Department of Energy
Richland Operations Office
P.O. Box 550
Richland, Washington 99352

MAR 27 1997

97-PAD-022

Mr. Ralph Arcaro
DNFSB Technical Staff
625 Indiana Avenue, N.W.
Suite 700
Washington, D.C. 20004

Dear Mr. Arcaro:

LETTER REPORT DEFINING TANK WASTE REMEDIATION SYSTEM (TWRS) ALTERNATIVE PATH

This letter transmits the "TWRS Privatization Alternate Path" letter report. This report is proposed as commitment number 5.2.1.3, due May 30, 1997, in the Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 92-4 Implementation Plan, Revision 2, Draft G (Enclosure 1).

It is understood that the revised 92-4 Implementation Plan has not been formally submitted to the DNFSB by the Richland Operations Office (RL), therefore the commitments proposed in Draft G cannot be treated as documented obligations. However, in discussions over the past several months, RL informally agreed that the commitments proposed in Draft G would be completed and submitted to the DNFSB by the dates identified. As a demonstration of good faith, the enclosed alternative path letter report is being provided to you. This commitment may be reconciled as part of future activities supporting the submittal of a revised 92-4 Implementation Plan by the Secretary of Energy.

Enclosure 2 is a letter from George Sanders, DOE-RL to Mike Wilson, State of Washington Department of Ecology, "Hanford Federal Facility Agreement and Consent Order (Tri-Party Agreement) Interim Milestone M-60-09," 96-WDD-178, dated October 25, 1996. Enclosure 3 is a letter "Core Competencies," 9555776, dated October 25, 1995, from J. O. Honeyman, Westinghouse (WHC), to W. J. Taylor, RL. For your information, enclosure 2 was informally provided to you on October 11, 1996. It is included with this transmittal along with Enclosure 3 because it is listed as a reference on the letter report.

If you have any questions, please contact me on 376-1890, or Hal Wacek of Materials Science Division (MSD), on 376-0601.

Sincerely,

C. R. DeLaney for SLT

Sandra L. Trine, RL/DNFSB Liaison
Performance Assessment Division

PAD:SLT

Enclosure (3)

cc w/encls:
K. Lang, DOE-HQ, EM-38
L. Morgan, PAI
M. Whitaker, DOE-HQ, S-3.1

cc w/o encl:
R. Erickson, DOE-HQ, EM-38
J. Hales, FDH

Department of Energy
Richland Operations Office
P.O. Box 550
Richland, Washington 99352

OCT 2 4 1996

96-WDO-178

Mr. Mike Wilson, Program Manager
Nuclear Waste Program
State of Washington
Department of Ecology
P.O. Box 47600
Olympia, Washington 98504-7600

Dear Mr. Wilson:

HANFORD FEDERAL FACILITY AGREEMENT AND CONSENT ORDER (TRI-PARTY AGREEMENT)
INTERIM MILESTONE M-60-09

Enclosed is the document titled "Report on Alternate Path Procurement Strategies If TWRS Privatization Effort is Unsuccessful" (Report).

This Report was prepared by an independent contractor and is being transmitted to Washington State Department of Ecology in fulfillment of Tri-Party Agreement Interim Milestone M-60-09. The views, opinions and conclusions expressed in the enclosed Report, including, but not limited to, adoption of assumptions, choice and use of definitions, and selection and relative ranking of contracting mechanism alternatives, are strictly those of the preparing contractor, and may not be assumed or construed to necessarily be those of the US Department of Energy, nor its Richland Operations Office.

If you have any questions, please contact me on (509) 372-3864.

