TFA
TANKS
FOCUS AREA

Midyear Review Report
FY 1999

May 1999

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Tanks Focus Area Midyear Review Report FY 1999

May 1999

Prepared for
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Pacific Northwest National Laboratory
Richland, Washington 99352

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ACRONYMS

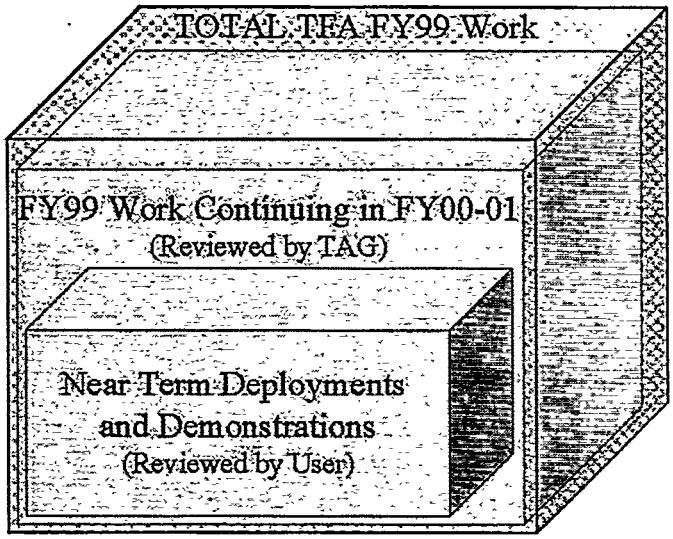
ASTD	Accelerated Site Technology Deployment
BNFL	British Nuclear Fuels Ltd.
BVESTs	Bethel Valley Evaporator Service Tanks
CIF	Central Incinerator Facility
CMST	Characterization, Monitoring and Sensor Technology
CST	crystalline silicotitanate
DOE	Department of Energy
DOE/RI	Department of Energy, Richland Operations Office
DST	double-shell tank
DWPF	Defense Waste Processing Facility
EM30	DOE Office of Environmental Management
EM40	DOE Office of
EM50	DOE Office of Science and Technology
EPA	Environmental Protection Agency
ESP	Efficient Separations Program
FETC	Federal Energy Technology Center
FIU	Florida International University
FFA	Federal Facility Agreement
FY	Fiscal Year
GAAT	Gunite and Associated Tanks
HEPA	High Efficiency Particulate Air
HAW	High Activity Waste
HLW	High-Level Waste
HTI	Hanford Tanks Initiative
INEEL	Idaho National Engineering and Environmental laboratory
LAW	Low Activity Waste
LDUA	Light Duty Utility Arm
LLW	Low-Level Waste
MPI	Multi-Point Injection
MST	monosodium titanate
MVCITs	Melton Valley Capacity Increase Tanks
MVSTs	Melton Valley Storage Tanks
OHF	Old Hydrofracture Tanks
ORNL	Oak Ridge National Laboratory
ORP	Department of Energy Office of River Protection
ORR	Oak Ridge Reservation
PHMC	Project Hanford Management Contract
PMP	Pulsating Mixer Pump
PNNL	Pacific Northwest National Laboratory
PVC	polyvinyl chloride
RCRA	Resource Conservation and Recovery Act
SLS	Solids Liquid Separation
SRS	Savannah River Site
TAG	Technical Advisory Group
TFA	Tanks Focus Area
TIM	Technology Integration Manager
TPB	tetraphenyl borate
TWRS	Tank Waste Remediation System
WVDP	West Valley Demonstration Project

Section 1 - Introduction

1.1 Purpose

The purpose of the Tanks Focus Area (TFA) Midyear Review was to improve the quality and responsiveness of TFA technical solutions to identified user needs. This review goal was achieved through executing a multi-phased review approach (see figure below).

The first phase of the midyear review focused on the subset of FY99 work identified by Department of Energy (DOE) users as having continuing benefit in FY00-01. The TFA FY00-02 Technical Responses identified FY99 work that had continued applicability based on the most current set of site user needs. Each TFA FY00-02 Technical Response which included FY work scope was reviewed by the TFA Technical Advisory Group (TAG), in a meeting held in February 1999. Made up of technical experts from across the country, the TAG provides high-quality, short-turnaround, independent technical reviews for the TFA.



Out of the 50 TFA FY00-02 Technical Responses, 25 included FY99 tasks. Comments and/or issues generated by the TAG on these current work activities are included in this report, including the TFA's disposition of the TAG comment or issue. The TAG review addressed the following questions:

1. Does the technical response address the critical issues of the need?

2. Does the technical response identify issues not addressed in the need?

3. Is the technical approach appropriate?

4. Are there additional technical issues that need to be addressed?

It is important to note that the purpose of the TAG review is to improve the technical quality of the responses, resulting, in most cases, in the issuance of revised technical responses. Members of the TAG participating in this review are included in Appendix A. A listing of the technical responses reviewed are contained in Appendix B. Specific TAG review comments are included in Appendix C.

The second phase of the midyear review included a smaller set of FY99 projects (refer back to diagram) that justified a programmatic review due to near-term deployment and/or demonstration project delivery expectations. The intent of this smaller, more focused review was to determine the readiness of these projects to deliver as scheduled, including evaluating the commitment and readiness of the site user to accept the technical solution. Fifteen technologies/technical solutions were selected for review based on the following criteria:

- represented a FY99 key deployment, demonstration or data delivery
- included each site
- involved each TFA functional area and TFA partner programs: Accelerated Site Technology Deployment (ASTD), Characterization, Monitoring and Sensor Technology (CMST), Efficient Separations Program (ESP), Robotics, University, and Industry
- a technical or programmatic concern was previously identified.

The TFA's Technology Integration Managers (TIMs) ensure that (1) a sound technical approach is used to solve the users' problems, (2) integrated technical solutions are available to meet the users' schedules, 3) technical solutions are useful to more than one site or more than one application wherever possible, and (4) users are integrally involved throughout the development of a technical solution. ensure user involvement in technology solutions. The TIMs presented the midyear project review information, which described the project need, identified the site(s) it applies to, and what problem it addresses. A status of each project was given, and any current or potential issues were identified and discussed.

The programmatic review panel (see Appendix A) consisted of members of the DOE Management Team, the TFA User Steering Group, and the TAG Chair. The panel was requested to engage in discussions, provide comments, and raise any programmatic or technical issues or recommendations at any time during the presentation. A summary of the TIM project reviews is provided below. Specific comments and issues raised are included in Appendix C.

1.2 Program Overview

The Tanks Focus Area was established by the DOE Office of Science and Technology (EM50) to develop and deliver technical solutions for safe and effective tank cleanup at four DOE tank sites: Hanford Site (Hanford), Idaho National Engineering and Environmental Laboratory (INEEL), Oak Ridge Reservation (ORR), and Savannah River Site (SRS). In FY99, the West Valley Demonstration Project (WVDP) in New York was added to the group of tank sites supported by the TFA.

The TFA emphasizes supporting and involving users to enable deployments. Needs submitted by user organizations provide the foundation for the TFA's technical program. Individual site needs are analyzed and technical responses are developed to address the needs. Users review the technical responses for applicability and adequacy to the submitted site need.

