2

CONCEPTUAL DESIGN REPORT

219-S SECONDARY CONTAINMENT UPGRADE

PROJECT W-178

Prepared for

Westinghouse Hanford Company

May 1993

For the U.S. Department of Energy
Contract DE-AC06-87RL10900

Prepared by

Kaiser Engineers Hanford Company
Richland, Washington

W178CDR

KAISER ENGINEERS HANFORD

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CONCEPTUAL DESIGN REPORT

219-S SECONDARY CONTAINMENT UPGRADE

PROJECT W-178

Westinghouse Hanford Company

for the
U.S. Department of Energy
Field Office, Richland
Richland, Washington

Prepared by Kaiser Engineers Hanford Company

Contractor Approval

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U.S. Department of Energy
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W178CDR

CONCEPTUAL DESIGN REPORT

FOR

219-S SECONDARY CONTAINMENT UPGRADE

PROJECT W-178

Prepared by

Kaiser Engineers Hanford Company
Richland, Washington

for

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Projects Department Date

TABLE OF CONTENTS

APPENDICES

ABBREVIATIONS

Ecology	State of Washington Department of Ecology
DOE	U.S. Department of Energy
RCRA	Resource Conservation and Recovery Act
RL	U.S. Department of Energy, Richland Field Office
VOG	vessel off-gas
WAC	Washington Administrative Code
WHC	Westinghouse Hanford Company

CONCEPTUAL DESIGN REPORT

219-S SECONDARY CONTAINMENT UPGRADE

PROJECT W-178

I. INTRODUCTION

The 219-S Facility is located in the 200-West Area on the Hanford Site and was constructed in 1951. The facility receives and treats liquid, low-level mixed waste from the 222-S Laboratory prior to transfer of that waste to the SY Tank Farm. The 219-S Facility consists of Cell A containing Tanks 101 and 102 and Cell B containing Tank 103 and a spare space.

The 219-S Facility does not meet current environmental and seismic requirements of Washington Administrative Code (WAC) 173-303-640. Project W-178 will modify the 219-S Facility to bring it into compliance with the tank system standards in WAC 173-303-640.

The cost estimate summary and conceptual project schedule are in Appendices C and D, respectively.

II. SUMMARY

Project W-178 will modify the 219-S Facility to bring it into compliance with the tank system standards in WAC 173-303-640. The secondary containment upgrade will consist of a stainless steel cell liner in both Cell A and the spare space in Cell B. Additionally, Cell B will be modified by taking Tank 103 out of service and installing a new tank: Tank 104.

The construction work will be accomplished in phases to minimize service interruption to the 222-S Laboratory.

The proposed design and construction method is the most cost effective of four alternatives evaluated during a value engineering session.

Project W-178 is a fiscal year 1995 Line Item. Total estimated construction costs of the project are $2,600,000; other project costs are $710,000. The total project cost is $3,300,000.

III. JUSTIFICATION

A Part B, Dangerous Waste Permit Application for the 219-S Facility has been submitted to the State of Washington Department of Ecology (Ecology). The facility is currently operating in an interim status. Failure to bring the 219-S Facility into compliance with Resource Conservation and Recovery Act (RCRA) and WAC 173-303, Section 640 will result in Ecology not approving the Part B permit, If the 219-S Facility is not brought into compliance the 222-S Laboratory operations will be stopped. Loss of the 222-S Laboratory will impact the operation of the 200 Area Tank Farms and other environmental restoration related work. The continued operation of the 222-S Laboratory is essential for compliance with Tri-Party Agreement.

IV. DESCRIPTION OF PROJECT SCOPE

A. SPECIAL EQUPMENT/PROCESS SYSTEMS (700)

Upgrading the 219-S Facility will consist of three construction phases to keep the facility operational.

Phase I Construction

During Phase I, Tank 101 will receive waste and Tank 102 will treat the waste to maintain service to the 222-S Laboratory.

A stainless steel liner, Tank 104, support piping system, and a temporary transfer pump for Tank 104 will be installed in the spare space in Cell B.

(See sketch ES-W178-2, sec B. All sketches are located in Appendix J.) The stainless steel lining in Cell B will include provision for a new sump. A sump liquid transfer system will consist of two 3-way motor-operated ball valves, pump, and piping. The piping will drain the existing Cell B sump and the newly installed sump. (See sketch ES-W178-2, sec B.) Compressed air for the temporary transfer pump and the electrical power for two motor-operated valves in Cell B will be provided and connected. Electric power for the new Tank 104 liquid level detection system will also be provided.

Electrical solenoid controls for the new air diaphragm transfer pump and the new sump pump will be installed.

Phase II Construction

During Phase II the new Tank 104 will accept high and intermediate level waste using temporary flex hoses for its piping system. (See sketch ES-178-5.) Tank 103 will receive and treat the waste pumped from Tank 104. A temporary transfer pump and flex hose system will transfer waste from Tank 103 to a tank truck loading station. (See sketch ES-W178-5.)

Electrical and instrumentation wires and conduit will be disconnected from Tanks 101 and 102 and removed to the cell walls before the tanks are removed.

Pipe lines to Tanks 101 and 102 will be disconnected and the tanks removed. A stainless steel liner and a new sump will be installed in Cell A. A sump liquid transfer system will consist of two 3-way motor-operated ball valves, pump, and piping. The piping will drain the existing Cell A sump and the newly installed sump to Tanks 101 and 102. (See sketch ES-W178-2, sec A.) Tanks 101 and 102 will be reinstalled and seismically restrained by a sway strut and ring assemblies. (See sketches ES-W178-1, detail 1, and ES-W178-2, sec A.) After the tanks are

reinstalled new electrical and instrumentation wires and conduit will be installed and connected. The 222-S Laboratory will be served by Tanks 103 and 104 through Phase II construction.

Phase III Construction

During Phase III, Tank 104 will receive high activity waste and Tank 101 will receive intermediate activity waste. (See sketch ES-W178-1.) Tank 102 will receive and treat the waste from Tanks 101 and 104. (See sketch ES-W178-1.)

Temporary piping installed in Phases I and II will be disconnected and the new Cell A piping system will be completed isolating Tank 103. Temporary piping to Tanks 103 and 104 will be disconnected and permanent piping connected to Tank 104. The existing motor-driven pump will be reinstalled to transfer neutralized waste from Tank 102. (See sketch ES-W178-1.) Tank 103 will be removed from service, emptied, and the piping disconnected. Electrical power to the Tank 103 agitator and transfer pump will be disconnected. Electrical power for the new sump pump, Sump 7 pump, transfer pump, and for the two new motor-operated valves will be installed and connected. Blind flanges and flange covers will be installed on Tank 103 as required. (See sketch ES-W178-2, sec B.) The 222-S Laboratory will be served by Tanks 101, 102, and 104 after Phase II construction.

Removal of existing steam jetting equipment and steam piping is included in the scope of this project and can occur during any phase of construction. A diaphragm pump system will replace the steam jet system.

1. Civil/Structural

Cell Liner

Stainless steel liners for Cell A and the space in Cell B will provide secondary containment for the liquids.

The liners will be 300 Series stainless steel sheet metal.

Nondestructive testing will be performed to ensure the structural and liquid integrity of the cell liner welds.

A flashing system to seal the cell liner to the cell wall at the top of the liner will be provided. The liner flashing must prevent water from getting between the liner and the cell wall.

Tanks 101 and 102 will be leveled with shims when they are reinstalled. The shims will be compatible with the liner and tank material.

Seismic Analysis

Westinghouse Hanford Company (WHC) has performed seismic calculations on Tanks 101 and 102 and on the vault walls (ref 4, 5, and 6). The calculations provide the main source of design input for the seismic restraints and the shims. The seismic restraints and anchors will withstand lateral and translational forces that occur during seismic events.

A seismic restraint analysis must show how the forces will be passed from the tanks to the restraint and to the cell wall. A seismic restraint analysis must also show how the tanks, restraints, and cell walls will behave under loading.

The seismic restraints will be designed and connected to the tanks in a manner that distributes seismic loads. Sufficient information to fabricate, install and inspect any modifications to the tanks will be provided during definitive design.

Sump

New sumps will be provided in the two new cell liners. Holes in the existing concrete floors will be provided to accommodate the new sumps. The existing floor slab will not be cut through and the soil under the slab will not be disturbed.

2. Mechanical

Piping

- **Temporary Piping**

  Temporary piping will connect the 222-S Laboratory waste drains to Tank 104 for waste receiving and storage. The temporary piping will be 2- and 3-in. flexible hosing and will connect Tank 104 to Tank 103 for the neutralization process during Phases I and II construction. Temporary piping will be removed during Phase III construction activities and replaced with permanent piping. Temporary piping will transfer neutralized waste from tank 103 to a tank truck.

- **Permanent Piping**

  All piping in Cell A will be replaced with new permanent piping connecting Tanks 101 and 102. (See sketch ES-W178-1.)

- **Temporary Transfer-Pump Air Lines (1/2- and 1-in. Air Lines)**

  Air lines 1/2- and 1-in. in diameter will feed the new diaphragm transfer pumping system throughout construction. (See sketches ES-W178-1, ES-W178-3, and ES-W178-5.)

Pumps

Air-operated, double-diaphragm pumps will be used for pumping waste from tanks and sumps. The pumps will be supplied with air pressure from an existing plant air line located in the 219-S Operating Gallery. A filter regulator lubricator will be installed on the supply air system to the diaphragm pumps. The filter regulator lubricator will be placed outside the cell so oil can be added and the oil flowrate adjusted. A reclassifier will be placed on the discharge air system to reclaim waste oil.

The two main transfer pumps will be 2-in., stainless steel with stainless steel wetted parts and Viton diaphragms. The suction pipe will have a 2-in. minimum diameter and the pumps will be capable of passing 1/4-in. diameter solids.

The two sump pumps will be stainless steel and have 1-in. diameter intakes, 3/4-in. diameter discharges, stainless steel wetted parts, and Viton diaphragms. Suction pipe size will be 1-in. minimum diameter and the pumps will be capable of passing 1/8-in. diameter solids.

Ball Valves

Ball valves will be 2-in., stainless steel, multi-port ball valves with teflon seats and seals. An electric actuator will be used to operate the valves.

Pressure Vessels

- **Tanks 101 and 102**

  Existing Tanks 101 and 102 have an approximate volume of 4,000 gal each and are located in Cell A. Tank 101 receives intermediate activity contaminated waste. Tank 102 receives and treats high and intermediate activity contaminated wastes.

- **Tank 103**

  Existing Tank 103 is located in Cell B and receives high activity contaminated waste. Tank 103 has an approximate volume of 1,500 gal and will treat high and intermediate activity contaminated wastes during construction. Tank 103 will be used during Phase I and II and removed from service during Phase III.

- **Tank 104**

  Tank 104 will be constructed of 300 Series stainless steel to store high activity waste and installed in Cell B of the 219-S Facility. Tank 104 will have a 6-ft outside diameter by 9.75-ft tall and have a volume of 1,900 gal.

- **Tank 105**

  Existing Tank 105 [vessel off-gas (VOG) demister tank] and it's supporting VOG piping system will be reused and will not be modified by this project.

3. **Instrumentation**

Tank Liquid Level

- The tank liquid level piping system will be retained for Tanks 101 and 102. The only change to the existing instrument piping will be routing the piping to the new tank.

- Tank liquid level indication for Tank 104 will be the same as for Tanks 101 and 102.