Sincerely,

George H. Sanders, Administrator
Hanford Tri-Party Agreement

WDO:ML

Enclosure

cc w/encl:
R. Jim, YIN
J. Wilkinson, CTUIR
D. Powaukee, Nez Perce Tribe
S. Dahl, Ecology
J. Grantham, Ecology
D. Sherwood, EPA
L. Arnold, FDH
P. Kearns, PNNL

Westinghouse
Hanford Company

P.O. Box 1970 Richland, WA 99352

October 25, 1995 9555776

Mr. W. J. Taylor, Director
Waste Disposal Division
U.S. Department of Energy
Richland Operations Office
Richland, Washington 99352

Dear Mr. Taylor:

CORE COMPETENCIES

References: (1) Letter, J. O. Honeyman, WHC, to W. J. Taylor, RL, "Multi-Year Program Plan Change Request," 9555591, dated October 18, 1995.

(2) Letter, G. H. Beeman, PNL, to J. E. Kinzer, RL, "Maintenance of PNL Core Technical Competencies to Support the TWRS Disposal Program," dated August 24, 1995.

(3) Letter, C. P. Bader, RL, to A. L. Trego, WHC, and W. J. Madia, PNL, "Tank Waste Remediation System (TWRS) Guidance for Update of the Multi-Year Program Plan (MYPP) - Supplemental Guidance for the Disposal Program," 95-PRI-073, dated July 26, 1995.

This letter is in response to reference 1 which requested that the issue of core competencies be addressed. It contains a summary list and paragraph descriptions of the core competencies requirements for the Tank Waste Remediation System (TWRS) Disposal Program jointly developed by Westinghouse Hanford Company (WHC) and Pacific Northwest Laboratory (PNL). Core competencies requirements were developed for each project in the work breakdown structure - retrieval, low-level waste (LLW), high-level waste (HLW), and storage and disposal. Core competencies requirements for support function areas are included within the core competencies for each project. The summary list is presented below and the paragraph descriptions are contained in Appendix A.

TABLE 1. SUMMARY LIST - CORE COMPETENCIES

1. Colloid Chemistry
2. Dissolution Thermodynamics
3. Supernatant Pretreatment Process Chemistry
4. Sludge Pretreatment Chemistry
5. Solids/Mobilization Separations
6. Glass Chemistry
7. Glass Process Chemistry
8. Process/Equipment Engineering
9. Materials Science
10. Physical/Analytical Chemistry
11. Statistics
12. Geochemistry
13. Flowsheet Engineering
14. Source Term Modeling
15. Geohydrology

The 15 core competencies listed above cover those requirements of the TWRS Disposal Program to resume a government-owned contractor-operated (GOCO) disposal strategy should the Alternate Acquisition Strategy (AAS) prove unsuccessful. The list agrees closely with an earlier PNL analysis (reference 2), although it is slightly shorter through modification and consolidation of categories.

The summary assessment of the degree of retention or loss of each core competency is that all core competencies requirements are adequately covered in FY 1996 by the FY 1996 Multi-Year Program Plan (MYPP) as modified by the pending change request (reference 1). This was accomplished by development and identification of funding for the backup technology tasks presented in reference 1. The only exceptions to complete coverage of core competencies was for both Solids/Mobilization Separations and Materials Science where nine FTEs were identified as needed, but only eight are funded. These deficits of one each were judged to be acceptable. Appendix B illustrates the core competencies requirements coverage.

The core competencies coverage was assessed by determining the coverage by the backup technology tasks and the baseline and then comparing with the requirements in case the AAS is not successful. Appendix C presents a matrix of core competencies needs and coverage by project, source of programmatic support (baseline or backup technology), and performing organization.

We believe this letter report fulfills the requirement for assessment of the degree of retention of core competencies and presentation of a plan for mitigation.

If you have any questions, please call me or R. D. Jensen, of my staff, on 373-6631.

Very truly yours,

J. O. Honeyman, Director
Disposal Program Office

jlc

Attachments 3

PNL - G. H. Beeman
L. K. Holton

RL - B. L. Nicoll
G. H. Sanders
A. H. Wirkkala (w/o attachment)

CONCURRENCE:

Date: 10/25/95

G. H. Beeman, Manager
TWRS Technology Program Office
Pacific Northwest Laboratory

APPENDIX A. CORE COMPETENCIES DESCRIPTIONS

Colloid Chemistry - The colloidal chemists provide expertise in the chemistry of very small particles in tank waste or very small particles generated from pretreating tank waste. Expertise is needed in agglomeration behavior, shear sensitivity, settling rates, chemical stability/particle formation, and in measuring critical fundamental properties of colloidal solutions. This core competency is needed to understand how radioactive solid liquid systems behave in settlers, filters, and other separation devices. It is critical because a failure in solid-liquid separation could result in a LLW product that does not meet specifications.

