

**U.S. Department of Energy**

~~Office of River Protection~~  
P.O. Box 450, MSIN H6-60  
Richland, Washington 99352

07-WTP-113

MAY 03 2007

Mr. C. M. Albert, Project Manager  
Bechtel National, Inc.  
2435 Stevens Center Place  
Richland, Washington 99354

Dear Mr. Albert:

CONTRACT NO. DE-AC27-01RV14136 – TRANSMITTAL OF THE U.S. DEPARTMENT OF ENERGY, OFFICE OF RIVER PROTECTION (ORP) DESIGN OVERSIGHT REPORT: REVIEW OF INTERFACE CONTROL DOCUMENTS (D-06-DESIGN-035)

ORP conducted a design oversight of the Waste Treatment and Immobilization Plant (WTP) Project Interface Control Document (ICD) design requirements associated with physical and process design. The attached report documents the results of this assessment.

The assessment identified numerous feed constraints being used by WTP in process design and safety analysis that are currently not captured in the Contract feed specifications or ICD 19, "Waste Feed." These feed constraints include; rheological properties; particle size and density; particle hardness/abrasivity; fissile material to absorber ratios; hydrogen generation rates; and ammonia. Bechtel National, Inc. (BNI) stated in discussions that they plan to propose draft ICD requirements for these constraints in May 2007. A meeting was held on April 11, 2007, with ORP and the WTP and Tank Farm Contractors to initiate the process to update ICD 19. It is critical that the WTP and Tank Farm Contractors identify appropriate engineering options and required risk management strategies for the potential new feed constraints in the upcoming ICD 19 interface meetings.

One finding was identified in the assessment and is documented in Section 5 of the attached oversight report. BNI has not formally tracked ICD action items for several years. BNI's Interface Control Procedure 24590-WTP-GPP-MGT-003, Rev. 2, effective January 2007, requires ICD action items to be tracked in WTP's Action Tracking System (ATS). A search of the ATS did not find any entries applicable to ICDs. BNI stated that the project plans to track open and action items using their ATS. BNI stated that the open and action items in ICD 19 would be the first to be entered into the ATS with the balance to follow. The project is at risk that a critical interface activity may not be completed when required due to failure to track ICD open and action items. Failure to track action items in ATS is a finding (D-06-AMWTP-DESIGN-035-F01).

MAY 03 2007

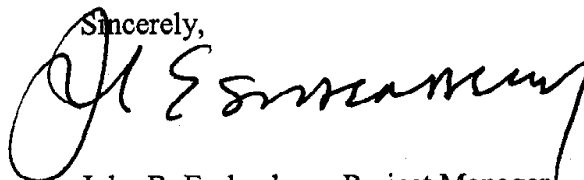
Mr. C. M. Albert  
07-WTP-113

-2-

BNI is requested to reply to the above finding within 30 days of receipt of this letter.

If you have any questions, please contact me, or your staff may contact Robert W. Griffith,  
Acting Director, WTP Project Engineering Division, (509) 372-2821.

Sincerely,



John R. Eschenberg, Project Manager  
Waste Treatment and Immobilization Plant Project

WTP:RAG

Attachment

cc w/attach:  
BNI Correspondence

U.S. Department of Energy, Office of River Protection

---

## WASTE TREATMENT PLANT (WTP) DESIGN OVERSIGHT REPORT

### REVIEW OF INTERFACE CONTROL DOCUMENTS

April 2007

Design Oversight: D-06-DESIGN-035

Team Lead:

  
\_\_\_\_\_  
Robert A. Gilbert, WTP Engineering Division

Team Members:

Lloyd McClure, ORP Consultant

## EXECUTIVE SUMMARY

The U.S. Department of Energy, Office of River Protection (ORP) conducted a design oversight of Waste Treatment and Immobilization Plant (WTP) Project Interface Control Document (ICD) design basis requirements associated with physical and process design. Specific objectives of the design oversight were to:

1. Review WTP implementation of ICD 19, "Waste Feed," design basis requirements associated with physical and process design.
2. Review WTP implementation of ICD 14, "Immobilized High-Level Waste," design basis requirements associated with physical and process design.
3. Review WTP implementation of ICD 15, "Immobilized Low-Activity Waste," design basis requirements associated with physical and process design.
4. Assess whether ICDs are currently not available that should be developed for potentially critical interfaces required to support physical and process design or future operations.