So far in FY99, 14 TFA technologies have been deployed, 2 have been demonstrated, and 13 technical reports have been delivered to the user. FY99 key deliverables achieved to date include:

- Pulsair™ Mixer in Gunite Tank (GAAT) W-9, ORR
- Pipe Capping System at GAAT W-7, ORR

- ❖ LDUA Non Destructive Examination - HLW Tank WM-188, INEEL
- ❖ Hanford Tanks Initiative Conclusions and Recommendations Report , Hanford
- ❖ Regenerable In situ High Efficiency Particulate Air (HEPA) Filter System Contract, SRS

The TFA established a goal of limiting carryover funds (uncosted balances) to 3-5% of total program funding. As of the Midyear Review, carryover was projected (using January 1999 data) to be at 4-6% of total program funding. However, a significant portion of the projected carryover was attributed to unbaselined funds, as well as FY99 ASTD new start activities. These ASTD activities had not been reported in PTS as of January 1999, resulting in a less favorable (0-2%) carryover projection. A result of this low carryover projection is a reduced level of contingency in addressing several activities that contain significant funding uncertainties. These activities include the Duratek SRS M-Area Melter, the Advanced Vitrification System proposed by Radioactive Isolation Consortium, AEA Technology's Nested Array Fluidic Sampler for Hanford, and the Alternatives to Reduce Risk for Hanford High-Level Waste (HLW) review. Close monitoring of carryover funds will continue through the balance of the fiscal year, particularly for managing funding uncertainties.

Section 2 - Project Reviews

2.1 *GAAT Alternate Mixing Systems – Flygt Mixers/Russian Pulsating Mixer Pump (99082)*

Alternate mixing systems are being evaluated for ORR to

- save on baseline robotic equipment maintenance and wear
- shorten the schedule of GAAT retrieval operations
- increase durability and lessen costs of systems for bulk waste retrieval
- allow for multiple simultaneous retrieval operations.

Evaluation of alternate mixing systems supports mobilization and heel retrieval activities for SRS Tank 19, and provides costs data for retrieval technology evaluation at the Hanford Site.

Flygt Mixers were deployed in GAAT W-5, enabling retrieval of 4,500 gallons of sludge and supernate. State regulators have stated that the tank is cleaned to the extent capable by the technology and no further retrieval is required. However, a new deployment platform is being designed to get the mixers closer to the tank floor for faster cleaning in future deployments. Oak Ridge National Laboratory (ORNL) will collect data from the Flygt Mixer deployment and provide the data to PNNL for analysis and publication of the results by the end of FY99. ORNL and PNNL budgets are adequate to complete the work.

The Federal Energy Technology Center (FETC) placed a contract with American Russian Environmental Services to develop the Russian Pulsating Mixer Pump (PMP) for use in an HLW tank environment. The Russian design is complete and fabrication of the pump has been initiated. Weld certification issues are causing a week for week slip in the schedule. The SRS site representative took an action to work with ORR to provide information on qualification of commercial grade equipment that they had previously used in certification of welding from foreign vendors. The information was provided and is currently being routed for approval by ORR. If not resolved in May, a decision will need to be made on whether or not to proceed with the task. If the project progresses, tank TH-4 has been identified as an alternate deployment facility. The balance of the plant design will be completed in mid-March. Procurement of the system will be completed in May, with cold tests in June. Deployment of the system and performance data is scheduled to be complete by September. Additional funding may be required for site preparation, deployment, and operation of the system.

User Acceptance: User expectations were consistent with project status.

2.2 *Idaho Nuclear Technology and Engineering Center Tank Sampling and Non-Destructive Examination*

Off-riser inspection, sampling, and gripper end-effectors are needed for use in large radioactive waste tanks at INEEL to

- conduct wall and below heel corrosion inspections to support continued tank use and spare tank certification

technical solution proposed by TFA through FIU, SRS now indicates the results have far exceeded their expectations. INEEL is also pleased with the work performed and data obtained thus far which has allowed them to begin down the path toward final treatment options. Hanford Site and BNFL personnel have not been actively involved in the melter activities at this point.

User Acceptance: User expectations were consistent with project status.

2.4 Savannah River Site Salt Disposition (99070)

Process systems are needed at SRS to remove cesium from the soluble waste for feed to the DWPF. This multiyear task involves technology development for crystalline silicotitanate (CST) ion exchange and tetraphenyl borate (TPB) precipitation to allow a primary alternative selection by DOE, followed by conceptual and preliminary design. A backup alternative will also be funded to a lesser extent, in case the primary alternative fails. Three parallel paths are in progress: (1) cesium ion exchange using CST, (2) small in-tank precipitation using TPB, and (3) strontium/transuranic extraction using monosodium titanate (MST). Glass variability studies are also being conducted. All projects were initiated in March; assessments are due in September. Pilot design and construction will be initiated in FY00, and operations testing should be complete in FY01.

SRS is also assessing direct grouting options for cesium disposal to look at saltstone loading and leaching from concrete. Westinghouse Savannah River Company recommended several preferred alternatives for cesium removal originally, which did not include the direct grout option due to significant regulatory/institutional issues (not technical issues). Now the assessment will look at additives to the saltstone matrix to increase stability. The assessment will involve meetings with regulators to identify their potential position.

SRS's goal is to be able to make a viable downselect process decision in September 1999, to include in the line item data sheet that will be submitted for funding in FY01. The preferred option will need to process 80 million gallons of supernate, including solubility process streams. Estimated costs to complete the flowsheets are around $1 billion, and it will take 8-10 years to move from conceptual design to operations (startup planned for 2010). SRS will need to use old style tanks to meet startup. needs. Some level of effort will be expended on the backup path until conceptual design begins. A pilot scale plant is required as soon as possible to address open design issues and provide representative mixing of tank wastes.

User Acceptance: User expectations were consistent with project status.

2.5 Central Incinerator Facility (CIF) Evaporator (99086)

SRS scrubs chlorine from their offgas system because of the incineration of polyvinyl chloride (PVC) and other chlorinated materials. The incineration rate must be limited because of the high amount of blowdown from the scrubber. By evaporating the offgas scrubber system and concentrating the final product by a 3:1 volume reduction ratio, the amount of solidified waste is reduced by 25% and the offgas system can be operated to handle full production rates for burning PVC.

Bench scale testing of the CIF Evaporator has shown 10^6 to 10^8 decontamination factors. Once proven, the evaporator technology will be an essential part of a successful flowsheet. By operating at a higher

flowrate through the scrubbers and increasing chloride concentration in the blowcrete, the site will operate more efficiently, reduce costs, and minimize the number of HEPA filters it uses.

User Acceptance: User expectations were consistent with project status.

2.6 Representative Sampling and At-Tank Analysis (99046)

Development of multiple depth remote sampling equipment is needed in Hanford's large waste feed staging tanks to

- ❖ obtain representative samples from several vertical locations in the tank
- ❖ obtain large sample volumes (up to 15 liters)
- ❖ verify the inventory of constituents before batch transfer to the privatization contractor.

In conjunction with the sampling equipment, at tank analysis instruments will be developed and deployed to determine when the waste in the tank has reached steady state composition from mixing and representative samples can be taken.

