

# START

JUN 28 1994

## ENGINEERING DATA TRANSMITTAL

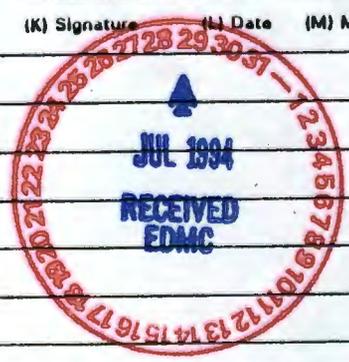
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17. SIGNATURE/DISTRIBUTION (See Approval Designator for required signatures)										(G)	(H)
Reason	Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN	(J) Name	(K) Signature	(L) Date	(M) MSIN	Reason	Disp.
	1	Cog. Eng. G.L. Lamphere	<i>G.L. Lamphere</i>	6/27/94	66-02						
	1	Cog. Mgr. W.W. Rutherford	<i>W.W. Rutherford</i>	6/27/94	R3-27						
	1	QA M.S. Bhargava	<i>M.S. Bhargava</i>	6/27/94	S1-54						
		Safety									
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18. <i>G.L. Lamphere</i> 6/27/94 Signature of EDT Originator Date		19. <i>W.W. Rutherford</i> 6/27/94 Authorized Representative for Receiving Organization Date		20. <i>W.W. Rutherford</i> 6/27/94 Cognizant Manager Date		21. DOE APPROVAL (if required) Ctrl No. _____ <input type="checkbox"/> Approved <input type="checkbox"/> Approved w/comments <input type="checkbox"/> Disapproved w/comments	
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Date Received: 6/28/94 KMB **INFORMATION RELEASE REQUEST** Reference: WHC-CM-3-4

**JUN 28 1994**

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List attachments.				
Date Release Required <b>June 30, 1994</b>				

Title Statement of Work for Engineering Services Unclassified Category UC- Impact Level Q

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 If "Yes", has disclosure been submitted by WHC or other company?  
 No  Yes Disclosure No(s).  
 Copyrights?  No  Yes  
 If "Yes", has written permission been granted?  
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 Will material be handed out?  Yes  No

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Review Required per WHC-CM-3-4	Yes	No	Reviewer - Signature Indicates Approval
			Name (printed) Signature Date
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Patent - General Counsel	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
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WHC Program/Project	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
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Information conforms to all applicable requirements. The above information is certified to be correct.

References Available to Intended Audience  Yes  No

Transmit to DOE-HQ/Office of Scientific and Technical Information  Yes  No

Author/Requestor (Printed/Signature) \_\_\_\_\_ Date \_\_\_\_\_  
G. L. Lamphere G.L. Lamphere 6/27/94

Intended Audience  
 Internal  Sponsor  External

Responsible Manager (Printed/Signature) \_\_\_\_\_ Date \_\_\_\_\_  
W.W. Rutherford W.W. Rutherford 6/27/94

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Stamp is required before release. Release is contingent upon resolution of mandatory comments.



Date Cancelled \_\_\_\_\_ Date Disapproved \_\_\_\_\_

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3. Number

WHC-SD-W314-SOW-001

4. Rev No.

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6. Author

Name: G.L. Lamphere

Signature

*G.L. Lamphere*

Organization/Charge Code 7F530

APPROVED FOR PUBLIC RELEASE

*KMB 6/28/94*

7. Abstract

The attached SOW requests engineering services to develop the Design Requirements Baseline documentation for Project W-314, Tank Farm Restoration and Safe Operations.

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10.

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9. Impact Level Q

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**TANK WASTE REMEDIATION SYSTEM  
TANK FARM RESTORATIONS AND SAFE OPERATIONS  
PROJECT W-314**

**STATEMENT OF WORK  
FOR  
ENGINEERING SERVICES**

**Prepared by  
Westinghouse Hanford Company  
Richland, Washington 99352**

**June 30, 1994**

**for the  
U.S. Department of Energy  
Richland Operations Office  
Richland, Washington 99352**

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## 1.0 INTRODUCTION

The U.S. Department of Energy (DOE) is committed to the safe storage of radioactive waste contained in the underground storage tanks located in the 200 East and 200 West Areas at the Hanford Site.

In support of the DOE commitment, the Westinghouse Hanford Company (WHC) Tank Waste Remediation System (TWRS) program has been established to store, treat, and immobilize highly radioactive tank waste in an environmentally sound, safe, and cost-effective manner. DOE established this program to manage the 177 underground waste storage tanks at the Hanford site. The TWRS program includes all activities related to receiving, storing, operating and maintaining, treating, and disposing of all liquid wastes.

