SEP 30 1996
Sta. 37

ENGINEERING DATA TRANSMITTAL

1. EDT 618858

2. To: (Receiving Organization)	3. From: (Originating Organization)	4. Related EDT No.:
Distribution	WHC TWRS Process Design R. J. Parazin	606378
5. Proj./Prog./Dept./Div.:	**6. Cog. Engr.:**	**7. Purchase Order No.:**
WHC TWRS Disposal Engineering	R. J. Parazin	N/A

8. Originator Remarks:
WHC-SD-WM-DRD-015 (TWRS PRIVATIZATION PHASE I RAW AND POTABLE WATER SERVICE DESIGN REQUIREMENTS DOCUMENT) is being routed for approval signatures and subsequent release. Comments were requested and incorporated via EDT 606378.

9. Equip./Component No.: NA

10. System/Bldg./Facility: NA

11. Receiver Remarks:

12. Major Assm. Dwg. No.: NA

13. Permit/Permit Application No.: NA

14. Required Response Date: 09/30/96

15. DATA TRANSMITTED

(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	(F) Approval Designator	(G) Reason for Transmittal	(H) Originator Disposition	(I) Receiver Disposition
1	WHC-SD-WM-DRD-015		0	TWRS PRIVATIZATION PHASE I RAW AND POTABLE WATER SERVICE DESIGN REQUIREMENTS DOCUMENT	N/a	1,3		

16. KEY

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

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

(G) Reason	(H) Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN	(J) Name	(K) Signature	(L) Date	(M) MSIN	(G) Reason	(H) Disp.
1	1	Cog.Eng. R. J. Parazin		9/30/96	H5-49	WHC TWRS Disposal Program K. A. Gasper		9/30/96	G3-21	1	1
1	1	Cog. Mgr. J. S. Garfield		9-30-96	H5-49	RL TWRS Waste Disposal T. R. Hoertkorn		9/30/96	B4-55	1	1
3		QA & Safety (TWRS-East Tank Farms) M. N. Islam			R3-08	ICF KH Infrastructure/Land Use Planning E. F. Yancey			G3-10	3	
3		Env. (TWRS Envir. Compliance/Support Services P. C. Miller			R1-51	RL Site Infrastructure Division W. A. Rutherford			A2-45	3	
3		RL Site Infrastructure Division D. J. Ortiz			A2-45	WHC Construction Projects P. Felise		9/30/96	B4-55	1	1

18. R. J. Parazin — 9/30/96
Signature of EDT Originator — Date

19. P. Felise — 9/30/96
Authorized Representative for Receiving Organization — Date

20. J. S. Garfield — 9-30-96
Cognizant Manager — Date

21. DOE APPROVAL (if required)
Ctrl. No.
[ ] Approved
[ ] Approved w/comments
[ ] Disapproved w/comments

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

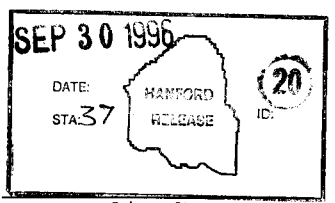
TWRS PRIVATIZATION PHASE I RAW AND POTABLE WATER SERVICE DESIGN REQUIREMENTS DOCUMENT

R. J. PARAZIN
Westinghouse Hanford Company, Richland, WA 99352
U.S. Department of Energy Contract DE-AC06-87RL10930

EDT/ECN: 618858 UC: 721
Org Code: 73520 Charge Code: D627L
B&R Code: EW4010000 Total Pages: 23

Key Words: TWRS Privatization, Phase I water services, water services, TWRS Privatization Phase I, privatization design requirements

Abstract: The U.S. Department of Energy has chosen to accomplish the Tank Waste Remediation System disposal mission via privatization. The disposal mission has been divided into two phases. Phase I, a 'proof of concept' phase, will establish and demonstrate the technical, commercial, and procurement capabilities necessary for privatization to proceed. Once established on this relatively small scale, privatization will be expanded, through a second competition, in the form of a second phase (Phase II) to dispose of the remainder of the tank waste. The Phase I privatization site will be located in the former Grout Disposal Site area. To prepare the site for use for the private contractors, utilities must be extended from the 200 East Area infrastructure. This document describes the design requirements for the prime water services; i.e raw, fire suppression and sanitary(potable) to be provided to the private contractors. These requirements will be used in directing the conceptual design of these proposed water services.



