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Waste Characterization System

Program Description Document

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Summary of Revisions

2/14/03 - Revision 0; Initial Issue

3/11/03 - Revision 1; Addition of backup/recovery discussion, addition of Reference 7, clarification of data entry for pre-transfer projections, and editorial changes

6/4/04 - Revision 2; Preparation for implementation of a new WCS platform (a web based program) to include clarification for the required changes associated with re-establishing WCS 1.5, deleted reference to the Sample Management Plan, added discussion of salt/sludge volume information sources to include engineering calculations and technical reports, modified PDD format, incorporated the role and responsibility of the DIRT committee for coordination and execution of the PDD implementation items

WSRC-IM-2003-00010

1.0 SCOPE

The scope of this Program Description Document (PDD) is to ensure that all data and calculations in the Waste Characterization System (WCS) that implements requirements of the Documented Safety Analysis (DSA) programs and Technical Safety Requirements (TSR) are controlled. This document is not a Safety Basis Document.

2.0 PURPOSE

The purpose of this PDD is to provide background information and describe the key controls needed to ensure the validity of the data and calculations contained in the LWD WCS.

3.0 BACKGROUND / PROGRAM DESCRIPTION

The WCS was developed for the purpose of having a data source for waste compositions in all high level waste tanks in the F & H Tank Farms. This system allows data input (e.g., waste characterization, tank levels and chemistry) for supernate, sludge and salt. WCS consists of two functional areas, including a sample data repository (WCS II) and the waste characterization system (WCS 1.5) that contains inputs and calculations used to represent real-time conditions in the tanks. WCS 1.5 is used to determine limits associated with various administrative control programs (e.g., Flammability Control Program, Corrosion Control Program, Transfer Control Program, etc). WCS II will include separately entered and stored data.

Formulas in the WCS program have been documented, reviewed, and approved; and, every change that has been made to the structure or content of the program has been documented. The system itself has undergone a system verification, and a technical baseline for the system has been written [1, 2, 3]. The WCS is Level B software classification in accordance with Manual E7, Procedure 5.05 [4]. A review of the system has been made, and cell formulas have been documented, reviewed and approved. Additionally, a Software Quality Assurance Plan [5] and Design Document for Software packages [References 6, 7] have been written to describe the system. This program is designed to give guidance regarding how this system works and describe the parts necessary for it to retain its credibility and utility; in addition, some of the controls listed below are necessary to maintain the Level B classification of this software system.

Prior to new data being input into WCS, a Data Integrity Review Team (DIRT) shall review the data to determine its technical validity. The core DIRT members consist of engineers with expertise in different areas such as corrosion, flammability, WCS, organic chemistry, criticality, etc. The Data Integrity Review Team meetings are conducted at least monthly and typically on a weekly frequency. The DIRT committee coordinates the execution of the implementation items identified in the PDD. DIRT functions include the review of information, evaluation of information

for technical validity, and processing the data into WCS in compliance with the Data Management Plan (DMP) [References 8, 9]. The data is also reviewed as a part of the Emergency Response Data (ERD) update process, which is performed on a periodic basis.

Data Acquisition

The data in the WCS shall be updated periodically to reflect the changes in the waste's composition; this periodicity is defined by DIRT. In order to accomplish this, there are several information sources that need to be connected to the WCS software owner. The following requirements are designed to establish a connection between various information sources and the maintainer of the WCS.

All reports or approved documents that contain results from waste tank samples shall be forwarded to the organization that owns the WCS. After sample results are received, they shall be evaluated through DIRT for inclusion into WCS. Sample results required by administrative programs shall be incorporated into WCS in accordance with the specific requirements identified within the affected administrative programs.

The results of sludge and/or salt soundings shall be reported to the owner of WCS. This information is key in knowing the amount of salt and sludge in a tank, as well as determining the amount of "trapped" gas in a tank (a flammability concern). This shall be accomplished by the reporting requirements in the procedure for performing a salt or sludge sounding, or any other relevant source of this information. After this information is received, it shall be evaluated through DIRT and included into WCS 1.5.

