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<b>13a. Description of Change</b> Direct revision of engineering task plan to provide detailed descriptions of activities for FY 2000, including budget and schedule. The description of activities in FY 2001 and beyond have been updated to reflect the current project status.				<b>13b. Design Baseline Document?</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
<b>14a. Justification (mark one)</b> Criteria Change <input checked="" type="checkbox"/> Design Improvement <input type="checkbox"/> Environmental <input type="checkbox"/> Facility Deactivation <input type="checkbox"/> As-Found <input type="checkbox"/> Facilitate Const. <input type="checkbox"/> Const. Error/Omission <input type="checkbox"/> Design Error/Omission <input type="checkbox"/>		<b>14b. Justification Details</b> The engineering task plan will be revised each fiscal year to provide a detailed description of activities for the current fiscal year based on prior year progress and the fiscal year budget being provided by EM-30, RPP, and EM-50 TFA programs.					
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**ENGINEERING TASK PLAN FOR THE DEVELOPMENT, FABRICATION, AND DEPLOYMENT OF A MOBILE, VARIABLE DEPTH SAMPLING AND AT-TANK ANALYSIS SYSTEM**

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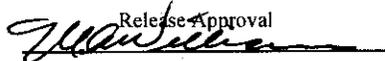
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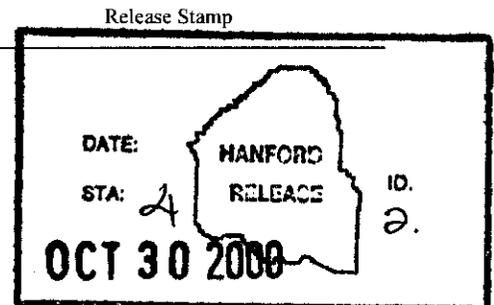
Abstract: This engineering task plan identifies the resources, responsibilities, and schedules for the development and deployment of a mobile, variable depth sampling system and an at-tank analysis system. The mobile, variable depth sampling system concept was developed after a cost assessment indicated a high cost for multiple deployments of the nested, fixed-depth sampling system. The sampling will provide DST staging tank waste samples for assuring the readiness of the waste for shipment to the LAW/HLW plant for treatment and immobilization. The at-tank analysis system will provide "real-time" assessments of the samples' chemical and physical properties. These systems support the Hanford Phase 1B vitrification project.

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ENGINEERING TASK PLAN FOR THE DEVELOPMENT, FABRICATION,  
AND DEPLOYMENT OF A MOBILE, VARIABLE DEPTH SAMPLING  
AND AT-TANK ANALYSIS SYSTEM

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ENGINEERING TASK PLAN FOR THE DEVELOPMENT, FABRICATION,  
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AND AT-TANK ANALYSIS SYSTEM

## 1.0 INTRODUCTION

This Revision 2 engineering task plan (ETP) identifies fiscal year (FY) 2000 work scope, activities, schedules, responsibilities, and funding to complete the development and testing of a mobile, variable depth sampling system (MVDSS) and an at-tank analysis system (ATAS). This is a multi-year, multi-task activity with the objective of having a MVDSS with the ATAS ready for hot deployment in FY 2005 to support samplings needs for the vitrification of Hanford's radioactive wastes. This system will provide the tank waste sampling functions required for the final disposal of the Hanford low activity waste (LAW) and high level waste (HLW). This work scope will be completed using technical resources from multiple agencies as outlined below.

This ETP outlines the specific work scope that will be completed by a Hanford technical team that includes Numatec Hanford Corporation (NHC), COGEMA Engineering Corporation (COGEMA Engineering), and CH2M HILL Hanford Group, Inc. (CHG). It also includes work that will be done by AEA Technology (AEAT) Engineering Services, a private company located in Charlotte, NC. The ETP identifies funding (and funding sources) that will be required to complete this work scope.

Revision 0 of this ETP outlined the scope of work that was completed in FY 1998. Revision 1 identified the work scope that was completed in FY 1999. This revised ETP provides detailed scope and costs for work that will be completed in FY 2000 and summaries of work for future years. For this multi-year activity, this ETP will be revised each fiscal year and updates made based on completed work activities and the current fiscal year's available funding.

## 2.0 SCOPE

The scope of work outlined in this ETP is to complete design, test, and documentation activities for the development and deployment of the MVDSS and the ATAS. This is a multi-task, multi-agency activity with funding from the EM-30 River Protection Program (RPP) and EM-50 Tanks Focus Area (TFA) and International Grants (IG) programs. The CHG team will provide the technical oversight, support, and planning for these activities that is needed to assure that the system can be safely deployed in a waste tank and will provide sampling support needed for the vitrification of Hanford's tank wastes.

### 2.1 OBJECTIVES

This Revision 2 ETP identifies specific activities, schedules, responsibilities, and funding for FY 2000 work scope in the development and deployment of the MVDSS and the ATAS. The objective is to have a system ready in FY 2005 for continued hot deployment to provide samples in support of the tank waste vitrification project. This readiness is based on the current projected available EM-50 and EM-30 funding for the current year and for out years. This ETP also

includes work scope that is planned to be completed in future years. This ETP will ensure that a sampling system that is needed to meet the Hanford Site safety, operational, and readiness review criteria for equipment deployed in the Tank Farms is satisfactorily developed and that approvals are obtained to support installation and operational needs.

The deployment strategy and plan (RPP 2000a) provides the strategy and top-level implementation plan for developing and deploying the MVDSS and the ATAS. The final objectives for this project, as outlined in the deployment strategy and plan, are as follows:

- Deployment of the MVDSS, with interfaces to deploy an ATAS, as an improved alternative to the current grab sampling and core sampling approaches for LAW and HLW feed staging to support the waste vitrification program.
- Development and deployment of an ATAS that will support waste batch management, including providing at-tank data for assessing the settling or mixing status of a waste batch which may be required to meet privatization contract delivery needs.
- Providing a tank waste sampling system that can meet RCRA criteria for organic waste materials and can provide sample size and sample quantities that will meet laboratory analysis needs, privatization contractor needs, and archiving needs.
- Accommodating sampling outages caused by any weather outages (e.g., from wind, snow, cold, and lightning) that limit the current base-line sampling methods (grab and core sampling).
- Reducing exposure and potential for personnel contamination (ALARA); provide sampling that minimizes environmental, worker safety, and public health risks.
- Phasing into use and into the baseline the MVDSS and ATAS in a way that supports risk reduction and does not increase risk (e.g., schedule risk).

#### 2.1.1 FY 2000 OBJECTIVES

The FY 2000 CHG Team work scope will be collaboratively funded by the EM-50 TFA and the EM-30 RPP programs. A detailed description of the EM-50 funding is contained in the FY 2000 Technical Task Proposal (TTP), RL0-8-WT-22 (FDH 2000). AEAT will receive funding through the EM-50 International Program (IP). This ETP will be revised on a yearly basis, based on the deployment strategy and plan, available funding, vitrification program needs, and progress made in developing and deploying the sampling and at-tank analysis technology. Later versions of the ETP document will place more emphasis on the deployment and activities required to support deployment and testing. The objectives for FY 2000 include the following:

- Complete pre-conceptual designs and calculations for the MVDSS.
- Initiate conceptual (outline) design for the MVDSS with an interface for deploying an ATAS.
- Initiate conceptual (outline) design for ATAS.
- Revise and issue the Level 2 Component Specification (LMHC 1999c) for the MVDSS and ATAS.
- Provide technical support to AEAT who will complete fluidic system testing and develop a conceptual design for a fluidic sampling system and RCRA-compatible

bottle filling station. A Phase III test campaign will evaluate potential sample out-gassing (loss of organics) caused by the fluidic pumping system.

- Review AEAT Phase I and Phase II test results (testing completed in FY 1999) and resolve comments with AEAT.
- Issue revised deployment strategy and plan document (RPP 2000a).
- Revise and issue a document that identifies potential tank waste analytes, physical properties, and radioactive analytes that can provide tank waste mixing/settling data when measured by an at-tank analysis system.
- Provide technical coordination and oversight for this multi-activity, multi-agency work.

### 2.1.2 FY 2001 OBJECTIVES

The FY 2001 work will continue the development of the MVDSS and ATAS with collaborative funding from EM-50 TFA and EM-30 RPP. The objective is to initiate the detailed design for the MVDSS and ATAS. The objectives include the following:

- Complete a review of the conceptual (outline) designs for the MVDSS and for the ATAS and formulate a path forward, including a “decision to proceed.”
- Complete fluidic pumping and sample bottle filling component tests based on a 4-inch deployment riser and the expanded source/feed tank that will provide LAW and HLW for vitrification. These tests will also verify performance calculations that were completed in FY 2000.
- Revise the Level 2 specification document (third revision) to include test results and the results of the conceptual (outline) design.
- Revise the ETP and the deployment strategy and plan documents.
- Complete a technical information package for detailed design.
- Complete a vendor call and place a contract for detailed design of the MVDSS.
- Provide vendor technical support in the completion of the detailed design (the detailed design will be completed in FY 2002).
- Provide AEAT technical support in their completion of detailed design for the fluidic pump and bottle filling system.
- Complete a preliminary hazards assessment for the sampler and the ATAS.
- Identify a Hanford cold test site for testing the MVDSS and ATAS.

The FY 2001 work will be a multi-task activity, completed by multi-agencies and companies including AEAT and CHG. Based on a “decision to proceed” that will be made by the CHG Team and, based on the FY 2000 design and test activities, the detailed design work will be initiated for the MVDSS and ATAS. CHG will complete a vendor call and place a contract for detailed design of the mobile, variable depth sampling system platform. AEAT will complete the design for the fluidic pump and bottle filling system modules that will be integrated into the MVSS detailed design. The AEAT will complete testing on the fluidic sampling system to provide data to validate performance calculations made in the conceptual design and to address an expanded group of feed/source tanks that were identified by the U.S. Department of Energy (DOE) in FY 1999 (RPP 2000b). The initial full-scale testing that was completed in FY 1999 was designed for tanks 241-AP-102 and 241-AP-104 that were to provide waste feed to

the processing/vitrification plant. In FY 1999, DOE re-evaluated the LAW and HLW waste specifications and expanded the number of tanks from which waste feed could be delivered. AEAT will receive funding through the EM-50 IG program. The CHG Team will provide technical support, integration, and oversight for these activities.

### 2.1.3 FY 2002 OBJECTIVES

The FY 2002 work will be a multi-task activity, completed by multi-agencies and companies. The overall objective is to complete the detailed design and initiate the fabrication of the MVDSS and the ATAS. The FY 2002 objectives include the following:

- Complete the detailed design, review the detailed design, and issue a “decision to proceed” with fabrication.
- Initiate the fabrication of the MVDSS and the ATAS.
- Provide technical support to fabrication of the MVDSS and ATAS
- Revise the hazards assessment based on the detailed design.
- Revise the ETP and the deployment strategy and plan documents.
- Complete an Alternatives Generation Analysis (AGA) and a decision whether or not to use this system as the baseline sampling system for supporting the waste feed for the vitrification project (Claghorn, et. al. 1997).
- Prepare the Hanford cold test site for receipt of the MVDSS and for the ATAS in FY 2003.

