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Conceptual Design Report, "TWRS Privatization Phase I, Liquid Effluent Transfer Systems, " Subproject W-506.

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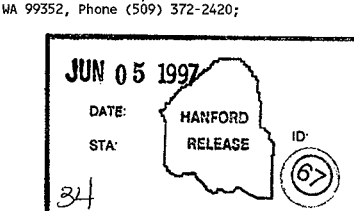
Abstract: This document includes Conceptual Design Report (CDR) for providing liquid effluent lines for routing waste from two Private Contractor (PC) facilities to existing storage, treatment, and disposal facilities in the 200-East Area.



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HNF-SD-W506-CDR-001
Revision 0

Conceptual Design Report

TWRS Privatization Phase I Liquid Effluent Transfer Systems

Subproject W-506

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

Project Hanford Management Contractor for the
U.S. Department of Energy under Contract DE-AC06-96RL13200

CONCEPTUAL DESIGN REPORT

TWRS PRIVATIZATION PHASE I

LIQUID EFFLUENT TRANSFER SYSTEMS

SUBPROJECT W-506

Prepared for

Numatec Hanford Corporation

June 1997

Prepared by

Fluor Daniel Northwest
Richland, Washington

W506CDR

W506CDR

CONCEPTUAL DESIGN REPORT

FOR

TWRS PRIVATIZATION PHASE I

LIQUID EFFLUENT TRANSFER SYSTEMS

SUBPROJECT W-506

APPROVED

Fluor Daniel Northwest

Principal Lead Engineer	Date	Technical Documents	Date
Safety Engineering	Date	Environmental Engineering	Date
Quality Engineering	Date	Project Manager	Date

Numatec Hanford Corporation

Project Manager	Date

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APPENDICES

ABBREVIATIONS

AKART	all known, available, and reasonable treatment (technologies)
BAT	best available technology
CDR	conceptual design report
D&D	decontamination and decommissioning
DCS	distributed control system
DOE	U.S. Department of Energy
DRD	design requirements document
Ecology	Washington State Department of Ecology
ETF	Effluent Treatment Facility
HAW	high-activity waste
LAW	low-activity waste
LERF	Liquid Effluent Retention Facility
NOC	notice of construction
P2/WMin	pollution prevention/waste minimization
PC	Privatization Contractor
PHMC	Project Hanford Management Contractor
PUREX	Plutonium Uranium Extraction Facility
PVC	polyvinyl chloride
QAPP	Quality Assurance Program Plan
RCRA	Resource Conservation and Recovery Act
RFP	request for proposal
RL	Richland Operations Office (DOE)
TEDF	Treated Effluent Disposal Facility
TOE	total operating efficiency
TWRS	Tank Waste Remediation System
USQ	Unreviewed Safety Question
WAC	Washington Administrative Code
WBS	work breakdown structure
WDOH	Washington State Department of Health

CONCEPTUAL DESIGN REPORT

TWRS PRIVATIZATION PHASE I

LIQUID EFFLUENT TRANSFER SYSTEMS

SUBPROJECT W-506

I. INTRODUCTION

Historically, the primary function of the 200 Areas facilities at the Hanford Site was to process nuclear material for defense purposes. This activity resulted in liquid radiological wastes that were stored in tank farms located in both the 200-East and 200-West Areas. High-activity waste (HAW) has been stored in large underground storage tanks at the Hanford Site since 1944; approximately 208 ML (55 Mgal) of waste are stored in 177 tanks. These caustic wastes consist of many different chemicals in the form of liquids, slurries, saltcakes, and sludges. In 1992, the Tank Waste Remediation System (TWRS) program was established to manage, retrieve, treat, immobilize, and dispose of these wastes in a safe, environmentally-sound, and cost-effective manner.

The U.S. Department of Energy (DOE), Richland Operations Office (RL) is pursuing a new business strategy of hiring private contractors to manage the retrieval, immobilization, and disposal of low-activity wastes (LAWs). Privatization strategy includes design, permitting, construction, operation and deactivation of equipment and facilities for treatment of tank wastes. The approach to privatization will be conducted in two phases. Phase I will be a proof-of-concept/commercial demonstration phase and includes supernatant pretreatment, LAW immobilization, and an optional HAW immobilization by two competing vendors.

Once proven on this relatively small scale, privatization will be expanded to Phase II, the full scale production phase, through a second competition to dispose of the remainder of the tank waste.

The TWRS Privatization Infrastructure Project is a part of the first phase of the privatization initiative and will develop a site to support the treatment of Hanford Site wastes. The Infrastructure Project consists of four subprojects that will provide key physical interfaces and services needed to support the Privatization mission.

Subproject W-506 is one of the four subprojects that make up the TWRS Privatization Infrastructure Project. The subprojects provide the infrastructure (except for sanitary sewer), the site improvements, and interfaces necessary to support the demonstration phase (Phase I) of TWRS Privatization. The subprojects are:

- W-503, "Electrical Power System"
- W-504, "Raw and Potable Water"
- W-505, "Site Development and Roads"
- W-506, "Liquid Effluent Transfer Systems"

Subproject W-506 will provide the effluent transfer lines for routing waste from the Privatization sites to existing waste lines leading to storage, treatment, and disposal facilities in the 200-East Area (ref 1).

In conjunction with preparation of the TWRS request for proposal (RFP) for the solicitation of Privatization Contractors (PC), a location was selected for the Phase I facilities (ref 2). The selected area is east of the major 200-East Area road and rail network, and will require modifications and additions to existing transportation corridors. The area was previously developed and characterized for the grout vault disposal site.

The DOE or the Project Hanford Management Contractor (PHMC) is responsible for accepting liquid effluent that meets all negotiated acceptance criteria from the PCs site boundary for disposal at the 200 Area liquid effluent facilities.

Two pipelines will be provided to transfer the waste from the PC sites. One pipeline, a double-contained pipe system, will tie into an existing line that routes the potentially radioactive, dangerous waste to the Liquid Effluent Retention Facility (LERF) and to the Effluent Treatment Facility (ETF) where the waste will be treated prior to disposal. The second pipeline, a single-pipe system, will tie into an existing line that routes the nonradioactive, nondangerous waste suitable for disposal to the Treated Effluent Disposal Facility (TEDF).

Engineering Study WHC-SD-WM-ES-396 identified applicable constraints, resolved outstanding issues, and established performance requirements required to optimize the overall liquid effluent transfer system performance (ref 3). The engineering study reviewed several transfer alternatives including use of a tank trailer which was determined to be too costly.

This conceptual design report (CDR) documents liquid effluent line routing, tie-in point locations, effluent flow rates, and system monitoring requirements.

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

II. SUMMARY

Subproject W-506, "Liquid Effluent Transfer Systems," is one of four subprojects that make up the Tank Waste Remediation System (TWRS) Privatization Infrastructure Project. Subproject W-506 will provide the effluent lines for routing waste from the Privatization sites to existing waste lines leading to storage, treatment, and disposal facilities in the 200-East Area.

The two parallel pipelines cover a distance of 1100 m (3,600 ft). The lines are routed from the tie-in locations adjacent to Canton Avenue, east along the proposed north access roadway, then turn south along the west boundary of the Privatization sites.

One line will transfer potentially radioactive, dangerous waste. This line will tie into the existing line that leads from the 242-A Evaporator Facility to the Liquid Effluent Retention Facility (LERF). After storage at LERF, the waste is sent to the Effluent Treatment Facility (ETF) for treatment. Final disposal is at the state-approved land disposal site north of the 200-West Area. The existing line is a double-encased pipe-in-pipe system that provides containment of potential leaks. The existing system is fiber-reinforced epoxy resin pressure pipe; the new pipe will be of this same material.

The second line transfers nonradioactive, nonhazardous waste that is suitable for disposal. This line will tie into the existing 10-in. line which leads to the Treated Effluent Disposal Facility (TEDF). At the TEDF, treated effluents are collected and released to disposal ponds. The existing line is polyvinyl chloride (PVC) pressure pipe; the new pipe will be of this same material.

Subproject W-506 is a fiscal year 1999 Line Item. Total estimated costs (TEC) of the project are $3,640,000; other project costs (expense funded) are $1,180,000. The total subproject cost (TEC) is $4,820,000.

III. JUSTIFICATION

In pursuing the concept of privatizing the TWRS, DOE proposes to restructure the current contracting process of purchasing products via a contractor-owned, contractor-operated facility working under a fixed-price type of contract. The underlying intent is to transfer a significant share of the responsibility, accountability, and liability for completing the remediation effort to PCs.

The upgrades provided by subproject W-506 are required to support the TWRS Privatization contracts (ref 4 and 5). By supporting TWRS Privatization, subproject W-506 supports the Tri-Party Agreement milestones for site clean-up, processing, and disposal of tank wastes.

IV. DESCRIPTION OF PROJECT SCOPE

A. IMPROVEMENTS TO LAND (460)

Two separate land parcels are to be developed by the Infrastructure Project, one for each PC. The features of each parcel are to be as equivalent as feasible, with neither parcel providing one PC a major advantage (see sketch ES-W506-C01, Parcels A and B. All sketches are shown in Appendix L)).

Site preparation, grading, and road construction will be performed by subproject W-505. It is intended that the majority of this work be done prior to the installation of the liquid effluent lines and water lines (subproject W-504). The site and roads will be graded, underground lines will be installed and backfilled, and then, paving will be performed.

Access to the PC sites from the north will be provided by a new road, that connects with Canton Avenue northeast of the 242-A Evaporator, and proceeds eastward across the 216-A-29 ditch. Installation of this new roadway provides a clean fill for placing utility lines above the potentially-contaminated soil in the 216-A-29 ditch. The earthwork to create the embankment at this crossing and the associated costs are part of the site development provided by subproject W-505.

B. UTILITIES (600)

The utilities covered by subproject W-506 are: the radioactive, dangerous liquid effluent line, and the nonradioactive, nondangerous liquid effluent line.

The effluent transfer pipeline routing was chosen to optimize the use of the site/access road corridor development of subproject W-505. The proposed route begins with tie-ins at the corresponding existing disposal

lines near Canton Avenue. The route runs east along the proposed north access road, and then turns south along the west boundary of the PC facility sites.

The PC effluent tie-in points for both facilities will be located at the west boundary of the land parcels as shown on the site plan (see sketch ES-W506-C02). Preliminary information indicates that the PC facilities will be arranged to release the effluents at this general location.

Each PC will discharge two liquid streams, radioactive, dangerous liquid effluent, and nonradioactive, nondangerous liquid effluent. The PCs will not commingle different waste types.

The PC will connect its facility to the effluent transfer piping at tie-ins provided at the site perimeter. The PC facility will provide the motive force (pumping) required to move liquid effluent from the source to the destination (TEDF or LERF). A minimum liquid velocity of 610 mm/s (2 ft/sec) at the average rate of flow will be maintained. The PC will be required to provide an automatic isolation valve or other method to prevent backflow of waste into their facility.

The effluent lines are sloped at a minimum of 0.10% to drain towards the tie-in points with the existing lines. The ground level is 205 m (672 ft) at the PC end and 203 m (665 ft) at the tie-in point. This change in site grade is insufficient to allow a greater one-way pipeline slope without extensive grading and much larger road embankments. However, because the effluent is to be pumped, only a minimum slope is required for secondary containment drainage on the radioactive dangerous line. The two liquid effluent lines will be installed in a single trench. The tie-ins to the existing lines will utilize Y-branch fittings rather than tees to minimize backpressure into the existing lines.

A hydraulic analysis will be performed as part of a future engineering evaluation to verify that the existing lines can accommodate the additional flows.

Most of the route passes through areas with few known existing utility line crossings, except in the immediate vicinity of the tie-ins. Adjacent to Canton Avenue, where the tie-ins will be made, there are water lines and several older larger-sized waste lines that lead to cribs and disposal facilities north of the PC sites (see sketch ES-W506-C03). These include: a 15-in. vitrified clay pipe, a 16-in. Schedule 20 steel cooling water disposal pipe, and a 36-in. corrugated metal cooling water disposal pipe. During construction, disturbance of these lines should be minimized due to their age, size, and potential for contamination. The vitrified clay pipe is an abandoned line and a portion of this line may be removed.

A subsurface soil contamination zone is located in the vicinity of the effluent line tie-ins (see sketch ES-W506-C03). The lines are routed around this area, which is marked at the surface with a chain barricade. The source and extent of belowgrade contamination is unknown.

The effluent lines will cross under two water lines: a 4-in. potable water line and a 12-in. raw water line. A concrete encasement will be provided on the nonradioactive, nondangerous line at this crossing because it crosses less than 0.61 m (2 ft) below the water lines complying with DOE Order 6430.1A, Section 0270-1.3. An additional encasement is not required on the radioactive dangerous line because it is a pipe-in-pipe system.

1. **Radioactive Dangerous Liquid Effluents**

   The PC facilities are expected to generate dilute aqueous effluent streams containing low levels of radionuclides and dangerous waste. Typical sources are process offgas condensates and ion exchange column washes (ref 12).

The radioactive, dangerous liquid effluents cannot be discharged directly into the soil column without treatment. The effluents are, therefore, required to be transported from the PC site boundaries to the Hanford Site LERF/ETF for storage, treatment, and disposal. The PCs shall discharge their waste streams into the liquid effluent transfer system within the current or negotiated future ETF treatability envelope (ref 6).

An encasement piping system (pipe-in-pipe) will be used to transfer radioactive, dangerous liquid effluent. The encasement pipe will prevent release of hazardous waste to the environment if a leakage from the primary pipe occurs. This line will be sloped to allow drainage, accumulation, and removal of liquids resulting from leaks or spills. A leak detection system will be installed in accordance with Washington Administrative Code (WAC), WAC-173-303 that is compatible with the system employed by the existing 242-A Evaporator condensate line (PC5000). Pull ports will be placed every 100 m for installation of the leak detection cable.

The radioactive, dangerous liquid effluent line will tie into the PC5000 which discharges to the LERF (see sketch ES-W506-C03). The PC5000 was installed under Project W-105, "LERF 242-A Evaporator Condensate Interim Retention Basin" (see drawing H-2-79604). The PC5000 is an encased, pipe-in-pipe system, 3-in. primary pipe with a 6-in. encasement. The new line will be the same size. The primary and encasement pipes are fiber-reinforced epoxy resin pressure pipe. The new lines will be of this same material to maintain consistency of chemical resistance of the system. The PC5000 was designed for a maximum operating pressure of 414 kPa (60 psi) and a maximum operating temperature of 49 °C (120 °F) as referenced in construction specification W-105-C3. The tie-in to the PC5000 must maintain the integrity of the existing system in regards to containment, leak detection, and testing requirements.

Based on a maximum velocity of 3 m/s (10 ft/s) to prevent erosion in accordance with DOE Order 6430.1A, Section 0270-1.3, the maximum discharge flowrate for the DN80 (3-in.) diameter fiberglass pipeline is 15 L/s (240 gpm).

The engineering study determined that two PC facilities combined will generate a total 100 000 m^3/yr, 3.15 L/s (50 gpm) average, of radioactive, dangerous liquid effluent. However, the TWRS Privatization contract commits DOE to accept 100 000 m^3/yr from each PC. The TWRS Privatization contract rate is a limiting figure acknowledged by the bidding PCs and RL during Phase I negotiations. The postulated volume is subject to further negotiation before the definitive design stage.

The LERF is located along the eastern perimeter of the 200-East Area north of the PC sites. The facility is used mainly as a Resource Conservation and Recovery Act (RCRA) permitable, low level, low hazard, interim liquid retention facility for 242-A Evaporator process condensate providing storage before subsequent processing in the ETF. The waste streams stored in LERF consist of 242-A Evaporator process condensate, N-Basin waste water, groundwater campaign, and miscellaneous wastes generated from laboratory and decommissioning operations. The groundwater campaign will end by 1999.

The ETF is located at the northeast corner of the 200-East Area and north of the LERF basin. The ETF treats and disposes of the inventory stored in the LERF basins. After treatment at the ETF, final disposal will be at the state-approved land disposal site, north of the 200-West Area.

The ETF is capable of treating a continuous flow of 9.5 L/s (150 gpm) at 72% total operating efficiency (TOE) based on the

current Evaporator condensate treatment schedule. The actual achievable flow rate may be less than this design target depending on the concentrations of the constituents of the effluent being treated. The Evaporator condensate inflow rate is typically around 3.78 L/s (60 gpm) for 2 mo/yr. The PC facilities are anticipated to generate an averaged flow of 3.15 L/s (50 gpm) of radioactive, dangerous liquid effluent (ref 3).

Administrative controls will be implemented as required to ensure that the design capacity of the PC5000 and the acceptance capability of the ETF are not exceeded. For example, the PCs may be required to alternate batch transfers. The control system could be used to interlock the pumps as a means of administrative control.

2. Nonradioactive, Nondangerous Liquid Effluents

The PC facilities are expected to generate aqueous nonradioactive, nondangerous effluent streams. The probable sources of the effluents are equipment washdowns and purge streams from cooling towers, steam boilers, and other equipment. Discharge of these streams to the TEDF will be after application of best available technology/all known, available, and reasonable treatment technologies (BAT/AKART).

The nonradioactive, nondangerous liquid effluent pipeline will tie into the "H-Line" (see sketch ES-W506-C03). The H-Line was installed under Project W-049H, "200 Area TEDF Collection System" (see drawing H-2-140342). The H-Line ties into the east-west cross-site disposal line which discharges into the TEDF (see drawing H-2-140323). The existing line is a 10-in. diameter polyvinyl chloride (PVC) pressure pipe; the new pipe will be of this same material to maintain consistency of the system, and will be a DN150 (6-in. diameter) line. The existing line was designed for a maximum operating pressure of 690 kPa (100 psi) and a maximum operating

temperature of 38 °C (100 °F) as referenced in construction specification W-049H-C1.

Based on a maximum velocity of 3 m/s (10 ft/s) the maximum discharge flow capability for the DN150 (6-in. diameter) PVC pipe is 53 L/s (840 gpm). The engineering study identified that the two PC facilities combined will generate a total 133 000 m^3/yr, 4.2 L/s (67 gpm) average of nonradioactive, nondangerous liquid effluent. However, the TWRS Privatization contract commits DOE to accept up to 300 000 m^3/yr 9.45 L/s (150 gpm) average from each PC. The TWRS Privatization contract rate is a limiting figure acknowledged by the bidding PCs and RL during Phase I negotiations. The postulated volume is subject to further negotiation before the definitive design stage.

The TEDF, a permitted state-approved land disposal site, provides the 18 km (11-mile) long collection piping and disposal systems for the 200 Areas treated effluent streams. The TEDF collects effluents from several facilities and discharges them to two rock-lined disposal ponds east of the 200-East Area. At these ponds, the effluent evaporates and infiltrates through the soil without any further treatment.

A flow of 12.6 L/s (200 gpm) from the Plutonium Uranium Extraction Facility (PUREX) down the H-Line has ceased now that PUREX is deactivated. The H-Line can, therefore, carry the additional effluent flow of 4.2 L/s (67 gpm) generated at two PC facilities beyond Fiscal Year 1997 and still have spare capacity (ref 3).

An effluent is required to be treated with the BAT/AKART at the PCs facility prior to discharge into the TEDF. The dispositioned liquid waste must meet the acceptance criteria and associated

administrative procedures of the TEDF, and meet discharge limits of State Waste Discharge Permit No. ST 4502.

C. SPECIAL EQUIPMENT/PROCESS SYSTEMS (700)

Instrumentation

The nonradioactive, nondangerous liquid effluent transfer pipeline to the TEDF will be monitored and recorded by each of the PCs for total flow (gpm), pH, and conductivity. The radioactive dangerous liquid effluent transfer pipeline to the LERF will be monitored and recorded by each PC for flow/total flow (gpm), pH, conductivity, and radioactivity in counts per minute (cpm). Process monitoring variables will be 4 to 20 mA analog signals generated by the PC process field instruments. The signals will be multiplexed and transmitted via phone modem utilizing a leased telephone line to the distributed control system (DCS) in the ETF control room (see sketch ES-W506-Y01).

A leak detection system will be installed in the encasement pipe of the radioactive dangerous liquid effluent transfer pipeline. The system will be microprocessor-based and operate on the principle of pulsed energy reflection. The system will be capable of locating a current leak; identifying multiple leaks; and eliminating spurious alarms caused by minor installation irregularities, static moisture, or condensation puddles.

The leak detection system will provide a hard-wired contact output to the PC facilities for annunciation and the shutdown of all associated effluent pumps. The system will also transmit an RS-232 protocol based signal to the ETF control room via phone modem utilizing a leased telephone line. The signal to the ETF control room will be sent to a computer that operates utilizing a windows-based operating system that will monitor and identify the location of a leak in the pipeline. In addition, signals can be initiated by the receiving facility for the shutdown of any transfer.

D. **OTHER PROJECT COSTS (900)**

Subproject W-505 will perform the survey to establish site contours. The subproject will also perform the scanning for underground lines to identify potential belowgrade interferences. Subproject W-505 will also be responsible for radiation survey work associated with the backfilling of the 216-A-29 ditch.

Subproject W-506 will be responsible for performing spot excavation to verify locations and elevations of utility line crossings in the vicinity of the tie-ins. This is normally performed by hand excavation or by using a vacuum-type excavating machine and excavating a small area through a pipe sleeve. Subproject W-506 will also identify the extent of radioactive contamination at the tie-in locations. A barricaded underground contamination area, adjacent to Canton Avenue, requires further investigation during definitive design.