Release Approval Date

Release Stamp

Approved for Public Release

DESIGN REQUIREMENTS DOCUMENT

for

TWRS PRIVATIZATION PHASE I

RAW AND POTABLE WATER SUPPLY SYSTEMS

WORK ORDER E23382

Prepared for

Westinghouse Hanford Company

September 1996

Subcontract WHC 380393

Prepared by

ICF Kaiser Hanford Company
Richland, Washington

DESIGN REQUIREMENTS DOCUMENT

for

TWRS PRIVATIZATION PHASE I

RAW AND POTABLE WATER SERVICE

WORK ORDER E23377

Prepared by

ICF Kaiser Hanford Company
Richland, Washington

for

Westinghouse Hanford Company

September 1996

Prepared by: _____ 9/30/96
L. A. Gaddis, P.E. Technical Author — Date

Concurrence: _____ 9/30/96
M.D. Rickenbach, ICF KH/TFRSO Principal Lead Engineer — Date

Concurrence: _____ 9/30/96
J.T. Koberg, ICF KH/TFRSO Project Manager — Date

TABLE OF CONTENT

DESIGN REQUIREMENTS DOCUMENT

for

RAW AND POTABLE WATER SUPPLY SYSTEMS

TWRS PRIVATIZATION PHASE I

1.0 SCOPE

1.1 IDENTIFICATION

TWRS Privatization Phase I, Raw and Potable Water Service, Project No. W-504

1.2 SYSTEM OVERVIEW

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 mixed waste storage tanks on the Hanford Site. Privatization is defined as vendors, under contract with DOE, using private funding to design, permit, construct, operate, and deactivate their own equipment and facilities to treat radioactive hazardous tank waste (or mixed waste as defined in the Washington Administrative Code [WAC] 173-303). Payment for these services takes the form of fixed price per unit of product meeting DOE specifications. Vendors are selected through a fixed-price competitive process.

Privatization activities have been divided into two phases. Phase I, a "proof of concept" phase, is to demonstrate the capabilities of privatization through the treatment of up to 13 percent of mixed waste at Hanford. Once demonstrated, privatization will be expanded into Phase II to include the treatment and disposal of the remainder of the waste.

In concert with the preparation of the Tank Waste Remediation System (TWRS) Request for Proposals (RFP), DE-RP06-96RL13308 (RL, 1996) for the solicitation of privatization contractors, a location was selected for the Phase I facilities, WHC-SD-WM-SE-023b (Shord, 1996). The location (the former grout disposal site) was selected for numerous reasons. Foremost: it already has been characterized and, to a degree, developed; it adjoins the planned feed tanks in the 200-East Area; and it is of sufficient size for two competing vendors to carry out the demonstration of pretreating, immobilizing, and vitrifying mixed waste. The selected area will be parcelled, and each privatization contractor will be assigned a site for development.

To prepare for the privatization contractor development of their assigned sites, utilities must be extended from the 200-East Area infrastructure. Various raw and potable water service systems were investigated through an engineering study, WHC-SD-TWR-ES-002, with the preferred alternative identified.

1.3 DOCUMENT OVERVIEW

This Design Requirements Document (DRD) defines the technical baseline for the design, construction and inspection of the piping systems that supply raw (fire suppression) and potable water to the privatization contractor sites. Included are documents identifying the general DOE and NFPA requirements at all DOE sites, followed by the more specific requirements applicable to the construction of water systems on the Hanford Site.

2.0 APPLICABLE DOCUMENTS

2.1 GOVERNMENT DOCUMENTS

The following documents of the exact issue shown form a part of this specification to the extent specified herein. In the event of conflict between the documents referenced herein and the contents of this specification, the content of this specification shall be considered a superseding requirement.

2.1.1 Specifications

2.1.1.1 Federal

29 CFR 1910, *Occupational Safety and Health Standards,* Code of Federal Regulations, Office of the Federal Register, National Archives and Records Administration, Washington, DC, 1994.

29 CFR 1926, *Safety and Health Regulations for Construction,* Code of Federal Regulations, Office of the Federal Register, National Archives and Records Administration, Washington, DC, 1994.

40 CFR 141 (rev. 5), *National Primary Drinking Water Regulations*, 1990.

40 CFR 142 (rev. 5), *National Primary Drinking Water Regulations Implementation*, 1990.

2.1.1.2 Military

MIL-P-326J, *Pipe, Culvert, Nestable,* Military Specification, 1992.

2.1.1.3 Other Government Agency

WAC 246-290, Washington Administrative Code, *Public Water Supplies*, Washington State, 1994.

