

[DOE-RL LETTERHEAD]

JUN 23 1994

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 "[CUSTOMER NEEDS ANALYSIS](#)", IN ACCORDANCE WITH COMMITMENT 6.1 OF THE DEPARTMENT OF ENERGY IMPLEMENTATION PLAN FOR BOARD RECOMMENDATION 93-5.

Reference: "Characterization Data Management Process Improvement Work Plan," WHC-SD-WM-WP-276, Rev. O, May 1994.

The enclosed Westinghouse Hanford Company (WHC) letter (#9453038, dated April 29, 1994), with enclosure has been reviewed by Department of Energy, Richland Operations Office (RL). The subject document fulfills the requirements of the Recommendation 93-5 Implementation Plan commitment. This document identifies the customers of the Characterization Program and their needs; and will serve as a basis for evaluating the Characterization Program's ability to meet its customers needs.

In the enclosed letter, WHC stated that the subject document was to be included as an attachment to a Data Management Improvement Plan to be completed by May 31, 1994. WHC has since issued the above referenced plan with the subject document attached.

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,

[Kenneth W. Brown for]
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, w/o encl.

CUSTOMER NEEDS ANALYSIS

1.0 INTRODUCTION

1.1 PURPOSE OF DOCUMENT

This document addresses the internal and external customer needs and problems encountered to date in obtaining tank waste characterization information. An assessment of the current state of characterization data management is presented with recommendations from the customers on proposed improvements for characterization data dissemination. The prime and secondary customers are identified as are their specific concerns and needs for characterization data.

1.2 SCOPE OF DOCUMENT

This document will provide a definition of the needs of the tank waste Characterization Program and their customers for information and data management. The intended audience of this analysis is the tank Characterization Program and its customers. The results of this analysis is based on the collaboration with both internal and external customers, and the review of existing documents. This document also describes the following:

- The mission and responsibility of the Characterization Program;
- Functional relationships of the customers with the Characterization Program;
- Information flows between Characterization Program and the customer.

The mission of the TWRS Characterization Program is providing waste tank characterization data and information to our customers. This document describes the problems, issues and needs associated with the reporting, distributing, and archiving of waste tank Characterization information and data.

2.0 CHARACTERIZATION PROGRAM AND CUSTOMERS

2.1 THE CHARACTERIZATION PROGRAM'S MISSION

The following characterization program mission, goals, and objectives were identified in "Waste Tank Safety, Operations, and Remediation Strategic Plan" (Humphreys and Morgan, 1993, WHC-EP-0501).

The Characterization Program mission is to provide, in a timely and cost effective manner, required characterization data of appropriate quality to Tank Waste Remediation System program elements. This includes providing characterization data to complete or support *Hanford federal Facility Agreement and Consent Order* (Tri-Party Agreement) milestones.

2.2 THE CURRENT STATUS OF CHARACTERIZATION INFORMATION

Currently, the Characterization program has a large quantity of information and data in the form of documents, laboratory analysis, data sheets, and tank characterization reports. Approximately 1,500 documents are stored in 2750E (within file cabinets in the Characterization Support group.) Other data are located throughout the site in staff files or in long term storage. A database is being established for storing newly generated characterization data information. It is called the Tank Characterization Database (TCD). The Tank Characterization Database can be accessed through Tank Waste Information Network (TWINS). Presently, information on thirteen waste tanks have been added to Tank Characterization Database. The schedule for adding information from more waste tanks will continue throughout 1994. Additionally, normalized Track Radioactive Components (TRAC) data and Safety Analysis database will be added to these databases.

2.3 CHARACTERIZATION CUSTOMERS

The Characterization Program has both internal and external customers. The internal customers, identified as Westinghouse Hanford organizations and other Hanford contractors, need tank characterization data to perform their daily tasks. The external customers are composed mostly of agencies and oversight groups. These groups sometimes focus on the Characterization Program, but in general they view characterization as key input to be able to evaluate other TWRS activities, such as retrieval, pretreatment, or disposal plans.

The customers of the Characterization Program were contact via cc:mail, telephone conversation, and direct meetings. There were approximately 30 customers (organizations, groups, etc.) contacted for this survey. The primary means of communication was to use cc:mail and send a questionnaire to survey a list of known and potential customers. This cc:mail questionnaire was sent on March 10, 1994. Each point of contact was given until the close of business March 18, 1994 to respond to the questionnaire. During the time between March 10 and March 18, points of contact who had not responded to the cc:Mail was either contacted by telephone or direct meetings. The questionnaires used in this survey are presented in Appendix C.