New air lines will supply air to the dip tubes to obtain a level measurement. The high pressure dip tube will extend to within 1 in. of the bottom of the tank. The low-pressure dip tube will protrude

into the top of the tank. A differential pressure transmitter will be installed across the air lines to the two dip inlets. A high level alarm will be tied into the existing 219-S Facility. The annunciator is multiplexed with the Tank 101 and 102 high level alarm and transmitted through an existing cable to Room 3-B in 222-S Laboratory.

Leak Detection

Leak detection will be achieved by providing a fluid detecting system in the sumps.

Existing fluid detecting and alarming systems for the existing sumps will be retained for measurement of cell liner leakage.

Sumps will be built as part of the new cell liners. Liquid detection in the new sumps will be provided by conductivity switches and relays. The level switch relays will be tied to annunciators with two alarms. The two sump alarms will be multiplexed together and transmitted to the alarm station in room 3-B of the 222-S Laboratory.

Temperature Measurement

Thermocouples with thermowells will be installed in Tanks 101, 102, and 104. The thermowells protect the thermocouples and will extend to within 1 in. of the bottom of the tanks. The thermocouple wires will be routed to the 219-S Operating Gallery where the signals will be locally displayed on three thermocouple digital temperature indicators.

4. **Electrical**

All electrical wiring in Cells A and B will be run in new rigid galvanized steel conduit. Seal fittings will be used on all existing conduit penetrations into the cells.

No new electrical utilities, heat tracing, lights, or receptacles are required.

The new air diaphragm pumps will be controlled by 120 V solenoids located on the control panel in the operating gallery of 219-S Building.

Although Tank 102 has the potential to reach 220°F, the cell maximum ambient temperature will stay at less than 104°F, therefore, standard electrical wiring can be used.

Control switches for the new motor-operated valves will be located on the 219-S Building instrument panel.

Signals from the new instrumentation will be routed to the existing panel in the 219-S Building. A common trouble alarm will be routed to an existing annunciation panel in room 3-B of the 222-S Laboratory. Existing spare wires will be used for the trouble alarm circuit from the operating gallery of the 219-S Building to room 3-B.

Power will be taken from the existing normal lighting panel (ITE, 2-1986, 225A, Main lug only, 208Y/120V, 9 vacant pole spaces) located on the north wall of the 219-S Building.

B. OTHER PROJECT COSTS (900)

Other project costs consist of the following activities by, or under the direction of, the operating contractor:

- Functional design criteria preparation.
- Conceptual design activities.

- Inventory and spare part procurement and training to support acceptance and operational testing activities.

- Multiphase activities performed prior to project authorization. These activities are permit support documentation, quality assurance reviews, design reviews, value engineering, nondedicated personnel functions, and project management activities.

C. DESIGN COMPLIANCE

The design and construction of project W-178 will comply with the codes and regulations listed in the project functional design criteria.

If computer software will be used for design analysis, verification and validation of the software will be required.

V. METHODS OF PERFORMANCE

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

The engineer/constructor contractor will provide the definitive design, engineering services during construction, acceptance inspection services, and project management support throughout the life of the project.

B. PROCUREMENT (WBS 2.0)

The engineer/constructor contractor will procure and provide the stainless steel Tank 104 as owner-furnished material to the construction contractor. The balance of the equipment for this project will be purchased and installed by the construction contractor.

C. CONSTRUCTION WORK BY ONSITE CONTRACTOR (WBS 3.1)

Construction work will be performed by the engineer/constructor contractor.

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

The operating contractor will provide for the burial of hazardous waste during project construction. The operating contractor will provide overall project management during the design and construction on this project. The integrated management team concept will be utilized for this project. The project integrator function will be performed by the operating contractor. Roles and responsibilities of the integrated management team will be defined in a project management plan.

VI. REQUIREMENTS AND ASSESSMENTS

A. **SAFEGUARDS AND SECURITY**

The existing safeguards and security measures will not be impacted by this project. No new measures beyond the current practices will be required.

B. **HEALTH AND SAFETY**

The design of this project will incorporate operational safety measures in compliance with recognized codes and standards.

The decontamination of Cell A and Tanks 101 and 102 will be conducted under approved radiation work procedures using the as low as reasonably achievable concept.

Routine construction hazards will exist during site preparation and construction activities. Field operations and construction will be conducted in compliance with recognized safety codes and standards. Administrative safety procedures now in effect in the 200-West Area, will be followed. The safety procedures do comply with Occupational Safety and Health Administration, Washington Industrial Safety and Health Administration, and the construction contractor's safety procedures.

Construction contractors will be required to take reasonable precautions for protection of the health and safety of their employees, subcontractors, operating contractor, and U.S. Department of Energy (DOE) personnel. This includes providing continuous access to construction areas by emergency vehicles and personnel, and ensuring that emergency evacuation routes are unobstructed.

C. DECONTAMINATION AND DECOMMISSIONING

Decontamination and decommissioning measures are not required for project W-178. The project upgrades the containment capability for the facility as required by current environmental regulations. Decontamination and decommissioning will be performed at a future date when the facility is retired from service.

D. PROVISIONS FOR FALLOUT SHELTERS

The project makes no modifications to the 222-S Laboratory that would require fallout shelters.

E. MAINTENANCE AND OPERATION REQUIREMENTS

The secondary containment upgrade of the 219-S Facility will not increase maintenance requirements or require installation of new equipment. No additional operating or maintenance personnel will be required upon completion of the modifications.

Equipment and components will be selected and installed to minimize the maintenance effort during normal use. The following criteria will be used in the definitive design effort:

- Use of interchangeable parts.
- Provide access for visual inspection.
- Provide access for disassembly.

- Allow maintenance with standard tools.

- Ensure exposure to radioactivity is kept as low as reasonably achievable.

- Provide operating and maintenance manuals for new equipment installed by the project.

F. AUTOMATED DATA PROCESSING EQUIPMENT

The project does not require new automated data processing equipment.

G. QUALITY ASSURANCE/SAFETY CLASSIFICATION

1. Quality Assurance Activities

Project activities for contractors involved in design, procurement, construction and acceptance will be governed by DOE Order 5700.6C, "Quality Assurance." Minimum project and quality attributes will be included in the project functional design criteria project specific Quality Assurance Plan or a section of the Project Management Plan will define the project, critical characteristics, safety classification assignments, and programmatic criteria. Additional requirements may be added by appropriate controlling documents. The specific technical and quality programmatic requirements, material certifications, qualification and certification of personnel, inspections, examinations and testing, and applicable quality assurance records will be established during definitive design and included in design documents.

2. Safety Classification

The project has been classified as Safety Class 3 as indicated in the Functional Design Criteria.

3. Independent Design Verification

An Independent Qualified Professional Engineer will be responsible for inspection of component installation during construction as required by WAC 173-303-640. The Independent Qualified Professional Engineer will provide an independent assessment as to the acceptability of the facility at the completion of the project.

H. ENVIRONMENTAL COMPLIANCE

The design and construction of project W-178 will comply with WAC 173-303-640, "Tank Systems."

Waste Handling

All wastes generated, directly or in support of this project, will be handled in accordance with the project waste handling plan (ref 9).

I. PERMITS

A detailed environmental permit plan has been prepared for project W-178 (ref 8). The plan identifies the permits required for compliance with the requirements of Resource Conservation and Recovery Act as well as current air quality and water quality standards. The National Environmental Policy Act documentation has been included in an environmental assessment that has been submitted to U.S. Department of Energy, Richland Field Office (RL) for approval.

J. PRELIMINARY SAFETY EVALUATION

The 219-S Facility is classified as a low hazard nuclear facility. A preliminary safety evaluation is not required during the conceptual design phase. A safety analysis addendum will be required prior to the start of construction and operation of the facility. The addendum will be an engineering change notice to the 222-S Laboratory's Hazards Identification and Evaluation document. The addendum will address the modifications to the 219-S Facility that may pose new hazards and risks to the 222-S Laboratory.

VII. IDENTIFICATION AND ANALYSIS OF UNCERTAINTIES

Project W-178 makes modifications and additions to currently operating systems in the 219-S Facility. The piping and instrumentation systems will be designed to match the existing installation to avoid conflict and confusion. Implementation of metrication would increase the project cost and schedule by an unknown amount.

The project cost estimate is based on the assumption that Tanks 101 and 102 can be reused. A nondestructive analysis of the tanks will be made when the tanks are removed. The analysis cannot be conducted earlier because there is no access to the bottom of the tanks.

VIII. REFERENCES

1. Functional Design Criteria, "219-S Double Containment Upgrade," Project W-178, prepared by Westinghouse Hanford Company, Document No. WHC-SD-W178-FDC-001, Rev. 1, April 1993.

2. Work Plan, "219-S Aqueous Waste Disposal Facility Tank System Integrity Assessment Plan," prepared by Westinghouse Hanford Company, Document No. WHC-SD-CP-WP-009, March 1990.

3. Engineering Report, "219-S Aqueous Waste Disposal Facility Tank System Integrity Assessment Report," prepared by Westinghouse Hanford Company, Document No. WHC-SD-CP-ER-030, July 1990.

4. Engineering Report, "219-S Waste Disposal Facility Permanent Seismic Supports For Tanks 101 and 102," prepared by Westinghouse Hanford Company, Document No. WHC-SD-W-DR-007, January 1991.

5. Engineering Study, "219-S Secondary Containment Upgrade," prepared by Westinghouse Hanford Company, Document No. WHC-SD-W178-ES-001, March 1991.

6. Engineering Report, "219-S Waste Disposal Facility Structural Evaluation of Tanks 101 and 102 for 3850 Gallon Fill," prepared by Westinghouse Hanford Company, Document No. WHC-SD-W-ER-103, April 1991.

7. Letter Report, "219-S Double Containment Upgrade," Project W-178, prepared by Kaiser Engineers Hanford, Document No. W178LR, May 1992.

8. Plan, "Environmental Permit Plan," project W-178, prepared by Westinghouse Hanford Company, Document No. WHC-SD-W178-PLN-001, Rev. 0, February 1993.

