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Tank Characterization Project Data Management Plan

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Tank Characterization Project Data Management Plan

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LIST OF TERMS

BOA	Basic Ordering Agreement
DOE	U.S. Department of Energy
DNFSB	Defense Nuclear Facilities Safety Board
DQO	Data Quality Objectives
EPA	U.S. Environmental Protection Agency
FR	Functional Requirements
HISI	Hanford Information System Inventory
HLAN	Hanford Local Area Network
HTCE	Historic Tank Contents Estimate
ICF KH	ICF Kaiser Hanford Company
LABCORE/LIMS	Labcore/Laboratory Information Management System
LATA	Los Alamos Technical Associates
PNNL	Pacific Northwest National Laboratory
PVCS	TCD Deficiency Tracking System
QC	quality control
RMIS	Records Management Information System
SAP	Sampling and Analysis Plan
SACS	Surveillance Analysis Computer System
SEF	Standard Electronic Format
TCD	Tank Characterization Database
TCDM	Tank Characterization Data Management
TCR	Tank Characterization Report
TCRC	Tank Characterization Resource Center
TDB	technical data book
TILD	TWRS Information Locator Database
TTB	TWRS Technical Basis organization
TVD	Tank Vapor Database
TWINS	Tank Waste Information Network System
TWRS	Tank Waste Remediation Services
WHC	Westinghouse Hanford Company
WWW	world wide web

1.0 TANK CHARACTERIZATION DATA MANAGEMENT MISSION

The Tank Characterization Data Management (TCDM) system provides data customers and users with data and information of known and acceptable quality when they are needed, in the form they are needed, and at a reasonable cost.

The TCDM mission will be accomplished by the following:

- Maintaining and managing tank characterization data and information based on business needs and objectives including transfer of ownership to future contractors.

- Capturing data where it originates and entering it only once to control data consistency. Electronic data and information management shall be emphasized to the extent practicable.

- Establishing data quality standards, and managing and certifying databases and data sources against these standards to maintain the proper level of data and information quality consistent with the importance of the data and information. Data obtained at high cost with significant implications to decision making regarding tank safety and/or disposal will be maintained and managed at the highest necessary levels of quality.

- Establishing and enforcing data management standards for the Tank Characterization Database (TCD) and supporting data sources including providing mechanisms for discovering and correcting data errors before they propagate.

- Emphasizing electronic data sharing with all authorized users, customers, contractors, and stakeholders to the extent practicable.

- Safeguarding data and information from unauthorized alteration or destruction.

- Providing standards for electronic information deliverables to subcontractors and vendors to achieve uniformity in electronic data management.

- Investing in new technology (hardware and/or software) as prudent and necessary to accomplish the mission in an efficient and effective manner.

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2.0 TANK CHARACTERIZATION DATA MANAGEMENT FUNCTIONS AND REQUIREMENTS

To facilitate this function, data requirements have been set forth in data quality objectives (DQO) and other documents including those listed in Figure 2-1 under "Data Requirements." The data generated as a result of historical, sampling, and analytical efforts should be managed according to a set of 10 data management functional requirements (see Figure 2-1). These requirements are discussed in the sections below.

2.1 DATA COLLECTION

Data are generated from a variety of historical review and modeling, instrumental, and analytical processes; the latter two are deployed both in the field and in laboratories. These data are maintained in a variety of repositories for a variety of purposes. For instance, the Tank Waste Remediation System Characterization Data Management Strategy document (June 1995) contained a listing of 38 existing characterization data sources (see Section 3.2, Table 3-1 for a revised version of this list). More recently, the TWRS Information Steering Committee has identified 110 data collection and/or management projects related to TWRS characterization, operations, finance, transition, safety, or technology. A number of these are of paramount importance to the characterization project, specifically the Tank Characterization Database (TCD), Tank Waste Information Network System (TWINS), Labcore/Laboratory Information Management (LABCORE/LIMS), surveillance data (Surveillance Analysis Computer System [SACS]) and Historical Tank Content Estimates (HTCE) data.

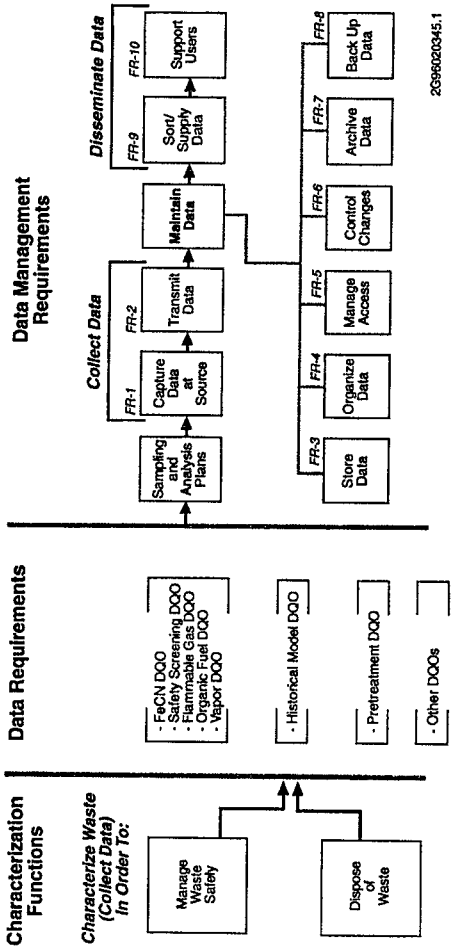
It is not necessary or desirable that all data sources supporting tank characterization be transmitted to, managed within, or accessed through the TCD. However, for data critical to the characterization effort such as analytical data (LABCORE/LIMS) and HTCE; TCD has been designated as the official database for maintenance and/or access of data. TWINS curently is the integrating access front-end for TCD as well as SACS and TVD.

The following functional requirements (FR) are established for data collection:

FR-1 Capture Data at Source. To the extent practical, data should be captured once only at the source in an electronic format.

FR-2 Transmit Data. Data to be transmitted to the TCD should be transmitted in the standard electronic format (SEF) receivable by TCD. This will eliminate use of human data manipulation and multiple entry, use of hard copies, and sources of error to the extent practicable.

Figure 2-1. Waste Characterization Data Management Functions and Requirements.



2.2 DATA MAINTENANCE

Data maintenance consists of several functions including data storage, organization, access management, change control, archiving, and backup.

The following functions and requirements are established for data maintenance:

FR-3 Store Data. Data shall be stored subject to configuration control and safe/secure storage in compliance with applicable standards. Data/information storage systems and databases shall comply with appropriate standards relating to hardware, software, and data administration (see Section 5.0).

FR-4 Organize Data. Data shall be collated, formatted, and/or combined as required for specific project needs identified by users and customers. Additional data fields (e.g., DQOs - see Section 6.5) or data types (e.g., data from new equipment - see Section 6.7) may be incorporated into TCD or other data sources as necessary to meet project requirements. Data qualifiers indicating the data status shall be placed in TCD data fields as required to indicate to users the data's quality status.

FR-5 Manage Access. Configuration control shall be implemented to provide consistent and efficient entry of and access to tank characterization data/information. Access will be managed to avoid loss or corruption of data/information due to unauthorized access.

FR-6 Control Changes. Significant changes to data or data fields in TCD will be subjected to formal review and approval by the Data Change Council (see Section 6.14) operating in accordance with a change protocol (DI-DM-00100). This protocol will ensure that significant data changes are adequately reviewed and approved prior to implementation. Errors discovered as a result of a quality control process shall be documented, corrected, and verified with a formal tracking method (PVCS).

FR-7 Archive Data. Tank characterization data shall be archived periodically to optimize storage space for high-priority data and to enhance accessibility to data (RMIS/ISEARCH is used on the Hanford Site to archive documents.).

FR-8 Back-up Data. Tank characterization data shall be backed up routinely on a schedule commensurate with the importance and cost of obtaining the data. For instance, data obtained at high cost shall be backed up more frequently than other data. Automatic (electronic) and manual backup methods shall be used as required to adequately protect data from loss. Currently, all data on network servers are backed up automatically as a function of network administration.

2.3 DATA DISSEMINATION

Data dissemination consists of sorting/supplying data and supporting users. The following FR are established in this area:

FR-9 Sort/Supply Data. The TCDM shall sort and supply data in standard reports in accordance with project data users' needs. The TCD shall also supply special reports in specified formats and sorts on request whenever feasible. Data shall be supplied electronically to the extent practicable to avoid introduction of error and to supply data at greater speed and efficiency. The majority of data distribution and access shall be accomplished using the Internet home pages. The Internet environment shall also be the publishing/document release medium of choice. Data disseminated shall be traceable to the data source from which it originated and shall be accompanied by data qualification of the reliability/quality of the data source, usability of the data, and uncertainty of the data, whenever practicable.

FR-10 Support Users. User and customer support shall be provided in the areas of hardware recommendations, software user service, and data administration for TCD. Data administration support to supporting data sources and databases will be provided as requested and required to meet project goals. User access and efficiency shall be emphasized.

3.0 ORGANIZATIONAL ROLES AND RESPONSIBILITIES

Organizational roles and responsibilities are discussed in the following three areas: (1) data generators, (2) data custodians, and (3) data customers. In addition, the organizational role of TCD and the Tank Characterization Resource Center (TCRC) is discussed.

3.1 DATA GENERATORS

Data generators produce raw data about tank contents. These data may not have been evaluated, interpreted, analyzed, or qualified prior to being placed in a managed data source (e.g., database). Most of this data comes from historical, field, in-tank, or analytical laboratory equipment and instrumentation. The information generated by data generators includes not only quantitative, numerical data, but also information that relates to the collection of the numerical data. This information may be in a myriad of forms and formats including photographs, instrument traces, calibration records, logbook entries, standard forms, reports, drawings, maps, and chain-of-custody forms. This metadata must be compiled and managed to provide complete information.

Currently, data generators reside in a number of organizations within TWRS as is appropriate to the charter and mission of each organization. A list of data generators (data sources) and the corresponding responsible parties for the generated data is given in Table 3-1. Note that this table may not be complete at any given time due to additions or changes in data sources brought about by changing program/project needs and requirements.

3.2 DATA CUSTODIANS

For many data sources, the data custodian and data generator may be the same. Most of the data sources listed in Table 3-1 maintain a dual role in generating data and in maintaining custody of the data. This is a correct and appropriate management method in most cases. Data custody includes maintaining the database or data resource on a day-to-day operational basis, maintaining change and access control, updating the database or data resource, and providing data to users who need them. However, several resources have been formally designated as "official" from a custodial point-of-view, but they do not generate data themselves. An example of this is the TCD, which receives data from other sources, most notably LABCORE/LIMS.

Table 3-1. Existing Characterization Data Resources. (3 sheets)

Short Name	System Name	Notes	Custodian	Type
BR	Ball Rheometer		see VFI	Instrument
CASS	Computer Automated Surveillance System	2, 5	Barnes, David	Data Acquisition System
CPT	Cone Penetrometer	2	Hanson, Carl	Data Acquisition Equipment
CST	Characterization Status Table		McCain, Dennis	Status Sheet
DACS	Tank 101-SY Data Acquisition and Control System	2, 5	Gauck, Gregory	Data Acquisition and Control
DACS 2	Data Acquisition and Control System 2		Bauer, Roger	See above
DQOs	Data Quality Objectives	3	Banning, Dave	Document
EXTRUSION VIDEOS	Tank Core Extrusion Video Tapes		Benally, Attlee	Video Library
GCS	Gas Characterization System	2, 5	Bauer, Roger	Data Acquisition System
GEN TRAN D SHT	General Transfer Data Sheet		Koreski, Jerry	Data Acquisition System
GMS-2	Gas Monitoring System 2	2, 5	Bauer, Roger	Data Acquisition System
HDAT	Hand-held Data Acquisition System	4, 5	Starghill, Charles	Data Acquisition System
HDWM	Hanford Defined Waste Model		Agnew, Steve	Predictive Model
HEIS	Hanford Environmental Information System	1, 5	Schwab, Mike	Database
HTCE	Historic Tank Contents Estimate		Brevick, Chris	Inventory Estimates

Table 3-1. Existing Characterization Data Resources. (3 sheets)

Short Name	System Name	Notes	Custodian	Type
IDB	Integrated Database		Cooney, Mike	Database
LABCORE/ LIMS	Labcore/Laboratory Information Management System	2, 5	Ibsen, Tom	Database
LDUA	Light Duty Utility Arm		Carteret, Betty	Equipment
LOG BOOKS	Laboratory Log Books		Ibsen, Tom	Data Source
MOIST MON	In-situ Moisture Monitoring System		Cash, Robert	Data Acquisition System
PHOTO/VIDEO SURV	Tank Farm Surveillance Video and Photo Library		Hisaw, Roger	Video/Photo Library
PU INVENTORY	Plutonium Inventory	5	Tusler, Leslie	Inventory Estimates
RGS	Retained Gas Sampler		Knight, Craig	Equipment Data Acquisition
RMCSS	Rotary Mode Core Sampling Spreadsheet		Mousel, Andy	Data Spreadsheet
SACS	Surveillance Analysis Computer System	1, 2, 5	Barnes, David	Database
SAMPLING LOG SHT	Operations Field Notes		Cockrell, Andy	Data Source
SHMS	Standard Hydrogen Monitoring System	2, 5	Bauer, Roger	Data Acquisition System
SMMS	Surface Moisture Monitoring System		Vargo, George Stockes, Troy	Data Acquisition System
SY-101	SY-101 Hydrogen Mitigation Data CD		Gregory, Barry (PNNL)	Database
TCD	Tank Characterization Database	1, 2, 5	Schaffer, Brad	Database
TCRs	Tank Characterization Reports	3	Kristofzski, John Hunt, John	Documents