WAC 173-303, Washington State, *Dangerous Waste Regulations*, (on coating or tape containing known carcinogens), 1994

M 41-10, *Standard Specifications for Road, Bridge, and Municipal Construction,* Washington State Department of Transportation, 1994

2.1.2 STANDARDS

2.1.2.1 Federal

DOE-RLID 5480.7, *Fire Protection* , U.S. Department of Energy, Richland Operations Office, Richland, Washington, 1994.

DOE 6430.1A, Order, *General Design Criteria,* U. S. Department of Energy (DOE)

2.1.2.2 Other Government Agency

Not Applicable

2.1.3 DRAWINGS

Not Applicable

2.1.4 OTHER PUBLICATIONS

2.1.4.1 Manuals

M 41-01, *Construction Manual*, Washington State Department of Transportation (WSDOT).

2.1.4.2 Regulations

ORNL/M-1127, *Safe Drinking Water Act,* Environmental Guidance Program Reference Books, 1990.

2.1.4.3 Handbooks

Not Applicable

2.1.4.4 Bulletins

DOE-RL-88-21, Revision 3, *Dangerous Waste Permit Application, 216-A-29 Ditch*, U.S. Department of Energy, Richland Operations Office, Richland, Washington, 1994.

DE-RP06-96RL13308, *Request for Proposals*, U.S. Department of Energy, Richland Operations Office, Richland, Washington, 1996.

Copies of specifications, standards, drawings, and publications required by suppliers in connection with specified procurement functions should be obtained from the contracting agency or as directed by the contracting agent.

2.2 NON-GOVERNMENT DOCUMENTS

The following documents of the exact issue shown for a part of this specification to the extent specified herein. In the event of conflict between the documents referenced herein and the contents of this specification, the contents of this specification shall be considered a superseding requirement.

2.2.1 SPECIFICATIONS

AWWA Manual M17, *Installation, Maintenance, and Field Testing of Fire Hydrants,* Third Edition, American Water Works Association, Manual of Water Supply Practices.

AWWA Manual M23, *PVC Pipe-Design and Installation,* American Water Works Association, Manual of Water Supply Practices

2.2.2 STANDARDS

ANSI/AWWA C104/A21.4-95, *American National Standard for Cement -Mortar Lining for Ductile-Iron Pipe and Fittings for Water.*

ANSI/AWWA C110/A21.10-93, *AWWA Standard for Ductile-Iron and Gray-Iron Fittings, 3 in. Through 48 in., for Water and Other Liquids.*

ANSI/AWWA C111/A21.11-95, *AWWA Standard for Rubber-Gasket Joints for Ductile-Iron and Gray-Iron Pressure Pipe and Fittings.*

ANSI/AWWA C500a-95, *AWWA Standard for Metal-Seated Gate Valves for Water Supply Service.*

ANSI/AWWA C502-94 AWWA Standard for Dry-Barrel Fire Hydrants

ANSI/AWWA C509a-95 *AWWA Standard for Resilient-Seated Gate Valves for Water Supply Service.*

ANSI/AWWA C550-90 *AWWA Standard for Protective Epoxy Interior Coatings for Valves and Hydrants.*

ANSI/AWWA C651-92, *AWWA Standard for Disinfecting Water Mains.*

ANSI/AWWA C900-89, *AWWA Standard for Polyvinyl Chloride (PVC) Pressure Pipe, 4 in. through 12 IN., for Water and Other Liquids,*

NFPA 24, *Standard for the Installation of Private Fire Service Mains and Their Appurtenances*, National Fire Protection Association, 1995 edition.

Uni-Bell Plastic Pipe Association, *Handbook of Plastic Pipe Design and Construction*, Dallas, Texas, 1980.

Pump Handbook, Karassik, I. J., Editor, McGraw-Hill Book Company, Publisher, 1976.

UPC, *Uniform Plumbing Code*, International Association of Plumbing and Mechanical Officials (IAPMO), 1994.

ANSI, Y14 Series, *Engineering Drawings and Related Documentation Practices.*

FM, Factory Mutual System *Approval Guide*, I Guide to Equipment Materials & Services, Factory Mutual Research Corporation for Property Conversation, 1996

UL, Underwriters Laboratories Inc., *Fire Protection Equipment Directory, 1996.*

2.2.3 DRAWINGS

Not Applicable

2.2.4 OTHER PUBLICATIONS

WHC-SD-TWR-ES-002, Engineering Study for *Raw and Potable Water Supply for TWRS Privatization Phase I,* Fort, D. L. , ICF Kaiser Hanford Company, Richland Washington, Sept. 1996.