Each identified customer organization had at least one point of contact. A total of 75 points of contact were contacted using cc:mail, with a 61.3 percent response rate (46 responses) supplying input to the customers need analysis. The customers with more than one point of contact took the option of allowing one or two points of contact to represent their group's input for this survey. The number of points of contact that took this option was approximately 26 or 34.7 percent. The remaining 4.0 percent gave responses via telephone conversations or direct meetings, expressing little or no interest in characterization information or data. These customers will be listed as indirect or potential customers of the Characterization Program.

The results from the customer survey yielded the following:

INTERNAL CUSTOMERS

<u>Customers</u>	<u>Point of Contact</u>	<u>Data Use:</u>
Tank Farms Environmental Engineering	C. H. Mulkey	Evaluate compliance with regulatory requirements and waste compatibility.
Nuclear Safety Standards and Requirements	D. O. Hess	Determine what radionuclides chemicals may have been introduced into the cribs and ditches associated with tank farm activities.
Waste Tank Operations	G. L. Dunford	Perform chemical content analysis for tank waste.
	D. P. Reber	Perform compatibility verification and engineering analysis on physical properties of tank waste.
Health Physics Programs	D. D. Beers	Prepare Safety Analysis Report support, occupational worker radiological protection support, environmental protection support.
TWRS Health Physics Technical Support	P. A. Olsen	Perform dose calculations and for contamination level estimations.
Waste Tank Safety Assurance	M. N. Islam	Aid in review and approval of safety-related documents and work associated with waste tanks.
Hanford Analytical Services	J. L. Deichman	Perform waste tank safety analysis and laboratory analysis to make analytical chemistry management decisions.
TWRS Environmental Engineering	G. M. Crummel	Obtain potential emissions (NESHAP/RCRA reporting).
Double Shell Tank Safety Analysis	R. J. Van Fleet	Safety Analysis Reports and other safety documents.
TWRS Projects	B. K. Horsager	Designing Pretreatment Processes to be in the Initial Pretreatment Module.
Safety and Environmental Advisory Council	D. D. Wood	Total tank or class inventory. Performance assessment and negotiation with the NRC over split between high level waste and low level waste
Waste Transfer Projects	D. V. Vo	Corrosion evaluation and to revise the Function Design Criteria for the cross site transfer lines replacement project.
Criticality and Radiological Safety Analyses	B. E. Hey	Calculate unit doses for the tank farms, as a basis for shielding analysis, ALARA.
TWRS Safety Engineering	W. L. Cowley	Safety Analysis for Tank Farms.
East Systems Engineering	R. A. Dodd	Verify compliance with Operational Safety Document specification, establish calculated fissile inventories, identify waste transfer

		compatibility, development of transfer flow sheets.
TWRS Process Engineering	M. J. Kupfer	Inventory and flowsheet preparation for the Technical Options Report.
Process Laboratory Technology	L. Jensen	Perform a statistical analysis of the waste tank sample data.
Flammable Gas Tank Safety	G. D. Johnson	Access overall behavior and to determine if a tank exhibits the characteristics that would make it a Flammable Gas Tank.
Ferrocyanide Safety Program	J. E. Meacham	Determine the potential for ferrocyanide reaction in Hanford Site tanks.
PNL Waste Tank Safety Program	J. W. Brothers	Flammable gas safety, data analysis and evaluation.
PNL Chemical Process Development	G. F. Schiefelbein	Verify contents of ferrocyanide tanks; determine the character of ferrocyanide waste tanks.
PNL Hydrogen Mitigation Project	C. W. Stewart	Estimate physical and thermal properties of different layers in the tank. Also, to estimate heat generation rates versus position.
PNL Environmental Information Technologies Group	S. F. Bobrowski	Implement the Tank Characterization Database system.
PNL Analytic Sciences Department	B. A. Pulsipher	Determine sampling requirements, data quality assessments, tank clustering, estimate spatial, sampling, and analytical uncertainties.
PNL Waste Tank Organic Safety Project	R. M. Bean	Make project management decisions, plan research strategies, and plan new work strategies.
PNL Experimental Project	P. J. Mellinger	Determine physical properties used in establishing and verifying waste simulants.