Table 3-1. Existing Characterization Data Resources. (3 sheets)

Short Name	System Name	Notes	Custodian	Type
TCRC	Tank Characterization Resource Center		Young, Ann	Document Resource Center
TFDB	Tank Farm Database	5	Koreski, Jerry	Database
TMACS	Tank Monitoring and Control System	2, 5	Barnes, David	Data Acquisition and Control
TOC	Total Organic Content Database		Turner, Dave	Database
TRAC	Track Radioactive Components	5	Simpson, Brett	Predictive Model
TWINS	Tank Waste Information Network System	2, 5	Bobrowski, Steve	Database Access
TVD	Tank Vapor Database	1, 2	Simonen, Christine	Database
VFI	Void Fraction Instrument	5	Bauer, Roger	Instruments
VIDON	Visual Image Digital Object Network		Schalla, Elaine	Image Library including Digital
WHC-EP-0182	Waste Tank Summary for Month Ending		Hanlon, Betty	Document
WIDS	Waste Information Database System	2, 5	Schwab, Mike	Database
WSTRS/LANL	Waste Status and Transaction Summary		Agnew, Steve	Database
WVPS	Waste Volume Projection System		Koreski, Jerry	Database

Notes:

1 = Tri-Party Agreement related database
2 = Hanford architecture key system
3 = Key document type: Tri-Party Agreement
4 = Inactive
5 = Registered in Hanford Information System Inventory

No data is generated by the TWINS custodians, yet TWINS is until October 1996 the formal, official route of access for historical, field, and analytical data of significance to the characterization project including TCD, HTCE, SACS, and TVD (see Section 6.3). Therefore, TWINS and its accessed sources such as TCD, LABCORE/LIMS, and HTCE must be managed at the highest level of compliance to recognized database and data resource standards (see Section 5.0).

3.3 DATA USERS AND CUSTOMERS

Data users and customers include, but are not limited to, the following:

- Individuals and organizations that need data to manage tank waste safely on a day-to-day operational basis. In many cases, the users are also the data generators and custodians.

- Individuals, organizations, and agencies that need data to model the health, safety, and environmental impacts of various waste management and disposal options in order to formulate alternatives for decision makers.

- Individuals, organizations, and agencies that need data to plan, design, and operate waste management and disposal processes once disposal decisions are made.

- Individuals, organizations, and agencies that need data and information to make policy decisions and select options for waste management and disposal such that human health and the environment are protected at a cost that the taxpayers can afford. The U.S. Department of Energy (DOE) is an example in this customer category.

- Individuals, organizations, and agencies that need data and information to supervise, regulate, or comment on waste disposal plans and projects. Regulatory bodies could be included here, such as the Washington State Department of Ecology.

- Individuals or groups that need data and information to remain informed or to form positions and to influence waste management and disposal decisions as a matter of Constitutional right. Various stakeholder groups, environmental groups, and private citizens could fall into this category.

Often the data users and customers are scientists, engineers, or technicians that need data of a very specific type, in a specific format, in a timely manner (often real time), and with a well known and stated precision and accuracy. As a general policy, data resources should be located as close as possible to the users. For many of the data sources listed in Table 3-1, the data generator, data custodian, and data user are the same individual or organization.

In general, official data sources such as TCD are expected to provide high-quality, official data to data users and customers in accordance with agreements such as the *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement) (Ecology et al. 1994).

3.4 TANK CHARACTERIZATION DATABASE AND TANK CHARACTERIZATION RESOURCE CENTER

Organizational responsibility for the TCD resides in the TWRS Technical Basis organization (TTB). A specific cost account plan for the data management function is maintained in the work breakdown structure. Currently, the Pacific Northwest National Laboratory (PNNL) provides Westinghouse Hanford Company (WHC) with operations and support for TCD.

The TCD is deemed to be the official, recognized database for the characterization project for analytical data. This database contains post-May 1989 analytical data collected in accordance with protocols established in the TPA with the regulatory authority (Washington State Department of Ecology). This data is marked with "TPA" flags. TCD also includes inventory estimates, historical, and other data subsets including analytical data collection prior to 1989.

The TCRC is also managed and operated by the TTB organization. This resource provides access to hard copies of characterization documents as well as indexed computer files of legacy documents such as letters, engineers files, and letter reports. This legacy information provides technical personnel and others with valuable information regarding the past history for tank waste management. The TCRC is located in building 2750E, room A-241. A satellite to the center is a TWINS/TCD training room located in building 2750E, room C-135, where TWINS/TCD data can be accessed electronically from a computer workstation. Training and support is also available in the training room.

3.5 DATA CERTIFICATION AND DATA SOURCE ASSESSMENT AND REGISTRATION OF DATA SOURCES FOR APPROPRIATE USE

Currently, 44 data sources (see Table 3-1) are used by or are available to support the characterization project. The appropriate use of and certification of the data for decision making in these sources is not well determined or documented. (Note: the word validation is avoided for application to tank characterization data because of the association the term has with RCRA/CERCLA data validation. TWRS data is not being validated per RCRA/ CERCLA.) Additionally, the sources (systems) that contain the data have not been uniformly assessed in comparison to known and accepted standards for hardware, software, and data administration. Some of the 44 sources are not registered in the Hanford Information System Inventory (HISI) and/or are not considered key systems in the Hanford Site architecture. Currently, only four of these sources are formally identified as Hanford Site Tri-Party Agreement-related databases. Several of the data sources that are not

registered, listed as key, or identified as Tri-Party Agreement-related are in fact being used to support decision-making documentation. An example is the HTCE data source, which is used in decision-making documents such as tank characterization reports (TCRs).

Analytical data collected after May 1989 has been flagged in TCD with a "TPA" to identify that such data has been collected in accordance with TPA protocols for use in TPA mandated documents. This is the only data that has been certified to the extent that it has been collected in accordance with regulatory agreements.

As an initial step towards completing these assessment, certification and registration tasks for data and data sources, the following designation scheme is proposed for application to each data source listed in Table 3-2. Application of this scheme would be equal to assigning a "grade" to each appropriate data source in Table 3-2.

Table 3-2. Designation Scheme.

Grade	Criteria
A	1. Contains analytical data (flagged) collected post-May 1989 per TPA protocol: data validity recognized by regulator.
	2. Database/data source has been subjected to self-assessment audit (see Section 6.8). Corrective actions are identified and tracked.
	3. Data in source has been "certified" per scientific standing by baseline inventory project or by Acceptance Test Criteria documentation.
B	4. Data source contains operational data necessary for safe operations; data may also be included in tank characterization reports (TCRs); data not necessarily collected per TPA recognized protocol.
	5. Self-assessment audit pending or not completed.
C	6. Data source contains information of historical or scientific interest; may contain data derived from models including chemical processing data, tank-transfer data, operations log books, etc. Data may not be used by itself for decision making regarding safe operations or disposal. Information may be included in TCRs if a disclaimer or qualification is attached to it.
	7. Self-assessment audit is not planned.
D	8. The data source is developmental, incomplete, of limited scope, or otherwise does not fit in above categories.

To certify data and inventories for appropriate use and to assess and register the sources containing the data and inventories, the following tasks are necessary:

1. Develop certification criteria for appropriate use of data and inventories to consider: regulatory status of data, scientific standing of data, best-available standing of data, and ability of data to support specific DQOs. The highest category of data certification useable for decision making would have the greatest regulatory, scientific standing and would be the best-available at the Hanford Site. It would also support the most DQO requirements. The baseline inventory task currently underway (see Section 6.11) will be very instrumental in certification of inventory data for appropriate use particularly from the point-of-view of scientific standing of the data. Since the scientists developing the inventory will be intimately familiar with the data and metadata, they will be instrumental in certifying data for appropriate use. Following certification of data and/or inventories as outlined above, appropriate flags could be set in the data in TCD. For instance, if baseline inventory data is accepted by the regulators, a flag to that effect could be set in the baseline inventory number.

2. Development of categories for specific appropriate use categories for data and/or inventories contained in each source listed in Table 3-1. For instance, data source xyz can be used for decision making, but data from source abc can only be used in conjunction with other data subject to certain disclaimers. Appropriate use categories will be identified along with listing of the types of decision-making documents a given data source can be used to support.

3. Assessment of key characterization data sources against a standards checklist for compliance with requirements for hardware, software, and data administration (see Section 5.2.).

4. Placement of flags in data in the TCD for data or inventories accepted by regulation. For data not in TCD, the grade (certification) would be listed in the TILD and/or HISI.

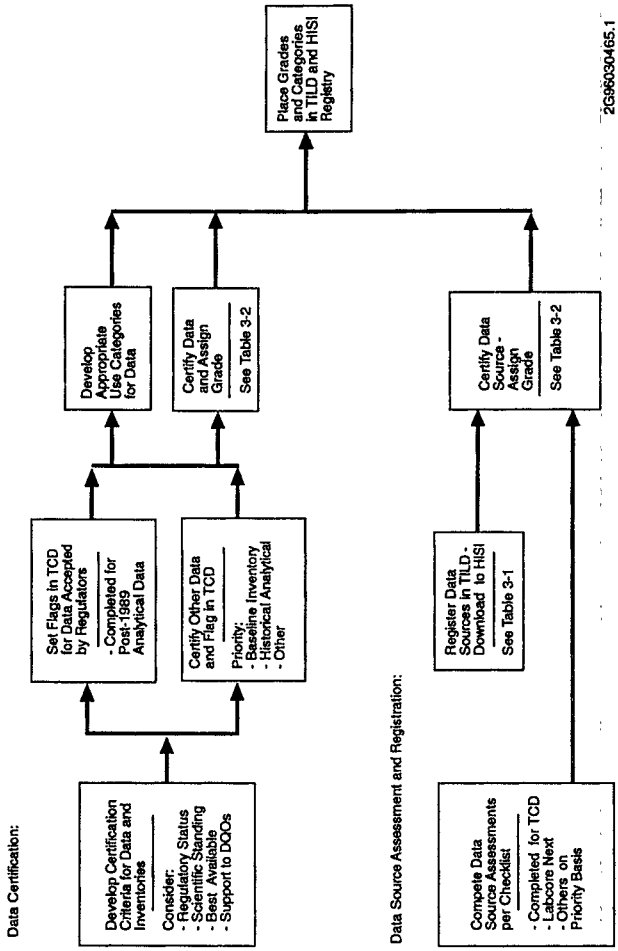
5. Registration of the sources in Table 3-1 in the TWRS Information Locator Database (TILD) and the Hanford Information Systems Inventory (HISI), including access instructions for each data source. Upon completion the registration would also be loaded into HISI for completeness and consistency.

6. Assignment of a grade (see Table 3-2) to data sources. Place grades in TILD and HISI registries.

Figure 3-1 illustrates how these tasks interact. The distinction between data certification and data source assessment should be noted since these two lines of tasks can be completed in parallel. The data source is the container for the data and consists of a system of hardware, software, and data administration practices. Validation of the data contained in a source must consider the factors discussed in the first task above.

Since data certification in a task in large part beyond the scope of data management, funds for task 1 are not included in Table 8-2. Funds for this task are more appropriately sought from other program elements. In contrast, data source certification tasks will be conducted within the scope of the budget outline in Section 8.1.

Figure 3-1. Data Certification and Data Source Assessment and Registration.



4.0 CURRENT TANK CHARACTERIZATION DATA MANAGEMENT PRACTICES

4.1 CURRENT DATA FLOW PROCESS

The *TWRS ISD Tank Characterization Report Generation Process As Is*, WHC-SD-WM-PD-045, Rev. 0, describes the overall process for characterizing high-level waste tanks. Although the report emphasizes the part of the process that deals with the TCRs, it describes the overall process. The process consists of the following:

- Developing DQOs
- Developing sampling requirements
- Developing a sampling and analysis plan
- Developing field instructions
- Collecting samples
- Analyzing samples
- Updating the TCD
- Reviewing anomalous data
- Issuing data packages
- Issuing the Tank Characterization Report.

The event is repetitive for each tank. Multiple passes through the event result in a revision of the Tank Characterization Report for an individual tank, representing increased knowledge about the tank. The sub-events are described as follows.

4.1.1 Data Quality Objectives Developed

Multiple sources of requirements from internal users and customers including DOE, the regulators, and the Defense Nuclear Facilities Safety Board (DNFSB) findings are blended through the DQO process. This process is to determine the data required to make decisions under uncertainty and maintaining a user-specified error rate.

The process starts when a customer or external agent identifies a tank waste data need. The data need pertains to an issue or concern with some aspect of the tank contents. It may be a safety issue related to the amount of hydrogen in the tank, or an issue related to the composition of the waste affecting an anticipated waste treatment process. Once the data need is identified, the DQO is prepared. The project coordinator and the Tank Characterization Technical Basis group supports this process by guiding the customer through the DQO process.