Numerous external audits and internal assessments of Hanford's Tank Farms have revealed that they require extensive restoration in order to meet the overall TWRS mission goals and support safe operation and maintenance activities. Due to their age and years of little or no upkeep, many Tank Farm infrastructure systems and components have either:

1. Exceeded their useful service life and can be expected to fail in the near-term;
2. Have deteriorated beyond repair and must be replaced to ensure continued reliable operation;
3. Have already failed;
4. Operate outside current environmental, health and safety regulations.

Deteriorating infrastructure and a poorly defined physical baseline are expected to increase long-term operation and support costs and possibly limit the number of viable alternatives for retrieval, pretreatment and disposal of tank waste.

In order to help correct the Tank Farm deficiencies, the Tank Farm Restoration and Safe Operations effort (Project W-314) has been established as an important part of the overall TWRS program. The goal of this project is to improve the reliability of safety related systems, minimize onsite health and safety hazards, and support waste retrieval and disposal activities by restoring and/or upgrading existing Tank Farm infrastructure.

Engineering Studies evaluating potential upgrades for the Tank Farm's instrumentation, ventilation, waste transfer and electrical distribution systems have been completed or are currently in progress. In addition, Functions and Requirements (F&R) documentation is currently being prepared, using the TWRS Systems Engineering Management Plan (SEMP) approach, to help define the appropriate technical baseline for Project W-314.

## 2.0 WORK SCOPE

WHC requests engineering services of Los Alamos Technical Associates, Inc. (LATA) for preparing the Design Requirements Baseline (DRB) documentation, for Project W-314, in support of the Design Requirements Review (DRR) in March of 1995. Engineering analysis including: development of functions; requirements; interfaces; trade studies; and maintenance and operations concepts shall be performed in support of the DRB development.

This documentation shall be based on the W-314 F&R and other supporting documentation, i.e., Engineering Studies provided by WHC and shall apply the Project SEMP methodology, consistent with the overall TWRS Program Systems Engineering effort.

Documentation developing the Project W-314 technical baseline shall be prepared, based on the ongoing F&R development work. The W-314 F&R's are currently being developed by WHC and TRW. LATA personnel will be required to work closely with WHC to ensure that LATA's documentation prepared in support of this SOW is consistent with the W-314 JMN and supporting documentation. LATA will be required to demonstrate that all the issues and uncertainties identified during the engineering study development phase of W-314 are addressed during DRB development.

The documentation developed during this effort shall demonstrate that the systems engineering approach has been correctly applied in determining the project's cost, schedule, and technical baseline and that the Project W-314 documentation is consistent with the overall SEMP and the Project W-314 Systems Engineering Work Plan (SEWP).

The systems engineering data contained in the DRB will be reviewed at the DRR in March and used as the technical baseline for the advanced conceptual design and definitive design. The systems engineering data shall accommodate traceability to the TWRS Program Systems Engineering Functions and Requirements.

All documentation prepared in accordance with this Statement of Work (SOW) shall become the property of the U.S. Department of Energy.

### 2.1 Description of Required Services

Specific tasks to be performed by LATA, in order to meet the objectives listed above include, but are not limited to, the following deliverables:

1. Develop a Functions and Operations Requirements (F&OR) baseline document containing all project requirements, including: requirements derived from the TWRS Program Systems Engineering (SE) Design Requirements Document (DRD); constraints; performance requirements; and interface requirements.

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2. Develop an optimized Project Design Concept including: a preliminary physical design concept for all tank farm upgrades included in Project W-314; maintenance; operations; testing; training; deployment; and decontamination and decommissioning (D&D) concepts. The data will be presented using engineering sketches and text to convey the information.
3. Develop Energy/Mass Flowsheets to document the results of the analysis performed for the development of the performance requirements and design concepts.
4. Develop Interface Control Documents (ICD) to define and control the physical interfaces with other tank farm projects, existing tank farm elements and future projects identified by the TWRS Program.
5. Develop a Project Design Specification to communicate the requirements developed during the F&OR process for subsequent design phases.
6. Develop a Logistics Plan for Project W-314 at a level of detail commensurate with the project design concept that includes: maintenance; facilities; spare parts; support equipment; technical data; computer resources; packaging, handling, storage and transportation; manpower; and training concepts.
7. Develop Trade Studies/Decision Analysis, as necessary, to document the trade studies and decision analyses performed during the development of the DRB. A listing of the anticipated TS/DA will be provided to WHC early in the DRB development process.
8. Develop a Test and Evaluation Plan (TEP) to communicate the test and evaluation approach for the current project phase and the remainder of the project development cycle. The TEP shall include the plans for any analysis and/or modeling required for verification of the DRB requirements.
9. Develop a Risk Management Plan to communicate the risk management approach to be implemented on Project W-314.
10. Develop a Conceptual Cost Estimate for all aspects of Project W-314 design concepts including: definitive design; procurement; construction; and project management. The Estimate will meet the requirements of DOE Order 5700.3, "Cost Estimating, Analysis and Standardization.
11. Develop Schedules for the definitive design, procurement and construction phases of Project W-314. These schedules shall include a calendar schedule describing expected progress and a logic schedule describing sequencing and interrelationships of events.