Potentially, the fabrication of the ATAS may be delayed to meet waste feed delivery (WFD) needs that were affected by the FY 2000 changes in the privatization contract. The CHG team will provide technical coordination, support, and oversight for the FY 2002 activities. Specifically, the CHG team will provide technical support for fabrication of the MVDSS and the ATAS. The FY 2002 activities will be supported by funding from EM-50’s TFA and IP programs with co-funding from EM-30. AEAT will complete the fabrication of the fluidic pump and bottle filling system modules. A commercial vendor will complete the fabrication of the MVDSS platform which will include the AEAT modules.

### 2.1.4 FY 2003 OBJECTIVES

The objectives for FY 2003 are to complete the fabrication of the MVDSS and the ATAS, complete vendor operational and performance testing, and certify that the system is ready for shipment to Hanford. The fabricated systems will be shipped to Hanford and installed in a cold test facility. Acceptance and Operational Testing will be completed to verify operational and performance status.

### 2.1.5 FY 2004 OBJECTIVES

The objectives for FY 2004 are to complete hot testing with the MVDSS and the ATAS. A readiness review will be completed to verify that each system is ready for hot deployment and testing. A hot test plan will be prepared and hot testing completed with the MVDSS. Potentially, the deployment of the ATAS may be delayed, based on needs for waste feed delivery. A “decision to proceed” with continued deployment in support of the vitrification project will be formulated, based on the hot test results and readiness review. Issues related to the Authorization Basis (AB) and environmental permitting will be identified and documentation prepared. EM-30 is expected to provide all of the funding for the FY 2003 activities.

## 2.2 DELIVERABLES AND MILESTONES

The objective is a MVDSS and an ATAS that can be deployed in waste feed tanks to provide waste sampling starting in FY 2005 as required by the Hanford waste processing and immobilization project. Deliverables that support this have been identified for each fiscal year. The detailed schedule, presented below, shows dates and activities for these deliverables and milestones. The planned deliverables and milestones are dependent on the status of previous work and availability of funding

### 2.2.1 FY 2000 DELIVERABLES AND MILESTONES

The major deliverables and milestones for FY 2000 are listed below. (As noted, some of the dates for the deliverables/milestones depend on data/input from AEAT.) The tasks and activities that support these deliverables/milestones are presented in Section 4.3.1. The FY 2000 milestones and activities are also presented in the FY 2000 TTP, RL08WT22 (FDH 2000).

#### Milestones/Deliverables:

- A.1 Complete review and approve AEAT's Phase III test implementation plan.  
Completed 5/15/00
- A.2 Complete review and comment resolution for AEAT Phase II and Phase III test reports. (The review of the Phase I and II test report 9/8/00. The review of Phase III AEAT testing in FY 2000 depends on AEAT completing their testing before 9/30/00.)
- A.3 Conceptual (outline) design for MVDSS and ATAS (depends on the CHG team's receiving fluidic pump conceptual design data from AEAT by 9/15/00) - 9/29/00 (*has been delayed to 11/13/00 due to late start of FY-00 activities*).
- A.4 Complete Review of Conceptual Design (Milestone delayed to 11/30/00 in FY 2001).
- A.5. Revise at-tank analyte document – 9/15/00,

#### Deliverables:

- Revised ETP (Revision 2) – 9/8/00.
- Revised Level 2 component specification (Revision 2) document – 9/31/00.
- Pre-conceptual design package - 7/28/00.
- Revised deployment strategy and plan (Revision 1) document – 3/17/00.

Based on a late start due to delays in EM-30 funding, the dates for A.2 and A.3 were modified. Milestone A.4 was delayed into FY 2001 due to a late start (5/1/00 rather than 10/1/00) from delays in the authorization of the CHG EM-30 co-funding.

### 2.2.2 FY 2001 DELIVERABLES AND MILESTONES

In FY 2001, a review of the FY 2000 conceptual design will be completed and a proceed-with-detailed-design decision will be made. AEAT will complete testing on the fluidic pumping system for the MVDSS. The detailed design will be initiated. A preliminary hazards assessment will be completed for the MVDSS and for the ATAS, and a facility for cold testing will be identified at Hanford. The ETP, deployment strategy and plan, and Level 2 documentation will be revised. Currently, the FY 2001 schedules for the MVDSS and the ATAS are the same but this may change based on WFD needs.

#### Milestones/Deliverables:

- Complete conceptual (outline) design – 10/13/00.
- A.4 Complete review of conceptual (outline) design (this milestone was delayed from FY 2000) - 11/30/00.
- Complete initial technical package of specifications for detailed design – 11/30/00.
- Formulate and issue “decision to proceed” with detailed design – 12/14/00.
- Issue test plan for AEAT tests on fluidic pump system for MVDSS – 2/15/01.
- Provide technical support in the development of the detailed design - 6/30/01.
- Issue vendor contract for detailed design – 4/30/01.

#### Deliverables:

- Revised ETP – 10/00.
- Revised (Revision 3) Level 2 component specification – 1/31/01.
- Completed final design information package – 6/28/01.
- Issued preliminary hazards assessment - 2/28/01.
- Identified Hanford cold test site – 8/31/01.
- Revised deployment strategy and plan document – 1/30/01.
- AEAT completed fluidic pump testing for MVDSS – 1/30/01.

### 2.2.3 FY 2002 DELIVERABLES AND MILESTONES

In FY 2002 the detailed design for the MVDSS and for the ATAS will be completed and fabrication initiated. The ETP and deployment strategy and plan documents will be revised. The hazards assessment will be revised based on the results of the detailed design. Preparations will be completed on the Hanford cold test site for receiving the MVDSS and the ATAS and initiating cold testing. An AGA will be completed for the MVDSS and a decision made whether or not to use this system as the base-line sampling system for supporting the vitrification project (Claghorn et al. 1997). If a favorable result is found, a decision to proceed with hot deployment will be issued. Currently, the FY 2002 schedules for the MVDSS and the ATAS are the same, but this may change based on WFD needs. The planned deliverables and milestones for FY 2002 include the following:

#### Milestones/Deliverables:

- Complete detailed design (vendor)– 12/28/01.

- A.1-1 Complete detailed design review and issue design review report (milestone) – 1/25/02.
- A.1-2 Issue “decision to proceed” with fabrication (milestone) – 2/15/02.
- A.1-3 Prepare certification checklist for acceptance of MVDSS and the ATAS.

Deliverables:

- Completed revision of ETP – 10/30/01.
- Completed MVDSS and ATAS detailed designs 12/28/01.
- Completed revision of deployment strategy and plan document – 1/30/02.
- Initiate fabrication of the MVDSS and the ATAS– 12/03/02.
- Complete AGA for the sampler and issue decision to proceed with hot deployment – (5/30/02).
- Completed preparation of Hanford cold test site – 8/01/02.
- Revised and issued hazards assessment – 8/02/02.

#### 2.2.4 FY 2003 DELIVERABLES AND MILESTONES

The fabrication of the MVDSS and the ATAS will be completed and the systems shipped to Hanford and installed in the cold test facility in FY 2003. After installation and checkout are completed, acceptance and operational testing will be completed as well as any additional cold testing that may be needed. Currently, the FY 2003 schedules for the MVDSS and the ATAS are the same, but this may change based on WFD needs. The deliverables/milestone dates for FY 2003 include the following:

Milestones/Deliverables:

- Receive, assemble and perform initial checkout of MVDSS and the ATAS at Hanford cold test facility (milestone) – 6/03/03.
- Completed Acceptance Testing (milestone) – 9/08/03.
- Completed Operational Testing (milestone) – 10/07/03

Deliverables:

- Revised ETP – 10/30/02.
- Revised deployment strategy and plan document - 1/29/03.
- Completed fabrication of the MVDSS and the ATAS and complete pre-acceptance checkout and testing (milestone) (may depend on the fabricator’s schedule)– 1/14/03.
- Certification that the systems are ready for shipment to Hanford – 1/21/03.
- Cold acceptance test plan – 12/27/02.
- Operational test plan – 3/31/03.

#### 2.2.5 FY 2004 DELIVERABLES AND MILESTONES

In FY 2004 a readiness check, hot deployment, and hot demonstration and testing will be completed. Prior to hot deployment, issues related to revisions needed in the Authorization Basis and for environmental permitting will be addressed. Based on the hot tests, a decision will be

made to proceed with the operation of the MVDSS and the potential fabrication of additional units for use in other waste feed tanks. Currently, the FY 2004 schedules for the MVDSS and the ATAS are the same, but this may change based on WFD needs. The deliverables/milestones dates may change based on status at the end of FY 2003 and the availability of FY 2004 funding. These FY 2004 activities will provide a sampling system ready for continued hot deployment in FY 2005.

Milestones/deliverables:

- Completed hot deployment readiness review (milestone) – 2/13/04.
- Issued decision to continue with hot deployment to support vitrification (milestone) – 9/29/04.
- Revised ETP – 10/30/03.
- Revised Authorization Basis (if required) – 3/29/04.
- Environmental permits (if required) – 4/05/04.
- Completed hot deployment – 6/16/04.
- Completed hot testing - 9/17/04.

### **3.0 BACKGROUND**

Under the Hanford Site River Protection Project (RPP) cleanup strategy, the DOE Office of River Protection (ORP) has the responsibility to treat and immobilize Hanford's LAW and HLW (Tank Waste Remediation System Privatization Contract DE-AC06-96RL13308, Mod. No. A006, 1998, U.S. Department of Energy, Richland, Washington). Three LAW envelopes have been identified that represent the range of liquid waste types in the large underground waste storage tanks on the Hanford Site: double-shell slurry/double-shell slurry feed (Envelope A); aging waste, also known as neutralized current acid waste (Envelope B); and organic complexant-containing complexed concentrate (Envelope C). Waste of all these types will be delivered as dilute slurry solutions having a maximum of 2 percent-by-weight solids. In addition one HLW envelope (Envelope D) has been identified which is an aqueous slurry of insoluble suspended solids (sludge). The interfaces and boundaries for the Process Waste Sampling Subsystem (PWSS) are defined in RPP-5786 (RPP 2000c).

The transfer of tank waste materials will be accomplished with a transfer line between the RPP staging tanks and the pre-processor facility feed tanks. The performance requirements and references to requisite codes and standards for the PWSS sampling subsystem are identified in HNF-5154 (CHG 2000a). Prior to transfer, waste samples will be analyzed to verify conformance within the appropriate waste envelope. The current baseline-approved method for sampling tank liquids is "grab" sampling. Core sampling is the baseline method for slurry and solid material sampling. Grab sampling utilizes the "bottle-on-a-string" technique that may be biased with materials from the upper tank elevations. Neither grab nor core sampling can be done while mixer pumps are operating. The RPP has identified a number of risks associated with the limitations and abilities of these baseline sampling techniques and their abilities to perform within the anticipated WFD schedules (and budgets).