4.1.2 Sampling Requirements Developed

This composite event is to establish and coordinate the sampling requirements for each sampling event. It is also to reconcile the available budget and known operational constraints on tank access and resource scheduling. This event results in a sampling schedule and a Tank Characterization Plan for each tank to be sampled during the fiscal year.

4.1.3 Sampling and Analysis Plan Developed

This composite event produces the Sampling and Analysis Plan (SAP) for a sampling event. The project coordinator combines the Tank Characterization Plan and the laboratory staff knowledge to provide a set of directions for analyzing samples from a tank.

4.1.4 Field Instructions Developed

This event uses the Tank Characterization Plan, and the expertise of the field sampling crews to develop work packages that will control the process of collecting physical samples from a tank and transporting them to the laboratory.

4.1.5 Samples Collected

This composite event applies the directions embodied in the work packages to the physical collection of tank samples and transporting them to the laboratory. The product of this event is samples delivered to the laboratory. Completion of this event begins a countdown to the issuance of the data reports described below.

4.1.6 Samples Analyzed

In this composite event, delivered samples are used in a series of physical and chemical analyses. The output is data in the LABCORE system. LABCORE automatically flags certain safety-related data if the data exceed a preset value. The flag causes other Safety customers to be immediately notified via a phone call, followed by an internal memo within 1 day of the flag being set. Samples analyzed also results in a series of hardcopy data reports that are used by the project coordinator to build data interpretations and report the results of the sample analysis.

4.1.7 Anomalous Data Reviewed

When an immediate notification is made during sample analysis, the Tank Data Review Committee will meet to review the available data from the tank, including the information from the current sampling event. The project coordinator presents the data to the Tank Data Review Committee, which then deliberates and makes recommendations for changes in the tank safety status and/or operational controls. These recommendations are recorded in safety review meeting minutes. The process of acting on these recommendations is outside the scope of this Data Management Plan.

4.1.8 Data Packages Issued

The hard copy data report is transcribed to WordPerfect[1] and/or Excel[2] spreadsheets (or equivalents) for interpretation and evaluation. Four different data report versions are possible depending upon the tank Watch List status, the data itself, and the quality of the data. These four report versions are respectively 45-, 60-, 90-day and final (105-day) reports. The report name indicates the due date for release based upon receipt of the samples in the lab (see above). The 60- and 90-day reports, if required, are issued as engineering change notices (ECN) to the 45-day report. The final report constitutes a complete revision of the 45-day report and includes all data resulting from the sampling report. (The 90-day report is often combined with the final report.)

4.1.9 Tank Characterization Database Updated

The LABCORE system periodically updates the TCD by transferring data electronically from LABCORE to the TCD. Individuals from several organizations are involved in this process, characterized here as simply TCD support. There is an ongoing program to expand the interface between LABCORE and TCD to include more data entities in the transfer process (see Section 6.9). The TPA requires analytical data from LABCORE to be loaded into TCD within seven days of issuance of a final data package.

4.1.10 Tank Characterization Report Issued

The issuance of the Final Data Report starts a second (WHC internal) countdown to the issuance of the TCR to the public. The project coordinator uses the final data package plus documentation of the sampling event and other available information to provide an analysis and interpretation of the data contained in the final data report. The test is prepared and then

[1]WordPerfect is a registered trademark of WordPerfect Corporation, Orem, Utah.

[2]Excel is a registered trademark of Microsoft Corporation.

published. The project coordinator has the option of preparing the draft report or using the services of a subcontractor (currently LATA). The historical section of the TCR is currently prepared by ICF Kaiser Hanford Company (ICF KH).

4.2 CURRENT PROCESS PROBLEMS

This section examines the data flow process from the following viewpoints: information, business function, technology, and work process problems. Plans to address these identified problems are elaborated in Section 6.0 of this document.

4.2.1 Information Problems

The tank waste data is disseminated from LABCORE to the project coordinator on a hardcopy report. These data are reentered into WordPerfect® and spreadsheet files, which are then incorporated into a draft electronic document. Hardcopy versions of the document are used in the review process. The hardcopy documents are marked up and serve as the basis for revising the electronic document. New hard copies are then written and put through the document clearance, release, and publication processes. This process has the following features:

- Multiple hardcopy versions of the document are generated throughout the process. The electronic versions of the document are used solely to support the generation of the hardcopy versions (see Sections 6.2, 6.3, and 6.4).

- Traceability of the information in the TCR is lacking. The traceability is lost at the data re-entry step where the data reports are prepared based upon hardcopy LABCORE output. This breaks the electronic chain-of-custody and introduces the possibility of transcription errors. An ongoing problem is the occurrence of differences between data presented in the TCR and data resident in TCD or LABCORE (see Section 6.9).

- The data presented in the TCR are not readily available in electronic form to be included in either higher level documents (e.g., tank farm-level summaries) or other TCRs (e.g., similar tanks in the same tank farm) (see Sections 6.2, 6.3, and 6.4).

- The same characterization data are published two or three times during the characterization process. The 60- and 90-day reports are published as page change ECNs to the 45-day report. The data then are included in the final data report (see Sections 6.2, 6.3, and 6.4).

- The data analysis process is internally consistent and related to other data from the same tank/sampling event. However it varies from TCR to TCR and must be documented in each TCR (see Sections 6.2, 6.3, and 6.4).

- Operational history data for individual tanks are generated off-line and put into the TCR. This information is often inaccurate and corrected based upon personal knowledge and/or private data sources. The private data sources have recently been collected into one place, the TCRC, so as to make this information available to all parties (see Sections 6.2, 6.3, and 6.4).

- Tank Characterization Report inventories are not being calculated consistently in a way acceptable to all customers including DOE and Ecology.

4.2.2 Business Function Problems Related to Data Management

- It is impossible to track the subcontractor costs associated with TCR generation to allow quantification of cost savings resulting from process improvements, particularly electronic methods adoption. LATA currently performs work under a Basic Ordering Agreement (BOA), which does not allow for tracking of individual task costs.

- The BOA and workorder process does not contain direct provisions for enforcing requirements on subcontractors related to uniform document production.

4.2.3 Technology Used

The technology used to produce TCRs is based on the Hanford Site Standard End System Operating Environment work station. Other technology is used for document distribution and storage after the TCR is released. However, the TCR generation process does not acknowledge or incorporate any requirements that would make the following downstream processes easier:

- TCRs are generated using WordPerfect® 5.1 and a variety of other software on individual work stations. Electronic files are stored locally on each project coordinator's work station (see Section 6.4).

- The network services available through the Hanford Local Area Network (HLAN) are not consistently used to route electronic documents for review, collect data for incorporation into the document, or to store and retrieve documents (see Sections 6.2 and 6.4).

- Prior experience with electronic document transfer resulted in excessive transmittal times (hours to days) for documents or else resulted in the document being corrupted by the system (i.e., embedded codes locking up the transmittal function).

- Offsite subcontractors cannot routinely access information using the HLAN. There is a problem with access via the public file servers.

- Hard copies are reproduced and the plant mail service or a clerk courier is used to formally distribute TCRs. The volume of copies made makes this an expensive process.

- The Internet is not used in any form during the document generation process. Recently, a new requirement was established to make issued TCRs available via the Internet. The current use of WordPerfect® 5.1 severely limits the ability to publish via the Internet.

- TCRs are currently being transferred into Records Management Information System (RMIS) after release. This is a process that relies on a high-speed document scanner and optical disc storage of the resulting bit mapped document pages. Documents will soon be available in their native format or RMIS, but legacy documents will continue to be available only as images.

- There are problems in the document production process due to incompatible software tools (i.e., much data are generated and worked with in Excel® spreadsheets, however, the Hanford Site standard word processing software, WordPerfect® 5.1, cannot import Excel® spreadsheets). Work around and significant data massaging must take place to incorporate the data into WordPerfect® 5.1. This problem will in part be corrected by encouraging document authors to learn and use WordPerfect 6.1 (see also Section 6.2).

4.2.4 Work Processes

A current weakness in the work processes is the high amount of "exception handling" that occurs. Other observations about the work processes are as follows:

- Revisions to "boiler plate" sections of documents must be made to each occurrence of the boiler plate in each TCR (see Section 6.2).

- Each revision of the same TCR requires republishing, in hardcopy, all information contained in the previous version (see Section 6.4).

- The hardcopy form of the TCR (and other information sources) are moved through the process, passing from individual to individual until the TCR is released and distributed to the customers. The electronic document capabilities at the Hanford Site have been used only to the extent that they support the generation of hardcopy documents (see Sections 6.2 and 6.4).

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5.0 DATA MANAGEMENT STANDARDS

5.1 GENERAL STANDARDS

General policies and standards relating to data management are found in the following documents:

- *Strategic Plan for Hanford Site Information Management*, U.S. Department of Energy, DOE/RL-94-69, Rev. 0, September 1994.

  The Strategic Plan provides a high-level framework and direction for Hanford Site information management.

- *Tank Waste Remediation System Information Resource Management Policy*, U.S. Department of Energy, DOE/RL-93-0166, November 1994.

  This document describes the information resource management policy of DOE/RL including policy drivers, operations policy, Media Services policy, Information Processing policy, and roles and responsibilities.

- *Tank Waste Remediation Data Management Plan*, U.S. Department of Energy, DOE/RL-94-94.

  This plan describes the business function, work plans and processes, data management generation, and planned activities for data management for TWRS as a whole.

- *Guidebook of Data Management Practices*, Westinghouse Hanford Co., October 1992.

- The *Guidebook of Data Management Practices* outlines processes for strategic data planning, data administration, data stewardship, data analysis and design, and database administration. The WHC data management infrastructure is also described including organizational resources, policies and procedures, planning resources, and tools and methods. These standards are incorporated here by reference.

The management requirements and procedures relating to data and information are found in WHC-CM-1-3, *Management Requirements and Procedures*, Section 1.31: Managing Data and Information.

The following are general standards of importance to tank characterization project data management:

- Data and information shall be collected only once where it originates and entered and managed by electronic means to the extent practicable.
- Specific data standards shall be established and enforced. For hardware, software, and data administration, see Section 5.2.
- Data shall be shared based on need and shared by electronic means to the extent practicable.
- Publications will prepare and manage data by uniform, consistent and standard electronic protocols to the extent practicable (see Section 5.3).
- Data and information will be controlled and protected at each data source to ensure safeguarding from deliberate, unintentional or unauthorized alteration, destruction or disclosure.
- Data and information quality will be actively pursued and specific requirements for data accuracy, availability, accessibility and usage will be established and followed, including qualification of data and provision of mechanisms for discovering and correcting data errors before they propagate.
- Vendors and subcontractors will be required to meet standards for electronic information deliverables to ensure uniformity in electronic data management (see Section 5.4).

5.2 DATA SOURCE STANDARDS

Data source standards are addressed in three categories: official databases or sources, supporting databases, and independent databases or sources. The function of these categories is displayed in Figure 5.1, along with the standards applicable to each.

In general, the function of an official database, of which TCD is the prime example, is to provide high-quality, readily accessible data to customers and users. Because this database will be used to prepare TCRs and other documents used for decision making in waste management and cleanup, the database must meet the highest data source standards. To this end, a checklist (DI-DM-002.00) has been prepared (see Attachment A) to assist custodians of official databases in identifying and assessing compliance with specific standards. This checklist is described in detail later in this section.

The second category of data sources is designated supporting databases. In general, these supply significant data to TCD or are accessed via TWINS. These include: TRAC,

LABCORE/LIMS, HTCE and SACS. It is recommended that these data sources also comply with the standard checklist as well as with the general standards.

The third category of data sources is the numerous remaining sources listed in Table 3.0, herein referred to as independent databases or sources. These sources are generally characterized as those sources where the data generator, data custodian, and data user are the same individual or organization. It is recommended that these data sources comply with the general standards and with a modified or graded specific checklist that is adapted to the specific function and significance of the database. Some independent databases may require a very high management standard where others do not require such rigor.

As mentioned previously, a checklist (DI-DM-002.00) has been established in order to identify specific standards for self-assessing database management. This checklist consists of a series of questions which if answered in the affirmative with supporting evidence will ensure that the data source meets the highest standard of hardware,software and data quality. The specific areas covered by the checklist include the following:

HARDWARE

- Physical protection
- Contingency planning
- System documentation
- User documentation
- User training
- Telecommunication security
- Performance standards

SOFTWARE

- Access control
- Contingency planning
- Configuration management
- Records management
- System edits
- Software user training
- Systems validation and verification
- Telecommunications protocols
- Software performance standards
- Personnel security

DATA ADMINISTRATION

- Contingency planning
- Privacy and security of data

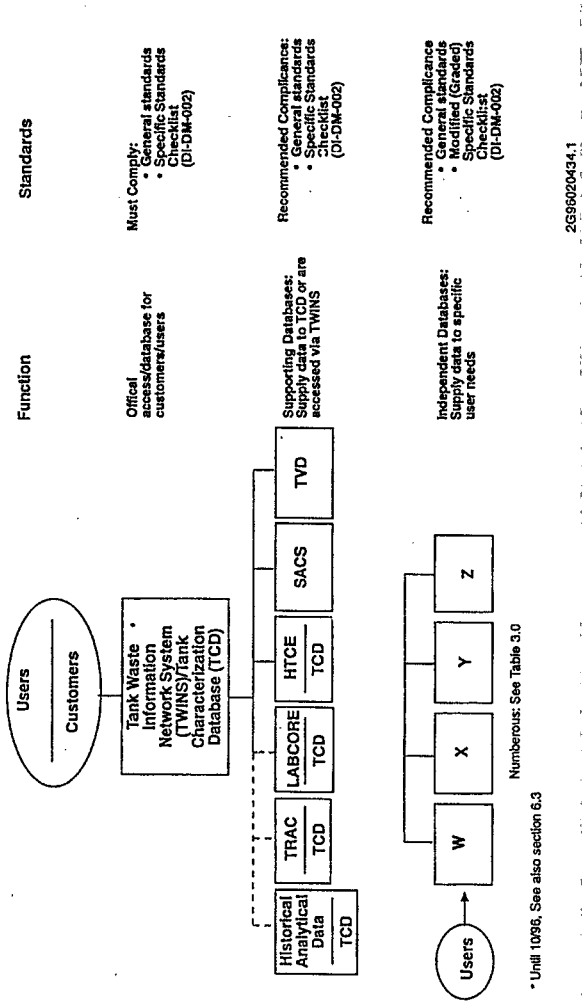
- Data quality
- Data collection and entry
- Data dissemination
- Data documentation
- Training
- Timeliness
- Data standards
- Data responsibility.