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12. Develop a Work Breakdown Structure (WBS) based on the project elements identified during the design concept development and selected management processes to provide a vehicle to track costs in the upcoming development phase. The Cost Estimate and Schedule must be consistent with the WBS.

Specific tasks to be performed by LATA, in order to meet the objectives listed above include, but are not limited to, the following items:

13. Support the WHC Upgrades Project Definitions organization with the development of the W-314 Design Requirements Document by performing systems engineering tasks including: functions and requirements development; architecture generation; and evaluation and optimization.
14. Perform engineering analysis in support of the F&OR process to develop the quantitative performance requirements, energy/mass flowsheets, interface requirements and design concepts.
15. Perform analysis to develop the information contained in the Logistics Plan.
16. Perform risk analysis on project concepts to determine risk incurred by decisions and provide information for risk management.
17. Support technical meetings with the customer to discuss requirements, design concepts, results of analysis, and technical issues as required.
18. Conduct Interim Design Reviews at the 30 and 60 percent baseline development to provide visibility and disposition review comments.
19. Conduct a Final Design Review of the completed DRB package and assist WHC in dispositioning review comments.
20. Submit completed DRB documentation along with all supporting data to WHC for approval. All data will be provided in electronic form as well as a hardcopy.
21. Conduct Weekly Status Meetings with WHC, see Section 6.0.
22. Prepare Monthly Progress Reports to WHC, see Section 5.0.
23. Prepare and submit a detailed work plan that addresses how LATA intends to meet the requirements of this SOW.
24. Conduct a Value Added Requirements effort, by reviewing the W-314 documentation and provide a dollar value to such activities as pursuing waivers, etc..

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**2.2 Schedule**

All schedule milestones are predicated on Upgrades Project Definition development of a draft by July 31.

Functions and Operation Requirements Document	Draft 10/1/94 Final 3/10/95
Project Design Concept	Draft 12/6/94 Final 3/10/95
Energy/Mass Flowsheets	Draft 10/15/94 Final 1/2/95
Interface Control Documents	Draft 2/1/95 Final 3/1/95
Project Design Specification	Draft 1/15/95 Final 3/10/95
Logistics Plan	Draft 2/1/95 Final 3/1/95
Trade Studies/Decision Analysis	Draft 10/1/94 Final 3/10/95
Test and Evaluation Plan	Draft 1/15/95 Final 3/1/95
Risk Management Plan	Draft 10/15/94 Final 12/15/94
Cost Estimate	Draft 12/6/94 Final 3/10/95
Schedules	Draft 12/6/94 Final 3/10/95
Work Breakdown Structure	Draft 12/6/94 Final 3/10/95

**2.3 General Requirements, Codes and Standards**

Refer to Section 9.0 - References, for the documents that define the project scope and requirements.

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The F&R document will provide a compilation of the Codes and Regulations that apply to this project.

### 3.0 PROJECT MANAGEMENT

The WHC Tank Farm Projects (TFP) organization has direct responsibility for overseeing performance of the activities requested by this SOW, and will serve as LATA's point of contact for all matters related to the execution of this work scope. Any questions that may arise in connection with the engineering services described within the SOW shall be directed to Gary L. Lamphere.

#### 3.1 Performance of Work

Refer to Section 2.2 of this document for the planned deliverables.

#### 3.2 Technical Approach

LATA shall prepare and submit a resource-loaded work plan that addresses how it will perform the requested services to support the schedule milestones described in Section 4.3. Specific items to address in the work plan include the following:

1. Identify the LATA Point of Contact for this task, as well as the key contributors to this effort.
2. Discuss the planned methodology for utilizing the Systems Engineering process, as defined in the SEWP, throughout the effort.
3. Provide a detailed cost estimate and schedule for completing the assigned tasks as defined in this SOW.