9. Plan, "Waste Handling Plan for Project W-178," Document No. WHC-SD-W178-PLN-002, Rev. 0, February 1993.

APPENDIX A

Work Breakdown Structure

WORK BREAKDOWN STRUCTURE

1.0 ENGINEERING

- 1.1 Definitive Design (Engineer/Constructor Contractor)
- 1.2 Engineering and Inspection (Engineer/Constructor 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)

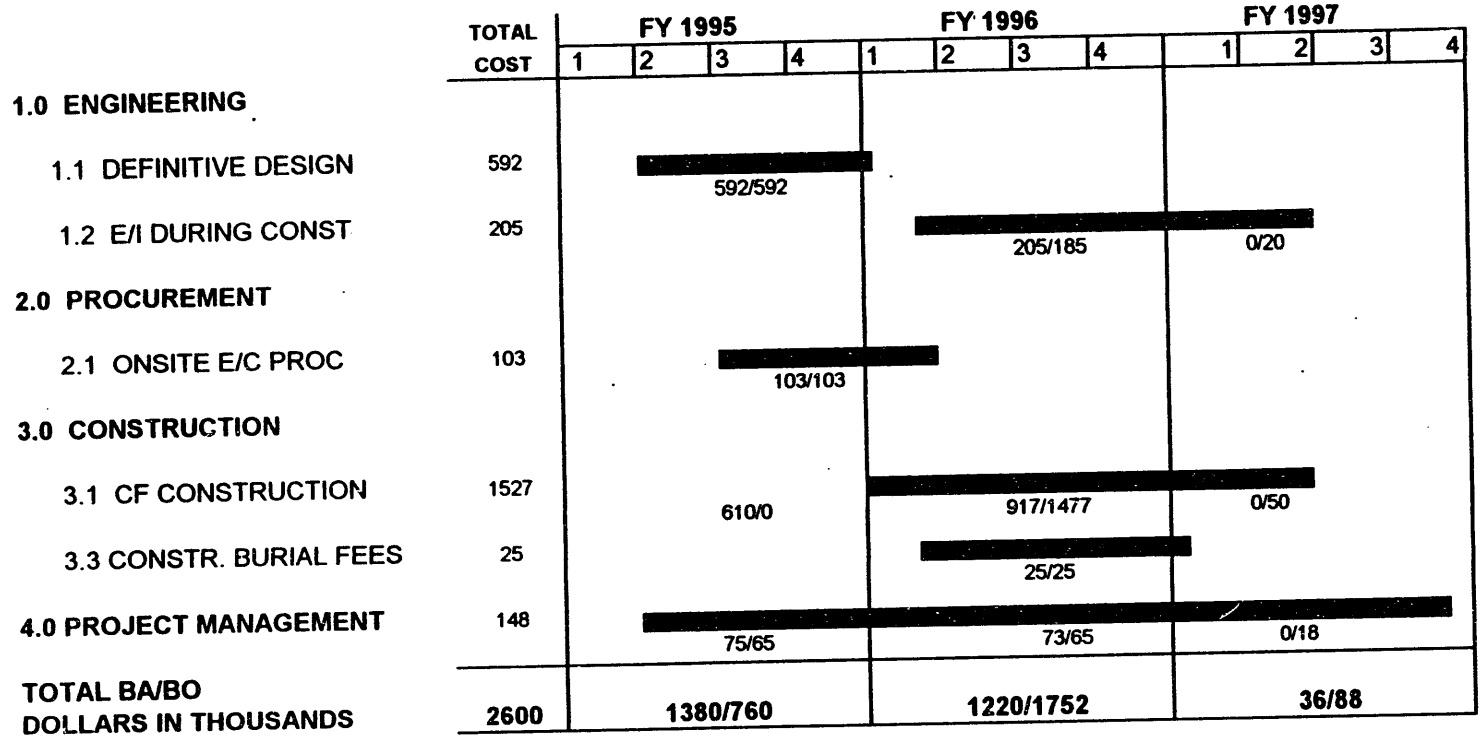
4.0 PROJECT MANAGEMENT (Operating Contractor)

5.0 OTHER PROJECT COSTS

APPENDIX B

BA/BO Schedule

PROJECT W-178
219-S SECONDARY CONTAINMENT UPGRADE
BA/BO SCHEDULE



APPENDIX C

Cost Estimate Summary

KAISER ENGINEERS HANFORD
WESTINGHOUSE HANFORD COMPANY
JOB NO. W-178 / ER-3073
FILE NO. W178BAA5

** IEST - INTERACTIVE ESTIMATING **
SECONDARY CONTAINMENT UPGRADE - 219-S FACILITY
CONCEPTUAL (REV 1)
DOE_R01 - PROJECT COST SUMMARY

DATE 04/26/93 10:13:11
BY JPM / JJM

COST CODE	DESCRIPTION	ESCALATED TOTAL COST	CONTINGENCY %	CONTINGENCY TOTAL	TOTAL DOLLARS
000	ENGINEERING	640,000	20	130,000	770,000
	(ADJUSTED TO MEET DOE 5100.4)	-40,000		-30,000	-70,000
700	SPECIAL EQUIP/PROCESS SYSTEMS	1,500,000	24	360,000	1,860,000
	(ADJUSTED TO MEET DOE 5100.4)	0		40,000	40,000
	TOTAL ESTIMATED CONSTRUCITON COST (TECC)	2,100,000	20	500,000	2,600,000
900	OTHER PROJECT COSTS	650,000	9	60,000	710,000
	(ADJUSTED TO MEET DOE 5100.4)	-50,000		40,000	-10,000
	TOTAL PROJECT COST (TPC)	2,700,000		600,000	3,300,000

TYPE OF ESTIMATE: CONCEPTUAL APRIL 26, 1993

ARCHITECT ENGINEER

OPERATING CONTRACTOR 5/3/93

REMARKS:

REV. 0 ESTIMATE SIGNED OFF PRIOR TO INCORPORATION OF "ICER" COMMENTS

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

C-1

WBS	DESCRIPTION	ESTIMATE SUBTOTAL	ONSITE INDIRECTS	SUB TOTAL	ESCALATION %	ESCALATION TOTAL	SUB TOTAL	CONTINGENCY %	CONTINGENCY TOTAL	TOTAL DOLLARS
1110	CATEGORY 1 DESIGN	248562	0	248562	10.03	24931	273493	20	54697	328191
1120	CATEGORY 2 DESIGN	180361	0	180361	10.03	18090	198451	20	39690	238141
SUBTOTAL 11	DEFINITIVE DESIGN	428923	0	428923	10.03	43021	471944	20	94387	566332
1210	ENGINEERING SUPPORT	55252	0	55252	16.31	9012	64264	20	12853	77116
1220	ACCEPTANCE INSPECTION	85602	0	85602	16.31	13961	99563	20	19912	119478
SUBTOTAL 12	ENGINEERING/INSPECTION	140854	0	140854	16.31	22973	163827	20	32765	196594
SUBTOTAL 1	ENGINEERING	569777	0	569777	11.58	65994	635771	20	127152	762926
2100	PROCUREMENT-ONSITE E/C	74727	0	74727	9.15	6838	81565	25	20391	101956
SUBTOTAL 2	PROCUREMENT	74727	0	74727	9.15	6838	81565	25	20391	101956
3101	PHASE I	540391	0	540391	12.24	66143	606534	26	156121	762657
3102	PHASE II	490780	0	490780	12.24	60071	550851	26	141787	692640
3103	PHASE III	63632	0	63632	12.24	7789	71421	25	18142	89563
SUBTOTAL 31	FA CONST-ONSITE E/C	1094803	0	1094803	12.24	134003	1228806	26	316050	1544860
3300	OPERATING CONTRACTOR BURIAL FEE	51203	0	51203	12.24	6267	57470	15	8621	66091
SUBTOTAL 3	CONSTRUCTION	1146006	0	1146006	12.24	140270	1286276	25	324671	1610951
4000	PROJECT MANAGEMENT-O/C	112342	0	112342	13.56	15234	127576	15	19136	146712
SUBTOTAL 4	PROJECT INTEGRATION	112342	0	112342	13.56	15234	127576	15	19136	146712
5001	COST TO DATE	36000	0	36000	0.00	0	36000	0	0	36000
5002	FY 1993 COST	193934	0	193934	0.00	0	193934	10	19393	213327
5003	FY 94 COST	13640	0	13640	4.70	641	14281	10	1428	15709
5004	FY 95 COST	95632	0	95632	9.60	9180	104812	10	10480	115294
5005	FY 96 COST	184514	0	184514	14.92	27529	212043	10	21205	233248

WBS	DESCRIPTION	ESTIMATE SUBTOTAL	ONSITE INDIRECTS	SUB TOTAL	ESCALATION %	ESCALATION TOTAL	SUB TOTAL	CONTINGENCY %	CONTINGENCY TOTAL	TOTAL DOLLARS
5006	FY 97 COST	77445	0	77445	20.62	15968	93413	10	9341	102756
SUBTOTAL 5	OTHER PROJECT COST	601165	0	601165	8.87	53318	654483	9	61847	716334
PROJECT TOTAL		2,504,017	0	2,504,017	11.25	281,654	2,785,671	20	553,197	3,338,879

1. DOCUMENTS AND DRAWINGS

DOCUMENTS: CONCEPTUAL DESIGN REPORT "SECONDARY CONTAINMENT UPGRADE FOR 219-S FACILITY ISSUE E

DRAWINGS: ES-W178-1 THRU ES-W178-5
FUNCTIONAL DESIGN CRITERIA "THE 219-S DOUBLE CONTAINMENT UPGRADE" WHC-SD-W178-FDC-001, REV 0

2. MATERIAL PRICES

UNIT COSTS REPRESENT CURRENT PRICES FOR SPECIFIED MATERIAL.

3. LABOR RATES

CURRENT KEH BASE CRAFT RATES, AS ISSUED BY KEH FINANCE (EFFECTIVE 10-01-92), INCLUDE FRINGE BENEFITS, LABOR INSURANCE, TAXES AND TRAVEL WHERE APPLICABLE, PER HANFORD SITE STABILIZATION AGREEMENT, APPENDIX A (EFFECTIVE 9-2-91). NON CRAFT HOURLY RATES ARE BASED ON THE 1993 FISCAL YEAR BUDGET LIQUIDATION RATES AS ISSUED BY KEH FINANCE (EFFECTIVE 10-01-92).

4. GENERAL REQUIREMENTS/TECHNICAL SERVICES/OVERHEADS

A.) ONSITE CONSTRUCTION FORCES GENERAL REQUIREMENTS, TECHNICAL SERVICES AND CRAFT OVERHEAD COSTS ARE INCLUDED AS A COMPOSITE PERCENTAGE BASED ON THE KEH ESTIMATING FACTOR/BILLING SCHEDULE, REVISION 14, DATED OCTOBER 01, 1992. THE TOTAL COMPOSITE PERCENTAGE APPLIED TO ONSITE CONSTRUCTION FORCES LABOR, FOR THIS PROJECT, IS 93% FOR SHOP WORK AND 134% FOR FIELD WORK, WHICH IS REFLECTED IN THE "ON&P/B&I" COLUMN OF THE ESTIMATE DETAIL.

5. ESCALATION

ESCALATION PERCENTAGES WERE CALCULATED BY THE HANFORD MATERIAL & LABOR ESCALATION STUDY, DATED FEBRUARY 1993, (REF. APPENDIX "H ENGINEERING AND APPENDIX G CONSTRUCTION" FOR THE MONTH OF FEBRUARY 1993.

6. ROUNDING

U.S. DEPARTMENT OF ENERGY - DOE ORDER 5100.4 PAGE J-2 SUBPARAGRAPH (H), REQUIRES ROUNDING OF ALL GENERAL PLANT PROJECTS (GPP'S) AND LINE ITEM (LI) COST ESTIMATES. REFERENCE: DOE 5100.4, FIGURE I-11, DATED 10-31-84.