WHC-SD-SQA-ANAL-30001, *Fire Protection Water Supply Analysis*, Bucci, H. M., Westinghouse Hanford Company, Richland, Washington, 1995.

WHC-SD-WM-SE-023b, *Tank Waste Remediation System Privatization Phase I Site Evaluation Report*, Shord, A. L., Westinghouse Hanford Company, Richland, Washington, 1996.

PNL-10698, *Hanford Site Groundwater Monitoring for 1994*, Dresel, P. E., Pacific Northwest Laboratories, Richland, Washington, 1995.

PNL-9809, *Climatological Data Summary 1993 with Historical Data,* Hoitink, D. J., Pacific Northwest Laboratory, Richland Washington, June 1994.

PNNL-11107, *Climatological Data Summary 1995 with Historical Data,* Hoitink, D. J., Pacific Northwest Laboratory, Richland Washington, May 1996.

Trost, E.T., 1996, Interoffice Memorandum, *Tank Waste Remediation System Privatization Phase I, Former Grout Disposal Site Vendor Site Layout and Access Road Assessment Report*, ICF Kaiser Hanford Company, Richland, Washington.

Manual of Practice, Construction Specifications Institute

Technical society and technical association specifications and standards are generally available for reference from libraries. They are also distributed among technical groups and federal agencies.

3.0 REQUIREMENTS

3.1 Project Definition

The TWRS *Privatization Request for Proposals,* solicitation number DE-RP06-96RL 13308 (DOE 1996), states that the DOE will provide and maintain pipelines to supply raw and potable water to the privatization contractor's site perimeter.

The raw water pipeline will be a looped system connecting to the existing 200-East Area, 300 mm (12 inch) raw and fire suppression water distribution system at a point 30 meters (100 feet) southeast of the 242-A facility (Evaporator). From this tie-in point the line will proceed southerly along Canton Avenue for approximately 600 meters (2000 feet). The northern portion of this segment, approximately 335 meters (1100 feet), will be placed inside an abandoned 16 inch steel cooling water line. The line will then proceed easterly along the north side of the site access road and south of the existing disposal crib area to the southeast corner of the privatization contractor parcels. The pipeline then proceeds north along the eastern boundaries of the parcels, then, west, along the north side of the northern parcel and returning to a second tie-in point 30 meters (100 feet) north of the 207-A basins on an existing 300 mm (12 inch) raw water main (see Figure 1).

