

[DOE-RL LETTERHEAD]

June 1, 1994

94-OCH-019

The Honorable John T. Conway
Chairman
Defense Nuclear Facilities Safety Board
Suite 700
625 Indiana Avenue, NW
Washington, D.C. 20004

Dear Mr. Conway:

TRANSMITTAL OF WESTINGHOUSE HANFORD COMPANY DOCUMENT TITLED "TANK WASTE REMEDIATION SYSTEM BLIND SAMPLE PROGRAM PLANS", WHC-SD-WM-PLN-084, Rev. 02, IN ACCORDANCE WITH COMMITMENT 1.9 OF THE DEPARTMENT OF ENERGY IMPLEMENTATION PLAN FOR BOARD RECOMMENDATION 93-5.

The [enclosed](#) Westinghouse Hanford Company (WHC) document was prepared to assist the Department of Energy, Richland Operations Office (RL) in improving the performance of characterization activities conducted by Tank Waste Remediation System (TWRS) organization at the Hanford site. It is being forwarded to you for appropriate use for you and your staff.

The subject document was reviewed by RL. The addition of the blind sample program to the existing sample exchange/evaluation program will establish a periodic independent blind sample check of all laboratories supporting tank characterization. The development of the blind sample plan fulfills the requirement of the Implementation Plan 93-5 commitment. In an effort to improve future revisions of the plan, RL has provided comments to WHC. A copy of the RL comments (letter # 94-OCH-024) is also enclosed for your information and use.

If you have any questions please contact myself or John M. Clark, Acting Manager of the TWRS Office of Characterization, on (509) 376-2246.

Sincerely,

T. R. Sheridan, Acting Program Manager
Office of Tank Waste Remediation System

Enclosure

cc w/encl:
K. Lang, EM-36, HQ
C. Defigh-Price, WHC

TANK WASTE REMEDIATION SYSTEM

BLIND SAMPLE PROGRAM PLAN

Prepared for the U.S. Department of Energy
Office of Environmental Restoration
and Waste Management

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LIST OF ACRONYMS

DNFSB	Defense Nuclear Facility Safety Board
DOE/RL	Department of Energy/Richland Field Office
PNL	Pacific Northwest Laboratory
QA	quality assurance
QC	quality control
TWRS	Tank Waste Remediation System
WHC	Westinghouse Hanford Company

1.0 INTRODUCTION

This Plan describes the Tank Waste Remediation System approach to meeting the Defense Nuclear Facilities Safety Board (DNFSB) Commitment 1.9 for developing a plan for blind samples (DOE/RL, 1994). The Tank Waste Remediation System proposes to use a program already in existence, namely the Sample Exchange/Evaluation Program (herein after called the Exchange Program). It is believed that the Exchange Program is responsive to the needs

of DNFSB commitment 1.9. The following sections provide detail in the mechanics of the Exchange Program.

2.0 SAMPLE EXCHANGE/EVALUATION PROGRAM DESCRIPTION

The Exchange Program was developed as a cooperative effort by the Westinghouse Hanford Company (WHC) Analytical Services and the Pacific Northwest Laboratory (PNL) Analytical Chemistry Laboratory (ACL), herein after called the Exchange Program Committee, to compare analytical laboratory performance on sample materials unique to the Hanford Nuclear Reservation. The program originated out of concern regarding the comparability of data between laboratories supporting the Tank Waste Remediation System. It was recognized that WHC 222S and PNL ACL did not use the same analytical procedures for all measurements. Furthermore, the blind performance evaluation programs performed by both laboratories were not treated similarly to most Hanford samples. The performance evaluation programs therefore gave limited information regarding laboratory capability in dealing with the complex samples on Site. The Exchange Program was developed as a mechanism for the Hanford Site to assess its analytical capabilities using actual Site waste material.

The Exchange Program Committee is made up of quality and program oversight personnel. The quality assurance representatives report directly to top laboratory management. Independence is further enhanced by the joint ownership of both Westinghouse Hanford Company and Pacific Northwest Laboratory in the Program. Each organizational representative plays a role in maintaining the integrity of the Exchange Program.

The Exchange Program strategy fulfills dual roles as a methods comparison/performance evaluation tool and as a continuous improvement vehicle via the time-phased blind sample exchanges between the participating laboratories. These exchanges are phased to test comparability of analytical methods, sample preparation procedures, and sample homogenization procedures. Besides the exchange of single blind sample materials, single blind QC standards are traded to benchmark analytical performance on the various methods being evaluated. Data from the blind sample and standard exchanges are used to evaluate method comparability between the participating laboratories. This approach is consistent with that identified in "Quality Assurance Guidance for The Integrated Performance Evaluation Program of EM Environmental Sampling and Analysis Activities" (EM-263 DOE, December 1993). Data and systems evaluations of each phase of the blind sample/standard exchanges lead to improvements in both analytical laboratory operations and the Exchange Program itself.