7. REMARKS

A.) ASSUME RAD LEVELS TOO LOW FOR BURNOUT.
B.) ONSITE CONTRACTOR WILL PUMP DOWN EXISTING TANKS BEFORE CONSTRUCTION BEGINS, COST IS AN "OTHER PROJECT COST", WBS 5.0.
C.) DEMOLITIONED MATERIALS AND FLUSH WATER ARE ASSUMED TO BE LOW LEVEL WASTE.
D.) ASSUME THAT LINER TO CELL FLASHING, AS DETAILED, WILL PREVENT WATER FROM GETTING BETWEEN THE LINER AND CELL WALL.
E.) ASSUME N.D.E. FOR TANKS 101 AND 102 WILL VERIFY TANK STRUCTURAL INTEGRITY.
F.) ASSUME CELL "B" WILL NOT REQUIRE DECON.
G.) ALL WIRING AND INSTRUMENTATION BETWEEN 219-S AND 222-S BUILDING IS AVAILABLE FOR REUSE.
H.) CONFINED SPACE ATTENDANT COSTS HAVE BEEN INCORPORATED INTO ESTIMATE.
I.) WASTE STORAGE TANKS ARE INSIDE CONCRETE CELL AND NOT INCONTACT WITH GROUND. THEREFORE IT ASSUMED TANK CATHODIC PROTECTION WILL NOT BE NEEDED.
J.) OPERATING CONTRACTOR WILL USE TANKER TO DISPOSE OF DECON WASTE WATER AND THESE COSTS ARE INCLUDED IN THE OPERATING CONTRACTOR'S OTHER PROJECT COSTS.
K.) OPERATING CONTRACTOR AND ENGINEERING CONTRACTOR COMMENTS HAVE BEEN INCORPORATED INTO ESTIMATE.
L.) STAINLESS STEEL WASTE STORAGE TANK ESTIMATE WAS EXTRAPOLATED FROM BUDGET QUOTE BY OREGON IRON WORKS FOR KEH PROJECT #C031-H
M.) (REV. 1) HAS INCORPORATED THE FOLLOWING (ICER) COMMENTS.
1. INCREASE OPERATING CONTRACTOR "OPC COSTS"
2. CHANGE BURIAL FROM "LOW LEVEL" TO "MIXED WASTE" AND APPLY SPECIAL BURIAL RATE PROVIDED BY OPERATING CONTRACTOR.
3. MODIFICATIONS 1 AND 2 ABOVE WILL REVISE ESCALATION AND CONTINGENCY COSTS.

COST CODE/WBS	DESCRIPTION	ESTIMATE SUBTOTAL	ONSITE INDIRECTS	SUB TOTAL	ESCALATION %	ESCALATION TOTAL	SUB TOTAL	CONTINGENCY %	CONTINGENCY TOTAL	TOTAL DOLLARS
000	ENGINEERING									
1110	CATEGORY 1 DESIGN	248562	0	248562	10.03	24931	273493	20	54697	328191
1120	CATEGORY 2 DESIGN	180361	0	180361	10.03	18090	198451	20	39690	238141
1210	ENGINEERING SUPPORT	55252	0	55252	16.31	9012	64264	20	12853	77116
1220	ACCEPTANCE INSPECTION	85602	0	85602	16.31	13961	99563	20	19912	119478
TOTAL 000	ENGINEERING	569777	0	569777	11.58	65994	635771	20	127152	762926
700	SPECIAL EQUIP/PROCESS SYSTEMS									
2100	PROCUREMENT-ONSITE E/C	74727	0	74727	9.15	6838	81565	25	20391	101956
3101	PHASE I	540391	0	540391	12.24	66143	606534	26	156121	762657
3102	PHASE II	490780	0	490780	12.24	60071	550851	26	141787	692640
3103	PHASE III	63632	0	63632	12.24	7789	71421	25	18142	89563
3300	OPERATING CONTRACTOR BURIAL FEE	51203	0	51203	12.24	6267	57470	15	8621	66091
4000	PROJECT MANAGEMENT-O/C	112342	0	112342	13.56	15234	127576	15	19136	146712
TOTAL 700	SPECIAL EQUIP/PROCESS SYSTEM	1333075	0	1333075	12.18	162342	1495417	24	364198	1859619
900	OTHER PROJECT COSTS									
5001	COST TO DATE	36000	0	36000	0.00	0	36000	0	0	36000
5002	FY 1993 COST	193934	0	193934	0.00	0	193934	10	19393	213327
5003	FY 94 COST	13640	0	13640	4.70	641	14281	10	1428	15709
5004	FY 95 COST	95632	0	95632	9.60	9180	104812	10	10480	115294
5005	FY 96 COST	184514	0	184514	14.92	27529	212043	10	21205	233248
5006	FY 97 COST	77445	0	77445	20.62	15968	93413	10	9341	102756
TOTAL 900	OTHER PROJECT COSTS	601165	0	601165	8.87	53318	654483	9	61847	716334
PROJECT TOTAL		2,504,017	0	2,504,017	11.25	281,654	2,785,671	20	553,197	3,338,879

REFERENCE: ESTIMATE BASIS SHEET PAGE 4 OF 25
COST CODE ACCOUNT SUMMARY PAGE 5 & 6F 25

THE U.S. DEPARTMENT OF ENERGY - RICHLAND ORDER 5700.3 "COST ESTIMATING, ANALYSIS AND STANDARDIZATION" DATED 3-27-85, PROVIDES GUIDELINES FOR ESTIMATE CONTINGENCIES. THE GUIDELINE FOR A CONCEPTUAL ESTIMATE SHOULD HAVE AN OVERALL RANGE OF 15 TO 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.

ENGINEERING

000 DEFINITIVE DESIGN / ENGINEERING INSPECTION

WBS 1.1 A 20% CONTINGENCY HAS BEEN APPLIED TO ALL DESIGN ACCOUNTS DUE TO THE UNCERTAIN CONDITION OF THE EXISTING DRAWINGS, THE ADDITIONAL DESIGN INTERFACE WITH OPERATIONS REQUIRED TO KEEP 219-S OPERATIONAL DURING CONSTRUCTION, AND ALLOWANCE FOR NORMAL VARIANCE OF PRODUCTIVITY.

1.2 A 20% CONTINGENCY HAS BEEN APPLIED TO ALLOW FOR UNKNOWN CONDITIONS THAT WOULD REQUIRE CHANGES IN ENGINEERING SUPPORT AND ACCEPTANCE INSPECTION.

AVERAGE ENGINEERING CONTINGENCY 20%

CONSTRUCTION

700 SPECIAL EQUIP/PROCESS SYSTEMS

WBS 2.1.0.0 A 25% CONTINGENCY HAS BEEN APPLIED TO ALLOW FOR POTENTIAL COST INCREASES RELATED TO STAINLESS STEEL MATERIALS.

WBS 3.1.0.1 A 26% CONTINGENCY HAS BEEN APPLIED DUE TO HIGH RISK OF UNKNOWN HAZARDS ASSUMED TO BE ENCOUNTERED IN ZONED AREAS AND UNCERTAINTIES PERTAINING TO REUSE OF ELECTRICAL WIRING.

WBS 3.1.0.2 A 26% CONTINGENCY HAS BEEN APPLIED TO ALLOW FOR POSSIBLE REPAIR OF EXISTING SST TANKS DAMAGED DURING REMOVAL AND REPLACEMENT. ALSO CONCERNS REGARDING CONDITION OF ELECTRICAL PANEL BOXES.

WBS 3.1.0.3 A 25% CONTINGENCY HAS BEEN APPLIED TO ALLOW FOR A POTENTIAL INCREASE IN THE QUANTITY OF CONDUIT AND PIPING TO BE REMOVED FOR TANK 103.

WBS 3.3.0.0 A 15% CONTINGENCY HAS BEEN APPLIED TO ALLOW FOR GROWTH IN THE VOLUME OF CONTAMINATED MATERIALS TO BE BURIED.

WBS 4.0.0.0 A 15% CONTINGENCY HAS BEEN APPLIED TO ALLOW FOR ADDITIONAL TIME IN ORDER TO EXECUTE PHASED CONSTRUCTION ACTIVITIES.

AVERAGE CONSTRUCTION CONTINGENCY 25%
AVERAGE PROJECT CONTINGENCY 24%

900 OTHER PROJECT COSTS

WBS 5.0 A 10% CONTINGENCY HAS BEEN APPLIED AS DIRECTED BY WHC PROJECT MANAGEMENT.

AVERAGE TOTAL PROJECT COST CONTINGENCY 20%

CSI	DESCRIPTION	ESTIMATE SUBTOTAL	ONSITE INDIRECTS	SUB TOTAL	ESCALATION %	ESCALATION TOTAL	SUB TOTAL	CONTINGENCY %	CONTINGENCY TOTAL	TOTAL DOLLARS
PROJECT TOTAL		2,504,017	0	2,504,017	11.25	281,654	2,785,671	20	553,197	3,338,879

STATEMENT OF WORK

PROJECT W-178

219-S SECONDARY CONTAINMENT UPGRADE

CLIENT: WESTINGHOUSE HANFORD CO. W.O. NO.: ER3073

PREPARED BY: W. R. Swift DATE: February 4, 1993

PROJECT SCOPE

Project W-178 will provide secondary containment for the existing Tanks 101 and 102 and replace Tank 103 with a new double contained Tank 104. The project will bring the 219-S facility into compliance with current environmental regulations.

REFERENCES

-Functional Design Criteria, WHC-SD-W178-FDC-001, Revision 1 Draft, dated October, 1992.

-KEH Letter Report, 219-S Double Containment Upgrade, dated May 7, 1992.

-WHC Letter of Instruction No. 9255313, dated July 14, 1992.

DETAILED SCOPE

Piping

-Existing Tank 103 shall be taken out of service and replaced by the installation of new Tank 104. The spare compartment in Cell B shall have a liner installed in it to provide secondary containment for new Tank 104 and its associated piping.

-Existing Tanks 101 and 102 shall be removed from Cell A to permit decontamination and installation of a secondary containment liner. The existing Tanks 101 and 102 and their associated piping shall be reinstalled in Cell A and returned to service.

-The steam systems in Cell A and B shall be removed from service and replaced with air diaphragm pumps for fluid transfer.

-The 219-S facility cannot be taken out of service during the construction effort for an extended length of time. The phasing plan developed in the CDR effort will sequence the construction activities to minimize the interruption to the facility.

WBS	DESCRIPTION	ESTIMATE SUBTOTAL	CONTRACT ADMINISTRATION %	CONTRACT ADMINISTRATION TOTAL	BID PACK PREP.	OTHER INDIRECTS	TOTAL INDIRECTS
1110	CATEGORY 1 DESIGN	248562	0.00	0	0	0	0
1120	CATEGORY 2 DESIGN	180361	0.00	0	0	0	0
1210	ENGINEERING SUPPORT	55252	0.00	0	0	0	0
1220	ACCEPTANCE INSPECTION	85602	0.00	0	0	0	0
2100	PROCUREMENT-ONSITE E/C	74727	0.00	0	0	0	0
3101	PHASE I	540391	0.00	0	0	0	0
3102	PHASE II	490780	0.00	0	0	0	0
3103	PHASE III	63632	0.00	0	0	0	0
3300	OPERATING CONTRACTOR BURIAL FEE	51203	0.00	0	0	0	0
4000	PROJECT MANAGEMENT-O/C	112342	0.00	0	0	0	0
5001	COST TO DATE	36000	0.00	0	0	0	0
5002	FY 1993 COST	193934	0.00	0	0	0	0
5003	FY 94 COST	13640	0.00	0	0	0	0
5004	FY 95 COST	95632	0.00	0	0	0	0
5005	FY 96 COST	184514	0.00	0	0	0	0
5006	FY 97 COST	77445	0.00	0	0	0	0
PROJECT TOTAL		2,504,017		0	0	0	0

Civil/Structural (24)

-Tank restraint and tank shim drawing
-Tank restraint anchorage drawing
-Secondary containment liner drawing
-Structural calculations for tank restraint system and tank shims
-Input to Construction Specification

Safety Review (26)

-Provide technical service to design disciplines for compliance with safety regulations and codes.
-Provide checking and design review services.