To address these risks and concerns, a MVDSS with an interface for an ATAS is being developed. The technology for this sampling system is based on a fluidic sampling technique that was previously developed and deployed by AEAT. AEAT is currently being funded by the DOE, EM-50 International Program (IP) to develop the fluid sampling and sample bottle filling system for this mobile, variable depth sampler. The fluidic pump technology has been deployed by AEAT for transfer pumps and in a fixed elevation sampler in a Savannah River Site (SRS) waste tank.

To provide on-line waste data (production data) from which the mixing/settling status of a waste batch can be assessed, an ATAS is being developed that will interface with a waste stream provided by the MVDSS. This sensing system will be integrated with the deployment platform for the fluidic sampling system. The ATAS will contain sensors that measure specific waste radioactive, physical, and chemical properties related to the mixing or settling status of tank wastes. A comparison of these measurements at different locations in a waste batch will provide the mixing/settling status information.

The FY 1998 work scope (LMHC 1998) consisted primarily of providing oversight for the development and initial testing of a concept for a sampling system that was completed by AEAT (LMHC 1999g and AEAT 1998a). These activities were funded by the DOE EM-50 TFA program (CHG team funding) and EM-50 IP program (AEAT funding).

The FY 1999 work scope included testing of a full-scale, fluidic pump-based sampling system (24-ft and 54-ft liquid lift distances) with 2 wt% and 15 wt% sand/water and 2 wt% and 25-30 wt% kaolin/water simulants. At mid-year in FY 1999, the DOE directed the following changes:

- Required that the sampling system meet RCRA criteria for organics (DOE 1999).
- Increased the number of feed tanks from two to include potentially all of the LAW source tanks (RPP 2000b).
- Reduced the work scope to accommodate a \$119 reduction in funding.

Based on a cost assessment and a determination that the AEAT needle and sampling "T" concept could not meet the RCRA criteria, a concept for a MVDSS with a new container filling concept was developed (LMHC 1999a). A decision process, using a Design Compliance Matrix developed for the sampling system, was used to select two preferred container-filling options (a single- and a two-station concept) (LMHC 1999b). This MVDSS would be used on multiple tanks, fill a 500-mL sample bottle, and meet the RCRA criteria for sampling volatile and semi-volatile organics.

These changes were accommodated by a slippage of the planned award of the ATAS contract being placed by the National Energy Technology Laboratory (NETL) in Morgantown, WV, and a delay of work in support of the sampler Outline Design by AEAT. The CHG team had provided support in the drafting of a Statement of Work for an ATAS and for working with the Characterization, Monitoring, and Technology Cross-Cut Program (CMST) through NETL.

## 4.0 DESCRIPTION

### 4.1 FUNCTIONS AND REQUIREMENTS (LEVEL 2 SPECIFICATION)

Level 2 Component Specifications are the current method used to identify the system functions and to provide the requirements to which RPP systems, structures, and components will be designed. The overall definitions for performance requirements and the requisite codes and standards to be applied during design are identified in, and flow down from, *Double-Shell Tank Process Waste Sampling Subsystem Specification* (HNF-2000). Specifically, Section 3.2.1.4, *Sample Staging Tank High-Level Waste*, provides criteria for sampling HLW, and Section 3.2.1.5, *Sample Staging Tank Low-Activity Waste*, provides criteria for sampling LAW to support WFD. The Level 2 Specification provides further definitions and more specific criteria needed to meet WFD needs (the status of much of the specific criteria in RPP-4154 was not defined and was presented as a “to be revised” (TBR) or a “to be defined” (TBD) status).

In FY 1998, a revised (Revision 1) Level 2 Component Specification was prepared for the MVDSS and the ATAS (LMHC 1999c). The Level 2 document included the data/sections that are needed to support the completion of hardware design, design reviews, and proof-of-principle testing of the nested, fixed-depth sampling system. The Level 2 Component Specification document provided the physical and chemical property range of the LAW materials that must be sampled. It also contained environmental and physical criteria for hardware operating inside the tank farm, criteria for in-tank operation, and criteria for using site-approved casks to transport samples to the 222-S Laboratory.

The preliminary specification document supported a two feed tank scenario (AP-102 and AP-104) with the sampling system based on a nested, fixed-depth sampling system concept. As indicated by the FY 1999 testing, the needle-based bottle filling concept did not meet RCRA organic sampling criteria and would not produce representative sampling for materials that settled quickly. The DOE also made a decision to provide tank wastes directly from a larger number of feed tanks. A preliminary cost assessment indicated that it would be more economical to use a portable sampling system versus placing a permanent nested, fixed-depth sampling system in each tank. Therefore, a concept for a mobile, variable depth sampling system was initially developed in FY 1999.

The Level 2 Specification, which provides the functions, requirements, and performance specifications for the MVDSS and the ATAS, is the primary technical document for designing and fabricating these systems. In FY 2000, the current Level 2 document will be revised to include the results of the AEAT testing with the fluidic sampling system and the RCRA-compatible bottle filling stations that were completed in FY 1999 and FY 2000, the results of the MVDSS conceptual design, and a simplified sensor suite for the at-tank analysis system.

In FY 1999, the TFA reduced the scope of the at-tank analysis activity and requested that it be limited to the slurry/sludge sensor and analyte systems that are currently being developed to support the TFA slurry monitoring techniques program. This change would reduce the risk level

in the development of the at-tank analysis sensors but would still provide sensors capable of measuring waste properties from which settling/mixing status could be determined. Some of these sensor systems are undergoing performance and evaluation testing in FY 2000 at other DOE sites.

The revised Level 2 document will also include the results of the FY 2000 pre-conceptual design and interface criteria for the increased number of feed tanks. The pre-conceptual design will include calculations that will further identify tank specifications and interface criteria. In FY 2000, the Revision 2, Level 2 document will be part of the specification package that will be used in the detailed design and fabrication of the MVDSS and the ATAS.

In FY 2001, the Level Component Specification document will again be revised to include the results of the conceptual designs completed for the MVDSS and for the ATAS and the results of the FY 2001 AEAT testing. The FY 2001 testing verifies the fluidic pumping system operation within the envelope of the source and feed tank dimensions and validates the ability to provide samples that are representative and meet RCRA criteria for organic samples. The Revision 3 document will provide the technical basis (functions and requirements) to complete the detailed design and the fabrication of the MVDSS and the ATAS.

The Level 2 Component Specification was developed in accordance with HNF-IP-0842 (CHG 2000b) and is based on the Data Quality Objectives (DQOs) for LAW feed and privatization contract interface control documents (BNFL 2000a and BNFL 2000b) as well as the current Tank Farms Authorization Basis (AB) and applicable state and federal regulations (LMHC 1999d).

#### **4.2 MOBILE, VARIABLE DEPTH SAMPLING SYSTEM AND AT-TANK ANALYSIS SYSTEM**

Figure 1 shows a conceptual MVDSS with an ATAS deployed in a Hanford Site double-shell tank. The MVDSS would provide the LAW and HLW samples in 500-mL bottles that could meet RCRA organic criteria and provide representative samples for low and high viscosity wastes. An ATAS would be interfaced with the waste stream from the MVDSS to provide on-line, real-time waste physical and chemical property data from which the homogeneity of the waste batch could be assessed.

The MVDSS is shown mounted on a portable skid that would be deployed with a crane (this skid also could be mounted on the back of a truck). This means that a clear path to a tank riser, currently required by the core truck systems, is not necessary. The electrical, compressed air, and water utilities needed to operate this sampling system also would be contained on a support trailer, with stand-by power being furnished from the tank farm utility support grid.

Details of the skid arrangement are shown in Figure 2. The waste sampling would be done by a power fluidic pump (charge vessel and reverse flow diverter [RFD]) that has no moving components that make contact with the tank waste (the RFD is the inlet "foot valve" for the sampling system). The charge vessel and RFD components would be deployed on a

segmented mast through a tank riser. The hose and reel design of the sampling system with the charge vessel riding on the mast would allow sampling at any waste depth in the tank (the RFD can be positioned at any waste depth in the tank). A steel cable around a pulley at the bottom of the segmented mast would provide active depth control for the sampling point (RFD and charge vessel) in the tank waste. Between sampling campaigns, the fluidic pump components could be drawn up into the riser for temporary storage.

The conceptual bottle filling station is shown in more detail in Figure 3. Waste from the fluidic pump would flow through the bottle-filling chamber via one of two potential paths controlled by valves. The initial path is a loop that bypasses the sample reservoir. This loop would be used to establish a steady-state waste material in the sampling system. The valves would allow the waste stream to be ported through the sampling reservoir to trap a waste sample. A 500-mL sample bottle would be placed under the reservoir and the reservoir opened to fill the bottle with the waste sample. The sample bottle and reservoir will produce sampling and filled sample bottles that can meet RCRA criteria for volatile and semi-volatile organic waste materials (zero headspace, sealed sample container, and low sample agitation). After a sample bottle is filled, the residual waste in the reservoir is flushed out with water or with waste from another sampling elevation to reduce potential cross-contamination of waste materials between samples. The sample bottle would be capped (sealed) and its exterior flushed with water to reduce surface contamination. During these operations, the fluidic pump would continue to pump waste through the loop by-passing the reservoir. This continuous operation reduces the potential for waste plugging within the pumping system. The filled and sealed sample bottle would be passed through the transfer chamber and into the packaging chamber. This three-chamber design has sealed doors between the chambers for contamination control. The sample bottles would be bagged when they are transferred through a bagging port and then inserted into a steel pig. The steel pig cover would be replaced and the sample removed for transport to the 222S Laboratory. Prior to removal, the steel pig surfaces would be swiped to determine if the contamination levels were outside of established limits for sample transportation.

The waste stream from the fluidic pump could also be directed through an ATAS waste loop. The ATAS sensors would measure specific waste chemical, physical, and radiation parameters that would be used to assess the mixing/settling (homogeneity) of the waste batch being considered for shipment to the pre-processing plant. The ATAS data provide an option for obtaining settling/mixing-based process control data without removing and transporting waste samples to the 222-S Laboratory for analysis.

The three-chamber design of the sample bottle filling system provides contamination control and incorporates shielding to protect operators from exposure during the sampling process. The sampling system chambers would have water spray systems that would wash down the chamber interior surfaces, the sample bottle-handling manipulators, and the exterior surface of filled sample bottles.

After a tank sampling campaign is complete, the sampling system skid would be moved to another waste tank, but the riser interface and the segmented mast with its fluidic pump

components (charge vessel and RFD) would remain in the tank. The riser interface may be re-usable, but the mast and pump components would be disposed of as contaminated waste. A new mast and fluidic pump components would be installed in each waste tank. The mast and fluidic pumping components could remain in a tank for reconnection with the MVDSS skid to continue sampling at a future date. The removal and disposal operation would be independent of the sampling system and would use an "A-frame" hoist similar to that used in the disposal of drill string segments from core sampling. As these components are raised above the riser, a high-pressure spray system would wash down each component. The removed segments would be bagged and placed in burial boxes similar to those currently used for core string disposal.