The sampling concept will involve a nested array of eight fluidic samplers which will fit down a 10-inch riser and sample eight different locations. The sample, continuously pulled above the riser, is returned to the tank until the at-tank analysis instruments indicate a sample can be taken. Two methods are being tested for above-riser filling of the sample bottle. The baseline method uses an inverted bottle with a septum on a needle. The alternative method uses an upright bottle with a valve to drain an in-line sample reservoir by gravity flow. The latter approach is being developed to satisfy Environmental Protection Agency sampling requirements, which require that (1) a vacuum not be pulled on the sample chamber, (2) the bottle is filled to zero head-space, and (3) the sample undergoes minimum agitation. DOE's Richland Operations Office (DOE/RL) has not implemented requirements for Resource Conservation and Recovery Act compliant sampling in verifying the inventory of tank waste prior to batch transfer to the privatization contractor. However, Project Hanford Management Contract (PHMC) personnel are developing the alternative sampling option in anticipation of the requirement. Proof-of-principle tests for the fluidic sampler and bottle filling configuration are scheduled for FY99 and FY00, followed by detailed design, fabrication, and cold acceptance testing of the full-scale sampler. Hot deployment in a double-shell tank (DST) is scheduled for FY03.

User Acceptance: User expectations were consistent with project status.

2.7 Tarzan Mobile Tool Deployment System

While the bulk of high-level waste at WVDP has already been retrieved and immobilized, retrieval of the residual heel may be required to meet tank closure requirements. To meet this need, the Tarzan Mobile Tool Delivery Systems is being developed, as well as a mast-mounted mobile tool delivery system (a backup to Tarzan). Historical and current product delivery issues with the Tarzan vendor (RedZone) have resulted in that project receiving a high-risk rating for completion. To assist in project completion, WVDP has assumed all tank-top handling scope from RedZone, as well as providing engineering oversight. A drop-dead delivery date has been established as 8/30/99, based on melter life expectancy and calculating backward.

$1.5M in funding was provided by WVDP for conceptual design of the systems. FETC provided an additional $660K towards the cost growth. Cost overruns are being negotiated with RedZone. FY00 activities will focus on development of tools for the systems; tools are likely to be similar for both systems. WVDP will make a decision in FY99 as to which direction they will proceed. This decision will constitute a gate 5 review of this technology.

User Acceptance: User involvement in Tarzan development has been ongoing; however, in April, the Tarzan project was terminated due to technical issues with weld failure on prototype components during testing, and schedule and cost issues. WVDP is now pursuing the backup mast-mounted system.

2.8 ORR/SRS Tank Closure (99085)

In situ grouting technology is being pursued for ORR GAAT tanks and Old Hydrofracture (OHF) tanks, and SRS Old Burial Ground solvent tanks to

- accommodate varying tank sizes and configurations
- entrain tank residues in a stable form
- uniformly emplace grout within the tanks
- isolate the tanks, support their structure and future surface barriers, and prevent tank collapse
- minimize the need for additional tank openings.

Multi-Point Injection® (MPI®) technology was successfully demonstrated last year during a cold demonstration in Duncan, Oklahoma. In 8 minutes, several feet of grout accumulated in the tank. Plans are now progressing for 2 cold demonstrations in FY99; 2 cold-demo tanks have been identified for shipment to the test site. Cold tests are planned for June or July; meanwhile, grout formulations are being studied. If the cold demo is successful, ORR plans to close 5 or 6 OHF tanks in FY00. The report for technology applicability to large size vertical tanks is on schedule. The driver for immobilization technology at SRS is a Federal Facility Agreement (FFA) agreement to start closing FFA tanks in FY01; the grouting technology needs to be proven.

The planned hot demo in TH4 (which requires regulatory approval) is delayed until FY01 while ORR reviews other approaches for tank closure. Up front costs for system installation/implementation will be co-funded by TFA; incremental costs for additional deployments are estimated to be small, but would be funded by the site.

User Acceptance: User expectations were consistent with project status.

2.9 Solids Liquid Separation (SLS) at ORR (99084)

ORR is consolidating all liquid waste from the Melton Valley Storage Tanks (MVSTs) and Bethel Valley Evaporator Service Tanks (BVESTs) into the new Melton Valley Capacity Increase Tanks (MVCITs). Each transfer of waste requires a period of time for settling, which impacts the schedule for meeting feed staging requirements. Improved technology is needed for separating out excess water introduced during retrieval activities. The SLS system will be used at ORR through 2001 or until consolidation operations are complete. If successful, the SLS technology has possible application at other sites. This information could be beneficial to BNFL, which is concerned about the amount of solids coming from Hanford tanks.

Bench-scale and full-scale tests are being conducted using simulated and actual waste. Construction of the SLS module has been completed and operational test plans and procedures are almost finished. Startup of the system was pushed from March to May to accommodate the schedule for waste transfers (valve pits are in use by tank farm operations). While the technical schedule and budget are on target, the Readiness Assessment could impact project progress (ORR has not done an assessment with the new M&I contractor [Bechtel Jacobs] before).

User Acceptance: User expectations were consistent with project status.

2.10 Corrosion Control and Monitoring (99043)

Improved knowledge of tank chemistry and corrosion processes is needed throughout the DOE complex to maintain tank integrity and reduce downstream processing requirements. Early corrosion probe designs provided the building blocks for developing more sensitive instruments capable of detecting uniform and localized corrosion, while providing continuous data for detecting the onset of conditions leading to pitting or stress corrosion cracking.

At Hanford, the latest Multifunction Probe contains enhanced functionality and automated data analysis software. The probe developers are also investigating data transfer via a direct transmitter to eliminate the interference being picked up by the underground cable. This probe will be deployed in FY99 into Hanford DST AN-105, which has shown indications of tank wall thinning. In all, 14 DSTs at Hanford are planned for installation of probes. Four of these installations are scheduled to occur in FY00. At present, these installations are not funded.

SRS has opted to include the electrochemical noise (EN) capability into their species probe for tank 43H. This additional scope has pushed back development milestones by two to four months, and deployment to FY00, but will allow SRS to develop detailed plans for integrating the probe into their system and to demonstrate the technical viability of the technology to support deployment. Hot testing of the Raman species probe in a hot cell at SRS on actual tank waste samples will begin in the March-April timeframe. The EN probe technology will be incorporated into the final probe design based on testing of that technology already conducted at Hanford. The EN probe technology successfully completed a Gate 4 review in March 1998.

$95K from Hanford EM30 should be adequate to complete the project (the original funding plan was $200K). Funding from SRS EM30 has not been provided at the planned level and issues with site support for deployment are being worked with site personnel.

User Acceptance: User expectations were consistent with project status.

2.11 Improve Waste Loading in HLW Glasses (99073)

Because of issues that emerged in the related melter tasks, studies are being performed on high level waste glasses to

- Improve databases associated with liquidus temperature and the onset of phase separation at SRS

- ❖ Avoid the formation of crystals that reduce durability of glass products at Hanford
- ❖ Develop process and product performance constraints for Idaho's HLW feed streams.