Piping (27)

-Tank 201 Process and Instrumentation Diagram Drawing
-Tank 101 and 102 Process and Instrumentation Diagram Drawing
-Tank 103 and 104 Process and Instrumentation Diagram Drawing
-Cell B Piping Plan, Phase 1
-Cell B Piping Sections and Details, Phase 1
-Operations Gallery Piping Plan, Phase 1
-Operations Gallery Piping Sections and Details, Phase 1
-Tank 104 Vendor Drawing
-Pipe Support Detail Drawings (2), Phase 1 and 2
-Cell A Piping Plan, Phase 2
-Cell A Piping Sections and Details, Phase 2
-Pipe Removal Plan and Details
-Input to the Construction Specification
-Input to the Procurement Specification

Instrumentation (29)

-Instrumentation Connection Drawings (2)
-Instrumentation Loop Drawings (2)
-Engineering Input to the Piping P and ID Drawings
-Input to the Construction Specification

Electrical (31)

-Electrical Plan, 219-S Building
-Electrical Plan, Cell A and B
-Instrument Panel Wiring and Room 3-B Wiring and Details Drawing
-Wire Run List
-Input to the Construction Specification
-Cathodic Protection Evaluation

Civil/Structural

-Tanks 101, 102, and 104 require seismic restraints be installed to prevent lateral motion.

-A secondary containment liner shall be designed and installed in Cell A for Tanks 101 and 102 and in Cell B for Tank 104.

Instrumentation and Controls

-Leak detection shall be installed in the secondary containment liners to detect leaks in the primary containment.

-Leak detection shall be installed in the existing sumps in Cell A and B.

-The existing instrumentation panel shall be modified to add the new instrumentation for Tank 104.

-The existing instrumentation on Tanks 101 and 102 shall be removed and reinstalled during the construction effort.

Electrical

-Power to the new diaphragm pump controls, electrical equipment and instrumentation shall be installed from an existing source in the 219-S building.

-Existing electrical services to the equipment and instrumentation in the cells shall be removed and reinstalled during the construction effort.

-The need for cathodic protection will be determined for the equipment in the cells.

DEFINITIVE DESIGN DELIVERABLES AND SERVICES

Environmental (22)

-Provide technical service to design disciplines for compliance with environmental regulations and codes.
-Coordinate with design disciplines for incorporation of environmental design criteria.
-Research codes, orders and environmental regulations.
-Provide checking and design review services.

Estimating (46)

-Preparation of the Construction cost estimate after completion of the definitive design

Procurement (49)

-Support the advance procurement of Tank 104

Construction Engineering (63)

-Perform a Constructibility Review of the definitive design documents
-Provide input to the construction estimate and schedule.

Document Control (65)

-Set up and maintain the project record files.
-Perform records closeout and records turnover

ASSUMPTIONS

Piping

-Project is Safety Class 3.
-The piping system will be designed in accordance with ASME B31.3, normal service, seismic design shall meet requirements as defined in SDC 4.1, Rev.11.
-The vessel and cell ventilation system will not require modification by this project.
-The discharge pump and piping to the tank farm and truck load out will not be installed or modified by this project.

Civil/Structural

-The project is Safety Class 3.
-The cells are structurally sound and do not require analysis or modification by this project.
-Design information and drawings for the cells are accurate and available.
-The existing special protective coating on the cell walls does not require repair or replacement.

Instrumentation and Controls

-Existing control room instrumentation is reusable with exception of the Jet gang valves.

Specifications (32)

-Construction Specification, assemble and edit 10 sections
-Procurement Specification, Tank 104

Specialty Engineering (33)

-Engineering Analysis for Radiological Shielding

Design Administration (35)

-Coordination of the engineering disciplines during the definitive design
-Coordination of the inter discipline design reviews
-Monitor adherence to the project technical baseline

Design Safety Analysis (36)

-Review the FDC for safety classifications to equipment and facility systems

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.

Quality Engineering (42)

-Review the design drawings and specifications for compliance to quality assurance requirements.

Acceptance Inspection (44)

-Provide inspection services during the construction effort
-Provide an independent assessment of the definitive design documents and construction installation in accordance with WAC 173-303

Project Controls (45)

-Set up Chart of Accounts and budgets in KEMS.
-Maintain Physical Progress and Cost and Comparison reports.
-Provide monthly updates of cost and schedule.
-Perform the duties of the Cost Account Manager (CAM).

Statement of Work
Project No. W-178
Page 1

STATEMENT OF WORK

OPERATING CONTRACTOR - PROJECT MANAGEMENT

PROJECT W-178

WORK ORDER NUMBER: ER 3073

PREPARED BY: J. J. Beyer DATE: 01/25/93

I. OBJECTIVES

The operating contractor shall provide project management services to the Department of Energy Field Office, Richland (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. The Project Integrator (PI) functions, as outlined in the Integrated Management Team (IMT) Memorandum of Understanding, shall be performed by the operating contractor.

II. TASKS

A. 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, plans and schedules, change requests, cost estimates, Quality Assurance (QA) programs and related audits, Engineering Change Notice (ECN), subcontracts, work orders, supplements, minutes of meetings, test procedures, and photographs, etc. All items shall be identified with the project number.

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 (MRM).

5. Overall responsibility for Project/Program Integration, Work Authorization, Technical/Cost/Schedule Integration, Baseline Control, and Reporting.

Statement of Work
Project No. W-178
Page 6

-No distributed control system will be used, all control will be manual.
-Controllable air for diaphragm pumps on Tanks 101, 102, and 104 will be provided.
-Existing sump level instrumentation will be used.

Electrical

-WHC will help KEH with drawing search and other miscellaneous information.
-Any required modification to existing panels in the Control room will be done by instrumentation.
-The existing electrical installation complies with the National Electrical Code.
-The existing multiplex cable from the 219-S facility to the 222-S Control Room will not have to be replaced or added to by this project.
-The existing lighting in the 219-S facility is adequate and will not require modification by this project.
-Short term outages of electrical equipment will be required.
-Adequate power is available in the 219-S building for the new pumps installed in Cells A and B.
-No heat trace will be required.

Statement of Work
Project No. W-0178
Page 3

2. Approve construction schedules consistent with project requirements.

3. Provide 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 interferences 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 the onsite construction contractor and/or facility operations.

8. Review vendor submittals as required and provide comments to the A-E.

9. Participate and concur in final inspection, testing, and acceptance of completed facilities for operation.

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.

B. Design

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

2. Provide technical direction and assistance for design accomplished by the Architect-Engineer (A-E).

3. The Project Engineer (PE) coordinates and takes the lead technical role in the design review process. Involves the user, site services, site water purveyor, operations, maintenance engineering, and process control, as necessary, in design reviews. Approve definitive design for compliance with the Functional Design Criteria (FDC), project baseline, safety, operability, reliability, energy conservation, and cost effectiveness; and to assure optimum design in terms of cost, safety, reliability, maintainability, accuracy, and compliance with applicable codes, standards, criteria, regulations, and DOE Management Directives.

4. Approve design schedules consistent with project requirements.

5. Concur with or approve 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, as appropriate, is a basis for design selections and decisions.

9. Participate in the team effort of developing and implementing a comprehensive, integrated project QA and/or Quality Control (QC) and/or inspection plan utilizing a graded approach.

10. Provide information, data, records, and guidelines for the special conditions or requirements that may impact project cost, i.e., radiation levels, security requirements, escort requirements, facility training requirements, waste handling requirements, etc.

D. Construction

1. Provide technical direction and assistance, as applicable, on construction accomplished by the fixed price contractor and onsite construction contractor.

STATEMENT OF WORK
PROJECT W-178
OTHER PROJECT COSTS

Prepared by: J. J. Beyer
Date: January 27, 1993

PROJECT SCOPE

The scope of this project will provide the 219-S Facility with secondary containment for all operational tanks and ancillary piping systems. Tank 103 will be replaced with a new tank which will be designated as tank 104. Corrosion protection shall be installed as required per WAC-173-303-640 (4) (e) (ii) . The cells shall be cleaned and the surface repaired as required. New tank support shims shall be designed and installed, as required. A leak detection system which will detect the failure of the primary containment or any release of hazardous waste or accumulated liquid in the secondary containment system shall be included.

Project W-178 will replace required piping from the interior cell walls to individual tanks and piping for tank to tank interconnections. Piping from tank 102 to the discharge pump which is supplied and installed by Project W-087, Radioactive Waste Lines, shall be supplied by this project. Project W-087 provides new piping from the 222-S Laboratory Facility to the outside wall of the 219-S Waste Handling Facility. The discharge pump from tank 102, and associated discharge piping to tank farms and truck load out connection, will also be supplied by project W-087. Project W-041, Environmental Hot Cell Upgrade, provides new drain lines from the new hot cells to the 219-S Facility and connections to tank 101 as required.

STATEMENT OF WORK (SOW) SCOPE

This SOW identifies expense funded activities performed by, or under the direction of, the Operating Contractor (OC). These are activities directly associated with the implementation of Project W-178 that are not capital costs included in the Total Estimated Construction Cost (TECC). These type of activities are identified as Other Project Costs (OPC). The OPC costs for Project W-178 span the project from its origination as a DOE-RL candidate project through turnover of the project for operational use.

DELIVERABLES

The deliverables for this section will be broken out by the performing organization. Many of the items listed deal with the client review associated with the design. These are necessary reviews to assure that the design properly interfaces with existing plant equipment and OC procedures (fit and function) and to assure that the user will be satisfied with the end product. The remaining items fall into two general categories which are nondedicated OC personnel support for the project construction activities and the actions necessary to integrate the project into the existing OC procedures.

Statement of Work
Project No. W 178
Page 4

PROJECT MANAGEMENT COST ESTIMATE

PROJECT PHASE	ITEM	MANHOURS	RATE	TOTAL $
DESIGN 9.5 months	Project Engineer	600	$57/Hr	34,200
	Project Manager	40	$57/Hr	2,280
	Clerical	40	$25/Hr	1,000
	Travel			2,000
PROCUREMENT 3 months (concurrent with design)	Project Engineer	40	$57/Hr	2,280
	Project Manager	8	$57/Hr	456
	Clerical	8	$25/Hr	200
	Travel			4,000
CONSTRUCTION 12 months	Project Engineer	950	$57/Hr	54,150
	Project Manager	80	$57/Hr	4,560
	Clerical	80	$25/Hr	2,000
PROJECT CLOSEOUT 3 months	Project Engineer	80	$57/Hr	4,560
	Project Manager	8	$57/Hr	456
	Clerical	8	$25/Hr	200
SUBTOTAL				$112,342
CONTINGENCY			15%	
TOTAL				

- Note: No escalation has been included

Conceptual Design Plan (CDP) Activities
- Prepare the document and coordinate the necessary approvals.

Value Engineering
- Participate in Study Analysis Session (value engineering) in support of revision to the FDC.

CDR Activities
- Manage the preparation of the CDR by the onsite E/C.
  - Manage overall CDR budget and schedule (meetings, reports, etc.).
  - Contribute text and appendices as required.
  - Coordinate client review & approval of document.

Quality Assurance Project Plan (QAPP)
- Review and approve the document.

Statement Of Work
- Provide PM and OPC statements of work for estimate.

Validation
- Prepare the Construction Project Data Sheet.
- Support the project validation process:
  - Validation reports
  - Validation package preparation
  - Presentations
- Coordinate activities in support of W-178 prior to authorization:
  - Deviation/waiver requests.

