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Conceptual Design Report, "TWRS Privatization Phase I, Raw and Potable Water, " Subproject W-504.

Gurdhian Singh

Numatech Hanford Corporation, Richland, WA 99352
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Abstract: This document includes Conceptual Design Report (CDR) for extension of existing Raw and Potable systems from 200-East Area systems to two new private contractor facilities for immobilization and disposal of low-activity waste (LAW). The work will include design and installation of almost 3400 m (11,200 ft) of raw water pipe and 2200 m (7,300 ft) of potable water pipe.

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Release Approval

6/5/97
Date

Approved for Public Release

Conceptual Design Report

TWRS Privatization Phase I

Raw and Potable Water

Subproject W-504

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
RAW AND POTABLE WATER
SUBPROJECT W-504

Prepared for
Numatec Hanford Corporation

June 1997

Prepared by
Fluor Daniel Northwest
Richland, Washington

W504CDR

W504CDR
CONCEPTUAL DESIGN REPORT
FOR
TWRS PRIVATIZATION PHASE I
RAW AND POTABLE WATER
SUBPROJECT W-504

APPROVED

Fluor Daniel Northwest

<u>4/5/97</u>		<u>6/5/97</u>
Principal Lead Engineer	Date	Environmental Engineering	Date
<u>6/5/97</u>		<u>6-5-97</u>
Safety Engineering	Date	Technical Engineering	Date
<u>6/5/97</u>		<u>6/5/97</u>
Quality Engineering	Date	Project Manager	Date

Numatec Hanford Corporation

<u>6/5/97</u>
Project Manager	Date

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ABBREVIATIONS

CDR	conceptual design report
CW	cooling water
DOE	U.S. Department of Energy
DRD	design requirements document
FDAS	field data acquisition system
HAW	high-activity waste
HDPE	high-density polyethylene
HPT	health physics technician
LAW	low-activity waste
NFPA	National Fire Protection Agency
NOC	notice of construction
P2/WMin	pollution prevention/waste minimization
PC	Privatization Contractors
PHMC	Project Hanford Management Contractor
PIV	post indicator valve
PVC	polyvinyl chloride
PW	potable water
QAPP	Quality Assurance Program Plan
RFP	request for proposal
RL	Richland Operations Office (DOE)
RLID	RL Implementing Directive
RW	raw water
TEDF	Treated Effluent Disposal Facility
TWRS	Tank Waste Remediation System
WAC	Washington Administrative Code
WBS	work breakdown structure
WDOH	Washington State Department of Health
WDOT	Washington State Department of Transportation

CONCEPTUAL DESIGN REPORT
TWRS PRIVATIZATION PHASE I
RAW AND POTABLE WATER
SUBPROJECT W-504

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. Phase II will be the full-scale production phase. Facilities will be sized so that all the remaining wastes can be processed and immobilized on a schedule that will accommodate removing the waste from the single-shell tanks by year 2018 and the double-shell tanks by 2028.

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 project consists of four subprojects that will provide key physical interfaces and services needed to support the Privatization mission.

Subproject W-504 is one of the four projects 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-504 will provide the raw and potable water lines to supply the water requirements to the PC sites (ref 1 and 2).

In conjunction with preparation of the TWRS Privatization request for proposal (RFP) for the solicitation of Privatization Contractors (PC), a location was selected for the Phase I facilities (ref 3). The selected area is east of the major 200-East Area road and rail network, and requires modifications and additions to existing transportation corridors. The area was previously developed and characterized for the grouted waste vault disposal site.

This conceptual design report (CDR) documents raw (untreated process) water (RW) and potable water (PW) line routing and tie-in point locations.

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

II. SUMMARY

Subproject W-504 is one of four projects that will develop the infrastructure serving the needs for the Tank Waste Remediation System (TWRS) Privatization Phase I facilities. Under this subproject, new raw and potable water supply lines will be extended from the 200-East Area systems. The existing water systems have the reserve capacity to provide the quantities of water required by the two Privatization Contractors (PCs). The raw water will serve the fire suppression and untreated process water requirements for the PCs. The two pipelines will be placed in the same trench when routed to the PC sites and separated horizontally and vertically to facilitate future tie-in connections and maintenance.

The work will include the installation of almost 3400 m (11,200 ft) of raw water pipe and 2200 m (7,300 ft) of potable water pipe. Raw water piping is predominately DN300 (12-in.) pipe with a minor amount of DN200 (8 in.). The PW pipe consists of about 1475 m (4,900 ft) of DN100 (4 in.), and 725 m (2,400 ft) of DN150 (6-in.) pipe. Sectional valves and fire hydrants will be installed on a limited basis in support of PC activities.

Subproject W-504 is a fiscal year 1999 General Plant Project. Total estimated costs (TEC) of the project are \$1,640,000; other project costs (expense funded) are \$970,000. The total subproject cost (TPC) is \$2,610,000.

III. JUSTIFICATION

Raw and potable water are essential elements of the 200-East Area infrastructure. Expanding existing 200-East Area water systems is the most cost effective and timely way to satisfy the project milestones.

The upgrades provided by subproject W-504 are required to support the TWRS Privatization contracts (ref 4 and 5). By supporting TWRS Privatization, subproject W-504 supports the Tri-Party Agreement milestones for site clean-up, processing, and disposal of tank wastes.

IV. DESCRIPTION OF PROJECT SCOPE

Subproject W-504 will provide water to the PC site during TWRS Privatization Phase I. Three types of water are required: PW, RW, and fire suppression water (RW describes both raw and fire suppression water). Subproject W-504 will provide reliable RW and PW service from the 200-East Area infrastructure by installing over 3400 m (11,200 ft) of new RW piping and 2200 m (7,300 ft) of PW supply piping. Upgrades to the PW and RW systems will be made to ensure reliable service. The improvements for the site will provide each PC with near equitable site conditions as reasonably possible.

A. IMPROVEMENTS TO LAND (460)

In this report, the references made to potable or sanitary water are synonymous. Existing record drawings and past practices on the Site used the term, "sanitary water," however, the current preferred terminology is, "potable water" (PW).

The Integrated Site Plan shows the land allocated to the PCs (see sketch ES-W504-C01. All sketches are shown in Appendix L). Equitable parcels of land are furnished with PW and RW, liquid effluent transfer piping, electrical power services, and paved access. The PC sites are highlighted on sketch ES-W504-C01. The RW and PW lines will be placed

in the same trench with the PW line elevated on a bench to facilitate accessibility to both lines for future maintenance and service connection additions. The effluent transfer lines to the PC sites will be located on the opposite side of the road from the water lines. When the transfer lines heading south to the PC sites cross with the water lines, the single-wall effluent lines will be encased to protect the water lines.

Four fire hydrants will be installed by this infrastructure expansion (see sketch ES-W504-C02). A hydrant will be located near each PC site and the other two will be specifically located to satisfy the fire protection requirements for the subproject W-503 230 kV substation.

The boundaries for each parcel have been established by using existing record drawings and aerial mapping information. The coordinates for each corner of each parcel are shown. Following initial survey work to establish property corners and to install site monumentation, work on the road subgrade and installation of the utilities will occur. Temporary use areas are also shown for each PC on sketch ES-W504-C01, identifying the land allocated for their use during construction, i.e. for parking, laydown areas, etc.

Raw Water

Raw water will be provided to the site via a DN300 (12-in.) supply line to serve the raw and fire suppression needs of the PC. The RW line will be a looped extension of the existing 200-East Area RW system with connections at the two locations (see sketch ES-W504-C02).

One tie-in point is located 30 m (100 ft) southeast of the 242-A Evaporator on the existing 12-in. (300 mm) polyvinyl chloride (PVC) RW line. From this point, the line will proceed south along Canton Avenue for approximately 600 m (2,000 ft). The northern portion of this segment, approximately 335 m (1,100 ft), will be placed inside an abandoned 16-in.

steel cooling water (CW) line. The RW line will proceed east along the north side of the PC Loop Road and south of the 216-A-30 and 37-2 disposal crib areas to the southeast corner of the PCs parcels. The pipeline continues north along the east boundaries of the parcels, then, west along the north side of the northern parcel and returns to a second tie-in point 30 m north of the 207-A Basins on an existing 12-in. PVC RW main (see sketch ES-W504-C02, Detail 3).

The primary reason for using the abandoned 16-in. CW line is to reduce the amount of excavation through the congested areas along Canton Avenue, near and around the 241-AW Tank Farm and the 272-AW Building. Locating a clear route for a new pipeline in this area is very difficult. If a new pipeline is installed using conventional methods, much of the route would have to be excavated by hand. The traffic disruption would become a major inconvenience to Plant operations. The direction in Letter of Instruction No. 2, complying with the design requirements document (DRD) and WHC-SD-TWR-ES-002, confirms that this is the preferred route (ref 1, 6, and 7, respectively). The installation cost for hand excavating and placing pipe 1.2 to 1.8 m (4 to 6 ft) deep are over two times the estimated cost to pull a DN300 high-density polyethylene (HDPE) pipe inside the abandoned 16-in. CW line. In addition, any interferences in the hand-excavated route would escalate the cost.

At initiation of definitive design, the condition of the existing 16-in. CW line will be evaluated by inserting a video camera into the line. The camera will inspect the full length of the pipe being considered for use. Two points of access (minimum) into the pipeline will be made to facilitate the video inspection. Following is the design and subsequent installation sequence.

- The first tie-in connection will install a metal caisson to facilitate accessing the existing 12-in. RW main and to obtain entry into the existing 16-in. carbon steel CW pipeline. A 2700 mm (9-ft) inside diameter caisson will be used to install the pulleys and anchor assembly for pulling the DN300 HDPE line and to serve as a permanent manhole (see sketch ES-W504-C04). The caisson also serves as a shoring system as excavation extends approximately 4 m (13 ft) deep to access the CW pipeline. A precast HS-20-rated lid with hatch cover will be installed at finished grade to cap the caisson.
- The opposite end of the existing CW pipeline is about 1.5 m (5 ft) deep and can be excavated to expose the pipe. A 12 m (40 ft) length of the CW line will be removed to facilitate inserting the HDPE line inside the CW pipeline (see sketch ES-504-C03).
- After obtaining access to both ends of the CW line, a steel mandrel will be passed back and forth through the pipeline to verify a clear passage and to remove any obstructions that may damage the HDPE pipe.
- The HDPE pipe will be installed from the south end, the HDPE sections fused together, and the pipe pulled into the CW line until it reaches the caisson. An adapter fitting, converting the HDPE to mate-up with cast iron flanged fittings, will be fused on inside the caisson.
- After the HDPE line is installed, flushed, and hydrostatically tested, the ends of the 16-in. CW will be sealed with 150 to 300 mm (6 to 12 in.) of grout and connected to the existing RW supply line.

The northern tie-in connection can be made using standard ductile or cast-iron fittings and a gate valve (see sketch ES-W504-C05, Detail 3). The gate valve will serve as a sectional valve and will be equipped with a nonsupervised post indicator valve (PIV) extension, complete with post barricade. This will be typical for all sectional valves installed on the RW line unless the valve is located beneath the asphaltic concrete pavement, in which case, a valve box with a cast-iron lid will be installed.

