST CODE ACCOUNT SUMMARY

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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 CURRENT WORKING ESTIMATE SHOULD HAVE AN OVERALL RANGE OF 15 TO 25 %.

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

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

COST CODE
 020 A 10% CONTINGENCY WAS APPLIED TO ALLOW FOR POSSIBILITY OF SCOPE CHANGES.
 030 A 15% CONTINGENCY WAS APPLIED DUE TO PERCENTAGE METHOD USED TO DETERMINE ENGINEERING COSTS.
 AVERAGE ENGINEERING CONTINGENCY 12%

COST CODE
 460 A CONTINGENCY OF 25% HAS BEEN APPLIED DUE TO THE PRESENCE OF CONTAMINATED SOIL AND PRELIMINARY SITE INFORMATION.
 501 A 22% CONTINGENCY HAS BEEN APPLIED DUE TO THE PRELIMINARY ELECTRICAL INFORMATION SITE INFORMATION.
 600 A CONTINGENCY OF 18% HAS BEEN INCORPORATED INTO UTILITY CONSTRUCTION DUE TO UNKNOWN AMOUNT OF CONTAMINATION THAT MIGHT BE ENCOUNTERED DURING EXCAVATIONS.
 700 A 22% CONTINGENCY HAS BEEN APPLIED DUE TO WORKING IN AN OPERATING CONTAMINATED FACILITY.
 810 A 25% CONTINGENCY HAS BEEN APPLIED TO DUE TO ASSUMPTIONS FOR BUILDING STRUCTURAL COMPONENTS AND PIPING SYSTEMS.

AVERAGE CONSTRUCTION CONTINGENCY 22 %
 AVERAGE PROJECT CONTINGENCY 15 %

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** IEST - INTERACTIVE ESTIMATING **
T-PLANT SECONDARY CONTAINMENT & LEAK DETECTION
CURRENT WORKING ESTIMATE
DOE_R07 - ONSITE INDIRECT COSTS BY MBS

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MBS	DESCRIPTION	ESTIMATE SUBTOTAL	CONTRACT ADMINISTRATION		BID PACK PREP.	OTHER		TOTAL INDIRECTS
			=====	TOTAL		=====	=====	
110000	DEFINITIVE DESIGN-ONSITE E/C	1095998	0.00	0	0	0	0	0
120000	ENGINEERING/INSPECTION-ONSITE E/C	489000	0.00	0	0	0	0	0
130000	WHC SAFETY SUPPORT (96)	260000	0.00	0	0	0	0	0
131000	WHC SAFETY SUPPORT (97)	100000	0.00	0	0	0	0	0
311000	DECON BUILDING	1613578	0.00	0	0	0	0	0
312000	2706-T/A RECEIVING BUILDING	2061001	0.00	0	0	0	0	0
313000	2706-T/A TANK STORAGE BUILDING	1014770	0.00	0	0	0	0	0
314000	2706-T BREEZEWAY BTWN DECON/REC	52458	0.00	0	0	0	0	0
315001	ELECTRIC UTILITIES TO SITE	142927	0.00	0	0	0	0	0
315002	RELOCATE HAZMAT CONNEX BOXES	74481	0.00	0	0	0	0	0
316000	NEW LINE FROM TANK 5-7 TO 2706-T	325290	0.00	0	0	0	0	0
330000	BURIAL FEE - O/C	209341	0.00	0	0	0	0	0
331000	CONSTRUCTION - O/C	1959	0.00	0	0	0	0	0
400000	PROJECT INTEGRATION	233000	0.00	0	0	0	0	0
500094	OPC PRIOR YEARS	1000900	0.00	0	0	0	0	0
500096	OPC FY 1996	520000	0.00	0	0	0	0	0
500097	OPC FY 1997	580000	0.00	0	0	0	0	0
500098	OPC FY 1998	400000	0.00	0	0	0	0	0

PROJECT TOTAL

10,174,703

===== 0 ===== 0 ===== 0 ===== 0 ===== 0 ===== 0 =====

ENGINEERING STATEMENT OF WORK**PROJECT W-259****T Plant Secondary Containment and Leak Detection Upgrades**

Client: Westinghouse Hanford Company W.O. No.: E41044

Prepared by: G. L. Koci Date: September 25, 1995

PROJECT SCOPE

Project W-259 will provide upgrades necessary to allow the T Plant facilities to perform decontamination activities in support of Waste Management and Environmental Restoration Programs on the Hanford Site. The T Plant facilities must be upgraded to meet the State of Washington Department of Ecology and United States Environmental Protection Agency requirements for the treatment of hazardous liquid wastes to provide these decontamination services. In particular, the facility must conform to the secondary containment and leak detection requirements.

The upgrade to be provided by this project is installation of a liquid waste collection, containment, leak detection, and transfer system for handling decontamination solutions in the 2706-T/TA facility.

All work will be within radiation zones. Construction will be by onsite construction forces.

REFERENCES

1. "Functional Design Criteria (FDC), "T Plant Secondary Containment and Leak Detection Upgrades W-259." Document No. WHC-SD-W259-FDC-001, Rev. 2, (DRAFT).
2. Engineering Study, "T Plant Engineering Study, 2706-T System Upgrades," Document No. WHC-SD-DD-ES-013, Rev. 0, December 3, 1992.
3. Engineering Change Notice 621104, "Revision to the Functional Design Criteria, WHC-SD-W259-FDC-001, Rev. 1," March 27, 1995.

DETAILED SCOPE**DESIGN SUPPORT SERVICES****Environmental Engineering (22)**

- Provide environmental regulations input as they affect design.
- Provide calculations to support material selection for primary and secondary containment.
- Review design documents to ensure compliance with environmental regulations.

- Input to air permitting/design support for filter stack.

Architectural (23)

- Provide one (1) Plan drawing for HVAC addition.
- Provide three (3) Elevation, Section, and Detail drawings for HVAC addition.
- Provide one (1) Plan drawing for tank enclosure building.
- Provide three (3) Elevation, Section, Detail, and Schedule drawings for tank enclosure building.
- Provide input to Civil/Structural for development of 2706-T storage tank location.
- Provide input to the Construction Specification (17 sections).