Project Management Plan (PMP)
- Prepare and submit document.

Permitting Support Documentation
- Manage and coordinate the activities pursuant to the permit requirements outlined in the Permitting Plan.

3. <u>WHC Environmental (ENV)</u>

FDC Activities
- Review and approve the document and any ECN's written against it.

Value Engineering
- Participate in Study Analysis Session (value engineering) in support of revision to the FDC.
- Participate in Value Engineering Session in support of definitive design.

CDR Activities
- Provide conceptual design input as required and participate in weekly project meetings as required.
- Support the client review of the conceptual design media.

Permitting Plan
- Perform a regulatory analysis.
- Develop a detailed plan that outlines all permit requirements.

Permitting Support Documentation

1. WHC User/Sponsor Program (USP)

Engineering Study
- Provide funding and overall management for the development of the document.
- Coordinate the necessary approvals for the document.

Functional Design Criteria (FDC) Activities
- Provide funding and overall management for the development of the document.
- Prepare and coordinate the necessary approvals of Engineering Change Notices (ECN's) to the document.

Value Engineering
- Participate in Study Analysis Session (value engineering) in support of revision to the FDC.
- Participate in Value Engineering Session in support of definitive design.

Conceptual Design Report (CDR) Activities
- Provide conceptual design input as required and participate in weekly project meetings.
- Support the client review of the conceptual design media.

Definitive Design Input and Review
- Provide necessary design input.
- Provide recommended spare parts list to be included in the construction specification.
- Support client review of the definitive design media.

Procurement Review
- Provide reviews of purchase requisitions, vendor data, etc. as required.

Operating Contractor Support (during construction)
- Support project activities on the site:
  - Provide escorts for jobwalks
  - Tagout of equipment.
  - Triple rinse tanks prior to removal.
- Attend and participate in weekly construction progress meetings.
- Support the client review of all construction documentation (including ECN's, submittals etc.).

Operational Readiness Review
- Prepare Operational Readiness Review (ORR) plans as necessary.
- Revise preventative maintenance procedures as required.
- Coordinate and manage all ORR activities.

Operational Test Procedures (OTP)/Startup
- Plan, prepare and coordinate OTP and Startup activities.
- Provide support for the ATP/OTP and Startup.

2. WHC Project Management Organization (PMO) (Prior to Project Authorization)

FDC Activities
- Review and approve the document and any ECN's written against it.

Definitive Design Input and Review
- Provide necessary design input as required.
- Support client review of the definitive design media as required.

Procurement Review
- Provide reviews of purchase requisitions, vendor data, etc. as required.

Permitting Support Documentation
- Review and approve construction permits as required.

Construction Review
- Support the client review of construction documentation (including ECN's, submittals etc.) as required.
- Perform safety surveillances as required.

Health Physics Technicians (HPT) Support
- Provide routine surveillance support for all construction activities within radiation zones.

6. Security (SEC)

FDC Activities
- Review and approve the document and any ECN's written against it.

CDR Activities
- Support the client review of the conceptual design media.

Definitive Design Review
- Support the client review of the conceptual and definitive design media as required.

7. On Site Engineer/Constructor (E/C)

CDP Activities
- Provide conceptual design statement of work for input into the CDP.

FDC Activities
- Perform a Study Analysis Session (value engineering) for revision of FDC.

CDR Activities
- Prepare the CDR text, schedules, cost estimates etc.

8. Other (OTH)

Document Control
- Perform various document control functions (document releases, duplicating, etc.)

- Prepare and coordinate the required permit application activities.
- Interface with DOE-RL and Washington State Department of Ecology.

Definitive Design Input and Review
- Provide necessary design input as required.
- Support client review of the definitive design media as required.

Procurement Review
- Provide reviews of purchase requisitions, vendor data, etc. as required.

Construction Review
- Provide client support in review of construction documentation.

4. WHC Quality Assurance (QA)

FDC Activities
- Review and approve the document and any ECN's written against it.

CDR Activities
- Provide conceptual design input as required and participate in weekly project meetings as required.
- Support the client review of the conceptual design media.

QAPP
- Develop the project specific Quality Assurance Program Plan.

Permitting Support Documentation
- Review and approve construction permits as required.

Definitive Design Input and Review
- Provide necessary design input as required.
- Support client review of the definitive design media as required.

Procurement Review
- Provide reviews of purchase requisitions, vendor data, etc. as required.

Construction Review
- Support the client review of all construction documentation (including ECN's, submittals etc.).
- Review work orders and LOI's generated by WHC.
- Participate in closeout of nonconformances and surveillances.
- Witness and approve the ATP/OTP.
- Review and approve the Official Acceptance of Construction.
- Participate in the close out of the project documentation.

5. WHC Safety Organizations (SAF)

FDC Activities
- Review and approve the document and any ECN's written against it.

CDR Activities
- Provide conceptual design input as required and participate in weekly project meetings as required.
- Support the client review of the conceptual design media.

OTHER PROJECT COST - SUMMARRY SHEET

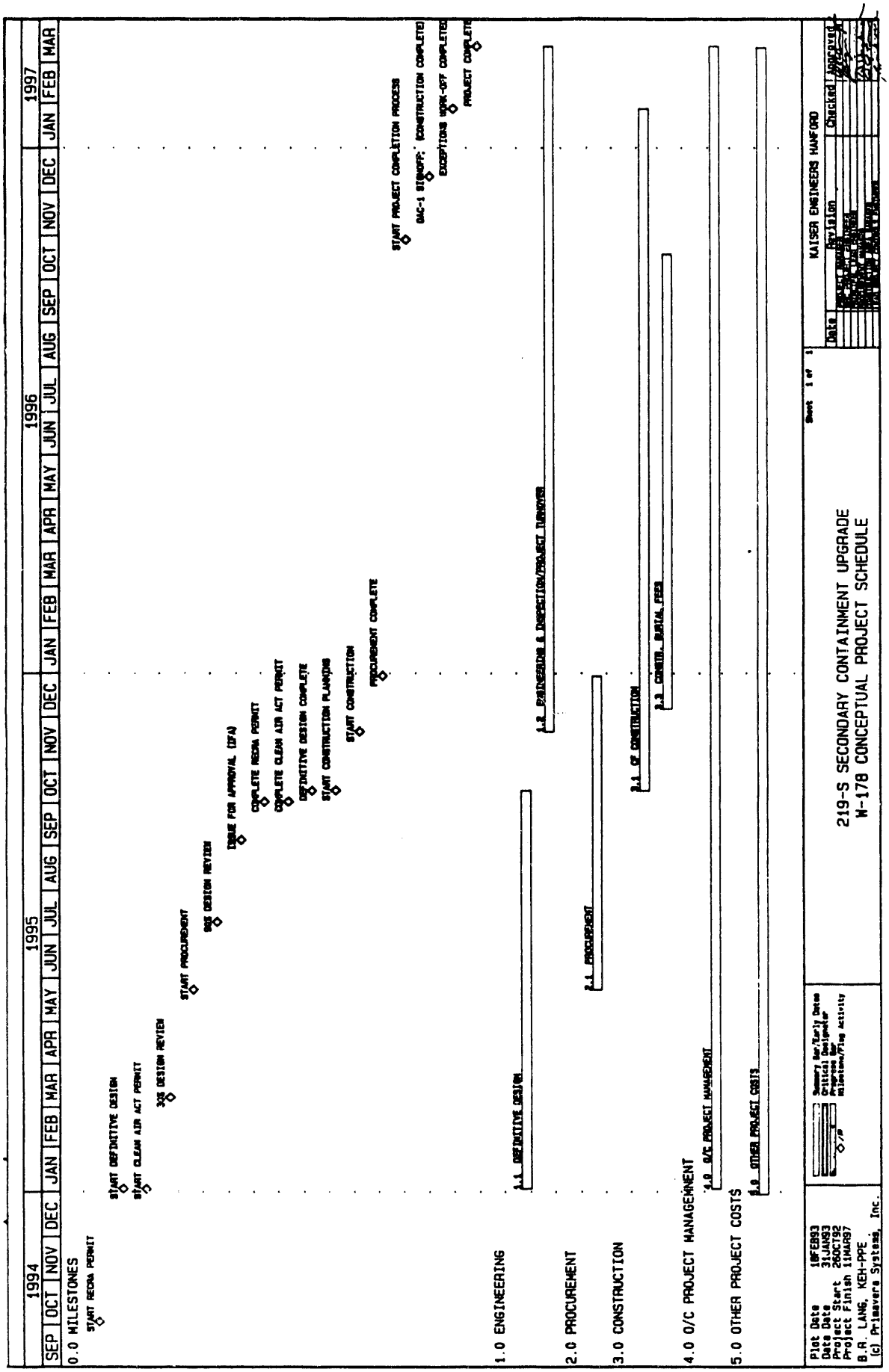
Project No. 96L-EWW-178 Prepared By J. J. Bever Date 01/28/93

ALL DOLLARS IN THOUSANDS

ORGANIZATION	PRIOR YR'S	FY 93	FY 94	FY 95	FY 96	FY 97	TOTAL
User/Sponsor Program (USP)	29.0	10.6	0.0	12.3	51.1	13.1	116.1
Project Manage. Org. (PMO)	1.0	47.8	8.7	0.0	0.0	0.0	57.5
Environmental (ENV)	1.0	5.6	4.9	67.8	4.8	2.4	86.5
Quality Assurance (QA)	1.0	2.5	0.0	5.7	21.8	5.5	36.5
Safety (SAF)	1.0	0.7	0.0	5.4	104.8	55.2	167.1
Security (SEC)	1.0	0.8	0.0	2.6	0.0	0.0	4.4
Engineer/Constructor (E/C)	0.0	125.0	0.0	0.0	0.0	0.0	125.0
Other (OTH)	2.0	1.0	0.0	2.0	2.0	1.0	8.0
							0.0
							0.0
							0.0
							0.0
							0.0
							0.0
							0.0
TOTALS	36.0	194.0	13.6	95.8	184.5	77.2	601.1

APPENDIX D

Conceptual Project Schedule


1994
1995
1996
1997
SEP OCT NOV DEC JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN FEB MAR
0.0 MILESTONES
START RCRA PERMIT
START DEFINITIVE DESIGN
START CLEAN AIR ACT PERMIT
30% DESIGN REVIEW
START PROCUREMENT
90% DESIGN REVIEW
ISSUE FOR APPROVAL (IFA)
COMPLETE RCRA PERMIT
COMPLETE CLEAN AIR ACT PERMIT
DEFINITIVE DESIGN COMPLETE
START CONSTRUCTION PLANNING
START CONSTRUCTION
PROCUREMENT COMPLETE
START PROJECT COMPLETION PROCESS
DAC-1 SIGNOFF: (CONSTRUCTION COMPLETE)
EXCEPTIONS WORK-OFF COMPLETED
PROJECT COMPLETE
1.0 ENGINEERING
1.1 DEFINITIVE DESIGN
1.2 ENGINEERING & CONSTRUCTION/PROJECT TURNOVER
2.0 PROCUREMENT
2.1 PROCUREMENT
3.0 CONSTRUCTION
3.1 CF CONSTRUCTION
3.2 CONSTR. PARTIAL FEED
4.0 O/C PROJECT MANAGEMENT
4.0 O/C PROJECT MANAGEMENT
5.0 OTHER PROJECT COSTS
5.0 OTHER PROJECT COSTS
Plot Date 18FEB93
Data Date 31JAN93
Project Start 26OCT92
Project Finish 11MAR97
B.R. LANG, KEH-PPE
(c) Primavera Systems, Inc.
Summary Bar/Early Dates
Critical Component
Progress Bar
Milestone/Float Activity
219-S SECONDARY CONTAINMENT UPGRADE
W-178 CONCEPTUAL PROJECT SCHEDULE
Sheet 1 of 1
KAISER ENGINEERS HANFORD
Date
Revision
Checked
Approved