On the north PC Loop Road, as the RW line crosses over the 216-A-29 ditch (Snows Canyon) embankment (constructed by subproject W-505), a DN600 nestable culvert pipe will be installed, extending a minimum of 15 m (50 ft) beyond the edge of the ditch embankment on each side. A 1.2 m (4-ft) diameter manhole will be installed at each end of the encasement to provide a monitoring point for leak detection. The manholes will double as a percolation sump and will be lined with a geotextile fabric and some gravel to allow dissipation of small amounts of water. The manholes will also provide a location for the installation of a tee and a sectional valve in the west manhole, allowing for the shutdown of the water line across the canyon in case of a pipeline break or a major leak.

Sectional valves have been spaced along the RW supply pipeline at specific locations, but not exceeding 366 m (1,200 ft) intervals to provide adequate isolation and shutoff capability for maintenance functions. Fire hydrants are located sparingly around PC Loop Road because there are no facilities or structures being threatened. The improvements proposed by the individual PCs will include fire protection amenities, including additional DN300 looped distribution pipe, fire hydrants, sectional valves, etc., within each site.

A DN200 (8-in.) RW tie-line will be installed to connect the existing 8- and 12-in. RW lines southeast of the 241-AX Tank Farm (see

sketch ES-W504-C02). This will enhance the performance and improve the reliability in the RW distribution system.

Potable Water

The PW will be supplied by a DN100 mm (4-in.) PVC pipeline connected into the existing 200-East Area PW system. An existing 4-in. PVC PW line is adjacent to the RW line, north of the 207-A Basins. The PW line will extend east to the PC site by utilizing a same trench, paralleling the northern and eastern portions of the RW loop (see sketch ES-W504-C02). The tie-in connection will be made using standard ductile or cast-iron fittings and gate valves as shown on sketch ES-W504-C05, Detail 3.

Similar to the RW line, the PW line will be encased in a DN300, nestable pipe culvert with the same 15 m extension beyond the ditch embankment. At each end of the pipeline encasement, a manhole will be installed as an inspection port to allow detection of leakage. A nonsupervised PIV and a tee with a blind flange will be installed to allow for isolating the line and for any future pipeline rerouting.

Two specific design measures are being taken to ensure flow and pressure reliability to PC sites (see sketch ES-W504-C02). The first requires the installation of a new northern tie-line that will provide a second PW source to the east side of the 200-East Area grid (see sketch ES-W504-C06). The second measure involves replacing a small portion of deteriorated 6-in. carbon steel PW pipe that remains in service near the 275-EA Building (see sketch ES-W504-C07).

The installation of a northern tie-line will significantly improve the flow and pressure characteristics of the PW system. Approximately 725 m (2,400 ft) of new DN150 (6-in.) pipe will be installed (see sketch ES-W504-C06). A tie-in point will be made on the existing 12-in. PW line located southwest of the 241-C Tank Farm, off 7th Street. The

line will continue parallel to the diagonal road heading northeast, then east along 8th Street, and across Canton Avenue where it will intersect with the existing 4-in. PW pipeline.

The route is clear of any known underground obstructions and the risk of encountering contaminated soils is low. The existing PW system has a dead-end leg serving the Treated Effluent Disposal Facility (TEDF). Installation of this tie-in line will provide a redundant source to the facilities on the east side of 200-East Area. It will also facilitate isolation capability when performing routine maintenance and when replacing the deteriorated portion of the 6-in. PW line.

Replacing the deteriorated 6-in. carbon steel PW pipe, south of the 275-EA facility, will also enhance the PW grid piping. During the winter of 1996/97, severe leaking occurred in a 75 m (250-ft) stretch of deteriorated 6-in. carbon steel PW pipe, and all but approximately 18 m (60 ft) of the pipe was removed and replaced. The small remaining length is of questionable integrity but it was left in-place because of difficulties in isolating the flow to essential facilities. Upon completion of the northern tie-line, flow can be isolated at this location without interruption to essential facilities. The work involves isolating the line, relocating the existing fire hydrant, capping-off the abandoned piping, and installing about 18 m of new DN150 PW line. Reconnecting the hydrant, flushing, testing, and disinfecting the line will complete the installation (see sketch ES-W504-C07).

Concurrent with subgrade construction on subproject W-505, subproject W-504 will install the RW and PW pipelines. A single trench will be excavated for both lines. A separation distance of 1200 mm (4 ft) will be required, allowing for accessibility for future maintenance and operation.

By coordinating construction efforts to ensure that the four subprojects are completely integrated, many activities can be performed concurrently to minimize the schedule. For example, while much of the roadwork described in subproject W-505 is underway, some of the water lines can be installed with minimal interference. The installation of the DN150 northern tie-line, the replacement of the deteriorated 6-in. carbon steel line, and the slip-lining of the 16-in. CW line with the DN300 HDPE pipe can all be accomplished concurrently with the other subprojects.

Following the subgrade preparation by subproject W-505, the RW and PW lines can be installed around the PC Loop Road, along with the liquid effluent transfer lines (subproject W-506) and the telecommunication lines (subproject W-503).

Flowmeters

Provisions will be made to install flowmeters to monitor RW or PW usage by the PCs (see sketch ES-W504-C02). Flowmeters will be installed at the PC points of delivery. The location of the flowmeter will be negotiated with the PC. The type and model of flowmeter to be used in the 200 Area RW and PW systems is unknown, however, turbine type meters are recommended, compatible with Field Data Acquisition System (FDAS) electronic monitoring hardware. Water meters will be furnished with a mechanically-operated impulse contactor for future connections to the FDAS.

Habitat Mitigation

Habitat mitigation and stabilization of disturbed areas will be provided under subproject W-505.

B. OTHER PROJECT COSTS (900)

Scanning for underground utilities is provided by subproject W-505. Unknown detected items may require additional exploratory excavations,

or potholing, to determine their origin. Scanning for two PW lines and scanning for utilities outside the PC site will be provided by subproject W-504.

An allowance for exploratory excavation some of the known lines will be made to verify pipeline location (horizontal and vertical). This is also an opportunity to verify pipeline materials and general configuration of the buried items. This information will be beneficial to the definitive design effort.

Radiation surveys will be required for the various areas being excavated. An allowance for health physics technician (HPT) coverage will be needed to cover the cost of these radiation surveys.

Isolation of the abandoned 16-in. CW pipeline will be verified prior to its use. In addition, a video inspection will be required to verify the condition of the pipeline. The pipeline is critical to design because it provides a clear path through the congested underground portion of the RW route. The CW pipeline serves as an encasement for the DN300 HDPE RW line as it courses north to the tie-in point with the existing 12-in. RW line.

C. DESIGN COMPLIANCE

The design and construction of subproject W-504 will comply with the codes and regulations listed in the project DRD.

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-504.

Engineering and Inspection (WBS 1.2)

The contracted engineer/constructor contractor will provide engineering during 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)

N/A

Fixed-Price Construction (WBS 3.2)

Construction work will be performed under fixed-price contracts managed and administered by the contracted engineer/constructor contractor.

D. PROJECT MANAGEMENT (WBS 4.0)

The performance contractor is directly responsible to the Project Hanford Management Contractor (PHMC) for performing all activities associated with this subproject. The performance contractor will be responsible for the development of overall infrastructure project plans, strategy documents, management of design/construction/startup activities and related PHMC interface activities as well as 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-504:

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 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.

VI. REQUIREMENTS AND ASSESSMENTS

A. SAFEGUARDS AND SECURITY

Parts of this project are within the 200-East Limited Security Area potentially requiring security clearance or security escorts. 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 Washington Administrative Code (WAC), 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 will be complied with during construction to minimize these risks. A primary hazard in excavating in the 200-East Area is the risk of radioactive contamination and exposure associated with the disposal of radioactive contaminated soil from the pipe trench excavation, and exposure from existing waste transfer lines that are tied into 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

No decontamination measures are anticipated for the abandoned 16-in. CW line. The line has been abandoned for several years and no decommissioning plans have been mentioned. By utilizing the CW line for this project, decommissioning will be postponed indefinitely.

Work required to replace 18 m (60 ft) of a deteriorated carbon steel PW line may encounter radiation-contaminated soils based upon recent experience. The contaminated soils were limited to a confined area and upon completion of the pipe installation, the radiation-contaminated soils were placed back into the trench as fill material. Decommissioning the abandoned segments of pipe is not required for subproject W-504.

D. PROVISIONS FOR FALLOUT SHELTERS

Provisions for fallout shelters are not required for this project.

E. MAINTENANCE AND OPERATION REQUIREMENTS

All 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 is not 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 for subproject W-504 will not be required.

2. Safety Classification

Safety classifications will be identified for those systems, components, and structures 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-4-6, "Non-Reactor Facility Safety Manual." Safety classifications are determined through analysis and consequences of failure based on information contained in the project DRD and safety analysis documents. The resulting safety classifications form the basis for the Hanford design and quality assurance requirements applied to the project. General Services is the highest level anticipated for any element of the proposed RW or PW systems.

H. ENVIRONMENTAL COMPLIANCE

The design and construction of subproject W-504 will comply with the following environmental regulations:

10 CFR 1021, "National Environmental Policy Act (NEPA)."

36 CFR 800, "Protection of Historical and Cultural Properties."

50 CFR 402, "Interagency Cooperation - Endangered Species Act."

DOE Order 5440.1E, "Compliance with the National Environmental Policy Act."

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

WAC-173-160, "Minimum Standards For Construction And Maintenance Of Wells; Part Three, Resource Protection Wells."

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.

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.

Installing RW and PW 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 during the activities, 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.

I. PERMITS

The WDOH may require a NOC if underground radioactive material areas are discovered during subproject W-504 activities. The construction activities will require a Washington State Waste Discharge Permit for Hydrotesting Maintenance and Construction, Permit No. ST 4508. The PW system design will require approval by the State of Washington.

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 microcomputer program P2-EDGE (ref 8), a P2/WMin opportunities list was prepared for subproject W-504. 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

A. POTABLE WATER

Underground Interferences

The proposed location of the PW line has not been scanned for existing underground interferences. Undetermined utility lines may alter the anticipated routes.

Potential for Contaminated Soil

Efforts have been made to route the proposed PW line improvements away from areas of radioactive or hazardous waste contamination. However, adjacent to 275-EA and the 241-C Tank Farm, subsurface contamination may exist and the areas need to be scanned and monitored for radiation prior to and during construction.

Water Supply Flow, Pressure, and Quality

RL has committed contractually to supply each PC with 95 lpm (25 gpm) per PC (24-hr average) or a total of 190 lpm (50 gpm). In comparison, the DRD has specified that a total of 245 lpm (65 gpm) (24-hr average) will be used for design when determining the size of the water supply piping. A cursory review of the hydraulics indicate that the existing PW system can supply 735 lpm (195 gpm) peak flow demand at a minimum pressure of 483 kPa (70 psi). This is based on the DRD figure, 245 lpm, with a peaking factor of 3 for a maximum flow condition. A water balance analysis is recommended at initiation of definitive design to verify the available flow and pressure.

Though the design appears conservative, there is a concern for flow stagnation in the PW system. The supply main may require a chlorine injection system to maintain water quality. A review of this concern during definitive design is prudent.