Civil/Structural

- One (1) Drawing List.
- One (1) Plot Plan for locating storage tank at Building 2706-T.
- Provide three (3) Site Plan drawings.
- Provide three (3) tank building structural drawings.
- Provide two (2) HVAC building structural drawings.
- Provide four (4) detail drawings of pits and liner installation.
- Provide two (2) drawings of floors and floor drains.
- Provide input to the Construction Specification (14 sections).
- Prepare calculations as required for building storage tank and transformer foundations.
- Prepare calculations for HVAC/Electrical/Fire Protection supports.
- Prepare calculations as required for 221-T storage tank supports.

Fire Protection (26.3)

- Provide input for Safety to review drawings, specifications, and Acceptance Test Procedures (ATP).
- Provide three (3) sprinkler modification drawing(s).
- Provide three (3) fire detection/alarm drawings.
- Update and revise existing fire protection drawings.
- Provide input to the construction specification (2 sections).
- Provide fire protection ATP input.
- Prepare calculations for fire protection upgrades.
- Provide safety reviews.

Piping (27)

- Two (2) Piping Plan and Elevations for 2706-T/TA.
- Three (3) Pipe Support drawings for 2706-T/TA.
- Two (2) drawings for fabrication and installation of 15,000 and 6,000 gallon tanks (to be included in the Procurement Specification).
- Two (2) General Arrangement drawings.
- One (1) Plan/Sections drawing.
- Two (2) Control drawings (Procurement).
- Two (2) drawings for installation of pump and agitator.

- Two (2) Demolition Plans to outline removal of equipment/piping within existing automotive and railroad pits and pipe trenches within 2706-T.
- One (1) Procurement Specification for pumps
- One (1) Procurement Specification for agitators.
- One (1) Procurement Specification for double walled tank
- Provide input into the Construction Specification (Section 15493).

HVAC (28)

- Provide input to the Construction Specification.
- Two (2) drawings of HVAC plans.
- Two (2) Sections and Details drawings.
- One (1) Control/Floor Diagram drawing.
- One (1) Duct Demolition/Rework drawing.
- Provide two (2) ATPs, one (1) each for the 2706-T/TA ventilation and 2706-T storage tank building ventilation.

Instrumentation (29)

- Provide five (5) Process and Instrumentation diagrams.
- Provide one (1) Instrumentation Plan View drawing.
- Provide four (4) Instrumentation Elevation/Detail drawings.
- Provide five (5) Interconnector drawings.
- Provide seven (7) Logic diagrams.
- Provide one (1) PLC Block diagram.
- Provide three (3) ATPs.
- Provide four (4) Procurement Specifications.
- Provide input to Wire Run list.
- Provide input to Construction Specification.

Electrical (31)

- One (1) Electrical Site Plan drawing.
- One (1) Electrical Building Plan drawing.
- Two (2) Power Plans.
- Two (2) Lighting Plans.
- One (1) one-line diagram.
- One (1) Elementary Diagram.
- One (1) Panelboard Schedule.
- One (1) Electrical Support Detail.
- Two (2) Wire Run lists.
- Four (4) Electrical Details.
- One (1) Poleline Plans and Profile.
- Three (3) Poleline Details.
- Provide input to the Construction Specification (3 sections).
- Provide five (5) sets of calculations.

Specifications (32)

- Construction Specification preparation (1).
- Procurement Specification preparation (8).
- ATP preparation.

Design Administration (35)

- Provide design supervision and interdiscipline coordination.
- Coordinate design basis inputs with discipline lead engineers.
- Ensure that design tasks are completed in accordance with requirements and procedures.

Environmental/Safety/Quality Assurance

- Review design documents and provide input for Environmental, Safety, and Quality Assurance requirements.

Project Management (40.1)

- Provide overall management of project activities.
- Prepare monthly summary of project status, cost, and schedule.
- Provide single point of contact for interface with the customer.

Project Management (40.2)

- Provide secretarial services to project management.

Quality Engineering (42)

- Review drawings, documents, and specifications to assure compliance with appropriate criteria and procedures.

Acceptance Inspection (44)

- Prepare Construction Inspection Plan.
- Provide independent assessment overview plan (by third party) for satisfaction of Washington Administrative Codes.

Project Controls (45)

- Set up Chart of Accounts and budgets in KEMS.
- Prepare the project schedule.
- Provide weekly update of cost and schedule.
- Provide Monthly Reports, Progress Schedule, EACs, and Bar Chart "S" Curve.
- Track changes to the work plan basis.

Estimating (46)

- Prepare a Construction Cost Estimate upon completion of Definitive Design.

Procurement (49.1)

- Provide input during design for Procurement Specification.
- Prepare one (1) bid package.

- Provide input into procurement schedule.

Submittal Document Control (49.4)

- Review Procurement Specifications (4).
- Prepare a Master Submittal List.

Construction Services (67)

- Provide constructibility review during the design process.
- Provide input into construction schedule.
- Perform review/comment on cost estimate.

ENGINEERING/INSPECTION DURING CONSTRUCTION

During construction, Engineering will provide the following support services:

- Acceptance inspection of construction activity as required by the Inspection Plan.
- Review and approval of submittals as required by the specifications.
- Preparation, review, and approval of Engineering Change Notices (ECN) required during construction.
- Review, disposition, and approval of Nonconformance Reports (NCR) generated during construction.
- Prepare and witness an ATP for HVAC controls and Instrumentation.
- Safety, Environmental, and Quality Assurance support of engineering activities.
- Instrumentation to provide technical support to an offsite vendor. This vendor will supply the Programmable Logic Controller (PLC) programming (based on ICF KH supplied ladder logic) and a related ATP for field testing of equipment. Instrumentation will also provide support during execution of the ATP at T Plant.
- As-building of project drawings at completion of construction.
- Direct ATPs developed during Definitive Design.

CONSTRUCTION

Construction Forces

- Prepare Project Control Package (PCP).
- Provide daily supervision of construction labor.
- Provide craft labor for performance of work.
- Provide Construction Engineering support for coordination of materials, drawings, and labor.

- Closeout and turnover of project files.

Project Management (40)

- Provide overall management of project activities.
- Prepare monthly summary of project status, cost, and schedule.
- Provide single point of contact for interface with the customer.

Project Controls (45)

- Set up Chart of Accounts and budgets in KEMS.
- Prepare the project schedule.
- Provide weekly update of cost and schedule.

Estimating (46)

- Provide estimating support as required for ECNs.

Procurement (49.1)

- Perform advance procurement.
- Perform expediting.
- Procure all construction materials.