The first 100 m of the pipeline route (Canton Avenue end) is assumed to involve radioactive contamination due to the crossing of an aged vitrified clay waste effluent line. Radiation survey and monitoring will be required in this area during the construction phase. For this conceptual design, it is assumed that the excavation and pipe installation at this location will be performed by onsite construction forces.

E. **DESIGN COMPLIANCE**

The design and construction of subproject W-506 will comply with the codes and regulations listed in the design requirements document (DRD) (ref 7). The degree of redundancy, reliability, and availability will correspond to a systematically-determined safety classification for all systems, structures, and components in accordance with DOE Order 6430.1A. Design of the effluent transfer piping will be based on the safety classification assigned to it. Materials will be compatible with the waste and the exposed environment. Use of materials that degrade in a radiation environment will be minimized. The design life of the system is 15 years.

V. METHODS OF PERFORMANCE

The methods of performance comply with the work breakdown structure (WBS) in Appendix A. The WBS indicates the major phases of work to be accomplished, i.e., engineering, construction, project management, and other project activities.

A. ENGINEERING (WBS 1.0)

Definitive Design (WBS 1.1)

The contracted engineer/constructor contractor will provide definitive design for subproject W-506.

Engineering and Inspection (WBS 1.2)

The contracted engineer/constructor contractor will provide project support for construction acceptance inspection, incorporate contractor as-build/ vendor submittals into the Hanford system, oversee walkthroughs and preparation of open items and exception lists, and support contract closing documentation.

B. PROCUREMENT (WBS 2.0)

N/A

C. CONSTRUCTION (WBS 3.0)

Force Account Construction (WBS 3.1)

The contracted engineer/constructor contractor will perform the site preparation work associated with the removal/burial of potentially or contaminated soil, along with the tie-in to the existing radioactive, dangerous line.

Fixed-Price Construction (WBS 3.2)

Construction work performed under fixed-price contracts includes the installation and testing of the effluent transfer lines. The work will be managed and administered by the contracted engineer/constructor contractor.

D. PROJECT MANAGEMENT (WBS 4.0)

The performance contractor is directly responsible to the PHMC for performing all activities associated with this project. The performance contractor will negotiate performance measures with the PHMC and manage and integrate overall infrastructure project plans, strategy documents, management of design/construction/startup activities and related PHMC interface activities, and engineering/technical support.

E. OTHER PROJECT COSTS (WBS 5.0)

The performance contractor will direct the resources necessary to perform the expense funded activities (other project costs) needed to implement subproject W-506:

Project Definition (WBS 5.1)

The performance contractor will provide electrical system integration including interface with the Integrated Product Teams (IPTs) and the Waste Integration Team (WIT), and preparation as well as maintenance of interface control documents (ICDs), and the DRD. Project definition also includes 230 kV system analysis to the BPA.

Conceptual Design (WBS 5.2)

The contracted engineer/constructor contractor will prepare a conceptual design report that will provide sufficient details for developing defensible cost estimates and a project schedule.

Project Technical Support (WBS 5.3)

This task includes the following activities:

- Support the conceptual phase of the project which included the generation of a DRD and a CDR.
- Preparation of validation documentation.
- Preparation of an engineering evaluation.
- Performance of unreviewed safety question screening.
- Provide input for integrated schedule.
- Preparation of project management plan.
- Preparation of quality assurance plan.
- Preparation of the safety and environmental documentation.
- Provide design input and reviews from cognizant plant personnel for definitive design.
- Provide support from plant personnel to generate and coordinate the documents necessary to obtain Washington State Department of Health (WDOH) approval of the design documents.
- Change control and records management support.
- Provide construction support, as required.
- Provide utilities support for system testing and startup including final tie-ins and operational testing.

Habitat Mitigation (WBS 5.4)

N/A

Engineering Evaluation (WBS 5.5)

The contracted engineer/constructor contractor will provide an engineering evaluation to determine if modifications are required to the CDR based on project site-specific data received from the PCs.

VI. REQUIREMENTS AND ASSESSMENTS

A. SAFEGUARDS AND SECURITY

Subproject W-506 is located within the Hanford Site with portions within the 200-East Security Area. A safeguards and security plan will be provided in accordance with PHMC procedures. This plan will be in effect at the time of construction.

B. HEALTH AND SAFETY

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

All excavation work will be performed in accordance with the WAC-296-155, Part N, "Excavation, Trenching and Shoring."

The constructor will provide an advance schedule to the patrol and to the fire department. A minimum 24-hr advance notification of any excavation work disrupting any roadway or other services will be required.

Risks associated with construction activities are to be considered and mitigated to the extent practical. In this regard, applicable DOE standards and regulations (as referenced in the DRD) will be complied with during

construction to minimize these risks. A primary hazard is the risk of radioactive contamination and exposure associated with the excavation and disposal of radioactive contaminated soil from the pipe trench, and exposure from existing waste transfer lines that are tapped or exposed by project excavation. The appropriate safety standards and procedures for removing, packaging, and disposing of contaminated soil and materials will be followed.

C. DECONTAMINATION AND DECOMMISSIONING

Radioactively-contaminated soil is known to be present in the vicinity of the tie-ins to the existing lines. It is planned that some of this soil, together with portions of an abandoned vitrified clay waste line, will be removed and disposed of as part of subproject W-506.

Final decontamination and decommissioning (D&D) of the effluent lines will be part of the overall 200-East effluent collection system D&D. The effluent lines and their components will be designed with smooth surfaces and other features which minimize potential for accumulation of contamination, therefore, facilitating future D&D efforts.

D. PROVISIONS FOR FALLOUT SHELTERS

Provisions for fallout shelters are not required for this project.

E. MAINTENANCE AND OPERATION REQUIREMENTS

All equipment and instruments will be designed to operate in the environment in which they are located and will be maintained with standard tools wherever practical. If special tools are required, the tools and instructions for use will be purchased with the equipment.

The piping is below grade and, therefore, should require minimal maintenance and have little impact on existing maintenance operations.

F. AUTOMATED DATA PROCESSING EQUIPMENT

Automated data processing equipment will not be required for this project.

G. QUALITY ASSURANCE/SAFETY CLASSIFICATION

1. Quality Assurance Activities

Minimum project quality attributes are included in the project DRD and will be incorporated into the project specific Quality Assurance Program Plan (QAPP). The QAPP will indicate the project critical characteristics, corresponding safety classification assignments, and programmatic controlling documents. The specific technical and quality programmatic requirements, material certifications, qualification and certification of personnel, inspections, examinations and testing, and applicable quality assurance records will be established during definitive design and included in design documents. Specifications will require controls to exclude misrepresented products.

Independent design verification may be required. Safety class items and services will be procured from qualified suppliers or designated as commercial grade items. Safety significant items and services will be procured from commercially available sources unless specific exception is noted during definitive design.

2. Safety Classification

Safety classifications will be identified for those structures, systems, and components, important to safety or environmental protection so that appropriate efforts will be placed on design, procurement, construction, testing, operation, maintenance, and modifications.

Safety classification criteria and methodology are defined in WHC-CM-4-46, "Non-Reactor Facility Safety Manual." Safety classifications are determined through analysis and consequences of

failure based on information contained in the project DRD. The resulting safety classifications form the basis for the Hanford design and quality assurance requirements applied to the project.

The original design drawings for the two existing lines show the following classifications: TEDF H-line: Safety Class 3 (see Drawing H-2-140342); PC5000: Impact Level 3 (see Drawing H-2-79604). The Unreviewed Safety Question (USQ) Screening established that subproject W-506 remains within the current authorization basis (see Appendix G). For this conceptual design effort, the highest level anticipated for any element of the subproject is General Services.

H. ENVIRONMENTAL COMPLIANCE

The design, installation, operation, and maintenance of the liquid effluent transfer system is affected by state and federal regulations, agreements, and PHMC requirements. In addition, there are many guidelines and specifications that set forth engineering requirements deemed necessary for safe design and construction of the liquid effluent system.

The lists below establish a hierarchy of documents to be used during the definitive design of the liquid effluent transfer system:

- DOE Order 6430.1A — General Design Criteria
- DOE Order 5820.2A — Radioactive Waste Management
- WAC-173-303 — Dangerous Waste Regulations
- WHC-IP-1043 — WHC Occupational ALARA Program
- WHC-SD-G-DGS-30011 — Radiological Design Guide
- WHC-CM-4-46 — Non-Reactor Facility Safety Manual

- WHC-SD-GN-DGS-30008 Design Loads for New Underground DSTs and Associated Underground Process Piping

The nonradioactive, nondangerous liquid effluents will be discharged into the TEDF, which does not have treatment or retention capability. Strict control at the generating facility interface is, therefore, essential for operating the TEDF in compliance with the following documents:

- DOE Order 5400.1 General Environmental Protection Program
- WAC-173-216 State Waste Discharge Permit Program
- Permit No. ST 4502 State Waste Discharge Permit
- WHC-SD-W049H-ICD-001 200 Area Treated Effluent Disposal Facility Interface Control Document

The radioactive, dangerous liquid effluent will be discharged into the LERF. The LERF is a passive facility that will receive the effluent for temporary storage and subsequent treatment at the ETF. The following documents set guidelines for acceptance of feed streams for treatment at the LERF/ETF complex:

- 40 CFR 268 Land Disposal Restrictions
- WHC-SD-W105-SAR-001 Liquid Effluent Retention Facility FSAR
- HNF-SD-ETF-ASA-001 200 Area Effluent Treatment Facility Auditable Safety Analysis Report (Draft)

• WAC-173-216	State Waste Discharge Permit Program
• DOE/RL-97-03	ETF/LERF Part B Permit Application
• Permit No. ST 4500	State Waste Discharge Permit
• 60 FR 31115	EPA Approval of Delisting Petition, DOE/RL-92-72
• WHC-SD-ETF-WAC-001	Acceptance of Feed Streams for Treatment at the LERF/ETF Complex

The existing operations of the LERF basin, the ETF, and final discharge of the treated effluents to the state-approved land disposal site are in compliance with the special and general conditions in the State Waste Discharge Permit No. ST 4500 and other applicable permits including the RCRA permit requirements. Additionally, air releases at the LERF and ETF are in compliance with applicable Ecology and WDOH permits. Permit modification is required for the discharge of ETF effluent to the state-approved land disposal site for new effluent stream from PC facilities. All technical information and analyses required to modify or comply with the existing permit to discharge effluent to the LERF basin will be submitted to RL by the PC.

The design and construction of subproject W-506 will comply with the following environmental regulations:

36 CFR 800	Protection of Historical and Cultural Properties
10 CFR 1021	National Environmental Policy Act (NEPA)

50 CFR 402	Interagency Cooperation - Endangered Species Act
DOE Order 5484.1	Environmental Protection, Safety, and Health Protection Information Reporting Requirements
WAC-173-216	State Waste Discharge Permit Program
WAC-173-303	Dangerous Waste Regulations
WAC-246-247	Radiation Protection-Air Emissions

Adherence to these regulations ensures that the environmental impacts are understood and properly mitigated, that cultural sites and artifacts are identified and protected, that ecological reviews have been completed and mitigation activities identified, and that required excavation permits are obtained.

A cultural review of the Phase I Infrastructure development work area was performed and documented. The review determined that cultural sites and artifacts do not exist on the surface and are not expected to be found in the subsurface areas that will be excavated. If, however, artifacts or cultural sites are uncovered or disturbed during excavation or grubbing, work must be halted until the find has been analyzed and properly mitigated.

The excavation activities for the effluent lines are not expected to be sources of toxic air pollutants or radioactive air emissions to the atmosphere. Therefore, air permits for these regulated air emissions are not required. If, however, surface or underground radioactive contamination is discovered, notification to the WDOH will be required to

ensure compliance with WAC-246-247. The WDOH may require a notice of construction (NOC) if underground radioactive material areas are discovered.

It is anticipated that subproject W-506 is within the current TWRS Environmental Impact Statement scope (ref 8). A supplemental analysis is scheduled for fiscal year 1998 to ensure that the activities planned are within the current documentation.

I. PERMITS

The WDOH may require a NOC if underground radioactive material areas are discovered during subproject W-505 activities.

The RCRA Final Status Permit (Part B) for the ETF/LERF is expected to be in force by mid-1998. Prior to the initiation of any construction activities, all proposed modifications to the effluent collection system that connects to the ETF/LERF must be approved by the Ecology. The cost for these modifications is accounted for in the project technical support portion of the estimate for subproject W-506 (WBS 5.0).

The RCRA Part B permit and other supporting permits for disposal of the ETF effluent will likely be affected by the introduction of the liquid effluents generated by the PCs into the collection system. Those impacts will be evaluated prior to the actual tie-in by the PCs and are not part of subproject W-506.

Prior to activation of effluent lines that tie into TEDF and ETF facilities, the WAC-173-216 permits will be modified to include the new sources (ref 9 and 10). These permit modifications are not part of subproject W-506.

J. UNREVIEWED SAFETY QUESTION

(See Appendix G).

K. POLLUTION PREVENTION/WASTE MINIMIZATION

Beginning January 1, 1997, all new projects having an estimated value at a General Plant Project level or higher and entering into conceptual design will utilize a checklist to document that pollution prevention/waste minimization (P2/WMin) has been considered in the development of the design package.

Through the use of a microcomputer program P2-EDGE, a P2/WMin opportunities list was prepared for subproject W-506 (ref 11). The list identifies those P2/WMin opportunities that are to be implemented and/or considered for further evaluation throughout the design and construction process.

A design checklist was developed during conceptual design that documents the evaluation of the items identified in the P2/WMin opportunities list for implementation and/or consideration. Sound engineering judgment based on experience was employed to determine those P2/WMin opportunities that will be implemented into the design and/or construction activities, and when. The P2/WMin opportunities list summary report and the design checklist are shown in Appendix K.

VII. IDENTIFICATION AND ANALYSIS OF UNCERTAINTIES

During the preparation of this CDR effort, several uncertainties were identified that impact the design and cost of the liquid effluent transfer systems. An engineering evaluation will be prepared during fiscal year 1998 to address these issues. The following sections identify these uncertainties, describe the assumptions made, and indicate how they were incorporated into the estimate.

A. EXTENSION OF LINES TO THE LERF FACILITY

The tie-in and utilization of the PC5000 is the most cost-effective and preferred method for the transfer of the radioactive dangerous effluent.

However, during the preparation of this CDR, several uncertainties were identified that could affect the decision to tie-in to the PC5000.

The main uncertainties in employing a tie-in are: the mixing of three different effluents prior to treatment will limit the ETF treatment capabilities; and the potential for exceeding the design capacity of the PC5000 and the related waste transfer system.

Due to the potential for these uncertainties to have a major impact on the project costs, it was determined to add an allowance in the estimate for the extension of a radioactive dangerous effluent line from each PC directly to the LERF (two separate lines). This would be in lieu of the PC5000 tie-in. In addition to the extension of the lines, the estimate allowance includes modifications to the LERF manifold system. These uncertainties should be resolved prior to the start of definitive design. The inclusion of this allowance at this time ensures that the project has identified the potential costs to accommodate these concerns.

LERF/ETF Treatment Capabilities

The unknown composition of the radioactive, dangerous liquid effluent will need to be defined prior to the start of definitive design. The acceptability of the waste at the LERF depends on its composition and, for this CDR, it is assumed that the PCs will provide whatever treatment is necessary to meet the LERF requirements. In addition, mixing of the wastes may limit the ability to utilize the most effective treatment process for a particular waste stream. As more is known about the PC waste composition, treatment options can be better defined. To provide for the optimum treatment flexibility at this time, the estimate includes an allowance for the extension of separate radioactive dangerous effluent lines to LERF.

PC5000 Evaporator Condensate Line Capacity

The amount of effluent to be discharged by the PCs is still uncertain. The DRD established PC maximum yearly flows. However, design flow rates,

such as peak and daily minimums and maximums, have not been established. A hydraulic analysis will be performed as part of the future engineering evaluation. The potential exists for the design capacity of the PC5000 to be exceeded by the discharge flows from the PCs, particularly when they discharge concurrently with the 242-A Evaporator. Administrative controls may be required such as, requiring the PCs to allow short-term reduction of their flows, or scheduling alternating batch transfers. If these controls are insufficient or unacceptable to the parties involved, or the flows are just too great, the extension of separate radioactive dangerous effluent lines to LERF would be required.

B. EVAPORATOR FACILITY PUMP MODIFICATIONS

An increase in backpressure in the PC5000, created when one or both PCs pump effluent, may impact the efficiency of the transfer pump at the Evaporator. The effects on the existing system will be investigated during definitive design to determine if modification to the Evaporator pump or the addition of control valves are required. The costs for any modifications will be part of subproject W-506. However, this item was not included in the estimate because it will not be a requirement if the two lines are extended to LERF as described in Uncertainty A. The cost of extending the lines greatly exceeds the cost of pump modifications, and only one or the other would be required.

C. LERF/ETF CAPACITY

The capability of the LERF/ETF to accept the PC wastes may be limited due to acceptance of wastes from other projects and depending on the schedule for discharge. Existing facilities may need to be expanded to provide additional storage or treatment capacity. However, this is out of the scope for this subproject.

D. TEDF COLLECTION SYSTEM CAPACITY

Other projects, such as the Packaged Boilers Project, are proposing to tie into the TEDF collection system. At this time, the impact on TEDF and its

collection system is unknown. The DRD established PC maximum yearly flows. However, design flow rates, such as peak and daily minimums and maximums, have not been established. A hydraulic analysis will be performed as part of the future engineering evaluation. Further investigation will be required to determine whether or not the TEDF will need to be expanded. This is not within the scope of subproject W-506.

E. PRIVATIZATION CONTRACTOR TIE-INS

The effluent tie-in points for both the PC facilities will be located at the west boundary of the PC sites. It was assumed for the conceptual design that the PC facilities will be arranged to release the effluents at this general location. If the arrangement of the PC facilities differs from this assumption, it may be necessary to extend the effluent lines to the east side of the PC site. This could result in significant additional earthwork and piping material costs which are not included in the estimate.

F. GROUND CONTAMINATION AT TIE-INS TO EXISTING SYSTEMS

The extent of ground contamination at the tie-in location has not been identified and could affect the routing of the liquid effluent lines. The extent of contamination at the 216-A-29 ditch could affect the routing of the liquid effluent lines if it is significantly greater than anticipated. An allowance has been provided in the estimate for the removal and disposal of contaminated soil at the tie-ins. It is intended that subproject W-505 will construct an embankment of clean soil to fill a portion of the ditch to minimize the potential for contacting contaminated soil.

G. INTERFERENCES WITH EXISTING LINES

The effluent piping layouts and cost estimates are based on reviews of existing plant drawings. Unforeseen interferences could occur if the drawings do not accurately reflect the elevation of existing piping. Prior scanning and potholing can minimize these uncertainties. Some of the existing lines in the tie-in vicinity are thought to be broken and/or abandoned. Further investigation of these lines will be done during

definitive design. Costs for scanning, potholing, and radiological surveys at the tie-in area have been included in the estimate.

H. PRESSURE TESTING OF LINES

The tie-in of the radioactive, dangerous line to the existing system will require some means to validate the integrity of the line at this connection. It may be necessary to pressure test the entire system (existing and new lines) which involves over 2 km of pipe. The cost for this testing has been included in the estimate. This will be investigated further in definitive design.

I. INTERFACING WITH PROJECT W-465

Project W-465, "Immobilized Low-level Waste Interim Storage Alternatives," proposes to use the existing adjacent grout vaults (west of the PC sites) as temporary waste storage facilities and proposes to construct an additional vault. Site grading for project W-465 could affect the contours of the surrounding land where the liquid effluent lines are to be installed, impacting design and costs.

J. INTERFACING WITH OTHER INFRASTRUCTURE PROJECT SUBPROJECTS

The schedule takes into account the integration of the construction of the effluent lines with that of the other utilities and services. It is anticipated that the initial clearing and grubbing of pipeline alignments will occur as part of the site preparation/road construction activities of subproject W-505. To avoid excavating into or through previously completed roadways, the construction of the underground lines should be completed prior to the need for final grading and paving of the roads. If the scheduling of the construction is done differently than proposed, the costs of all the infrastructure projects could be affected.

K. INSTRUMENTATION

Assumptions regarding the instrumentation are as follows:

- The interface between the leak detection system's field enclosure and the PC facility will not exceed 30 m (100 ft).

- The Liquid Waste Processing Facility operating staff will be responsible for monitoring and operating the pipeline.

- Both the PCs and the ETF control room will receive the instantaneous flowrate from the flow transmitter. Total flow will be calculated based on the flowrate.

L. TELECOMMUNICATION

Telecommunication services have not been addressed in the RFP. It is assumed that each PC will provide the necessary devices and connections to transmit the leak detection and control signals to the ETF control room.

M. EXISTING LEAK DETECTION SYSTEM

The existing leak detection system on the PC5000 line is a low-point leak detection system with probes every 1,000 ft. This differs from the continuous leak detection system to be installed for the subproject W-506 radioactive dangerous line. The existing leak detection system has a history of spurious alarms that have occasionally limited the operations at the Evaporator. The existing system will be interlocked so that both PC facilities and the Evaporator will be shut down if a leak detector activation occurs. The PHMC will be subject to penalties if the liquid effluent transfer systems are not available to the PC because of these shutdowns. Due to this potential impact on the PC operations, it was determined to upgrade the existing system during subproject W-506 definitive design. The cost of this upgrade will be part of subproject W-506. However, this item was not included in the CDR estimate because it will not be a requirement if the two lines are extended to LERF as described in

Uncertainty A. The cost of extending the lines greatly exceeds the cost of leak detection upgrades and only one or the other would be required.