B. RAW WATER**Underground Interferences**

The proposed location of the RW line has not been scanned for existing underground interferences. Undetermined utility lines may alter the anticipated location.

Condition of the Abandoned 16-in. CW Pipeline

The CW pipeline has been abandoned and out of service for several years. Using the line as a host pipe for the HDPE is of concern. The following actions should be taken in the interim prior to the start of definitive design.

- Verify that the south end of the line has been blanked-off with a blind flange as shown in 241-A-201 valve pit on drawing H-2-55996. Determine if access can be made at this location to insert a video camera for inspection purposes.
- Verify that the north end of the line has been isolated. Other than valving in the 241-A-401 and 241-A-501 Buildings, isolation of the line has not been verified. Reference drawings H-2-56129, H-2-56789, and H-2-56789.
- The condition of the inside surface has not been verified. The CW line may be filled with water. Due to corrosion and rust buildup, the inside surface of the pipe may have to be cleaned and smoothed to avoid damaging the HDPE pipe during installation.
- An allowance for performing potholing, to gain entry into the CW pipeline for video inspections is recommended should other avenues of entry prove to be impractical or not available.
- In the process of performing the above evaluations, verify if the existing CW pipe or the contents within it are radioactively contaminated.

Potential for Contamination

Efforts have been made to route the proposed RW line improvements away from areas of radioactive contamination. However, with the proposed RW being adjacent to the 242-A Evaporator and the 216-A-8, 216-A-30, and 216-A-37-2 cribs and within the existing 16-in. CW pipeline, subsurface contamination may exist. Since there is a reasonable potential for contamination, core samples of the soil are recommended to assess the soil conditions.

Water Supply Flow and Pressure

RL has committed contractually to supply 760 lpm (200 gpm) to each PC (24-hr average) of process RW or a total of 1520 lpm (400 gpm) and provide up to a total of 9450 lpm (2500 gpm) of fire water to be shared between the PCs. In comparison, the DRD has combined the needs of both PCs requiring a total of 1090 lpm (290 gpm) (24-hr average) and matching the fire flow noted above, but adding a minimum 345 kPa (50 psi) for minimum duration of 4 hours. The pipe size will be DN300 (12 in.) as governed by National Fire Protection Agency (NFPA) 24, DOE Order 6430.1A, and RL Implementing Directive (RLID) 5480.7. A preliminary water balance analysis was performed which resulted favorably in satisfying the design requirements (ref 9).

Detrimental Effects of DN200 Inter-tie

The preliminary RW system analysis was performed to determine the system capability. Recommendations within this analysis find that improved flow conditions will occur if a DN200 RW inter-tie is made east of the 241-AX Tank Farms. Based on this recommendation, the LOI requests that this inter-tie be made part of subproject W-504. However, reservations have been expressed about making this connection. Questions exist regarding the location and integrity of the 40-yr old pipeline. Drawings indicate that schedule 40 carbon steel was originally installed. Making this tie-in and subjecting the old line to reverse flow conditions may have detrimental affects on the old line. The consequence of making this tie-in connection may result in replacing the existing line, in part or in its entirety, earlier than previously planned.

In addition, the soil conditions and underground interferences where the crossing will be made are suspect. The potential for finding contaminated soils is high and the presence of the 36-in. CMP liquid effluent drain line complicates this connection. The added benefit of making this connection may be outweighed by the risk it suggests to the existing pipeline.

C. CONTROL OF CONTAMINATED SOILS

During soil excavations, hazardous or radioactive-contaminated soils may be encountered. If rerouting or realigning to avoid the contaminated site is impracticable, removal of the contaminated soil will be addressed on a case-by-case basis. Handling contaminated soils will have an adverse impact to the cost and schedule of the project.

The cost and schedule impacts will be governed by the level of contamination. The safety and procedural methods used in response to handling contaminated materials are determined by the source. What additional resources will be required are impossible to predict. However, there are costs associated with the handling, packaging, and the burial costs, and the monitoring support from the HPT. A contingency will be added to cover cost and schedule impacts resulting from delays caused by special dress requirements, packaging excavated material, coordinating the transportation of packaged waste using regulated vehicles, etc. The level of contamination will remain unknown until a radiological assessment can be completed.

VIII. REFERENCES

A. DOCUMENTS

1. Letter of Instruction No. 2, Subproject W-504, Tarik Choho (Numatec Hanford Corporation) to J. L. Henderson (Fluor Daniel Northwest), "TWRS Privatization Phase I Raw and Sanitary Water," NHC-9750683, January 31, 1997.
2. Letter of Instruction No. 3, Subproject W-504, R. J. Parazin (Numatec Hanford Corporation) to B. C. Harmon (Fluor Daniel Northwest), "TWRS Privatization Phase I Raw and Sanitary Water," NHC-9752787, March 31, 1997.

3. 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.
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. Design Requirements Document, "TWRS Privatization Phase I Raw and Potable Water Supply Systems," WHC-SD-WM-DRD-015, Rev. 0, prepared by ICF Kaiser Hanford Company, September 1996.
7. Engineering Study, "TWRS Privatization Phase I Raw and Potable Water Service Engineering Study," WHC-SD-TWR-ES-002, Rev. 0, prepared by Westinghouse Hanford Company, September 1996.
8. Microcomputer Program P2-EDGE, Version 2.0, "Pollution Prevention Environmental Design Guide for Engineers," Pacific Northwest National Laboratory, 1996.
9. Letter Report, "Tank Waste Remediation System Privatization Phase I, Water Balance Analysis," E23385LR, prepared by ICF Kaiser Hanford Company, September 1996.
10. Interface Control Document, "Interface Control Document for Raw Water," WHC-SD-WM-ICD-034, Rev. 0, prepared by Westinghouse Hanford Company, January 1996.

11. Interface Control Document, "Interface Control Document for Potable Water," WHC-SD-WM-ICD-035, Rev. 0, prepared by Westinghouse Hanford Company, January 1996.

B. CODES AND STANDARDS

1. **Code of Federal Regulations**

10 CFR 1021, "National Environmental Policy Act Implementing Procedures."

36 CFR 800, "Protection of Historical and Cultural Properties."

50 CFR 402, "Interagency Cooperation - Endangered Species Act."

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

DOE Order 5440.1E, "Compliance with the National Environmental Policy Act."

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

Order 6430.1A, "General Design Criteria."

3. **Washington Administrative Code**

WAC-173-160, "Minimum Standards For Construction And Maintenance Of Wells; Part Three, Resource Protection Wells."

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

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

C. DRAWINGS

H-2-32981, Sh. 1, Rev. 1	3 in. Sanitary Water Line to 241-AX
H-2-34505, Sh. 1, Rev. 1	Civil Water Supply Sludge Transfer Facilities for Tank 241-A-101
H-2-34874, Sh. 1, Rev. 5	Fire Hydrant Map, 200 East
H-2-36535, Sh. 1, Rev. 18	Sanitary & Raw Water Map, 200-East Area
H-2-36535, Sh. 7, Rev. 1	Sanitary & Raw Water Map, 200-East Area
H-2-36535, Sh. 8, Rev. 0	Sanitary & Raw Water Map, 200-East Area
H-2-36535, Sh. 10, Rev. 2	Sanitary & Raw Water Map, 200-East Area
H-2-43409, Sh. 1, Rev. 2	3 in. Sanitary Water 241-C Tank Farm
H-2-55900, Sh. 1, Rev. 9	Plot Plan
H-2-55993, Sh. 1, Rev. 3	16 in. Cooling Water Line Plan & Profile PUREX Waste Disposal Facility
H-2-55994, Sh. 1, Rev. 4	8 in. Raw Water Plan & Profile PUREX Waste Disposal Facility
H-2-55994, Sh. 2, Rev. 4	8 in. Raw Water Plan & Profile PUREX Waste Disposal Facility
H-2-55995, Sh. 1, Rev. 3	16 in. Cooling Water & 8 in. Raw Water Section & Details

H-2-55996, Sh. 1, Rev. 4	750,000 gal. Cooling Water Storage Tank Contractor Information
H-2-56038, Sh. 1, Rev. 4	Control House 241-A-271 Equipment Arrangement & Piping
H-2-56114, Sh. 1, Rev. 1	Contact Condensed Installation Plot Plan
H-2-56115, Sh. 1, Rev. 2	Contact Condensed Installation General Layout
H-2-56121, Sh. 1, Rev. 2	Control Valve Pit Structural
H-2-56125, Sh. 1, Rev. 4	Vapor Header Condenser Arrgt
H-2-56126, Sh. 1, Rev. 4	Contact Condenser Installation Water Supply & Drain Piping-Arrgt
H-2-56129, Sh. 1, Rev. 7	Contact Condenser 241-A-501 Valve Pit Piping Arrangement
H-2-56135, Sh. 1, Rev. 1	Extension of 8 in. Raw Water & 16 in. Cooling Water Plan & Profile
H-2-56395, Sh. 1, Rev. 0	Temporary Construction Water Line Locations "As Built"
H-2-56789, Sh. 1, Rev. 4	16 in. Cooling Water Plan & Profile to 241-A-401 Condenser
H-2-56797, Sh. 1, Rev. 1	241-A-401 Waste Cooling Water Plan & Profile

H-2-57285, Sh. 1, Rev. 4	241-A-401 Equipment Arrangement Plan
H-2-61974, Sh. 1, Rev. 2	Civil Plan & Profile 6 in. San. Water Ln. No. 850 & 8 in. Raw Water Ln. No. 849
H-2-61975, Sh. 1, Rev. 2	216-A-41 Crib, Plan & Profile of 6 in. San. Water Ln. No. 850 & 8 in. Raw Water Ln. No. 849
H-2-69267, Sh. 1, Rev. 6	Civil Plot Plan
H-2-69288, Sh. 1, Rev. 1	Civil 4 in. Sanitary & 14 in Raw Water Plan, Profile & Details
H-2-71902, Sh. 1, Rev. 1	Civil Site Preparation Plan 241-AN Tank Farm
H-2-72414, Sh. 2, Rev. 3	Civil Site Plan Profiles and Details
H-2-76481, Sh. 1, Rev. 2	Piping Plan Raw & Sanitary Water
H-2-76481, Sh. 2, Rev. 2	Piping Plan Raw & Sanitary Water
H-2-81238, Sh. 1, Rev. 3	Sanitary and Raw Water Systems Routing Plan
H-2-81238, Sh. 2, Rev. 3	Sanitary and Raw Water Systems Routing Plan
H-2-81238, Sh. 3, Rev. 3	Sanitary and Raw Water Systems Routing Plan