In addition to general and specific standards for data sources, standards have also been prepared for electronic publication of tank characterization documents. These standards are applicable to preparation of tank characterization reports and other key documents. These standards can be found in Attachment B.

5.3 STANDARDS FOR ELECTRONIC INFORMATION DELIVERABLES (SUBCONTRACTORS AND VENDORS)

Standards have been prepared for use with subcontractors and vendors in purchase requisition, statement of work or letter of instruction preparation. These standards, if used, will assure that reports, publications and other electronic information deliverables are consistent with current hardware/software architecture. These standards are given in Attachment D. Electronic Inter-operability Standards for Hanford Contractors have also been proposed and are available on the Hanford Internet Home Page under the home page for Information Management.

Figure 5-1. Data Source Standards Applicability.



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6.0 TANK CHARACTERIZATION DATA MANAGEMENT PROCESS IMPROVEMENTS

Several TCDM process improvements are underway or are planned to address the process problems described in Section 4.2. The subsections below describe these tasks and initiatives. The relationship of these tasks to the planned evolution of TCDM is illustrated in Figure 6-1.

The process improvements described herein will stand alone, but each also contributes to the desired end point and planned future of TCDM as described in Section 7.0. These process improvements are entirely consistent with, necessary, and desirable to achieve the future end point, but in the interim, also improve operations of the existing system. The improvements fully forward the mission described in Section 1.0, and enhance achievement of the functions and requirements listed in Section 2.0.

6.1 HISTORICAL TANK CONTENT ESTIMATES ON WORLD WIDE WEB

The HTCE documents are being completed for the northwest, northeast, southwest, and southeast quadrants of Tank Farms. Numerous and voluminous documentation will exist to support each quadrant summary document.

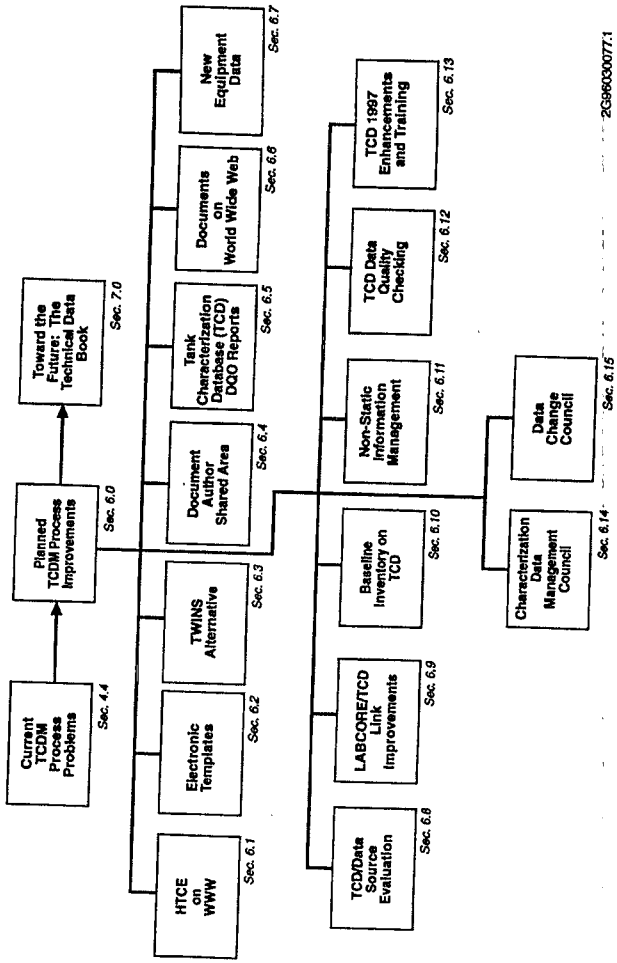
Placement of the four quadrant summary documents on the world wide web is tentatively planned for fiscal year 1997 (see Section 6.1) if funding permits. Placement of the HTCE summary documents on the WWW will greatly enhance dissemination of and access to this important information.

Until WWW access is available, HTCE information can be accessed by a compact disc (CD) prepared by the HTCE contractor (ICF KH). This CD is being made accessible via the local area network in fiscal year 1996. This CD is also available in the TCRC. HTCE data can also be accessed via the TCD.

6.2 ELECTRONIC TEMPLATES AND STANDARD REPORTS FOR DOCUMENT PREPARATION

Electronic templates will be developed and used to create tank characterization documents, as funding permits. Templates are particularly useful for documents that have a standard format with information duplicated within the document category (e.g., sample analysis plans). The templates will be available from a shared server or on the internal WWW. Authors will be able to "check out" the templates but will not be able to change the contents. All templates will be under configuration control and changed only by the authority of a document

Figure 6-1. Planned Evolution of Tank Characterization Data Management.



supervisor. Use of the templates will allow authors to focus on unique content and not spend time on format to repetitive content. Configuration control will be greatly enhanced and electronic review and management of contents will become routine.

Plans in fiscal year 1997 include development of a template for sample analysis (SAP) (see Section 8.1 line 12). Additional templates can be prepared in fiscal year 1997 to include a template for certain sections of TCRs if funding permits.

Also in fiscal year 1996, progress was made in preparing TCD to generate standard reports for electronic drop-in use in TCR documents. Standard reports developed include:

- Analytical data
- Analytical methods
- Anion mass and charge data
- Executive summary tank description
- Subsampling scheme and description
- Sampling observations
- Analytical data: Total Alpha.
- Historical Inventory Estimate Summary Physical Properties
- Historical Inventory Estimate Chemical/RadChem Constituents
- Cation Mass and Charge Balance
- Percent water
- Concentration and Relative Difference for two cores

A standard report for VAPOR database information is currently being scoped for potential implementation in fiscal year 1996.

Additional standard reports will be identified for development in fiscal year 1997 as funding permits. Determination of standard reports to develop will be done in close communication with data users and customers.

In addition, increased electronic reporting capability has resulted from additional records received into TCD from LABCORE. These include the following:

- Sampling event record
- Sample description record
- Sample relationship record.

Improvements in electronic document templates and standard reports are expected to greatly enhance document content and format consistency both during the document creative stage and in the subsequent document revision and control process.

6.3 TWINS ALTERNATIVES

The TWINS was developed to provide electronic access to tank waste data at the Hanford Site and other DOE sites. It is not a database per se, but is an access capability for TCD and tank data at other sites. In fiscal year 1996, DOE-HQ funding for TWINS operation was discontinued. This shortfall was made up by Hanford Site program funding.

In view of these changes, an alternative to TWINS has been developed in anticipation of total loss of TWINS funding in fiscal year 1997. This alternative consists of the following elements:

- Operate TWINS at a minimum level in fiscal year 1996
- Implement a TCD specific user interface using off-the-shelf vendor software
- Provide open access to TCD and Vapor databases on the internal WWW.
- Provide controlled access to TCD and vapor databases on the external WWW.

A bonus task from this effort is integration of tank transfer data into TCD by flagging TCD data that has been preempted or invalidated by subsequent tank-to-tank transfers.

6.4 DOCUMENT AUTHOR SHARED AREA

A file server shared area (\\WHC 198\CHARDOCS) has been developed to serve as a draft library for tank characterization reports and other documents. Use of the area allows document authors, technical editors, and technical contributors to prepare, circulate, and review documents without the necessity of circulating hard copies or multiple electronic files. Use of the area also ensures that the electronic version of a document is the same as a released hard copy of a document and that changes and revisions of documents are managed and controlled. In the future, establishment of the electronic version of a document (rather than a hard copy version) as the quality record copy will be pursued (see Section 6.2).

To assist personnel in using the shared area and to ensure use of the area, a document supervisor has been appointed. In addition, desk instructions on using the area have been distributed.

Once documents are released, the electronic version will be maintained in a document management system call Saros Mezzanine (Saros). The system administrator is Media Management Systems. Individual users/group administrators may gain access appropriate to their needs. Saros provides a number of services that are essential to maintaining the integrity of documents. These services include access to broad search capabilities, version control, security, and document storage.

Saros will be the repository for all released documents, initial releases via Engineering Data Transmittal forms, and subsequent releases via ECNs. The TTB document supervisor will

serve as the organization's quality control checkpoint. All document filing and copy removals shall be authorized by Media Management Systems or the TTB document supervisor.

6.5 TANK CHARACTERIZATION DATABASE DATA QUALITY OBJECTIVE REPORTING

The utility of TCD could be expanded by placing DQO information in the TCD data fields. Users of TCD have expressed interest in such an enhancement. In fiscal year 1996, a prototype demonstration was done wherein ferrocyanide and safety screening DQO information was added to the data fields in TCD. The demonstration added the following information for the analytes contained in the two DQOs:

- Analyte (e.g. nickel)
- Tanks applicable to that DQO analyte
- Applicable DQO (ferrocyanide or safety screening)
- DQO document title, number and revision
- Threshold value and units for the analyte
- Uncertainty value for the analyte (if available).

In addition, for those analytes contained in the two DQOs, flags are set in the data fields of TCD referring the user to the DQO information described above.

Following implementation and evaluation of the prototype in fiscal year 1996, a decision will be made whether to expand the treatment of DQOs in TCD to all other active DQOs. This enhancement will require minimum maintenance and will fit within the TCD operations budget proposal for fiscal year 1997.

6.6 TANK CHARACTERIZATION DOCUMENT PLACEMENT ON WORLD WIDE WEB

A repeatable process has been established to communicate significant Hanford Site work in a totally electronic medium with the placement of 128 tank characterization documents on the WWW for public dissemination by the end of June 1996. The process involves converting WordPerfect® files into hypertext markup language. The documents include 52 tank characterization reports, 11 DQO documents and 65 tank characterization plans.

Using the internal network of WWW as a distribution tool will result in significant savings for the Hanford Site. Eventually, only a small number of documents will need to be distributed in hard copy, which will save in printing and distribution costs. An additional savings will result from reduction of hard copies distributed as a result of Freedom of Information requests. These requestors will be referred to the WWW for the latest version of documents.

At present, funds are not available to maintain documents placed on the WWW nor are such funds being proposed in this plan for fiscal year 1997. Emphasis is instead being placed on making legacy documents accessible on the WWW. However, in fiscal 1998 and in outyears, document upgrade and maintenance on the WWW will become a pressing issue to be addressed in budget development.

6.7 NEW EQUIPMENT DATA

Several new instruments and equipment capabilities are on-line or are coming on-line in the near future. Assessments have been made as to how to most effectively disseminate the data at the lowest cost. Table 6-1 lists these items, the operational date and the current plan to disseminate the data and information from each source.

Table 6-1. New Equipment (New Data Source).

Instrument Type or Data Source	Operational Date	Data Dissemination Method
Historical Tank Content Estimates (HTCE) Backup Data and Information	in operation	Available on HLAN via CD ROM. Inventory numbers available in TCD
Surface Moisture Monitoring System (SMMS)	TBD	To be determined.
Cone Penetrometer (CP)	on hold	
Light Duty Utility Arm (LDUA)	9/1/96	TBD
Void Fraction Instrument (VFI)	in operation	Copy of reports available in TCRC and via RMIS. CD ROM disk available on request.
Ball Rheometer (BR)	in operation	Contained in VFI reports.
Retained Gas Sampler	in operation - reports in preparation	Copy of reports will be available in TCRC and via RMIS as they are issued.
101-SY Hydrogen Mitigation Data	in operation	Available on HLAN via CD ROM.

6.8 TANK CHARACTERIZATION DATABASE AND DATA SOURCE EVALUATION

A self-assessment team has been assembled in fiscal year 1996 to use the self-assessment checklist (DI-DM-002.00)(see Attachment A and Section 5.2) for TCD evaluation. Use of the checklist will allow discovery of problem areas and subsequent corrective action.

Following the TCD assessment, it is anticipated that the checklist will be used to evaluate supporting databases such as LABCORE although the makeup of the evaluation teams may vary.