Dissolution Thermodynamics - The dissolution thermodynamics core competency provides expertise in thermodynamic modeling of Hanford sludges and pretreated sludges using the Environmental Simulation Program (ESP). Modeling is necessary to predict the type and concentration of leaching solutions, temperatures, and solid-solution ratios, to efficiently dissolve tank sludge and thus minimize high level waste. This information will be used to design plant operating flowsheets. This predictive capability is vital given the large number of widely varying sludge types and chemical components in the waste tanks.

Supernatant Pretreatment Process Chemistry - The pretreatment process chemists provide expertise in chemistry associated with the application of ion exchange, molecular retention, precipitation, and the organic destruction or decomplexation of Hanford tank waste supernates, water washes and alkaline leaches. A knowledge of this chemistry is vital to ensuring that LLW pretreatment processes are viable.

Sludge Pretreatment Chemistry - The sludge pretreatment chemists provide expertise in the behavior of sludges during pretreatment process operations and determination of the chemical phases and speciation of sludge components. Laboratory-scale experiments are conducted to provide this basic information. This core competency is vital in optimizing the enhanced sludge wash process and minimizing the volume of high level waste produced.

Solids/Mobilization Separations - This core competency provides expertise on: the effects of waste composition, concentration, and phase changes on slurry rheology; waste transport control and monitoring instruments; the effect of geometry and sensor measurements on equipment deployment; and the effect of equipment selection on the extent of sludge mobilization. This activity is critical to establishing waste transport criteria, developing and validating instruments for sludge mobilization, establishing performance characteristics of solids separations technologies, performing equipment scale-up and testing, and providing for cleaning, maintenance, and long-term performance.

Glass Chemistry - Glass chemists will formulate waste glasses to meet process/product performance requirements. Laboratory test glasses using a nonradioactive simulant will be formulated and characterized for such properties as durability, crystallinity, liquidus temperature, electrical conductivity and viscosity. Glass performance models can then be developed from the data, and used to optimize the waste feed. Simulant waste glass

performance must be validated by glass formulations with radioactive waste. Glass chemists are also critical in the development of increased waste-loaded glasses to minimize the overall volume of glass produced.

Glass Process Chemistry - Glass process chemists will evaluate the feed preparation, vitrification and off gas generation processes. Physical properties of the waste slurries will be characterized to optimize the design of transport systems. Vitrification redox control additive requirements will be determined to control glass melt foaming and to avoid crystal formation in the glass. Process streams (including off gas compositions) need to be characterized for behavior, reaction products and controllability to reduce the risk of hazardous conditions and to ensure successful plant operation.

Process/Equipment Engineering - Process and equipment engineers define, develop, and adapt the processes and equipment associated with the pretreatment and vitrification systems. Testing will be performed to evaluate the processability of the waste and the performance of the equipment for the feed transport, vitrification, off gas treatment, glass pouring and acceptability under process conditions. Process modeling will be conducted to establish requirements for process monitoring and control. This also includes process stream sampling and analyses, and process reliability.

Materials Science - Materials scientists will determine the appropriate materials of construction for process equipment such as the melter and off gas systems, process vessels, glass canisters, pumps, agitators and instruments. This competency also enables the development, characterization, and evaluation of other waste forms including matrices and packaging materials.

Physical/Analytical Chemistry - The physical/analytical chemists perform chemical analyses of various constituents feeding or resulting from any retrieval, pretreatment or vitrification process. Chemists provide the capability of measuring the composition of process stream samples and end-products such as waste feed, glass and off gas. Analytical chemists are key to providing reliable and timely test results.