H-2-81238, Sh. 4, Rev. 3	Sanitary and Raw Water Systems Routing Plan
H-2-88720, Sh. 1, Rev. 1	Key Plan and Drawing List 12" Fire Water and 4" Sanitary Water
H-2-88722, Sh. 1, Rev. 1	Civil Plan/Profile and Details 242A Tie-in
H-2-88723, Sh. 1, Rev. 2	Civil Plan/Profile 12" Fire Water & 4" SW Lines
H-2-88724, Sh. 1, Rev. 1	Civil Plan/Profile 12" Fire Water & 4" SW Lines
H-2-88724, Sh. 2, Rev. 1	Civil Plan/Profile 12" Fire Water & 4" SW Lines
H-2-88725, Sh. 1, Rev. 2	Civil Plan and Details 12" Fire Water & 4" SW Lines
H-2-88726, Sh. 1, Rev. 2	Civil Profiles 12" Fire Water & 4" SW Lines
H-2-88727, Sh. 1, Rev. 1	Civil Plan/Profile and Details 12" Fire Water
H-2-88728, Sh. 1, Rev. 1	Civil Plan/Profile 12" Fire Water
H-2-88728, Sh. 2, Rev. 0	Civil Plan/Profile 12" Fire Water
H-2-88729, Sh. 1, Rev. 1	Civil Details
H-2-88729, Sh. 2, Rev. 1	Civil Details

H-2-88729, Sh. 3, Rev. 0 Civil Details

H-2-131002, Sh. 1, Rev. 0 Civil Project Site Plan

H-2-131003, Sh. 1, Rev. 0 Civil Bldg. Site Plan

H-2-131004, Sh. 1, Rev. 0 Civil Plan & Profile Raw Water

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 (N/A)
 - 3.2 Fixed-Price Construction (Construction Contractor)
- 4.0 PROJECT MANAGEMENT (Performance Contractor)
- 5.0 OTHER PROJECTS COSTS (Expense Funded)
 - 5.1 Project Definition (Performance Contractor)
 - 5.2 Conceptual Design (Contracted Engineer/Constructor Contractor)
 - 5.3 Project Technical Support (Performance Contractor)

APPENDIX B

Budget Authorized/Budget Outlay Schedule

SUB-PROJECT W-504
TWRS PRIVATIZATION PH. I RAW AND SANITARY WATER SYSTEMS
BA / BO SCHEDULE

	TOTAL COST	FY 1996				FY 1997				FY 1998				FY 1999				FY 2000			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1.0 ENGINEERING																					
1.1 DEFINITIVE DESIGN	240																				
1.2 E / I DURING CONST	160																				
3.0 CONSTRUCTION																					
3.2 FIXED PRICE CONST.	980																				
4.0 PROJ MANAGEMENT	260																				
5.0 OTHER PROJ COSTS	970																				
		210 / 210				320 / 320				300 / 260				140 / 120				0 / 60			
TOTALS BA / BO	2610	210 / 210				320 / 320				300 / 260				1780 / 1600				0 / 220			
DOLLARS IN THOUSANDS																					

APPENDIX C

Cost Estimate Summary

TWRS PRIVATIZATION PHASE I RAW AND SANITARY WATER
CONCEPTUAL ESTIMATE
PROJECT COST SUMMARY

DATE 06/05/97

DESCRIPTION	MAN HOURS	COST	SALES TAX	OH&P	B&I	CONTR OH&P	ESCLAT	CONTR	PHMC ADDERS	TOTAL COST
	H	\$	%	%	%	%	%	%	%	\$
ENGINEERING	3891	327066	0.00%	0.72%	0.00%	3.68%	14.90%	24.43%		467389
CONCEPTUAL DESIGN	0	87000	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		87000
DEFINITIVE DESIGN	2214	143051	0.00%	1.66%	0.00%	4.06%	20.00%	33.29%		236277
ENGINEERING AND INSPECTIONS	1417	97015	0.00%	0.00%	0.00%	6.08%	20.00%	33.29%		164612
CONSTRUCTION FIXED PRICE	0	555439	0.00%	0.00%	4.08%	6.17%	20.00%	12.18%		975020
CONSTRUCTION MANAGEMENT	0	120715	0.00%	0.00%	0.00%	6.17%	20.00%	33.04%		204609
FIXED PRICE CONSTRUCTION	0	534718	0.00%	0.00%	5.00%	6.17%	20.00%	7.70%		770411
PROJECT MANAGEMENT	2969	238539	0.00%	0.00%	0.00%	0.00%	10.00%	0.00%		262392
PROJECT MANAGEMENT	2969	238539	0.00%	0.00%	0.00%	0.00%	10.00%	0.00%		262392
OTHER PROJECT COST	4183	346908	0.00%	0.00%	0.00%	0.00%	3.80%	0.00%		389498
PROJECT DEFINITION	1460	292106	0.00%	0.00%	0.00%	0.00%	3.70%	0.00%		302916
PROJECT TECHNICAL SUPPORT	2723	554802	0.00%	0.00%	0.00%	0.00%	5.31%	0.00%		584282
SUB-TOTAL PROJECT COST	10783	\$2,067,946	0.00%	0.11%	1.29%	2.57%	12.08%	8.37%		\$2,612,501
ADJUSTED/ROUNDED										(12,501)
TOTAL PROJECT COST										\$2,600,000

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

FLUOR DANIEL NORTHWEST, INC.
NUMATEC HANFORD CORP
JOB NO. W504/P2GE08
FILE NO. W5048AA3

** TEST - INTERACTIVE ESTIMATING **
THRS PRIVATIZATION PHASE 1 RAW AND SANITARY WATER
CONCEPTUAL ESTIMATE
PHMCR02 - WORK BREAKDOWN STRUCTURE (WBS) SUMMARY

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WBS	DESCRIPTION	ESTIMATE SUBTOTAL	ESCALATION % TOTAL	SUB TOTAL	CONTINGENCY % TOTAL	SUB TOTAL	SITE ALLOCATION	TOTAL DOLLARS		
110000	DEFINITIVE DESIGN	145422	4.06	5904	151326	20	30265	236277		
120000	ENGINEERING AND INSPECTION	97015	6.08	5901	102916	20	20583	164612		
SUBTOTAL 1	ENGINEERING	242437	4.87	11805	254242	20	50848	400889		
324001	8TH STREET SW WATERLINE CO #6	67060	6.17	4137	71198	20	14239	95847		
324002	275-EA BLDG SW LINE REPAIR CO#7	13397	6.17	826	14224	20	2844	19149		
324003	HDPE PIPE IN EXISTING LINER CO#3/#4	53327	6.17	3290	56617	20	11323	76219		
324004	4" SANITARY WATERLINE CO#2/#5	118915	6.17	7337	126252	20	25250	169962		
324005	12" RAW WATER LOOP	405055	6.17	24991	430047	20	86009	578933		
324006	8" RAW WATER CROSS TIE	24423	6.17	1506	25930	20	5186	34908		
SUBTOTAL 324	W-504 FP CONSTRUCTION COSTS	682181	6.17	42090	724271	20	144854	975020		
SUBTOTAL 3	CONSTRUCTION	682181	6.17	42090	724271	20	144854	975020		
400000	PROJECT MANAGEMENT	238539	0.00	0	238539	10	23853	0	262392	
SUBTOTAL 4	PROJECT MANAGEMENT	238539	0.00	0	238539	10	23853	0	262392	
510000	PROJECT DEFINITION	292106	0.00	0	292106	4	10810	302916	0	
520000	CONCEPTUAL DESIGN	87000	0.00	0	87000	0	0	87000	0	
530000	PROJECT TECHNICAL SUPPORT	554802	0.00	0	554802	5	29480	584282	0	
SUBTOTAL 5	OTHER PROJECT COSTS	933908	0.00	0	933908	4	40290	974198	0	
PROJECT TOTAL		2,097,065	2.57	53,895	2,150,961	12	259,847	2,410,808	201,693	2,612,501

FLUOR DANIEL NORTHWEST, INC.
NUMATEC HANFORD CORP
JOB NO. W504/P2GE08
FILE NO. W504BAA3

**** TEST - INTERACTIVE ESTIMATING ****
THRS PRIVATIZATION PHASE I RAW AND SANITARY WATER
CONCEPTUAL ESTIMATE
PHMCR03 - ESTIMATE BASIS SHEET

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BY KLR/BPL

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-504 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:
REQUEST FOR ESTIMATE DATED 3/20/97, CDR HNF-SD-W504-CDR-001 REVISION 0 DATED JUNE 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 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 COST FOR FLUOR DANIEL HANFORD AND NUMATEC 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) CONTRACT ADMINISTRATION FACTOR OF 21.5% HAS BEEN APPLIED TO THE DIRECT CONTRACT VALUE WHICH INCLUDES COSTS FOR BID PACKAGE PREPARATION, CONTRACT MANAGEMENT & ADMINISTRATION AND PLANNING SUPPORT.
- (3) A FACTOR OF 0.25% FOR HOME OFFICE ENGINEERING TO ALLOW FOR USAGE OF GOVERNMENT OWNED EQUIPMENT CONTROLLED BY DYNACORP.

C. INDIRECT COSTS

FIXED PRICE CONTRACTOR COSTS ARE UNIT PRICE THEY APPEAR IN SUBCONTRACT COLUMN AND INCLUDE CONTRACTORS OR&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.

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.
- (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).

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FLUOR DANIEL NORTHWEST, INC.
NUMATEC HANFORD CORP
JOB NO. W504/P22G08
FILE NO. W504BAA3

** TEST - INTERACTIVE ESTIMATING **
THRS PRIVATIZATION PHASE I RAW AND SANITARY WATER
CONCEPTUAL ESTIMATE
PHNCR03 - ESTIMATE BASIS SHEET

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FDNW APPLIES THE ABOVE FACTORS TO ESTIMATED COSTS AS FOLLOWS:

- (1) FDH GFS/G&A CM FACTOR: A COMPOSITE FACTOR OF 33.04% 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 MATERIAL G&A/FEE RATE FACTOR OF 7.7% HAS BEEN APPLIED TO THE FDNW FIXED PRICE CONSTRUCTION CONTRACT VALUE.
- (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 MANAGEMENT LABOR = 33.04%.

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.

B. CONTINGENCY ALLOWANCE GUIDELINES:

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

6. 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.

7. 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 DUE TO THE PRELIMINARY STAGE OF DESIGN.

WBS 1.2. A CONTINGENCY OF 20% HAS BEEN APPLIED BECAUSE THE PERCENTAGE USED WAS TAKEN OFF OF CONSTRUCTION DIRECT DOLLARS.
SEE COMMENTS ON W.B.S. 32

WBS 3.2. A CONTINGENCY OF 20% HAS BEEN APPLIED DUE TO THE PRELIMINARY STAGE OF DESIGN AND UNCERTAINTY CONCERNING UNDERGROUND OBSTRUCTIONS WITHIN THE UTILITY CORRIDOR.

WBS 4.0. A CONTINGENCY OF 10% HAS BEEN APPLIED PER CLIENT REQUEST.

WBS 5.1. A CONTINGENCY OF 4% HAS BEEN APPLIED PER CLIENT REQUEST.

WBS 5.2. A CONTINGENCY OF 0% HAS BEEN APPLIED BECAUSE CONTINGENCY IS INCLUDED IN THE COST.

WBS 5.3. A CONTINGENCY OF 5% HAS BEEN APPLIED PER CLIENT REQUEST.