The checklist may also be used to evaluate other supporting and/or independent databases, data systems, and data sources as defined in Section 5.2. For these, it is anticipated that the checklist will be graded (modified) to reflect considerations such as importance of the system, cost and impact of loss or misuse of data, cost to recover data, and similar considerations.

6.9 IMPROVE TANK CHARACTERIZATION DATABASE, LABORATORY QC REPORTING AND LABORATORY INTERFACE

6.9.1 222-S Lab Interface

The TCD/Labcore team has successfully designed and implemented a Standard Electronic Format (SEF) interface to improve electronic data transfer from LABCORE to TCD. The goal has been to reduce, to the maximum extent possible, all manual data entry into the TCD. With the release of SEF version 2.4, a number of manual steps have been eliminated, which will reduce the risk of data entry or interpretive errors.

Remaining work to be accomplished includes the following:

- Streamlining the interface to provide "preliminary" invalidated data to the TCR writers and to support characterization data configuration control. Current practice leaves all analytical data in the LABCORE system until the final data package is released, at which time the data is transferred to TCD. Often, TCR authors are required to begin writing a TCR while the lab data is still in the "preliminary" or "unreleased" state. Because the TCD is now capable of producing several standard reports for use in the TCRs, the availability of preliminary data in TCD is becoming critical.

- With the practice of using "preliminary" data comes an increased responsibility on the part of the data users to ensure that all data corrections and validation procedures are applied to the final dataset used in the TCR. Therefore, explicit procedures, possibly desk instructions, should be developed to ensure that the data used in the TCR report, including all underlying calculations and statistics, is the same as the final data report released from LABCORE to TCD.

- Provide the ability to load "revised final reports" into TCD. 222-S Laboratory has identified the need to issue revised final reports. The TCD system was originally set up to handle changes to individual sample analyses and sample

results, but not complete reports. The ability within TCD needs to be developed to replace an entire report's worth of data for a given tank with a new version of the same report. The old report's data must be archived, or saved as change records.

- Following the complete implementation of the SEF 2.4 format, an assessment of the overall process should be made to determine if there are additional cost effective steps that can be taken to reduce the level of effort required, and/or to increase the reliability.

6.9.2 325 Lab Interface

The PNNL's 325 Laboratory is supporting the tank characterization program by performing laboratory analyses on tank samples. Because the 325 Laboratory is not a LABCORE user, the lab report data required to be delivered to TCD is being prepared using the "Lab Macro" data formatting system previously developed for use at the 222-S Laboratory. Using this system, trained staff transfer data from electronic spreadsheets and paper lab reports to the TCD SEF 2.4 format, which can then be loaded directly into TCD. Additional steps must be taken to verify this manually prepared data once it has been loaded into TCD.

The present solution to TCD-325 Laboratory's interface is inadequate if the 325 Laboratory is to receive significant core analysis work in the future. In that event, permanent solutions could include placement of LABCORE in the 325 Laboratory or use of an RLIMS System with a LABCORE or TCD interface.

6.9.3 Laboratory QC Results in TCD

Approximately 80 QC result types currently exist in TCD including: Detection limits, standards, blanks, spikes, recoveries, duplicates, etc. A number of lab qualifiers also are in the database. The lab QC result type data matches the primary values by lab sample identification (ID) numbers. This data is most easily viewed by applying a filter to the lab sample ID number.

6.10 BASELINE INVENTORY PLACEMENT IN TANK CHARACTERIZATION DATABASE

The Standard Inventory Estimate project is currently working to identify the chemical and radionuclide inventories of tank waste as well as certain physical and chemical waste properties. A single standard characterization source term basis for waste in each underground storage tank is being compiled. The resulting data will provide the best values based on present-day information sources. The data will be available on a hierarchical basis (e.g., a global [total inventory] basis, a tank-by-tank basis, and a waste phase basis). The

data will be updated periodically to reflect current information using configuration control procedures.

During fiscal year 1996, the project team has been assembled and the *Work Plan for Defining a Standard Inventory Estimate for Wastes Stored In Hanford Site Underground Tanks* (WHC-SD-WM-WP-311, Rev 0) was published .

The TCD will be the repository of choice, providing the best basis estimate of waste characteristics for each underground storage tank. The resulting database upgrades to support this project are to be in place by September 1997.

This data management plan considers the balance of TCD upgrades and subsequent loading of data. Adequate resources and funding are available through the end of fiscal year 1996. Table 6-2 summarizes the target deliverables and dates. Project deliverables requiring data management support in fiscal year 1997 will be discussed in Section 8.0 of this plan.

6.11 NON-STATIC INFORMATION MANAGEMENT PLANS

A number of information sources routinely generate non-static data and information. This data changes frequently (daily or weekly) and is often of importance to those tracking milestone progress or operations parameters. A prime example is the Tank Characterization Progress Chart generated by the CTB. This chart displays applicable DQOs tank-by-tank and indicates sampling progress towards meeting DQO requirements. The chart is updated weekly and the graphics are updated monthly. This particular information has been migrated from WordPerfect® to Excel® and the charts have been placed easily on the internal WWW. Additional similar information types exist and will be addressed for WWW placement as well in fiscal year 1997.

Table 6-2. Summary of Target Deliverables and Dates.

Task	Due date
Develop global inventories: Phase II	3/29/96
2nd Quarter status report	4/12/96
Tank-by-tank inventories (22 tanks): Phase III	6/28/96
3rd Quarter status report	7/12/96
Tank-by-tank inventories (22 tanks): Phase IV	9/30/96
4th Quarter status report	10/11/96
Tank-by-tank inventories (70 tanks): Phase V	1/31/97
1st Quarter status report	12/13/96
Develop tank-by-tank inventories: Phase VI; issue final documentation, enter inventories into TCD	6/30/96
2nd Quarter status report	4/11/96

6.12 TCD DATA QUALITY CHECKING

During fiscal year 1996 increased capabilities to check data entering TCD will be deployed. The capability will be deployed in three phases as follows:

1. Add four new fields to the analysis result table and the analysis result change table. The four fields include: review status (reviewed, unreviewed, suspect), date of review, entity reviewing (individual or algorithm), reason for status. This task also involves developing a computer algorithm to perform checks nightly including: range check for selected analytes, order-of-magnitude differences for selected analytes, standard units missing and percent differences within a sample for selected analytes.

2. Develop additional checks in algorithm for: cation/anion comparison, historical data comparison, cross sampling event comparison, cross core comparison and standard deviations.

3. Add the four new fields to historical data and inventory data.

All phases will be complete prior to the end of fiscal year 1996.

Laboratory quality control data also currently exists in TCD including approximately 80 result types associated with duplicates, spikes, standards, blanks, recoveries , retention times, etc. In addition, laboratory data qualifiers also currently exist in the metadata within TCD.

6.13 TCD 1997 FISCAL YEAR ENHANCEMENTS AND TRAINING

In addition to the TCD enhancements completed in fiscal year 1996, four enhancements are planned for fiscal year 1997. To date a proposed list of enhancements has been drafted including:

1. Load Tank Characterization Report data into TCD from tanks B-110 and U-110. Reports have been issued for these tanks but the data was never loaded into TCD from these early (legacy) reports.

2. Provide capability to enter data into TCD from the monthly Waste Tank Summary Reports (Hanlon reports).

3. Provide capability to enter thermographs from differential scanning calorimeter instrumentation into TCD

4. Provide data fields in TCD for drilling and sample event data such as drill temperatures, drill string forces, etc.

5. Place uncertainty values associated with inventory estimates into the TCD.

6. Place sludge washing analytical data into TCD.

7. Add global inventories (Kupfer) field into TCD.

8. Add sniffer vapor data field into TCD.

These proposed enhancements along with others that may be proposed will be prioritized towards the end of fiscal year 1996. Once determined, the enhancements will be completed one per quarter as indicated in Section 8.2.

In addition to TCD enhancements, continued training to TCD users and customers must be provided as TCD is enhanced. Training is also necessary for reassigned employees or as refresher training for current employees. The training may include group classes at PNNL or WHC locations, individual training, open house demonstrations, circulars, REACH articles, help line calls, etc. A modest budget for ongoing training has been provided as a line item in Section 8.1.

6.14 CHARACTERIZATION DATA MANAGEMENT COUNCIL

A Characterization Data Management Council has been formed to specifically coordinate efforts and address issues related to data management in the TWRS characterization project. The Council meets periodically to share information, identify issues, and coordinate solutions to characterization project data management problems. A chairperson from the Characterization Technical Basis organization, the TCD administrator, the TWRS information officer, and representatives from publications, analytical labs, data users, data standards, PNNL and ICF KH comprise the Council.

Benefits of the Council are improved communications and coordination of characterization project data management activities, elimination of duplicate efforts, identification of priority issues and tasks, and more rapid solution to data management problems. The chair of the Characterization Data Management Council also is a member of the Information Management Steering Committee for TWRS.

6.15 DATA CHANGE COUNCIL

A Data Change Council has been chartered to control significant changes to the data and data fields within the TCD. The Council ensures adequate review, notification, and documentation of proposed significant changes to the TCD. Significant changes include modification, addition, or deletion of data or data fields that could impact decision making about tank safety or disposal. Planned, routine entry of analytical data or correction of known errors found as a result of a quality control process are not considered significant for

purposes of this Council and do not need to be brought before the Council. (These processes are managed by other means.) The Council is managed by the TCD administrator.

An administrative procedure (desk instruction) has been prepared to govern the Council in its consideration of requests for significant changes in the TCD. The desk instruction (DI-DM-001.00) specifies the process for assessing, reviewing, and approving significant changes. Use of the desk instruction will ensure that potentially impacted programs, projects, data users, and data customers have an opportunity to be notified and to review and comment on any proposed significant changes to the TCD. The instruction also provides for adequate approval and documentation of significant changes.

The data change council will also serve the role of editorial board to oversee changes to the technical data book (TDB) structure and standards. For a full description of the TDB, see Section 7.0.

6.16 OUTSOURCING OF TANK CHARACTERIZATION DATABASE OPERATIONS

In fiscal year 1996, a statement of work is being prepared and bids (estimates) sought for outsourcing of operations and technical support for the Tank Characterization Database. It is anticipated that outsourcing of this service could result in substantial reductions in the cost of TCD operations and support (see Section 8.1, line 4 and attached notes).

7.0 TOWARDS THE FUTURE: TECHNICAL DATA BOOK DEVELOPMENT

The TDB is intended to be the electronic access mechanism for the all technical knowledge about the TWRS project. The book will be accessible to all TWRS personnel and subcontractors through a common electronic interface. The initial representation of the book will be in support of the TWRS characterization project. The TDB will, however, be designed to be expandable to cover other portions of TWRS with a minimum of effort and a maximum amount of re-use.

The TDB is an integrating framework wherein many improvement efforts can be organized and coordinated.

7.1 GENERAL FEATURES

The TDB will be divided into two principle sections: the external TDB and the internal TDB. These are respectively resident either on the external WWW server or internal HLAN server(s). The internal TDB will be further subdivided according to organizational responsibilities for the TWRS program (e.g., Characterization and Operations)

The Internal TDB will contain the following:

- Common shareware (see Section 6.4)
- Standards for performing work (see Section 5.3)
- Desk instructions regarding data management
- Templates for document production (e.g., TCRs, SAP) (see Section 6.2)
- Data management standards and evaluation of data sources (see Sections 5.0 and 6.8)
- Non-static progress charts (see Section 6.12)
- Unique, limited scope, new field instrument data (see Section 6.7)
- Data source registry: Appropriate use categories (see Section 3.5)
- Standards for electronic information deliverables (subcontractors and vendors) (see Section 5.3)

The external TDB will be the publishing medium of choice and contain released files reflecting the state of the knowledge about the HLW tanks and eventually the TWRS program. The characterization section of the external TDB (see Section 6.6) will contain at least the following (static) information types:

- TCRs
  - Safety status
  - Inventory data and calculations
  - Sampling history

- Historical Tank Content Estimates
- DQOs
- SAPs
- TCPs
- TWAPs

A draft example of portions of the TDB is contained in the file \\DS101\ISD\FY96_ISD\CHAR\PROTOTYP\TDB-DRF.WPD.

7.2 SUPPORTING CONCEPTS

Placing most of the TDB on the external web is expected to constitute public release of the data and information. An interface with "Project X" (Life Cycle Document Management System Project) is anticipated to supply a portion of this functionality. The administration and maintenance of the TDB will be the responsibility of the "TDB Editorial Board," who will oversee and approve the development of and changes to the TDB Design Basis, including template and standards changes (see Section 6.14).