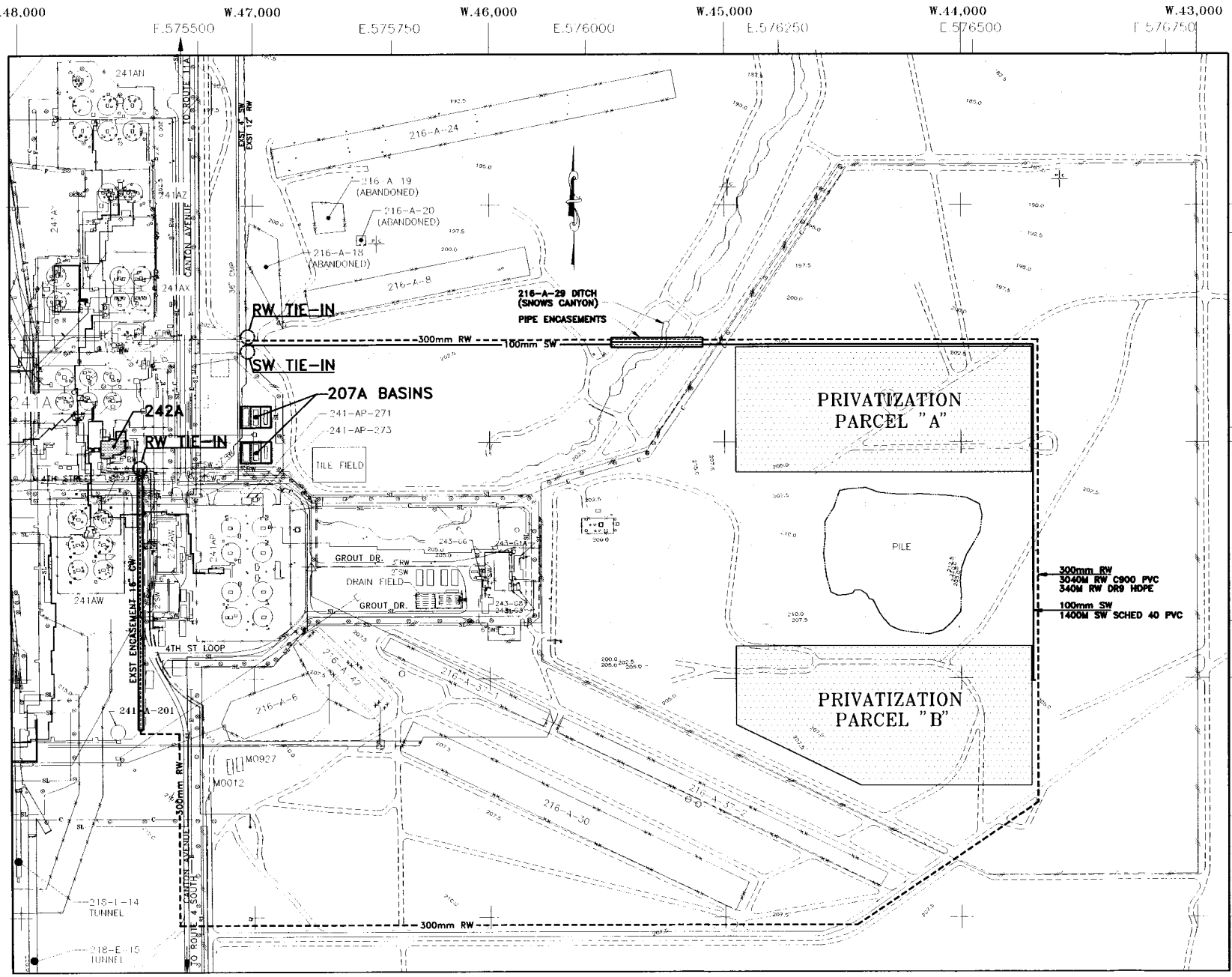
The potable water will be supplied by a 100 mm (4 inch) minimum pipe line stub from the existing 200 East area potable/sanitary water system. Tapping into the existing 75 mm sanitary water line, adjacent to the raw water line north of the 207-A basins, the line will extend easterly to the privatization site by utilizing the same trench as the northern and eastern portion of the raw water extension loop (see Figure 1).

3.1.1 Item Diagram

See following page, Figure 1.

3.2 CHARACTERISTICS

During the construction and operation of the TWRS Privatization Phase I facilities, each privatization contractor will have need for three primary types of water: raw water, fire suppression water, and potable (or sanitary) water. The raw and the fire suppression water will be combined in a system while the sanitary water will be in a second system. The characteristics for these systems are detailed in the following sections.



LEGEND

W.46,000 HANFORD PLANT COORDINATES (FEET)
N.40,000

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

SITE PLAN

SCALE: 1:4500

0 45 90 180 270 360

1 cm = 45 meters

Drawn by TA DAVIS

Cad File E2337C8

BEST AVAILABLE COPY

FIGURE 1

3.2.1 Functional Characteristics

3.2.1.1 Raw/Fire Suppression Water, Quantity Requirements for Raw Water - Combining the needs of both privatization contractors, the raw water distribution system will provide a 24-hour averaged demand of 1 090 lpm (290 gpm)[1].

Quantity Requirements for Fire Suppression Water - In addition to the raw water requirements, a minimum of 9 450 lpm (2500 gpm)[1] of fire suppression water is required at all times to each site. Fire suppression water is to be a continuous supply to both sites at a minimum pressure of 345 kilopascal (50 psi) for a minimum duration of 4 hours, (DOE RLID 5480.7).

The fire suppression water supply and distribution system shall meet NFPA 24, DOE Order 6430.1A, and RLID 5480.7 criteria. The distribution system shall consist of 300 mm (12 inch) minimum mains, constructed of NFPA-approved materials, and have alternate flow paths between the source of water and the delivery or tie-in point.

Redundant Source Capabilities for the Fire Suppression Water - The distribution system will provide two separate sources of water to each privatization site (DOE RLID 5480.7). This includes the means to valve or shut down a selected portions of the system and still maintain supply to both sites if a line breaks or if the water supply is restricted.

3.2.1.2 Potable/Sanitary Water, Potable Water Quantity Requirements - Combining the needs of both privatization contractor sites requires a 24-hour averaged demand of 245 lpm (65 gpm)[1].