VIII. REFERENCES

A. DOCUMENTS

1. Letter of Instruction No. 2, Subproject W-506, Tarik Choho (Numatec Hanford Company) to J. L. Henderson (Fluor Daniel Northwest, "TRWS Privatization Phase I Liquid Effluent Systems, NHC-9750686, January 31, 1997.

2. Site Evaluation Report, "Tank Waste Remediation System Privatization Phase I Site Evaluation Report," WHC-SD-WM-SE-023, Rev. 0A, prepared by Westinghouse Hanford Company, January 1996.

3. Engineering Study, "TWRS Privatization Phase I Liquid Effluent Transfer Systems Engineering Study," WHC-SD-WM-ES-396, Rev. 0, prepared by ICF Kaiser Hanford Company, September 1996.

4. Contract, "TWRS Privatization Contract," British Nuclear Fuels Limited (BNFL), DE-AC06-96RL13308, 1996.

5. Contract, "TWRS Privatization Contract," Lockheed Martin Advanced Engineering Services (LMAES), DE-AC06-96RL13309, 1996.

6. Criteria, "Acceptance of Feed Streams for Treatment at the LERF/ETF Complex," WHC-SD-ETF-WAC-001, Rev. 0, prepared by Westinghouse Hanford Company, October 1994.

7. Design Requirements Document, "TWRS Privatization Phase I Liquid Effluent Transfer Systems," WHC-SD-WM-DRD-014, Rev. 0, prepared by Westinghouse Hanford Company, September 1996.

8. Summary, "Environmental Impact Statement for TWRS Summary," DOE/EIS-0189D, prepared by U.S. Department of Energy, Richland Operations Office, 1996 (Draft).

9. Permit, "Effluent Treatment Facility/Liquid Effluent Retention Facility Dangerous Waste Permit Application," DOE/RL-97-03, Rev. 0, 1991.

10. Washington State Department of Ecology, State Waste Discharge Permits No. ST 4500 (June 1995) and No. ST 4502 (April 1995).

11. Microcomputer Program P2-EDGE, Version 2.0, "Pollution Prevention Environmental Design Guide for Engineers," Pacific Northwest National Laboratory, 1996.

12. Interface Control Document, "Interface Control Document for Radioactive, Dangerous Liquid Effluents," RDD-100-ICD-6, April 1996 (Draft).

13. Interface Control Document, "Interface Control Document for Untreated Liquid Effluents," WHC-SD-WM-ICD-038, Rev. 0, prepared by Westinghouse Hanford Company, January 1996.

14. Interface Control Document, "Interface Control Document for Treated Liquid Effluents," WHC-SD-WM-ICD-039, Rev. 0, prepared by Westinghouse Hanford Company, January 1996.

15. Interface Control Document, "200 Area Treated Effluent Disposal Facility Interface Control Document," HNF-SD-W049H-ICD-001, Rev. 4, prepared by Rust Federal Services of Hanford, Inc., May 1997.

16. Procedure, "Design Loads for New Underground DSTs and Associated Underground Process Piping," prepared by Westinghouse Hanford Company, WHC-SD-GN-DGS-30008, September 1993.

17. Technical Manual, "Technical Basis for the Liquid Effluent Retention Facility Operating Specifications," WHC-SD-W105-TM-001, Rev. 3, prepared by Westinghouse Hanford Company, May 1995.

18. **Construction Specifications**
W-049H-C1, Rev. 0, Piping and Pump System Collection System 200 Area Treated Effluent Disposal Facility (Divisions 2 through 16)

W-105-C3, Rev. 1, Piping and Electrical for 242-A Evaporator and PUREX Interim Retention Basin

B. CODES AND STANDARDS

1. **Code of Federal Regulation**
40 CFR 268, "Land Disposal Restrictions," as amended.

2. **Federal Register Notice**
60 FR 31115, "EPA Approval of the 200 Area Effluent Treatment Facility Delisting Petition, DOE/RL-92-72," 1995.

3. **U.S. Department of Energy Orders**
Order 5400.1, "General Environmental Protection Program."

Order 5820.2A, "Radioactive Waste Management."

Order 6430.1A, "General Design Criteria."

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

4. **Washington Administrative Codes**

WAC-173-216, "State Waste Discharge Permit Program."

WAC-173-303, "Dangerous Waste Regulations."

WAC-246-247, "Radiation Protection-Air Emissions."

WAC-296-155, "Safety Standards for Construction Work."

C. **DRAWINGS**

H-2-3330, Sh. 1, Rev. 5	PUREX Cooling Water Disposal to Gable Mt Pond 216-A-25 Plan & Profile (Part 6)
H-2-3333, Sh. 1, Rev. 3	PUREX Cooling Water Disposal to Gable Mt Pond 216-A-25 Details (Part 9)
H-2-44501, Sh. 69, Rev. 12	Area Map - 200 East A Plant Facilities
H-2-56000, Sh. 1, Rev. 4	216-A-34 Crib Line Proportional Sample Cond Cool H20 Discharge Plan & Profile
H-2-56156, Sh. 1, Rev. 2	Contact Condenser Installation Condensate & Cooling Water Plan & Profile
H-2-56797, Sh. 1, Rev. 1	241-A-401 Waste Cooling Water Plan and Profile

H-2-79604, Sh.1, Rev. 2	Piping Plot and Key Plans 242-A Evap Cond Stream
H-2-79608, Sh.1, Rev. 2	Piping Plan Sect & Det 242-A Evap Cond Stream
H-2-79609, Sh.1, Rev. 2	Piping Plans 242-A Evap Cond Stream
H-2-79610, Sh.1, Rev. 2	Piping Plan Retention Basins
H-2-79623, Sh.1, Rev. 2	Piping Profile 242-A Evap Cond Stream
H-2-88722, Sh. 1, Rev. 1	Civil Plan/Profile and Details 242A Tie In
H-2-88723, Sh. 1, Rev. 1	Civil Plan/Profile 12" Fire Water & 4" SW Lines
H-2-88723, Sh. 2, Rev. 2	Civil Plan/Profile 12" Fire Water & 4" SW Lines
H-2-140342, Sh. 1, Rev. 2	Civil Line H Sta 0+00 to Sta 32+23

APPENDIX A

Work Breakdown Structure

WORK BREAKDOWN STRUCTURE

1.0 ENGINEERING

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

2.0 PROCUREMENT (N/A)

3.0 CONSTRUCTION

- 3.1 Force Account Construction (Contracted Engineer/Constructor Contractor)
- 3.2 Fixed-Price Construction (Construction Contractor)

4.0 PROJECT MANAGEMENT (Performance Contractor)

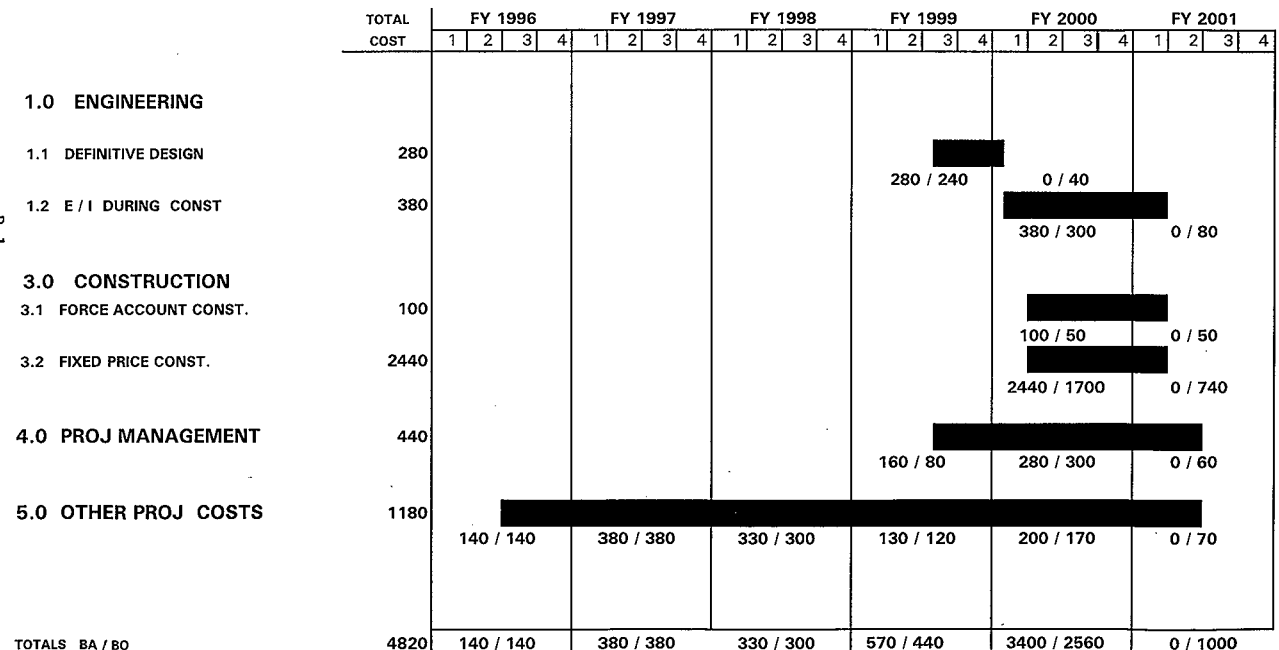
5.0 OTHER PROJECT COSTS (Expense Funded)

- 5.1 Project Definition (Performance Contractor)
- 5.2 Conceptual Design (Contracted Engineer/Constructor Contractor)
- 5.3 Project Technical Support (Performance Contractor)
- 5.4 Habitat Mitigation (N/A)
- 5.5 Engineering Evaluation (Contracted Engineer/Constructor Contractor)

APPENDIX B

Budget Authorized/Budget Outlay Schedule

SUB-PROJECT W-506
TWRS PRIVATIZATION PH. I LIQUID EFFLUENT TRANSFER SYSTEM
BA / BO
SCHEDULE



APPENDIX C

Cost Estimate Summary

FLUOR DANIEL NORTHWEST
NUMATEC HANFORD INC.
JOB NO. W-506/P2GG10

TWRS PRIVATIZATION PHASE I LIQUID EFFLUENT SYSTEM
CONCEPTUAL ESTIMATE
PROJECT COST SUMMARY

DATE 06/05/97

DESCRIPTION	MAN HOURS	COST	SALES TAX	OH&P B&I	CONTR OH&P	ESCLAT	CONT	PHMC ADDERS	TOTAL COST
	H	$	%	%	%	%	%	%	$
ENGINEERING:	6203	557686	0.00%	0.06%	0.00%	7.20%	7.01%	24.66%	832394
CONCEPTUAL DESIGN	0	173000	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	173000
DEFINITIVE DESIGN	2879	167758	0.00%	0.18%	0.00%	5.68%	20.00%	32.93%	283325
ENGINEERING AND INSPECTION	3324	216928	0.00%	0.00%	0.00%	8.39%	20.00%	33.29%	376069
CONSTRUCTION-FIXED PRICE:	0	1661895	0.23%	0.03%	5.35%	8.73%	6.53%	12.82%	2539376
CONSTRUCTION MANAGEMENT	0	292738	0.00%	0.00%	0.00%	8.73%	18.07%	34.26%	504582
FIXED PRICE CONSTRUCTION	0	1324932	0.21%	0.00%	6.71%	8.73%	18.00%	7.70%	1954734
ONSITE CONSTRUCTION FORCES	0	44225	2.53%	1.20%	0.00%	8.73%	20.00%	33.75%	80060
PROJECT MANAGEMENT:	5084	396742	0.00%	0.00%	0.00%	0.00%	10.00%	0.00%	436416
PROJECT MANAGEMENT	5084	396742	0.00%	0.00%	0.00%	0.00%	10.00%	0.00%	436416
OTHER PROJECT COST:	5626	949635	0.00%	0.00%	0.00%	0.43%	5.42%	0.00%	1011773
PROJECT DEFINITION	1935	263214	0.00%	0.00%	0.00%	0.00%	5.52%	0.00%	277735
PROJECT TECHNICAL SUPPORT	3691	636421	0.00%	0.00%	0.00%	0.00%	6.48%	0.00%	677663
ENGINEERING EVALUATION	0	50000	0.00%	0.00%	0.00%	2.50%	10.00%	0.00%	56375
SUB-TOTAL PROJECT COST	16913	$3,565,958	0.11%	0.02%	2.49%	4.98%	13.68%	10.25%	$4,819,959
ADJUSTED/ROUNDED									(19,959)
TOTAL PROJECT COST									$4,800,000

TYPE OF ESTIMATE	CONCEPTUAL ESTIMATE	JUNE 5, 1997	REMARKS:
FDNW LEAD ESTIMATOR	BPL	ESTIMATING MANAGER	
PROJECT MANAGER			
CLIENT			

WBS	DESCRIPTION	ESTIMATE SUBTOTAL	ESCALATION %	ESCALATION TOTAL	SUB TOTAL	CONTINGENCY %	CONTINGENCY TOTAL	SUB TOTAL	SITE ALLOCAT'N	TOTAL DOLLARS
110000	DEFINITIVE DESIGN	168067	5.68	9546	177613	20	35522	213135	70189	283325
120000	ENGINEERING AND INSPECTION	216928	8.39	18192	235120	20	47024	282144	93925	376069
SUBTOTAL 1	ENGINEERING	384995	7.20	27738	412733	20	82546	495279	164114	659394
310001	FINAL TIE-INS	7257	8.73	633	7891	20	1578	9469	3508	12977
310002	RADIOACTIVE EFFLUENT PIPING	52942	8.73	4621	57564	20	11512	69077	21364	90441
SUBTOTAL 31	ONSITE CONSTRUCTION FORCES	60200	8.73	5255	65455	20	13091	78546	24872	103419
326001	SITEWORK	96651	8.73	8437	105089	20	21017	126106	15013	141120
326002	RADIOACTIVE EFFLUENT PIPING	286674	8.73	25026	311701	21	66861	378563	45070	423633
326003	NON RAD PIPING	66462	8.73	5802	72265	20	14453	86718	10324	97042
326101	SITEWORK FOR EXCAVATED PIPE	34834	8.73	3041	37875	15	5681	43556	5185	48742
326102	SITEWORK FOR BERM FILLED PIPE	114506	8.73	9996	124503	15	18675	143178	17046	160225
326103	MISC SITEWORK FOR PIPE ROUTE	28326	8.73	2472	30799	10	3079	33879	4033	37912
326104	CATCH BASIN REWORK	468721	8.73	40919	509640	20	101928	611569	72811	684380
326105	ELECTRICAL/PIPING FOR LINE	602386	8.73	52588	654974	15	98246	753220	89676	842896
SUBTOTAL 3261	EXTRA PIPING TO LERF BASIN	1248775	8.73	109018	1357793	17	227611	1585404	188753	1774158
SUBTOTAL 326	W-506 FP CONSTRUCTION COST	1698564	8.73	148284	1846849	18	329943	2176792	259162	2435955
SUBTOTAL 3	CONSTRUCTION	1758764	8.73	153540	1912305	18	343034	2255339	284035	2539375
400000	PROJECT MANAGEMENT	396742	0.00	0	396742	10	39674	436416	0	436416
SUBTOTAL 4	PROJECT MANAGEMENT	396742	0.00	0	396742	10	39674	436416	0	436416
510000	PROJECT DEFINITION	263214	0.00	0	263214	6	14521	277735	0	277735
520000	CONCEPTUAL DESIGN	173000	0.00	0	173000	0	0	173000	0	173000
530000	PROJECT TECHNICAL SUPPORT	636421	0.00	0	636421	6	41242	677663	0	677663
550000	ENGINEERING EVALUATION	50000	2.50	1250	51250	10	5125	56375	0	56375
SUBTOTAL 5	OTHER PROJECT COSTS	1122635	0.11	1250	1123885	5	60888	1184773	0	1184773
PROJECT TOTAL		3,663,136	4.98	182,528	3,845,665	14	526,144	4,371,809	448,150	4,819,959

1. ESTIMATE PURPOSE

CONCEPTUAL COST ESTIMATE: THIS ESTIMATE WILL BE USED TO ESTABLISH THE PROJECT BUDGET(BASELINE).

2. ESTIMATE TECHNICAL BASIS

A. THIS ESTIMATE HAS BEEN PREPARED FOR THE W-506 PROJECT AS REQUESTED BY FDNW PROJECT MANAGEMENT AND NUMATEC HANFORD INC.
B. A DESCRIPTION OF THE TECHNICAL SCOPE OF WORK MAY BE FOUND IN THE FOLLOWING REFERENCE DOCUMENTS:
-CDR DATED JUNE 1997.
-REQUEST FOR ESTIMATE DATED MARCH 20, 1997.
C. THIS ESTIMATE UTILIZES AN ESTIMATE WORK BREAKDOWN STRUCTURE WHICH INTERFACES WITH THE PROJECT WORK BREAKDOWN STRUCTURE AS PROVIDED BY PROJECT MANAGEMENT/PROJECT CONTROLS.

3. ESTIMATE METHODOLOGY

A. DIRECT COSTS:
A BOTTOMS-UP TECHNIQUE HAS BEEN UTILIZED IN THE PREPARATION OF THIS ESTIMATE.
(1) CONSTRUCTION LABOR, MATERIAL AND EQUIPMENT UNITS HAVE BEEN ESTIMATED BASED UPON ONE OR MORE OF THE FOLLOWING STANDARD COMMERCIAL ESTIMATING RESOURCES, PUBLISHED ESTIMATING MANUALS/DATABASES: IN HOUSE DATABASES AND R.S. MEANS THE UNITS MAY HAVE BEEN FACTORED/ADJUSTED BY THE ESTIMATOR AS APPROPRIATE TO REFLECT INFLUENCES BY CONTRACT, WORK SITE, OR OTHER IDENTIFIED PROJECT OR SPECIAL CONDITIONS.
(2) THE DIRECT COSTS FOR NUMATEC HANFORD INC. HAVE BEEN PROVIDED TO FDNW PROJECT MANAGEMENT BY NHC PROJECT MANAGEMENT FOR INCLUSION INTO THIS ESTIMATE.

B. DIRECT COST FACTORS
(1) SALES TAX HAS BEEN APPLIED TO ALL MATERIALS AND EQUIPMENT PURCHASES AT 8%.
(2) AN ESTIMATING FACTOR OF 15% HAS BEEN APPLIED TO TOTAL FDNWS CONSTRUCTION CRAFT LABOR COST FOR GENERAL CONDITIONS AND A FACTOR OF 23.6% HAS BEEN APPLIED TO TOTAL FDNW CONSTRUCTION COST FOR TECHNICAL SERVICES.
(3) CONSUMABLES ARE ESTIMATED AT 3.2% OF DIRECT MATERIAL AND EQUIPMENT COSTS.
(4) GENERAL FOREMAN FACTOR OF 7% HAS BEEN APPLIED TO DIRECT CRAFT LABOR CREWS.
(5) CONTRACT ADMINISTRATION FACTOR OF 21.5% HAS BEEN APPLIED TO THE DIRECT CONTRACT VALUE WHICH INCLUDES COSTS FOR BID PACKAGE PREPARATION, CONTRACT MANAGEMENT & ADMINISTRATION & PLANNING SUPPORT.
(6) A FACTOR OF 10% HAS BEEN APPLIED TO DIRECT CRAFT LABOR AND 0.25% FOR HOME OFFICE ENGINEERING TO ALLOW FOR USAGE OF GOVERNMENT OWNED EQUIPMENT CONTROLLED BY DYNCORP.

C. INDIRECT COSTS
FIXED PRICE CONTRACTOR COSTS ARE UNIT PRICE AND THEY APPEAR IN SUBCONTRACT COLUMN AND INCLUDE OH&P.

D. RATES
(1) FLUOR DANIEL NORTHWEST LABOR RATES ARE BASED UPON THE FLUOR DANIEL FEDERAL OPERATIONS (FEDFO) DISCLOSURE STATEMENT. FOR ESTIMATING PURPOSES, AVERAGE RATES BY OPERATIONS CODE HAVE BEEN DEVELOPED BASED UPON RECENT COST HISTORY.
(2) FLUOR DANIEL NORTHWEST SERVICES (CONSTRUCTION CRAFT LABOR) RATES ARE THOSE LISTED IN APPENDIX A TO THE HANFORD SITE STABILIZATION AGREEMENT.
(3) FDH & PHMC SUBCONTRACTOR STANDARD LABOR RATES ARE THOSE LISTED IN THE FINANCIAL DATA SYSTEM (FDS) FDST 321R REPORT ORGANIZATION RATES PLUS ADDERS.

E. SITE ALLOCATIONS FACTORS

SITE ALLOCATION FACTORS ARE DEVELOPED AND PROVIDED BY FLUOR DANIEL HANFORD (FDH) FOR ESTIMATING USE.

(1) GOVERNMENT FURNISHED SERVICES RATE IS APPLIED TO ALL COSTS TO LIQUIDATE GOVERNMENT FURNISHED SERVICES PROVIDED TO THE ENTERPRISE COMPANIES: 14% FOR FDNW, 10% FOR FDNWS (CONSTRUCTION).
(2) HANFORD SITE G&A RATE OF 16.7% IS APPLIED TO ALL COSTS TO LIQUIDATE THE HANFORD GENERAL & ADMINISTRATIVE COSTS.
(3) HANFORD SITE MPR RATE OF 7.0% IS APPLIED TO ALL PURCHASED MATERIAL AND 7.7% TO ALL PURCHASED SERVICES TO LIQUIDATE THE COST OF PROCUREMENT (INCLUDING RECEIVING).