8.0 FISCAL YEAR 1997 PLANNED ACTIVITIES: COST AND SCHEDULE

8.1 COST BREAKDOWN

Table 8-1 is a cost breakdown for the fiscal year 1997 planned activities:

Table 8-1. Cost Breakdown. (2 sheets)

Item	Funding Source	FTEs #	FTEs $ K	Contract Source	Contract $ K	Material	Total $ K
Maintain technical lead for Characterization Project DM	DM CAP	1.0	91.7				91.7
Maintain Data Administrator	DM CAP	1.0	91.7				91.7
Maintain TCRC and Document Supervisor	DM CAP	.5	45.8				45.8
Maintain TCD operations and technical support including 4 TCD enhancements	DM CAP			PNNL or alternate	330 [1]		330
Provide technical support TCDM process improvements	DM CAP	.5	45.8				45.8
Maintain TCD Data Quality Officer; maintain deficiency tracker system	DM CAP	1.0	91.7				91.7
Provide support to Labcore/TCD link and data loading	DM CAP			PNNL	50		50
Provide TCD training to WHC users	DM CAP			PNNL	10		10
Place legacy characterization documents on WWW	DM CAP			Boeing	42 [2]		42

Table 8-1. Cost Breakdown. (2 sheets)

Item	Funding Source	FTEs #	FTEs $ K	Contract Source	Contract $ K	Material	Total $ K
Place HTCE documents on WWW	DM CAP			Boeing	40 [3]		40
Place baseline inventory in TCD	baseline inventory						N/A
Technical Data Book Development	DM CAP			Boeing	60[4]		60
Maintain TTB computing capability	DM CAP					11.5 computer hdwr. [5]	11.5
Develop electronic templates for document preparation	DM CAP			Boeing	35 (allow)		35
Subtotal			367		567	11.5	945
GA/CSP							78
TOTALS							1023 [6]

Notes:

- FTE $ includes functional overhead

[1]Assumes FY 1996 level of effort continues with a 17% reduction.

[2]Assumes 21 documents at $2K/document at PNNL, substantial savings may result from outsourcing

[3]Assumes 4 quadrants at $10K/quadrant

[4]Additional funds may be programmed for this task from TWRS ISD.

[5]Includes MPR of 15 percent

[6]FY 96 Data management expenditures were $1,235.7K; FY 97 budget of $1,023K represent a 17% reduction. Total is rounded.

8.2 SCHEDULE BREAKDOWN

Table 8-2 is a schedule breakdown of the major fiscal year 1997 milestones.

Table 8-2. Schedule Breakdown (Major Milestones).

Item	Start Date	Due Date
Place 21 legacy TCRs on world wide web	October 1, 1996	December 28, 1996
Place HTCE documents on world wide web	quad. 1 October 1, 1996 quad. 2 December 1, 1996 quad. 3 February 1, 1997 quad. 4 April 1, 1997	quad. 1 December 12, 1996 quad. 2 February 1, 1997 quad. 3 April 1, 1997 quad. 4 June 1, 1997
Develop electronic templates for TCR documents	October 1, 1996	June 1, 1997
Develop Technical Data Book[1]		
-deliver TDB link map	October 1, 1996	November 1, 1996
-deliver example files/ skeleton structure	November 1, 1996	November 16, 1996
-develop document production specifications	November 16, 1996	November 30, 1996
-develop document viewing environment	November 16, 1996	November 30, 1996
-develop required standards	November 16, 1996	November 30, 1996
-develop configuration management plan	November 30, 1996	December 15, 1996
Revise characterization project Data Management Plan	October 1, 1996	March 30, 1997
Complete first TCD enhancement[2]	October 1, 1996	December 28, 1996
Complete second TCD enhancement[2]	January 2, 1997	March 31, 1997

Table 8-2. Schedule Breakdown (Major Milestones).

Item	Start Date	Due Date
Complete third TCD enhancement[2]	April 1, 1997	June 30, 1997
Complete fourth TCD enhancement[2]	July 1, 1997	October 1, 1997

Notes:

quad. = quadrant

[1]Provides first phase which includes structure of data book, does not populate data book.

[2]See Section 6.14

8.3 BUDGET PRIORITIES

In the event that data management budgets must be reduced to a greater extent than has already been planned in this document, cuts will be made in the following order:

1. Line 12: technical data book development
2. Line 14: develop electronic template for document preparation
3. Line 10: place HTCE documents on WWW
4. Line 9: place legacy documents on WWW
5. Line 5: provide technical support to TCDM process implements.

These cuts preserve basic operation of essential data resources and services, but sacrifice long-term improvements in technology, work efficiency and capability, and in data dissemination to the public.

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ATTACHMENT A

SELF-ASSESSMENT STANDARDS CHECKLIST FOR DATA SYSTEMS

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March 28, 1996

To: Distribution

From: M. R. Adams

Re: Self-assessment Standards Checklist for Data Systems (follows)

SELF-ASSESSMENT STANDARDS CHECKLIST FOR DATA SYSTEMS

The purpose of this checklist is to provide self-assessment of the data, hardware, and software of a data system. The information collected should be used to assess the system and data to identify areas for improvement and plan for corrective action.

Not all questions apply to every system. A graded approach should be used in determining which questions and to what degree each question applies. Consideration should be given to the relative importance of the system, risk and impact associated with loss or misuse of the data, cost to recover from a loss of data, benefits, and funding.

The checklist is intended to used as a self-assessment tool by the organization responsible for the system or an unofficial assessment tool by a user of the data. It may be used to help those responsible for systems to be as thorough and complete in design, documentation and protection of the hardware, software, and data in the system as required for the relative importance of the system and value of the data.

The checklist can help users to better understand the system and data and to identify where requirements are not being met.

1.0 DATA ADMINISTRATION

1.1 DATA RESPONSIBILITIES

1. Who is the owner of the data, for each type of data, (responsible for setting rules and making decisions regarding the data)?

2. Are the responsibilities for the data owner and users clearly defined?

3. What are their responsibilities? Have the users been informed?

1.2 CONFIGURATION MANAGEMENT OF DATA

Data

1. What controls exist for creating, viewing, changing, updating, deleting, and archiving data?

2. Are these controls documented?

3. Is a history of changes to the data tracked? If so, how long?

4. Are the date, time, and person making a change tracked?

5. Is there any known data redundancy between this system and any of the feeder systems?

6. If yes, how is preference determined?

Responsibilities

1. Who can authorize changes to the data?

2. Are authorization levels appropriate?

1.3 CONTINGENCY PLANNING

Data

1. Is there a documented contingency plan including backup and recovery in case of loss of data?

2. When was the plan last tested?

3. Does the plan consider impacts to both input and output interface systems?

4. What amount of data entry backlog (available data not on the system) triggers alternative action?

5. What criteria exists for dispositioning of data entry backlogs?

Personnel

1. Are trained backup personnel available to collect and enter data in the event that primary personnel are unavailable?

1.4 PRIVACY AND SENSITIVITY

1. Is the data classified, sensitive, proprietary, or private?

2. What are the risks associated with the loss or misuse of the data?

3. What methods of protection are in place that are not covered by the hardware and software sections?

1.5 DATA QUALITY (ACCURACY, PRECISION, COMPLETENESS)

1. What are the quality requirements or objectives?

2. For what purposes can the data be used?

3. Does the data have an adequate pedigree (traceability to the source)?

4. What measures exist to assess data quality?

5. Are quality levels or indicators created and stored?

Edit Checks

1. What edit checks exist?

2. What if the value is out of range? Is the value allowed or not?

3. How are out of range values reconciled?

Validation and Verification (correctness and completeness)

1. What methods exist to validate and verify the data?
2. Is there a procedure?
3. Has the data been validated and verified all the way back to the source?
4. How are problems reconciled?
5. How are problems communicated to the users?

1.6 DATA COLLECTION AND ENTRY

1. What data collection procedures exist?
2. Is any metadata generated during data collection?
3. If so, where is it recorded?
4. What data entry procedures exist?

1.7 DATA DISSEMINATION

1. With what systems is the data shared?
2. What data are shared?
3. What reports are available and on what media?
4. What data are in the reports?
5. Who accesses the data?

1.8 DATA DOCUMENTATION

1. Are data definitions, descriptions, models, and data life cycles documented?
2. Are data quality, protection, and authority requirements documented?
3. Are data flow diagrams in place?

4. Do the data flow diagrams trace all the way to the source of the data and include all interfaces?

5. Has all documentation been approved by the owner?

1.9 TRAINING

1. Do data collection and entry personnel adequately understand the data?

2. Do the users including those that receive the data through an interface understand the data and what it can be used for?

1.10 TIMELINESS

1. How frequently is the data collected or updated?

2. Is the date and time known?

3. When is the data made available to the users on the system?

4. How current is the data in the feeds and reports?

5. Are users notified of any backlog?

1.11 DATA STANDARDS

1. What industry, company, and site data standards apply?

2. Are they followed?

2.0 HARDWARE

2.1 PHYSICAL PROTECTION OF HARDWARE

Access Control

1. How is access controlled? (key, cipher lock, Omnilock)

2. If keys, who controls them and who has them?

3. If codes, who controls them and when were they last revised?

4. When was the last time the access control list (e.g., a list of active Omnilock codes) was printed and reviewed?

Detection

1. What means of smoke detection are employed?

2. What means of heat detection are employed?

3. What means of fire detection are employed?

4. What means of water detection are employed?

5. How are electrical surges and outages detected?

6. Is the system electronically monitored so that hardware failure will be immediately detected and addressed?

7. Are any other means used?

Suppression

1. What smoke suppression methods are employed?

2. What heat dissipation techniques are employed?

3. What fire suppression tools are available?

4. What means are available to void excess water?

5. Is backup power available?

6. How are electrical surges normalized?

2.2 CONTINGENCY PLANNING FOR HARDWARE BACKUP

1. Is there a documented plan?

2. When was it last updated?

3. Has it been tested? When?

4. What happens when one of the means of detection or suppression is activated? Who is notified? Are the system manager and users notified?

5. What length of down time triggers alternative action?

2.3 HARDWARE SYSTEM DOCUMENTATION

Hardware

1. Are the hardware components and individual specifications/requirements identified in the system documentation?

2. Are maintenance contracts and contacts clearly identified?

3. Does system documentation include telecommunication components, graphics devices, special purpose I/O devices, controllers?

4. Are vendor contacts listed and current?

User

1. Are appropriate directions for using the hardware found in the user documentation?

2.4 HARDWARE USER TRAINING

1. What hardware training is available?

2. How is user training conducted (class, one-on-one)?

3. Is attendance required before user account is established?

4. Is attendance documented?

2.5 TELECOMMUNICATION SECURITY

1. What telecommunications equipment (Microwave, telephone, modem) is used?

2. Where is it located?

3. How is it protected?

4. What alternatives exist in the event of primary failure?

5. Which is preferred?

6. Has its use been tested?

2.6 HARDWARE PERFORMANCE STANDARDS

1. Are any established? If so, what are they?

2. How frequently is performance measured?

3. How frequently are adjustments/corrections required?

3.0 SOFTWARE

3.1 SYSTEM ACCESS CONTROL

Documentation

1. Is there a written procedure?

2. Is there a written request?

3. If yes, is the request signed by the user?

4. Is the request approved by the user's manager?

5. Is the request approved by the System Administrator?

6. Are the authorities for each user documented (e.g., read only, read/write for what subsets of data)?

Account Access

1. Are passwords required or is some other method used?

2. If yes, are they user or system generated?

3. What minimum length is required?

4. What is the configuration?

5. Are changes forced?

6. If yes, how frequently?

7. How many cycles are locked?

8. How are user-requested changes controlled?

9. How are unsuccessful attempts handled?

10. Are successful accesses logged (e.g., transaction log)?

11. What is done to detect intruders? Is the transaction log reviewed?

Access Review

1. Are transferred or terminated employees promptly identified and access authority revoked?

2. How is ongoing need verified for each user of the system?

3. How is scope of authority defined and controlled?

Code

1. Are the current source code or another source of rebuilding the system maintained?

2. Are backup copies maintained in a different building?

3. How is the executable (object) code protected?

4. What controls exist to prevent unauthorized access and modification to executable code?

3.2 CONTINGENCY PLANNING FOR SOFTWARE

1. Is there a documented Contingency Plan?

2. Does the Plan include telecommunication coverage?

3. When was the Plan last tested?

4. Has system management identified the current risks and acknowledged the potential consequences?

5. Do the terms and conditions of the software license permit transfer to another CPU if the primary unit is unable to operate?

6. Are we using the latest version of the software?

7. If not, what are the potential consequences?

8. Are we using the latest version of the operating system?

9. If not, what are the potential consequences?

10. Are trained backup personnel available in the event that primary personnel are unavailable?

3.3 SYSTEM CONFIGURATION MANAGEMENT

1. Is there a written and approved procedure for making any modification to the system?

2. Are all addition, revision, deletion requirements documented in detail in writing and approved by the owner?

3. Are all change requests submitted to a central location?

4. Are change requests prioritized by the system owner?

5. Is a Test Plan prepared by the owner in advance?

6. Are test results documented?

7. Are all adverse results dispositioned by correction and retesting?

8. Is there a formal acceptance process?

9. How is implementation into the executable code controlled?

10. Is a source code library maintained?

11. Do explanations (comments) in the source adequately explain who made changes, what changes were made, and when?

12. Is there any known similar functionality between this system and any other systems?

13. How are users notified of changes?

3.4 SOFTWARE DOCUMENTATION

System Documentation

1. Is the system adequately documented at least meeting requirements in WHC-CM-3-10 and WHC-CM-4-2 QR 19?

2. Is the system quality affecting software per WHC-CM-4-2 QR 19? If quality affecting software, what are the approval designators (E, S, Q, and/or D) per WHC-CM-3-5 Section 12.7?