### Overall Conclusions

The review of ICD 19 design basis requirements associated with physical and process design identified numerous feed constraints being used by WTP in process design and safety analysis that are currently not captured in the Contract feed specifications or ICD 19. These feed constraints include: rheological properties; particle size and density; particle hardness/abrasivity; fissile material to absorber ratios; hydrogen generation rates; and ammonia. The Contractor, Bechtel National, Inc. (BNI) stated in discussions that they plan to propose draft ICD requirements for these constraints in May 2007. A meeting was held on April 11, 2007, with ORP and the Tank Farms Contractor (TFC) and WTP Contractor to initiate the process to update ICD 19. The TFC and WTP Contractor plan to identify appropriate engineering options and required risk management strategies for the new feed constraints.

ICDs 14, 15, and 19 contain lists of open and action items. Open items in ICDs 14, 15, and 19 have not been formally statused for several years. Many due dates identified in the ICDs have passed. Project schedules have also changed significantly since the 2003 issuance of the ICDs. Open and action items were reviewed for ICDs 14, 15, and 19. Open items that are past due included: (1) ICD 19, address siphoning of waste between the tank farm and WTP receipt vessels by December 2006; (2) ICD 14, address incompatible contractual requirements imposed on the WTP Contractor and TFC for surface contamination on canisters and casks by June 2004; and (3) ICD 15, provide clarification between the TFC and WTP contracts to ensure compatible requirements for DOE acceptance of immobilized low-activity waste (ILAW) by September 2005. Based on review of the ICD 14, 15, and 19 open items, the assessors did not find any instances where BNI's failure to track open and action items had an impact on project design or construction. However, this condition puts the project at risk that a critical interface activity may not be completed when required.

24590-WTP-GPP-MGT-003, *Interface Control Procedure*, Rev. 2, effective January 18, 2007, requires action items to be tracked in WTP's Action Tracking System (ATS). Section 3.3.1.5 states:

“An action item is an activity necessary to maintain the compatibility of the interface. Action items may be assigned to resolve an identified issue, or to complete the interface definition at a future time when additional information is available. These items are documented in team meeting minutes and tracked in the WTP Action Tracking System. The WTP core team member enters the item in the Action Tracking System and assigns responsibility for resolution with the concurrence of the appropriate IO.”

A search of the ATS did not find any entries applicable to ICDs. BNI stated that the project plans to track open and action items using their ATS. BNI stated that the open and action items in ICD 19 would be the first to be entered into the ATS with the balance to follow. The project is currently at risk due to failure to track ICD open and action items.

Failure to track action items in ATS is a **Finding. D-06-AMWTP-DESIGN-035-F01.**

An ICD is currently not available to facilitate physical and process design for future operations that will require receipt of slightly contaminated 19M sodium hydroxide for use as a process reagent in pretreatment. Approximately 1,100 metric tons of slightly contaminated sodium will be converted to 19M sodium hydroxide for use in the WTP as a process reagent. BNI stated WTP can receive contaminated caustic through temporary design modifications to allow use in the WTP process. However, details of these modifications were not available. Interface details need to be established for reagent transfer volume, frequency, and physical interface to ensure WTP is constructed with appropriate features for this interface and allow project planning to convert slightly contaminated sodium to sodium hydroxide. A draft revision of the WTP contract statement of work currently with BNI for final review requires development of an ICD for waste sodium.