APPENDIX E

Outline Specification

OUTLINE SPECIFICATION

DIVISION 5 - METALS

Section 05556 Stainless Steel Cell Liner

1. 300 Series Stainless Steel

DIVISION 13 - SPECIAL CONSTRUCTION

Section 13440 Instrumentation

1. Flowmeter: Fischer Porter rotameter.
2. Differential pressure transmitter: 4-20 mA output.
3. Strip chart recorder: Bailey Model BC-2.
4. Digital indicator: 4-20 mA input.
5. Air pressure regulator
6. Thermocouples, RDT
7. Temperature indicators:
8. Level switches: Lumenite EH-26-B probe and FLT-1031 relay.
9. Annunciator: Ronan Model LB 2000 with 2 annunciator windows.
10. Leak detectors

DIVISION 15 - MECHANICAL

Section 15499 Building Service Piping Systems

A. Temporary Process Lines

1. Flexible hose: Goodyear Blue Flexwing flexible hose and compatible fittings.

B. Pump temporary air lines

1. Flexible hose: Aeroquip 2661-16 AQP hydraulic hose, AQP elastomer tube and compatible fittings.

C. Permanent Lines

1. Pipe: Stainless steel seamless, Schedule 40S, ASTM A 312, Grade 304L.
2. Pipe Fittings: Stainless steel, standard weight, ASTM A 403, Grade WP-S

3. Tube: 0.035 inch wall stainless steel tubing, ASTM A 269, Grade TP 304L.

4. Tube Fittings: Stainless steel compression type, Swagelok.

D. Pumps

1. Tank pumps: 2 inch stainless steel Wilden Model M8 with stainless steel wetted parts and Viton diaphragms. Suction pipe size, 2 inch minimum diameter. Pump capable of passing 1/4 inch diameter solids. Supply air pressure will be 125 psig maximum. Filter regulator lubricator is required for permanent installation.

2. Sump pumps: Stainless steel Wilden Model M2 with 1-inch intake and 3/4-inch discharge with stainless steel wetted parts and Viton diaphragms. Suction pipe size, 1 inch minimum diameter. Pump capable of passing 1/8 inch diameter solids. Supply air pressure will be 125 psig maximum.

E. Valves

1. Ball valves: 2 inch stainless steel PBM Multi-port with teflon seats and seals.

F. Tank 104

1. Shell outside diameter: 6 ft (72 in).

2. Overall vessel length: 9 ft-9 in (117 in).

3. Volume: Approximately 1900 gallons.

4. Shell material: SA240 (304L) stainless steel plate.

5. Shell thickness: 0.50 inches.

6. Head material: SA240 (304L) stainless steel forged.

7. Head thickness: 0.50 inches (inverted dished head).

8. Nozzle material: SA240 (304L) stainless steel forged.

9. Maximum static internal pressure: 20 psi.

10. Operating temperature: 120°F.

11. Specific gravity of fluid: 1.4.

12. pH of contents: 1.0.

13. Contents

    a. Temporary: High and intermediate activity waste.

    b. Permanent: High activity waste.

14. Corrosion allowance: 0.125 inches.

15. Radiographic inspection: Spot.

16. Longitudinal seam efficiency: 0.85.

DIVISION 16 - ELECTRICAL

Section 16400 Service and Distribution

1. Conduit: Rigid galvanized steel.

2. Conductors: Type THWN/THHN.

APPENDIX F

Preliminary Safety Evaluation

(To be prepared during definitive design)

Westinghouse Hanford Company

Internal Memo

From: Facility Safety Documentation 29300-92-5
Phone: 6-8893
Date: August 6, 1992
Subject: PREPARATION OF SAFETY DOCUMENTATION FOR PROJECT W-178, 219-S DOUBLE CONTAINMENT UPGRADE

To: J. J. Beyer R3-35

cc:

D. A. Conners	T6-10	C. B. McVey	H1-61
B. G. Faulk	T5-56	C. E. Norton	S1-54
L. D. Goodwin	T6-12	G. L. Smith	H5-35
G. A. Johnston	R3-35	Project Files	R1-28
		RJK File/LB	

Reference:

(1) Internal Memo from J. J. Beyer to G. L. Smith, "Project W-178, 219-S Double Containment Upgrade, Support for Preparation of a Preliminary Safety Evaluation (PSE)," Dated July 27, 1992.

(2) WHC-CM-4-46, Nonreactor Facility Safety Analysis Manual, Dated July 31, 1992.

(3) RLIP 4700.1A, Project Management System, Dated March 16, 1989.

(4) SD-CP-HIE-001, 222-S Laboratory Facilities Hazards Identification and Evaluation, Revision 0, Dated June 10, 1989.

As requested, a determination of the appropriate safety documentation was conducted for Project W-178, 219-S Double Containment Upgrade (Reference 1). This project is classified as low hazard and modifies the 222-S Laboratory facilities, a low hazard nuclear facility. It will replace the existing double contained tanks TK-101, TK-102, and TK-103 with a new double contained tank TK-103, and modify the existing piping to continue the process flow.

The need for a preliminary safety evaluation (PSE) during the conceptual design phase was evaluated. It was determined that this low hazard line item project does not require a PSE based on the requirements of References 2 and 3. However, additional safety documentation will be required for this project.

J. J. Beyer
Page 2
August 6, 1992

29300-92-5

A safety analysis addendum will be required prior to construction and operation of the facility modification. This document would be a engineering change notice (ECN) to the 222-S Laboratory Facilities Hazards Identification and Evaluation document (Reference 4). The addenda should address the modifications to the 219-S Facility and identify any new hazards or risks to the 222-S Laboratory facilities.

If you have any questions or concerns about the safety documentation determination, please contact me on 6-8893.

RJ Kidder

R. J. Kidder, Lead Engineer
Facility Safety Documentation

bmb

APPENDIX G

Physically Handicapped Assessment

(Provided by Westinghouse Hanford Company)

ACCOMMODATIONS OF PHYSICALLY HANDICAPPED

PROJECT NO. 96L-EWW-178

PROJECT TITLE Secondary Containment Upgrade for the 219-S Facility

LOCATION 200 West (area) BUILDING 219-S

Prepared By John J. Beyer Title Project Engineer

Date 12/09/92

Type of Project:

- ☐ New Building (or Building Addition)
- ☒ Building Alteration
- ☐ Site Development (Grading, Walks, Parking Lots)
- ☐ Other

Application of Regulations:

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

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

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

Exceptions:

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

- ☒ a. Not intended for occupancy or use by the handicapped
- ☒ b. Alteration not involving existing stairs, doors, elevators, toilets, etc.
- ☐ c. Not structurally possible

General Comments:

Project W-178 provides the necessary facility modifications to meet the Washington Administrative Code and Resource Conservation and Recovery Act requirements for Treatment, Storage and Disposal Facilities. This modification shall include the installation of secondary liner and leak detection systems. The majority of the work activities will be performed in a radiologically controlled area. No modifications will be made to means of entrance or exit from the facility. There are no employees assigned as occupants to this facility.

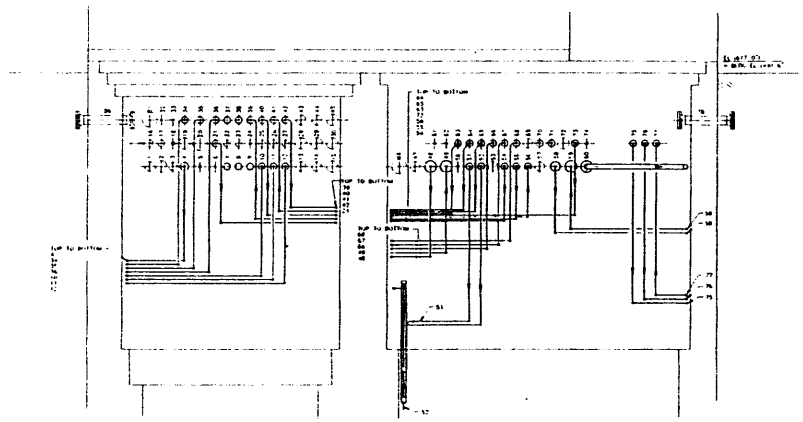
Signature John J. Beyer 12/09/92 Date

A-6000-806 (09/92)

APPENDIX H

Sketches

ES-W178-1	W178 Attachment 1
ES-W178-2	W178 Attachment 2
ES-W178-3	W178 Attachment 3
ES-W178-4	W178 Attachment 4
ES-W178-5	W178 Attachment 5



SECTION C (ATTACHMENT 1)

LINE LIST (LINE NO. CORRESPONDS TO NOZZLE)			
LINE NO.	SIZE	MATERIAL	SERVICE
4	3/4"	SCHED 40S SST PIPE	DRAIN FROM SAMPLE BOX
10	1.5"	SCHED 40S SST PIPE	SAMPLE (AIR BLEED)
11	1-1/2"	SCHED 40S SST PIPE	SAMPLE (SUPPLY)
12	1-1/2"	SCHED 40S SST PIPE	SAMPLE (RETURN)
16	1-1/2"	EXISTING	LEAK DETECTOR TEST WATER
21	1-1/2"	SCHED 40S SST PIPE	LEAK DETECTOR TEST WATER
34	1-1/2"	SCHED 40S SST PIPE	TK-104 WF SG
35	1-1/2"	SCHED 40S SST PIPE	TK-104 WF SG
36	1-1/2"	SCHED 40S SST PIPE	TK-104 WF SG
39	1-1/2"	SCHED 40S SST PIPE	TK-104 TRANSFER PUMP AIR RETURN
40	1-1/2"	SCHED 40S SST PIPE	TK-104 TRANSFER PUMP AIR SUPPLY
41	1-1/2"	SCHED 40S SST PIPE	B-CELL SUMP PUMP AIR RETURN
42	1-1/2"	SCHED 40S SST PIPE	B-CELL SUMP PUMP AIR SUPPLY
48	1-1/2"	SCHED 40S SST PIPE	A-CELL SUMP PUMP AIR SUPPLY
49	1-1/2"	SCHED 40S SST PIPE	A-CELL SUMP PUMP AIR RETURN
51	1-1/2"	SCHED 40S SST PIPE	LEAK DETECTOR TEST WATER
52	1-1/2"	SCHED 40S SST PIPE	LEAK DETECTOR TEST WATER
54	1.4"	.035 WALL SST TUBING	WATER TO AGITATOR A-102 STUFFING BOX
55	1.4"	.035 WALL SST TUBING	WATER FROM AGITATOR A-102 STUFFING BOX
56	1.4"	.035 WALL SST TUBING	OIL TO AGITATOR A-102
58	1-2"	SCHED 40S SST PIPE	TK-101 TRANSFER PUMP AIR SUPPLY
59	1-2"	SCHED 40S SST PIPE	TK-101 TRANSFER PUMP AIR RETURN
60	2"	SCHED 40S SST PIPE	CHEM ADD TO TK-102
63	1.4"	.035 WALL SST TUBING	GREASE TO AGITATOR A-102 UPPER STUFFING BOX
64	1.4"	.035 WALL SST TUBING	GREASE TO AGITATOR A-102 LOWER BEARING
65	1.4"	.035 WALL SST TUBING	GREASE TO AGITATOR A-102 LOWER STUFFING BOX
66	1-2"	SCHED 40S SST PIPE	TK-101 WF SG
67	1-2"	SCHED 40S SST PIPE	TK-101 WF SG
68	1-2"	SCHED 40S SST PIPE	TK-101 WF SG
70	1-2"	SCHED 40S SST PIPE	TK-101 WF
71	1-2"	SCHED 40S SST PIPE	TK-101 WF
73	1.4"	.035 WALL SST TUBING	GREASE TO AGITATOR A-102 UPPER BEARING
75	1.5"	SCHED 40S SST PIPE	SAMPLE (AIR BLEED)
76	1-2"	SCHED 40S SST PIPE	SAMPLE (RETURN)
77	1-2"	SCHED 40S SST PIPE	SAMPLE (SUPPLY)
80	2"	SCHED 40S SST PIPE	TK-102 PUMP OUT
81	2"	SCHED 40S SST PIPE	HAW TRANSFER FROM TK-104 TO TK-102
82	1"	SCHED 40S SST PIPE	B-CELL SUMP TRANSFER TO TK-102
83	4"	SCHED 40S SST PIPE	VESSEL VENT FROM TK-101,102 & 104 TO TK-105
84	3"	SCHED 40S SST PIPE	IAW FROM NOZZ 84 TO TK-101
85	3"	SCHED 40S SST PIPE	IAW FROM NOZZ 85 TO TK-101
89	4"	SCHED 40S SST PIPE	VESSEL VENT FROM TK-105 TO HEPA FILTER
90	3"	SCHED 40S SST PIPE	HAW FROM NOZZ 90 TO TK-104
91	3"	SCHED 40S SST PIPE	HAW FROM NOZZ 91 TO TK-104
92	3"	SCHED 40S SST PIPE	IAW FROM NOZZ 92 TO NOZZ 85
93	3"	SCHED 40S SST PIPE	IAW FROM NOZZ 93 TO NOZZ 84