FDNW APPLIES THE ABOVE FACTORS TO ESTIMATED COSTS AS FOLLOWS:

(1) FDH GFS/G&A CM FACTOR: A COMPOSITE FACTOR OF 21.50% HAS BEEN APPLIED TO TOTAL FDNW FIXED PRICE CONSTRUCTION MANAGEMENT WHICH INCLUDES GOVERNMENT FURNISHED SERVICES (GFS) AND SITE G&A/FEE.
(2) FDH CM RATE FP CONST FACTOR: A G&A/FEE RATE FACTOR OF 7.7% HAS BEEN APPLIED TO THE FDNW FIXED PRICE CONSTRUCTION CONTRACT VALUE= 7.7%
(3) FDH GFS/G&A LABOR FACTOR: A COMPOSITE FACTOR HAS BEEN APPLIED TO TOTAL FDNW LABOR COSTS AS FOLLOWS: AE/CM COSTS = 33.04%, FDNWS CONSTRUCTION LABOR = 28.40%, FDNWS CONSTRUCTION MANAGEMENT LABOR = 33.04%, FDNW CONTRACT MANAGEMENT AND ADMINISTRATION = 21.50%
(4) FDH MPR/G&A MATERIAL FACTOR: A COMPOSITE FACTOR OF 24.87% HAS BEEN APPLIED TO TOTAL FDNW MATERIAL COST WHICH INCLUDE A MPR OF 7% AND MATERIAL G&A/FEE OF 16.7%

4. ESCALATION

ESCALATION PERCENTAGES WERE CALCULATED FROM THE JANUARY 1997 UPDATE OF THE ECONOMIC ESCALATION PRICE CHANGE INDICES FOR DOE CONSTRUCTION PROJECTS AS PUBLISHED BY THE "OFFICE OF INFRASTRUCTURE ACQUISITION" FM-50.

5. CONTINGENCY

A. DEFINITION OF CONTINGENCY AS PROVIDED BY DOE

"CONTINGENCY COVERS COSTS THAT MAY RESULT FROM INCOMPLETE DESIGN, UNFORESEEN AND UNPREDICTABLE CONDITIONS, OR UNCERTAINTIES WITHIN THE DEFINED PROJECT SCOPE. THE AMOUNT OF CONTINGENCY WILL DEPEND ON THE STATUS OF DESIGN, PROCUREMENT, AND CONSTRUCTION; AND THE COMPLEXITY AND UNCERTAINTIES OF THE COMPONENT PARTS OF THE PROJECT. CONTINGENCY IS NOT TO BE USED TO AVOID MAKING AN ACCURATE ASSESSMENT OF EXPECTED COST" (OFFICE OF WASTE MANAGEMENT (EM-30) COST AND SCHEDULE GUIDE.

7. CONTINGENCY ALLOWANCE GUIDELINES

THE DOE GUIDELINE CONTINGENCY ALLOWANCE FOR A CONCEPTUAL ESTIMATE -STANDARD= 15% TO 25%.

8. METHODOLOGY

CONTINGENCY IS EVALUATED AT THE LOWEST WORK BREAKDOWN STRUCTURE (WBS) LEVEL WITHIN THE COST ESTIMATE DETAILS. IT IS SUMMARIZED AT UPPER WBS LEVELS AND REPORTED ON THE SUMMARY REPORTS.

4. ANALYSIS

AN ASSESSMENT OF DESIGN MATURITY, WORK COMPLEXITY AND PROJECT UNCERTAINTIES HAS BEEN PERFORMED. AN EXPLANATION OF THIS ASSESSMENT AND CONTINGENCY RATES WHICH HAVE BEEN ADDED TO THE COST OF WORK ARE AS FOLLOWS:

WBS 1.1. A CONTINGENCY OF 20% HAS BEEN APPLIED BASED ON THE PRELIMINARY STAGE OF THE PROJECT AND INCOMING DATA FROM SUBCONTRACTORS FOR THE FACILITIES THAT ARE BEING DESIGNED TO SUPPORT THE PRIVATIZATION PHASE. MINOR DESIGN ALTERATIONS MAY BE REQUIRED TO FACILITATE THE PRIVATIZATION PHASE.
WBS 1.2. A CONTINGENCY OF 20% HAS BEEN APPLIED BECAUSE THE DOLLAR AMOUNT WAS DERIVED FROM CONSTRUCTION AS A PERCENTAGE, COMMENTS FROM W.B.S.SEE 31 AND 32.
WBS 3.1. A CONTINGENCY OF 20% HAS BEEN APPLIED BECAUSE AT THIS STAGE NO TESTS HAVE BEEN COMPLETED TO SEE THE AMOUNT OF RADIATION PRESENT. CONSTRUCTION COST COULD BE AFFECTED ONCE THESE TESTS ARE DONE, NO SWP FACTORS HAVE BEEN INC
WBS 3.2. A CONTINGENCY OF 18% HAS BEEN APPLIED DUE TO THE EARLY STAGES OF DESIGN. DESIGN CHANGES MAY IMPACT VARIOUS DISCIPLINES IN THE CONSTRUCTION PHASE.
WBS 4.0. A CONTINGENCY OF 10% HAS BEEN APPLIED AT THE CLIENTS REQUEST.
WBS 5.1. A CONTINGENCY OF 6% OVERALL HAS BEEN APPLIED AT THE CLIENTS REQUEST.
WBS 5.2. NO CONTINGENCY WAS APPLIED BECAUSE DOLLARS ARE FOR DESIGN THAT IS COMPLETE.
WBS 5.3. A CONTINGENCY OF 6% OVERALL HAS BEEN APPLIED TO OUTYEAR PER THE CLIENTS REQUEST.
WBS 5.4. A CONTINGENCY OF 10% WAS ADDED TO INVESTIGATE THE NEED FOR TIE-IN INTO CONTAMINATED LINE OR RUN SEPARATE LINES TO LERF. DUE TO THE POSSIBILITY THAT MORE THAN ONE STUDY WILL BE NEEDED 20% CONTINGENCY WAS APPLIED.

6. ROUNDING

THE PROJECT COST SUMMARY REPORT IS SUMMARIZED AND ADJUSTED/ROUNDED AS FOLLOWS:
THE ESCALATED TOTAL COST COLUMN, CONTINGENCY TOTAL COLUMN AND TOTAL DOLLARS COLUMN SUB-TOTALS ARE SUMMARIZED BY CONTRACTOR.
THE COLUMN SUBTOTALS ARE ADJUSTED/ROUNDED TO THE NEAREST $1,000/$10,000. THE PROJECT TOTAL SUMMARY LINE TOTALS ARE ADJUSTED/ROUNDED TO THE NEAREST $10,000/$100,000.

7. REMARKS

PER THE DIRECTION OF THE CUSTOMER (NUMATEC HANFORD INC.) THE PROJECT SUMMARY SHEET WAS MODIFIED TO REFLECT DISTRIBUTION OF BY ACTIVITY (I.E. ENGINEERING, CONSTRUCTION, AND PROJECT MANAGEMENT) FOR THE PROJECT.

MAJOR ASSUMPTIONS WHICH HAVE BEEN MADE IN THE PREPARATION OF THIS ESTIMATE ARE AS FOLLOWS:

A.) PHMC COST WERE SUPPLIED BY FDNW PROJECT MANAGEMENT AND NUMATEC.
B.) ASSUME ONSITE CONSTRUCTION FORCES WILL PERFORM THE FINAL TIE-INS OF THE RADIOACTIVE EFFLUENT LINE AND 100M BEYOND, WHICH INCLUDES MACHINE AND HAND EXCAVATION, BACKFILL, AND ASSOCIATED RISERS.
C.) ASSUME FIXED PRICE CONTRACTOR TO PERFORM ALL REMAINING CONSTRUCTION WORK.
D.) PIPING IS IN SAME TRENCH (DANGEROUS AND NON DANGEROUS).
E.) ENCASEMENTS HAVE BEEN INCLUDED FOR ALL ROAD CROSSINGS.
F.) ASSUME APROX. 20 FT OF POTENTIALLY CONTAMINATED 15" VCP PIPE TO BE REMOVED, COST FOR DISPOSAL IS INCLUDED IN PHMC COSTS.
G.) PORTIONS OF PROJECT W-505, MUST BE COMPLETED PRIOR TO PIPELINE INSTALLATION.
H.) OTHER PROJECT COSTS FOR PRIOR YEARS (FY96 AND 97) ARE BASED ON ACTUAL EXPENDITURES, FY97 BUDGETS AND CURRENT ESTIMATES TO COMPLETE. FY 98, 99, 00 AND 01 REFLECT THE LATEST INFORMATION FROM DESIGN REQUIREMENTS DOCUMENTS, STUDIES, AND PLANS COMPLETED TO DATE. COSTS PROVIDED BY NUMATEC FOR WBS 4.0, 5.1, 5.2, AND 5.3 ARE INCLUSIVE OF ESCALATION AND APPLICABLE TAXES PER NHC PROJECT MANAGEMENT. THE NUMATEC PROJECT MANAGERS' EXPERTISE AND EXPERIENCE WITH PREVIOUS PROJECTS, THE PREVIOUSLY COMPLETED LIFE COST CYCLE COST ESTIMATE, AND HISTORICAL DATA FROM PREVIOUSLY COMPLETED PROJECTS HAVE BEEN USED TO DERIVE THE ESTIMATED COSTS. DETAILED PLANNING FOR THESE ACTIVITIES WILL BE REFLECTED IN THE PHMC FY 98 MULTIYEAR WORK PLAN.

WBS	DESCRIPTION	ESTIMATE SUBTOTAL	CONSTRUCTION MANAGEMENT %	CONSTRUCTION MANAGEMENT TOTAL	OTHER COSTS	SUB TOTAL	TOTAL
110000	DEFINITIVE DESIGN	168067	0.00	0	0	0	168067
120000	ENGINEERING AND INSPECTION	216928	0.00	0	0	0	216928
SUBTOTAL 1	ENGINEERING	384995		0	0	0	384995
310001	FINAL TIE-INS	5873	23.58	1384	0	1384	7257
310002	RADIOACTIVE EFFLUENT PIPING	43502	21.70	9440	0	9440	52942
SUBTOTAL 31	ONSITE CONSTRUCTION FORCES	49375		10825	0	10825	60200
326001	SITEWORK	80610	19.90	16041	0	16041	96651
326002	RADIOACTIVE EFFLUENT PIPING	239095	19.90	47579	0	47579	286674
326003	NON RAD PIPING	55432	19.90	11030	0	11030	66462
326101	SITEWORK FOR EXCAVATED PIPE	29053	19.90	5781	0	5781	34834
326102	SITEWORK FOR BERM FILLED PIPE	95502	19.90	19004	0	19004	114506
326103	MISC SITEWORK FOR PIPE ROUTE	23625	19.90	4701	0	4701	28326
326104	CATCH BASIN REWORK	390927	19.90	77794	0	77794	468721
326105	ELECTRICAL/PIPING FOR LINE	502407	19.90	99979	0	99979	602386
SUBTOTAL 3261	EXTRA PIPING TO LERF BASIN	1041514		207261	0	207261	1248775
SUBTOTAL 326	W-506 FP CONSTRUCTION COST	1416651		281913	0	281913	1698564
SUBTOTAL 3	CONSTRUCTION	1466026		292738	0	292738	1758764
400000	PROJECT MANAGEMENT	396742	0.00	0	0	0	396742
SUBTOTAL 4	PROJECT MANAGEMENT	396742		0	0	0	396742
510000	PROJECT DEFINITION	263214	0.00	0	0	0	263214
520000	CONCEPTUAL DESIGN	173000	0.00	0	0	0	173000
530000	PROJECT TECHNICAL SUPPORT	636421	0.00	0	0	0	636421
550000	ENGINEERING EVALUATION	50000	0.00	0	0	0	50000
SUBTOTAL 5	OTHER PROJECT COSTS	1122635		0	0	0	1122635
PROJECT TOTAL		3,370,398		292,738	0	292,738	3,663,136

WBS	DESCRIPTION	ESTIMATE SUBTOTAL	DYN EQ.USAGE	FDH GFS/G&A CONST.MGMT	FDH MPR F.P./S.C.	FDH GFS/G&A LABOR	FDH MPR/G&A MATERIAL	SITE ALLOC SUBTOTAL
110000	DEFINITIVE DESIGN	168067	415	0	0	54931	0	55347
120000	ENGINEERING AND INSPECTION	216928	542	0	0	71673	0	72215
SUBTOTAL 1	ENGINEERING	384995	957	0	0	126604	0	127562
310001	FINAL TIE-INS	5873	570	457	0	1619	41	2688
310002	RADIOACTIVE EFFLUENT PIPING	43502	2449	3119	0	6948	3857	16374
SUBTOTAL 31	ONSITE CONSTRUCTION FORCES	49375	3020	3576	0	8567	3898	19062
326001	SITEWORK	80610	0	5300	6206	0	0	11507
326002	RADIOACTIVE EFFLUENT PIPING	239095	0	15720	18410	0	0	34130
326003	NON RAD PIPING	55432	0	3644	4268	0	0	7912
326101	SITEWORK FOR EXCAVATED PIPE	29053	0	1910	2237	0	0	4147
326102	SITEWORK FOR BERM FILLED PIPE	95502	0	6279	7353	0	0	13632
326103	MISC SITEWORK FOR PIPE ROUTE	23625	0	1553	1819	0	0	3372
326104	CATCH BASIN REWORK	390927	0	25703	30101	0	0	55804
326105	ELECTRICAL/PIPING FOR LINE	502407	0	33033	38685	0	0	71718
SUBTOTAL 3261	EXTRA PIPING TO LERF BASIN	1041514	0	68479	80196	0	0	148675
SUBTOTAL 326	W-506 FP CONSTRUCTION COST	1416651	0	93144	109082	0	0	202226
SUBTOTAL 3	CONSTRUCTION	1466026	3020	96720	109082	8567	3898	221289
400000	PROJECT MANAGEMENT	396742	0	0	0	0	0	0
SUBTOTAL 4	PROJECT MANAGEMENT	396742	0	0	0	0	0	0
510000	PROJECT DEFINITION	263214	0	0	0	0	0	0
520000	CONCEPTUAL DESIGN	173000	0	0	0	0	0	0
530000	PROJECT TECHNICAL SUPPORT	636421	0	0	0	0	0	0
550000	ENGINEERING EVALUATION	50000	0	0	0	0	0	0
SUBTOTAL 5	OTHER PROJECT COSTS	1122635	0	0	0	0	0	0
PROJECT TOTAL		3,370,398	3,977	96,720	109,082	135,172	3,898	348,851

WBS	DESCRIPTION	SITE ALLOC SUBTOTAL	ESCALATION %	ESCALATION TOTAL	SUB TOTAL	CONTINGENCY %	CONTINGENCY TOTAL	TOTAL DOLLARS
110000	DEFINITIVE DESIGN	55347	5.68	3143	58491	20	11698	70189
120000	ENGINEERING AND INSPECTION	72215	8.39	6056	78271	20	15654	93925
SUBTOTAL 1	ENGINEERING	127562	7.21	9199	136762	20	27352	164114
310001	FINAL TIE-INS	2688	8.73	234	2923	20	584	3508
310002	RADIOACTIVE EFFLUENT PIPING	16374	8.73	1429	17803	20	3560	21364
SUBTOTAL 31	ONSITE CONSTRUCTION FORCES	19062	8.73	1664	20726	20	4145	24872
326001	SITEWORK	11507	8.73	1004	12511	20	2502	15013
326002	RADIOACTIVE EFFLUENT PIPING	34130	8.73	2979	37110	21	7960	45070
326003	NON RAD PIPING	7912	8.73	690	8603	20	1720	10324
326101	SITEWORK FOR EXCAVATED PIPE	4147	8.73	362	4509	15	676	5185
326102	SITEWORK FOR BERM FILLED PIPE	13632	8.73	1190	14823	15	2223	17046
326103	MISC SITEWORK FOR PIPE ROUTE	3372	8.73	294	3666	10	366	4033
326104	CATCH BASIN REWORK	55804	8.73	4871	60676	20	12135	72811
326105	ELECTRICAL/PIPING FOR LINE	71718	8.73	6261	77979	15	11696	89676
SUBTOTAL 3261	EXTRA PIPING TO LERF BASIN	148675	8.73	12979	161655	17	27098	188753
SUBTOTAL 326	W-506 FP CONSTRUCTION COST	202226	8.73	17654	219880	18	39282	259162
SUBTOTAL 3	CONSTRUCTION	221289	8.73	19318	240607	18	43427	284035
400000	PROJECT MANAGEMENT	0	0.00	0	0	0	0	0
SUBTOTAL 4	PROJECT MANAGEMENT	0	0.00	0	0	0	0	0
510000	PROJECT DEFINITION	0	0.00	0	0	0	0	0
520000	CONCEPTUAL DESIGN	0	0.00	0	0	0	0	0
530000	PROJECT TECHNICAL SUPPORT	0	0.00	0	0	0	0	0
550000	ENGINEERING EVALUATION	0	0.00	0	0	0	0	0
SUBTOTAL 5	OTHER PROJECT COSTS	0	0.00	0	0	0	0	0
PROJECT TOTAL		348,851	8.17	28,518	377,370	19	70,780	448,150

STATEMENT OF WORK
FOR
PERFORMANCE CONTRACTOR - OTHER PROJECT COSTS

SUB-PROJECT W-506

TWRS Privatization Phase I - Liquid Effluent Transfer System

I. OBJECTIVE

The PHMC performance contractor shall provide project support services to the U. S. Department of Energy, Richland Operations Office (RL) from the project's inception through completion of construction and project closeout. In addition to project management/project engineering covered by capital funding (FY 99 & 2001), other tasks are identified here within the scope of the performance contractor under the heading of Other Project Costs.

The objective of this Statement of Work is to further describe and delineate these tasks for this sub-project.

II. TASKS

A. Project Definition

Principally provides integration of the sub-project with the interfacing organizations established to implement the TWRS Phase I Privatization contract.

a. Systems Integration (FY 96, 97, 98, 99, 00)

1. Support Integrated Product Teams (IPTs) established per the Phase IA contact around KEY M&I/Privatization Contractor (PC) interfaces.

2. Support the Waste Integration Team (WIT) established per the Phase IA contract to direct the Phase I effort. Tasks include providing technical information, expertise, etc. necessary in contract negotiations and execution.

3. Maintenance/refinement and updating of Interface Control Documents (ICD), Interface Control Drawings, (ICDwgs), Design Requirement Documents (DRD) based upon IPT negotiations and the reconciliation/closure of ICD 'issues'.

4. Maintenance/revision of the TWRS Systems Engineering Functional Requirements Database (FRDB) through issuance of change Requests based upon IPT negotiations and the reconciliation of ICD 'issues'.

B. Conceptual Design

The Conceptual Design Report for this project has been funded and will be completed in FY 97. A related Engineering Study and Design Requirements Document were funded and completed in FY 96.

C. Project Technical Support

In prior year costs and FY 98, this task includes the project management, project control & reporting, administrative tasks and activities required to manage the project during the expense funded years prior to actual start of construction and during startup.

Activities include:

- Preparation and update of PBS
- MYWP Planning
- Project Management Plan
- Project reporting and performance monitoring and analysis
- Project Control and Cost/Schedule interfaces
- Establishment and maintenance of Change Control for the Project
- Input and Updates to FM-20 reviews
- Clerical Support as required
- Key Decision and Project Validation support

General Technical Support of activities required by the sub-project for the life of the project are also included. Due to the tight schedule constraints, this task also includes the preparation of Task Orders, Letters of Instruction, etc. for definitive design and other related tasks during FY 98. These other related tasks include:

- Technical leadership, monitoring and reporting
- Preparation of project documentation including Construction Project Data Sheets, Total Project Cost Estimates and Project Schedules
- Establish and maintain project files and provide for records management support for project data
- Prepare Letter of Instruction directing definitive design.
- Perform and direct all safety, environmental and permitting activities, reviews and technical issues related to the sub-project.
- Provide Radiation Protection Technician (HPT) support as required by the sub-project.
- Provide for startup activity support
- Provide for turnover of project to operating organization
- Provide for official project closeout activities

Specific Technical Support for activities directed by the Project Engineer include:

- Engineering Assessments due to Privatization contract changes
- Liquid Effluent Transfer Systems Engineering/Reviews
- Environmental Reviews
- Infrastructure Design Review Support
- USQ and other safety related support

- Excavation Permitting activities
- Operations reviews and support as required
- ATP, OTP, ORR support as required
- Quality Assurance Planning and Implementation
- Safety Planning and Implementation
- Authorization Basis Review/Modification

Miscellaneous support includes multi-media/duplicating resources, supplies, computer software requirements and desktop support, travel and training as required by the sub-project.

ENGINEERING STATEMENT OF WORK

PROJECT NO./TITLE : W-506, TWRS Privatization Phase I
Liquid Effluent Transfer Systems

WORK ORDER : E23393
LE : Ann S. Langevin (Civil)
Mark A. Friedrich (Control Systems)
PLE : David L. Fort
PM : Brian C. Harmon

PROJECT SCOPE:

Subproject W-506 is one of four subprojects that make up the TWRS Privatization Infrastructure Project. These four subprojects together develop the site infrastructure for the support of privatization of Hanford Site waste treatment.

Subproject W-506 provides Civil design for the installation of two liquid effluent transfer lines, which transfer waste from the privatization contractor's sites to waste treatment facilities. The two effluent lines are: radioactive/dangerous, and non-radioactive/non-dangerous.

RESPONSIBILITIES:

Engineering, Design/Drafting and Checking will be performed by individuals from FDNW. The A/I and Construction Management services will also be performed by FDNW.