A major goal of these activities is to limit the operating region due to the costs involved with testing numerous glass formulations, as well as reducing process model errors. Fundamental data derived from the work will be applicable to a number of DOE sites. At INEEL, the glass studies are being integrated into their pretreatment/flowsheet activities. SRS estimates the liquidus temperature studies will increase waste loading by 1%, which equals $250-300 million in life-cycle cost savings; DWPF sludge processing may impact this goal. Implementation of the SRS DWPF liquidus data into the plant controls system will be accomplished in FY00; the site is co-funding this work.

For Hanford, this work is directed toward limiting the waste loading stream for the Phase II privatization contract in order to provide realistic controls and measures for the glass product. Studies are showing that cooling in the pour spout riser is a major contributor to crystallization in the glass, which impacts its durability. Phosphates cause phase separation in the glasses. Phase separated glasses are only as durable as the weakest phase, which also impacts qualification of the glass product, an issue the Hanford Site wants to avoid. Once phase separated glass is introduced to the melter, it is hard to recover from.

User Acceptance: User expectations were consistent with project status.

2.12 SRS Tank Heel Retrieval (99067)

Heel removal technologies are needed for large tanks at SRS and the Hanford Site. Technologies under evaluation include:

- ❖ Flygt mixers
- ❖ Disposable crawlers
- ❖ Chemical cleaning.

Bench-scale Flygt mixer tests have been successful and SRS is now preparing for full-scale system testing and hot demonstration. The site has identified the Flygt Mixer as the baseline retrieval system for tanks 18 and 19. Tank 19 deployment has been delayed to FY01 due to funding issues.

A low-cost disposable crawler system ($50K) is also being developed for use in tanks to compare against more complex mobile retrieval systems. Full-scale operations testing with tools will occur this summer, with system delivery to SRS operations planned for September.

Russian chemical cleaning work is showing that chemical additives can be successful in breaking apart sludge to enhance suspension of the tank waste. This work is in the advanced development stage, with data delivery (test results) expected later this FY.

User Acceptance: User expectations were consistent with project status.

2.13 Regenerable In Situ HEPA Filters (99071)

An alternative HEPA filter is being investigated to replace current fiberglass filters used throughout the DOE complex. Per the Request For Proposals, the new filter will be able to be cleaned in place, which

will lower exposure risks to workers and reduce or eliminate filter disposal costs. It is anticipated that the contract(s) will be awarded in late April to early May. All other activities/milestones hinge upon contract award. During April, two contracts were placed with vendors to provide prototype filters for testing at SRS. Tank 12H at SRS has been tentatively identified for deployment of the full scale demonstration system. Deployment will occur in FY01.

User Acceptance: User expectations were consistent with project status.

2.14 Prevention of Solids Formation and Saltcake Dissolution (99054)

This work is being conducted to

- predict the onset of solid phase formation in Hanford waste solutions in Phase II planning and evaluation of waste transfers
- address pipeline plugging at Hanford and SRS
- investigate potential for excessive waste dilution at ORR
- help manage limited tank space.

Solids formation experiments are being conducted with models to simulate tank conditions in order to refine the operating window for waste transfers at Hanford. A report will be provided in September with results of the process options, thermodynamics and kinetics tests. Aqueous dissolution tests are being conducted using actual saltcake samples from Hanford tanks. The evaluation will be completed using the ESP model. Results from all studies are on schedule for delivery to the user. This work provides the foundation for planning Tanks Waste Remediation System waste transfers and tank inventory management. In addition, related work has been conducted to assist Hanford with mitigation options for crust growth in tank SY-101.

User Acceptance: User expectations were consistent with project status.

2.15 Hanford Tanks Initiative (HTI) Closeout

Due to funding constraints, DOE's Office of River Protection (ORP) at Hanford elected to suspend all activities being conducted under HTI to mitigate near-term program risks. ORP plans to reinstate the activities in FY00. The Cone Penetrometer work will transfer to the Vadose Zone Groundwater Integration project. C-106 heel retrieval contracts have been selected and will be held in suspension in the form of a no-cost extension. Closure criteria discussions (Retrieval Performance Evaluation) with stakeholders are complete and the document will be finalized and issued. The LDUA will likely be transferred to another site.

Although the mission of HTI was not accomplished, benefits were seen in dialogue with the state and in retrieval activities. Although some HTI activities need to continue, these are not built into the project beyond FY99. TWRS will support future activities, but at a reduced level, focused mainly on retrieval and risk reduction.

User Acceptance: User expectations were consistent with project status.

APPENDIX A

TFA REVIEW PANELS

Technical Advisory Group (TIM/TAG Review, February 8-10, 1999)

Wally Schulz, Chair
Jimmy Bell, Bell Consultants, Deputy Chair and Closure Subgroup
Dawn Kaback, Concurrent Technologies Corporation, Characterization Subgroup
Bruce Kowalski, University of Washington, Characterization Subgroup
George Vandergrift, Argonne National Laboratory, Pretreatment Subgroup Lead
John Swanson, Consultant, Pretreatment Subgroup
Major Thompson, Westinghouse Savannah River Company, Pretreatment Subgroup
Paul Scott, Pacific Northwest National Laboratory, Retrieval Subgroup Lead
Brenda Lewis, Westinghouse Savannah River Company, Retrieval Subgroup
Tom Weber, Consultant, Immobilization Subgroup Lead
Joe Gentilucci, JAG Technical Services, Immobilization Subgroup
Bill Prindle, Consultant, Immobilization Subgroup
Robert Erdmann, Attorney at Law, Closure Subgroup
Larry Tavlarides, Syracuse University, Safety Subgroup

Programmatic Review Panel (Midyear Review, March 23-26, 1999)

Ted Pietrok, DOE-RL, TFA Program Lead
Kurt Gerdes,, DOE-HQ, TFA Headquarters
Cavanaugh Mims, DOE-HQ, Office of Environmental Restoration (EM40)
Ken Picha, DOE-HQ, Office of Environmental Management (EM30)
Tom Guttman, DOE-SRS, Site Representative
Jacquie Noble-Dial, DOE-Oak Ridge Reservation, Site Representative
Keith Lockie, DOE-Idaho, Site Representative
Jon Peschong, DOE-Richland Operations Office (RL), Site Representative
Marcus Glasper, DOE-RL, TFA
Billie Mauss, DOE-RL, TFA
Jerry Morin, Westinghouse Savannah River Company
Jim Honeyman, Lockheed Martin Hanford Company
Sharon Robinson, Oak Ridge National Laboratory
Jim Valentine, Lockheed Martin Idaho Technology Company
Rod Quinn, Pacific Northwest National Laboratory
Wally Schulz, TAG Chair

APPENDIX B

TECHNICAL RESPONSES

TIM/TAG Review

99001	Transuranic, Strontium, and Cesium Removal from INEEL Wastes
99019	Conditioning and Immobilization of LAW to Meet Waste Acceptance Criteria
99041	Universal Solvent Process for Transuranic, Cesium, and Strontium Removal
99047A	Vadose Zone Characterization Technologies (HTI)
99047B	Hanford Tank Heel Alternate Removal System
99048	Testing and Prediction of Long-Term Waste Glass Performance
99052	Technologies for Pit Operation Enhancement, Remote Operation/Maintenance, and Disassembly
99059	Hanford/SRS Waste Mixing and Mobilization
99076	Waste Transfer Line Plugging Prevention and Unplugging Methods
99078	In-Tank Wt% Suspended Solids Probe and Slurry Monitors
99055B	HLW Sludge Washing Monitor