HNF-2056  
REV. 2

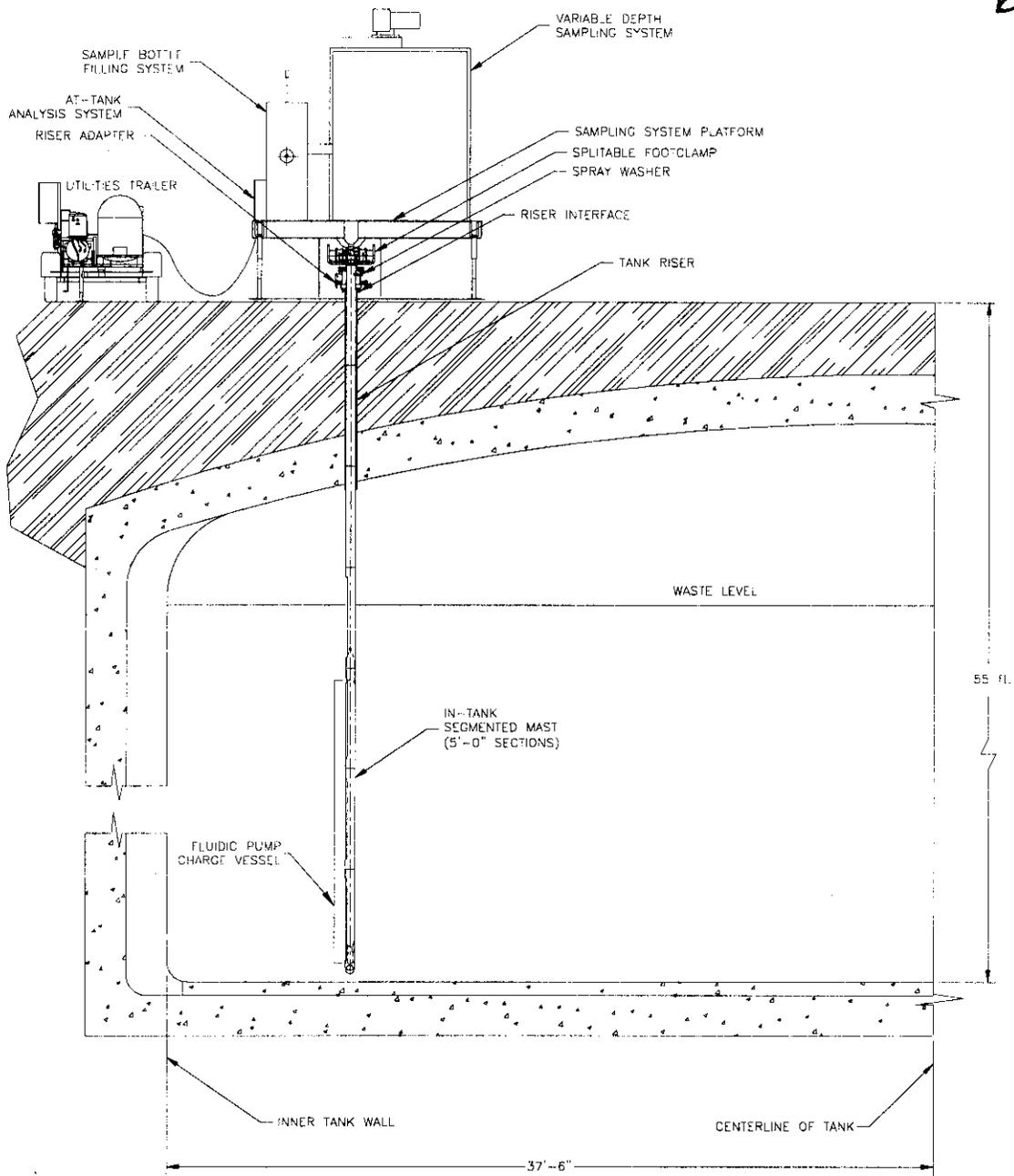


Figure 1. Mobile, Variable Depth Sampler and At-Tank Analysis System Deployed in a Double-Shell Tank

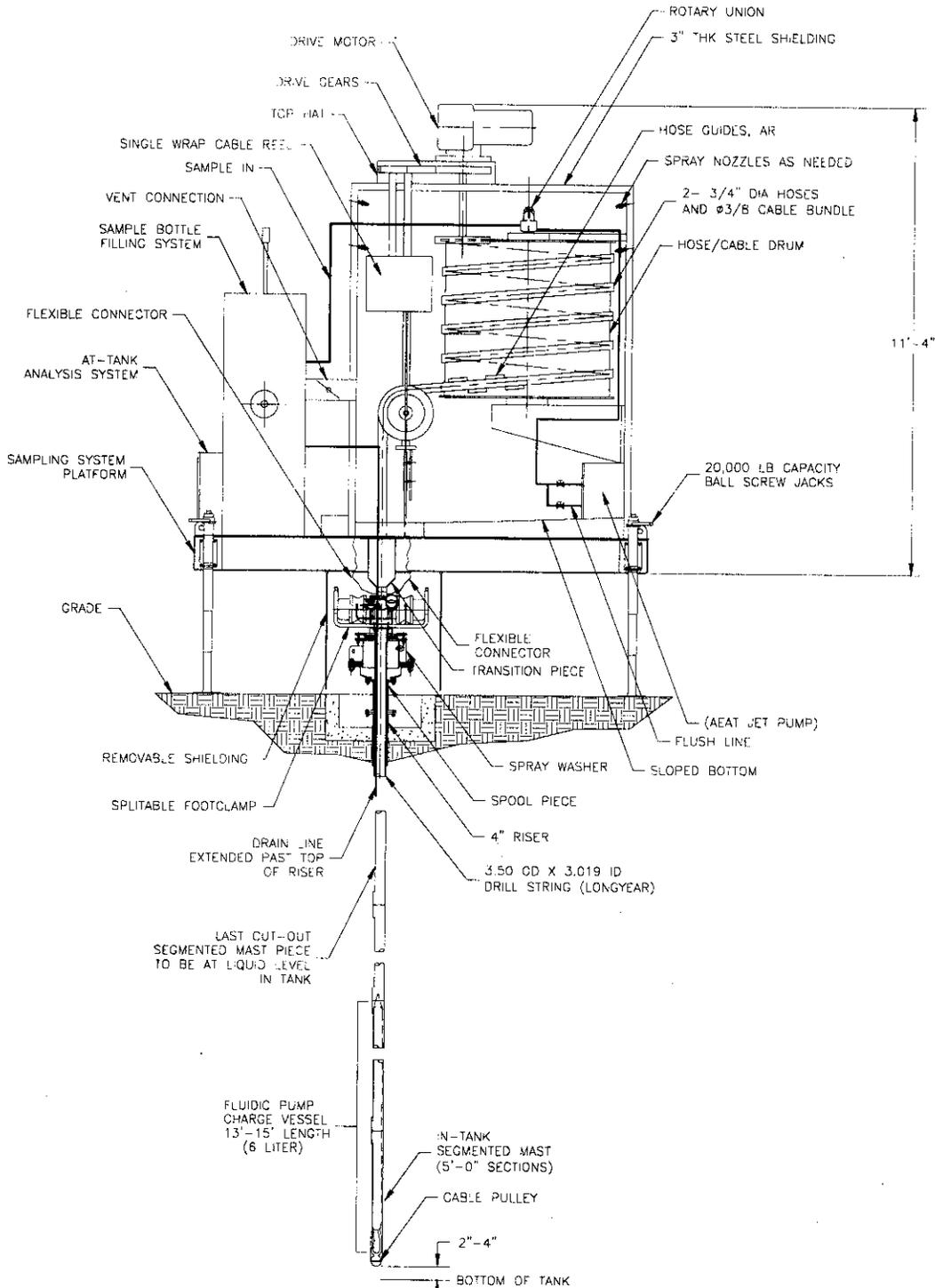


Figure 2. Major Components and Interfaces for the RCRA-Compatible Bottle Filling Station and At-Tank Analysis System.

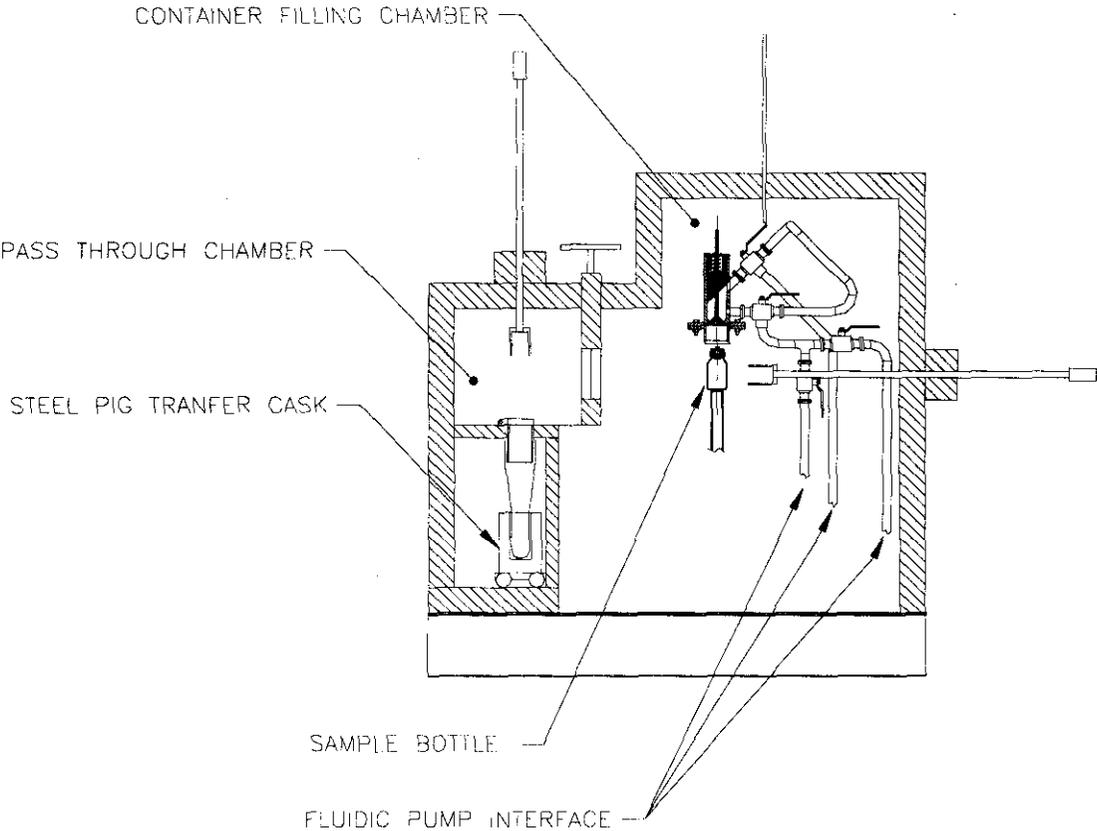


Figure 3. RCRA-Compatible Organic Sample Bottle Filling Station

### 4.3 ENGINEERING TASKS

#### 4.3.1 FY 2000 ENGINEERING TASKS

In FY 2000 pre-conceptual and conceptual (outline) designs will be developed for the MVDSS and for the ATAS. A preliminary data package will be developed to support detailed design in FY 2001 and to initiate fabrication in FY 2002. AEAT will complete proof-of-concept tests with the RCRA-compliant bottle filling stations and will evaluate the potential for sample de-gassing in the fluidic pump sampler. CHG will provide oversight, technical direction, and technical reviews for test and design work that will be completed by AEAT and by the CHG team. The CHG Team will comprise the technical experts from the CHG Characterization Engineering and Characterization Operations organizations, COGEMA Engineering Corporation (COGEMA), and Numatec Hanford Corporation (NHC). The CHG team will also work with the EM-50 TFA and with the EM-30 RPP programs in coordinating planning and technical execution of the overall project scope, including work performed by supporting organizations.