STATEMENT OF WORK

OPERATING CONTRACTOR - PROJECT MANAGEMENT

PROJECT W-259

W.O. NO.: ER4235

PREPARED BY: T. A. CARLSON

DATE: August 1995

I. OBJECTIVES

The Operating Contractor shall provide project management services to the U.S. Department of Energy-Richland Operation Office (DOE-RL) from definitive design through the completion of construction and project closeout. Project management will include, but is not limited to, overall planning, daily management and technical direction, coordination, control and status reporting for all phases of the project. Before the start of definitive design, the Operating Contractor responsibility and authority will be formally documented in a DOE-RL approved Project Management Plan.

II. TASKSA. General

Provide liaison with the cognizant RL office during the life of the project. Furnish the project information necessary to facilitate surveillance and evaluation of project execution.

1. Provide copies of all project associated correspondence, reports, design drawings, Nonconformance Reports (NCRs), plans and schedules, cost estimates, Quality Assurance (QA) programs and related audits, Engineering Change Notices (ECNs), subcontracts, work orders and supplements, minutes of meetings, test procedures, photographs, etc. All items shall be identified with the project number (W-259).
2. Provide timely notification of meetings, acceptance tests, and final inspections (with agenda when applicable).
3. Provide immediate notification of accidents, incidents, significant problems, work stoppages, etc.
4. Provide data for the Management Review Meeting.
5. Provide responsibility and authority for daily management of the project as provided in the Project Management Plan (PMP).

B. Design

1. Establish project files responsibilities and requirements and disseminate these to project participants.

Statement of Work
Project W-259
Page 2 of 5

2. Provide technical direction and assistance for design accomplished by the Architect/Engineer (A/E).
3. The Project Engineer coordinates and takes the lead technical role in the design review process. Involves the user, site services, operations, maintenance engineering, and process engineering, as necessary, in design reviews. Approves Definitive Design for compliance with the Functional Design Criteria (FDC), project baseline, safety, operability, reliability, energy conservation, and cost effectiveness. Assure optimum design in terms of cost, safety, reliability, maintainability, accuracy, and compliance with applicable codes, standards, criteria, regulations, and Department of Energy (DOE) Management Directives.
4. Approve design schedules consistent with project requirements.
5. Provide and/or concur with engineering reports as required.
6. Coordinate and integrate environmental, NEPA, permitting and safety assessment activities into the project.
7. Update all project documents, control media, reports, schedules, and cost summaries as new information becomes available.
8. Assure that cost effectiveness is stressed in the project design and construction, and that life cycle cost analysis (LCCA), as appropriate, is a basis for design selections and decisions.
9. Participates in the team effort of developing and implementing a comprehensive, integrated project QA and/or Quality control (QC) and/or inspection plan.
10. Provide information, data, records, and guidelines for the special conditions or requirements that may impact project cost, i.e., radiation levels, escort requirements, etc.
11. Assure preparation of Fair Cost Estimate.
12. Coordinate with the Onsite Construction Contractor to assure constructibility.

C. Procurement (Long Lead and Engineered Equipment)

1. Assure procurement plans and schedules are consistent with project schedule requirements.

2. Initiate documentation to procure long lead and engineered equipment.
3. Provide liaison between A/E, program/project coordinators, buyers, and vendors during procurement.
4. Coordinate participation of Quality Assurance, program/project coordinators, and other cognizant personnel during procurement and in-factory acceptance testing activities.
5. Assure that comprehensive vendor surveys have been performed within procurement guidelines.
6. Provide overall management of procurement for engineered equipment.

D. Construction

1. Provide technical direction and assistance, as applicable, on construction accomplished by the Fixed Price Contractor and Onsite Construction Contractor.
2. Approve construction schedules consistent with project requirements.
3. Approve and/or concur with construction reports as required.
4. Assure industrial and nuclear safety at the construction site.
5. Update all project documents, control media, reports, schedules, and cost summaries as new information becomes available.
6. Provide coordination between operational user and construction forces to minimize interference and facilitate the construction work. Assure user submittal review as appropriate.
7. Issue excavation and/or drilling and/or tie-in- permits and welding and/or cutting permits to the Onsite Construction Contractor. Approve radiation work procedures, if required, initiated by Onsite Construction Contractor.
8. Review vendor submittal as required and provide comments to the A/E or buyers.
9. Participate and concur in final inspection, testing and acceptance of completed facilities for operation.

Statement of Work
Project W-259
Page 4 of 5

10. Support project startup readiness review as required.
11. Assure accurate completion of as-built drawings.
12. Prepare the project close-out documents, and obtain the required approvals.
13. Arrange for disposition and/or storage of project records.

E. Decontamination and Decommissioning (D&D)

1. Provide design and technical services for D&D work associated with the 2706-T/TA Facilities, including relocation/removal of existing utilities.
2. Provide labor and materials for all D&D activities.
3. Coordinate D&D activities with Operating Contractor personnel, including plant operation, engineering, safety, and environmental organizations.

Statement of Work
 Project W-259
 Page 5 of 5

PROJECT MANAGEMENT COST ESTIMATE SUMMARY

<u>PHASE</u>		<u>MANHOURS</u>	<u>RATES</u>	<u>TOTAL</u>
Design	Project Engineer	1100	\$62.50	\$ 68,750
	Project Manager	110	62.50	\$ 6,875
	Clerical Support	40	32.40	\$ 1,296
Procurement	Project Engineer	550	\$62.50	\$ 34,375
	Project Manager	55	62.50	\$ 3,438
	Clerical Support	20	32.40	\$ 648
Construction	Project Engineer	1000	\$62.50	\$ 62,500
	Project Manager	1000	62.50	\$ 6,250
	Clerical Support	30	32.40	\$ 972
	SUBTOTAL	<u>3005</u>		<u>\$185,104</u>
	GA\CSP at 25.5%			<u>\$ 47,202</u>
	TOTAL PROJECT MANAGEMENT			<u>\$232,306</u>
	ROUNDED			<u>\$233,000</u>

STATEMENT OF WORK
PROJECT W-259
OTHER PROJECT COST

PREPARED BY: T. A. CARLSON

DATE: August 1995

I. PROJECT SCOPE

Project W-259 will provide upgrades to the liquid waste collection and transfer systems for handling decontamination liquid waste solutions at the T Plant facility. In particular, the upgrades will be performed at and adjacent to the 2706-T/TA Facility.

Upgrades provided by this project are installation of a liquid waste collection, containment, leak detection, and transfer system for handling decontamination solutions in the 2706-T/TA Facility.