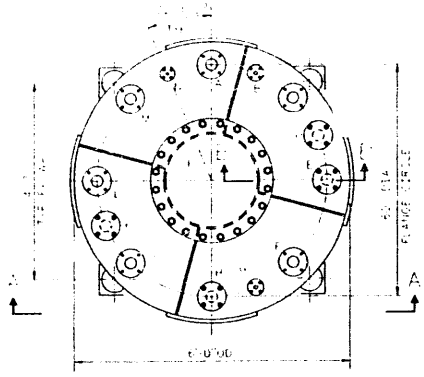
CONCEPTUAL

DAVE PECK

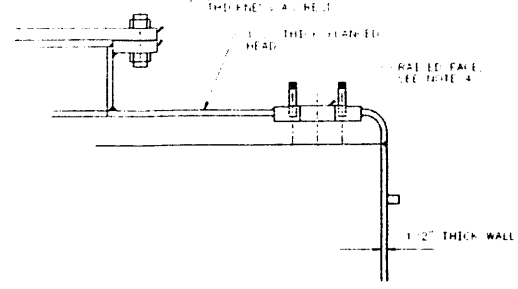
U.S. DEPARTMENT OF ENERGY
RICHLAND FIELD OFFICE
PARSONS ENGINEERS MANAGED COMPANY

W178
ATTACHMENT 3

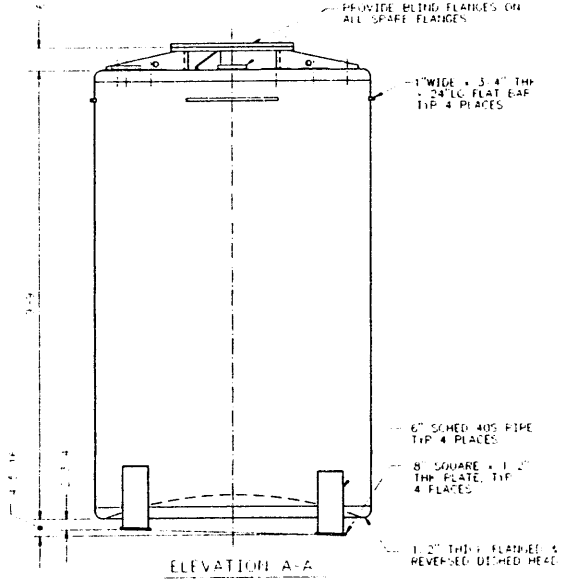
F-19 ES-W178-3 0



PLAN

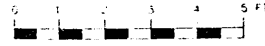


SECTION B-B



ELEVATION A-A

NOZZLE SCHEDULE		
NOZ	SIZE	SERVICE
A	3"	HAW IN
B	1"	ENLARGEMENT DRAIN (PROV A-GRD)
C	3"	HAW IN
D	3"	SPARE
E	3"	SPARE
F	3"	VESSEL VENT
G	1"	SUMP IN
H	3"	SPARE
J	3"	HAW OUT
K	3"	SPARE
L	3"	WEIGHT FACTOR - SPECIFIC GRAVITY
M	3"	SAMPLE
N	2.4	DRAIN
P	24"	SPARE



NOTES:

1 FABRICATION SHALL BE IN ACCORDANCE WITH ASME SECTION VIII DIVISION 1, CODE STAMP NOT REQUIRED

2 DESIGN DATA
TEMPERATURE ..... 120 F
PRESSURE ..... 20 PSIG
VOLUME ..... 1900 GAL
EST WT (EMPTY) ..... 5,500 LBS
EST WT (FULL OF WTR) ... 22,200 LBS

3 MATERIALS
PLATE ..... ASTM A240 TP 304L
PIPE ..... ASTM A312 GR TYPE 304L
BOLTS ..... ASTM A193 GR B8
NUTS ..... ASTM A194 GR 8F
GASKETS ..... PTFE (TEFLON OR EQUAL)

4 ALL FLANGES SHALL BE 150# RAISED FACE UNLESS OTHERWISE NOTED

TK-104

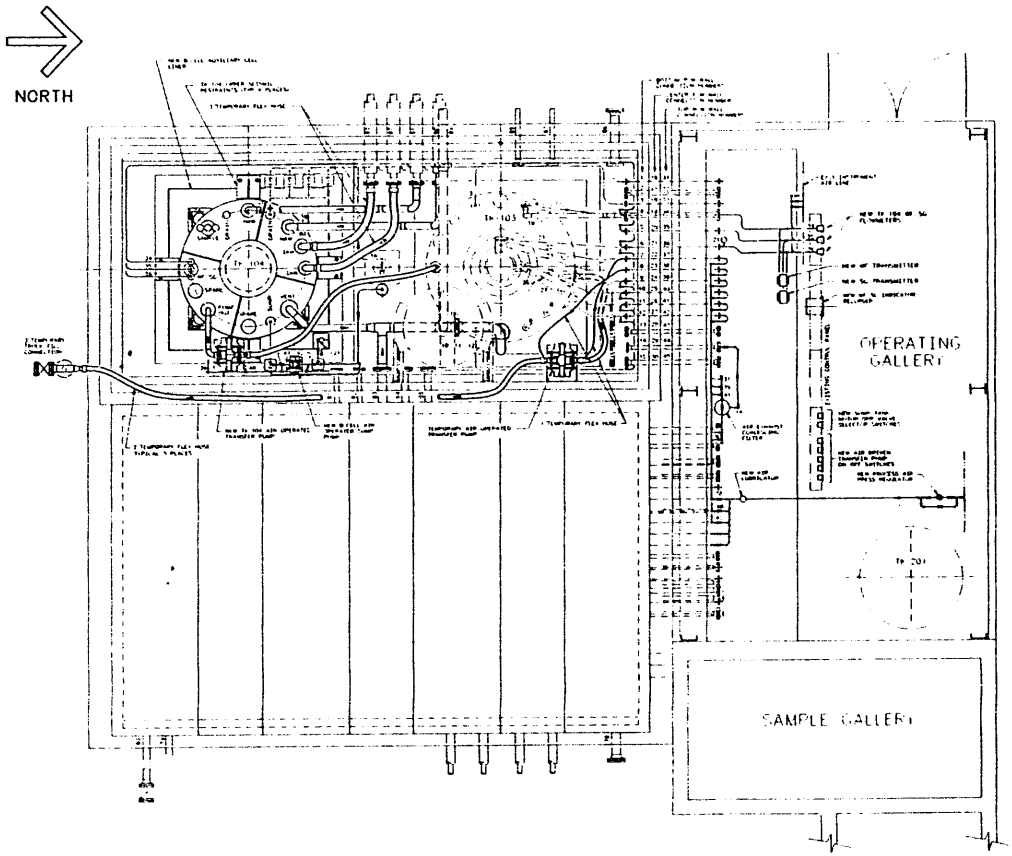
CONCEPTUAL

U.S. DEPARTMENT OF ENERGY
RICHLAND FIELD OFFICE
RAYTHEON ENGINEERS AND CONSTRUCTORS

W178
ATTACHMENT 4

ES-W178-4 | 0

2 PLOT SCALE 1:1



PHASE I PIPING PLAN

NOTE

PHASE I SHALL INCLUDE THE FOLLOWING

1. INSTALLATION OF THE NEW AUXILIARY B-CELL LINER & TANK 104 SUPPORT PADS
2. INSTALLATION OF NEW TANK 104 & UPPER SEISMIC RESTRAINTS
3. INSTALLATION OF NEW TANK 104 PIPING WITH THE EXCEPTION OF IN-CELL SAMPLE LINES
4. INSTALLATION OF NEW TK-104 TRANSFER PUMP AND SUCTION LINE
5. INSTALLATION OF NEW TEMPORARY TK-103 TRANSFER PUMP & TRUCK FILL STATION
6. INSTALLATION OF TEMPORARY FLEX HOSES AS SHOWN FOR INTERIM WASTE PROCESSING
7. INSTALLATION OF NEW TK-104 WEIGHT FACTOR/ SPECIFIC GRAVITY INSTRUMENTATION
8. INSTALLATION OF NEW TRANSFER PUMP AIR SUPPLY MANIFOLD PIPING & SOLENOID VALVES
9. INSTALLATION OF NEW TRANSFER PUMP AIR RETURN MANIFOLD & COALESCING FILTER
10. INSTALLATION OF NEW B-CELL SUMP PUMP MOTOR OPERATED SUMP & TANK SELECTOR VALVES & ASSOCIATED PIPING
11. INSTALLATION OF NEW AUXILIARY B-CELL SUMP LEAK DETECTOR & DETECTOR TEST PIPING
12. REMOVAL OF EXISTING JET SWING VALVES AND ALL ASSOCIATED STEAM PIPING
13. INSTALLATION OF NEW PUMP & MOTOR OFF VALVE SWITCHES W/ RELAYS

CONCEPTUAL

DAVE PECK

U.S. DEPARTMENT OF ENERGY
RICHLAND FIELD OFFICE
KAISER ENGINEERS HANFORD COMPANY

W178
ATTACHMENT 5

F | ES-W178-5 | 0

2 PLOT SCALE 1=1 | NEMROD

END

DATE FILMED

9/7/93