In support of this activity, AEAT will be funded by EM-50, International Program, to complete the following activities:

- Develop a Phase III Test Implementation Plan – (AEAT Test Plan issued on 5/30/00).
- Complete Phase III charge vessel out-gassing tests (scheduled to be completed 9/30/00).
- Complete Outline Design of Fluidic Sampler Pump and RCRA-Compatible Bottle Filling Station for the MVDSS (Initial parts of the Outline Design are due to the CHG Team in August) – 9/15/00.
- Provide fluidic pump envelope data to CHG - 8/15/00.
- Provide envelope data for sample bottle filling station to CHG - 9/30/00

The CHG team FY 2000 work scope will be collaboratively funded by the EM-50 TFA and EM-30 RPP programs. The basic system development activities will be funded by EM-50 while EM-30 will fund management, oversight and coordination, and advanced design activities.

##### 4.3.1.1 FY 2000 EM-30-Funded Tasks

The specific engineering tasks that will be completed with EM-30 funding include the following:

##### 1. Project management –

This activity provides for the project management, technical integration, and oversight to coordinate the technical development work performed by the CHG team and AEAT (International Program funding). This work includes centralized task administration such as budget and scope planning, TTP control, budget and scope/milestone change control, progress tracking system input, milestone tracking, and deliverable distribution. In addition, a TTP will be developed and submitted to EM-50 TFA to support activities in FY 2001.

Deliverables/Milestones: This is a level of effort task. Deliverables for this task will be reports and status summaries as required by program reporting requirements.

## 2. Revise Engineering Task Plan

This activity provides for the revision of this ETP, (LMHC 1999a) to reflect the impact of the revised AEAT FY 2000 statement of work as well as the status of activities and for identifying detailed tasks, schedules, and funding sources for FY 2001 and beyond. The ETP basically functions as the memorandum of understanding with EM-30 for the current fiscal year.

### Deliverables:

Revision 2 of ETP document – 9/08/00.

## 3. Revise Level 2 Component Specification Document

The Level 2 Component specification document (LMHC 1999c) will be revised in this task. The Revision 2 document will address the following:

FY 1999 changes in feed tank scenarios that included 4-inch riser deployment and feed from an increased number of double-shell tanks (DSTs) (RPP 2000b).

MVDSS and ATAS conceptual designs.

RCRA-compatible sample bottle filling station (DOE 1999).

AEAT FY 1999 testing with needle based bottle filling and FY 2000 testing of the RCRA-compatible bottle filling station and charge vessel organic de-gassing (LMHC 1999e).

Revised waste data from sampling campaigns that include the 241-AZ-101 mixer pump tests.

Data obtained for the pre-conceptual designs and conceptual design of the MVDSS and from the conceptual design of the ATAS

Revised at-tank analyte identification document (assessing mixing/settling status of a waste batch).

To provide early support to AEAT in their conceptual design work, a red-lined Level 2 specification document will be prepared initially from the Revision 1 document.. The red-line document will then be expanded into a revised draft Level 2 specification that will be reviewed and released as a CHG, Revision 2, document. This document will be part of the documentation package that will be prepared to support detailed design.

### Deliverables/Milestones:

Complete a red-lined document for AEAT – (completed 7/28/00).

B-3 Issue Revision 2 Level 2 Component Specification (milestone) - 9/31/00.

## 4. Pre-Conceptual Designs for the Sampler and At-Tank Analysis System

A pre-conceptual design for the MVDSS and the ATAS will be developed in this task. The pre-conceptual design will be based on the MVDSS concept with an interface for deploying an ATAS. This pre-conceptual design activity will include the following sub-tasks:

Develop pre-conceptual design for the MVDSS and the ATAS.

Complete engineering calculations that will validate the design, resolve technical issues, and demonstrate/support pre-conceptual design features.

Acquire interface data (tank farm, waste tank, waste) to support pre-conceptual and conceptual (outline) designs and revise the Level 2 specification document.

Obtain data on potential at-tank sensor systems.

Prepare a pre-conceptual design package for transmittal to AEAT and presentation to AEAT/TFA – (June 28, 2000 kickoff/interface meeting at Hanford).

Milestone:

Pre-Conceptual Designs for Sampler and At-Tank Analysis Systems - 7/28/00.

5. Initiate Technical Support for Detailed Design Call Package

This task provides for the development of a technical support package and issuing a vendor call for a commercial vendor contract to complete the detailed design of a MVDSS and ATAS. The CHG team will prepare a preliminary specification package that will include the Level 2 Component Specification and the pre-conceptual design data. Due to delays in initiating the FY 2000 work, this task will be delayed into FY 2001 and will not involve NETL. In FY 2000 CHG will complete a vendor call and issue a contract for a detailed design of the mobile, variable depth sampling system platform.

Milestone:

Technical Support Package for Detailed Design Vendor Call Package – 12/8/00

4.3.1.2 FY 2000 EM-50-Funded Tasks

A-1 Phase II and III Test Support

In this task, technical support will be provided by the CHG Team for the AEAT Phase II and Phase III testing. In FY 1999 two container filling concepts were identified in an AGA/trade study: single-station and two-station concepts. The CHG Team issued a Phase II Test Plan in FY 1999 that identified test setups, simulants, tests, and measurements for testing the container filling concepts. Based on this test plan, AEAT developed a Phase II test implementation and set up a test rig in FY 1999. However, AEAT did not complete the testing in FY 1999. The CHG team will complete the following activities related to the Phase II testing:

- The CHG team will witness part of the Phase II testing being completed at AEAT.
- The CHG team will prepare a report (trip report) based on the test observations. These observations will be presented to AEAT.

In FY 2000 AEAT will develop a test plan for, and will complete, Phase III testing at their facilities. These tests will evaluate the potential for organic de-gassing of wastes within the fluidic pumping systems charge vessel and RFD components. The concern is that the fluidic sampling system's pulsed-pumping cycle, which includes pulling a slight vacuum on the waste when the charge vessel is being filled, will bias (degas) the volatile and semi-volatile organic content of the waste delivered to the container filling station. The CHG Team will complete the following activities:

- Provide guidance to AEAT for the Phase III test plan, including test rig, tests, and measurements (completed on 1/25/00) (Reich 2000a).

- Identify test simulants and organic spikes (jointly with the Idaho National Engineering and Environmental Laboratory [INEEL]) for the degassing tests (completed on 3/22/00) (Reich 2000b).
- Approve the AEAT Phase III test plan and test rig components (completed on 5/16/00) (Reich 2000c).
- Witness degassing testing and provide AEAT observations and recommendations
- Prepare a trip report summarizing de-gassing test observations and present the report to AEAT.

After the completion of all of this testing, AEAT will prepare written test reports summarizing the results of the testing for the CHG team and will present the test results to the CHG team. The CHG team will

- Review the AEAT test reports
- Provide AEAT with comments on the tests and test data
- Review AEAT resolution of comments.

As indicated above, the Phase II testing that was scheduled to be completed by AEAT in FY 1999, was delayed into FY 2000. Part of the FY 1999 EM-50 carry-over funding was used to cover CHG team costs for witnessing this testing and the resolution of test comments. The carry-over funding also supported the CHG team in the identification of organic spiked simulants and the review and approval of AEAT's Phase III test implementation plan. The Phase III tests will evaluate the de-gassing potential of the fluidic pump's charge vessel using the organic spiked simulants.

#### Milestones:

- A.1 Complete Review of AEAT Test Implementation Plan for Phase III Tests – (Completed 5/15/00)
- A.2 Review Phase II and III Test Results - (Review of Phase I and II AEAT test report – 9/8/00. The review of the Phase III AEAT testing in FY 2000 depends on AEAT completing their testing before 9/30/00.

#### A.2 Conceptual (Outline) Design of MVDSS Platform

A conceptual (outline) design will be developed for the MVDSS platform and the ATAS. AEAT will complete the conceptual design for the fluidic pumping system and the RCRA-compatible bottle filling station that will be integrated into this platform. The conceptual design will expand the pre-conceptual design that will be completed in the above EM-30-funded (Task 4), Pre-Conceptual Design. The conceptual design will consider waste tank and tank farm interface issues such as weight, size, deployment, decontamination, and operation. A conceptual (outline) design package will be prepared that contains drawings and descriptions of the system design features needed to support the development of a detailed system design. The design will be documented via Hanford H-2 level drawing format and will include the following:

- Process Flow Diagrams - Block flow diagrams depicting utility needs and process steps, including tank ventilation system, if applicable, and including any appropriate mass balance or flow volumes.
- Equipment Layout/Arrangement Drawings – Electrical and mechanical drawings with details necessary to convey equipment locations, system layout, and essential conceptual interfaces with externally-provided utilities, the ATAS and deployment platform. Arrangement drawings will show locations and preliminary dimensions; distances between equipment will be detailed as appropriate.
- Process and Instrumentation Diagram (P&ID) – All components of the sampler system (umbilical cable, RFD, charge vessel, tubing, sampling station, controller module, and utilities support module) should be addressed on these drawings.
- Engineering Calculations – Calculations shall be completed that demonstrate conformance to key criteria such as safety, performance within the conceptual mobile, variable depth sampling system envelope, operability, reliability, etc. This includes radiation shielding and system weight calculations.

This design activity will require technical interfacing with AEAT in their completion of the conceptual (outline) design for the fluidic pumping system and bottle filling station. This activity will also provide technical data to support contracting with a private vendor who will complete the detailed design. The detailed design will be the basis for fabrication that will be initiated in FY 2002. Interface meetings will be held with AEAT at Hanford and via telephone conference calls. Due to a funding delay, the start of these activities was delayed and the completion of the conceptual (outline) design will be in FY 2001.