**TABLE OF CONTENTS**

1.0 INTRODUCTION .....1

2.0 BACKGROUND .....1

3.0 OBJECTIVES, SCOPE, AND APPROACH.....1

    3.1 Objectives .....1

    3.2 Scope.....1

    3.3 Approach.....2

4.0 RESULTS .....2

    4.1 General Interface Management.....2

    4.2 ICD 19, Interface Control Document for Waste Feed .....3

    4.3 ICD 14, Interface Control Document for Immobilized High-Level Waste.....6

    4.4 ICD 15, Interface Control Document for Immobilized Low-Activity Waste.....6

    4.5 Potential Need for Additional Interface Control Documents .....7

5.0 FINDINGS .....8

6.0 PERSONNEL CONTACTED AND REFERENCES .....9

    6.1 Personnel Contacted .....9

    6.2 References.....9

Appendix A

Review of WTP Interface Control Documents Lines of Inquiry and Assessment

Appendix B

Design Product Oversight Plan

---

**LIST OF ACRONYMS**

ATS	Action Tracking System
BNI	Bechtel National, Inc.
BOD	<i>Basis of Design</i>
CAR	Corrective Action Report
Cs	cesium
CSB	Canister Storage Building
CSER	Criticality Safety Evaluation Report
CSF	Container Storage Facility
CSL	Criticality Safety Limit
DI	desk instruction
DOE	U.S. Department of Energy
HLW	high-level waste
ICD	Interface Control Document
IDF	Integrated Disposal Facility
ILAW	immobilized low-activity waste
ISF	integrated storage facility
LAW	low-activity waste
MT	metric ton
ORP	Office of River Protection
PT	Pretreatment [Facility]
RPP	River Protection Project
Sr	strontium
TFC	Tank Farm Contractor
WED	WTP Engineering Division
WTP	Waste Treatment and Immobilization Plant

## 1.0 INTRODUCTION

The U.S. Department of Energy (DOE), Office of River Protection (ORP) conducted a design oversight of Waste Treatment and Immobilization Plant (WTP) Project Interface Control Document (ICD) design basis requirements associated with physical and process design. This report documents results from this assessment.

## 2.0 BACKGROUND

The WTP Engineering Division (WED) has responsibility for design oversight of the WTP Project. Per contract DE-AC27-01RV14136, ORP will use a partnering approach to manage interaction between ORP, the WTP Contractor, the Tank Farm Contractor (TFC), and other Hanford Site contractors. The WTP Contractor, Bechtel National, Inc. (BNI), shall provide resources necessary to establish and implement the partnering approach. The Contractor shall, in cooperation with ORP (as lead), the TFC (CH2M HILL Hanford Group, Inc.), and other Hanford Site contractors, establish an interface management process to assure effective control of technical, administrative, and regulatory interfaces. ICDs shall reflect all interfaces and services needed in the construction and performance testing phases, and projected interface and services needed for the future commissioning and operating phases; be an element of the design basis; and shall be updated as required.

## 3.0 OBJECTIVES, SCOPE, AND APPROACH

### 3.1 OBJECTIVES

The specific objectives of this oversight were:

1. Review WTP implementation of ICD 19, "Waste Feed," design basis requirements associated with physical and process design.
2. Review WTP implementation of ICD 14, "Immobilized High-Level Waste," design basis requirements associated with physical and process design.
3. Review WTP implementation of ICD 15, "Immobilized Low-Activity Waste," design basis requirements associated with physical and process design.
4. Assess whether ICDs are currently not available that should be developed for potentially critical interfaces required to support physical and process design or future operations (e.g., Fast Flux Test Facility sodium hydroxide, cesium and strontium capsules, feed to supplemental low-activity waste).

### 3.2 SCOPE

This oversight included review of ICDs 14, 15, and 19; 24590-WTP-PL-MG-01-001, *Interface Management Plan*; relevant sections of 24590-WTP-DB-ENG-01-001, *Basis of Design (BOD)*; and piping and instrumentation diagrams, process flow diagrams, system descriptions, and flowsheet information including 24590-WTP-RPT-PT-02-005, *Flowsheet Bases, Assumptions*,



and Requirements. Interviews and discussions were also conducted with cognizant WTP Engineering management and staff.

### 3.3 APPROACH

This oversight was conducted within the guidelines of ORP M 220.1, *Integrated Assessment Plan*, and ORP Desk Instruction (DI) 220.1 "Conduct of Design Oversight." The approved design product oversight plan, "Waste Engineering Division Assessment of Waste Treatment Plant Interface Management," is provided in Appendix A.

## 4.0 RESULTS

### 4.1 GENERAL INTERFACE MANAGEMENT

Section C.9 of the WTP contract provides the requirements for ICDs that describe the physical and administrative interfaces between ORP, the WTP Contractor, the TFC, and other Hanford Site contractors.

The River Protection Project (RPP) involves two or more contractors, under Contract to ORP, that carry out the functions necessary to achieve the RPP mission. The WTP facilities are located on the Hanford Site and will rely upon other organizations to provide support services. In order to ensure that the efforts and facilities are coordinated, a formal system of interface management was developed by ORP and its contractors and is described in 24590-WTP-PL-MG-01-001, *Interface Management Plan*. The objective of the interface management system is to assure documentation and management of shared responsibilities for: (1) transfer of energy, data, or materials; and (2) development, operation, and maintenance of compatible facilities and subsystems.