REFERENCES

Conceptual Design Report
Engineering Study
Master Site Plan

DELIVERABLES:

1. Civil Drawings (twelve).
2. Construction Specification W-506-C1.
3. Engineering Change Notice (ECN) to modify existing ETF I/O Drawing

CRITERIA DOCUMENTS:

DOE 6430.1A - General Design Criteria.
Design Requirements Document (dated Sept 1996)

ASSUMPTIONS:

1. A DOE 6430.1A checklist will not be provided
2. Highest Safety Class Level is General Services.
3. Hours are included for the extension of two radioactive dangerous lines to the LERF basin. This would be done in lieu of the tie-in to the existing PC5000 line and H line. This is the most costly assumption and therefore the most conservative for planning purposes.
4. Hours for modifications to the Evaporator Pump system are not included. This is a potential requirement if the existing PC5000 line is tied into, however the costs for this will be significantly less than the extension of two rad/dang lines to the LERF basins.
5. PC facilities will be arranged to release waste on the west side of their land parcels.
6. Extent of radioactively contaminated soil will not preclude pipe routing through these areas.
7. If tie-ins to the existing lines (PC5000 and H-Line) are precluded by other projects, by the waste composition, or the volume of waste produced by the PCs, these items will be defined prior to the start of definitive design.
8. The design and construction of the other three subprojects will be coordinated to allow the most cost effective design. W-505 will perform the preliminary grading of the pipe route.
9. Environmental permitting activities are performed by others.
10. Installation of leak detection system will be shown on Civil drawings.

MILESTONES AND TARGET DATES:

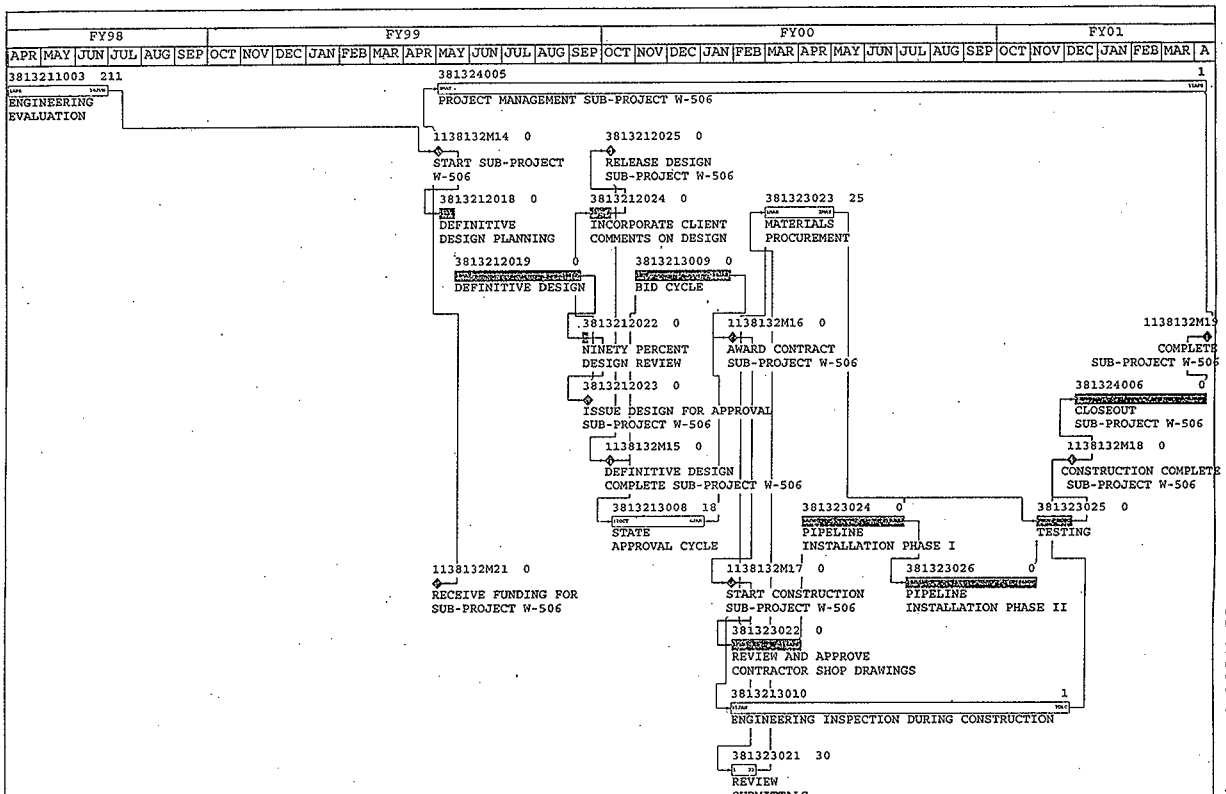
The design is scheduled for Fiscal year 1999.

RESTRAINTS:

1. Potential for radioactive contaminated soils exist.
2. Schedule will be directly impacted by our ability to receive the field data reports in a timely manner, i.e. scanning, potholing survey information.

APPENDIX D

Conceptual Project Schedule



Plot Date	4JUN97
Data Date	29DEC97
Project Start	29DEC97
Project Finish	1FEB02

(c) Primavera Systems, Inc.

Activity Bar/Early Dates
Critical Activity
Progress Bar
Milestone/Plag Activity

WSOR Sheet 1 of 1

SUB-PROJECT W-506 CONCEPTUAL SCHED.
PRIVATIZATION PHASE I
LIQUID EFFLUENT SYSTEM

FDNW

Date	Revision	Checked	Approved
6/4/97	Rev. 0		

APPENDIX E

Outline Specification

OUTLINE SPECIFICATION

DIVISION 2 - SITEWORK

Section 02200 Earthwork

1. Removal of existing contaminated soil at tie-in location.

2. Trenches for underground piping.

3. Shore excavations deeper than 1 meter (4 feet), if side slopes are steeper than 1-1/2 to 1 ratio.

4. Backfill

   a. Structural: Under pipelines; well graded soil mixtures with 75 mm (3-inch) maximum cobble size, compact to 95% of the maximum density as determined by compaction control tests.

   b. Common: Well graded soil mixtures with 200 mm (8-inch) maximum cobble size, compact each layer with 1 pass of vibratory roller.

   c. Bedding for underground pipe: Excavated sandy material having less than 20% gravel particles (by volume) and maximum dimension of 12 mm (1/2-inch). Place bedding material in area from 100 mm (4 inches) below the pipe and up to 300 mm (1 foot) above the pipe.

5. Finish grading and stabilization of disturbed areas with 50 mm (2-inch) minus gravel or locally available natural grass mixture.

6. Plastic sheet marker for buried pipe and conduit: 150 mm (6-inch) wide detectable tape.

7. Flexible Route Markers: Aboveground markers with barbed anchors at embedment end.

8. Earthwork shall be performed in accordance with WDOT M 41-10, Division 2.

Section 02650 Piped Utilities

PIPE CODE P-1			
Service	Max Operating Pressure	Test Pressure	Max Operating Temp
Non-Radioactive Non-Dangerous	690 kPa (100 psig)	1034 kPa (150 psi)	38 °C (100 °F)
Sizes	DN80 (6")		
Pipe	PVC in accordance with AWWA C900.		
Joints	Elastomeric-gasket joints in accordance with AWWA C900.		
Wall Thickness	Class 150		
Fittings	Steel: Cast iron or ductile iron Class 150 in accordance with AWWA C110 with cement lining in accordance with AWWA C104 and mechanical or push-on joints in accordance with AWWA C111. PVC: In accordance with AWWA C907.		
Compression Couplings	Compression type similar to, Dresser Style 38, 138, or 153 or approved substitute.		
Nuts and Bolting	Carbon steel heavy hex series bolts, ASTM A 307, and heavy hex nuts, ASTM A 563.		
Gaskets	Use full face gaskets with flat face flanges. Compressed synthetic fiber, 1.6 mm (1/16") thick, Anchor Packing #443 or approved substitute.		
Water Stops	Fernco concrete manhole adaptors or approved substitute.		

DIVISION 13 - SPECIAL CONSTRUCTION

Section 13400 Measurement and Control Instrumentation

1. Leak Location/Detection System: Range 0-5000 ± ft; output 2 SPDT relays rated 10 Amp at I25 V ac; RS232 communication port; power 120 V ac 60 Hz; Perm-alert PAL-AT Model AT 20C, PAL-COM software.

2. Modem: 2- or 4-wire full-duplex lease line; modulation compatible with CCITT V.32bis and V.32; data rate 9600 bps; power requirements 115 V ac ± 10%, 60 Hz.

3. Multiplexer/De-multiplexer: 16 input/output channels configure to accept any combination of analog and/or discrete signals; converter to send signal over dial-up modem; modem accessory; 24 V dc power supply.

DIVISION 15 - MECHANICAL

Section 15491 Power Piping Systems

PIPE CODE M-17		
Service	Max Operating Pressure	Max Operating Temp
ENC (encasement)	414 kPa (60 psig)	49 °C (120 °F)
Radioactive Dangerous (Primary)	414 kPa (60 psig)	49 °C (120 °F)
Sizes	DN80 (3") primary pipe DN150 (6") encasement pipe	
Pipe	Centrifugally cast, fiberglass-reinforced epoxy thermoset resin pressure pipe as designated in ASTM D 2997 classification RTPR Type II, Grade 1, Class C, minimum 30 mil pure resin corrosion barrier, and a constant IPS OD. Both the carrier pipe and containment pipe are similar to FIBERCAST DUALCAST double containment piping system using CENTRICAST III EP carrier and containment pipe.	
Wall Thickness	DN80, 2.4 mm (0.096") DN150, 3.0 mm (0.118")	
Fittings Double Containment	Fittings shall have the same working pressure or greater than the piping material in the piping system. Fittings shall be compression or contact molded with integral sockets, and of the same resin systems as the pipe. The fittings shall be factory assembled and shall include the inner carrier fitting and outer containment fitting as a single unit. Clam-shell fittings shall not be permitted. Fittings are similar to FIBERCAST DUALCAST double containment pipe fittings.	
Flanges	Fiberglass-reinforced epoxy thermoset resin with pressure rating equal or greater than piping material. Flat face socket weld, bolthole pattern in accordance with ANSI B16.5 for Class 150. Flanges shall be from the same manufacturer as the piping given above.	
Bolting	Alloy shell studs, ASTM A 193, Grade B8 and heavy hex nuts, ASTM A 194, Grade 8F.	
Inner Supports	The inner carrier pipe shall be centered and supported by pipe centering supports of the same manufacturer as the pipe. Support spacing shall conform to the unsupported span requirements as specified by the manufacturer.	
Adhesive Materials	Joint adhesives and bonding materials shall be of the same manufacturer as the pipe and fittings and shall be of the same resin system. Adhesives shall be applied in accordance with manufacturer recommendations.	

APPENDIX F

Energy Conservation Report and Analysis

(Waived per DOE letter, 96-WDD-154)

APPENDIX G

Unreviewed Safety Question Evaluation

(Provided by Project Hanford Management Contractor)

An Unreviewed Safety Question Screening/Determination has been completed based on the project Design Requirements Document and the Engineering Study. It was determined that the project is bounded by existing safety analyses and is within the current Authorization Basis. Therefore, a Preliminary Safety Evaluation is not required.

PROJECT W-506
CONCEPTUAL DESIGN
UNREVIEWED SAFETY QUESTION

An Unreviewed Safety Question (USQ) screening/evaluation was performed using the Project W-506 Design Requirements Document (reference 1) and the W-506 Engineering Study (reference 2). During performance of the USQ screening/evaluation, LW-97-014, it was determined that adding piping to the existing Liquid Waste Processing Facilities (LWPF) effluent transfer system is within the current LWPF Authorization Basis; 242-A Evaporator/Crystallizer Safety Analysis Report (WHC-SD-WM-SAR-023, Rev 2-C) and Final Safety Analysis Report: 242-A Evaporator Liquid Effluent Retention Facility (WHC-SD-W105-SAR-001, Rev. 0-D).

Project W-506 is in place to provide effluent tie-ins for the privatization sites. The new portion of the radioactive dangerous waste effluent transfer system will be double encased, similar in design to the existing effluent system. The non-dangerous non-radioactive effluent line will be non-encased. Since the project based the design on existing effluent radiological and toxological composition requirements, and the design is similar to the existing system, it was determined from the USQ screening/evaluation that the design is within the current Authorization Basis. No further evaluation needs to be performed at this time per the outcome of the USQ screening/evaluation.

Prior to actual facility modification, additional USQ screening/evaluations will need to be revisited and potentially revised. The reason for revisiting the USQ screening/determination is to ensure that the assumptions remain valid for any new Authorization Basis documentation that might exist at time of construction. Additional USQ screening/evaluations might be required depending on Safety Analysis outcome for the Privatization Facilities. Subsequently, updates of Authorization Basis documentation may be required to assure accuracy of facility descriptions.

References:

(1) WHC-SD-WM-DRD-014, Rev. 0, *Design Requirements Document for Privatization Phase I Liquid Effluent Transfer Systems*, September 30, 1996

(2) WHC-SD-TWR-ES-396, Rev. 0, *TWRS Privatization Phase I Liquid Effluent Transfer Systems Engineering Study*, September 30, 1996

UNREVIEWED SAFETY QUESTION SCREENING/Evaluation FORM	Page 1 of 7
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Facility: [X] 242-A [X] LERF

ECN No. PCA No.

Work Pkg No. Other (Specify) Project W-506

TITLE: LIQUID EFFLUENT SYSTEMS FOR TWRS PRIVATIZATION PHASE I - W-506

Description of the proposed activity/REPORTABLE OCCURRENCE or PIAB:

Project W-506 is in place to provide liquid effluent transfer systems to the TWRS privatization facilities. The proposed activity consists of adding piping to the existing Liquid Waste Processing Facilities (LWPF) liquid effluent transfer system and thereby tapping into existing resources.

Introduction:

In pursuing Hanford Site cleanup efforts, the U.S. Department of Energy (DOE) has decided to privatize the treatment and disposal of radioactive hazardous waste that is contained in Hanford's underground storage tanks. In the privatization effort, vendors will design, permit, construct, operate, and deactivate their own equipment and facilities. The privatization activities have been divided into two phases. Phase I will demonstrate the effectiveness of the privatization via treatment of a small portion (less than 13%) of Hanford's mixed waste. Once demonstrated, Phase II will be implemented to treat and dispose of the remainder of the waste.

As part of the privatization contract, DOE has committed to process liquid effluent produced by the vendor. Project W-506 is in place to provide liquid effluent transfer systems to the Tank Waste Remediation System (TWRS) privatization sites. The TWRS privatization contractor (PC) will produce two liquid effluent streams: 1) radioactive dangerous liquid and 2) non-radioactive non-dangerous liquid.

It is expected that the PCs combined will generate a total of 100,000 cubic meters per year (50 gpm) of radioactive dangerous liquid effluent (WHC 1996b). Project W-506, TWRS Privatization Phase I Liquid Effluents Systems, will tie into the existing 200 East Area Liquid Effluent Retention Facility (LERF). The LERF is located along the eastern perimeter of the 200 East Area. The facility is used mainly as a RCRA permitted, low level, low hazard, interim liquid retention facility for 242-A Evaporator process condensate before subsequent processing in the Effluent Treatment Facility (ETF). The LERF consists of three retention basins, each with a nominal storage capacity of 25.5 ML (6.75 Mgal). Section 4.4 of the LERF FSAR states that 'there are no Safety Class 1 of Safety Class 2 systems, structures, or components at LERF. Therefore, in accordance with the definitions contained in DOE Order 6430.1A ... there are no "Safety Class Items" associated with the LERF facility'.

The ETF is located in the northeast corner of the 200-East Area and north of the LERF basins. The ETF treats and disposes of the inventory stored in the LERF basins. The waste streams stored in LERF consist of 242-A Evaporator process condensate, N-Basin waste water, ground water campaign, and miscellaneous wastes generated from laboratory and decommissioning operations. The ground water campaign is scheduled to end by 1999. After treatment at the ETF, final disposal will be at the state approved land disposal site (SALDS), a crib north of 200-West Area.

UNREVIEWED SAFETY QUESTION SCREENING/Evaluation FORM (Continued)	Page 2 of 7
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The ETF is capable of treating a continuous flow of 9.5 L/s (150 gpm) at 72 % total operating efficiency (TOE) based on the current evaporator condensate treatment schedule. Based on the currently available information regarding the anticipated flow rates of the PC facilities, it is expected that the Liquid Waste Processing Facilities (LWPF) will be capable of accepting and treating this waste. However, actual acceptance of any waste into the LERF for treatment at ETF must be negotiated with the LWPF, and may be impacted by ETF campaign schedule requirements (e.g., scheduled or unscheduled outages, maintenance activities, waste characterization, etc), necessity to segregate waste at LERF, and commitments between LWPF and other generating facilities.

A buried encased pipeline will be used to transfer radioactive dangerous liquid effluent from the PC facilities to LERF. The tie in point will be located east of the grout vaults approximately between the coordinates N.39550/N.41400 and W.44950/W.43600. The proposed route begins at coordinates W.43650 and N.41430 east of the PC facilities and runs straight west up to W.45000. The route then runs north along the proposed interior road east of the PC facilities up to the proposed north asphalt concrete pavement (ACP) road for the privatization phase I stage. The route continues west along the north ACP road and ties into the existing 242-A Evaporator condensate discharge line PC5000 (Drawing H-2-79604). This line (PC5000) is considered part of the LERF and is covered under the Authorization Basis for that facility. It is further noted that in accordance with the 242-A Evaporator Safety Equipment List, the only portion of the process condensate system with safety class designation is the radiation monitoring and diversion system. Pipelines containing process condensate external to the 242-A Evaporator are not part of the monitoring and diversion system and are therefore not considered safety class equipment.

It is noted that the CDR includes "uncertainty dialogue" stating that the CDR process may determine that it is desirable to construct a new line connecting the Privatization Contractors' facilities directly to the LERF rather than tieing into the 242-A Evaporator process condensate line. This alternative is not specifically evaluated in this USQ document. However, from the standpoint of this document, the exact location of the tie in to the 242-A Evaporator process condensate line is inconsequential. This analysis assesses the impact to the affected facilities from the interface location (tie-in point) and does not address the safety or approval authority for any design upstream of that point. Design approval and safety classification upstream of the interface point is outside of the bounds of the impacted facilities (242-A and the LERF) and as such, is outside of the scope of this analysis. If this second line is determined to be necessary, an interface point must then be identified and the impact to the LERF/242-A Evaporator will be analyzed through the USQ process at that time.

It is expected that the PCs combined will generate a total of 133,000 cubic meters per year (67 gpm) of non-radioactive non-dangerous liquid effluent (WHC 1996b). Project W-506, TWRS Privatization Phase I Liquid Effluents Systems, will tie into the existing 200 East Area Treated Effluent Disposal Facility (TEDF) with a non-encased line. The TEDF provides the 11 mile long collection piping and disposal system for the 200 Areas treated effluent streams. The TEDF collects effluents from several facilities and discharges them to two rock lined disposal ponds east of the 200-East Area. At these ponds, the effluent evaporates and infiltrates through the soil without any further treatment.

The TEDF H-line was installed under Project W-049H, "200 Area TEDF Collection System," (Drawing H-2-140342). The H-line ties into the east-west cross-site disposal line which discharges into the TEDF. The H-line is capable of 20 L/s (317 gpm). Based on the currently available information regarding the anticipated flow rates of the PC facilities, it is expected that capacity will exist at TEDF to accept this effluent stream. However, actual acceptance of any waste to TEDF must be negotiated with the LWPF, and may be impacted by such things as scheduled or unscheduled outages, maintenance activities, and commitments between LWPF and other generating facilities. Furthermore, it is noted that the TEDF is a radiological facility. As such, evaluations of the Authorization

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Basis of this facility are performed using the Authorization Basis Review (ABR) system as described in WHC-IP-0931, Section 19.

The non-radioactive non-dangerous liquid effluent pipeline will run parallel to the radioactive dangerous liquid effluent line and tie into the H-line at N41050.

Since project W-506 is tieing into the existing 200 East effluent transfer piping systems, it is evident that there will be an impact on these systems. The 242-A process condensate line is part of the LERF facility and any safety designation is addressed in that Authorization Basis.

Scope:

This USQ document evaluates whether project W-506 Conceptual Design Report (CDR) is within the LWPF Authorization Basis. Since exact specifics are not known at this time, this USQ document only evaluates the project from a general overview. It therefore does not establish approval authority for construction or use of the new tie-in lines. Also, negotiation with LWPF will be required prior to the planning of the construction in order to minimize the impact to the 242-A Evaporator, LERF, and ETF facilities due to outages required for the actual tie in. This USQ document bases its conclusions on currently available information such as known effluent rates and existing effluent composition guidelines as stated in WHC 1996a and specified in WHC 1994. Prior to the line construction and/or use, additional USQ documents, and potentially safety analyses, will be required to address available capacity and actual effluent compositions. This USQ document only addresses the feasibility of tieing into the LERF process piping.

Authorization basis:

DESH, 1997, 242-A Evaporator/Crystallizer Safety Analysis Report, WHC-SD-WM-SAR-023, Rev. 2-C, Duke Engineering and Services Hanford Company, Richland, Washington

WHC, 1994, Final Safety Analysis Report: 242-A Evaporator Liquid Effluent Retention Facility, WHC-SD-W105-SAR-001, Rev. 0-D, Westinghouse Hanford Company, Richland, Washington

Conclusion:

From a general overview it has been concluded that the project design is within the current Authorization Basis for 242-A and LERF. Further USQ documents must be performed prior to construction to address short term impacts on outages required for tie-ins. Other USQ documents must be performed to address operational specifics (i.e. hydraulics, line capacity, effluent composition, pressure, waste mixing, back flow prevention, etc.) prior to the use of these lines once these specifics are known.