EXTERNAL CUSTOMERS

<u><i>Customers</i></u>	<u><i>Point of Contact</i></u>	<u><i>Data Use</i></u>
DOE Tanks Advisory Panel	L. Kovach	General technical input for the Tanks Advisory Panel.
DOE Tanks Advisory Panel	D. O. Campbell	Estimate composition, inventories, etc., for processing waste and criticality concerns.
SAIC (DOE-HQ Contractor)	R. S. Daniels	Compatibility of waste streams, validity of safety and environmental assessments, and the closure of Unreviewed Safety Questions.
SAIC (DOE-HQ)	H. G. Sutter	In support of numerous headquarters support

Contractor)
DOE-RL Tanks Waste J. R. Noble-Dial
Remediation Systems
Washington State M. Lerchen
Department of
Ecology

tasks.
Make decisions on the tank waste such as
disposal, retrieval, pretreatment, etc.
Regulate waste management under RCRA
and Washington's Dangerous Waste
Regulations and the Tri-Party Agreement.

The customers of the Characterization Program are concerned that tank characterization data management adequately and efficiently track and archive tank waste samples, categorize and store tank waste analytical data, prepare tank characterization data packages, and support reduction, manipulation, and communication of tank characterization data.

3.0 PROBLEMS PAST AND PRESENT

This section addresses the past and present problems and issues from customers of the Characterization Program. An assessment of the current situation and an approach for supporting future data management needs will be presented.

3.1 SCOPE OF PROBLEM

A large volume of tank characterization data has been generated to meet numerous needs on the Hanford site. An increasing need for access to the characterization data for planning, scientific and regulatory purposes from multiple groups both onsite and offsite exists. However, customers and potential customers are experiencing a lack of availability to the characterization data or large volumes of data from which it is difficult to access needed information. Additionally, even if the current data were available, it could be misleading to the customer. There are multiple related systems, data inconsistencies, and lack of integration. Tank characterization data management should address all tank waste data and anticipate future automation of existing manual processes.

Past practices has been for the Characterization personnel to receive information and enter the data manually. Data interpretation methods have not been standardized for visual interpretation of trends.

3.2 CHARACTERIZATION DATA PROBLEMS

The following assessment is compiled from information gathered through current data management related reviews, planning activities, and interviews with individual customers of the Characterization Program. This section addresses common areas of concern, and indicates the problems that may cause these concerns.

The survey was able to present several positive aspects of the current status of characterization data management. The results from the total customer response yielded that 25 percent of the customers did not have any specific problems with tank characterization data. The data sheets, waste tank safety analysis, tank characterization plans and reports, and

laboratory analysis supplied these customers with enough usable data and information to perform their functions.

There were many specific problems summarized in each category below. These categories are listed in order of importance. There were 71 total specific problems, with 30 percent of these data controls and requirements related, 17 percent being data accessibility and availability related, 14 percent data presentation, data quality, and data format related, and lastly 11 percent data interface related. A significant number of customers expressed a need to have user friendly electronic databases available to access tank characterization data.

3.2.1 Specific Concerns and Problems

Specific concerns and problems in the areas of physical measurements, data quality, data controls and requirements, data accessibility and availability, data format, and data interfacing are:

Data Controls and Requirements Problems

- Reports are not timely. For example tank 241-AZ-101 was sampled in 1989 but the customer still has been unable to obtain the final report. Be more timely. Provide the information in a database format. Check for internal consistency of the data before issuing.
- Lack of core recovery and poor analyses of tank 241-T-107.
- Long delays in obtaining core analyses.
- It is sometimes difficult to collect it all, especially when it is issued piecemeal in the form of an original report and later supplements.
- Would like to see a single final report or updated file.
- Physical properties data incomplete or lacking totally.
- Uniform characterization procedures for all samples. Consistent entry into data bases.
- Data spread among disconnected reports and letters. Various units and characterization methods used.
- The database systems now being implemented should help tremendously.
- Prior to 1994, timeliness was a problem, also evaluation of data out of expected range.
- More rapid turnaround of samples and timely data reports, reviewed to ensure quality.
- Expeditious sampling and analysis of all tanks wastes. Enforcement of Data Quality Objective (DQO) process to ensure necessity and validity.

- Inability to know the location of characterization data and information.
- A user friendly electronic database is needed.
- No one place where data are held. Also, formats sometimes make it difficult to pull pertinent data out. Timely access has also been a problem in past.
- Technical Control Documents (TCD) will help, but will monitoring and surveillance data be in TCD? Where will it be located?
- There needs to be a single repository for characterization data. There are too many back corner spreadsheets that are being used as a basis for design and safety analysis. The TWRS data need to have better quality assurance, be kept up to date, and most importantly, be the recognized single source for tank composition and inventory.
- There was no central location for data on sample results for the double and single-shell tanks. This customer hired a consulting company to put together radionuclide a chemical inventory documents for all tanks. It is currently under revision, with an expected release date of June 1994, for Revision 2.
- The customer believes that concerns are being addressed by setting up the Tank Characterization Database at PNL.
- Establish a central collection point or contact which can be used by all interested parties. Spread the word through cc:mail, Hanford Reach, managers meetings, etc. that characterization data have been centralized at a specified location or a certain group/person can provide characterization data.