Up until approximately two years ago, regular interface meetings were held between the WTP Contractor and TFC to address interface issues and update ICDs. Since that time, there has been little formal effort to maintain and update the ICDs and to track progress on resolving open issues. ICDs 14, 15, and 19 contain lists of open and action items. Open items in ICDs 14, 15, and 19 have not been formally stasured for several years. Many due dates identified in the ICDs have passed. Project schedules have also changed significantly since the 2003 issuance of the ICDs. Open and action items were reviewed for ICDs 14, 15, and 19.

Open items that are past due include:

1. ICD 19, address siphoning of waste between the tank farm and WTP receipt vessels by December 2006.
2. ICD 14, address incompatible contractual requirements imposed on the WTP Contractor and TFC for surface contamination on canisters and casks by June 2004.
3. ICD 15, provide clarification between TFC and WTP contracts to ensure compatible requirements for DOE acceptance of immobilized low-activity waste (ILAW) by September 2005.

Based on review of the ICD 14, 15, and 19 open items, the assessors did not find any instances where BNI's failure to track open and action items had an impact to project design or construction. However, this condition puts the project at risk that a critical interface activity may not be completed when required.

The *Interface Control Procedure* (24590-WTP-GPP-MGT-003, Rev. 2, effective January 18, 2007) requires action items to be tracked in the WTP Action Tracking System (ATS). Section 3.3.1.5 states:

“An action item is an activity necessary to maintain the compatibility of the interface. Action items may be assigned to resolve an identified issue, or to complete the interface definition at a future time when additional information is available. These items are documented in team meeting minutes and tracked in the WTP Action Tracking System. The WTP core team member enters the item in the Action Tracking System and assigns responsibility for resolution with the concurrence of the appropriate IO.”

A search of the ATS did not find any entries applicable to ICDs. BNI stated this was because actions and open items were previously being tracked through the ICDs. BNI stated that the project plans to track open and action items using their ATS in the future. BNI stated that the open and action items in ICD 19 would be the first to be entered into the ATS with the balance to follow. The project is currently at risk due to failure to track ICD open and action items.

Failure to track action items in ATS is Finding **D-06-AMWTP-DESIGN-035-F01**.

#### **4.2 ICD 19, INTERFACE CONTROL DOCUMENT FOR WASTE FEED**

Review of ICD 19 design basis requirements associated with physical and process design identified numerous feed constraints being used by WTP in process design and safety analysis that are currently not captured in the contract feed specifications or ICD 19. These feed constraints include rheological properties, particle size and density, particle hardness/abrasivity, fissile material to absorber ratios, hydrogen generation rates, and ammonia. BNI stated in discussions that they plan to propose draft ICD requirements for these constraints in May 2007. A meeting was held on April 11, 2007, with ORP and the WTP Contractor and TFC to initiate the process to update ICD 19. The WTP Contractor and TFC plan to identify appropriate engineering options and required risk management strategies for the new feed constraints.

BNI has prepared a list of waste feed parameters for consideration that are needed to protect the WTP design basis as documented in specific calculations. These include:

- High-level waste (HLW) feed consistency viscosity at 25°C of <10cP – Feed consistency viscosity is critical to assure HLW feed can be pumped and mixed in the WTP. Discussions with BNI indicate BNI plans to propose revised rheology limits in a revised draft of the ICD in May 2007. ICD 19, Table 6, provides nominal HLW transfer properties. This includes consistency viscosity at 25°C of <50cP. The BOD does not provide specific waste rheology assumptions.

Assessment of the impact of proposed feed rheology requirements on the number of batches that may be unacceptable for transfer into WTP has not been performed.

The capability to project rheological properties from available tank characterization information is not currently available.

- Waste feed particle size and density – Waste feed particle density is critical to assure waste can be mixed in vessels to release flammable gasses and facilitate sampling for process control. ICD 19, Table 6, provides nominal HLW transfer properties. This includes a particle size distribution with a mean of 7.5 microns and particle density of 2.9 g/cc. The BOD does not provide specific particle size and density requirements.

BNI and the TFC have worked jointly to establish particle size and density distributions for Hanford Site tank wastes, see WTP-RPT-153, *Estimate of Hanford Waste Insoluble Solid Particle Size and Density Distribution*. Based on this work, BNI has assumed a particle size of 11 micron median size and density of 2.9. These assumptions are subject to change pending resolution of External Flowsheet Review Team issue M1, “Line Plugging.” BNI plans to propose particle size of 11 micron median size and density of 2.9 g/cc in a revised draft of ICD 19 in May 2007 to protect the WTP design basis.