Sludge and/or salt soundings may not be effective for determining the amount of salt and sludge in a tank once bulk waste removal has been initiated by the Waste Removal or Salt Removal Programs. These programs typically utilize video inspections and sampling as additional means to establish the tank heel and then document the results in a Technical Report or Engineering Calculation. Similar evaluations are often performed during intermediate bulk waste removal processing and after salt dissolution and mining activities. These evaluations/calculations shall be forwarded to the organization that owns WCS. After this information is received, it shall be evaluated through DIRT for the inclusion into WCS 1.5.

The WCS must be updated with sludge canyon receipts (e.g., F-Canyon, H-Canyon). Although the receipts of waste into the tank farm are reported on Workgroup 8 shortly after the transfers are completed, this list needs to be documented, reviewed, approved, and shall be evaluated through DIRT for incorporation into WCS 1.5. By updating the canyon receipts in a timely manner, WCS shall reflect a close approximation of what is in each tank at any given time. The changes in chemistry that result from other tank farm influents (e.g., ETP, DWPF) are captured by periodic samples per the Corrosion Control Program. The typical canyon transfer is less than 2,000 gallons. Assuming there are 10 canyon transfers in a month, the addition to a

tank is less than 20,000 gallons. The heat contribution corresponding to 20,000 gallons is inconsequential to the heat inventory represented within WCS. Several months of typical canyon transfers would be required to significantly impact the characterization of a receipt tank. Additionally, impact reviews are performed prior to special canyon transfers, approved through a Special Waste Compliance Plan, into tank farm waste tanks; therefore, significant effects are evaluated and accounted for in advance.

Water additions to waste tanks that require an evaluation per the Corrosion Control Program [10] or the Flammability Control Program [11], must be accounted for in WCS. The pre-addition evaluation shall use WCS to dilute the chemistry in the affected waste tank by the amount of water being added; and shall be incorporated into WCS 1.5.

The tank levels from the post transfer feedback sheets shall be incorporated into WCS 1.5. Post-transfer updates shall be performed upon completion of the transfer, or prior to the next transfer involving one of the applicable tanks.

Implementation Actions

1. DIRT shall meet at least monthly.
2. All reports or approved documents that contain results from waste tank samples shall be forwarded to the organization that owns the WCS.
3. Waste Removal or Salt Removal Program tank heel evaluations (e.g., technical report or engineering calculations) shall be forwarded to the organization that owns the WCS.
4. After sample results are received, they shall be evaluated through DIRT for inclusion into WCS.
5. After sludge and/or salt sounding results are received, they shall be evaluated through DIRT for inclusion into WCS.
6. After tank heel evaluation information is received, WCS shall be evaluated through DIRT for inclusion into WCS.
7. Canyon sludge receipts shall be updated in WCS shall be evaluated through DIRT for inclusion into WCS.
8. The post-addition water dilution updates to WCS shall be accomplished upon completion of the addition.
9. Post-transfer updates to WCS shall be accomplished upon completion of the transfer.

WSRC-IM-2003-00010

Data Entry

The following guidelines are given to ensure that the data in the WCS retains its high pedigree.

All data entry shall be in compliance with Manual E7, Procedure 5.80. This procedure requires that a Data Management Plan (DMP) be written and followed. This DMP [References 8, 9] outlines the steps necessary to properly document and verify data entered into the system. Not only will the process outlined in the DMP ensure that data is entered correctly (data entry verification), but will ensure that all data submitted for entry into the system is properly reviewed and is valid and relevant data (data verification), as required.

Sample results, pre- and post-transfer data, sludge/salt sounding information, and canyon sludge receipts shall be entered into the WCS only after they have been approved per the requirements of the DMP. The entry of all other data shall also comply with this procedure. Any formula changes in WCS or changes to the structure of WCS will be governed by the process outlined below in the "Software Baseline and Change Control" section of this PDD.