### 4.0 QUALITY ASSURANCE

LATA is responsible to assure the requirements of 10 CFR 830.120, "Quality Assurance Requirements" are implemented in their activities, as applicable.

### 5.0 REPORTS

#### 5.1 Monthly Narrative

LATA shall provide a monthly narrative that describes the overall project status, major accomplishments, and problems that may affect cost and schedule. LATA shall provide recommendations for solutions to any problems. A statused design schedule shall be submitted with the narrative.

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## 5.2 Monthly Performance

LATA shall submit a monthly report on or before the fifth of each month with information about the activities in the previous month. Monthly reports should also include the following information:

1. Project Manager's narrative highlights and status assessment for each contract deliverable task.
2. Issues or concerns about cost and schedule with recommended resolution and narrative about any progress towards resolution.
3. Agreements or commitments concerning problems or technical resolution.
4. Major activities planned before the next report is due.
5. Cost and schedule variance analysis information at the contract work breakdown structure reporting level. Variance analyses should be for the current month and cumulative to date; include cause, effect and corrective action.
6. Project funds status report.
7. Milestone status report.
8. Staffing status for planned and actual staff.

## 6.0 MEETINGS

LATA will be responsible for keeping meeting minutes, obtaining approvals and making distribution.

### 6.1 Kickoff Meetings

Kickoff meeting(s) will be conducted at the beginning of each major activity to ensure the understanding of the assignment and identify any discrepancies or areas requiring further clarification.

### 6.2 Progress Meetings

Informal weekly status meetings will be conducted with WHC to review progress, issues, problems, and upcoming activities. These meetings will be conducted either at the local LATA office or at a designated WHC facility. LATA shall be responsible for documenting and distributing the meeting minutes, no later than five working days after the meeting. These minutes shall document all significant agreements, issues/problem areas, commitments, and action items.

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LATA and WHC project personnel will meet informally as necessary to facilitate the completion of the requested work. Documentation of minutes will not be required for these informal meetings.

### 6.3 Design Reviews

Formal Design Review meetings will be conducted to disposition comments received during the formal review process.

### 6.4 Monthly Review Meetings

Formal Monthly Review Meetings will be conducted with the U.S. Department of Energy, Richland Operations Office, (RL) WHC and LATA Project Management to review progress, issues, problems, and upcoming activities. LATA shall be responsible for documenting and distributing the meeting minutes, no later than five working days after the meeting. These minutes shall document all significant agreements, issues/problem areas, commitments, and action items.

## 7.0 DESIGN END ITEMS

LATA shall provide a schedule of all end items with definite submission dates, contain a purpose of submittal, and show who has to concur.

### 7.1 Conceptual Review

The following information shall be included in the conceptual review; engineering report, supporting calculations, sketches, engineering and construction cost estimates, budget authorization/budget outlay (BA/BO) schedule, work plan for conceptual design and energy conservation report.

### 7.2 Conceptual Design

Include preliminary drawings or sketches, conceptual design report, engineering and construction estimate, project master schedule, work plan for definitive design and schedule of fiscal year appropriations and cost requirements for each year in which appropriations are requested (BA/BO). Computer-aided drafting (AUTOCAD) shall be used for all drawings, sketches, etc..

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## 8.0 REFERENCES

The following is a listing of reference information items available to support LATA's work on this activity. If additional documentation/information is needed, this shall be brought to the attention of the TFP point of contact.

1. WHC-SD-W314-FRD-001, Rev. 0 (Draft), "Functions and Requirements for Tank Farm Restoration and Safe Operations," dated March 31, 1994.
2. WHC-SD-W314-ES-001, Rev. 0, "W-314A Tank Farm Integrated Instrumentation Systems Upgrade Engineering Study," dated March 15, 1994.
3. WHC-SD-W314-002, Rev. 0, "W-314A Study Comparison to Cost Trade-Off Options," dated May 15, 1994.
4. WHC-SD-WM-ES-284, Rev. 0, "Double Shell Tank Ventilation Upgrades, Project W-314B, Engineering Study," dated February 16, 1994.
5. WHC-SD-W314C-ES-001, Rev. 0, "Engineering Study, Transfer System Upgrade, Project W-314C," dated March 28, 1994.
6. DOE/RL-93-0106, Rev. 0 (Draft), "Tank Waste Remediation Systems (TWRS) Systems Engineering Management Plan," dated March, 1994.
7. WHC-SD-W314-SEMP-001, Rev. 0 (Draft), "Project W-314 Systems Engineering Management Plan," dated June, 1994.
8. Facility Drawing Index and copies of drawings (as required.).

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