Implementation of these requirements across the waste feed interface will lead to administrative controls and potentially require engineered systems to protect the WTP. Controls range from requiring low-activity waste (LAW) feed to be retrieved from tank farms with floating suction or stick pumps set at a specified height above tank solids while the tank is not mixed, to use of hydrocyclones to separate larger and denser particulate, to grinders to size reduce solids. Feed delivery implications associated with these physical property constraints have not been developed. The WTP Contractor and TFC plan to meet in May 2007 to discuss these requirements and develop engineering controls, administrative controls, and risk management strategies.

- Criticality Safety Limits (CSL) - The BOD does not provide CSLs. BNI’s CSLs are defined in the *Preliminary Criticality Safety Evaluation Report for the WTP* (CSER) (24590-WTP-RPT-NS-01-001), and are part of the WTP Authorization Basis. These limits are based on ratios of fissile material to absorber material that will assure criticality is prevented. Evaluation of historical feed vectors (HNF-SD-WM-SP-012, *Tank Farm Contractor Operation and Utilization Plan*, Rev. 5D) identified that waste from double-shell tank C-104 was projected to exceed the CSL. The TFC has included requirements in their feed control list to blend the C-104 solids to meet the WTP CSL. BNI stated that the CSLs would be included in a revised draft of ICD 19 in May 2007.

ICD 19, Section 3.3.4, states, “The CSER is in the process of a significant update and approval by ORP. Consequently, no specifications are included in this revision of the ICD (see Action Item A19-10).” The expected completion date for Action Item A19-10 was December 2003. The need date in the ICD was set at six months prior to transfer of the first HLW feed to WTP. While continued slippage of this task has not resulted in an issue, this action should be completed to institutionalize the need for the TFC to screen waste feed batches against the CSLs. This screening will identify waste batches that could potentially exceed the CSL in time to allow efficient blending in the tank farms. BNI stated in discussion that the CSLs would be included in a revised draft of the ICD in May 2007.

- Hydrogen Generation Rates – WTP vessel mixing and ventilation systems are being designed based on specific hydrogen generation rate limits. The BOD does not include limits for hydrogen generation. ICD 19 does not have limits to address hydrogen generation rates for feed delivered to WTP. Discussions with BNI indicated BNI plans to propose hydrogen generation rate limits in a revised draft of the ICD in May 2007.

WTP hydrogen generation rates for waste feed are documented in 24590-WTP-M4C-V11T-00004, *Calculation of Hydrogen Generation Rates and Times to Lower Flammability Limit for WTP*. These limits will be used to identify waste batches that could potentially exceed the WTP design basis hydrogen generation rates in time to allow efficient blending in the tank farms. Evaluations of historical feed vectors identified the need to blend solids from double-shell tank AZ-101 to meet WTP hydrogen generation rate criteria. The TFC has included requirements in their feed control list to blend the AZ-101 solids to meet the WTP hydrogen generation rate design basis.

- Ammonia in Feed – WTP vessel mixing and ventilation system are being designed based on specific flammable gas limits including contributions from ammonia. The BOD does not include limits for ammonia in waste feed. ICD 19 does not have limits to address ammonia content for feed delivered to WTP. An ammonia limit of 0.04M in feed to WTP has been proposed to support closure of a condition of acceptance for the WTP Preliminary Safety Analysis Report (COA No. 23). BNI stated this limit bounded the highest ammonia content projected in the tank waste batches sent to WTP in the HNF-SD-WM-SP-012, Rev. 5D feed vector.

Limitation of ammonia in feed helps prevent accumulation of flammable gas in the WTP. BNI plans to propose a limit of 0.04M ammonia for LAW feed and 0.0015M for HLW feed to protect the design basis in a revised draft of the ICD in May 2007. These limits will be used to identify waste batches that could potentially exceed the WTP design basis for ammonia in time to allow efficient blending in the tank farms.

- Waste Particle Hardness – WTP has limits on waste particle hardness used in vessel erosion calculations. ICD 19 does not provide particle hardness specifications. Additionally, the BOD does not specify particle hardness requirements. BNI's Authorization Basis Amendment Request, 24590-WTP-SE-ENS-04-041, *Authorization Basis Amendment Request, PT Non-Newtonian Vessels (Hydrogen Mitigation)*, required that waste particle characteristics for waste batches have a median hardness of 4.4 Mohs. BNI plans to propose an ICD constrain on median particle hardness of 4.4 Mohs in May 2007.