The program maintains the single blind aspect of its sample/standard exchanges in the following ways:

- Hanford Matrix samples to be used in each Phase of the Exchange Program are carefully selected by the Exchange Program Committee. Actual tank waste material containing analyses of interest at measurable concentrations are selected from current tank material archive inventory for use as single blind (tank origin not known to receiving laboratory) matrix samples.

- Different tank material is chosen for each new Phase.

Once selected the samples are prepared and distributed under guidance provided by the Exchange Program Committee; sample identification is changed and sample origin data is not forwarded to the laboratories. The Exchange Program Committee retains this information in secure files, access is limited to Committee members only.

- Single blind QC standards are prepared under direction of the Exchange Program Committee. The "true" values associated with these standards are maintained similarly to the samples in a secure file.

As in Phase II, all tank material is completely reprocessed making comparison to previous work less useful. Additionally, the laboratories are requested to report results based on the extract concentration. This makes it harder for the laboratory to compare data to past results which were reported on the original sample basis.

The combination of all of the factors above make it exceedingly difficult for the analyst to use historical data to obtain a "nominal" value.

Each phase of the Exchange Program is carefully planned and documented by the Exchange Program Committee. Documentation for each phase is maintained in a Test Plan. The Test Plan describes Phase objectives (i.e. compare radiochemical methods, compare inorganic methods, compare preparation methods, etc...) and provides guidance for evaluation criteria for each method. Currently the Exchange Program Committee is scheduling to run two to three Phases of the Exchange Program, including blind samples, each fiscal year. Each phase will provide additional data points which can then be used to identify problems and trend progress on each method evaluated.

The process used by the Exchange Program Committee to achieve these ongoing improvements is as follows:

- Hanford matrix samples and QC standards are distributed as single blinds to each participating laboratory.
- Results from each requested analysis are compiled by each laboratory and forwarded to the Analytical Services, Technical and Quality Oversight participant on the Exchange Program Committee.
- A simple evaluation based on statistical significance is applied to the data to flag possible outliers. A pre-determined evaluation criteria is documented in a Test Plan written for each individual phase of the program.
- Outlier data is investigated by the Exchange Program Committee to decide if a possible source of error can be found within the data.
- If no obvious source of error is found, the cognizant scientists, involved in the analysis, are asked to participate in the investigation.

- Once a source of error has been found, the Exchange Program Committee prepares a corrective action recommendation for submission to each laboratory's management and the TWRS Characterization Program. This corrective action recommendation is found in each Phase's final report.
- If a source of error still cannot be identified, then the analysis in question will receive additional attention in subsequent Phases of the Exchange Program. The process of identifying errors will be iterative as more data is obtained.

3.0 PROGRAM ACCOMPLISHMENTS

Currently the first two phases of sample exchanges have been completed. In Phase I, core material was fused by each laboratory, the fusion preparations were exchanged by the laboratories and analyzed using various radiochemical analytical methods. Besides the fused core material, a blind radiochemical standard was distributed to each laboratory. A final report of the findings from Phase I has been issued to DOE/RL (QA/QC Triad¹, 1993).

Phase II expanded the scope to include water leach, acid digest, and fusion preparations of Hanford Tank Core Samples. Again these preparations were submitted as single blinds to each laboratory. In addition, samples were submitted in quadruplicate (for more accurate statistical analysis of the data) and submitted for both inorganic and radiochemical evaluation. A letter report of the findings from Phase II has been issued to the DOE/RL (Defigh-Price, 1994).

4.0 PROGRAM FUTURE GOALS

The next phase of sample exchange (Phase III) is currently being planned. Phase III will further expand the Program investigation into sample preparation methods. In Phase III, homogenized tank core material will be prepared. The tank core material will be prepared using each of three methods (water leach, acid digestion, and fusion). Comparison of the analytical results will enable the Exchange Program Committee to compare the sample preparation methods used.

Future Phases of the Exchange Program may be used to evaluate Tank Core homogenization methodologies, organic analyses (on intact material), and new analytical technologies as they are brought on line. Additional areas of program growth include evaluation of critical methods as determined by various TWRS Program drivers (i.e. DQO's, Safety Screening Issues).

Other offsite DOE laboratories may be included in future sample/standard exchanges if called upon to help in the characterization of Hanford tank wastes.

5.0 CONCLUSIONS

The Exchange Program provides for both a blind QA sample evaluation of Hanford Specific material and performance evaluation on blind QC standards. The program also provides additional value to the participating laboratories through its continuous improvement

component. As it is currently scoped, the continuation of the Program fulfills the requirements of DNFSB Commitment 1.9 (DOE/RL, 1994).

6.0 REFERENCES

DOE/RL, 1994, *Recommendation 93-5 Implementation Plan*, U.S. Department of Energy, Richland, Washington.

QA/QC Triad, *Sample Exchange/Evaluation (SEE) Program Phase I Report, Rev 0.*, 1993.

Defigh-Price, C., 1994, Letter to J. M. Clark, "Defense Nuclear Facilities Safety Board Milestones Commitment 5.5 of the Reference, 'Issue a Report on Results of the Sample Exchange Phase II'.", dated March 31, 1994.

¹Exchange Program Committee