Implementation Actions

10. Data changes made within WCS shall comply with the DMP for software control requirements.

Data Output

The data in the WCS is utilized by several formulas to determine limits associated with various Administrative Control Programs (e.g., the Flammability and Corrosion Control Programs) for the waste tanks. The flammability status, the most limiting of the fill limits (protected by the HLLCP setpoint), the temperature limits, and the sampling frequency of each tank are all examples of limits that are calculated in WCS and are reported in the ERD.

The ERD will be revised any time one of these limits change due to a change in WCS approved input data. The ERD shall also be revised prior to a transfer, if that transfer projection shows that one of these limits will be changed in a non-conservative direction due to the transfer. With every ERD revision with facility operating limit impacts, an ERD linking procedure (SW11.6-SVP-ERD) must be completed to ensure that the facility complies with the changes being made.

Implementation Actions

11. The ERD shall be revised to reflect limit changes in WCS.

12. For every ERD revision with facility operating limit impacts, the ERD linking procedure shall be completed.

WSRC-IM-2003-00010

Software Baseline and Change Control

The WCS has been classified as Level B software and must be managed to meet the requirements for this type of software. The Software Quality Assurance Plan (SQAP) [5] governs the methods that must be used to ensure the proper handling of this program. The SQAP requires that all changes to the system be made in accordance with Manual E7, Procedure 5.62.

All changes made to the structure or formulas of WCS must be written and approved in a Computer Program Modification Tracker (CMT). This document will identify the Configuration Items (CI) that need to be changed. (The index of the CIs will be kept in the Design Document for Software (DDS)).

To address backup and recovery, including disaster recovery, the production version of WCS will be hosted on a server that provides daily back-up of all files. Back-ups will be maintained to be available to recover from a failure of the production server. The documents managed as baseline documents include the Requirements Specification for Software (RSS) and the Design Document for Software (DDS) [References 6, 7, 12]. Any changes to the baseline documents must be done in one of the following three ways: (1) a full revision, (2) a Design Change Notice (DCN) in accordance with Manual E7, Procedure 2.38, or (3) the Design Change Form (DCF) in accordance with Manual E7, Procedure 2.37.

For all other concerns regarding the quality assurance of this WCS, refer to the SQAP.

Implementation Actions

13. WCS shall be controlled using Level B software requirements.

4.0 OTHER COMMITMENTS

N/A

5.0 DEVIATION HANDLING

N/A

WSRC-IM-2003-00010

6.0 REFERENCES

1. HLW-STE-99-0329 *Waste Characterization System (WCS) Technical Baseline Control.* Memorandum from J. R. Hester to B. L. Lewis, August 1999.

2. HLW-CSTE-99-0246 *WCS Verification Plan.* Memorandum from G. J. Hutchens to B. L. Lewis, July 1999.

3. HLW-CSTE-99-0336 *Results of WCS Verification Review.* Memorandum from G. J. Hutchens to B. L. Lewis, September 1999.

4. G-SWCD-H-00010 Software Classification Document. *Waste Characterization System (WCS) 1.5 and WCS II.* November 2002.

5. B-SQP-H-00041 Software Quality Assurance Plan. *HLW Waste Characterization System.* November 2002.

6. B-RS-H-00118 Requirements Specification for Software and Design Document for Software. Closure Business Unit Waste Characterization System (WCS) 1.5 Functional Performance Requirements and Design Specification. February 2003.

7. B-DD-H-00039 *Closure Business Unit Liquid Waste Disposition Project Waste Characterization System II Design Document for Software.* September 2003.

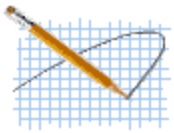
8. B-DMP-H-00002 Data Management Plan. *Waste Characterization System Data Management Plan*, March 2003.

9. B-DMP-H-00003 Data Management Plan. *Waste Characterization System II Data Management Plan*, May 2004.

10. WSRC-TR-2002-00327, CSTF Corrosion Control Program, May 2003.

11. WSRC-TR-2003-00087, CSTF Flammability Control Program, April 2004.

12. B-RS-H-00086 Closure Business Unit Liquid Waste Disposition Project Waste Characterization System II (WCS II) Functional Performance Requirements Specification. July 2003.



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