Milestone:

A.3 Complete Conceptual (Outline) Design for Mobile Sampler System – 10/13/00.

A.3 Review of Conceptual (Outline) Design of Sampling System.

This task provides for the review of the conceptual (outline) design of the MVDSS completed in the A.2 task. The design review will specifically assess the design's ability to meet the Level 2 Component Specifications. The review findings will be documented. Potential paths for the disposition of comments, corrective actions, and other findings that may result in the need to modify the detailed design will be identified. The results of the outline design review will be used as a basis to form a decision for proceeding with the detailed design of the MVDSS in FY 2001. The design review will be initiated in FY 2000 but will be completed in FY 2001 due to the delay in initiating the work for this TTP. The activities related to this design review task include the following:

- Setup of design review package
- Establishing design review schedule and notifying review participants
- Completing design review
- Resolving review comments and closing out corrective actions
- Issuing design review report.

Milestone:

A.4 Complete Review of Mobile Sampler Conceptual (Outline) Design – 11/30/00.

A.4 At-Tank Analysis System Document

In this task, the FY 1999 draft document that identifies tank waste potential chemical, physical, and radioactive properties for use in assessing the mixing/settling status of the waste will be revised. The data in this document will provide support for the conceptual design of the ATAS that is being developed with EM-30 support. The draft document will be revised, reviewed, and issued as an RPP document. The activities for this task are to revise, review, and issue the document that identifies potential physical, chemical, and radioactive properties for indicating waste mixing or settling status for an ATAS.

Milestone:

Issue Candidate At-Tank Analyte Assessment Document – 9/15/00.

A.5 Revise Deployment Strategy and Plan Document

This task will revise the deployment strategy and plan document that was completed in FY 1999. The deployment strategy and plan provides a strategy and top-level implementation plan for demonstrating and deploying the MVDSS and the ATAS. It also includes an assessment of the sampling-related risks currently identified with the FY 2000 multi-year program plan and how these risks would be mitigated with the sampling system. The document includes a cost benefit of using the sampling system and a discussion of how the sampling system supports the privatization contract.

*This task was completed using FY 1999 EM-50 carry over funds (RPP 2000a). This task is included in this ETP only to show continuity from FY 1999.*

Milestone:

H-1 Revised Deployment Strategy and Plan document was issued on 3/17/00.

## 4.3.2 FY 2001 ENGINEERING TASKS

In FY 2001 the detailed design of the MVDSS and the ATAS will be initiated. AEAT will complete testing of the major components in the MVDSS. The CHG team will complete a review of the conceptual (outline) design and will place a vendor contract for the detailed design of the MVDSS and the ATAS. Due to WFD needs, the ATAS schedule may be delayed. The sampling system detailed design will include a fluidic pumping system, bottle filling station, interfaces for an ATAS, and a platform that integrates these into a mobile system. A decision-to-proceed with detailed design will be made based on the FY 2000 conceptual (outline) designs and the AEAT testing. The CHG team will also use the design to develop a preliminary hazard assessment for the sampling system and identify a cold test site for cold testing of the MVDSS and the ATAS. The CHG team will support AEAT in their testing by developing a test plan, approving an AEAT test implementation plan, and witnessing tests and reviewing the test results with AEAT. The ETP and the Level 2 Specification documents will be revised. The CHG Team

will provide technical support, integration, and oversight for these activities and will revise the Engineering Task Plan (ETP) and the deployment strategy and plan.

The FY 2001 work will involve the CHG Team, AEAT, and, potentially, a detailed design vendor. The CHG team FY 2001 work scope will be completed with co-funding from EM-30, RPP, and EM-50, TFA. AEAT will be funded from the EM-50 International Programs. The CHG Team EM-30 funded activities supporting this scope include as well as EM-30 activities delayed from FY-2000:

- Revise Engineering Task Plan - 10/00
- Revise deployment strategy and plan document - 1/01
- Issue preliminary hazards assessment - 2/01
- Issue Rev. 3 Level 2 Component Specifications to support the Detailed Design - 1/01
- Complete design information package for Detailed Design procurement - 11/00
- Identify test site/facility for cold testing of prototype mobile sampler - 8/01.

The CHG Team EM-50-funded activities for FY 2001 include the following:

- Complete a vendor call and place a contract for detailed design services- 4/30/01
- Provide technical information to support the detailed designs – 11/01
- Complete the review of the conceptual (outline) design - 10/00.

Specific milestones associated with these activities include the following and milestones delayed from FY 2000:

- A.1 Issue Decision to Proceed with Detailed Design - 11/00
- A.2 Issue Test Plan for AEAT Mobile Sampler Testing - 12/00
- A.3 Complete Technical Specification package to support detailed design call and contract placement - 4/30/01
- A.4 Complete the Review of the Mobile Sampler Conceptual (Outline) Design - 10/31/00 (FY 2002 activity).

Other activities that support this project include the AEAT testing. Tentative milestones for these activities include the following:

- Complete testing with a mobile, variable depth sampling system (AEAT) - 1/01
- Complete Technical Package of Specification for detailed design procurement – 11/00
- Initiate formal call process – 11/00
- Issue contract to detailed design vendor - 6/01
- Complete and issue the detailed design (by the vendor) – 2/02.

The above activities and milestones are part of the overall schedule shown in Appendix A.

#### 4.3.3 FY 2002 ACTIVITIES

In FY 2002 the detailed designs for the MVDSS and for the ATAS will be completed and fabrication initiated. A review of the detailed design will be completed and a decision-to-

proceed-with-fabrication issued. Currently it is planned that the fabrication activity will be completed by contract with a private vendor (potentially the same vendor that completed the detailed design). The CHG team will provide technical support in the selection of a vendor and to the vendor during fabrication. The fluidic pump components for the sampling system will be provided by AEAT from EM-50, International Programs. The fabrication vendor will integrate these components into the MVDSS system platform.

The CHG team will complete preparations at the Hanford cold test site in anticipation of the system installation and cold testing that will be completed in FY 2003. The hazard assessments for the MVDSS and the ATAS will be updated. An AGA will be completed for the sampling system and a decision made whether or not to use this system as the baseline sampling system for supporting the privatization contract (Claghorn, et al. 1997). However, the AGA decision may be delayed until acceptance and operational testing is completed. The ETP and the deployment strategy and plan documents will be revised.

The CHG team activities will be supported by co-funding from EM-30 and EM-50 TFA including funding placing, initiating and monitoring a commercial vendor fabrication contract. The CHG team EM-30-funded activities include

- Prepare cold test facility for receipt of the prototype sampler - 8/02
- Revise hazards assessment and issue Revision - 8/02
- Update Engineering Task Plan - 10/01
- Revise deployment strategy and plan document – 1/02.

The CHG team EM-50 funded-activities include

- Provide support for fabrication of the MVDSS.

The milestones and deliverables for FY 2002 activity include

- A.1 Complete review of the Detailed Design of the sampling system and issue a report 1/02
- A.2 Issue a decision to proceed with fabrication - 2/02.

The design and fabrication activities that will be completed in FY 2002 by a commercial vendor include

- Complete detailed design (vendor) 12/01
- Initiate fabrication of mobile sampler deployment platform (NETL) -2/02.

Appendix A shows the integrated schedule for these activities/deliverables/milestones.

#### 4.3.4 FY 2003 ACTIVITIES

The MVDSS and the ATAS will be shipped to Hanford and installed in the cold test facility. Prior to shipment, the fabrication vendor(s) will complete checkout and testing to verify operation per the Level 2 specifications. The CHG team will develop a certification checklist that will be used to certify the status of the systems prior to shipment. After installation is complete, an operational checkout will be completed with both systems, and Acceptance and

Operational testing will be completed. Modifications will be completed as identified from the testing, and additional testing completed that may be needed as a result of the modifications. Acceptance Test Plans (ATP) and Operational Test Plans (OTP) will be prepared to support this testing. An Acceptance for Beneficial Use (ABU) will be completed and supporting documentation prepared as required by the ABU. The ETP will be revised, and a final revision of the deployment strategy and plan document will be completed. Issues related to the AB and environmental permitting will be identified. EM-30 is expected to provide all of the funding for all of the CHG team FY 2003 activities.

#### 4.3.5 FY 2004 ACTIVITIES

In FY 2004 reports summarizing the results of acceptance and operational testing will be developed and issued. Operator training will be completed. A hot test installation and test plan will be developed and a hot deployment readiness review completed for the MVDSS and the ATAS. The hot testing will be completed, and a performance review completed. Based on this review and waste feed delivery needs, a decision will be made to continue with hot operation in support of the vitrification project. An assessment will be made to determine potential AB revisions and environmental permitting that may be required. Documentation will be prepared to meet these needs. EM-30 is expected to provide all of the funding for the FY 2004 activities.

#### 4.4 VERIFICATION

A system of testing and verification with strategic check points is being followed in this multi-year, multi-activity task. In FY 1998 AEAT completed testing on a conceptual design of a fluidic sampling system that demonstrated sampling feasibility for Hanford types of waste materials (AEAT 1998a and AEAT 1998b). The needle-based bottle filling system was tested with a full-scale fluidic RFD-based pumping system (57 ft high sample lift) in FY 1999. These tests demonstrated that the fluidic pumping system delivered representative samples (solids content and particle size distribution) for a 10 wt% sand/water simulant and a 30 wt% kaolin/water simulant. However, the test data indicated that the needle sampling system did not provide representative sampling with these simulants (the needle sampling system was under-sampling the solids for simulants that settled quickly). The testing also demonstrated that wastes with solids that settled very quickly could plug the fluidic pumping system if the system was not properly flushed after pumping these simulants.

In FY 2000, as a FY 1999 carry-over task, tests were completed by AEAT on two bottle filling concepts selected by an AGA study (LMHC 1999a) for their potential to provide filled sample bottles that could meet RCRA criteria for organic samples (zero head-space). These tests also provided data on optimum operational parameters for the fluidic pumping system.

In FY 2000, AEAT will complete testing on the fluidic pump charge vessel to identify potential de-gassing from the partial vacuum that is drawn on the charge vessel during the filling cycle. The concern is that there may be a loss of volatile organics that could bias the analysis of a sample's organic inventory. In FY 2001, a review of the conceptual (outline) designs for the MVDSS and the ATAS will be completed by the CHG Team. Based on this review, a decision-to-proceed will be made. In FY 2002 after the detailed design is completed, the CHG team will

complete a design review and will form a decision-to-proceed with fabrication based on the design review.

After the sampling system is constructed in FY 2003, the fabrication vendor will perform test and checkout at their facilities prior to shipping the system to Hanford for installation in the cold test facility. The CHG team will prepare a certification checklist that will be used to verify that the system is ready for shipment to Hanford.

In FY 2003, the MVDSS and the ATAS will be assembled and installed in the Hanford cold test facility and acceptance testing and operational testing completed. Upon successful completion of this testing, a hot deployment readiness review will be completed. These systems will be then installed in a waste tank and hot testing completed. The decision to deploy the ATAS may be delayed, based on WFD sampling needs to support waste treatment and immobilization. The hot testing will be reviewed and a decision formulated to continue with hot operation to support the waste feed for the vitrification project.