It is imperative that WTP assumptions that deviate from contract feed specifications or agreed to ICD feed constraints be proactively worked among the TFC, the WTP Contractor, and ORP. Physical property assumptions for tank waste feed are based on limited characterization data. Integrated approaches to stage feed, characterize feed, and deliver feed meeting WTP design basis must be jointly developed. These approaches must assess the project risk for all parties and develop engineering controls, administrative controls, and risk mitigating strategies.

An open item in ICD 19 that is past due required agreement to be reached by the WTP Contractor and TFC on how siphoning of waste between the Tank Farm and WTP will be prevented. This action was identified as needing closure by December 2006 in ICD 19. Discussions with BNI indicated this action has not been closed. BNI stated they anticipate the issue will be addressed in operating procedures. The issue is not expected to impact design, but the issue needs to be captured in ATS with a due date based on the rebaselined project.

#### **4.3 ICD 14, INTERFACE CONTROL DOCUMENT FOR IMMOBILIZED HIGH-LEVEL WASTE**

Review of ICD 14 design basis requirements associated with physical and process design identified one open item that could impact process design and successful facility operation if not addressed.

There is an outstanding open issue for the TFC to prepare integrated storage facility acceptance criteria for receipt and storage of the immobilized high-level waste at the Canister Storage Building. One particular area of concern, incompatibility in the required maximum surface contamination limits, was identified in the ICD as an open issue. There is a possibility that the final maximum surface contamination acceptance criteria may be more restrictive than in the current WTP contract. This could require a design change or additional operating time to provide additional decontamination of the waste containers during operations.

#### **4.4 ICD 15, INTERFACE CONTROL DOCUMENT FOR IMMOBILIZED LOW-ACTIVITY WASTE**

Review of ICD 15 design basis requirements associated with physical and process design identified several open items that could impact process design and successful facility operation if not addressed.

Open issue 15-20 in ICD 15 states, "The concept of ILAW "acceptance" defined in the WTP and TFC contracts needs clarification to ensure compatibility with the WTP contract requirement for DOE to accept custody of all ILAW." Requirements for the ILAW product are in Specification 2 of the WTP Contract. Criteria for waste acceptance are in RPP-8402, *Waste Acceptance Criteria for the Immobilized Low-Activity Waste Disposal Facility*. These documents need to be reviewed to ensure there are no incompatibilities. Also, confirmation is needed that the final Integrated Disposal Facility (IDF) waste acceptance criteria will not be more restrictive than those in RPP-8402 and the WTP contract. Incompatibilities between the current WTP contract requirements and the final IDF criteria could require WTP design or operating changes.

The open issues in the ICD pertaining to clarification of the concept of ILAW "acceptance" as defined in the WTP and TFC contracts and final DOE acceptance of ILAW not occurring until two months after disposal are still open issues and should be transferred to the ATS. This is part of issue 15-20 and related to the two issues discussed above. If final DOE acceptance of a waste package is not granted, retrieval from IDF and special handling of the container may be required.

The Container Storage Facility (CSF) was removed from the ILAW facility design on the basis that the TFC would "increase the fleet size of the shipping casks to support elimination of the CSF." An ILAW transportation optimization study completed in April 2004 concluded 14 trailers would be needed; the TFC is currently updating this study. The only remaining lag storage for ILAW product within the WTP are the 18 container park stands located in the buffer store/rework area between the Container Pour Handling System and the LAW Container Finishing Handling System. Once the updated transportation study is completed, this issue may need additional evaluation to assess the costs/benefits of adding storage back into WTP versus the capital costs and additional operating costs for the additional trailers.

#### **4.5 POTENTIAL NEED FOR ADDITIONAL INTERFACE CONTROL DOCUMENTS**

The assessors evaluated whether additional ICDs should be developed for potentially critical interfaces required to support physical and process design or future operations. Three potential interfaces were evaluated including:

1. Use of slightly contaminated sodium hydroxide provided to WTP for use as a process reagent
2. Feed delivered to a supplemental LAW facility from the WTP Pretreatment (PT) Facility
3. Provisions to receive cesium and strontium from a facility that processed material from cesium and strontium capsules currently stored at Hanford in the Waste Encapsulation and Storage Facility.

It was concluded that an ICD for the slightly contaminated sodium hydroxide provided to WTP for use as a process reagent was warranted at this time.