II. STATEMENT OF WORK

This statement of work (SOW) identifies expense funded activities that will be incurred and/or managed under the direction of the Operating Contractor (OC). These type of expense activities are identified as Other Project Costs (OPC). These expense funded activities are directly associated with the implementation of Project W-259 that are not capital costs included in the Total Estimated Construction Cost (TECC). This SOW is broken out by the performing organization.

III. DELIVERABLES - OTHER PROJECT COSTS

The deliverables for this section are identified by the performing organizations. Many of the items listed deal with the client review associated with design. These reviews are necessary to assure that the design properly interfaces with existing plant equipment, operating contractor procedures, and to assure that the user will be satisfied with the end product.

A. Westinghouse Hanford Company (WHC) - Programs

1. Prepare functional design criteria and revisions
2. Prepare program/budget plans
3. Participate in value engineering sessions
4. Support document review of conceptual and definitive design media

Statement of Work
Other Project Costs
Page 2 of 6

B. Westinghouse Hanford Company (WHC) - Projects

1. Review functional design criteria
2. Manage conceptual design report preparation
3. Prepare construction project data sheet
4. Participate in value engineering sessions
5. Prepare letters of instruction
6. Coordinate site preparation, site planning
7. Contribute text and appendices as required
8. Coordinate review and approval of project document
9. Prepare project plan, project management plan and request for project authorization
10. Provide project management and other project costs statement of work for estimate
11. Support for project validation
 - a. Validation reports
 - b. Validation package preparation
 - c. Presentations
12. Coordinate activities prior to authorization
 - a. Deviation/Waiver request
 - b. Soil characterizations
 - c. Plant maintenance activities

C. Westinghouse Hanford Company (WHC) - Operations

1. Provide input for document review
 - a. Conceptual design report
 - b. Value engineering sessions
 - c. Definitive design
 - d. Operational test procedures
2. Support project activities
 - a. Design/Construction job walks
 - b. Equipment tagouts
 - c. Support/Witness acceptance test procedures
 - d. Perform operational test procedures
3. Revise operations procedures
4. Operator training for new waste collection systems
5. Provide initial chemical inventories for new waste collection systems

Statement of Work
Other Project Costs
Page 3 of 6

D. Westinghouse Hanford Company (WHC) - Maintenance

1. Provide input for document review
 - a. Conceptual design report
 - b. Value engineering sessions
 - c. Definitive design
2. Provide general support of the project
3. Provide recommended spare parts list
4. Provide training for new waste collection systems
5. Development/Revise preventative maintenance procedures for equipment
6. Provide craft support for the operational test procedures

E. Westinghouse Hanford Company (WHC) - Environmental

1. Provide input for document review
 - a. Functional design criteria
 - b. Conceptual design report
 - c. Value engineering sessions
 - d. Definitive design
2. Perform regulatory analysis
3. Develop permitting plan
4. Coordinate permitting activities
5. Support development and approval of the national environmental policy act (NEPA) documentation

F. Westinghouse Hanford Company (WHC) - Quality Assurance

1. Provide input for document review
 - a. Functional design criteria
 - b. Conceptual design report
 - c. Value engineering sessions
 - d. Definitive design
 - e. Letters of instruction and work orders
 - f. Procurement specifications/requirement
 - g. Project management plan
 - h. Engineering change notices
 - i. Acceptance test procedures, operation test procedures, and official acceptance of construction
2. Generate the quality assurance project plan (QAPP)
3. Participate in closeout of nonconformance and surveillance reports

Statement of Work
Other Project Costs
Page 4 of 6

- G. Westinghouse Hanford Company (WHC) - Plant Engineering
 - 1. Provide input for document review
 - a. Functional design criteria
 - b. Conceptual design report
 - c. Value engineering sessions
 - d. Definitive design
 - e. Engineering change notice submittal
 - g. Acceptance test procedures
 - h. Maintenance and operations procedures
 - 2. Support acceptance testing/operational testing
 - 3. Prepare new preventative maintenance procedures
- H. Kaiser Engineers Hanford (KEH) - On Site Engineer/Constructor
 - 1. Prepare conceptual design report
 - 2. Support validation process
 - 3. Participate in value engineering sessions
- I. Westinghouse Hanford Company (WHC) - Safety Organizations
 - 1. Provide input for document review
 - a. Functional design criteria
 - b. Conceptual design report
 - c. Value engineering sessions
 - d. Definitive design
 - e. Engineering change notices
 - f. Acceptance and operational test procedures
 - g. Deviations and waivers
 - 2. Conduct safety meetings and job walks
 - 3. Prepare construction site surveillance
 - 4. Prepare safety analysis documentation
- J. Westinghouse Hanford Company (WHC) - Health Physics Technicians
 - 1. Support soil characterization prior to construction
 - 2. Provide surveillance activities during construction
 - a. Digging operations
 - b. Equipment release
 - c. Radiological surveys
 - d. Demolition activities

Statement of Work
Other Project Costs
Page 5 of 6

TABLE 1 - PROJECT W-259 ACTIVITY FUNDING			
ACTIVITY DESCRIPTION	FUNDING SOURCE		
	TECC	OPC	PROGRAM
PROJECT DEFINITION			
Engineering Study			X
Functional Design Criteria		X	
Site Evaluation Report		X	
CONCEPTUAL DESIGN			
Conceptual Design Report		X	
Permitting Plan		X	
Environmental Documentation - (NEPA-EX, EA)		X	
Quality Assurance Project Plan		X	
Statement of Work		X	
Project Management Plan		X	
Advance Conceptual Design		X	
PROCUREMENT/CONSTRUCTION			
Definitive Design	X		
Inspection	X		
Construction	X		
As Built Drawings	X		
Acceptance Testing/Procedures	X		
Preliminary Safety Analysis Report (PSAR)	X		
OPERATIONAL PREPAREDNESS & START-UP			
Inventories to Support ATP/OTP Activities		X	
Spare Parts to Support ATP/OTP Activities		X	
Training to Support ATP/OTP Activities		X	
Operational Readiness Review		X	

TABLE 1 - PROJECT W-259 ACTIVITY FUNDING (CONT)			
ACTIVITY DESCRIPTION	FUNDING SOURCE		
	TECC	OPC	PROGRAM
MULTI-PHASE ACTIVITIES ^{Note 3}			
Document Control			X
Records Management			X
QA/Environmental/Safety Audits & Assessment			X
Permitting Support Document (Construction & Operations)		X	
Quality Assurance Reviews	X	X	
Design Reviews	X	X	
Value Engineering		X	
HPT's/Operators (Non dedicated personnel)		X	
Project Management ^{Note 1}		X	
Project Administrative Support ^{Note 2}		X	X

Note 1. Project Management activities include, but are not limited to:

- Writing of LOIs, preparations of Statement of Work (S.O.W.), preparation of PMP, participation in constructibility reviews, support for validation and project data sheets, A/E selection, preparation of Project Authorization and files lists, Participation in Value Engineering studies, establish funding for A/E design, PMP revision, request for Project Authorization Modifications, lesson learned DAC/4c's, etc.