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FLUOR DANIEL NORTHWEST, INC.
NUMATEC HANFORD CORP
JOB NO. W504/P2GE08
FILE NO. W504BAA3

** TEST - INTERACTIVE ESTIMATING **
THRS PRIVATIZATION PHASE I RAW AND SANITARY WATER
CONCEPTUAL ESTIMATE
PHMCRO3 - ESTIMATE BASIS SHEET

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8. 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 CATEGORIES.
THE TOTAL PROJECT COST ARE ADJUSTED/ROUNDED TO THE NEAREST \$10,000/\$100,000.

9. REMARKS

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

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

- A.) ALL CONSTRUCTION WORK IS TO BE DONE BY FIXED PRICE CONTRACTOR
- B.) E & I WERE ESTIMATED AS A DIRECT PERCENTAGE OF CONSTRUCTION.
- C.) FDNW PROJECT MANAGEMENT AND DEFINITIVE DESIGN WERE MANLOADED BY FDNW PROJECT MANAGEMENT.
- D.) PORTIONS OF PROJECT W-505 MUST BE COMPLETED IN CONJUNCTION WITH THIS PROJECT.
- E.) ALL NUMATEC COSTS WERE PROVIDED BY FDNW PROJECT MANAGEMENT AND NUMATEC HANFORD INC.
- F.) OTHER PROJECT COSTS FOR PRIOR YEARS (FY96 AND FY97) ARE BASED ON ACTUAL EXPENDITURES, FISCAL YEAR 97 BUDGETS AND ESTIMATES TO COMPLETE. FISCAL YEARS 98, 99, 00 AND 01 REFLECT THE LATEST INFORMATION FROM DESIGN REQUIREMENTS DOCUMENTS, STUDIES, AND PLANS COMPLETED TO DATE. COST 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 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 FY98 MULTI YEAR WORK PLAN.

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FLUOR DANIEL NORTHWEST, INC.
 NUMATEC HANFORD CORP
 JOB NO. W504/P20E08
 FILE NO. W504BAA3

** TEST - INTERACTIVE ESTIMATING **
 THRS PRIVATIZATION PHASE I RAW AND SANITARY WATER
 CONCEPTUAL ESTIMATE
 PHMCR05 - CONSTRUCTION MANAGEMENT/OTHER COST SUMMARY

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WBS	DESCRIPTION	ESTIMATE SUBTOTAL	CONSTRUCTION %	MANAGEMENT TOTAL	OTHER COSTS	SUB TOTAL	TOTAL
=====	=====	=====	=====	=====	=====	=====	=====
110000	DEFINITIVE DESIGN	145422	0.00	0	0	0	145422
120000	ENGINEERING AND INSPECTION	97015	0.00	0	0	0	97015
SUBTOTAL 1	ENGINEERING	242437		0	0	0	242437
324001	8TH STREET SW WATERLINE CO #6	55194	21.50	11866	0	11866	67060
324002	275-EA BLDG SW LINE REPAIR CO#7	11027	21.50	2370	0	2370	13397
324003	HDPE PIPE IN EXISTING LINER CO#3/#4	43891	21.50	9436	0	9436	53327
324004	4" SANITARY WATERLINE CO#2/#5	97873	21.50	21042	0	21042	118915
324005	12" RAW WATER LOOP	333379	21.50	71676	0	71676	405055
324006	8" RAW WATER CROSS TIE	20102	21.50	4321	0	4321	24423
SUBTOTAL 324	W-504 FP CONSTRUCTION COSTS	561466		120715	0	120715	682181
SUBTOTAL 3	CONSTRUCTION	561466		120715	0	120715	682181
400000	PROJECT MANAGEMENT	238539	0.00	0	0	0	238539
SUBTOTAL 4	PROJECT MANAGEMENT	238539		0	0	0	238539
510000	PROJECT DEFINITION	292106	0.00	0	0	0	292106
520000	CONCEPTUAL DESIGN	87000	0.00	0	0	0	87000
530000	PROJECT TECHNICAL SUPPORT	554802	0.00	0	0	0	554802
SUBTOTAL 5	OTHER PROJECT COSTS	933908		0	0	0	933908
PROJECT TOTAL		1,976,350		120,715	0	120,715	2,097,065

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FLUOR DANIEL NORTHWEST, INC.
NUMATEC HANFORD CORP
JOB NO. W504/P2GE08
FILE NO. W504BAA3

** TEST - INTERACTIVE ESTIMATING **
TWRS PRIVATIZATION PHASE I RAW AND SANITARY WATER
CONCEPTUAL ESTIMATE
PHMCR06 - SITE ALLOCATIONS BY WBS

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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	145422	328	0	0	43464	0	43793
120000	ENGINEERING AND INSPECTION	97015	242	0	0	32053	0	32296
SUBTOTAL 1	ENGINEERING	242437	571	0	0	75518	0	76089
324001	8TH STREET SW WATERLINE CO #6	55194	0	3920	4249	0	0	8170
324002	275-EA BLDG SW LINE REPAIR CO#7	11027	0	783	849	0	0	1632
324003	HDPE PIPE IN EXISTING LINER CO#3/#4	43891	0	3117	3379	0	0	6497
324004	4" SANITARY WATERLINE CO#2/#5	97873	0	6952	7536	0	0	14488
324005	12" RAW WATER LOOP	333379	0	23681	25670	0	0	49352
324006	8" RAW WATER CROSS TIE	20102	0	1427	1547	0	0	2975
SUBTOTAL 324	W-504 FP CONSTRUCTION COSTS	561466	0	39884	43232	0	0	83117
SUBTOTAL 3	CONSTRUCTION	561466	0	39884	43232	0	0	83117
400000	PROJECT MANAGEMENT	238539	0	0	0	0	0	0
SUBTOTAL 4	PROJECT MANAGEMENT	238539	0	0	0	0	0	0
510000	PROJECT DEFINITION	292106	0	0	0	0	0	0
520000	CONCEPTUAL DESIGN	87000	0	0	0	0	0	0
530000	PROJECT TECHNICAL SUPPORT	554802	0	0	0	0	0	0
SUBTOTAL 5	OTHER PROJECT COSTS	933908	0	0	0	0	0	0
PROJECT TOTAL		1,976,350	571	39,884	43,232	75,518	0	159,206

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FLUOR DANIEL NORTHWEST, INC.
NUMATEC HANFORD CORP
JOB NO. W504/P2GE08
FILE NO. W5048AA3

** IEST - INTERACTIVE ESTIMATING **
TWRS PRIVATIZATION PHASE I RAW AND SANITARY WATER
CONCEPTUAL ESTIMATE
PHMCRO7 - SITE ALLOCATION ESCALATION/CONTINGENCY REPORT.

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WBS	DESCRIPTION	SITE ALLOC SUBTOTAL	ESCALATION % TOTAL	SUB TOTAL	CONTINGENCY % TOTAL	TOTAL DOLLARS	
=====	=====	=====	=====	=====	=====	=====	
110000	DEFINITIVE DESIGN	43793	4.06	1778	20	9114	54685
120000	ENGINEERING AND INSPECTION	32296	6.08	1964	20	6852	41112
SUBTOTAL 1	ENGINEERING	76089	4.92	3742	20	15966	95798
324001	8TH STREET SW WATERLINE CO #6	8170	6.17	504	20	1734	10409
324002	275-EA BLDG SW LINE REPAIR CO#7	1632	6.17	100	20	346	2079
324003	HDPE PIPE IN EXISTING LINER CO#3/#4	6497	6.17	400	20	1379	8278
324004	4" SANITARY WATERLINE CO#2/#5	14488	6.17	893	20	3076	18459
324005	12" RAW WATER LOOP	49352	6.17	3045	20	10479	62876
324006	8" RAW WATER CROSS TIE	2975	6.17	183	20	631	3791
SUBTOTAL 324	W-504 FP CONSTRUCTION COSTS	83117	6.17	5128	20	17649	105894
SUBTOTAL 3	CONSTRUCTION	83117	6.17	5128	20	17649	105894
400000	PROJECT MANAGEMENT	0	0.00	0	0	0	0
SUBTOTAL 4	PROJECT MANAGEMENT	0	0.00	0	0	0	0
510000	PROJECT DEFINITION	0	0.00	0	0	0	0
520000	CONCEPTUAL DESIGN	0	0.00	0	0	0	0
530000	PROJECT TECHNICAL SUPPORT	0	0.00	0	0	0	0
SUBTOTAL 5	OTHER PROJECT COSTS	0	0.00	0	0	0	0
PROJECT TOTAL		159,206	5.57	8,870	20	33,615	201,693

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STATEMENT OF WORK
FOR
PERFORMANCE CONTRACTOR - OTHER PROJECT COSTS

SUB-PROJECT W-504

TWRS Privatization Phase I - Raw and Potable Water

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 & 2000), 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 contract 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.
- Provide for Soil Sampling for potential contamination.
- 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
- Water Systems Engineering/Reviews
- Environmental Reviews
- Infrastructure Design Review Support

- USQ and other safety related support
- Department of Health approval - Potable Water
- Operations reviews and support as required
- ATP, OTP, ORR support as required
- Quality Assurance Planning and Implementation
- Safety Planning and Implementation
- Utilities 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-504, Raw and Potable Water

WORK ORDER : E23391
LE : Kirt D. Bare (Civil)
PLE : David L. Fort
PE : Brian C. Harmon

PROJECT SCOPE:

Subproject W-504 is one of four projects that make up the TWRS privatization infrastructure project. This subproject provides the water infrastructure and interfaces necessary to support the demonstration phase (Phase I) of the TWRS privatization.

Subproject W-504 will provide the raw and potable water lines to supply the water requirements to the PC sites. Upgrades to the existing potable water system are also included to improve the reliability and flow characteristics to the PC site.

RESPONSIBILITIES:

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

REFERENCES:

1. Conceptual Design Report, TWRS Privatization Phase I Raw and Potable Water, Subproject W-505, HNF-SD-W504-CDR-001, Rev. 0.
2. Interface Control Document for Raw Water, WHC-SD-WM-ICD-034, Rev. 0.
3. Interface Control Document for Potable Water, WHC-SD-WM-ICD-035, Rev. 0.
4. Engineering Study, TWRS Privatization Phase I Raw and Potable Water Service, WHC-SD-TWR-ES-002, Rev. 0.
5. Design Requirements Document for TWRS Privatization Phase I, Raw and Potable Water Supply Systems, WHC-SD-WM-DRD-015, Rev. 0.
6. Letter Report, Tank Waste Remediation System Privatization Phase I Water Balance Analysis, E23385LR, dated 9/30/96, by T. Ambalam.

DELIVERABLES:

1. Civil Drawings (11 each).
2. Construction Specification: W-504-C1.

CRITERIA DOCUMENTS:

1. Design Requirements Document for TWRS Privatization Phase I, Raw and Potable Water Supply Systems, WHC-SD-WM-DRD-015, Rev. 0.
2. DOE 6430.1A - General Design Criteria.

ASSUMPTIONS:

1. The design will satisfy the General Services design requirements.
2. Adequate flow and pressure are available to meet the design requirements for raw and potable water supply. It is not anticipated that a flow analysis will be required.
3. No contaminated soils are anticipated.
4. The existing 16" CW line is accessible and can be used as proposed for the installation of the DN300 HDPE pipe within it.
5. The raw and potable water lines will be installed as shown on the sketches ES-W504-C01 through ES-W504-C07 and ES-W505-C07 and ES-W505-C08.