Midyear Review (Also reviewed at TIM/TAG)

99043	HLW Corrosion Control
99046	Nested Array Fluidic Sampler
99054A&B	Prevention of Solids Formation and Saltcake Dissolution
99068	Improve Performance and Design of HLW Melters
99070	Salt Cesium Separation Processes (SRS)
99071	Alternative Filtration Technologies
99073	Improve Waste Loading in HLW Glass
99082	GAAT Alternate Mixing Systems
99084	Solid/Liquid Separations – MVST
99085	Demonstration of Grout Injection Technology
99086	Evaporation/Cesium Removal at ORNL (CIF Evaporator)
99067	Tank Heel Retrieval Technology (SRS Tank Heel Retrieval)
N/A	LDUA Sampler for Tank Waste (INTEC Tank Sampling and NDE)

Midyear Review Only (Not included at TIM/TAG Review)

N/A	Tarzan Mobile Tool Delivery System

APPENDIX C

REVIEW COMMENTS/ISSUES

99082 GAAT Alternate Mixing Systems – Russian Pulsating Mixer Pump

Issue: Welding certification issues (Price Anderson) week for week slip.

- If not resolved by the end of April, project continuation will need to be evaluated
- If system cannot be built in Russia, costs will increase
- "Window of opportunity" for deployment needs to be identified or re-evaluated
- Need to evaluate equivalency and how to accept via testing or other means (ISO 9000)
- If QA personnel cannot resolve, issue will be raised up the management chain (Gary Reiner).

User Response: Currently working with QA personnel; ORR QA personnel concerned with setting a "precedent."

USG Response: SRS and Hanford have experienced similar issues; have precedence information on commercial grade dedication process that ORR could use.

Action: SRS agreed to provide information to ORR on commercial grade dedication process.

TAG Comment: Consider chemical approach to clean OBG and evaporator tanks.

TFA Response: Development of chemical cleaning methods is described in Technical Response 99067 Tank Heel Retrieval Technology.

99068 Improve Performance of HLW Melters

No User issues or comments.

TAG Comment: Consider pour spout insert coatings/materials to modify glass pouring properties and to reduce erosion/corrosion.

TFA Response: Technical Approach modified to indicate that, in addition to physical design changes, modifications to materials of construction will also be evaluated to reduce the impact of corrosion and erosion.

TAG Comment: Need to look at argon blanket effects/impacts.

TFA Response: Technical Approach modified to indicate that the potential effects of blanket gases in the pour spout area will be evaluated.

TAG Comment: Need to understand the influence of the melt rate of FeO versus Fe_2O_3 on the cold cap.

TFA Response: Technical Approach expanded to indicate that the effect of FeO versus Fe_2O_3 will be considered in evaluating ongoing tasks to improve the melter feed chemistry.

TAG Comment: Need to look at potential design features from HWVP.

TFA Response: Progress to Date modified to indicate that an ongoing review of international and commercial melter experience will include a review of HWVP melter evaluations to identify enhancements for next generation melters.

99070 SRS Salt Disposition

Issue: SRS operates at higher hydroxide concentrations than ORR; need to evaluate impact on CST performance.

TFA Response: This activity will be included in FY99-00 task plans.

Issue: It has been recommended that real waste samples of at least 75 liters are needed to adequately evaluate the performance of CSTs. Samples of this size (75 liters) are difficult to obtain.

TFA Response: Although a real issue, this does not need to be addressed until FY00. In the future, if SRS is unable to obtain samples of this size, it is likely that alternatives can and will be pursued.

Comment: Column tests are being conducted to supply needed information on sampling methods, as well as ion exchange processes Potential concern regarding friability of resin when dropped 16 feet.

TFA Response: The current column design is 16ft by 5ft; the test setup will be 16ft tall by 3" to address scale issues for loading and crushing of the CST medium.

Comment: Focus of work in FY99 vs. FY00.

TFA Response: Complete studies to aid DOE in downselect of primary alternative in FY99. Focus in FY00 will be on the primary path; some contingency will be available for an alternate path/backup to reduce program risk. Pilot scale activities will be conducted for the primary alternative only.

Comment: FY00 EM30 budget $40 million.

TFA Response: At least $5M to needed to co-fund development, plus additional in-kind support.

Issue: Design issues for pilot scale facility.

TFA Response: The activity will be started in FY00; sufficient scale is necessary to provide representative mixing of tanks.

TAG Comment: Conducting hot waste tests at SRS with 100 ml samples may not provide meaningful data; sample size for tests should be ½ to1 liter size; small size test may not correctly simulate the mixing phenomena. SRS can handle larger size samples in their hot cells.

TFA Response: The appropriate scale for testing will be addressed in the program execution guidance (PEG) and in the associated test plans.

TAG Comment: Previous experimental data on CST solubility in glass was done in the absence MST. Therefore, the validity of this in light of the SRS process that will include a MST processing step may be questioned.

TFA Response: The PEG and associated test plans will address the need to understand the impact of the MST processing step on the CST performance.

99086 CIF Evaporator

Issue: Construction materials must be able to handle high nickel components.

TFA Response: Site will use either Inkanel or equivalent.

Comment: What kind of effluent stream is coming out of the CIF?

User Response: Low-level, made up of blowdown from combustion process for disposing/burning plastic suits, some solid wastes, etc.)

Issue: Permitting

User Response: There are really no technical permitting issues; in fact, the technology should reduce the burden on existing equipment. However, the administrative process (RCRA modification to flowsheet) for completing the permit could impact the entire process schedule.

TAG Comment: Where does the effluent for the ORR evaporator go?

TFA Response: Technical Approach modified to describe the paths for effluents from the evaporator and other system components.

TAG Comment: Since storing moist CST, need to consider heat and gas generation issues; could impact the loading. Does there need to be any evaluation of unbound cesium mobility or quantity of unbound cesium in cask/canister to be sent to NTS.

TFA Response: Technical Approach expanded to include the evaluation of the potential for temperature increase, gas release, and cesium desorption for its impact on storage, transportation, and disposal.

TAG Comment: The TAG had a number of questions regarding the need for the Consolidated Incineration Facility (CIF) and associated evaporator.

TFA Response: The Need Summary was expanded to provide additional details regarding the need and application of the CIF evaporator.

99046 Representative Sampling and At-Tank Analysis

Comment: EM30 co-funding is presently above the line.

Comment: Need to review physical chemistry of sampling process to see if RCRA requirements can be met with baseline design.

Issue: Sampler plugging at charge vessel. Bernoulli "nozzles" are only 1/3" in diameter, representing a "weak spot" in the transfer system (i.e., it has the potential for plugging easier than larger diameter sampling vessels would.) Can the design be modified to increase the size? Is it worth it?

TFA Response: PI is addressing potential plugging issues within the scope of feature testing. Also, backflush capability is being evaluated for incorporation into system design.

Issue: SY-101 AEA Transfer Pump costs are impacting Nested Sampler FY99 budget. $119K has been taken out of Nested Sampler Task to fund transfer pump for SY-101. Site should probably evaluate Westinghouse backup pump before pursuing AEA pump.