UNREVIEWED SAFETY QUESTION SCREENING/Evaluation FORM (Continued)	Page 4 of 7
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References:

RFSH, 1997, 200 Area Liquid Waste Processing Facilities Administrative Policies, WHC-IP-0931, Section 19, Authorization Basis Review.

WHC, 1996a, Design Requirements Document for TWRS Privatization Phase I Liquid Effluent Transfer Systems, WHC-SD-WM-DRD-014, Rev. 0, Westinghouse Hanford Company, Richland, Washington

WHC, 1996b, TWRS Privatization Phase 1 Liquid Effluent Transfer Systems Engineering Study, WHC-SD-WM-ES-396 Rev. 0, Westinghouse Hanford Company, Richland, Washington.

WHC, 1992, 242-A Evaporator Safety Equipment List, WHC-SD-WM-SEL-028, Rev. 0, Westinghouse Hanford Company, Richland, Washington

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USQ SCREENING:

A. Does the proposed activity represent a change to the facility as described in the Authorization basis?

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

Basis:

Several of the Authorization Basis documents, referenced above, mention effluent treatment systems and the generation of liquid effluent within LWPF facilities. The exact specifics including amount of liquid generated, and piping locations/layouts are not discussed. WHC-SD-W105-SAR-001 figure 1 shows the piping layout from 242-A Evaporator to the LERF. Since the liquid effluent system is described in the Authorization Basis and the system design is being modified, the proposed activity involves a change to the facility as described in the Authorization Basis.

B. Does the proposed activity represent a change to procedures as described in the Authorization basis?

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

Basis:

The proposed activity does not represent a change to procedures as described in the Authorization Basis. No existing procedures will be modified as a result of the proposed activity.

C. Does the test or experiment represent a test or experiment not described in the authorization basis documentation?

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

Basis:

The proposed activity involves the expansion of the existing liquid effluent transport systems. No tests or experiments are involved.

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D. Does the proposed activity or reportable occurrence, impact OSRs?

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

Basis:

There are no OSRs involving liquid effluent systems which will be impacted.

E. Does the reportable occurrence or PIAB involve analytical errors, omissions, and/or deficiencies in the Authorization basis?

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

Basis:

The proposed activity does not involve a PIAB or Reportable Occurrence.

USQE No. 1 Teresa A. Campbell
Print Name

Teresa A. Campbell 6/3/97
Signature Date

USQE No. 2 Roger A. Wahlquist
Print Name

Roger A Wahlquist 6/3/97
Signature Date

IF "YES", USQE CONTINUE WITH Evaluation BELOW

USQ Evaluation:

1. Could the proposed activity, reportable occurrence or PIAB significantly increase the frequency of occurrence of an accident previously evaluated in the Authorization basis?

[X] No [] Yes/Maybe

Basis:

Design basis accidents are discussed in Chapter 9 of the LERF SAR. Three types of accidents are analyzed, Spill/Splash Occurrences, Partial Uncovering of a LERF Basin, and Spray Leaks. The tie-ins to the piping systems as described in the CDR will not increase the frequency of any of these accidents. However, it is acknowledged that only the overall design is evaluated here and that future USQ documents must address construction or operational specifics of these lines.

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6. Could the proposed activity, reportable occurrence or PIAB create the possibility of a malfunction of EQUIPMENT IMPORTANT TO SAFETY of a different type than any previously evaluated in the Authorization basis?

   [X] No [] Yes/Maybe

   Basis:

   As previously stated, the LERF does not contain any safety class equipment. Therefore, the proposed activity cannot create the possibility of a new type of ITS equipment malfunction.

7. Could the proposed activity, reportable occurrence or PIAB reduce the margin of safety for any OSR as defined in the Authorization basis?

   [X] No [] Yes/Maybe

   Basis:

   There are no OSRs involving liquid effluent systems which will be impacted. The only OSR for the LERF is for waste composition and verification of composition through sampling. As no new material is approved to be added by this evaluation, the composition within the basins will not be affected and therefore, no OSR or it's associated safety margin is affected.

8. Does the proposed activity, reportable occurrence or PIAB require a new or revised OSR?

   [X] No [] Yes/Maybe

   Basis:

   This USQ document addresses the project from a general overview only, and does not include specifics regarding construction or operational specifics of these lines. Therefore, no new or revised OSRs are required at this time.

USQE No. 1 Roger A. Wahlquist (Print Name) — Roger A Wahlquist (Signature) — 6/3/97 (Date)

USQE No. 2 Teresa A. Campbell (Print Name) — Teresa A. Campbell (Signature) — 6/3/97 (Date)

PRC REVIEW

Meeting No.: _____ Date _____

PRC Chairman Concurrence: _____ (Signature) _____ (Date)

UNREVIEWED SAFETY QUESTION SCREENING/Evaluation FORM (Continued)	Page 6 of 7
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2. Could the proposed activity, reportable occurrence or PIAB significantly increase the consequences of an accident previously evaluated in the Authorization basis?

   [X] No [] Yes/Maybe

   Basis:

   Only the overall design of this project is evaluated in this USQ document. No actual addition of waste is evaluated or approved at this time. Acceptance of any new waste streams to the LERF must be evaluated in future USQ documents. Therefore, no increase in consequences of previously evaluated accidents is possible at this time.

3. Could the proposed activity, reportable occurrence or PIAB significantly increase the frequency of occurrence of a malfunction of EQUIPMENT IMPORTANT TO SAFETY previously evaluated in the Authorization basis?

   [X] No [] Yes/Maybe

   Basis:

   The double encased pipeline connecting 242-A to LERF (PC5000) is not safety class. Adding another branch of double encased pipeline into the feed line will not increase the frequency of a malfunction of the pipeline since the design is similar to that of the existing system. Furthermore, as previously stated, the LERF does not contain any safety class equipment. Therefore, there are no previously evaluated ITS equipment malfunctions. Thus the proposed change cannot increase the frequency of such malfunctions.

4. Could the proposed activity, reportable occurrence or PIAB significantly increase the consequences of a malfunction of EQUIPMENT IMPORTANT TO SAFETY previously evaluated in the Authorization basis?

   [X] No [] Yes/Maybe

   Basis:

   The double encased pipeline connecting 242-A to LERF (PC5000) is not safety class. Adding another branch of double encased pipeline into the feed line will not increase the consequences of a malfunction of the pipeline since the design is similar to that of the existing system. Furthermore, as previously stated, the LERF does not contain any safety class equipment. Therefore, there are no previously evaluated ITS equipment malfunctions. Thus the proposed change cannot increase the consequences of such malfunctions.

5. Could the proposed activity, reportable occurrence or PIAB create the possibility of an accident of a different type than any previously evaluated in the Authorization basis?

   [X] No [] Yes/Maybe

   Basis:

   Accidents discussed in Chapter 9 of the LERF SAR encompass any potential accidents associated with the LERF as a result of the proposed activity. No new accidents are identified at this time. Therefore, the proposed activity cannot create the possibility of a new type of accident.

APPENDIX H

Economic Analysis and Life Cycle Cost Analysis

(Waived per DOE letter, 96-WDD-154)

APPENDIX I

Physically Handicapped Assessment

(Waived per DOE letter, 96-WDD-154)

APPENDIX J

Plant Forces Work Review

FDH	Fluor Daniel Hanford, Inc. P.O. Box 1000, Richland, WA 99352-1000 PLANT FORCES WORK REVIEW	Plant Forces Work Review No. FDH-063-97	Date 3/24/97	Page 1 of 4

Title	JCS Work Pkg or Project No.	Area	Bldg. No.
TWRS PRIVATIZATION PHASE ONE	W-504, W-505, W-506	200E	N/A

REQUESTER

Estimated Cost of Work:

*1.	Procured Material/Equipment	$ 318,000
*2.	Materials/Equipment Purchased for Shop Fabrication	$ 0
*3.	Job-Site Material	$ 1,140,000
4.	Shop Labor	$ 0
5.	Job-Site Labor	$ 1,761,000
6.	Other Costs (design, field inspection, and contingency allowance)	$ 2,465,000
7.	General Overhead (Labor Only)	$ 406,000
	Total Job	$ 6,090,000

*Include estimated fair value of material or equipment acquired on site

Requester's Name and Phone No. Brian C. Harmon, 373-6528 Date 3/20/96

FDH

Reviewed By:

Area Work Review Agent John Allison Date 3/21/97

Company Work Review Agent Gary Maxwell Date 3/24/97

DOE

The following determination has been made regarding applicability of the Davis-Bacon Act, as amended, to the work described above:

Applicable [XX] Construction Not Applicable [ ] Plant Forces

Chairman *Original Signed by Alt. Paul Davis* 3/26/97

RL-Labor Standards Board Date

"Description of Work"

Briefly state the reason for this work activity:

In collaboration with numerous parties, the U.S. Department of Energy (DOE) has decided to privatize the treatment and disposal of most of the radioactive hazardous waste contained in the underground storage tanks on the Hanford Site. In order to provide infrastructure to the new privatization site, a new 230 KV Substation, Raw and Sanitary water distribution systems, Site Development and Roads, and Liquid Effluent Systems must be extended from the existing Hanford infrastructure.

Project (W-504) is one of the four projects that will provide site development and infrastructure to the Privatization Site. All four conceptual design efforts are currently underway. This PFWR combines scope for three of the four projects. W-503 (FDH-053-97 attached) was submitted for a determination without the CWRAs knowledge of Projects W-504, 505, and 506. The other three projects are listed below:

W-504 --------- TWRS Privatization Phase I, Raw and Sanitary Water Service

W-505 --------- TWRS Privatization Phase I, Site Development and Roads

W-506 --------- TWRS Privatization Phase I, Liquid Effluent Systems

Job summary:

W-504 Grub, grade, install approximately 7,200 ' of 4" & 6" sanitary water line, 11,200' of 12" raw water line and appropriate valves.

F D H	Fluor Daniel Hanford, Inc. P.O. Box 1000, Richland, WA 99352-1000 PLANT FORCES WORK REVIEW Continued	Plant Forces Work Review No. FDH-063-97	Page 2 of 4

W-505 Grub, grade, install approximately 5,800' of new paved roadways, 5,200' of upgrades to existing roadway, and 3,000' of new power lines.

W-506 Grub, grade, install 7,500' of 2" & 6" effluent piping. 4,000' of excavation x 3' to 10' deep is required.

Discuss all programmatic or physically associated work planned, underway, or recently completed in the work area:

FDH-053-97 is directly associated with the aforementioned projects.

Describe entire work scope. Fully describe complete job scope using a stepped work flow format. Describe and estimate the cost of labor and material on foundations, structures, utility systems, or other construction type activity. Provide sketches or measurements for all work:

W-504:

Estimated Cost of Work:		
*1.	Procured Material/Equipment	$ 0
*2.	Materials/Equipment Purchased for Shop Fabrication	$ 0
*3.	Job-Site Material	$ 575,000
4.	Shop Labor	$ 0
5.	Job-Site Labor	$ 770,000
6.	Other Costs (design, field inspection, and contingency allowance)	$ 375,000
7.	General Overhead (Labor Only)	$ 145,000
*Include estimated fair value of material or equipment acquired on site	Total Job	$ 1,865,000

W-504 will extend the existing Hanford Site sanitary and raw water systems to the TWRS Privatization Site. The sanitary water line will be extended to provide potable water and the raw water line will be extended to provide untreated process & fire suppression water to the new site. Both new water lines will be looped for increased reliability.

1. Perform grubbing & grading activities on the proposed utility corridors. (approximately 25K)

2. Install approximately 7,200' x 4" & 6" sanitary water line. The new lines will be installed between 4' and 6' deep. The new lines will be installed with the appropriate valves to meet existing and proposed operational and fire protection requirements. (Approximately 440K)

3. Install approximately 11,200' x 12" raw water line. The new line will be installed between 4' and 6' deep. The new line will be installed with the appropriate valves to meet existing and proposed operational and fire protection requirements. (Approximately 840K)

4. Perform flushing and testing of the new water lines. (Approximately 25K)

5. Perform soil stabilization. (Approximately 15K)

Note: All sagebrush mitigation and re-vegetation activities will be performed under Project W-505 (Site Development and Roads).

F D H	Fluor Daniel Hanford, Inc. P.O. Box 1000, Richland, WA 99352-1000 PLANT FORCES WORK REVIEW Continued	Plant Forces Work Review No. FDH-063-97	Page 3 of 4

W-505:

Estimated Cost of Work:

*1.	Procured Material/Equipment	$	0
*2.	Materials/Equipment Purchased for Shop Fabrication	$	0
*3.	Job-Site Material	$	430,000
4.	Shop Labor	$	0
5.	Job-Site Labor	$	620,000
6.	Other Costs (design, field inspection, and contingency allowance)	$	1,575,000
7.	General Overhead (Labor Only)	$	110,000
*Include estimated fair value of material or equipment acquired on site	Total Job	$	2,735,000

In order to provide infrastructure to the new privatization site, the site must be cleared and developed with roads, lighting, and temporary construction power.

This effort will develop the TWRS Privatization Site by extending the existing Hanford Site roads and electrical power (temporary construction service only) to the TWRS Privatization Site.

1. Perform grubbing & grading activities on the TWRS Privatization Phase I Site. (approximately 135K)

2. Install approximately 5,800' of new paved roadways. (Approximately 395K)

3. Install approximately 5,200' of upgrades to existing Hanford Site roadways. (Approximately 139K)

4. Install approximately 3,000' of new power lines. Approximately twelve poles will be removed or relocated and approximately fifteen new poles will be added. The new electrical service will provide security lighting and temporary construction power to the privatization contractors. (Approximately 220K)

5. Perform soil stabilization and re-vegetation activities at the Privatization Site. (Approximately 160,000)

6. Perform sagebrush mitigation per DOE-RL requirements. Approximately 95 acres of sagebrush habitat will be cleared as a part of TWRS Privatization Phase I. (Approximately 1,300K)

F D H	Fluor Daniel Hanford, Inc. P.O. Box 1000, Richland, WA 99352-1000 PLANT FORCES WORK REVIEW Continued	Plant Forces Work Review No. FDH-063-97	Page 4 of 4

W-506:

*1.	Procured Material/Equipment	$	318,000
*2.	Materials/Equipment Purchased for Shop Fabrication	$	0
*3.	Job-Site Material	$	135,000
4.	Shop Labor	$	0
5.	Job-Site Labor	$	371,000
6.	Other Costs (design, field inspection, and contingency allowance)	$	515,000
7.	General Overhead (Labor Only)	$	151,000
*Include estimated fair value of material or equipment acquired on site	Total Job	$	1,490,000

In order to accomplish this, a new pipeline system must be installed between the new privatization site and the existing 200 Area liquid effluent facilities. These new pipelines will provide the necessary means of transferring pre-treated liquid effluent from the new privatization contractors.

This effort will install a liquid effluent transfer system for the TWRS Privatization Site. The new effluent system will provide a reliable means of transferring radioactive, dangerous liquid effluent and non-radioactive, non-dangerous liquid effluent to the 200 Area liquid effluent facilities. Two separate pipelines must be installed to keep the different waste types from commingling.

1. Perform grubbing & grading activities on the proposed utility corridors. (Approximately 25K)

2. Install approximately 7,500' of liquid effluent pipeline with associated drain tanks & valves. The new pipelines will be sized between 2" and 6" in diameter and will be installed between 3' and 10' deep. Both pipelines (radioactive, dangerous & non-radioactive, non-dangerous) will be placed in the same trench for a significant portion of each run. Approximately 4,000 lineal feet of trenching will be required for this work. (Approximately 644K)

3. Install the necessary electronics and monitoring equipment for the new liquid effluent system. Data signals will be transmitted over the Hanford Site telecommunications system. (Approximately 115K)

4. Perform flushing and testing of the new effluent lines. (Approximately 30K)

5. Perform soil stabilization. (Approximately 10K)

Note: All sagebrush mitigation and re-vegetation activities will be performed under Project W-505 (Site Development and Roads).

APPENDIX K

Pollution Prevention/Waste Minimization

P2-EDGE SUMMARY REPORT

Project Information

Project: TWRS Privatization Phase I Liquid Effluent Systems
Project Number: W-506
Project Manager: Tarik Choho
Address: 2440 Stevens Place, Room 1215
Phone: (509) 376-0590

Project Size: Line Item Project
Type of Project: New Construction
Design Phase:

P2-EDGE Analysis
Origination Date: 19 Mar 97

Evaluator Comments

Name: David Fort
Telephone: (509) 376-4250

Notes

Data is unfiltered.

Opportunities that WILL BE CONSIDERED:

1.A.3	1.A.8	1.A.9	1.A.19	1.A.21	1.A.24	1.B.2	1.B.5	1.B.6
1.B.7	1.D.2	2.B.11	3.B.1	3.B.2	3.B.4	6.B.1	6.B.2	6.D.1
9.A.5	9.A.6	9.A.7	9.B.1	9.B.2	9.B.3	9.D.1	11.A.1	11.B.2
15.A.25								

Opportunities that WILL NOT BE CONSIDERED:

1.A.20	2.A.3	2.A.8	3.B.3	5.A.2	15.A.20

Opportunities that WILL BE IMPLEMENTED:

1.A.2	1.A.13	1.A.25	2.A.6	2.A.10	11.A.18	13.A.5	13.A.7	13.A.10
13.A.13	13.A.20	13.A.22						

Opportunities that are NOT APPLICABLE:

1.A.1	1.A.4	1.A.5	1.A.6	1.A.7	1.A.10	1.A.11	1.A.12	1.A.14
1.A.15	1.A.16	1.A.17	1.A.18	1.A.22	1.A.23	1.A.26	1.A.27	1.A.28
1.A.29	1.A.30	1.B.1	1.B.3	1.B.4	1.B.8	1.B.9	1.B.10	1.B.11
1.B.12	1.B.13	1.C.1	1.D.1	1.D.3	2.A.1	2.A.2	2.A.4	2.A.5
2.A.7	2.A.9	2.A.11	2.A.12	2.A.13	2.A.14	2.A.15	2.A.16	2.B.1
2.B.2	2.B.3	2.B.4	2.B.5	2.B.6	2.B.7	2.B.8	2.B.9	2.B.10
2.B.12	2.B.13	2.C.1	2.C.2	2.D.1	2.D.2	3.A.1	4.A.1	4.B.1
4.B.2	5.A.1	5.B.1	5.B.2	5.C.1	6.B.3	7.A.1	7.A.2	7.B.1
7.B.2	7.B.3	7.B.4	8.A.1	8.A.2	8.A.3	8.B.1	8.B.2	9.A.1
9.A.2	9.A.3	9.A.4	9.A.8	9.A.9	9.A.10	9.A.11	10.A.1	10.A.2
10.A.3	10.A.4	10.B.1	10.C.1	10.D.1	11.A.2	11.A.3	11.A.4	11.A.5
11.A.6	11.A.7	11.A.8	11.A.9	11.A.10	11.A.11	11.A.12	11.A.13	11.A.14
11.A.15	11.A.16	11.A.17	11.A.19	11.A.20	11.A.21	11.A.22	11.A.23	11.A.24
11.A.25	11.A.26	11.A.27	11.B.1	11.B.3	11.C.1	11.D.1	12.A.1	12.A.2
12.A.3	12.B.1	12.B.2	12.B.3	12.B.4	12.B.5	12.B.6	13.A.1	13.A.2
13.A.3	13.A.4	13.A.6	13.A.8	13.A.9	13.A.11	13.A.12	13.A.14	13.A.15
13.A.16	13.A.17	13.A.18	13.A.19	13.A.21	13.A.23	13.B.1	13.B.2	13.B.3
13.B.4	13.B.5	13.C.1	13.C.2	13.D.1	13.D.2	13.D.3	14.A.1	15.A.1
15.A.2	15.A.3	15.A.4	15.A.5	15.A.6	15.A.7	15.A.8	15.A.9	15.A.10
15.A.11	15.A.12	15.A.13	15.A.14	15.A.15	15.A.16	15.A.17	15.A.18	15.A.19
15.A.21	15.A.22	15.A.23	15.A.24	15.A.26	15.A.27	15.A.28	15.B.1	15.B.2
15.B.3	15.B.4	15.B.5	15.B.6	15.C.1	15.D.1	16.A.1	16.A.2	16.A.3
16.A.4	16.A.5	16.A.6	16.A.7	16.A.8	16.A.9	16.A.10	16.A.11	16.B.1

POLLUTION PREVENTION/WASTE MINIMIZATION OPPORTUNITIES
DESIGN CHECKLIST
Dated: 5-6-97

PROJECT NUMBER W-506

PROJECT TITLE TWRS PRIVATIZATION, PHASE I - LIQUID EFFLUENT SYSTEMS
PROJECT CONTRACTOR NHC PROJECT MANAGER TARIK CHOHO

DESIGN CONTRACTOR FDNW DESIGN AGENT FDNW

Opportunity Number 1.A.2
( ) Will Consider
( ) Will Not Consider
(X) Implemented
( ) Not Applicable
Description: Bonded joints and chemical resistant double wall pipe are being employed.

Opportunity Number 1.A.3
( ) Will Consider
( ) Will Not Consider
(X) Implemented
( ) Not Applicable
Description: Design considered minimum route length to meet the project requirements.

Opportunity Number 1.A.8
(X) Will Consider
( ) Will Not Consider
( ) Implemented
( ) Not Applicable
Description: Definitive design will require dust mitigation practices.

Opportunity Number 1.A.9
( ) Will Consider
( ) Will Not Consider
(X) Implemented
( ) Not Applicable
Description: Conceptual design evaluated materials and selected a minimum number of appropriate materials to be used during definitive design.