3. Are system documents (manuals) protected by RIDS?

4. Are electronic versions backed up in accordance with RIDS?

5. Are system documents updated as an integral part of each and every modification to the system?

6. Has the system been registered in the Hanford Information System Inventory (see JetFORM RL-649)?

User Documentation

1. Is there a User's Manual?

2. Who's responsible for its accuracy?

3. Are user documents (manuals) protected by RIDS?

4. Are electronic versions backed up in accordance with RIDS?

5. Are user documents updated as an integral part of each and every modification to the system?

3.5 SYSTEM EDITS

1. Are data edits defined in the software requirements?

2. Are both rejects and recycles anticipated? Recycles are rejects that are accumulated to be checked or reprocessed at a later time.

3. What controls exist to ensure that rejects are dispositioned and reentered?

4. What controls exist to ensure that recycles are cleared in a timely manner?

3.6 SOFTWARE USER TRAINING

1. What training is available?
2. How is user training conducted (class, one-on-one)
3. Who provides the training?
4. What are their credentials?
5. Is attendance required before user account is established?
6. Is attendance documented?
7. Is the training evaluated by the attendees and suggestions provided to the system owner?

3.7 SYSTEM VALIDATION AND VERIFICATION

Formulas and Calculations

1. Is the source of each formula documented?
2. Are formulas verified by an independent source?
3. Are mathematical results validated?

Data Standards

1. Does the system comply with all industry, company, and site standards or have waivers been granted?

3.8 TELECOMMUNICATION PROTOCOLS

Input

1. What systems send data to this one?
2. How is the data transmitted?
3. What alternative transmission methods are possible?
4. What are the consequences if the data is not available?

Output

1. What systems receive data from this one?
2. How is the data transmitted?
3. What alternative transmission methods are possible?
4. What are the consequences if our data is not available?

3.9 SYSTEM PERFORMANCE STANDARDS

1. Are any performance standards established? If so, what are they?
2. How frequently is performance measured?
3. How frequently are adjustments/corrections required?

3.10 PERSONNEL SECURITY

System Analyst

1. Who is (are) the system analyst(s)? Are they listed in documentation?
2. What academic credentials does each have?
3. How much experience does each have as an analyst?
4. How much experience does each have with this system?
5. Is the prior analyst still an employee?
6. Who is available to provide such skills in the event of accident, illness, vacation, transfer, or termination?
7. Is there a rotating on-call list?

System Programmer

1. What language(s) are used?
2. Who is (are) the system programmer(s)? Are they listed in documentation?

3. What academic credentials does each have?

4. How much experience does each have as a programmer?

5. How much experience does each have with this system?

6. Is the prior programmer still an employee?

7. Who is available to provide such skills in the event of accident, illness, vacation, transfer, or termination?

8. Is there a rotating on-call list?

Data Entry

1. Who is (are) the data entry personnel? Are they listed in documentation?

2. What academic credentials does each have?

3. How much practical experience does each have?

4. How much is required?

5. How much experience does each have with this system?

6. Who is available to provide such services in the event of accident, illness, vacation, transfer, or termination?

7. Who will supplement current staff to disposition any data entry backlog?

8. Is there a rotating on-call list?

ATTACHMENT B

PUBLICATIONS STANDARDS

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The following information and instructions are based on the suggested Statement of Work for Resource Documentation Supplied by Subcontractor (June 1, 1995). It includes modifications that pertain to the Tank Characterization Reports.

A. Scope, Work Tasks, Descriptions, and Requirements

1. Supplier shall provide a hard copy and an electronic copy of documentation. Supplier shall use a 3.25-in. or a 5.25-in. double-sided high density diskette and shall provide a list of contents.

2. Documentation text shall be provided in WordPerfect 5.1 or 6.1. Graphics shall be provided in software that is compatible with WordPerfect 5.1 or 6.1.

3. Document numbers will be supplied by the author.

B. Documents shall be formatted as follows:

1. Font shall be 12 cg times.

2. Font size shall not be less than 12 pt. in text, tables, and graphics. If necessary, tables shall be placed horizontally on the page to fit.

3. Margins
   a. Top: .5-in. from page top to header (centered document and revision numbers on each page) and .5-in. margin between header and text.
   b. Bottom: .5-in. from bottom of text to footer (centered page number) and .5-in. margin from footer to page bottom.
   c. Sides: Right side margin = 1-in. left side margin = 1.5-in.

4. Executive Summaries
   a. Page numbers should be ES-1, ES-2 etc. Figures and tables should begin ES-.
   b. Executive summaries should be double-spaced.
   c. References in an Executive Summary will cited in the reference section of the document.

5. Table of Contents
   a. Shall be electronically generated.
   b. Shall include all section titles through the third order, figures, and tables. Appendix and attachment titles only shall appear after section titles and before figures and tables. Within the Table of Contents, individual appendices will be titled as follows:
      A TITLE OF APPENDIX
      B TITLE OF APPENDIX
   c. Shall be numbered i, ii, etc.

6. The List of Terms including acronyms (ALARA) and measurements (kL) shall follow the table of contents.

7. Appendices
   a. Shall not have separate tables of contents or lists of figures, tables, or terms.
   b. Sections shall be numbered as follows: A1.0, A1.1, A1.1.1 etc.

8. Documentation headings
   a. Headings through the third level shall have decimal numbers (1.0, 1.1, 1.1.1)
   b. First order headings (section titles as 1.0) shall be centered and in bold caps.
   c. Second order headings (1.1) shall be left justified and in bold caps.
   d. Third order headings (1.1.1) shall be left justified and in bold with initial caps.
   e. Fourth order headings shall be left justified and in bold with initial caps followed by a period.
   f. Two spaces shall be inserted between level heading numbers and the text that follows.

9. Measurements shall be written in international system units. Measurements should be abbreviated in the text and spelled out in the List of Terms. If desired, U.S. measurements can follow international system units in parentheses.

10. Superscripts and subscripts shall be used when appropriate, e.g., for footnoting or in chemical names: (H_2O or ^{241}Am).

11. Figures and drawings shall have numbers and titles that appear above the figure or drawing. Figures shall be referenced in the text (see Figure 1-1) and be placed as close to the first reference as is possible. Figures shall fit within allowable margins or on 11 x 17-inch pages.

Figures and drawings shall be compatible with WordPerfect 5.1, 6.0, or 6.1. Figures that cannot be made compatible with WordPerfect must be submitted as electronically generated and printed on a laser-jet printer. Photographs shall be submitted as half-tones.

Major text in the figures/drawings should be in the upright position and should be easy to read.

12. Tables shall meet the following requirements:

    a. Shall be done in WordPerfect 5.1, 6.0, or 6.1. (At this time, we believe that only 5.1 will go on the internet.)
    b. Shall have a number and a title which are included in the top cell that has no visible top or side lines. If the title is footnoted, the footnote number shall follow the title, e.g., Title.[1] (2 sheets)
    c. Column title rows should be bottom justified. Column titles should be initial capitalized except for words such as "a," "and" etc.
    d. Shall be formatted using indents (not spaces).
    e. Shall be referenced in text (see Table 1-1) and be placed as close to that reference as possible.
    f. Footnotes (Example attached)
        (1) Shall be included at the bottom of the table in a cell that has no visible bottom or side lines.
        (2) The first line of the cell shall be blank and the second line shall say Note: or Notes:. Footnotes shall begin on the third line.
        (3) Footnotes will be indented.
        (4) Where there is more than one footnote, and if any footnote is more than a single line, double space between footnotes. An exception is as follows: if double spacing footnotes will bump the footnote cell to the next page, delete the double spacing if, by so doing, the cell will fit the current page.
        (5) Footnotes shall be in 10 pt type.
    g. References within footnotes should be text-type references, e.g., Babad (1994). Do not follow reference with a period. A full reference should appear in the reference section.
    h. Tables extending for more than one page length shall have the table title and header row(s) marked as header rows.

13. Equations
    a. All equations shall be input using the WordPerfect equation editor.
    b. Equations shall be in 12 pt. or 10 pt. cg. times depending on size. Use discretion and consistency. Equations should not be italicized.

14. References shall include the following in consecutive order and separated by commas: (indent) (shift-tab), last name and initials of primary author, initials and last names of other authors in alphabetical order, year of publication, title of document, document number, document revision, publisher, city, and state of publication. Within text a reference is cited (author last name followed by the year of publication) or (author last name et al. followed by the year of publication).

13. Acronyms and Abbreviations

Acronyms are used when the name or term is used repeatedly throughout a document; they are not used when the term is used a limited number of times. Each acronym is spelled out upon first usage, e.g., transuranics (TRU); thereafter TRU. Acronyms shall appear in a List of Terms after the Table of Contents and before the first section.

Abbreviations shall follow the same conventions as acronyms.

14. A trademark, e.g. ™, shall follow a trademarked product name, and a note shall appear after its first use including the product name, owner, and the city, and state when appropriate., e.g.," WordPerfect is a trademark of the WordPerfect Corporation within the United States," or "SUMMA is a trademark of Molectrics, Inc., Cleveland, Ohio."

15. Pagination
    a. Short documents, i.e., fewer than 25 pages, can be numbered as 1, 2, 3, etc.
    b. Longer documents, i.e., more than 25 pages, or documents with sections shall be numbered 1-1, 1-2, 2-1, 2-2, etc.
    c. Documents with sections shall have all sections beginning on odd numbered pages. Therefore if a section ends on an odd-numbered page, it shall be followed by a blank page.
    d. Documents longer than 25 pages shall be printed back-to-back.

ATTACHMENT C

SUPPLEMENT TO ATTACHMENT B

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ATTACHMENT C

SUPPLEMENT TO ATTACHMENT B

The following information was exerted from Using Excel Version 5 for Windows, Special Edition, copyright 1993, Que Corporation

EXPORTING TEXT

You can export data to many DOS or mainframe applications by saving the file in one of the many formats used by Excel. Most DOS or mainframe applications can translate from one of these formats into their own formats.

IMPORTING EXCEL DATA INTO A WORDPERFECT 5.1 FILE

To import Excel files into a WordPerfect 5.1 document, save the Excel file as a "comma delimited" file. Then, send the file to a Media Service Center for incorporation into your document. NOTE: The closest Media Service Center is in 2750E; Bette Lauzon is the Lead Editor.

LINKING EXCEL DATA TO WORDPERFECT 6.0 OR 6.1 FILE

Excel worksheets or ranges can be read directly into some programs, such as WordPerfect. Rather than using a file format as an intermediary, WordPerfect and some other word processors have the capability of reading data directly from an Excel worksheet file.

To import Excel data into a Wordperfect 6.0 or 6.1 complete the following steps:

1. Save your Excel data in Excel 4 worksheet format.

   NOTE: WordPerfect 6.0 and 6.1 import several spreadsheet file formats that Excel exports, including Excel 2.1, 3.0, and 4.0; and Lotus 1-2-3, versions 1.0 through 3.1.

2. Switch to Wordperfect, if it is already running; otherwise, start is now.

3. Open the WordPerfect file in which you want to use the Excel data, if it is not already open, and then position the cursor where you want the Excel data to appear.

4. Choose the Tools command, or press Alt+F7; then choose Spreadsheet Import.

5. Choose Filename, type the full path name, and then press Enter.

6. Choose the Range command, and enter the data range or range name. If you don't specify a data range or range name, the entire worksheet is imported.

7. Choose the Type command, and select Import as Table or Import as Text. You may need to reformat fonts and columns in tables to fit the data on the page.

   CAUTION: Some mathematical functions in Excel may not translate into WordPerfect so check the results carefully.

8. Choose the Import command.
   WordPerfect inserts the data.

   TIPs: You can use WordPerfect's File List or Quicklist to find the file you need.

   To preserve Excel's mathematical functions so that WordPerfect can recalculate the data if you make changes, choose the Import as Table command.

ATTACHMENT D

STANDARDS FOR HARD COPY AND ELECTRONIC INFORMATiON DELIVERABLES

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STANDARDS FOR HARD COPY AND ELECTRONIC INFORMATION DELIVERABLES

Information created and supplied to Westinghouse Hanford Company (WHC or Buyer) must follow the standards as set forth in this document, unless otherwise specified by the buyer. Electronic deliverables shall be compatible with and able to integrate with the hardware and software architecture as specified. Seller transfer of deliverables to the buyer must be completed before Purchase Order expiration.

The following requirements apply to standards for electronic and hard copy information deliverables produced for WHC by its subcontractors and suppliers.

1.0 CURRENT HARDWARE/SOFTWARE ARCHITECTURE

The standard end user workstation is INTEL™[3] based and is a node on the Hanford Area Network (HAN). Each workstation is loaded with the End System Operating Environment (ESOE). The ESOE comprises Microsoft™ (MS) Windows for Workgroups™ Version 3.1.1 (WFW) and MS-DOS™ 6.22. The HAN presents an Ethernet interface to the ESOE workstation which uses MS TCP/IP-32 for the network interface. The MS Winsock™ Applications Programming Interface (API) Version 1.1 is enabled.

A standard application suite for an ESOE workstation includes Novell, Inc, WordPerfect™ 5.1, IBM™/ Lotus Development Corporation cc:MAIL™ (DOS or Windows versions), IBM/ Lotus Development Corporation LOTUS™ 1-2-3™ spreadsheet (DOS version), and Software Publishing Corporation Harvard Graphics™ (DOS Version 3.0). The MS Windows™ based products WordPerfect™ 6.0A and WordPerfect™ 6.1, and MS EXCEL™ spreadsheet have been approved for controlled introduction and are expected to become standard products. MS PowerPoint™ is just being proposed for controlled introduction. Currently, only WordPerfect™ 5.1, cc:MAIL™ (DOS and Windows version), and Harvard Graphics™ are available on every ESOE workstation.