Statistics - This core competency provides expertise in the definition of uncertainty for experimental design, test evaluation, process/product control, and product acceptance. Statistical methodologies are necessary to determine the effects of components and their interactions on glass properties using the minimum number of samples and tests, interpretation of data for empirical models, determining the number of samples, sampling locations, and the size of samples to assure process control and product acceptability.

Geochemistry - The geochemist will determine the extent of migration of radionuclides through sediments below the disposal site. This includes chemical interactions with Hanford sediments and use of chemical barriers to control the release of radionuclides. This competency supports the development of a disposal Performance Assessment and design of the LLW disposal system.

Flowsheet Engineering - The flowsheet core competency provides an expertise in applying ASPEN software and the ARENA/SIMAN model to develop a TWRS-integrated

disposal flowsheet. A flowsheet illustrates the basic process relationships (rates), defines the equipment required to carry out the process steps, and indicates the need for utilities. This core competency provides assurance that the process definition meets all the established criteria and requirements, with the minimal number of process steps.

Source Term Modeling - This competency provides the data and mathematical models to describe the release from the LLW form and package in the disposal environment. The competency also provides technical guidance to long-term durability testing to assure the testing is relevant and provides necessary data for Performance Assessment models.

Geohydrology - The geohydrologist will determine the site-specific hydraulic properties of the Hanford sediments, hydraulic properties of the engineered disposal system, and identify conceptual models to simulate flow and transport to support Performance Assessment and disposal system design.

APPENDIX B. SUMMARY OF CORE COMPETENCIES COVERAGE IN FY 1995 MYPP

Full-Time Equivalent (FTEs)				
Core Competency	Needed	Funded		Surplus/ (deficit)
		Baseline	Backup Technology	
1. Colloid Chemistry	2.0	0	2.0	0
2. Dissolution Thermodynamics	3.0	1.0	2.0	0
3. Supernatant Pretreatment Process Chemistry	4.0	2.0	2.0	0
4. Sludge Pretreatment Chemistry	3.0	0.5	2.5	0
5. Solids/Mobilization Separations	9.0	1.0	7.0	(1)
6. Glass Chemistry	8.0	5.0	4.0	1
7. Glass Process Chemistry	3.0	1.5	2.5	1
8. Process/Equipment Engineering	8.0	6.0	2.0	0
9. Materials Science	9.0	1.0	7.0	(1)
10. Physical/Analytical Chemistry	5.0	0	5.5	0.5
11. Statistics	1.0	0	1.0	0
12. Geochemistry	2.5	0	2.5	0
13. Flowsheet Engineering	3.0	2.0	1.0	0
14. Source Term Modeling	1.0	0	1.0	0
15. Geohydrology	4.0	1.5	2.5	0
TOTAL	65.5	21.5	44.5	

	RETRIEVAL			LOW-LEVEL WASTE			HIGH-LEVEL WASTE			STORAGE & DISPOSAL			
Core Competency	WHC	PNL	Other[2]	WHC	PNL	Other[2]	WHC	PNL	Other[2]	WHC	PNL	Other[2]	Total
1. COLLOID CHEMISTRY													
Needed					1			1					2.0
Funded (Baseline)													0
Funded (Backup)													
EM-30					.5			1					1.5
Other[1]					.5								0.5
Total Funded					1			1					2.0
Surplus (Deficit)				0	0		0	0					0
2. DISSOLUTION THERMODYNAMICS													
Needed							1	2					3.0
Funded (Baseline)							1						1.0
Funded (Backup)													
EM-30								2					2.0
Other[1]													
Total Funded							1	2					3.0
Surplus (Deficit)							0	0					0
3. SUPERNATANT PRETREAT PROC CHEM													
Needed				2	2								4.0
Funded (Baseline)				2									2.0
Funded (Backup)													
EM-30					1								1.0
Other[1]					1			1					1.0
Total Funded				2	2								4.0
Surplus (Deficit)				0	0								0