Opportunity Number 1.A.13
( ) Will Consider
( ) Will Not Consider
(X) Implemented
( ) Not Applicable
Description: Bonded joints and chemical resistant double wall pipe are being employed.

Opportunity Number 1.A.19
( ) Will Consider
( ) Will Not Consider
(X) Implemented
( ) Not Applicable
Description: To be implemented in the construction specification during definitive design.

Opportunity Number 1.A.20
( ) Will Consider
(X) Will Not Consider
( ) Implemented
( ) Not Applicable
Description: Freeze protection is best accomplished with direct burial of the lines. Gravity drain lines are proposed, therefore either direct burial is required or cuts would be left open to fill naturally.

Opportunity Number 1.A.21
(X) Will Consider
( ) Will Not Consider
( ) Implemented
( ) Not Applicable
Description: Will be considered during definitive design and implemented as appropriate in the construction specification/s.

Opportunity Number 1.A.24
(X) Will Consider
( ) Will Not Consider
( ) Implemented
( ) Not Applicable
Description: Will be considered during definitive design and implemented as appropriate in the construction specification/s.

Opportunity Number 1.A.25

Description: Bonded joints and double wall pipe are being employed.

_____ Will Consider
_____ Will Not Consider
X Implemented
_____ Not Applicable

Opportunity Number 1.B.2

Description: Definitive design will consider requiring recycled materials as applicable.

X Will Consider
_____ Will Not Consider
_____ Implemented
_____ Not Applicable

Opportunity Number 1.B.5

Description: To be considered during procurement of equipment and materials.

X Will Consider
_____ Will Not Consider
_____ Implemented
_____ Not Applicable

Opportunity Number 1.B.6

Description: Will be considered during definitive design and implemented as appropriate in the construction specification/s.

X Will Consider
_____ Will Not Consider
_____ Implemented
_____ Not Applicable

Opportunity Number 1.B.7

Description: Will be considered during definitive design and implemented as appropriate in the construction specification/s.

X Will Consider
_____ Will Not Consider
_____ Implemented
_____ Not Applicable

Opportunity Number 1.D.2

Description: Construction specifications will require appropriate containment.

_____ Will Consider
_____ Will Not Consider
X Implemented
_____ Not Applicable

Opportunity Number 2.A.3

Description: Storm water runoff to bodies of water is not possible at the site.

_____ Will Consider
X Will Not Consider
_____ Implemented
_____ Not Applicable

Opportunity Number 2.A.6

Description: Will be reviewed and confirmed during definitive design.

_____ Will Consider
_____ Will Not Consider
X Implemented
_____ Not Applicable

Opportunity Number 2.A.8

Description: Project site is an arid region. Unless watered, landscaping to reduce stormwater runoff will generally not survive.

_____ Will Consider
X Will Not Consider
_____ Implemented
_____ Not Applicable

Opportunity Number 2.A.10

Description: Definitive design will define percolation areas as applicable.

_____ Will Consider
_____ Will Not Consider
X Implemented
_____ Not Applicable

Opportunity Number 2.B.11

Description: Water for open bore flushing of the new lines will be too large a quantity in too short a period to be captured for secondary use.

_____ Will Consider
X Will Not Consider
_____ Implemented
_____ Not Applicable

Opportunity Number 3.B.1 — X Will Consider; Will Not Consider; Implemented; Not Applicable

Description: Will be considered during definitive design and implemented as appropriate in the construction specification/s.

Opportunity Number 3.B.2 — X Will Consider; Will Not Consider; Implemented; Not Applicable

Description: Will be considered during definitive design and implemented as appropriate in the construction specification/s.

Opportunity Number 3.B.3 — Will Consider; X Will Not Consider; Implemented; Not Applicable

Description: Transport to the batch plant more than 32 Km distant is not practical.

Opportunity Number 3.B.4 — X Will Consider; Will Not Consider; Implemented; Not Applicable

Description: Will be considered during definitive design and implemented as appropriate in the construction specification/s.

Opportunity Number 5.A.2 — Will Consider; Will Not Consider; Implemented; X Not Applicable

Description: Piping systems are to constructed on non-metallic materials.

Opportunity Number 6.B.1 — X Will Consider; Will Not Consider; Implemented; Not Applicable

Description: Will be considered during definitive design and implemented as appropriate in the construction specification/s.

Opportunity Number 6.B.2 — X Will Consider; Will Not Consider; Implemented; Not Applicable

Description: Will be considered during definitive design and implemented as appropriate in the construction specification/s.

Opportunity Number 6.D.1 — X Will Consider; Will Not Consider; Implemented; Not Applicable

Description: Will be considered during definitive design and implemented as appropriate in the construction specification/s.

Opportunity Number 9.A.5 — X Will Consider; Will Not Consider; Implemented; Not Applicable

Description: Will be considered during definitive design and implemented as appropriate in the construction specification/s.

Opportunity Number 9.A.6 — Will Consider; X Will Not Consider; Implemented; Not Applicable

Description: De-Minimus painting is required on this project.

Opportunity Number 9.A.7 — X Will Consider; Will Not Consider; Implemented; Not Applicable

Description: Will be considered during definitive design and implemented as appropriate in the construction specification/s.

Opportunity Number 9.B.1

	Will Consider
X	Will Not Consider
	Implemented
	Not Applicable

Description: De-Minimus painting is required on this project.

Opportunity Number 9.B.2

	Will Consider
X	Will Not Consider
	Implemented
	Not Applicable

Description: De-Minimus painting is required on this project.

Opportunity Number 9.B.3

	Will Consider
X	Will Not Consider
	Implemented
	Not Applicable

Description: De-Minimus painting is required on this project.

Opportunity Number 9.D.1

X	Will Consider
	Will Not Consider
	Implemented
	Not Applicable

Description: Will be considered during definitive design and implemented as appropriate in the construction specification/s.

Opportunity Number 11.A.1

X	Will Consider
	Will Not Consider
	Implemented
	Not Applicable

Description: Will be considered during definitive design and implemented as appropriate in the construction specification/s.

Opportunity Number 11.A.18

	Will Consider
	Will Not Consider
X	Implemented
	Not Applicable

Description: Bonded joints and double wall pipe with continuous leak detection are being employed.

Opportunity Number 11.B.2

X	Will Consider
	Will Not Consider
	Implemented
	Not Applicable

Description: Will be considered during definitive design and implemented as appropriate in the construction specification/s.

Opportunity Number 13.A.5

	Will Consider
	Will Not Consider
X	Implemented
	Not Applicable

Description: Bonded joints and double wall pipe with continuous leak detection are being employed.

Opportunity Number 13.A.7

	Will Consider
	Will Not Consider
X	Implemented
	Not Applicable

Description: Will be reviewed and confirmed during definitive design.

Opportunity Number 13.A.10

	Will Consider
	Will Not Consider
X	Implemented
	Not Applicable

Description: Bonded joints and double wall pipe with continuous leak detection are being employed.

Opportunity Number 13.A.13

	Will Consider
	Will Not Consider
X	Implemented
	Not Applicable

Description: Bonded joints and double wall pipe with continuous leak detection are being employed.

Opportunity Number 13.A.20

_____ Will Consider
_____ Will Not Consider
_X_ Implemented
_____ Not Applicable

Description: Bonded joints and double wall pipe with continuous leak detection are being employed.

Opportunity Number 13.A.22

_____ Will Consider
_____ Will Not Consider
_X_ Implemented
_____ Not Applicable

Description: Bonded joints and double wall pipe with continuous leak detection are being employed.

Opportunity Number 15.A.20

_____ Will Consider
_X_ Will Not Consider
_____ Implemented
_____ Not Applicable

Description: The use of bonded joints in pipes is preferred in order to minimize potential leak points.

Opportunity Number 15.A.25

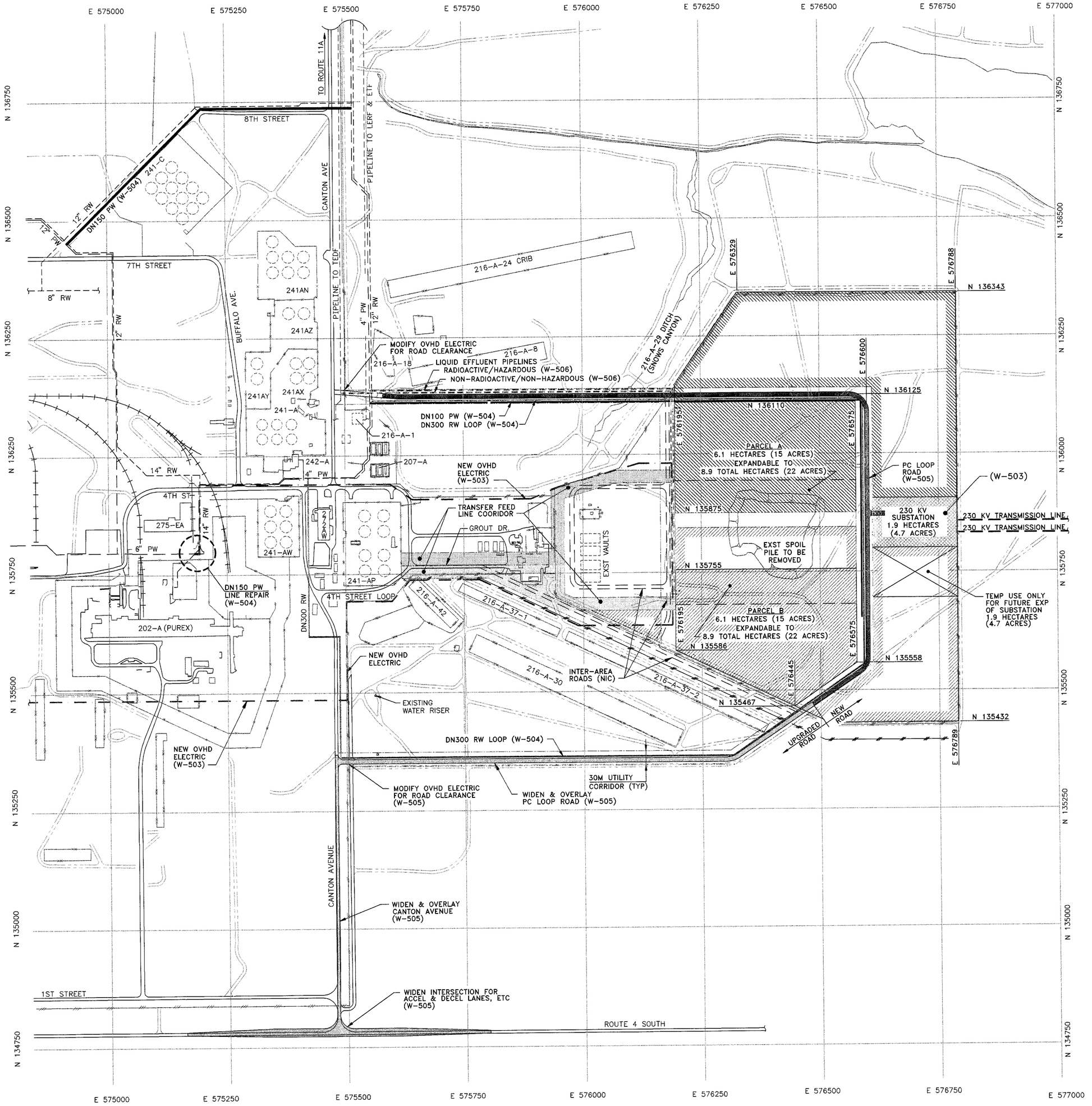
_X_ Will Consider
_____ Will Not Consider
_____ Implemented
_____ Not Applicable

Description: Will be considered during definitive design and implemented as appropriate in the construction specification/s.

APPENDIX L

Sketches

ES-W506-C01	Integrated Site Plan
ES-W506-C02	Liquid Effluent Transfer Systems Site Plan
ES-W506-C03	Liquid Effluent Transfer Systems Enlarged Site Plan
ES-W506-C04	Typical Utility Corridor
ES-W506-Y01	Control System Interconnection Diagram
ES-W506-Y02	Control System Interconnection Diagram
ES-W506-Y03	Radioactive, Dangerous Liquid Effluent System Architecture
ES-W506-Y04	Non-Radioactive, Non-Dangerous Liquid Effluent System Architecture

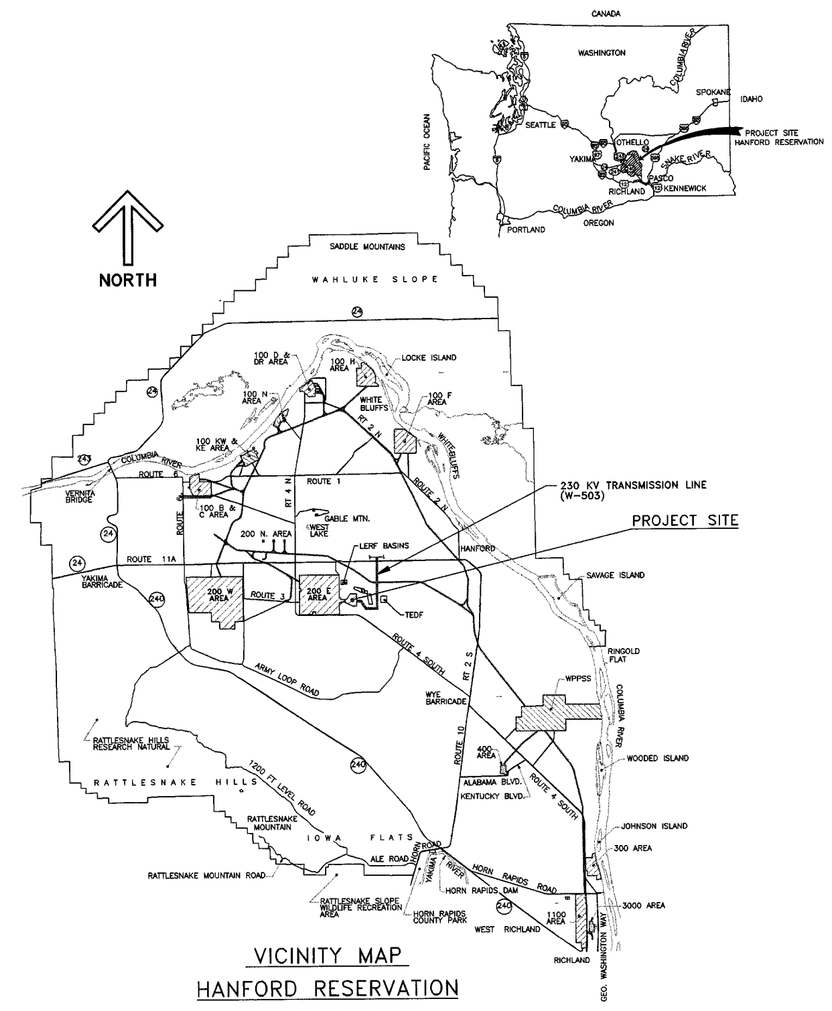


INTEGRATED SITE PLAN

80 0 40 80 160 240 320 400

SCALE IN METERS

1 : 4000



VICINITY MAP
HANFORD RESERVATION

2000 0 2000 4000 6000 8000 10000

SCALE IN METERS
1 : 100

SUB-PROJECT:

W-503
W-504
W-505
W-506

SCOPE:

ELECTRICAL SUBSTATION
RAW AND POTABLE WATER
SITE DEVELOPMENT/ROADS
LIQUID EFFLUENTS

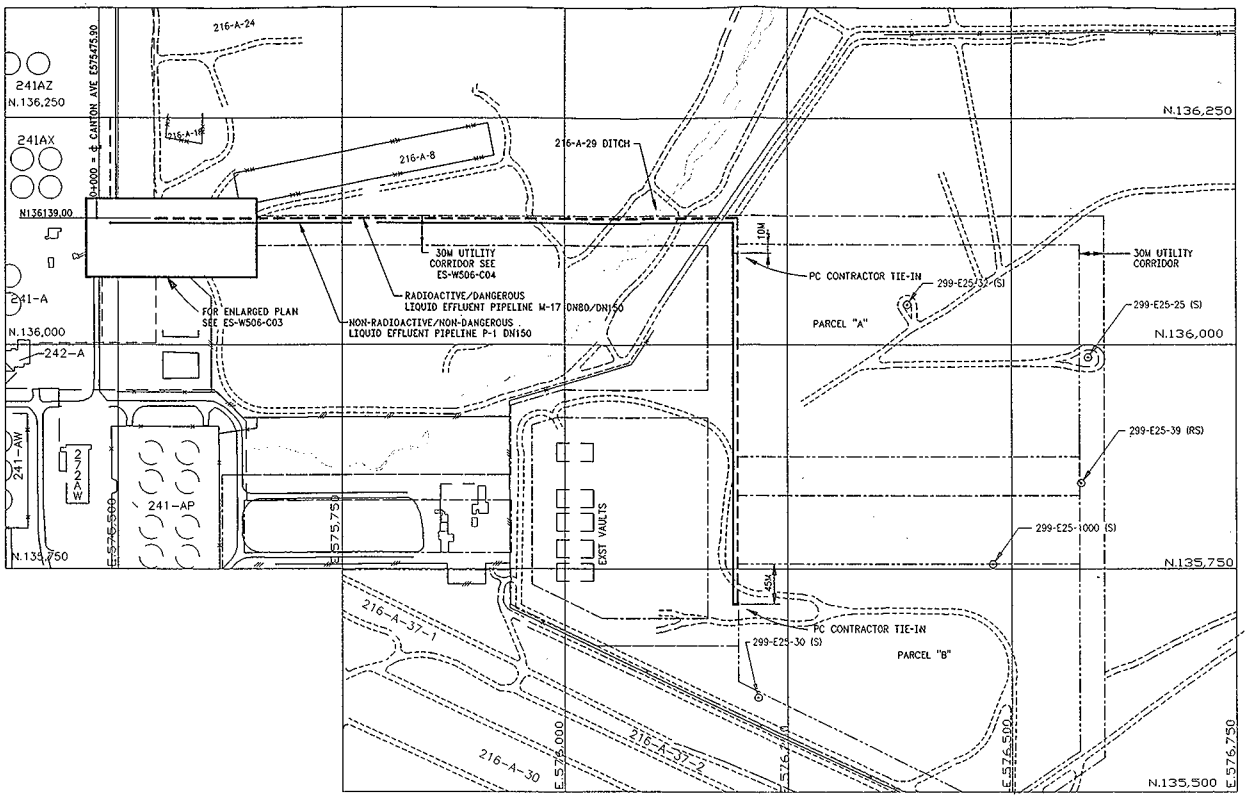
LEGEND:

- PARCEL A
  - LAYDOWN AREA
  - TRANSFER FEED LINE CORRIDOR
- PARCEL B
  - LAYDOWN AREA
  - TRANSFER FEED LINE CORRIDOR
- ELECTRIC SUBSTATION
- NEW ROAD
- UPGRADED ROAD
- UTILITY CORRIDOR
- EXISTING UGND UTILITY
- LIQUID EFFLUENT
- RAW WATER
- POTABLE WATER
- OVHD ELECTRIC
- E 576700 WASHINGTON STATE GRID SYSTEM COORDINATE IN METERS

FLUOR DANIEL NORTHWEST

Prepared By/Date		CAD FILE
DJ WHITISH/05-29-97	ES-W506-C01	IW506C01

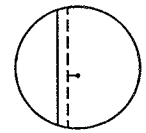
HNF-SD-W506-CDR-001, Rev 0



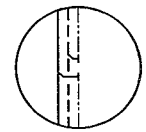
LEGEND

E.576,000
N.135,750 WASHINGTON STATE GRID (METERS)

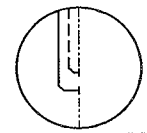
- FINISH GRADE
- EXISTING NON-RADIOACTIVE/NON-DANGEROUS LIQUID EFFLUENT LINE
- NEW NON-RADIOACTIVE/NON-DANGEROUS LIQUID EFFLUENT LINE
- EXISTING RADIOACTIVE/DANGEROUS LIQUID EFFLUENT LINE
- NEW RADIOACTIVE/DANGEROUS LIQUID EFFLUENT LINE
- PARCEL BOUNDARY
- EASEMENT BOUNDARY
- CYCLONE FENCE
- TEST WELL
- DIRT ROAD
- POWER POLE
- SL STREET LIGHT
- E OVERHEAD POWER



PULL PORT AT 100M O/C

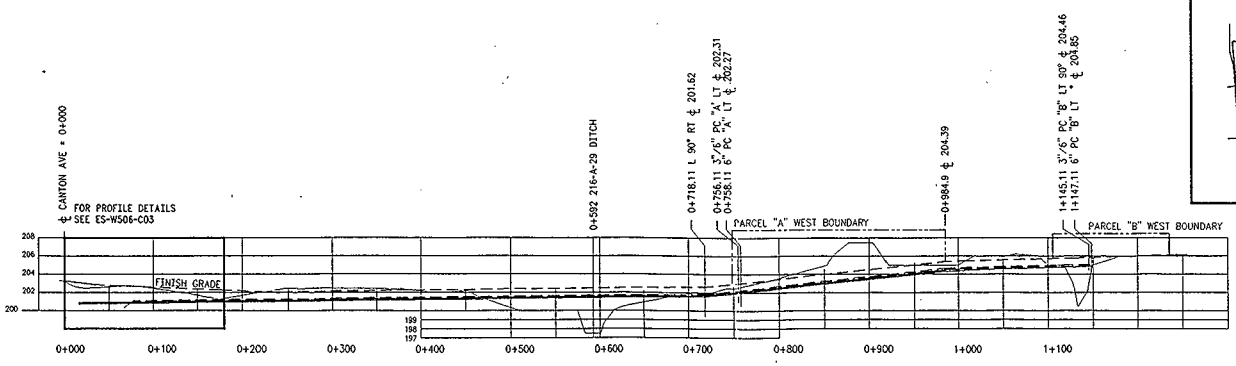


PC TIE-IN PARCEL "A"