TWRS Privatization Phase I activities are expected to be completed in 2012. At that time, each privatization contractor will be required to deactivate their respective facilities. It is anticipated that there will be a need for raw and sanitary water for at least one year after the conclusion of process activities. It is also estimated that deactivation activities could take up to 3 years. There will be a need for fire suppression water during deactivation activities, therefore, the raw water delivery system should have a life expectancy beyond the year 2015.

3.2.2 Physical Characteristics

Both systems, raw/fire and potable water, shall be designed in accordance with DOE Order 6430.1A. In addition, the fire suppression system shall also meet the requirements of NFPA 24 and DOE-RLID 5480.7.

---

[1] The anticipated quantity or average flow requirements for raw (or untreated process) water, fire suppression water, and potable (or sanitary) water, were forecasted in August, 1996, by the TWRS Privatization Source Evaluation Board and are repeated here accordingly (by informal direction). The criteria differs from that stated in the RFP which is that each PC is to be provided 760 lpm (200 gpm) of raw water, and 95 lpm (25 gpm) of potable water, both averaged over 24 hours. Fire suppression water criteria remains the same at 9 450 lpm (2500 gpm).

The systems should be designed with future expansion consideration, i.e., installation of tee or crosses with valving at each major bend (90 degrees) of the pipelines. Both pipelines shall have a minimum cover of 0.8 meter (2.5 feet) with addition depth as required for freeze protection and road or railroad crossings. Past standard practice for the Hanford Site has been 1.1 meters (3.5 feet)

At the beginning of the raw water system, near the 242 A Evaporator, the pipe will be pulled through an existing 400 mm (16 inch) steel pipe. Special design considerations will be required at this tie-in to the existing system, and at the end of the encasement pipe.

The raw/fire and potable water pipelines will be installed in the roadway berm across the 216-A-29 Ditch (Snows Canyon). These sections of the pipelines will be encased in a large pipe to provide protection for the berm and the underlying inactive hazardous waste disposal unit (RCRA Part A permit, DOE/RL-88-21) . The 300 mm raw water pipeline shall be encased in a minimum 400 mm nestable steel pipe culvert that extends a minimum of 15 meters (50 feet) beyond the edge of the ditch embankment. The 100 mm potable water line will be encased in a minimum 200 mm nestable pipe culvert with the same 15 meter extension beyond the ditch embankment. At each end of the pipelines, an inspection port (i.e. manhole) will be installed to allow for inspection for inordinate amounts of leakage from the water lines. The port may also provide a percolation sump (geotextile lined gravel pocket), that will allow dissipation of small amounts of water. The ports will also provide a location for the installation of tees and valving that would allow for the shut down of the water lines across the canyon in case of pipeline breakage or major leakage. Tees and valves in the water mains will also allow easy future rerouting of the pipelines if necessary.

Where the raw and potable pipelines tie into existing water lines, tees and valving on each leg shall be installed to allow isolation and shut off of the lines as necessary during normal operation and maintenance of the water mains.

3.2.3 Reliability

The raw/fire water line shall be valved and looped, connected to existing raw water main at two separate locations, to provide isolation and opposite feed water source of fire or raw water during an unexpected breakage or shutdown of the line, tie-in of new lines, or for scheduled maintenance.

Design documents shall be checked by the design agent and by the site water purveyor to verify that the designed systems meet the specified specification, standards, drawings, and other documents.

3.2.4 Maintainability

The piping systems shall be designed and constructed with future maintenance considerations. Valves, manholes, hydrants, etc. should be delineated with marker/guard posts when not in a roadways to aid in locating the items and to protect against vehicular traffic. The valve box or manhole cover shall be installed slightly above existing grade, except in paved road areas, so the soil, vegetation, or other debris do not obstruct access to the facility. Location of the water line features should also be in areas not prone to flooding, soil build up, or excessive erosion (bottom of valleys or top of hills).

3.2.5 Environment

Design of the raw and potable water systems will follow DOE Order 6430.1A for depth of burial and for other details related to preventing the pipelines from freezing. Refer to Climatological Data Summary, 1993 with historical data and 1995 with historical data (document numbers PNL-9809 & PNL-11107 respectfully) for historical weather data.

Construction could occur during the colder winter months, November through February. Under no circumstance shall the water mains be constructed in frozen ground, backfilled with frozen material, installed, or tested when the temperature is below 5° C (40° F) and dropping.