TFA Response: The TCR for the funds transfer is being held by TFA Program Lead until a management decision is made on the Westinghouse/AEA options. The privatization schedule is the driver for the nested sampler deadline.

Comment: Hanford team should engage the Washington State Department of Ecology in RCRA sampling discussions.

TFA Response: To our knowledge, the Washington State Department of Ecology has not been engaged. However, DOE-RL has made a decision to pursue RCRA sampling and will include RCRA sampling capability in the design.FY00 testing will be expanded to include compliance to RCRA sampling delivery methods.

Comment: Heterogeneity of waste will make representative sampling difficult at best.

TFA Response: Steady profiles will be provided through at-tank analysis.

TAG Comment: Recommend early dialogue with EPA in establishing equivalency.

TFA Response: Added to Task Description that discussions involving EPA would be conducted during the preparation of functions and design requirements for the Idaho nested array sampler.

99085 ORR SRS Tank Closure

Comment: How was degree of mixing verified in the FY98 cold demo?

TFA Response: Sand was used as the waste simulant. After the grout cured, a trench was cut and a core was pulled. Visual inspection showed the sand was evenly distributed throughout the grout mix.

Action: Provide video on Duncan, OK cold demo to Idaho Site Rep (K. Lockie).

Comment: Should MPI® Large Tank Application Report include evaluation of Hanford and SRS as potential candidates for MPI technology.

User Response: Yes.

Comment: What kind of expense are the sites looking at with this technology?

TFA Response: MPI® uses oil-field grout injection technology. While initial cost is high (design, setup, etc), incremental costs would be low. It is not a capital expense, rather it is a service. The team moves in, fills the tank, and moves on. That is why it is recommended that multiple tanks be scheduled for injection around the same timeframe, to minimize up-front costs for separate deployments.

Comment: Explain again how the scope for FY00 has changed and the associated funds availability?

TFA Response: Three tasks were identified for FY00:

1. Hot demo/treatability study at SRS on Tank S21 ($600K TFA/$600K site)
2. Hot deployment test on ORR OHF Horizontal tank ($600K TFA/$600K Site)
3. Hot demo/deployment on vertical midsize tank TH4 ($600K TFA/$600K site)
   - deferred to FY01; funds available for additional FY99 cold demo

TAG Comment: Response needs to address SRS concern with structural degradation in OBG tanks; need to analyze forces imparted by MPI® technology.

TFA Response: During FY98 and FY99 the TFA has and is funding activities that address this concern. First, a cold demonstration of the MPI® technology was performed on a 15 foot diameter vertical tank in December, 1997. The report prepared describing this test (ORNL/TM-13710) notes: "For steel tank walls (1/4-in. or greater), the MPI® jets cannot cut through the steel even when operated at 11,000 psi, with a standoff distance of 1 in., for a duration of 300 s, and jetting cement-based grout." Second, a cold demonstration will be performed during FY99 on a horizontal tank that simulates Savannah River OBG tanks. Finally, during FY99 a report will be prepared assessing the applicability of MPI® for DOE tank grouting. One issue to be specifically addressed in this report is the impact of MPI® grout injection forces on tank structural degradation.

99084 Solids Liquid Separation at ORR

Comment: What types of solids and radioactivity are we talking about?

Response: Not slurry; about .05 - .25% solids (TRU); 10-50 rad during experimental TFA work in hot cell.

Comment: Background radiation will increase over time based on large surface area of equipment. Probably should evaluate accumulation of contamination in filters.

TFA Response: Comment will be forwarded to ORR safety operators.

Comment: BNFL has identified their requirements for minimal solids in TWRS sludge delivery.

Action: J. Honeyman needs to contact Neil Brown and recommend attendance at deployment; provide performance evaluation report, due in July.

Comment: What is the estimated throughput of the system?

TFA Response: The filtrate rate is 5 gpm.

Comment: Was Spintek evaluated for centrifuged CFF?

Response: Yes, it was concluded it would not work for this application due to maintenance and robustness of equipment (more suited to lab environment than field operations).

TAG Comment: The TAG reviewed the technical response and had no specific comments.

TFA Response: None required.

99043 Corrosion Control and Monitoring

Comment: CMST requested additional design review of the SRS combined probe in May.

Comment: SRS driver is waste receipt tanks; waste chemistry changes rapidly and current sampling methods are costly compared to probe installation costs and exposure rates. Need user approval to get on site schedule

User Response: Fabrication and cold testing will be completed before presenting project to SRS Program review board.

Comment: If Raman/EN combined probe works successfully, would Hanford be interested in this variation?

User Response: Yes, if installation and data collection elements will work, and given no cost obstacles.

Issue: Future Hanford Site installations (14) funding is uncertain.

USG Rep Response: Priority may increase if operations is responsible for corrosion monitoring.

Comment: SRS needs to evaluate cost for installation and operations in tank 43H.

User Response: Hot cell testing and engineering support should be added to EM30 co-funding. If deployed, site will pick up installation costs.

TAG Comment: Can experience on EN Probe for carbon steel tanks be directly applied to stainless steel tanks (Oak Ridge)

TFA Response: A limited laboratory study will be needed to confirm that EN responses for stainless steels in nuclear waste environments is analogous to those for carbon steels. There is a good deal of commercial experience with EN monitoring in stainless steels for the petrochemical and pulp and paper industries. Journal articles form these industries as well as academic publications all indicate that EN is an applicable technology for monitoring stainless steel corrosion.

TAG Comment: Raman still has problem with quantitative measurements of analytes - data will be location specific

TFA Response: The concerns of analytical capability and location specific data are separate issues. We hear frequently the concern that a probe in a riser may not adequately characterize the conditions of the tank. This is undoubtedly true to a certain extent, but we need to put this in the context of the existing state of the art. By the existing techniques (at Hanford), every 1 to 5 years we dangle a bottle on a string somewhere down into the supernate and collect whatever is willing to flow into that bottle. This gives us a snapshot of questionable representativeness of a particular location at a specific time. Contrast this to an on-line probe in a particular riser which provides continuous data over a 50 foot vertical array. This technology is an improvement in characterization.

TAG Comment: TAG endorses this.

TFA Response: The TAG reviewed this technical response and had questions regarding the details of the workscope but did not recommend changes to the response.

TAG Comment: Can performance of probe be validated against destructive methods or accepted practices (outside of tank)

TFA Response: The pre-1996 laboratory studies conducted by Hanford used destructive metallography to confirm the physical condition of the electrodes in comparison to the instrument response. The EN probe in DST 241-AZ-101 has been interrogated by an ASTM standard Linear Polarization Resistance test. The LPR tests were consistent with the EN probe response. The electronics package purchased for this year's deployment has an embedded LPR package that will allow regular studies of this type to be conducted. At this juncture, there are no plans to remove a probe from a tank for destructive analysis.

99073 Improve Waste Loading in HLW Glasses

Issue: Discrepancy between TFA study data and SRS historical data; needs to be validated.

TFA Response: Task is being reduced by $100K due to recent (good) news on consistency in statistical model results.

Comment: Bestman/Beahm EMSP task is being integrated with this work.

Comment: Randy Kirkbride, LMHC, should be included on distribution of reports and as an attendee at future meetings at Hanford on the subject. Randy is responsible for tank retrieval and waste blending for TWRS, and should be aware of waste loading assumptions as they relate to these activities.