An ICD is currently not available to facilitate physical and process design for future operations that will require receipt of slightly contaminated 19M sodium hydroxide for use as a process reagent in pretreatment. Approximately 1,100 metric tons (MT) of slightly contaminated sodium will be converted to 19M sodium hydroxide for use in the WTP as a process reagent. BNI stated WTP can receive contaminated caustic through temporary design modifications to allow use in the WTP process. However, details of these modifications were not available. Interface details need to be established for reagent transfer volume, frequency, and physical interface to ensure WTP is constructed with appropriate features for this interface and to allow project planning to convert slightly contaminated sodium to sodium hydroxide. A draft revision of the WTP contract statement of work currently with BNI for final review requires development of an ICD for waste sodium.

The WTP contract and BOD currently do not require provisions to feed a supplemental LAW facility. However, the ability to transfer feed to a supplemental LAW processing facility has been evaluated and it was deemed that the existing transfer lines that were provided in the PT Facility design for the second WTP LAW vitrification facility could be used for that purpose. The transfer lines would have to be connected to a supplemental facility and the existing WTP design would require evaluation to make sure the associated systems were capable of making transfers with appropriate pump capacity and discharge head based on the location of a new

facility. Design of the supplemental LAW facility is currently unfunded. Interface development to provide supplemental LAW a design basis for treated LAW feed composition, transfer rate, transfer volume, transfer frequency, and physical properties will be needed when design resumes. However, development of a supplemental LAW ICD should be deferred until project design is funded.

There are provisions in the PT Facility to receive cesium and strontium waste from a capsule processing facility and the piping connections are depicted on 24590-PTF-M5-V17T-00008, *Process Flow Diagram HLW Lag Storage and Feed Blending System HLP*. The cesium and strontium waste stream would be blended with the treated pretreatment slurry and fed to the HLW Vitrification Facility. The assessors concluded that an ICD should not be prepared at this time. If DOE decides to send the cesium and strontium capsule material to WTP for incorporation into HLW glass, an ICD should be prepared following the decision when interface details can be realistically defined.

## 5.0 FINDINGS

### **Finding D-06-AMWTP-DESIGN-035-F01:**

Contrary to 24590-WTP-GPP-MGT-003, *Interface Control Procedure*, Rev. 2, effective January 18, 2007, BNI has not tracked action items relating to ICDs.

24590-WTP-GPP-MGT-003 requires action items to be tracked in ATS. Section 3.3.1.5 states:

“An action item is an activity necessary to maintain the compatibility of the interface. Action items may be assigned to resolve an identified issue, or to complete the interface definition at a future time when additional information is available. These items are documented in team meeting minutes and tracked in the WTP Action Tracking System. The WTP core team member enters the item in the Action Tracking System and assigns responsibility for resolution with the concurrence of the appropriate IO.”

ICDs 14, 15, and 19 contain lists of open and action items. Open items in ICDs 14, 15, and 19 have not been formally statused for several years. Many due dates identified in the ICDs have passed. Project schedules have also changed significantly since the 2003 issuance of the ICDs. Open and action items were reviewed for ICDs 14, 15, and 19.

Open items that are past due include: (1) ICD 19, address siphoning of waste between the tank farm and WTP receipt vessels by December 2006; (2) ICD 14, address incompatible contractual requirements imposed on the WTP Contractor and TFC for surface contamination on canisters and casks by June 2004; and (3) ICD 15, provide clarification between the WTP Contractor and TFC contracts to ensure compatible requirements for DOE acceptance of ILAW by September 2005. Based on review of the ICD 14, 15, and 19 open items, the assessors did not find any instances where BNI's failure to track open and action items had an impact to project design or construction. However, this condition puts the project at risk that a critical interface activity may not be completed when required.

A search of the ATS did not find any entries applicable to ICDs. BNI stated that the project plans to track open and action items using their ATS. BNI stated that the open and action items in ICD 19 would be the first to be entered into the ATS with the balance to follow.