Note 2. Project Administrative Support activities include, but are not limited to:

- Administrative Support for preparation of validation package & Project data sheets, cost estimate reviews, status reporting to RL, E/C work forecast document preparation, project data sheet revision, re-validation, etc.

Note 3. When two funding sources are shown, activities performed prior to project authorization are expense funded and part of OPC. After project authorization these activities are part of TECC, except when performed by non-dedicated personnel. Non dedicated personnel activities after authorization are part of OPC.

APPENDIX D

Revised/Proposed Project Schedule

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APPENDIX E

Outline Specification

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OUTLINE SPECIFICATION

DIVISION 2 - SITEWORK

Section 02200 Earthwork

1. Loadbearing backfill, compacted.
2. Nonloadbearing backfill, compacted.
3. Crushed gravel stabilization.

Section 02512 Hot-Laid Asphaltic Concrete Paving

1. Base course (ballast), leveling course, asphalt material, aggregates and mineral fiber, Class B proportioning, WSDOT M41-10.

DIVISION 3 - CONCRETE

Section 03300 Cast-In-Place Concrete

1. Minimum strength: 3000 lb/in² at 28 days.
2. Reinforcing steel bars: ASTM A 615, deformed, Grade 60.
3. Welded wire fabric: ASTM A 185.
4. Nonshrink grout, nonmetallic type.
5. Concrete forms: Wood, steel, plywood, or pressed fiberboard.

DIVISION 5 - METALS

Section 05500 Metal Fabrications

1. Rolled steel shapes: ASTM A 36.
2. Steel plate: ASTM A 36 or A 283.
3. Steel bars: ASTM A 36.
4. Bolts: ASTM A 307, Type A.
5. Steel grating: Hot-dip galvanized, FS RR-G-661, Type 1, pressure locked with end bars.
6. Stainless steel structural shapes.
 - a. Channel: ASTM A 276.
 - b. Beams: ASTM A 276.
 - c. Sheets: ASTM A 240.

DIVISION 9 - FINISHES

Section 09805 Special Protective Coating

1. Coating: Novolac epoxy coating, Koch Corrosion Control Co. Techni-Plus EN 25.
2. Joint sealant: Flexible epoxy polymer coating, Sentry Polymers, Inc. Semstone 805 - see construction details for joints.

DIVISION 13 - SPECIAL CONSTRUCTION

Section 13440 Instrumentation

1. Microprocessor-based system
 - a. Programmable controller; Modicon 984-A120.
 - b. Industrial PC: 486 with 16 MB RAM minimum, 1 GB hard drive.
 - c. Video display terminal: 20" with touchscreen.
 - d. MMI software: Wonderwave Intouch.
 - e. Input/output modules.
 - 1) Discrete input; Modicon AS-BDEP-216.
 - 2) Discrete output; Modicon AS-BDAP-203.
 - 3) Analog input; Modicon AS-BADU-205.
 - 4) Analog output; Modicon AS-BDAU-202.
2. Exhaust monitoring system: Isokinetic probe, vacuum pump system with flow control, beta gamma monitor, record surplus air system control, air monitor.
3. Leak detection/location: Control unit, UL listed as intrinsically safe for Class 1, Groups C and D hazardous locations; Permalert Environmental Specialty Products, Inc. PAL-AT Model AT40K. Quick drying, chemical resistant, coaxial sensor cable; Permalert Environmental Specialty Products, Inc. type AGW Gold.
4. Level indicating transmitter: RF Admittance technology, Kynar insulated probe, flange-mounted probe, range 0 to 20 ft, electronics remote mount from sensor, 4-20 mA output, explosionproof housing; Drexelbrook Model 508-45-6. Power supply for transmitter; 120 V ac input, 24 V dc output; Drexelbrook Model 401-13-24.

DIVISION 15 - MECHANICAL

Section 15493 Chemical Process Piping Systems

1. Primary piping

- a. Pipe: Stainless steel, seamless, ASTM A 312, Grade TP304L, Schedule 40S.
- b. Fittings: Stainless steel, ASTM A 403, Grade WP304L; butt welding, ASME B16.9; wall thickness to match pipe.
- c. Flanges: Class 150, forged stainless steel, ASTM A 182, Grade F 304L, raised face; weld neck, ASME B16.5. Bore to match pipe ID.
- d. Bolting: Alloy steel studs, ASTM A 193, Grade B7, and heavy hex nuts, ASTM A 194, Grade 7.
- e. Gaskets: Spiral wound gasket 1/8-inch thick, Type 304 or 316 stainless steel with graphite filler material, ASME B16.5, Appendix E; Flexitalic RC or Garlock Guardian, or compressed carbon fiber gasket 1/16 to 1/8 inch thick; Anchor Packing 15 or Garlock Graphlock.
- f. Valves
 - 1) Ball: 150 lb ASME flanged, stainless steel, with UHMW seals and packing.
 - 2) Two-way actuator: High-torque, integral, single-phase, reversible, 120 V ac electric motor; NEMA ICS 6 Type 7 enclosure; 90 degree travel with limit switches; two SPDT position switches; visual shaft position indicator; motor brake; spring return on power failure; with manual override.
 - 3) Three-way actuator: High-torque, integral, single-phase, reversible, 120 V ac electric motor; NEMA ICS 6 Type 7 enclosure; 180° travel with limit switches; three SPDT position switches; visual shaft position indicator; with manual override.
 - 4) Check: Standard 150 lb ASME flanged, stainless steel, ball.

2. Secondary Encasement Piping

- a. Pipe: Stainless steel, seamless, ASTM A 312, Grade TP304L, Schedule 40S.
- b. Fittings: Stainless steel, ASTM A 403, Grade WP304L; butt welding, ASME B16.9; wall thickness to match pipe.