#### **4.5 PROCUREMENT**

CHG will handle all Hanford procurement activities required for this task. The CHG design authority, with input from the CHG team will determine the safety classification of the components. The CHG team, in accordance with RPP-PRO-1819 (RPP 1999) and HNF-IP-0842 (CHG 1999a) will prepare any Commercial Grade Item (CGI) dedication forms, for safety class or safety significant equipment, required to support procurement activities.

No procurement is planned for FY 2000. In FY 2001, a contract will be established to complete detailed design through a commercial vendor. The detailed design will be completed in FY 2002 and a commercial vendor call completed to identify a commercial vendor to complete the fabrication of the MVDSS and the ATAS. Potentially, the ATAS could be delayed, based on WFD sampling needs that remain to be defined. The CHG team will assist in the development of the specification packages for these calls and procurements. It is also assumed that the CHG team will assist in the technical assessment of proposals from prospective vendors prior to issuing design and fabrication contracts.

#### 4.6 ACCEPTANCE FOR BENEFICIAL USE

The Acceptance for Beneficial Use (ABU) process that will be used for this activity will conform with Raymond 1995a. An ABU was not required for the preliminary development activities. However, to complete this project and turnover of equipment to Characterization Field Operations (CFO), an ABU is needed to support the work scope in FY 2003 and 2004. The ABU checklist/forms are included as Attachment D. This ABU will be completed before acceptance of equipment by CFO. The completed ABU form will be updated as required via the Engineering Change Notice (ECN) process (HNF 1999a).

#### 4.7 INSTALLATION

No installation activities are planned for FY 2000, 2001 and 2002. After the fabrication and checkout are completed in FY 2003, the MVDSS will be installed in the Hanford cold test facility. Selection and preparation of the cold test site will be completed in FY 2002. In FY 2004, after successful completion of acceptance testing and operational testing and the completion of a readiness review, the MVDSS with an ATAS will be installed in a waste tank for hot testing.

#### 4.8 PRE-OPERATIONAL AND OPERATIONAL TESTING

See Section 4.4, *Verification*, for details on planned testing. After completion of acceptance testing and operational testing, operator training will be completed in FY 2004. Acceptance and operational testing will be completed per HNF-IP-0842 (CHG 2000c).

#### 5.0 ORGANIZATION

Development of the MVDSS and ATAS requires the support of various programs as well as the implementing organizations. Responsibilities are assigned to various companies and organizations as identified in the following.

Representatives of the TFA will provide an interface to the TFA Technical Management Team to ensure that the project is implemented in a manner consistent with TFA planning and programmatic goals.

Responsible International Grant Manager	B. A. Carteret
Responsible TIM	T. R. Thomas
CMST Responsible Point of Contact (POC)	G. J. Bastiaans (Ames Lab, Iowa State University)

The Engineering and Design Services and Characterization Projects organizations will provide project oversight as well as technical leadership and support in the development, review, and approval of design criteria, site safety, and operational documentation. R. M. Boger is the EM-50 TTP Principle Investigator (PI). CHG will also provide cognizant engineering and design authority functions.

Principle Investigator and Manager	R. M. Boger (NHC)
Design Authority	G. P. Janicek

Cognizant Manager  
Cognizant Engineer

J. S. Schofield  
R. G. Brown

COGEMA Engineering will provide engineering services for managing the tasks associated with this project and engineering support during the design, fabrication, and testing of the MVDSS and ATAS. COGEMA Engineering will prepare documentation as specified in this ETP for review and issuance.

Responsible Manager  
Responsible Engineer  
Responsible Engineer

J. D. Criddle Jr.  
F. R. Reich  
G. W. Wilson

The CHG Data Assessment and Interpretation (DAI) group will provide support in the development and approval of criteria and test simulant documentation.

DAI, Cognizant Manager  
Technical POC, Geologist

J. G. Field  
A. W. Templeton

Safety, quality, environmental, and operations reviews of documentation as required to support this activity will be provided by the following:

Field Sampling, Manager  
Safety, Plant Engineer  
Quality Control, QC Engineer  
Environmental Engineering, Plant Engineer

J. F. Sickels  
L. A. Flowers  
M. L. McElroy  
L. L. Penn

The administrative POC for EM-50 TFA will be through the Fluor Hanford, Inc. (FH) Technology Management Office. The FH point of contact will provide site administration while the point of contact for reporting will be through the CHG Strategic Planning (SP) office.

SP, Program Manager  
Administrative POC

J. O. Honeyman, CHG  
S. K. Foreman, FDH

The CHG SP and the CHG Interface Process Team (IPT) Coordination will provide interface information for the vitrification project that the sampling system will be used to support after hot deployment is completed.

IPT Project/Program Manager

K. A. Gasper, CHG

AEA Technology will perform the necessary testing and design of the fluidic sampling system and RCRA compatible bottle filling chamber.

Responsible POC  
Technical POC

P. Murray, AEAT  
M. C. Williams, AEAT

## **6.0 SCHEDULE**

The estimated schedule for the MVDSS and the ATAS is provided in Attachment A. The schedule shows current year (FY 2000) and outyear activities. The tasks and activities with this schedule will result in a MVDSS with an ATAS ready to support waste treatment and immobilization in early FY 2005. However, the schedules for engineering, fabrication, and testing are dependent upon many variables, including funding, and therefore may be subject to change. The CHG team will closely manage these tasks and will report any potential schedule issues to the appropriate management. The estimated schedule will be updated each fiscal year when this ETP is updated. The schedule will show more details for the current year. Task milestones and deliverables are summarized in Section 2.2. The engineering tasks for each fiscal year in the estimate schedule are in Section 4.3.

## **7.0 COST ESTIMATE**

The estimated costs to complete the activities for this ETP are shown in Table 1 and Table 2. Table 1 shows the FY 2000 estimated costs. Table 2 contains an overall summary of the total development and deployment costs through FY 2004, as identified in the deployment strategy and plan (RPP 2000a), for deploying sampling systems in the LAW feed staging tanks. Both tables show the funds that will be provided from EM-50 TFA and IP programs and from the EM-30 RPP program. Table 2 also shows the transition from EM-50 to EM-30 funding; in FY 2003 and 2004 the required funding would be provided totally by EM-30. The costs shown in this table are dependent upon many variables and, as such, are not "fixed price" estimates. However, they do reflect the resource loaded schedules for the RPP. The CHG team will manage the task closely and report any cost issues to the appropriate management.

As indicated above, the EM-50 FY 1999 carryover funds were used to fund the CHG team to complete FY 1999 carry over activities. The carry over tasks included revising and issuing the deployment strategy and plan document, witnessing the Phase II testing originally scheduled to be completed by AEAT in FY 1999, identifying organic spike simulants for the AEAT Phase III organic de-gassing testing with the fluidic pump charge vessel, and providing for the CHG team review of the AEAT Phase III de-gassing test implementation plan. These activities have been completed prior to issuing this ETP revision.

## **8.0 CONFIGURATION MANAGEMENT**

The portion of the task to be completed in FY 2000 is being performed in accordance with the development control process (RPP 1999). Drawings that will be developed by AEAT and the CHG team for the pre-conceptual and conceptual design tasks will be prepared as Hanford H-2 drawings. Any modifications needed to the design media after the initial approval will be done per the following "redline" process. The redline change is approved after representatives from CHG have signed the change. Once approval has been obtained for the change, the master copy of the design media with the redline will be updated. The purpose for following this procedure is to maintain configuration control of the tested equipment, thereby maintaining the facility use potential of the equipment. Any changes made to the equipment must be approved before initiating cold testing.

In FY 2003 (following fabrication), the development control process will transition to configuration control before equipment turnover to CHG Operations. This means that design media will be created in accordance with Hanford Policy and Procedures for development of drawings and Vendor Information files (CHG 2000d and RPP 1999). After configuration control has been established to the requirements of HNF-PRO 1819, changes in the configuration will be controlled through the ECN process (RPP 1999, CHG 2000d, and HNF 1999a). Any new drawings associated with this task will be categorized as essential, support, or information, as required by HNF-PRO-1819 (RPP 1999). Approved design media must be created before installation of the components in a Hanford waste tank.

## **9.0 QUALITY ASSURANCE**

Subcontractors supplying parts or services for the development, design, and fabrication of the MVDSS and ATAS shall implement a documented quality assurance program that meets the appropriate requirements of 10 CFR 830, "Nuclear Safety Management, Subpart A, General Provisions, Section 830.120, Quality Assurance Requirements," Code of Federal Regulations. The program shall be submitted to CHG Engineering Design Services Management for review and approval prior to initiation of work. CHG also reserves the right to review and assess the subcontractor's program or program implementation at any time. As a minimum, the subcontractor's quality assurance plan will include and have controls for

- personnel training and qualification
- documentation and records
- design
- work processes
- inspection
- acceptance testing.

All documentation (ECNs, etc.) associated with this task that will be released as RPP documents will be assigned approval designators by the responsible engineer, with concurrence from the cognizant manager. The approval designator will be determined from Table 1 of RPP-PRO-233 (CHG 1999b). Those documents given an approval designator "Q" will be reviewed and approved by Quality Assurance as required by RPP-MP-600 (CHG 2000e).

## **10.0 SAFETY**

All documentation (ECNs, etc.) associated with this task will be assigned approval designators by the responsible engineer with concurrence from the cognizant manager and design authority. The approval designator will be determined from Table 1 of RPP-PRO-233 (CHG 1999b). Those documents given an approval designator "S" will be reviewed and approved by Safety.

A preliminary hazards assessment will be performed in FY 2001 after the system design is clearly defined. The assessment will be revised in FY 2002 and a revised hazards assessment document issued. Although the RPP waste tanks have been determined to have a very low

probability of a criticality accident (not credible finding), a criticality assessment will have to be completed with the MVDSS and ATAS. The preliminary hazards assessment will be used to perform USQ screenings/determinations against the current tank farm AB (LMHC 1999d and LMHC 1999f). The outcome of these USQs will determine the work necessary to encompass this activity in the tank farm AB. This work will be performed in accordance with RPP-PRO-700 (CHG 2000f) and RPP-PRO-704 (CHG 2000g). The preliminary hazards assessment will be revised in FY 2002.

## **11.0 ENVIRONMENTAL**

All documentation (ECNs, etc.), associated with this task, will be assigned approval designators by the responsible engineer with concurrence from the cognizant manager and design authority. The approval designator will be determined from Table 1 of RPP-PRO-233 (CHG 1999b). Those documents given an approval designator "E" will be reviewed and approved by Environmental Compliance.