MILESTONES AND TARGET DATES:

The Definitive Design schedule is as follows:

Definitive Design	Apr 1998-Aug 1998
Project Complete	Oct 1999

RESTRAINTS:

1. Survey and Scanning activities need to be accomplished before the definitive design can start. The schedule will be directly impacted upon a timely receipt the survey data.

APPENDIX D

Conceptual Project Schedule

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Plot Date	1JUN97	Activity Ref/Early Date	5504	Sheet 1 of 1	FDNR
Date Data	29DEC97	Critical Activity			
Project Start	29DEC97	Program Ref			
Project Finish	1FEB02	Milestone/Flag Activity			
SUB-PROJECT W-504 CONCEPTUAL SCHED.					
PRIVATIZATION INFRASTRUCTURE PHASE I					
RAW AND SANITARY WATER					
<div>SAW</div>					
(c) Primavera Systems, Inc.					

APPENDIX E

Outline Specification

OUTLINE SPECIFICATION

DIVISION 2 - SITEWORK

Section 02200 Earthwork

1. Loadbearing backfill, compacted.
2. Bedding: Sand cushion for pipe, compacted.
3. Control Density Fill: See Section 02237. Material substituted for common and structural backfill and bedding.
4. Plastic sheet marker for buried piping.
5. Soil compaction testing.

Section 02235 Road Subgrade and Granular Base

1. Base Course: WSDOT M 41-10
2. Leveling Course: WSDOT M 41-10

Section 02237 Controlled Density Fill

1. Flowable Concrete Piping Backfill: Design strength 345 to 690 kPa (50 to 100 psi).

Section 02380 Caissons

1. Caisson: Bolted galvanized cold-formed steel corrugated multi-plate liner, 2.4 m (9 ft) diameter, 6 mm (1/4 in.) minimum thickness.
2. Pressure Grout: 1 part cement, 3 part sand.
3. Ladder: Galvanized steel for egress.

Section 02512 Hot-Laid Asphaltic Concrete Pavement

1. Asphalt concrete pavement for pavement repairs, WSDOT M 41-10.
 - a. Asphalt: AR-4000-W.
 - b. Aggregate: Class A or B, and G

Section 02650 Piped Utilities

1. Potable Water Piping:
 - a. PVC: AWWA C900, Class 150.

- b. Ductile Iron, Cement Lined: AWWA C151 and C104, Class 50, with C111 joints.
 - c. HDPE: AWWA C906, PE 3408.
- 2. Fittings: Ductile iron; PVC; or
 - a. PVC: Ductile iron, AWWA C110/C111, lined.
 - b. Ductile Iron: AWWA C110/C111, lined.
 - c. HDPE: HDPE extruded elbows.
- 3. Valves: Cast iron body, resilient seat, gate type, AWWA C500 and C509, flanged, non-rising stem, with indicator post flange.
- 4. Indicator Post: Adjustable, telescoping-barrel type with locking handle.
- 5. Corporation Stop: Plug or ball valves, AWWA C800.
- 6. Encasement Pipe: 200 mm (8 in.), nestable steel culvert pipe conforming to WSDOT M 41-10, Section 9-05.4(8).
- 7. Manhole: 1.2 m (4 ft) diameter, precast concrete conforming to WSDOT M 41-10, Section 9-12.4, with open free-draining base. MH ring and cover in accordance with WSDOT M 21-01, Standard Plan B25.
- 8. Flushing and hydrostatic testing.
- 9. Disinfected: AWWA C651.
- 10. Thrust restrained: In accordance with NFPA 24.

Section 02668 Fire Water Systems

- 1. Raw/Fire Water Piping: PVC meeting AWWA C900, Class 150; HDPE meeting AWWA C906, PE 3408; or ductile iron, AWWA C151 with C111 joints.
- 2. Fittings: Ductile iron, AWWA C110/C111, lined; PVC; or HDPE.
- 3. Valves: Cast iron body, resilient seat, gate, AWWA C500 and C509, flanged, non-rising stem, with indicator post flange.
- 4. Indicator Post: Adjustable, telescoping-barrel type with locking handle.
- 5. Fire Hydrants: 150 mm (6 in.), AWWA C502, dry barrel.
- 6. Encasement Pipe: 400 mm (16 in), nestable steel culvert pipe conforming to WSDOT M 41-10, Section 9-05.4(8).

7. Manhole: See Section 02650.
8. Flushed and hydrostatic tested.
9. Installation in accordance with NFPA 24.
10. Thrust Restrained: NFPA 24

DIVISION 3 - CONCRETE

Section 03300 Cast-In-Place Concrete

1. Concrete: 25 MPa (3000 psi) minimum strength at 28 days.
2. Reinforcing Steel Bars: ASTM A 615, deformed, Grade 60.

APPENDIX F

Energy Conservation Report and Analysis

(Waived per DOE Letter No. 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-504
CONCEPTUAL DESIGN
UNREVIEWED SAFETY QUESTION**

An Unreviewed Safety Question (USQ) screening/determination was performed using the Project W-504 Design Requirements Document (reference 1), the W-504 Engineering Study (reference 2), and a raw water balance analysis (reference 3). During performance of the USQ screening/determination, TF-97-0387, it was determined that the design does not place the facility outside of that described in the current Tank Waste Remediation System (TWRS) Authorization Basis; Interim Safety Basis (WHC-SD-WM-ISB-001, Rev 0-M) and RL approved documentation referenced therein.

The existing raw water system in the 200 East services a multitude of facilities. Many of the Authorization Basis documents applicable to the facilities, serviced by the existing raw water system, use a loss of raw water as an initiating event for an accident. Based on the outcome of the water balance analysis, it was judged that the addition of an extension to the existing raw water supply and subsequent reduction of available raw water resources will not cause a loss of raw water. The water balance analysis also showed that there will be ample supply of raw water for the existing facilities along with the ability to meet the supply required by the Privatization Sites. Since project W-504 is tapping into the existing raw water system and has demonstrated (through water balance analysis) that the final system will not invalidate existing safety analyses, the project does not impact the current Authorization Basis. No further evaluation needs to be performed at this time per the outcome of the Unreviewed Safety Question screening/determination.

Prior to actual facility modification, the USQ screening/determination 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 USQs 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-015, Rev. 0, *Design Requirements Document for TWRS Privatization Phase I Raw and Potable Water Supply Systems*, September 30, 1996
 - (2) WHC-SD-TWR-ES-002, Rev. 0, *TWRS Privatization Phase I Raw and Potable Water Service Engineering Study*, September 27, 1996
 - (3) Work Order E23385, *Tank Waste Remediation System Privatization Phase I Water Balance Analysis*, September 30, 1996

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

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AREA: ☒ East ☐ West ☐ GeneralFacility: ☒ 242-A ☒ DST ☒ SST ☐ LERF
☒ Aging Waste ☒ Other Project 504

ECN No.

PCA No.

Work Pkg No.

Other (Specify) Project W-504

TITLE: NEW RAW WATER AND POTABLE WATER SYSTEMS FOR TWRS PRIVATIZATION PHASE I

Description of the Proposed Activity/REPORTABLE OCCURRENCE or PIAB:

Project W-504 is in place to provide new raw and potable water systems to the TWRS privatization sites. The proposed activity consists of adding piping to the existing TWRS water supply system and thereby tapping into existing resources. This activity will affect the amount of water available to existing systems and therefore needs to be evaluated.

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 of Hanford's mixed waste (<13%). Once demonstrated, the rest of the waste will be treated and disposed of during Phase II.

As part of the privatization contract, DOE has committed to provide utilities to the privatization sites. Project W-504 is in place to provide raw and potable water to the Tank Waste Remediation System (TWRS) privatization sites. The TWRS privatization raw water/fire suppression system will be a looped piping system. The raw water piping system will tie into the existing 200 East raw water and fire suppression system at a location southeast of the 242-A Evaporator. The existing TWRS potable water system will be tapped into near the 207-A basins, to provide potable water to the privatization sites. The potable water line will utilize the same trench as the new raw water line.

Since the project is tying into the existing 200 East water supply systems, it is evident that there will be an impact in the amount of water available. From the project's Design Requirements Document, WHC-SD-WM-DRD-015, it was stated that the raw water distribution system will be able to provide an averaged demand of 290 gpm 24 hours a day. Additionally, fire suppression requires a minimum of 2500 gpm to be supplied to both privatization sites at all times. The fire suppression system is required to be a continuous supply to both sites at a minimum pressure of 50 psi for a minimum duration of 4 hours. Potable water is required to be supplied to both sites at a demand of 65 gpm for 24 hours a day.

UNREVIEWED SAFETY QUESTION SCREENING/DETERMINATION FORM (Continued)	Page 2 of 9
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Scope:

This USQ screening/determination evaluates whether project W-504, as a system installed, is within the Authorization Basis. Additional USQs will be required once construction begins to determine the short term impact of shutting down systems for tie-in. Since exact specifics are not known at this time, this USQ screening/determination only gives a general overview of the projects ability to reside within the Authorization Basis.

Authorization Basis:

DESH, 1996a, *Aging Waste Facility Interim Operational Safety Requirements*, WHC-SD-WM-OSR-004, Rev. 1-E, Duke Engineering and Services Hanford, Richland, Washington

DESH, 1996b, *Double Shell Tank Interim Operational Safety Requirements*, WHC-SD-WM-OSR-016, Rev 0-E, Duke Engineering and Services Hanford, Richland, Washington

DESH, 1996c, *Single Shell Tank Interim Operational Safety Requirements*, WHC-SD-WM-OSR-005, Rev 0-F, Duke Engineering and Services Hanford, Richland, Washington

DESH, 1997a, *East and West Tank Farms Standing Order 97-01 - Compensatory Actions For Open Discovery Unreviewed Safety Questions (USQs)*, Duke Engineering and Services Hanford, Richland, Washington

DESH, 1997b, *Hanford Site Tank Farms Facilities Interim Safety Basis*, WHC-SD-WM-ISB-001, Rev. 0-M, Chapter 6, Duke Engineering and Services Hanford, Richland, Washington

DESH, 1997c, *242-A Evaporator/Crystallizer Safety Analysis Report*, WHC-SD-WM-SAR-023, Rev. 2-B, Westinghouse Hanford Company, Richland, Washington

RHO, 1985, *244-AR Vault Safety Analysis Report*, SD-WM-SAR-018, Rev 0, Rockwell Hanford Operations, Richland, Washington

RHO, 1986a, *Double-Shell Tank Farm Facility (241-AN, AH, AP, and SY) Safety Analysis Report*, SD-WM-SAR-016, Rev 1, Rockwell Hanford Operations, Richland, Washington

RHO, 1986b, *Single-Shell Tank Isolation Safety Analysis Report*, SD-WM-SAR-006, Rev 2, Rockwell Hanford Operations, Richland, Washington

WHC, 1989, *Aging Waste Facility Safety Analysis Report*, SD-HS-SAR-010, Rev 2, Westinghouse Hanford Company, Richland, Washington

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WHC, 1991, *Safety Analysis Report for the 204-AR Waste Unloading Facility*, WHC-SD-WM-SAR-40, Rev 1, Westinghouse Hanford Company, Richland, Washington

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

WHC, 1994b, *Safety Analysis Report - Stabilization of Single-Shell Waste Storage Tanks by Salt Well Jet Pumping*, SD-WM-SAR-034, Rev 0-A, Westinghouse Hanford Company, Richland, Washington

WHC, 1996a, *Tank Farm Interim Operational Safety Requirements Compliance Implementation Plan*, WHC-IP-0954, Rev 4, Westinghouse Hanford Company, Richland, Washington

Conclusion:

It has been concluded that the proposed activity of a new looped raw water system tied into the existing water supply system is within the Authorization Basis. Further USQs will need to be developed once work packages are created to encompass construction activities.