3. Pipe Code M-2; Steam Piping
 - a. Pipe: Carbon steel, ASTM A 53 Type S, Grade B, Schedule 80.
 - b. Fittings: 2000 and 3000 pound forged steel, ASTM A 105; screw connections, ASME B16.3.
 - c. Valves: Ball, carbon steel, NPT.
4. Pipe Code M-5; Service Water
 - a. Pipe: Galvanized or plain carbon steel, ASTM A 53, Type S or ASTM A 106, Grade B, Schedule 80.
 - b. Fittings: 150 pound malleable iron, ASTM A 197; screw connections, ASME B16.14.
 - c. Valves: Ball, brass, NPT.
5. Pipe Code M-7; Process Air Piping
 - a. Pipe: Carbon steel, ASTM A 53 Type S, Grade B, Schedule 80.
 - b. Fittings: 150 lb malleable iron, ASTM A 197; screw connections, ASME B16.3.
 - c. Valves: Ball, brass, NPT.
6. 2706-T Facility
 - a. Sump pump: Submersible stainless steel, for transferring tank basin sump pit water to 15,500 gallon tank.
 - b. Vertical turbine pump: Axial flow vertical turbine, stainless steel.
 - c. Agitator: Top entering, bladed, axial flow, blade speed 100 rpm, stainless steel.
 - d. Storage tanks: Vertical, stainless steel, ASME Section VIII, Division 1.
 - e. Filtration: Two-stage filtration system - 1st stage contain multi-bag filter to remove larger than 200 micron particles, 2nd stage filter to remove larger than 50 micron particles.
 - f. Electric operated diaphragm pump: Stainless steel, for transferring automotive and railroad pit sump water to storage tanks.
 - g. Air compressor: Air cooled rotary screw type, capable of delivering 100 scfm at 100 psig.

Section 15500 Heating, Ventilating, and Air Conditioning

1. Duct: Stainless steel sheet, ASTM A 240, Type 304 or 304L, minimum of 18 ga., built to SMACNA pressure rating of 2 in. water.
2. Duct Reinforcement
 - a. Stainless steel sheet: ASTM A 240, Type 304 or 304L.
 - b. Stainless steel shapes: ASTM A 276, Type 304 or 304L.
3. Duct Supports and Hangers: Stainless steel shapes, ASTM A 276, Type 304 or 304L.
4. HEPA filter train: Filter housing to consist of an inlet plenum, demister section, 100 kw heater section, flame arrester, plenum, Flanders model E-5 T-I 3x2 GG-F2 T-0 (304L) L Type 1 and E-5 T-I 3x2 GG-F2 T-0 (304L) R Type 1 filter sections placed back-to-back, and fan section. Filters to be rated at 99.97% DOP, self-contained, fire- and moisture-resistant, Type A fire resistive, and of size scheduled on the Drawing.
5. Chevron-style Demisters: Koch Style #1 stainless steel.
6. Heat pumps: Carrier model 38YKC060, compressor time delay relay, cycle protector. Quantity of 4.
7. Fan coil units: Carrier model 40BA009, two stages of electric resistance heat. Quantity of 4.
8. Unit heaters: Indeeco Triad with built-in thermostat or equal.
9. Testing: ASME N510.
10. Balancing: Adjusting existing 2706-T pit exhaust fan after equipment installation to match original air flow.
11. Breather HEPA filter: Pall or equivalent.

Section 16300 Medium Voltage Distribution

1. Conduit
 - a. Rigid steel.
 - b. PVC, concrete encased.
2. Cable: 15 kV single conductor for both 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 minimum thickness.
- d. Insulation shield: 30-mil minimum extruded nonmetallic covering over insulation with 5-mil minimum nonmagnetic metal component directly over or embedded in covering.
- 3. Wood poles: Western red cedar, cut from live timber, butt-treated, single top cut at 30 degree angle with normal to axis of pole and at right angles to sweep. Roofs and grains brush-treated with preservative.
- 4. Crossarms: Straight-grained douglas fir, free from twists to within 0.1 inch per foot of length, with bends and twists in only one direction. Apply preservative to crossarms.
- 5. Pole hardware: Hot-dipped galvanized after fabrication.
- 6. Fused cutout and lighting arrestor combination.
- 7. Fused cutout: 15 kV, 150 A, heavy-duty, 10,000 A symmetrical interrupting capacity. Fuses will be installed by Operating Contractor.
- 8. Line conductor: 15 kV, ACSR Aerial Conductor.
- 9. Equipment enclosures: NEMA ICS 6 Type 3R minimum.
- 10. Outdoor radial feed distribution transformers: 1000 kVA, 3-phase, padmounted, compartment type in accordance with ANSI C57 standards. The transformer shall be designed for 60 Hz, 95 kV BIL primary, 30 kV BIL secondary, OA cooling and 65°C temperature rise above 40°C ambient. The transformer shall be loop feed. The transformer shall be filled with RTE less flammable fluid (no substitutions) with voltage ratings shown on the drawings. Universal bushing wells for use with ANSI/IEEE 386 bushing inserts shall be provided for the transformer high voltage connections. The transformer shall have 2 full capacity 2-1/2% taps above and below 13.8 kV. Tap changing will be accomplished at no load. The tap changer external operating mechanism shall have provisions for padlocking. The transformer shall be equipped with the following accessories:
 - a) External operable Kearney Bayonet fuse or approved substitute.
 - b) Internal, back up Kearney current limiting fuse or approved substitute.
 - c) One inch drain valve in secondary compartment.
 - d) Dial type thermometer located in secondary compartment.
 - e) Liquid level gauge.

- f) Pressure/Vacuum gauge.
 - g) Three insulated grounded bushing caps.
11. Pole-top lightning arresters: Distribution valve type rated 18 kV, 15.3 kV MCOV, 95 BIL, for use on 13.8 kV electrical 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.