There is a potential that the pipe line excavation may encounter areas that have been contaminated with radiation and have previously not been marked or identified on any drawings. It will be the contractors responsibility to monitor excavation activities for possible contamination. The areas of highest potential for radioactive contamination are near the ends of cribs 216-A-30, 216-A-37-2, 216-A-8; along Canton Avenue; and in the vicinity of 216-A-29 ditch (Snows Canyon).

3.2.6 Transportability and Storage

Not Applicable

3.2.7 Safety

All phases of construction of the raw and potable water systems shall be accomplished in accordance with applicable OSHA standards in the Codes of Federal Regulation 29 CFR 1910 and 29 CFR 1926.

All materials used in construction shall be non-toxic where practical, reference WAC 173-303.

3.3 DESIGN AND CONSTRUCTION

3.3.1 Parts/Materials/Processes

All raw or potable piping material shall be in accordance with WSDOT M 41-10 or as required below.

Piping materials shall be polyvinyl chloride (PVC) in accordance with AWWA C900, or high density polyethylene (HDPE) in accordance with ASTM D 2447.

New pipe encasement shall be nestable steel culvert pipe conforming to WSDOT M-41.10.

All fire hydrants shall be in accordance with AWWA C502, Dry-Barrel Fire Hydrants, and be of standard manufacture.

Fittings shall be cast iron in accordance with AWWA C110/A21.10 and C111/A21.11.

All buried valves shall have valve boxes in accordance with section 9-30.3(4) of WSDOT M 41-10.

All components of the water systems shall be current products, and be listed in UL Fire Protection Equipment Directory , or in FM Approval Guide, for their intended use.

3.3.2 Industry and Government Standards

Products incorporated into the work shall be new, and of the most suitable grade for the purpose intended, unless otherwise required in the specifications. References in the DRD to products, or to patented or proprietary processed, by trade name make, or catalog number, shall be regarded as establishing a standard of quality, and shall not be construed as limiting competition. Contractor and subcontractors procurement and receiving activities shall implement controls that will minimize the potential for incorporating suspect/counterfeit items into the work.

3.3.3 Electromagnetic Radiation

Not Applicable

3.3.4 Cleanliness

The piping contractor will be required to keep the piping system clean during construction in accordance with WSDOT M-41-10, paragraph 7-11.3(2). Provisions shall be taken to keep the pipe clean before, during and after installation.

Both systems shall be flushed following completed installation and before hydrostatic testing, in accordance with NFPA 24 and WSDOT M 41-10. The raw and potable water systems shall be disinfected in accordance with AWWA C651

3.3.5 Corrosion of Parts

All ductile-iron fittings shall be lined with a cement-mortar in accordance with AWWA C104. Valves and Hydrants shall have an interior protective epoxy coating in accordance with AWWA C550.

3.3.6 Protective Coatings

All buried ferrous surfaces shall be covered with two coats of asphaltic coating in accordance with AWWA C502. The exposed portion of the fire hydrants shall be coated in accordance with AWWA C502. Guard Post for hydrants and valves shall be painted similar to the fire hydrants.

3.3.7 Interchangeability

Not Applicable

3.3.8 Identification and Marking

All piping and appurtenances shall be marked in accordance with industry standards.

3.3.9 Nameplate

Not Applicable

3.3.10 Human Engineering

Not Applicable

3.3.11 Qualification

Not Applicable

3.3.12 Document Submittal

Document submittals shall be detailed by the design firm.

3.3.13 Personnel and Training

The water systems shall be designed by or under the direct supervision of a Registered Professional Engineer in the State of Washington, with training, knowledge, and past experience in the design and construction of water distribution systems. The calculations, drawings, and specifications shall be stamped by the Registered Professional Engineer.

Construction of the water systems shall be by a contractor and personnel with previous experience in the installation of buried piping.

4.0 QUALITY ASSURANCE PROVISIONS

4.1 GENERAL

4.1.1 Responsibility for Verification

The construction contractor shall have first line responsibility for performance of inspection of delivery, storage and installation of all piping materials. The design engineer or his agent may also have a selected first line inspection responsibility or may elect to only be responsible to overview the contractors inspection activities. Final review and acceptance will be by the design agent.

4.1.2 Verification Methods

Verification methods shall be through field surveillance as specified by the guidance documents or by the construction contract documents.

4.2 QUALIFICATION VERIFICATION

Qualification of the design firm and personnel will be determined during the selection process of the design firm. A listing of previous projects and a listing of key personnel will be a part of the design firm's proposal for the project.