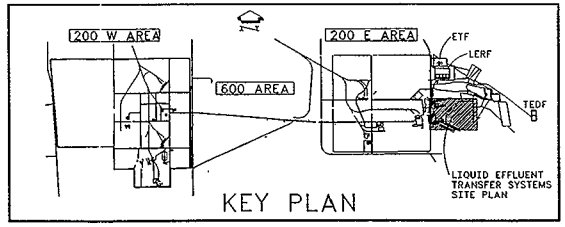


PC TIE-IN PARCEL "B"

LIQUID EFFLUENT TRANSFER SYSTEMS PLAN



LIQUID EFFLUENT TRANSFER SYSTEMS PROFILE



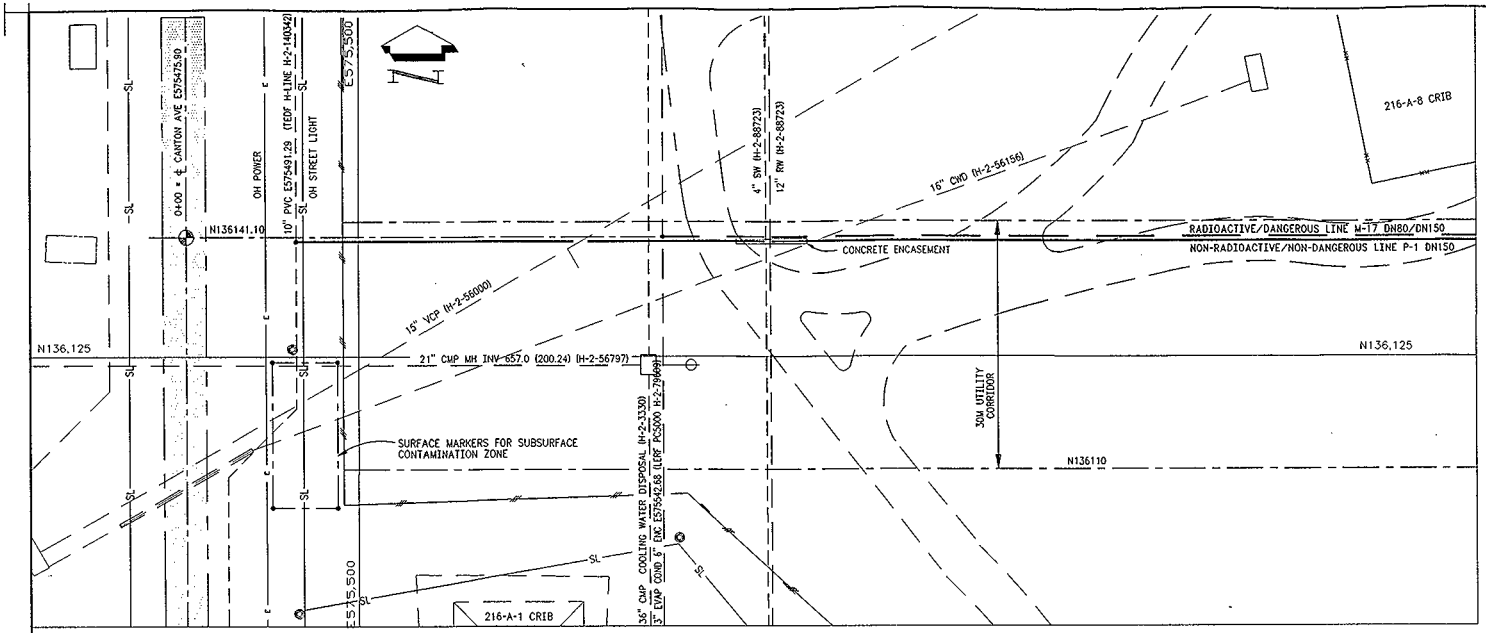
KEY PLAN

LIQUID EFFLUENT TRANSFER SYSTEMS SITE PLAN

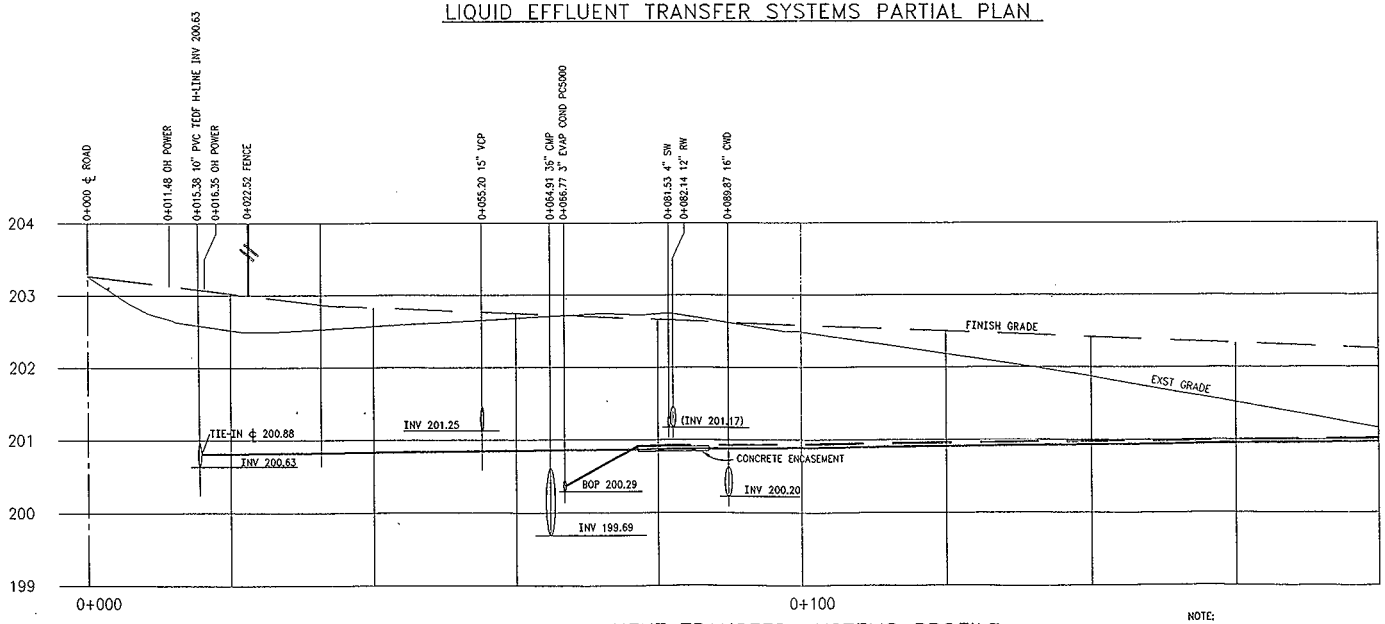
50 0 25 50 100 150 200 250

SCALE IN METERS

FLUOR DANIEL NORTHWEST		
Prepared By/Date PLAMG 3/31/97	ES-W506-C02	CAD FILE IW506C02



LIQUID EFFLUENT TRANSFER SYSTEMS PARTIAL PLAN



LIQUID EFFLUENT TRANSFER SYSTEMS PROFILE

NOTE:
FOR LEGEND SEE ES-W506-C02

LIQUID EFFLUENT TRANSFER SYSTEMS

ENLARGED SITE PLAN

10 0 10 20

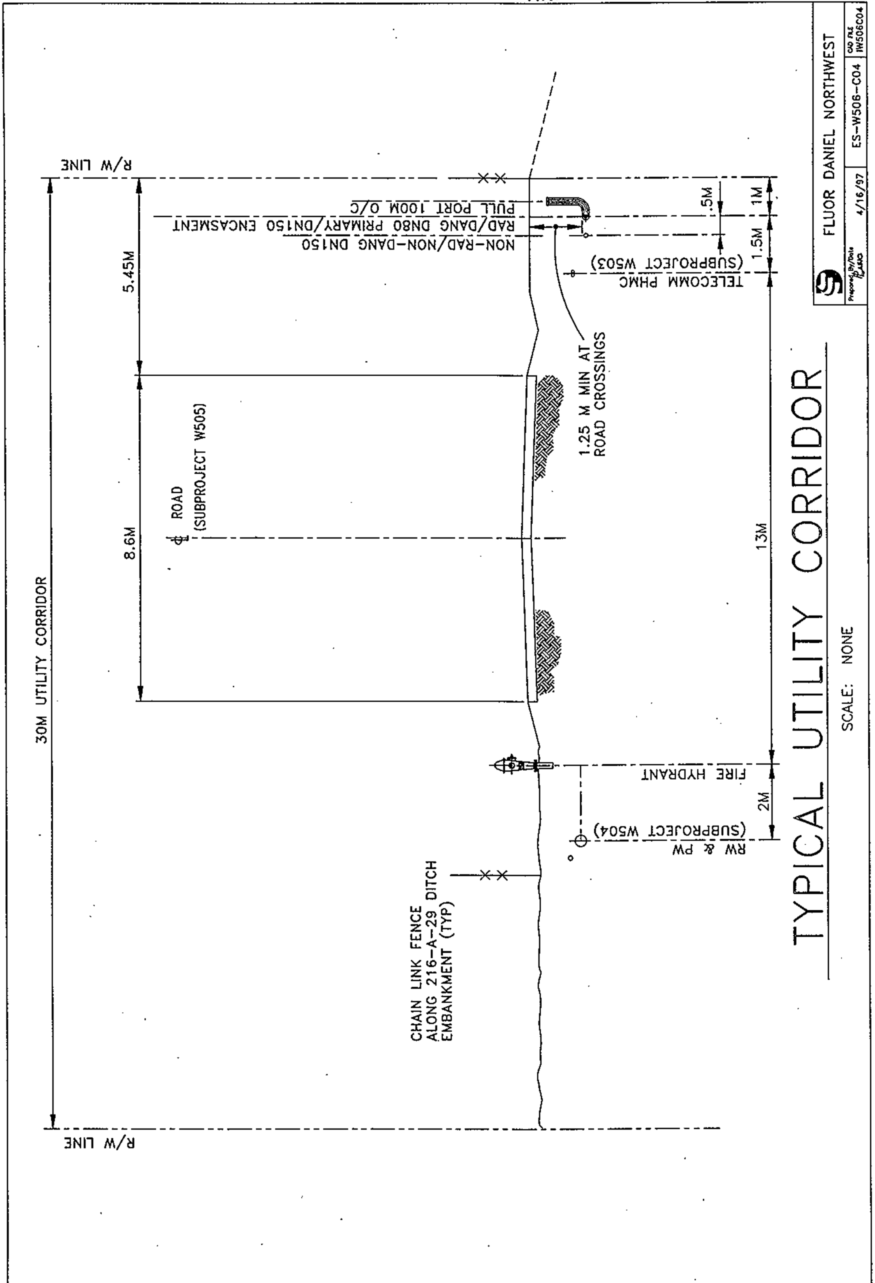
SCALE IN METERS

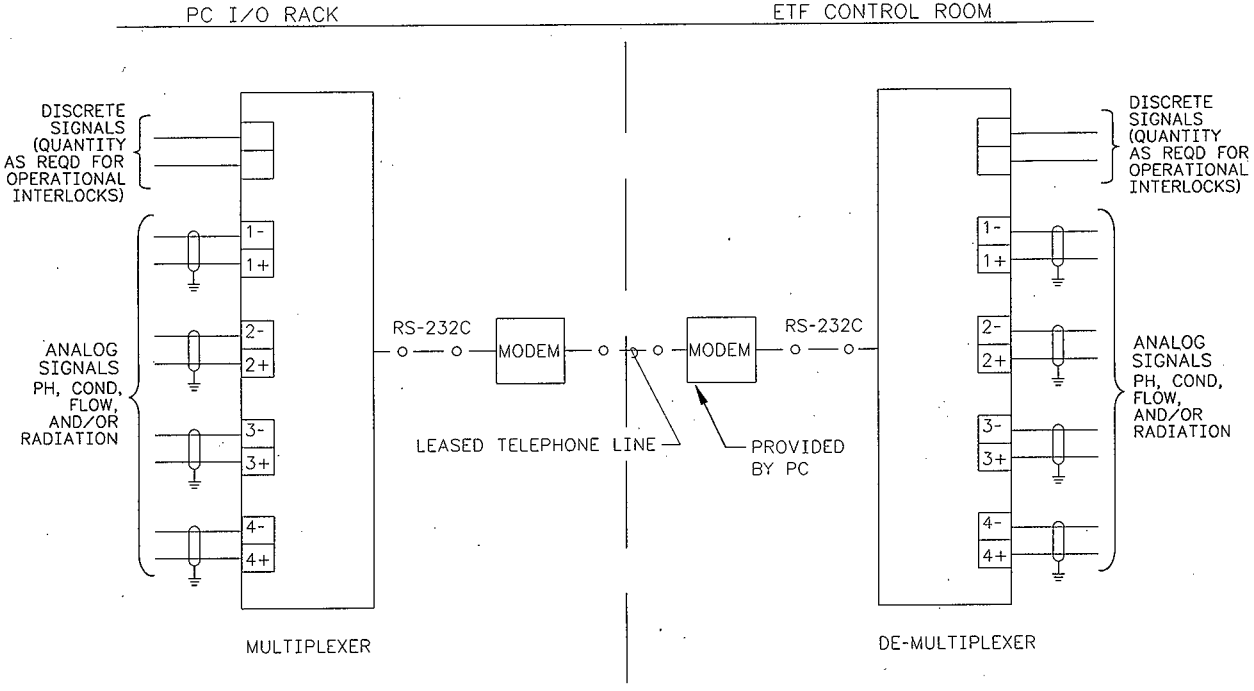
FLUOR DANIEL NORTHWEST

Prepared by/Date P.A.W.C. 3/31/97

ES-W506-C03

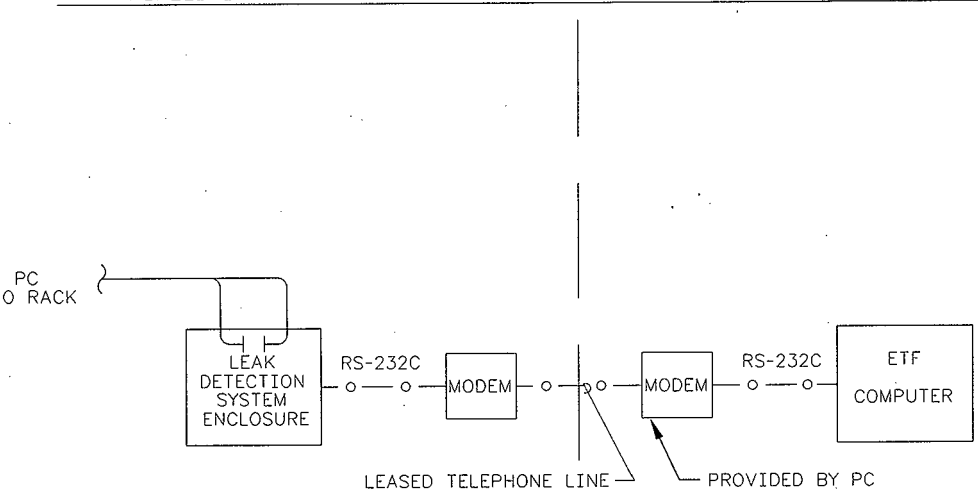
CAD FILE W506C03


TYPICAL UTILITY CORRIDOR
SCALE: NONE
FLUOR DANIEL NORTHWEST
ES-W506-C04
4/16/97
IW506C04
30M UTILITY CORRIDOR
R/W LINE
R/W LINE
5.45M
8.6M
13M
1.5M
1M
.5M
2M
ROAD
(SUBPROJECT W505)
1.25 M MIN AT
ROAD CROSSINGS
PULL PORT 100M O/C
RAD/DANG DN80 PRIMARY/DN150 ENCASMENT
NON-RAD/NON-DANG DN150
TELECOMM PHMC
(SUBPROJECT W503)
FIRE HYDRANT
RW & PW
(SUBPROJECT W504)
CHAIN LINK FENCE
ALONG 216-A-29 DITCH
EMBANKMENT (TYP)



CONTROL SYSTEM
INTERCONNECTION DIAGRAM
(TYPICAL FOR RAD/DANG AND NON-RAD/NON-DANG)

FLUOR DANIEL NORTHWEST		
Prepared By/Date Wm ZICKUHR/5-30-97	ES-W506-Y01	CAD FILE 0W506Y1



CONTROL SYSTEM
INTERCONNECTION DIAGRAM

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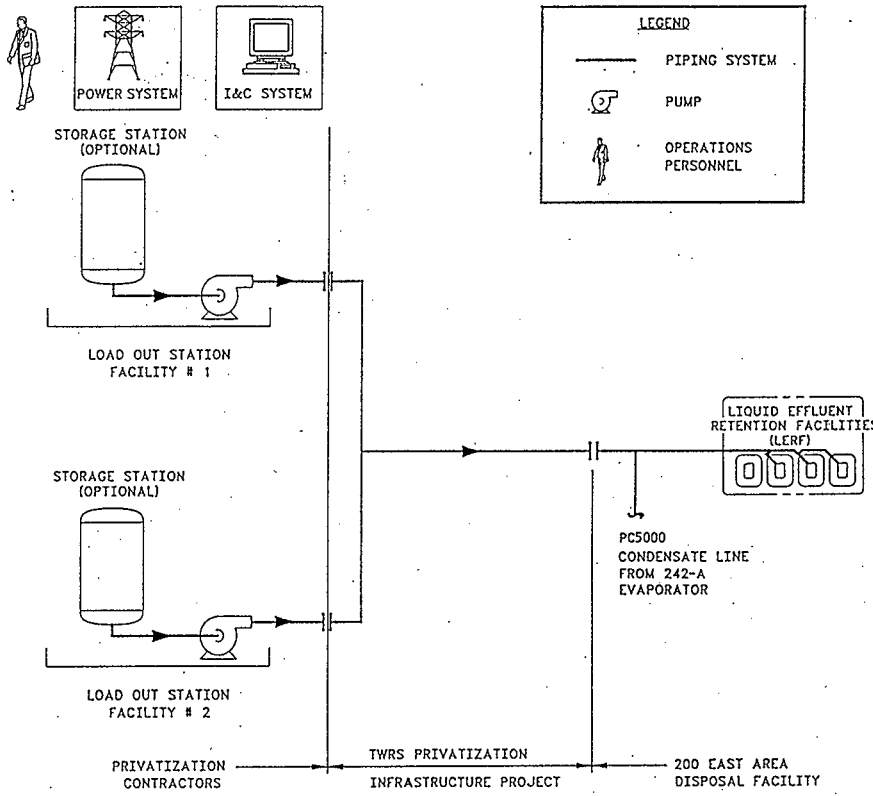
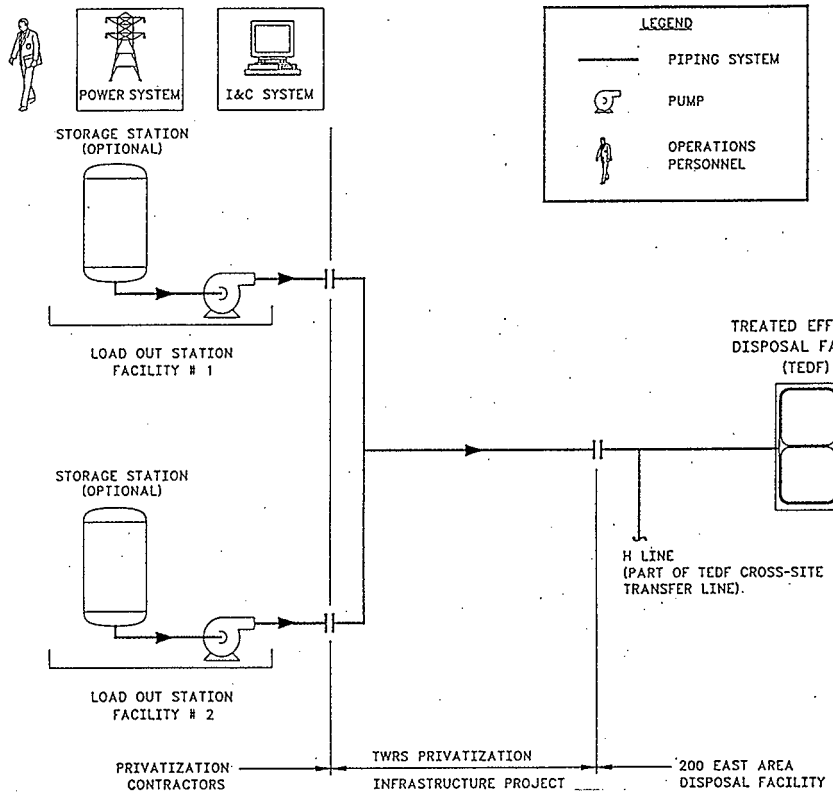


RADIOACTIVE, DANGEROUS LIQUID EFFLUENT SYSTEM ARCHITECTURE

FLUOR DANIEL NORTHWEST			
Prepared By/Date	5/30/97	ES-WS06-Y03	CAD FILE NA



NON-RADIOACTIVE, NON-DANGEROUS LIQUID EFFLUENT SYSTEM ARCHITECTURE

FLUOR DANIEL NORTHWEST			
Prepared By/Date AAVG	5/30/97	ES-W506-Y04	CAD FILE NA

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