Section 16400 Service and Distribution

1. Conduit: PVC coated rigid, galvanized steel rigid, EMT and PVC.
2. Connectors: Stranded copper with Type THWN/THHN or XHHW.
3. Equipment enclosures: NEMA ICS 6 Type 1 minimum (inside), Type 3R minimum outside or in wet locations.
4. Motor Control Centers (MCC): 20 inch deep enclosure for control equipment, assembled to provide dead-front unit, and meet the requirements of the drawings. 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.
 - b. Locate master terminal boards in bottom of sections.
 - c. Provide full rated neutral bus as shown on the Drawings.
 - d. Feeder circuit breakers: Molded case, 3-phase, individually mounted in a drawout type cubicle, trip free, rated for use at 480 V ac minimum. Interrupting rating; minimum 25,000 A.I.C. symmetrical at 480 V ac. For ampere frame and trip ratings for the individual breaker see one-line diagram drawings.
5. Mini-power center panelboards: 480 V-240/120 V surface mounted and UL listed.
6. Manual motor controllers: Toggle operated, provided with means for locking in "Off" position.
7. Safety switches: NEMA KS 1, nonfusible heavy duty Type HD, horsepower rated for 600 V ac.
8. Exterior lighting fixtures: Aluminum housing, UL listed for outdoor use, pole mounted, U.V. stabilized clear prismatic lens, low pressure sodium lamp, photocell integrally mounted and prewired for automatic "on-off" dusk to dawn operations. 480 V ac, high power factor ballast suitable for high and low ambient temperature operation.

9. Receptacles: NEMA WD 1 Designation 5-20R, duplex, ivory, specification grade, rated 20 A, 120 V, 3-wire, grounding type, with screw terminals arranged for side wiring. Self-grounding receptacles may be used instead of ground requirements specified.
10. General Purpose Transformers: NEMA ST 20, floor mounted, 60 Hz, of kVA rating shown on the drawings, with two 2-1/2% taps above and two 2-1/2% taps below normal rated primary voltage minimum. Insulation system shall be rated 220°C with 150°C winding temperature rise above ambient.
11. Heat Trace: Self-regulating heating cable for freeze protection, 15 watts per foot, 120 V.
12. Motors: High efficiency motors.
13. Uninterruptible Power Source: A 5.0 kVA UPS that is UL listed to produce a no break power sine wave output voltage of 120 V ac $\pm 3\%$ with RF noise isolation and lightning and surge protection. The unit shall be able to operate in an environment of 95% relative humidity and have an efficiency of 90%. The output neutral is to be bonded to ground.

APPENDIX F

**Energy Conservation Report and Analysis
(Not Applicable)**

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APPENDIX G

**Preliminary Safety Evaluation
(To be provided by Westinghouse Hanford Company
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APPENDIX H

Economic Analysis and Life Cycle Cost Analysis (Not Applicable)

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APPENDIX I

Physically Handicapped Assessment (Not Applicable)

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APPENDIX J

Sketches

ES-W259-I1	P&ID Waste Collection Legend
ES-W259-I2	P&ID Waste Collection 2706-T Building
ES-W259-I3	P&ID Waste Collection 2706-T Building
ES-W259-C1	Civil/Electrical Site Plan Decon Collection
ES-W259-C2	Civil/Electrical Decon Collection Plan
ES-W259-C3	Structural Decon Collection Tank Section
ES-W259-C4	Structural Decon Collection Plan and Elevations
ES-W259-C5	Civil Decon Collection Drainage Plan
ES-W259-C6	HVAC Pad Cover Plan and Elevation
ES-W259-C7	Civil Decon Collection Section
ES-W259-M1	Piping Decon Collection Tank Site Plan
ES-W259-M2	Piping Decon Collection Tank Section Views
ES-W259-M3	Piping Demolition Details Sludge Sump Lines
ES-W259-N1	Electrical 2706-T Building One-Line Diagram
ES-W259-S1	Structural RR Pit Sump Liner Assembly
ES-W259-S2	Structural RR Pit Sump Liner Sections and Details
ES-W259-S3	Structural Automotive Pit Sump Liner Sections and Details

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SYMBOL LEGEND

LINES:
EXISTING
ELECTRICAL
ELECTRICAL BINARY SIGNAL
PNEUMATIC
SOFTWARE LINK

VALVES:

BALL VALVE

3-WAY BALL VALVE

CHECK VALVE

MOTOR OPERATED
2-WAY BALL VALVE

MOTOR OPERATED
3-WAY BALL VALVE

3-WAY BALL VALVE

SAMPLE VALVE

NEEDLE VALVE

FLUSH VALVE

MISCELLANEOUS

REDUCER

PROCESS ENCASMENT

HOSE CONNECTION

BACKFLOW PREVENTER

AIR COMPRESSOR

VERTICAL TURBINE PUMP

SUMP PUMP

AGITATOR

DIAPHRAGM PUMP

WELD PIPE

INSTRUMENTATION

PLC SHARED DISPLAY AND/OR CONTROL (ACCESSIBLE TO OPERATOR)
LOCAL MOUNTED INSTRUMENT
PLC INTERCONNECTING LOGIC WITH BINARY OR SEQUENTIAL LOGIC FUNCTIONS

ABBREVIATIONS:

PLC PROGRAMMABLE LOGIC CONTROLLER

VALVE POSITION VS OPERATIONAL MODE

VALVE	P & ID ORIENTATION	BC	AC	AB	NOTES
FV-101	POSITION BC - TRANSFER FROM PIT SUMPS TO TK 1 POSITION AC - TRANSFER FROM PIT SUMPS TO TK 1 POSITION AB - N/A				
FV-102	POSITION BC - TRANSFER TO LOAD OUT STATION FROM TK 1 POSITION AC - TRANSFER FROM PIT SUMPS TO TK 1/TK-2 POSITION AB - N/A				
FV-103	POSITION BC - N/A POSITION AC - TRANSFER FROM PIT SUMPS TO TK 2 POSITION AB - TRANSFER FROM PIT SUMPS TO TK-1				
FV-104	POSITION BC - TRANSFER TO TK 1 POSITION AC - SAMPLE/RECIRCULATION POSITION AB - N/A				

INSTRUMENT SYMBOL LETTER IDENTIFICATION				
SYMBOL	FIRST LETTER		SUSCEEDING LETTERS	
	MEASURED OR INITIATING FUNCTION	MODIFIER	READOUT OR PASSIVE FUNCTION	MODIFIER
A	ALARM			
D	DETECTION			
E	ELEMENT			
H	HAND			
I	INDICATOR			
L	LEVEL OR LEAK			
P	PRESSURE			
S	SWITCH			
T	TRANSMITTER			
X	FAILURE			
Y	EVENT, STATE PRESENSE			
Z	POSITION			

- NOTES
1. ABBREVIATIONS WILL BE IN ACCORDANCE WITH ASME Y1.1-1969 UNLESS OTHERWISE NOTED.
 2. INSTRUMENT SYMBOLS AND IDENTIFICATION ARE IN ACCORDANCE WITH ANSI/ISA-S5.1-1982, (APPROVED 1992) AND ISA S5.1-1983 UNLESS OTHERWISE NOTED.