Data Accessibility and Availability Problems

- Had difficulty finding out what analyses had been conducted on which tanks. Just determining who had the information was difficult.
- Accessing the tank characterization database, and getting data out of it. The customer is completely ignorant about this. Is there a set of instructions?
- The customer would like step-by step instructions as to how to access the tank characterization database directly from my Macintosh. Can Macintosh users use the network?
- Develop an easy access plan to the TCD and implement it.
- The problem so far is determining what information is available and where it can be obtained.
- Time delays and availability.
- The customer usually has to request the data from WHC people who are too busy

resulting in excessive use of their time and a delay before the data are delivered.

- Good tank vapor and gaseous emission data not available.
- Unavailability, especially in the past.
- It is difficult to find the needed data without spending a lot of time trying to locate it.
- Data need to be consolidated and made available electronically.
- Data are not available for all tanks. Also representativeness of sample data.

Data Presentation Problems

- The data did not adequately characterize actual and potential degradation products in tank farm effluents, did not provide actual fractionation factors and did not provide data relating to actual quantities of radionuclides and chemicals that were released to the soil column.
- What is needed is a process description document that describes the chemicals introduced into the tanks and a description of the chemical processes occurring in the tanks based on the radiological and temperature environments present.
- In older data there is often inadequate definition of alpha and transuranic content. Also, uranic mass analysis has been needed, but is usually not available.
- Key samples should be selected for more complete analysis (like mass and unusual isotopes that may be important for certain purposes), but it is too expensive to do everything for all samples. The reported composition units are inconsistent.
- For chemical composition, report them in g-mole/L and provide the estimated total volume for each waste phases. The distributions are limited.
- More sampling. Better models. Continue collecting worthwhile historical data. Establish and maintain an organization whose responsibility is the collection, maintenance, QA, and accessibility of these data such that this organization is recognized as the place to obtain the latest and best available information on Hanford waste composition and inventory.
- Poor core recovery has hopefully already been addressed. The laboratory needs to have ownership of the core analyses and become more involved in understanding the drivers for the analyses they are performing. If they are included in this process, the quality should improve.
- Nickel content serves as a marker for amount of nickel ferrocyanide originally added to tank. The current method approved for determining nickel involves a fusion procedure carried out in a nickel crucible. Although the blanks are negligible, the use of nickel crucibles casts some doubt on the accuracy of the numbers.

- There is a need for characterization data as required by the regulations (RCRA, NESHAP, CAA , EPCRA, etc.)

Data Quality Problems

- Needs quality checks before distributing. Some data showed possible inventories and had to be reanalyzed and revised.
- The lack of usable waste tank characterization data can only be resolved by increased quality waste tank sampling and analysis. There is a need for increased quality waste samples and analysis. There has been a dependence on knowledgeable people outside of the Characterization Program to obtain it for disposal program.
- Quality check by people who have a gut feel for approximate contents, and can spot bad data from past experience and knowledge.
- Improve sample recoveries, avoid contamination, assure good quality analysis.
- Waste tank data quality varies over time. Most information that could explain discrepancies is not easily accessible, and some is only in site people's memories.
- Modernize the data management process; that is electronic media, databases, central storage area, etc. But that requires a data management design-that includes an appropriate development of requirements and life cycle design.
- There is a need for improved emissions data.
- Outliers present meaningless quality indicators or no procedure for use of spike- or blank-corrections.
- Get statistical support within the analytical laboratories by developing and implementing a statistical quality control program within each laboratory. Most of the errors customers catch could be identified early if the analytical laboratory had access to qualified statisticians in house.
- It is only recently that safety analysis have had characterization data, thanks to the efforts of those working on the tank farms interim safety basis (ISB) and Criticality Unreviewed Safety Question (USQ). The problem, and this is not the fault of the present characterization program, is the lack of quality data, or any data for many of the tanks. Much of the characterization data we currently have are based on decades old rock-on-a-bottle-on-a-string sampling. The data also lacks representation of the general tank composition or are obsolete due to later transfers.

Data Format problems

- The customer is unable to obtain data except from reports, and it takes too long to get them.