Comment: Need to evaluate incorporation of centerline canister cooling into testing, as quenching tends to reduce phase separation.

TFA Response: Technical workscope includes crystalline and phase separation studies. These studies include full crystallization kinetics that use both quenching and controlled centerline cooling to bracket the test conditions.

Comment: Even though funding reduction and DWPF liquidus complexity has affected work on problem constituents for Hanford, the site would still like preliminary data on model constraints that will help the most by the end of FY00

TFA Response/Action: Need to meet with Hanford Site POCs and revisit focus of task to ensure it's directed at the data needed to support privatization decision points

TAG Comment: Look at response (Hanford) regarding operation within composition region that produces phase separation – recommend avoid regions of secondary phases.

TFA Response: Needs Summary modified to indicate that general practice is to ensure that the operationg region avoids secondary phases. The need from the user does request that the impact of seconday phases be examined.

TAG Comment: How does Cr fit into crystallization issues?

TFA Response: Need Summary modified to indicate that the impact of chromium-based crystals on glass durability needs to be determined.

99067 SRS Tank Heel Retrieval

Issue: Oxalic acid dissolution has been an issue relative to criticality; West Valley is concerned that oxalic acid could cause a breach or leak in the tank

TFA Response: Recent Russian work may show how to resolve this.

Comment: How much savings are we talking about on the remote crawler system?

TFA Response: The disposable portion of the system costs about about $50K; the complete system is around $250K. This is around one-tenth the cost of a system like Scarab, and will save $2 million in containment and hose management systems, which are not necessary for a disposal unit.

Comment: Is the Flygt mixer the baseline for *just* tank 18 and 19?

TFA Response: Yes, these are type IV tanks. The Flygt mixer, using the current configuration, won't fit other "type" tanks at SRS

Issue: Waste retrieval at SRS is being funded as a line item project; there are issues associated with blending different funding sources which may limit the ability to leverage EM50 dollars. Can EM50 combine expense funds with the line item projects? If it's called a demonstration, can expense dollars fund it?

Action: S. Schlahta to work with SRS/TFA to identify guidelines for EM50 support of a line item project.

TAG Comment: Need to conduct a peer review of the Russian chemical cleaning work to date.

TFA Response: A gate review of the Russian chemical cleaning work is planned for late FY1999 – early FY2000. The Technical Response has been modified to include the gate review in the chemical tank cleaning task description.

TAG Comment: Could chemical treatment be used to increase mobility?

TFA Response: Technical Approach modified to indicate that chemical additions will be considered to enhance mechanical retrieval methods, particularly as it relates to increasing retrieval performance in obstructed tanks.

99071 Regenerable In Situ HEPA Filters

Comment: FY99 budget will be revisited after contract award to evaluate the potential for carryover.

Issue: Project is not currently on SRS integrated schedule; site needs better feasibility and cost data before presentation to the program board. Need to convince facility manager that more than one site organization is interested in the technology.

TFA Response: This is recognized as an obstacle that will be handled further along in the technology development process.

Comment: Inherent problem with conventional systems is the inability to measure alpha contamination; need to make very conservative assumptions to allow for this.

TFA Response: Robust columnar design is being tested.
USG Response: Could be of interest to Hanford for reducing Authorization Basis issues.

TAG Comment: Tech Response needs to clarify that vendor has option to replace whole system, not just filters.

TFA Response: Technical Approach modified to indicate that the extent of the "system" to be provided will be dependent upon the regeneration approach and filter media selected, but must be complete and not degrade the performance or safety characteristics of the presently installed system.

TAG Comment: Inert activity is generally better than a powered process

TFA Response: Noted. This concept is captured in the technical requirements of the RFP.

TAG Comment: Need to be careful about secondary waste streams created in filter regeneration process

TFA Response: Noted. This concept is captured in the technical requirements of the RFP.

99054A & 99054B Prevention of Solids Formation and Saltcake Dissolution

Comment: Washington State Department of Ecology is concerned with waste compatibility issues.

Comment: DWPF recycle seems to have impacted solids formation in drain lines, as well as contributing to accumulation of a "pudding" type layer in tank 38 (a drop tank).

Comment: SRS has concluded they have "voids" in their saltcake layers. This determination was made based on the correlation between level fluctuations and changes in atmospheric pressure.

TAG Comment: Look at boiling temperatures.

TFA Response: Technical Approach modified to include temperature conditions for testing.

TAG Comment: Sodium is important in factorial experiment.

TFA Response: Technical Approach modified to include sodium in factorial experiment.

TAG Comment: Clarify role of AEA work with respect to FACSIMILE code and ESP.

TFA Response: Summary of Need modified to indicate that the equilibrium model (ESP) is needed to define suitable composition/temperature operating envelopes and the kinetics model (FACSIMILE) is needed to predict process dynamics, which impact required processing rates and equipment size. Technical Approach modified to indicate that the AEA work with the FACIMILE code is addressing the kinetics of solids formation which is important to understanding plug formation.

TAG Comment: Clarify that work is not related to leaching.

TFA Response: Summary of Need modified to indicate that this work is focused on understanding the chemical and thermochemical basis for the phenomena of line pluggage and scale buildup associated with feed preparation and transport.

TAG Comment: 99054A FY01 Task A.2 scope needs to be expanded.

TFA Response: Workscope for FY01 has been revised and is now described in terms of three subtasks rather than two. The task descriptions more clearly define the work to be conducted.

TAG Comment: Need to collaborate with work in EMSP.

TFA Response: Comment accepted. The TFA is in contact with a number of the EMSP PIs including those recommended by the TAG and is monitoring the progress of their work for potential collaboration.

TAG Comment: FIU pipe loop is too short to allow for particle formation and settling. Need to allow for 10 to 15 minutes residence time rather than 15 seconds.

TFA Response: Comment accepted. The TFA is working with the PI's to address this concern.

99054B Saltcake Dissolution

TAG Comment: The TAG reviewed the technical response and had no specific comments.

TFA Response: None required.

HTI Closeout

Comment: Will other uses for the LDUA be pursued at Hanford or will it be available for deployment at another site?

Action: T. Pietrok will confirm availability of LDUA with ORP Management.

Comment: Closure at Hanford is different than closure at other sites (all sites are unique) in that the State is unwilling to discuss closure on a tank-by-tank basis; only closure by tank farm.

TFA Response: Retrieval-based closure needs a better technical basis (included in the original mission of HTI).

MIDYEAR REVIEW

INTEC Tank Sampling and Non-Destructive Examination

Comment: The Non-Destructive examination is listed as "partially done" because although an examination of the wall was conducted, the examination did not include the area beneath the tank heel as identified on the milestone.

Issue: May need to issue TCR for milestone change (WM-185 to WM-182).

TFA Response: TFA will work with INEEL to revise milestone

Tarzan Mobile Tool Deployment System

Comment: Doesn't RedZone have some responsibility to pay for cost overruns?. What kind of contract is this? They have consistently shown management problems in the early engineering activities; this is something that should be kept in mind.

User Response: RedZone has agreed to pay back a portion of their fee, but will not cover the majority of the overruns.

Action: April project review should be tailored to address gate 5 review requirements.