The construction contractor will also be required to furnish a similar listing of previous jobs at the time of acceptance of bid proposal. This list should include, but not be limited to: name of contract, contracting agency, and a contact person within the agency.

4.3 INSPECTIONS AND TESTING

The following table shows the minimum quality assurance requirements for the related work items.

Item	Description	Specification	Responsibilities	Remarks
1	Pipe - PVC	WSDOT M41-10 AWWA M23 NFPA 24	Contractor/ Design Engr.	Material & Installation
2	Pipe - HDPE	WSDOT M41-10 AWWA M23 NFPA 24	Contractor/ Design Engr.	Material & Installation
3	Hydrants	WSDOT M41-10 AWWA M23 NFPA 24	Contractor/ Design Engr.	Material & Installation
4	Fittings	WSDOT M41-10 AWWA M23 NFPA 24	Contractor/ Design Engr.	Material & Installation
5	Flushing/Testing	WSDOT M41-10 NFPA 24	Contractor/ Design Engr.	Material & Installation
6	Disinfection	AWWA C651 WSDOT M41-10	Contractor/ Design Engr.	Material & Installation
7	Excavation/ Backfill	WSDOT M41-10 AWWA M23 NFPA 24	Contractor/ Design Engr.	Material & Installation
8	Asphalt Concrete Pavement	WSDOT M41-10	Contractor/ Design Engr.	Material & Installation

5.0 PREPARATION FOR DELIVERY

5.1 GENERAL

The materials used for the raw and potable water system are all commercially available. The construction contractor will be responsibility for all materials and supplies including industry standard packaging and handling. The contractor will verify that all material are as specified and not damaged during shipment and that the materials arrive on site in pristine condition. Also it will be the contractors responsibility to protect all material from damage until the project is accepted by the government.

5.2 PRESERVATION AND PACKAGING

Manufacture standard

5.3 PACKING

Manufacture standard

5.4 MARKING

Manufacture standard

5.5 HANDLING

Manufacturing requirements

5.6 SHIPPING

Not applicable

6.0 NOTES

6.1 ABBREVIATIONS AND ACRONYMS

ANSI	American National Standard Institute
AWWA	American Water Works Association
CFR	Code of Federal Regulations
CWA	Clean Water Act
DOE	U.S. Department of Energy
ECOLOGY	Washington State Department of Ecology
ETF	Effluent Treatment Facility
FM	Factory Mutual System
gpm	gallons per minute
HDPE	High Density Polyethylene
lpm	liters per minute
mm	millimeters
NFPA	National Fire Protection Association
psi	pounds per square inch
PVC	Poly Vinyl Chloride
RCRA	Resource Conservation and Recovery Act
RFP	Request for Proposal
RL	U.S. Department of Energy, Richland Field Office

TEDF	Treated Effluent Disposal Facility
TWRS	Tank Waste Remediation System
UPC	Uniform Plumbing Code
UL	Underwriters Laboratories
WAC	Washington Administrative Code
WHC	Westinghouse Hanford Company
WSDOT	Washington State Department of Transportation

DISTRIBUTION SHEET

To	From	Page 1 of 1
Distribution	WHC TWRS Process Design R. J. Parazin	Date 09/30/96
Project Title/Work Order		EDT No. 618858
TWRS Privatization Phase I Raw and Potable Water Service Design Requirements Document		ECN No. N/A

Name	MSIN	Text With All Attach.	Text Only	Attach./ Appendix Only	EDT/ECN Only
U.S. Department of Energy Richland Operations Office					
N. R. Brown	K6-51	x			
T. R. Hoertkorn	B4-55	x			
D. J. Ortiz	A2-45	x			
W. A. Rutherford	A2-45	x			
R. B. Simmons-Green	S7-53	x			
ICF Kaiser Hanford Company					
D. L. Fort	G3-12	x			
J. T. Koberg	G3-12				x
M. D. Rickenbach	G3-12	x			
E. F. Yancey	G3-10	x			
Pacific Northwest National Laboratory					
B. A. Reynolds	P7-19	x			
Westinghouse Hanford Company					
R. U. Elwell	S7-12	x			
P. Felise	B4-55	x			
J. S. Garfield	H5-49	x			
K. A. Gasper	G3-21	x			
M. N. Islam	R3-08	x			
A. R. Johnson	H6-20	x			
P. C. Miller 4	R1-51	x			
R. J. Parazin (2)	H5-49	x			
L. E. Thomas	R3-08	x			
W. L. Adams	S5-13	x			
Central Files (original + 1)	A3-88	x			