- Tank farm engineers and people involved with planning waste treatment need a centralized, indexed source of all sorts of information about the tanks, their contents, and the history. The information systems now seem to be fragmented and not well understood (undocumented).
- Assign much more effort than in the past. Problem seems to be thorough indexing. Also, there is much information in personal files, etc. that ought to be assembled so it is understandable and retrievable.
- It would be helpful to get this information updated more often than it is.
- Sample data often hard to interpret. Often multiple inconsistent data from different samples solve the problems.
- The data packages are very cumbersome and not very user friendly. Some of the pages are not copied well, making it very difficult to read (there have been times when pages were missing).
- The packages are not sent out as a complete package. WHC's 222-S laboratory will send out a package on a certain tank and for a specific core. Two or more months later customers receive a package from PNL on that same tank and core, containing a different set of analyses. There has never been any notification from either laboratory or Hanford Analytical Services stating that this package is incomplete and the material from PNL will be delivered at a later date.
- Data Quality Objectives should reduce some of the analytical burden, therefore, the paper stack should diminish also. When data are sent out incomplete, let the customer know that more data will follow later. An explanation of why the remaining data are late would be helpful, especially if the time exceeds the 215 day clock.
- The data packages were developed with specific need, and were not easily understood. It was also not easy to use the information that was presented.
- At a minimum, the analysis should cover process requirements and should verify compliance with the specs.

Data Interface Problems

- The customer sometimes doesn't know what to ask for and we give him the wrong answers.
- Working together to prepare critical documents such as Data Quality Objective and Tank Characterization Plans.
- The laboratory data are not well organized, is in non-standard formats, and is sometimes not available electronically.

- Mandated transmissions of laboratory data to the Technical Control Documents.
- It is very difficult to get the laboratories to release some of their data.
- The major problem is that many times the characterization data TWRS users data conflict with the characterization data being used by the staff in other departments who perform shielding analyses. The reason for the discrepancy is sometimes traced to the different approaches used to derive the data (i.e. flow sheet vs. laboratory sample); however, it has also been traced to transcription errors in the TWRS data.
- The customer has had a problem knowing what data were available for a given tank and where the data could be found.
- Individual responses are shown in Appendix B.

3.2.2 General problems.

Below is a summary of general problems associated with the present condition of characterization data management.

Tank Characterization Data availability to customers

One problem identified is the lack of availability of useful and accurate tank characterization data. This lack of available data apparently stems from limited access, multiple systems lacking proper integration, and the absence of standardized data management procedures. The customers want immediate access to the best available information. Presently, information is not readily available to internal or external customers. Historical and current tank characterization data reside in too many different locations.

In addition, there has been little or no response to requests for characterization information and data for both internal and external customers. Access to these data are needed, but it is often cumbersome or difficult to obtain. Currently data exist in many locations and forms, both hard copies and electronic. Standardization could help provide consistency, but many current systems would exist on the current platform. There are existing systems for obtaining data, but gaining access is difficult. In some cases, multiple approvals are needed. Lack of available data can impact the customer's ability to make decisions and resolve problems and meet regulatory data access requirements.

Data format needs improving

- Historical and current tank characterization data reside in too many different uncontrolled formats and forms.
- The older tank characterization reports are hard to use.
- Quick summaries or easy abstracts, that can be accessed easily are needed.
- Reports have been very thick and cumbersome to use to find critical data.

- Some consistency (notebooks with fixed formats, for example) may be very helpful.

Poor data controls and protection

- The current tank characterization data suffer from a lack of configuration control and management for both data and requirements.
- Characterization Program does not maintain and update a list of its customers that use tank characterization information.
- The existence of database media are not well known, and is difficult for some to access.
- Requirements for characterization data collection, control, and maintenance must be defined to assure the right-data are obtained with traceability, reliability, and availability throughout the data life cycle.
- Processes and requirement for controlling characterization data are not being applied consistently.
- Furthermore, tank characterization data validity checks and official sources of information are not uniformly identified and documented.

Unestablished tank characterization data standards

- Data standards have not been established for much of the tank data.
- The current policies are not sufficient to ensure that required implementations will meet (or even adequately define) future characterization data management needs.

Poor data quality

- The lack of qualification of how the data were produced and the large variability in the quality of characterization data and affects useability.
- Because tank characterization data quality is not uniformly controlled, confidence in the data and information is affected.
- Data incompatibility is also a side effect of the numerous systems and lack of standards.
- In order to ensure the appropriate use of data, and guarantee accurate, reliable data for decision making, information about the quality of the data should be documented.

4.0 CONCLUSIONS

The questionnaire was able to present several positive aspects of the current status of characterization data management. There were data sheets, waste tank safety analysis, tank characterization plans and reports, and laboratory analysis that assisted some customers in performing their functions. There are areas that are in need of improvement. These will be addressed in a Data Management Improvement Plan, written by the Characterization Program in response to Defense National Facilities Safety Board (DNFSB) Commitment 6.2.