References

WHC, 1996c, *Design Requirements Document for TWRS Privatization Phase I Raw and Potable Water Supply Systems*, WHC-SD-WM-DRD-015, Rev. 0, Westinghouse Hanford Company, Richland Washington

FDNW, 1996, *Tank Waste Remediation System Privatization Phase I Water Balance Analysis*, Work Order E23385, September 30, 1996

USQ Screening:

- A. Does the PROPOSED ACTIVITY represent a change to the facility as described in the AUTHORIZATION BASIS?

☐ No ☒ Yes ☐ N/A

Basis:

Several of the Authorization Basis documents, referenced above (WHC 1989), mention water supply systems and the uses of water within TWRS facilities. The exact specifics including amount of water required and piping locations/layouts are not mentioned. There are accident scenarios written within the Authorization Bases that use loss of water as an initiating event. DOE Order 5480.21 requires "safety evaluations for changes to a nuclear facility that alter the design, function, or method of performing the function of a structure, system, or component (SSC)

UNREVIEWED SAFETY QUESTION SCREENING/DETERMINATION FORM
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described in the safety analyses either by text, drawing, or other information relied upon as the authorization basis". Since the raw water system is an SSC and the system design is being altered, 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?
☒ 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 ☐ N/A

Basis:

The proposed activity involves the expansion of the existing raw water and potable water supply systems. No tests or experiments are involved.

D. Does the PROPOSED ACTIVITY or REPORTABLE OCCURRENCE, impact:

- OSRs or IOSRs?
- Approved IOSR Compliance Implementation Plan?

☒ No ☐ Yes ☐ N/A

Basis:

There are no OSRs impacted that involve raw water systems. There is an unimplemented IOSR, LCO 3.7.2 (DESH 1996a), that requires Raw Water (RW) and Emergency Cooling Water (ECW) systems to be OPERABLE. Project W-504 will not affect the Operability of the raw water system per the Computer Analysis (FDNW 1996). The privatization requirement of 290 gpm will lessen the amount available to other systems, but the IOSR does not specify how much is required. Fire suppression requirements of 2500 gpm at 50 psi for 4 hours has also been shown by computer analysis (FDNW 1996) to not prevent Operability. A failure of the cooling water support system requires that the Emergency Cooling Water system be used, which is a separate system and will remain non-impacted by the project. Since the project will not affect the Operability of the raw water system and will not affect the Emergency Cooling water system, the proposed activity does not impact LCO 3.7.2.

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E. Does the REPORTABLE OCCURRENCE or PIAB involve analytical errors, omissions, and/or deficiencies in the AUTHORIZATION BASIS?

☐ No ☐ Yes ☒ N/A

Basis:

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

USQE No. 1 Matthew S. Tiffany

Print Name

USQE No. 2 Daniel J. Minter

Print Name

Matthew S. Tiffany
Signature

4/17/97
Date

Daniel J. Minter
Signature

4-17-97
Date

IF "YES", USQE CONTINUE WITH DETERMINATION BELOW

USQ DETERMINATION:

1. Could the PROPOSED ACTIVITY, REPORTABLE OCCURRENCE or PIAB significantly increase the frequency of occurrence of an accident previously evaluated in the AUTHORIZATION BASIS?

☒ No ☐ Yes/Maybe

Basis:

An event from table 9-4 (WHC 1989) involves the Condensers in a loss of cooling water. The sequence involving a raw water failure results in steam not condensing and surface condensers heating up. This results in thermal stress rupturing the condenser and contaminated cooling water being released to the pond. The preventive features of this accident rely on low water pressure alarms at a pressure of <30 psig, metal mass of condenser preventing rapid heat up, and the condenser being designed for temperatures of 212 °F. The proposed activity does not impact or alter any of the preventive features of the accident. The mitigating measures state that thermocouples and pressure sensing instruments are set to alarm before damage occurs. An additional mitigating measure relies on the emergency cooling water being supplied from either spare pumps or from well pumps. The proposed activity does not involve the Emergency Cooling Water system and will not impact the thermocouples or pressure sensing instruments of the condensers. There is no mention of the amount of cooling water required for the condensers other than the low pressure alarm set point of 30 psig. The proposed activity has been evaluated via computer model (FDNW 1996) to show the available pressure of the system at 2500 gpm. From the results, an engineering judgement can be concluded that the pressures (determined to be > 90 psi) will remain sufficient to not cause a loss of raw water. The loss of raw water is only an event and not an accident in itself. The AB document (WHC 1989) states that the hazards identified were compared to each other,

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on the basis of source terms and consequences, to determine the accidents. With the preventive features and mitigating measures in place and not altered by the proposed activity, the proposed activity will not increase the frequency of occurrence of an accident evaluated in SAR-10 WHC 1989.

An accident involving the raw water system is described in table 4-8 (WHC 1991). The cause of the accident is a line failure resulting in a loss of water to safety showers and pump seals, and fire protection. In the Mitigating/Preventive features column of the table, it is stated that the fire protection system can be pressurized with a tanker truck. From the computer analysis, an engineering judgement can be made that the raw water system will have sufficient pressures after the proposed activity. Additionally, the Mitigating/Preventive features are not being altered by the proposed activity. Therefore, the proposed activity does not increase the frequency of occurrence of the raw water accident described in WHC 1991.

Table 9-3 of SAR-018 (RHO 1985) contains an event dealing with cooling water. The event assumes a breakage or shut down of the raw water transport line. As demonstrated above, the frequency of a loss of cooling water is not increased as a result of the proposed activity. Even with a loss of cooling water, the 244-AR facility is in a shutdown mode and is set for deactivation. The consequences of the cooling water accident include loss of control room instrumentation and a loss of control of the vessel ventilation system diaphragm valves due to a loss of cooling to the compressor. The compressor that the SAR is describing is no longer in service for ecological reasons and additionally the vessel ventilation system is no longer in service. There is a closed loop cooling system which provides the instrument air with a portable air compressor used as a backup. Therefore, the proposed activity does not increase the frequency of occurrence of an accident described in RHO 1985.

The Evaporator SAR (DESH 1997c) evaluated the hazard of a loss of raw water supply and pressure in table 9-4. The accident and potential consequences are 1) a loss of desuperheater and overheating of evaporator contents resulting in a flashover into the condenser and 2) loss of pump seals leading to a potential evaporator overflow. The mitigating measures rely on interlocks and alarm response features to prevent the accident from occurring. Since the proposed activity is not altering the interlocks or alarm response procedures, the proposed activity will not increase the frequency of occurrence of the accidents.

In summary, the proposed activity of providing water to the privatization sites has been judged to not cause a failure of the raw water system. A raw water loss was the only event analyzed for the raw water system. Additionally, the preventive features and mitigating measures are not being altered by the proposed activity. Therefore, the proposed activity will not increase the frequency of an accident previously analyzed in the Authorization Basis.

UNREVIEWED SAFETY QUESTION SCREENING/DETERMINATION FORM (Continued)	Page 7 of 9 <hr/> USQ Tracking No. TF-97-0387 <hr/> Rev. 0
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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?

☒ No ☐ Yes/Maybe

Basis:

As demonstrated in question 1, the only accidents involving the raw water system involve a loss of raw water for cooling purposes and fire suppression. It has been elaborated that the proposed activity of providing raw and potable water to the privatization sites will not result in a loss of water. As stated in the scope section, the proposed activity is limited to a general overview of the project and does not take into account construction activities, which will be evaluated later. Since the proposed activity will not increase the frequency of an accident and does not add any source term to the system, the proposed activity will not increase the consequences of an accident previously analyzed in the Authorization Basis.

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?

☒ No ☐ Yes/Maybe

Basis:

The only equipment important to safety involved with the proposed activity is the raw water system. It has been demonstrated through computer analysis (FDNW 1996) that the existing system is capable of handling the extra demand that the privatization sites require. Therefore, based on the calculation, it is an engineering judgement that the proposed activity will not significantly increase the frequency of occurrence of a malfunction of the raw water piping system.

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?

☒ No ☐ Yes/Maybe

Basis:

As demonstrated in question 3, the only equipment important to safety which is affected is the raw water system. The consequences of a malfunction of the raw water system will remain the same as a result of the proposed activity. Similarly, since the frequency is not increased and no source term is being added to the system by the proposed activity, the proposed activity will not increase the consequences of a malfunction of the raw water system.

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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:

The only accident involving raw water is a loss of raw water supply leading to a loss of cooling water or fire suppression. No other accident scenarios are credible. Therefore, the proposed activity does not create the possibility of an accident other than that previously evaluated in the Authorization Basis.

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:

The only equipment important to safety that is involved with the proposed activity is the raw water system. No other equipment important to safety can be identified as it relates to the proposed activity. Therefore, the proposed activity can not create the possibility of a malfunction of equipment important to safety of a different type than previously evaluated in the Authorization Basis.

7. Could the PROPOSED ACTIVITY, REPORTABLE OCCURRENCE or PIAB reduce the margin of safety for any OSR/IOSR as defined in the AUTHORIZATION BASIS?

☒ [X] No ☐ [] Yes/Maybe

Basis:

There are no OSRs or Implemented IOSRs which rely on the raw water system. A failure of the raw water system will not occur as a result of the proposed activity. Additionally, the system will not introduce new system interactions on the raw water system which could result in the reduction of the margin of safety (i.e. increase of pressure above the design limits of the existing system). Therefore, the proposed activity will not reduce the margin of safety for any OSR/IOSR as defined in the Authorization Basis.

UNREVIEWED SAFETY QUESTION SCREENING/DETERMINATION FORM
 (Continued)

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8. Does the PROPOSED ACTIVITY, REPORTABLE OCCURRENCE or PIAB require a new or revised OSR/IOSR (including compensatory measures required by a Compliance Implementation Plan)?

☒ No ☐ Yes/Maybe

Basis:

No revised OSR/IOSR is required at this time since no OSRs exist and the only IOSR (unimplemented) is not impacted by the proposed activity. Once more details are developed regarding the raw water safety requirements, if any, that the privatization facilities may have, additional USQs may be required. The future USQs might require new OSRs based upon future safety analysis outcome. At this time, however, this USQ can only provide a general overview of the project as it impacts the existing system and does not require new OSRs.