1 TFA

2 ANL, LANL, etc.

	RETRIEVAL			LOW-LEVEL WASTE			HIGH-LEVEL WASTE			STORAGE & DISPOSAL			
Core Competency	WHC	PNL	Other[2]	WHC	PNL	Other[2]	WHC	PNL	Other[2]	WHC	PNL	Other[2]	Total
4. SLUDGE PRETREATMENT CHEMISTRY Needed							1	2					3.0
Funded (Baseline)							.5						0.5
Funded (Backup) EM-30 Other[1]								2 .5					2.0 0.5
Total Funded							.5	2.5					3.0
Surplus (Deficit)							(.5)	.5					0
5. SOLIDS/MOBILIZATION SEPARATIONS Needed	G			1	1			1					3.0
Funded (Baseline)				1									1.0
Funded (Backup) EM-30 Other[1]	G				.5 .5								0.5 0.5
Total Funded	G			1	1		✓	0					3.0
Surplus (Deficit)	0	0		0	0			(1)					(1.0)
6. GLASS CHEMISTRY Needed				1	1		1.5	2.5		1	.5	.5	8.0
Funded (Baseline)				1			1.5	1.5		1			5.0
Funded (Backup) EM-30 Other[1]					1			2.5			.5	.5	4.0
Total Funded				1	1		1.5	4		1	.5	.5	9.0
Surplus (Deficit)				0	0		0	1.5		0	0	0	1.0

1 TFA

2 ANL, LANL, etc.

	RETRIEVAL			LOW-LEVEL WASTE			HIGH-LEVEL WASTE			STORAGE & DISPOSAL			
Core Competency	WHC	PNL	Other[2]	WHC	PNL	Other[2]	WHC	PNL	Other[2]	WHC	PNL	Other[2]	Total
7. GLASS PROCESS CHEMISTRY Needed							1	2					3.0
Funded (Baseline)							1.5						1.5
Funded (Backup) EM-30 Other[1]								2.5					2.5
Total Funded							1.5	2.5					4.0
Surplus (Deficit)							.5	.5					1.0
8. PROCESS/EQUIPMENT ENGINEERING Needed				3	1		2	2					8.0
Funded (Baseline)				3			2	1					6.0
Funded (Backup) EM-30 Other[1]					.5			1.5					2.0
Total Funded				3	.5		2	2.5					8.0
Surplus (Deficit)				0	0		0	.5					0
9. MATERIALS SCIENCE Needed	3				1		1	1		1	2		9.0
Funded (Baseline)										1			1.0
Funded (Backup) EM-30 Other[1]	3				1			.5		.5	2		7.0
Total Funded	3				1			.5		1.5	2		8.0
Surplus (Deficit)	0	0		0	0		(1)	(.5)		.5	0		(1.0)

1 TFA

2 ANL, LANL, etc.

	RETRIEVAL			LOW-LEVEL WASTE			HIGH-LEVEL WASTE			STORAGE & DISPOSAL			
Core Competency	WHC	PNL	Other[2]	WHC	PNL	Other[2]	WHC	PNL	Other[2]	WHC	PNL	Other[2]	Total
10. PHYSICAL/ANALYTICAL CHEMISTRY Needed					2			3					5.0
Funded (Baseline)													
Funded (Backup) EM-30 Other[1]					1.2 0.9			2.2 1.0			.2		3.6 1.9
Total Funded					2.1			3.2			.2		5.5
Surplus (Deficit)					0.1		0	0.2		0	0.2		0.5
11. STATISTICS Needed								1					1.0
Funded (Baseline)													
Funded (Backup) EM-30 Other[1]								1					1.0
Total Funded								1					1.0
Surplus (Deficit)							0	0					0
12. GEOCHEMISTRY Needed	2										.2	.3	2.5
Funded (Baseline)													
Funded (Backup) EM-30 Other[1]	2										.2	.3 SNL	2.5
Total Funded	2										.2	.3	2.5
Surplus (Deficit)	0	0								0	0	0	0