U.S. DEPARTMENT OF ENERGY
NICKEL DREYFUS OFFICE
107 FAIRVIEW BLVD
P & ID
WASTE COLLECTION
LEGEND
ES-W259-11
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NOTE:
1) SEE DWG ES-W259-11 FOR LEGEND.

U.S. DEPARTMENT OF ENERGY KIDLAND OPERATIONS OFFICE KIDLAND HANFORD COMPANY P & ID WASTE COLLECTION 2706-T BUILDING		PRELIMINARY	
PROJECT: 1 PLANT SECONDARY CONT AND LEAK DETECTION UPGRADES		DATE: 2/1/84	
DRAWN BY: J. W. B. / 1004		CHECKED BY: F. J. L. / 1004	
SCALE: 1"=1'		SHEET: 1 OF 1	

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PROJECT NO.		3		CONCEPTUAL	
PROJECT NAME		U.S. DEPARTMENT OF ENERGY DEADEND SECTION OFFICE 1ST FLOOR, BAYNARD CORP.			
PROJECT LOCATION		STRUCTURAL DECON COLLECTION TANK			
PROJECT DESCRIPTION		SECTION 1 PLANT STRUCTURE FOR AND LUMIN. EFFECTIVE PROPORTION			
PROJECT DATE		ES-W259-C3 0			
PROJECT STATUS		F 100% 100% 100% 100% 100%			
PROJECT OWNER		U.S. DEPARTMENT OF ENERGY			
PROJECT MANAGER		J. B. W. 100%			
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U.S. DEPARTMENT OF ENERGY RICKARD CONSULTING OFFICE		1CT WILSON HANFORD COMPANY	
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PLAN PAD COVER
SCALE: 1/4"=1'-0"

PLAN 2706-T DECON AREA
SCALE 1/4"=1'-0"

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01-10

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A SECTION
ES-W259-M1 SCALE 1/4"=1'-0"

B SECTION
SCALE 1/2"=1'-0"

U.S. DEPARTMENT OF ENERGY Hazardous Waste Operations OFFICE OF RADIATION SAFETY	PRELIMINARY
PIPING DECON COLLECTION TANK SECTION VIEWS	
ES-W259-M2	0

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DETAIL A
SCALE: N.O.E

DETAIL B
SCALE: NONE

NAME	R. JOHNSON-CORP INC.	ENTRY DATE		PRECEDENTARY
ADDRESS				
CITY				
STATE				
ZIP				
PROJECT	SEE CRVAT FORM			
DATE	SEE CRVAT FORM			
BY	SEE CRVAT FORM			
DATE				
PROJECT NO.	1			
PROJECT NAME	DEMOLITION DETAILS SLUDGE SUMP LINES			
PROJECT TYPE	PLANT SECONDARY CUM TANK DETECTION			
PROJECT LOCATION				
PROJECT STATUS				
PROJECT DESCRIPTION				
PROJECT COMMENTS				
PROJECT DATE				
PROJECT TIME				
PROJECT COST				
PROJECT BUDGET				
PROJECT STATUS				
PROJECT COMMENTS				
PROJECT DATE				
PROJECT TIME				
PROJECT COST				

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LEGEND

U.S. DEPARTMENT OF ENERGY RICHARDSON OPERATIONS OFFICE 107 KASPER BLVD. COMPANY	
ELECTRICAL 2706-T BUILDING ONE-LINE DIAGRAM	
DATE: 11/13/79	BY: J. W. 259-N1
REVISION: 1	ES-W259-N1
SCALE: 1"=1'	PLOT SCALE: 1"=1'
J-14	

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J-15

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① INSIDE LINER DETAIL
SCALE: 1-1/2"=1'-0"

② OUTSIDE LINER DETAIL
SCALE: 1-1/2"=1'-0"

③ SECTION
SCALE: 1-1/2"=1'-0"

④ SECTION
SCALE: 1-1/2"=1'-0"

⑤ DETAIL
SCALE: 3/4"=1'-0"

DESIGNED BY		CHECKED BY		DATE		PROJECT		SHEET NO.		TOTAL SHEETS	
WHC		WHC		2/2/84		RR PIT SUMP LINER		1		1	
PROJECT NO.		SHEET NO.		DATE		PROJECT		SHEET NO.		TOTAL SHEETS	
W259S02		1		2/2/84		RR PIT SUMP LINER		1		1	
PROJECT NO.		SHEET NO.		DATE		PROJECT		SHEET NO.		TOTAL SHEETS	
W259S02		1		2/2/84		RR PIT SUMP LINER		1		1	

RS CHRISTENSEN		3		CONCEPTUAL	
U.S. DEPARTMENT OF ENERGY		RICHMOND OPERATIONS OFFICE		ICF KAISER HANFORD COMPANY	
STRUCTURAL		RR PIT SUMP LINER		SECTIONS AND DETAILS	
PROJECT NO. W259S02		SHEET NO. 1		DATE 2/2/84	
PROJECT TITLE		RR PIT SUMP LINER		SECTIONS AND DETAILS	
PROJECT NO. W259S02		SHEET NO. 1		DATE 2/2/84	
PROJECT TITLE		RR PIT SUMP LINER		SECTIONS AND DETAILS	
PROJECT NO. W259S02		SHEET NO. 1		DATE 2/2/84	

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2 OUTSIDE LINER DETAIL
SCALE 1-1/2"=1'-0"

B SECTION
SCALE 1-1/2"=1'-0"

2 INSIDE LINER DETAIL
SCALE 1-1/2"=1'-0"

A SECTION
SCALE 1-1/2"=1'-0"

3 DETAIL
SCALE 3/4"=1'-0"

ASSEMBLY SIMILAR TO SUMP LINER
LOCATED IN RR PIT SEE ES-W259-S1

REVISION	DATE	BY	CHKD	APP'D	DESCRIPTION
1	10/1/81	W. J. KASPER			CONCEPTUAL
2	10/1/81	W. J. KASPER			U.S. DEPARTMENT OF ENERGY Hazardous Waste Operations Office FOR KASPER, RANDOLPH COMPANY
3	10/1/81	W. J. KASPER			STRUCTURAL AUTOMOTIVE PIT SUMP LINER SECTIONS AND DETAILS
4	10/1/81	W. J. KASPER			1-PLAN SECTION CONT AND LSA DETECTION DEVICES
5	10/1/81	W. J. KASPER			ES-W259-S3 10

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