INTEL is a registered trademark of Intel Corporation. Microsoft and MS-DOS are registered trademarks and Windows, Windows for Workgroups, Winsock, EXCEL, and PowerPoint are trademarks of the Microsoft Corporation. WordPerfect is a registered trademark of the WordPerfect Corporation acquired by Novell Corporation. IBM is a registered trademark of the International Business Machines Corporation (IBM). LOTUS and 1-2-3 are registered trademarks of the Lotus Development Corporation acquired by IBM. cc:MAIL is a trademark of cc:MAIL Incorporated, acquired by LOTUS Development Corporation, acquired in turn by IBM. Harvard Graphics is a registered trademark of Software Publishing Corporation.

2.0 ELECTRONIC DELIVERABLES - GENERAL

2.1 HARD COPY

The Seller shall provide a hard copy of all electronic deliverables. The standard page size is 216 x 279 mm (8.5 x 11 in.)

Data deliverables and computational deliverables that produce data are excluded.

Specific requirements for media, file format, and hard copy deliverables are listed below for each type of electronic deliverable.

3.0 DOCUMENTS

3.1 MEDIA

Electronic document files shall be provided on one of the following media formats as specified by the buyer:

3.1.1 90-mm (3.5 in.)/1.44 MB IBM PC-formatted floppy diskette(s)

3.1.2 130-mm (5 1/4 in.) MPC CD-ROM disk

3.2 FILE FORMATS

Electronic document files shall be provided in one of the following file formats:

3.2.1	Documents:	Wordperfect 5.1 format
3.2.2	Spreadsheet:	Excel 4.0 (.xls) format or Lotus 1-2-3 (wk?) format
3.2.3	Database:	Xbase (.dbf) format

3.3 HARDCOPY FORMATS

Font shall be CG Times, Letter Gothic. Font size shall not be less than 10 point in text, tables, and graphics.

Margins shall be as follows:

3.3.1 Top: 13 mm (0.5 in.) from page top to header (centered document and revision numbers on each page) and 13 mm (0.5 in.) margin between header and text.

3.3.2 Bottom: 13 mm (0.5 in.) from bottom of text to footer (centered page number) and 13 mm (0.5 in.) margin from footer to page bottom.

3.3.3 Side: 25 mm (1 in.), all sides

3.4 MEASUREMENT UNITS

Measurement units shall be written in the International System of Units (SI) unless otherwise directed by the Buyer. It is acceptable to use SI measurements with the common unit equivalent shown following, in parentheses, eg, 25.4 mm (1 in.). Units of Measure may be abbreviated when used with numeral quantities e.g., 100 L. Reference material on the use of the metric system is available from the Buyer.

Note: The current version of this document refers to paper sizes and margins in U.S. common units for the convenience of the Buyer and the Supplier. In the next several years A4 paper will become the preferred size paper, however, this size cannot be processed by current U.S.-manufactured printers and copiers and some software cannot provide margins in SI units.

3.5 PREDOMINANTLY TEXT ELECTRONIC DOCUMENTS

This section addresses the traditional word processing document that is predominantly text with occasional embedded tables and graphics. These requirements apply to supporting documents, publications, manuals, and other types of documents.

3.5.1 File Format

The standard preparation software for text is the DOS-based WordPerfect 5.1. Electronic deliverables shall be provided as WordPerfect 5.1 files. Any other software to be used shall be approved by the Buyer.

3.5.2 Document Numbers

Document numbers will be supplied by the Buyer.

3.5.3 Document Format

3.5.3.1	Table of Contents (TOC)
3.5.3.1.1	The TOC shall be electronically generated.
3.5.3.1.2	The TOC shall include all section titles through the third order, figures, and tables. Appendix and attachment titles, only, shall appear after section titles and before figures and tables.
3.5.3.1.3	A list of terms including acronyms and abbreviations shall follow the TOC.
3.5.3.2	Headings
3.5.3.2.1	Headings through the fifth level shall have decimal numbers (1.0, 1.1, 1.1.1, 1.1.1.1, 1.1.1.1.1)
3.5.3.2.2	First order headings (section titles as 1.0) shall be centered and in bold caps.
3.5.3.2.3	Second order headings (1.1) shall be left justified and in bold caps.
3.5.3.2.4	Third order headings (1.1.1) shall be left justified and in bold with initial caps.
3.5.3.2.5	Fourth order headings shall be left justified and in bold with initial caps followed by a period and text.
3.5.3.3	Superscripts and subscripts shall be used when appropriate, e.g., for footnoting or in chemical names (H_20 or ^{241}Am).

3.5.4 Figures and Graphics

Figures and graphics shall be referenced in the text (see Figure 1) and be placed as close to the first reference as is possible. They shall fit within allowable margins.

Figures and graphics shall have numbers and captions that appear above the figure.

Figures and graphics shall be compatible with WordPerfect 5.1 unless otherwise authorized by the Buyer. Compatible means the file format is capable of being incorporated into a WordPerfect document file. Figures that cannot be made compatible must be submitted as electronically generated and printed on a LaserJet™[4] printer. Photographs shall be submitted as half-tones.

3.5.5 Tables

Tables shall be referenced in text and be placed as close to the reference as possible. If necessary, tables may be placed horizontally on the page to fit.

Tables may be prepared using the WordPerfect Table editor:

3.5.5.1 Table numbers and captions shall be included in a cell that has no visible top or side lines.

3.5.5.2 Footnotes and references shall be included at the bottom of the table in a cell that has no visible bottom or side lines.

3.5.5.3 For tables that extend more than one page in length, the table title and header row(s) shall be marked as header rows and appear on each page.

Small Tables may be prepared within the text body, using tabs (not spaces).

3.5.6 Equations

Equations prepared in WordPerfect shall be prepared using the Equation editor.

Reference shall include the following in consecutive order and separated by commas:

3.5.7.1 (indent) (shift-tab),

3.5.7.2 last name and initials of primary author,

3.5.7.3 initials and last names of other authors in alphabetical order,

3.5.7.4 year of publication,

3.5.7.5 title of document, document number, document revision, publisher, city, and state of publication.

LaserJet is a registered trademark of Hewlett Packard Corporation

Within text a reference is cited:

3.5.7.6 (author last name followed by the year of publication) or

3.5.7.7 (author last name et al. followed by the year of publication)

References relating to tables and appendices shall follow the table or appendix.

3.5.8 Acronyms and Abbreviations

Acronyms and abbreviations are used when the name or term is used repeatedly (more than 3) throughout a document. Each acronym is spelled out upon first usage, e.g., transuranic (TRU), and thereafter stand alone, e.g., TRU. Acronyms shall appear in a List of Terms after the TOC and before the first section. The required abbreviations for engineering documents are those defined in ASME Y1.1 "Abbreviations for use on drawings and in text."

3.5.9 Trademarks

A trademark symbol, ™, shall follow a trademarked product name, after its first use and a note shall appear including the product name, owner, and the city and state when appropriate., e.g.,"WordPerfect is a trademark of the WordPerfect Corporation within the United States" or "Summa is a trademark of Molectrics, Inc., Cleveland, Ohio."

3.5.10 Pagination

Short documents may be numbered 1, 2, 3, etc. Documents with more than 25 pages shall be numbered 1-1, 1-2, 2-1, 2-2, etc., according to their major section numbers. Documents with major sections and having more than 25 pages shall have all sections beginning on odd numbered pages. Therefore, if a section ends on an odd-numbered page, it shall be followed by a blank page.

This is because documents longer than 25 pages shall be printed back-to-back.

3.6 SPREADSHEETS

This section addresses documents that are predominantly of a spreadsheet nature with some embedded text and graphics.

Windows-based spreadsheets shall be provided in the format of Microsoft EXCEL 4.0 (.xls) or later version. DOS-based spreadsheets shall be provided in the format of LOTUS 1-2-3 version 2.0 or later.

Upon Buyer approval, an export feature may be used to meet the spreadsheet standards.

3.7 PRESENTATION MATERIAL

This section deals with those electronic deliverables that contain presentation material, including presentation graphics.

Presentation materials shall be compatible with Harvard Graphics. Compatible means the file format is capable of being read and processed by Harvard Graphics software. Microsoft Powerpoint or comparable product may be used with buyer approval.

3.8 DATABASE FILES

Database files shall be provided in Xbase (.dbf) format unless otherwise agreed to by the Buyer.

3.9 COMPUTER-AIDED DESIGN (CAD) PRODUCTS

3.9.1 Drawings

3.9.1.1 AutoCAD™[5] is the minimum requirement drafting software for delivery of engineering drawings released into the Hanford controlled, engineering drawing system.

3.9.1.2 Drawings developed using CAD software other than AutoCAD shall be converted by the supplier to AutoCAD (datasets ".DWG" format) before final plot generation. The version of AutoCAD (e.g., version 12c4), used for development of ".DWG" datasets shall be determined and approved as part of the final contract negotiation.

3.9.1.3 Sellers shall submit CAD datasets (.DWG format) at the completion of their purchase order contract concurrent with the release of the final hard copy engineering drawings. A one-to-one continuity shall be maintained between the AutoCAD datasets (.DWG format) and the released drawings, i.e., the released drawings shall be capable of producing plotted drawings from the ".DWG" datasets.

AutoCAD is a registered trademark of the Autodesk Corporation

3.9.2 3D Manufacturing Models

Electronic media (i.e. 3D models, Stereo Lithography files, 3D IGES files, APT programs, etc.) used in the fabrication or development of prototype or automated manufacturing deliverables shall be provided in their native format. Such media shall be clearly identified as to the software they were created on, software revision levels, and other distinguishing characteristics.

3.9.3 Electronic Media and Formats

The following are accepted forms for transfer of drawing files using an electronic media format. Other media may be used if approved by the Buyer.

3.9.3.1 Tape Formats

QIC-80 (any)
DC2120/KappaMat

3.9.3.2 Rewritable Optical, all of the following:

600 MB or 1.3 GIG 130 mm (5 1/4 in.) Rewritable Optical
1024 Bytes/Sector CorelSCSI™[6] format 130 mm (5 1/4 in.) Rewritable Optical

1024 Bytes/Sector, Micro Design™ format 130 mm (5 1/4 in.) Rewritable Optical

3.9.3.3 WORM Optical, all of the following:

400 MB or 940 MB 130 mm (5 1/4 in.) WORM Optical, Micro Design format

CorelSCSI format

3.9.3.4 CD-ROM

3.9.3.5 Iomega Bernoulli™ (44 and 90 MB formats) drives

CorelSCSI is a registered trademark of the Corel Corporation, Micro Design is a registered trademark to the Micro Design International Corporation, Iomega Bernoulli is a registered trademark to the Iomega Corporation.

DISTRIBUTION

Number of Copies		
OFFSITE		
	Richland Operations Office	
2	J. F. Thompson Jr.	S7-54
	N. W. Willis	S7-54
1	Pacific Northwest National Laboratories	
	S. F. Bobroski	K7-28
ONSITE		
18	Westinghouse Hanford Company	
	M. A. Adams	R2-12
	R. B. Bass	S7-81
	D. L. Banning	R2-12
	R. A. Bechtold	K7-22
	M. K. Britton	B3-56
	B. D. Byron	H8-05
	J. W. Cammann	R2-12
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	T. Legore	H8-44
	D. J. McCain	R2-12
	E. I. Husa	R1-30
	J. G. Kristofzski	R2-12
	J. B. Schaffer	R2-12
	R. R. Thompson	R2-12
	A. E. Young	R2-12
	Central Files	A3-88
	DPC	A3-94

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DISTRIBUTION SHEET

To	From	Page 1 of 1
Distribution	Data Management	Date 06/12/96
Project Title/Work Order		EDT No. EDT-616008
WHC-SD-WM-MP-002, Rev. 0, "Tank Characterization Project Data Management Plan"		ECN No. N/A

Name	MSIN	Text With All Attach.	Text Only	Attach./ Appendix Only	EDT/ECN Only
OFFSITE					
U. S. Department of Energy - Richland Field Office					
J. F. Thompson, Jr.	S7-54	X			
N. W. Willis	S7-54	X			
Pacific Northwest National Laboratories					
S. F. Bobroski	K7-28	X			
ONSITE					
Westinghouse Hanford Company					
M. R. Adams	R2-12	X			
R. B. Bass	S7-81	X			
D. L. Banning	R2-12	X			
R. A. Bechtold	K7-22	X			
M. K. Britton	B3-56	X			
B. D. Byron	H8-05	X			
J. W. Cammann	R2-12	X			
R. J. Cash	S7-14	X			
S. J. Eberlein	R2-12	X			
J. W. Hunt	R2-12	X			
T. Legore	H8-44	X			
D. J. McCain	R2-12	X			
E. I. Husa	R1-30	X			
J. G. Kristofzski	R2-12	X			
J. B. Schaffer	R2-12	X			
R. R. Thompson	R2-12	X			
A. E. Young	R2-12	X			
Central Files	A3-88	X			
T.C.R.C.	R2-12	X			