TFA Response: Tarzan project terminated at Stage 5. User cancelled project in April due to technical design issue and continuing schedule problems. FETC is currently in negotiations with Tarzan contractor (RedZone Robotics) to closeout project. A mast-mounted system will be pursued in its place.

TAG REVIEW

99001 TRU, Sr, and Cs Removal from INEEL Wastes

TAG Comment: Optimize TRUEX to reduce phosphate.

TFA Response: Description of Technical Approach revised to indicate that methods to reduce or eliminate phosphates from the flowsheet will be evaluated.

TAG Comment: Consider water dissolution [of calcine]

TFA Response: Description of Technical Approach expanded to indicate that methods to dissolve calcine, including sequential leaching procedures, will be evaluated.

99019 Conditioning and Immobilization of Low-Activity Waste to Meet Waste Acceptance Criteria

TAG Comment: How can criteria be established if final road map is not defined?

TFA Response: The criteria will certainly change over the long period between setting a project base line in about 2012 and even initiation of processing in 2020. Technical Approach revised as follows:

"During the time period required for development of a waste processing and disposal strategy, Idaho will be subject to regulatory changes as well as advances in waste processing technology. It is expected that the waste acceptance criteria will evolve, but a current baseline plan is essential and should be consistent with the HLW integrated process flowsheet."

TAG Comment: Sorbents need to have long-term performance and stability established with respect to period of performance.

TFA Response: Technical Approach revised to indicate that long-term stability of the sorbent or stabilizer will need to be determined and demonstrated. Task description on sorbent/stabilizer selection expanded to include long-term performance validation testing.

TAG Comment: Silica gel itself does not have significant adsorption capabilities or specificity. Silica gel can be made specific by attaching ligand covalently or otherwise. More focus is needed to the requirement of the adsorbent to achieve need, and specific adsorbent with required characteristics should be sought or developed.

TFA Response: Technical Approach revised to indicate that the evaluation is not limited to silica gels but will consider other sorbent that will meet the need.

99041 Universal Solvent Process for TRU, Sr, and Cs Removal

TAG Comment: Form panel to review all separation options for INEEL (include international experts).

TFA Response: Technical Approach and Task Description expanded to include convening a panel of solvent extraction experts to review separations options for INEEL.

99047A Vadose Zone Characterization Technologies

TAG Comment: At the time the TAG reviewed this response, the funding for this work was in doubt. The TAG recommended that a new response be prepared once disposition of the cone penetrometer at Hanford was resolved.

> TFA Response: The technical response has been revised assuming that the cone penetrometer will be transitioned to Hanford's Groundwater Vadose Zone Integration Project and that the TFA will provide support during that transition.

99047B Hanford Tank Heel Alternate Removal Systems

TAG Comment: The TAG reviewed this technical response and had no comments.

> TFA Response: None required.

99048 Testing and Prediction of Long-Term Waste Glass Performance

TAG Comment: Need good understanding of disposal environment.

> TFA Response: Technical Approach revised to describe ongoing close integration with Hanford performance assessment activities and to confirm the need for understanding of the disposal environment to ensure the applicability of testing and resulting data.

TAG Comment: Not clear how much study allows understanding effect of glass composition on test mechanisms.

> TFA Response: Technical Approach expanded to indicate that compositional effects will be related to glass performance.

TAG Comment: Concern with new test being given high credibility at the expense of large data base with other methods.

> TFA Response: Technical Approach expanded to indicate that care will be taken to ensure that testing protocols are technically reviewed and cross checked with other tests and glass performance data generated through other programs.

99052 Technologies for Pit Operation Enhancement, Remote Operations/Maintenance, and Disassembly

TAG Comment: Resolve overlap between retrieval and immobilization responses (99052 and 99077, 99074).

> TFA Response: Workscope to address improving DWPF operations has been removed from this technical response and is addressed in Technical Response 99074 Develop Remote Technology to Improve DWPF Operations.

99055B HLW Sludge Washing Monitor

TAG Comment: Need to add chromium to list of analytes.

TFA Response: Needs Summary modified to indicate that a purpose of the probe is to monitor constituents in order to maximize the amount of chromium removed.

TAG Comment: If there are analytes for which there are no commercial sensors, need to thing through strategy to address this. May require development in this situation.

TFA Response: The strategy would be to identify, at the workshop to define a preliminary set of functions and design requirements, where there are gaps in sensor technology and then to prepare a plan for developing the needed technology.

99059 Hanford/SRS Waste Mixing and Mobilization

TAG Comment: Consider all three functions (mixing, mobilization, and transfer) in the response.

TFA Response: While the TFA is looking at specific improvements to mixing/mobilization and transfer, the scope of work includes looking at the system as a whole. For example, this year the TFA is looking at mixing rheology of SRS Tank 8 slurry for both mixing and transfer refinements. Mobilization and transfer strategies vary from site to site based on the need to minimize water use and to provide for safe and reliable transfer.

99076 Waste Transfer Line Plugging Prevention and Unplugging Methods

TAG Comment: Should consider unplugging transfer lines with chemicals as part of the technical approach. Do they understand the composition of the solutions that led to the plugging? Need to figure out what's causing the plugging in the first place.

TFA Response: The chemical aspects of pipeline plugging are being addressed in a separate technical response 99054A Feed Preparation and Transport.

TAG Comment: Survey industry capabilities to see what is available before starting technology development work is a valid technical approach.

TFA Response: The TFA agrees. The detailed task descriptions include working with the Federal Energy Technology Center (FETC) to solicit proposals from industry for pipeline inspection tools.

TAG Comment: Test on-line instrumentation on FIU test bed.

TFA Response: Technical Approach modified to indicate that sensors for monitoring pipeline transfers will be addressed in Technical Response 99078, In-Tank Wt% Suspended Solid Probe and Slurry Monitors. Sensor testing from that technical response will be conducted on the Florida International University (FIU) test bed as appropriate.

99078 In-Tank Wt% Suspended Solid Probe and Slurry Monitors

TAG Comment: The TAG had a number of comments with respect to the testing and implementation of specific sensors.

TFA Response: These comments will be addressed in the PEG and associated test plans.

APPENDIX D

FY99 TFA MIDYEAR ACTION TRACKING

TECH RESP #	ACTION	ASSIGNED TO	STATUS
99082	Provide SRS with information on experience on commercial grade dedication process	J. Morin	Complete
99085	Provide video on Duncan, Oklahoma cold demo (Multi Point Grout Injection) to Keith Lockie, Idaho Site Rep.	L. Bustard	Complete
99084	Contact Neil Brown and recommend attendance at SLS deployment at ORR; provide him the performance evaluation report, due in July.	J. Honeyman	Complete
99084	Forward comment on SLS contaminated equipment to ORR safety operators	J. Westsik	In Progress
99073	Meet with Hanford Site POCs (WIT) and revisit focus of Waste Loading task to ensure it's directed at the data needed to support privatization decision points.	B. Holtzscheiter	Complete
99067	SRS/TFA to establish/identify guidelines for EM50 support of a line item project	S. Schlahta	In Progress
	Confirm availability of LDUA with ORP Management.	T. Pietrok	In Progress
	Tarzan Project Review in April should be tailored to address Gate 5 review requirements.	B. Carteret	Complete

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