1 TFA

2 ANL, LANL, etc.

	RETRIEVAL			LOW-LEVEL WASTE			HIGH-LEVEL WASTE			STORAGE & DISPOSAL			
Core Competency	WHC	PNL	Other[2]	WHC	PNL	Other[2]	WHC	PNL	Other[2]	WHC	PNL	Other[2]	Total
13. FLOWSHEET ENGINEERING													
Needed				2.5			0.5						3.0
Funded (Baseline)				2									2.0
Funded (Backup)													
EM-30				0.5			0.5						1.0
Other[1]													
Total Funded				2.5			0.5						3.0
Surplus (Deficit)				0	0								0
14. SOURCE TERM MODELING													
Needed											1		1.0
Funded (Baseline)													
Funded (Backup)													
EM-30											1		1.0
Other[1]													
Total Funded											1		1.0
Surplus (Deficit)													0
15. GEOHYDROLOGY													
Needed										2	2		4.0
Funded (Baseline)										.3	1.2		1.5
Funded (Backup)													
EM-30										1.7	0.8		2.5
Other[1]													
Total Funded										2	2		4.0
Surplus (Deficit)										0	0		0

1 TFA

2 ANL, LANL, etc.

ERRATA FOR: "REPORT ON ALTERNATE PATH PROCUREMENT STRATEGIES IF TWRS PRIVATIZATION EFFORT IS UNSUCCESFUL"			
Ref	Page #	Section	Comment
1		Title Page	Document should be dated October 1996.
2	1	Executive Summary	Document references a Tri-Party Agreement (TPA) alternate path milestone of December 2002. There is no TPA alternate path milestone for this date. TPA Milestone M-61-02 for initiating hot operations of Phase I low-activity waste pretreatment and immobilization is for December 2003.
3	1	Executive Summary	Typographical error: "Government to being preparing" should be "Government to begin preparing".
4	6	1.3.1 Current Program Status	Document states the, "facilities will treat and immobilize approximately 3% of the tank waste". The Phase I LAW facilities will treat and immobilize approximately 6 - 13% of the tank waste.
5	6	1.3.1 Current Program Status	Typographical error: "These contracts were be" should be "These contracts will be".
6	6	1.3.1 Current Program Status	Reference to $185 million budget authority should be $170 million.
7	7	1.3.3 Low Level Waste Vitrification Plant Procurement	Insert the phrase "day for" between "20 tons per" and "each facility".
8	7	1.3.3 Low Level Waste Vitrification Plant Procurement	The statement, "At this stage of the procurement, the facility could be readily down-sized to 20 tons per day..." is not true for the LLWVP procurement.
9	8	3.1.2.2 Risks	Typographical error: " .." should be "."
10	13	3.2.4.2 Risks	Omitted coverage of disadvantages.
12	19	4.1.4 Source of Funds Summary	Typographical error: "actually produced product The funding" should be "actually produced product. The funding".

ERRATA FOR: "REPORT ON ALTERNATE PATH PROCUREMENT STRATEGIES IF TWRS PRIVATIZATION EFFORT IS UNSUCCESFUL"			
Ref	Page #	Section	Comment
13	26	4.2.5 Funding Mechanism Summary	Typographical error: "budget amendment in 1988" should be "budget amendment in 1998" .
14	27	4.3 Funding Summary	Typographical error: "probably a lessor factor" should be "probably a lesser factor".
15	29	5.2.2.1 Contract Type	Typographical error: "substantialinvestment" should be "substantial investment".
17	30	5.2.2.5 Funding	Typographical error: "budget authority May all" should be "budget authority may all".
18	32	5.2.4.1 Contract Type	Typographical error: "could either competitively selected" should be "could either be competitively selected".
19	34	5.2.5.5 Funding	Typographical error: "required up from rather than" should be "required up front rather than".
20	35	5.2.6.5 Funding	Typographical error: "undoubtedly the conceptual design" should be "undoubtedly be the conceptual design"