USQE No. 1 Matthew S. Tiffany

Print Name

USQE No. 2 Daniel J. Minter

Print Name

 Signature
Matthew S. Tiffany

 Date
 4/17/97

 Signature
Daniel J. Minter

 Date
 4-17-97

PRC REVIEW

Meeting No.: _____

Date _____

PRC Chairman Concurrence:

Signature _____

Date _____

APPENDIX H

Economic Analysis and Life Cycle Cost Analysis

(Waived per DOE Letter No. 96-WDD-154)

APPENDIX I

Physically Handicapped Assessment

(Waived per DOE Letter No. 96-WDD-154)

APPENDIX J

Plant Forces Work Review

F D H	Fluor Daniel Hanford, Inc. P.O. Box 1000, Richland, WA 99352-1000		Plant Forces Work Review No.	Date	Page
	PLANT FORCES WORK REVIEW		FDH-063-97	3/24/97	1 of 4
R E Q U E S T E R	Title TWRS PRIVATIZATION PHASE ONE		JCS Work Pkg or Project No. W-504, W-505, W-506	Area 200E	Bldg. No. N/A
	<u>Estimated Cost of Work:</u>				
	*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
	*Include estimated fair value of material or equipment acquired on site			Total Job	\$ 6,090,000
	Requester's Name and Phone No. <u>Brian C. Harmon, 373-6528</u>				Date <u>3/20/96</u>
F D H	<u>Reviewed By:</u>				
	Area Work Review Agent	<u>John Allison</u>			Date <u>3/21/97</u>
	Company Work Review Agent	<u>Gary Maxwell</u>			Date <u>3/24/97</u>
D O E	The following determination has been made regarding applicability of the Davis-Bacon Act, as amended, to the work described above:				
	Applicable [XX]	Not Applicable []	Chairman <u>Original Signed by Alt. Paul Davis. 3/26/97</u>		
	Construction	Plant Forces	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 CHWRAs 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.

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	Continued		

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:

<u>Estimated Cost of Work:</u>		
*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).

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	PLANT FORCES WORK REVIEW Continued	FDH-063-97	3 of 4

W-505:

<u>Estimated Cost of Work:</u>		
*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)

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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 Raw and Sanitary Water
 Project Manager: Tarik Choho
 Address: 2440 Stevens Place, Room 1215
 Phone: (509) 376-0590

Project Number: W-504

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

P2-EDGE Analysis
 origination date: 25 Feb 97

Evaluator Comments

Name: David Fort
 Telephone number: (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.A.10
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
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Opportunities that WILL BE IMPLEMENTED:

1.A.2	2.A.10
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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.13
1.A.14	1.A.15	1.A.16	1.A.17	1.A.18	1.A.22	1.A.23	1.A.25	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.6	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.11	11.A.12
11.A.13	11.A.14	11.A.15	11.A.16	11.A.17	11.A.18	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.5	13.A.6	13.A.7	13.A.8
13.A.9	13.A.10	13.A.11	13.A.12	13.A.13	13.A.14	13.A.15	13.A.16	13.A.17
13.A.18	13.A.19	13.A.20	13.A.21	13.A.22	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.20	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-504PROJECT TITLE TWRS PRIVATIZATION, PHASE I - RAW AND SANITARY WATERPROJECT CONTRACTOR NHC PROJECT MANAGER TARIK CHOHODESIGN CONTRACTOR FDNW DESIGN AGENT FDNWOpportunity Number 1.A.2

☐ Will Consider
☐ Will Not Consider
☒ Implemented
☐ Not Applicable

Description: Bell and spigot gasketed pipe will be used in the definitive design.Opportunity Number 1.A.3

☐ Will Consider
☐ Will Not Consider
☒ Implemented
☐ Not Applicable

Description: Design considered minimum route length to meet the project requirements.Opportunity Number 1.A.8

☒ 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
☒ 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.19

☐ Will Consider
☐ Will Not Consider
☒ Implemented
☐ Not Applicable

Description: To be implemented in the construction specification during definitive design.Opportunity Number 1.A.20

☐ Will Consider
☒ Will Not Consider
☐ Implemented
☐ Not Applicable

Description: Freeze protection is best accomplished with direct burial of the lines. Raw and sanitary water lines do not pose a contamination problem.Opportunity Number 1.A.21

☐ Will Consider
☐ Will Not Consider
☐ Implemented
☒ Not Applicable

Description: Water line installation does not lend itself to the use of precut or premanufactured materials.Opportunity Number 1.A.24

☐ Will Consider
☐ Will Not Consider
☒ Implemented
☐ Not Applicable

Description: Definitive design specifications will require minimum material requirements.Opportunity Number 1.B.2

☒ Will Consider
☐ Will Not Consider
☐ Implemented
☐ Not Applicable

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

Opportunity Number 1.B.5 ☒ Will Consider
☐ Will Not Consider
☐ Implemented
☐ Not Applicable
Description: To be considered during procurement of equipment and materials.

Opportunity Number 1.B.6 ☐ Will Consider
☐ Will Not Consider
☐ Implemented
☒ Not Applicable
Description: Water line packaging materials are not reusable.

Opportunity Number 1.B.7 ☒ 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.D.2 ☐ Will Consider
☐ Will Not Consider
☒ Implemented
☐ Not Applicable
Description: Construction specifications will require appropriate containment.

Opportunity Number 2.A.3 ☐ Will Consider
☒ Will Not Consider
☐ Implemented
☐ Not Applicable
Description: Storm water runoff to bodies of water is not possible at the site.

Opportunity Number 2.A.8 ☐ Will Consider
☒ Will Not Consider
☐ Implemented
☐ Not Applicable
Description: Project site is an arid region. Unless watered, landscaping to reduce stormwater runoff will generally not survive.

Opportunity Number 2.A.10 ☐ Will Consider
☐ Will Not Consider
☒ Implemented
☐ Not Applicable
Description: Definitive design will define percolation areas as applicable.

Opportunity Number 2.B.11 ☐ Will Consider
☒ Will Not Consider
☐ Implemented
☐ Not Applicable
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.

Opportunity Number 3.B.1 ☒ 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 ☒ 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 <u>3.B.3</u>	☒ Will Consider ☐ Will Not Consider ☐ Implemented ☐ Not Applicable
Description: <u>Transport to the batch plant more than 32 Km distant is not practical.</u>	
Opportunity Number <u>3.B.4</u>	☐ Will Consider ☐ Will Not Consider ☐ Implemented ☐ Not Applicable
Description: <u>Will be considered during definitive design and implemented as appropriate in the construction specification/s.</u>	
Opportunity Number <u>5.A.2</u>	☐ Will Consider ☐ Will Not Consider ☐ Implemented ☒ Not Applicable
Description: <u>Piping systems are to constructed on non-metallic materials.</u>	
Opportunity Number <u>6.B.1</u>	☐ Will Consider ☐ Will Not Consider ☐ Implemented ☐ Not Applicable
Description: <u>Will be considered during definitive design and implemented as appropriate in the construction specification/s.</u>	
Opportunity Number <u>6.B.2</u>	☐ Will Consider ☐ Will Not Consider ☐ Implemented ☐ Not Applicable
Description: <u>Will be considered during definitive design and implemented as appropriate in the construction specification/s.</u>	
Opportunity Number <u>6.D.1</u>	☐ Will Consider ☒ Will Not Consider ☐ Implemented ☐ Not Applicable
Description: <u>Anticipated quantity of waste wood is de-minimus and not practical to consider by itself.</u>	
Opportunity Number <u>9.A.5</u>	☐ Will Consider ☐ Will Not Consider ☐ Implemented ☐ Not Applicable
Description: <u>Will be considered during definitive design.</u>	
Opportunity Number <u>9.A.6</u>	☐ Will Consider ☒ Will Not Consider ☐ Implemented ☐ Not Applicable
Description: <u>De-Minimus painting is required on this project.</u>	
Opportunity Number <u>9.A.7</u>	☐ Will Consider ☐ Will Not Consider ☐ Implemented ☐ Not Applicable
Description: <u>Will be considered during definitive design and implemented as appropriate in the construction specification/s.</u>	
Opportunity Number <u>9.B.1</u>	☐ Will Consider ☒ Will Not Consider ☐ Implemented ☐ Not Applicable
Description: <u>De-Minimus painting is required on this project.</u>	
Opportunity Number <u>9.B.2</u>	☐ Will Consider ☒ Will Not Consider ☐ Implemented ☐ Not Applicable
Description: <u>De-Minimus painting is required on this project.</u>	

Opportunity Number 9.B.3

_____ Will Consider
☒ Will Not Consider
 _____ Implemented
 _____ Not Applicable

Description: De-Minimus painting is required on this project.Opportunity Number 9.D.1

☒ 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

☒ 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.10

☒ 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.B.2

☒ 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 15.A.25

☒ 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-W504-C01	Integrated Site Plan
ES-W504-C02	Site Plan
ES-W504-C03	RW Line
ES-W504-C04	RW Line Tie-In
ES-W504-C05	RW & PW Line Tie-In
ES-W504-C06	PW Line
ES-W504-C07	PW Line

INTEGRATED SITE PLAN

- SUB-PROJECT:
- W-503
 - W-504
 - W-505
 - W-506
- SCOPE:
- ELECTRIC SUBSTATION
 - RAW AND POTABLE WATER
 - SITE DEVELOPMENT/ROADS
 - LIQUID EFFLUENTS

LEGEND:	
	PARCEL A
	LANDOWN AREA
	TRANSFER FEED LINE CORRIDOR
	PARCEL B
	LANDOWN AREA
	TRANSFER FEED LINE CORRIDOR
	ELECTRIC SUBSTATION
	NEW ROAD
	UPGRADED ROAD
	UTILITY CORRIDOR
	EXISTING UNOD UTILITY
	LIQUID EFFLUENT
	RAW WATER
	POTABLE WATER
	OWHD ELECTRIC
	WASHINGTON STATE GRID SYSTEM
	COORDINATE IN METERS

FLUOR DANIEL NORTHWEST

Prepared By/Date
DJ WHITISH/05-29-97

ES-W504-C01

CAD FILE
IW504C01

W504 SITE PLAN

FLUOR DANIEL NORTHWEST		CAD FILE JWS04C02
	Prepared By/Date DJ WHITISH/06-04-97	ES-W504-C02

1 RW LINE
ES-W504-C02 SCALE: NONE

HNF-SD-W504-CDR-001, Rev. 0

	FLUOR DANIEL NORTHWEST
TX 05/04/00/05-29-97	ES-W504-C03 INVS04C03

<p>FLUOR DANIEL NORTHWEST</p>
<p>Prepared By/Date TK EHRHARD/05-29-97</p>	<p>ES-W504-C04 DOW FILE JWS04C04</p>

3 RW & PW LINE TIE-IN
ES-W504-C02 SCALE: NONE

	FLUOR DANIEL NORTHWEST Prepared By/Date TK EHRHARD/04-30-97 CAD FILE ES-W504-C05 IWS04C05
--	--

FLUOR DANIEL NORTHWEST	
<small>Prepared By/Date TK ENR/04-30-97</small>	<small>ES-W504-C06</small>	<small>610 FILE HWS04C06</small>

5 PW LINE
ES-W504-C02 SCALE: NONE

FLUOR DANIEL, NORTHWEST	
	TX: 01/10/00/04--30-87	ES-W504-C07
	CON. FILE	INVS04C07

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