## **12.0 SYSTEMS ENGINEERING**

This ETP defines the necessary work required to achieve completion of testing, design, and fabrication of the MVDSS and the ATAS. These activities have been added to the Work Breakdown Structure (WBS) (WBS 2.01.1.06.04.04.10 for EM-50 funding and WBS 1.01.01.012.01.03.01.09 for EM-30 funding). The purpose of including the scope of work to deploy this system in a DST is based upon the expectation that the system would eventually supplement or replace the currently planned grab sampling method of sample retrieval. A systems engineering assessment will be completed in FY 2002, in accordance with CHG procedures (CHG 1999c) to document the decision on whether or not to incorporate the system into the baseline for deployment in a Phase 1 waste feed source or feed staging tank. Milestone T01-01-108 has been added for completion of this task (this is also the TFA Technology Insertion date). The Alternatives Generation and Analysis (Claghorn, et al. 1997) will be revised to incorporate development and cold testing results of the sampling system. A decision plan will be prepared that will produce a decision of whether to proceed with the deployment of the MVDSS and ATAS to either supplement or replace the current grab sample baseline approach. The decision analysis will be completed in accordance with HNF-IP-0842 (CHG 1999c) and the plan will be implemented upon approval of the decision-maker (to be determined), and concurrence from the DOE Richland Operations Office (RL).

## **13.0 CLOSEOUT COSTS**

Should this project be prematurely terminated in FY 2000, funds would be required to document the work status of the incomplete tasks, collect and sort the documentation, and file incomplete work in a retrievable format. It is estimated that COGEMA Engineering would require between \$15,000 and \$20,000 to perform this closeout activity which would be dependent upon the progress made toward project completion before termination notice. This section will be updated for follow-on years as detailed planning is performed and this ETP is updated.

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Table 1. Estimated Cost Distribution of FY 2000 Funds

Task	Funding Source (\$000)			
	EM-30	EM-50 TFA	EM-50 IP (AEAT)	EM-50 CMST (NETL)
1. Project Management	120	3.5		
2. Revise Engineering Task Plan	35			
3. Revise Level 2 Component Specification Document	30			
4. Pre-Conceptual Designs for the Sampler and At-Tank Analysis System	55			
5. Initiate Technical Support with NETL Vendor Call Package	20			
A-1 Phase II and III Testing and Test Support	15	35 + 22 <sup>1</sup>	218	
A.2 Conceptual (Outline) Design of Mobile, Variable Depth Sampler System Platform		146		
A.3 Review of Conceptual (Outline) Design of Sampling System.		17		
A.4 At-Tank Analysis System Document		13.5		
A.5 Revise Deployment Strategy and Plan Document		16 <sup>1</sup>		
Conceptual (Outline) Design of Fluidic Sampler and RCRA Compatible Filling Station			168	
Initiate Procurement Call For Detailed Design Contract Vendor Contract				? <sup>2</sup>
<b>Totals</b>	<b>275</b>	<b>215 + 38<sup>1</sup></b>	<b>386</b>	<b>?<sup>2</sup></b>

Notes: (1) FY 1999 Carry over funds of \$38K.

(2) Funding for NETL from EM-50 is not known

Table 2. EM-30 and EM-50 Estimated Total Budgets

Organization	EM-50 (\$000)				
	FY-00	01	02	03	04
CHG	250	250	150		
AEAT	386	175	70		
NETL	0	600	1100		
EM-50 Sub-Total	636	1025	1320		
	EM-30 (\$000)				
CHG	275	436	935	1761	620
<b>TOTAL</b>	<b>911</b>	<b>1461</b>	<b>2255</b>	<b>1761</b>	<b>620</b>

APPENDIX A

SUMMARY SCHEDULE OF ACTIVITIES

Mobile, Variable Depth Sampler - RL08WT22		1999				2000				2001				2002				2003				2004				20
ID	Task Name	Start	Finish	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018			
1	FY 2000 Tasks:			10/01	10/01																					
2	1-Project Management	Fri 10/01/99	Fri 10/01/99																							
3	Status Reports	Fri 10/01/99	Fri 09/29/00																							
4	Quarterly reports to EM-50	Fri 10/01/99	Fri 09/29/00																							
5	2-Engineering Task Plan	Mon 05/15/00	Fri 09/08/00																							
6	Revise ETP	Mon 05/15/00	Mon 06/19/00																							
7	Review and approval	Tue 06/20/00	Tue 08/29/00																							
8	Issue engineering task plan	Wed 08/30/00	Fri 09/08/00																							
9	3-Level 2 Component Specification	Mon 07/03/00	Fri 09/29/00																							
10	Revise Level 2 Component Spec	Mon 07/03/00	Fri 09/08/00																							
11	Review and approval	Mon 09/11/00	Fri 09/29/00																							
12	Issue Rev. 2 level 2 component spec.	Fri 09/29/00	Fri 09/29/00																							
13	4-Pre-Conceptual Design Sampler & At-Tank Sys	Tue 05/16/00	Fri 07/28/00																							
14	Identify Design Team Members and Design As	Tue 05/16/00	Tue 05/16/00																							
15	Draft Sampler Platform Pre-Conceptual Design	Tue 05/16/00	Mon 07/17/00																							
16	Complete Pre-Conceptual Sampler Platform De	Mon 07/17/00	Fri 07/28/00																							
17	Transmit pre-conceptual design to AEAT.	Fri 07/28/00	Fri 07/28/00																							
18	Draft At-Tank Pre-Conceptual Design	Tue 05/16/00	Mon 07/17/00																							
19	At-Tank Analysis Pre-Conceptual Design	Tue 07/18/00	Fri 07/28/00																							
20	Complete At-Tank Pre-Conceptual Design	Fri 07/28/00	Fri 07/28/00																							
21	(Task being modified) 5-Initiate Tech Transfer call wi	Fri 08/04/00	Fri 09/29/00																							
22	NETL Interface & prep of SOW package	Fri 08/04/00	Fri 09/29/00																							
23	Complete SOW Package	Fri 09/29/00	Fri 09/29/00																							
24	A-1 Phase II & Phase III Test Support	Fri 10/01/99	Fri 09/29/00																							
25	Phase II Test Support	Fri 10/01/99	Fri 02/11/00																							
26	Review Phase II Test Plan	Fri 10/01/99	Mon 11/01/99																							
27	Witness Testing	Mon 01/24/00	Fri 01/28/00																							
28	Test report & comment Resolution	Mon 01/31/00	Fri 02/11/00																							
29	Phase III Test Support	Mon 01/03/00	Fri 09/29/00																							
30	Identify Phase III Simulant	Mon 01/03/00	Tue 02/29/00																							
31	Review Phase III Test Plan	Tue 03/14/00	Mon 05/15/00																							
32	AEAT Completes Phase III Test Plan	Tue 03/14/00	Mon 05/15/00																							
33	A.1 Complete review & approve Phase III	Mon 05/15/00	Mon 05/15/00																							
34	Witness Testing	Mon 07/03/00	Mon 07/03/00																							







APPENDIX B

ACCEPTANCE FOR BENEFICIAL USE FORMS

ACCEPTANCE FOR BENEFICIAL USE (ABU)					
1. Document Title: ENGINEERING TASK PLAN FOR THE DEVELOPMENT, FABRICATION, AND DEPLOYMENT OF THE MOBILE, VARIABLE DEPTH SAMPLER AND AT-TANK ANALYSIS SYSTEM.			2. Engineering Task No. TBD		
3. Document No. HNF-2056, Rev. 2	E3	5. SSC Designator TBD	6. System/ Bldg/Facility 200General	7. Equip/ Component No.	8. ECN/EDT No. EDT
9. Final ABU ( )      Partial ABU ( )			10. ATP Rerun Required      ( ) Yes      ( ) No		
11. Description of Work					
12. Description of Work to be Completed		13. Scheduled Completion Date	14. Responsibility for Completion	15. Impact on Operations/Safety	
See Section 4.0 and 4.3 of HNF-2056		TBD	TBD	Mobile, variable depth sampler and at-tank analysis system installation/operation in accordance with the Authorization Basis and State operating permits.	

16. Documents or Other Items/Tasks to be Updated	17. Fund Source	18. Doc #	19. Responsibility for Completion	20. Required prior to final ABU (Yes/No)
<u>TRAINING:</u>				
• Training manuals ( )				
• Training to Operating Crews (x)		TBD	TBD	Yes
• Training to Maintenance Crews ( )				
<u>ENGINEERING:</u>				
• Engineering Procedure ( )				
• Final Safety Analysis Report (FSAR)( )				
• Safety Assessment (SA) ( )				
• Safety Basis Documentation (x)		TBD	TBD	Yes
• Level 2 Component Specification/Functional Design Criteria (FDC)(x)		TBD	F.R. Reich	Yes
• Conceptual Design Report (CDR) ( )				
• Supplemental Design Requirements Document (SDRD) ( )				
• System Design Description (SDD) (x)		TBD	F.R. Reich	No
• Test procedures/specifications (x)		TBD	J.S. Schofield	Yes
• Safety Equipment List (x)		TBD	TBD	Yes
• Environmental Impact Statement ( )				
• Environmental Report ( )				
• Environmental Permit (x)		TBD	TBD	Yes
• Stress/Seismic Analysis ( )				
• Stress/Design Report (x)		TBD	TBD	Yes
• Equipment Specification ( )				
• Procurement Specification (x)		TBD	TBD	Yes
• Construction Specification ( )				
• Essential Material Specification ( )				
• Technical Specification ( )				
• As-built Drawing (x)		TBD	TBD	No
• Interface Control Drawing ( )				
• Computer Software ( )				
• Design Compliance Matrix (x)		TBD	TBD	Yes

16. Documents or Other Items/Tasks to be Updated	17. Funding Source	18. Doc #	19. Responsibility for Completion	20. Required prior to final ABU (Yes/No)
<u>OPS:</u>				
• Operating and Maintenance Manuals( x		TBD	TBD	Yes
• Operating Procedures ( x )		TBD	RG Brown	Yes
• Operation Instructions ( )				
• Calibration Procedures ( x )		TBD	TBD	Yes
• Preventative Maintenance Procedures( x		TBD	RG Brown	Yes
• Operations Safety Requirements ( )				
<u>QA:</u>				
• Inspection Plan ( x )		TBD	TBD	Yes
• QAPP ( )				
• QAP JP ( )				
• NEC Inspection ( x )		TBD	TBD	Yes
<u>PROCUREMENT ACTIVITIES:</u>				
• Vendor Information ( x )		TBD	TBD	No
• Material List ( )				
• Spare Parts ( x )		TBD	JS Schofield	No
• Purchase Requisition ( )				
• ALARA Management Worksheet ( )				
• Other Commercial Grade Item forms( x )		CGI Forms	TBD	Yes

Signature	Date
<u>OPERATIONS AND ENGINEERING</u>	
Cog/Field Engineer	<hr/>
Cog/Field Mgr.	<hr/>
QA DC Board	<hr/>
Safety JS Ranschau	<hr/>
Projects Characterization	<hr/>
Modification Projects	<hr/>
Characterization Ops	<hr/>
Design Engineer/Agent	<hr/>
Design Authority	<hr/>