## 6.0 PERSONNEL CONTACTED AND REFERENCES

### 6.1 PERSONNEL CONTACTED

#### BNI Engineering

- G. Duncan
- M. Hall
- I. Papp

#### BNI Quality Assurance

- D. Kammaenzind

#### CH2M HILL

- Kris Colosi
- Mike Thien

### 6.2 REFERENCES

24590-LAW-3YD-LPH-00001, *System Description for LAW LPH Container Pour Handling System*, Rev. 0, January 17, 2006

24590-LAW-ICF-ENG-04-001, *ICD-15: ILAW Dose Rate and Weight*, January 29, 2004

24590-LAW-ICF-ENG-04-0002, *ICD-15: ILAW Transport Vehicle Length*, February 25, 2004

24590-LAW-ICF-G-01-001, *ICD-15: WTP Provide ILAW Package to TFC for Training*, October 31, 2001

24590-LAW-ICF-G-02-001, *ICD-15: Eliminate Unnecessary Container Storage and Acceptance Process Steps for ILAW Product*, August 13, 2002

24590-PTF-M5-V17T-00008, *Process Flow Diagram HLW Lag Storage and Feed Blending System HLP*, September 21, 2004

24590-WTP-BODCN-ENC-04-0008, *Process Basis of Design (Revised to incorporate ORP Comments on Section 6)*, June 10, 2004

24590-WTP-DB-ENG-01-001, *Basis of Design*, Rev. 1D, November 27, 2006

24590-WTP-GPP-MGT-003, *Interface Control Procedure*, Rev. 2, January 18, 2007

24590-WTP-ICD-MG-01-014, *ICD 14 – Interface Control Document for Immobilized High-Level Waste*, Rev. 2, November 15, 2003



- 24590-WTP-ICD-MG-01-015, *ICD 15 – Interface Control Document for Immobilized Low-Activity Waste*, Rev. 2, November 15, 2003
- 24590-WTP-ICD-MG-01-019, *ICD 19 – Interface Control Document for Waste Feed*, Rev. 3, August 15, 2003
- 24590-WTP-ICF-ENG-02-005, *ICD-14 Establishment of IHLW Transportation Cask Lid Critical Dimensions*, December 31, 2002
- 24590-WTP-ICF-ENG-03-002, *ICD-14: IHLW: Establishment of IHLW Transportation Cask Critical Dimension*, February 24, 2003
- 24590-WTP-ICF-ENG-03-004, *ICD-14: IHLW Canister Receipt/Retrieval Throughput*, October 16, 2003
- 24590-WTP-ICF-ENG-03-005, *ICD-14: IHLW Canister Design Basis Contact Dose Rates for TFC Projects*, August 21, 2003
- 24590-WTP-ICF-ENG-03-009, *ICD-15: ILAW – Deletion of DOE-Sampling Details*, October 15, 2003
- 24590-WTP-ICF-OP-04-0002, *Emergency Returns Flush Responsibility*, September 14, 2005
- 24590-WTP-ICF-PR-01-001, *ICD-14: Radionuclide Value Correction*, August 9, 2001
- 24590-WTP-M4C-V11T-00004, *Calculation of Hydrogen Generation Rates and Times to Lower Flammability Limit for WTP*, May 18, 2006
- 24590-WTP-PL-MG-01-001, *Interface Management Plan*, Rev. 2, January 18, 2007
- 24590-WTP-RPT-NS-01-001, *Preliminary Criticality Safety Evaluation Report for the WTP*, Rev. 5, December 2006
- 24590-WTP-RPT-PT-02-005, *Flowsheet Bases, Assumptions, and Requirements*, Rev. 3, June 29, 2005
- 24590-WTP-SE-ENS-04-041, *Authorization Basis Amendment Request, PT Non-Newtonian Vessels (Hydrogen Mitigation)*, Rev. 2, November 22, 2004
- CCN: 039604, letter, A.R. Veirup, BNI, to M.K. Barrett, ORP, "Submittal and Request for Approval of Minimum Essential Initiative Number 0001 – Elimination of Low Activity Waste Container Storage Facility," dated August 29, 2002
- CCN: 085100, "ICD-14 Team Meeting," Meeting Minutes, April 2, 2004
- CCN: 087329, "ICD-19 Team Meeting: Waste Feed Constraint Management," Meeting Minutes, dated April 14, 2004

- CCN: 090709, "ICD-14 Team Meeting," Meeting Minutes, dated June 9, 2004
- CCN: 099394, "ICD-15 Team Meeting," Meeting Minutes, dated September 14, 2004
- CCN: 099395, "ICD-14 Team Meeting," Meeting Minutes, dated September 23, 2004
- CCN: 100420, "ICD-15 Working Group Meeting on Interface Milestone Dates," Meeting Minutes, dated September 22, 2004
- CCN: 100429, letter, R.J. Schepens, ORP, to J.P. Henschel, BNI, "Basis of Design Change Notice (BODCN), 24590-WTP-BODCN-ENG-04-0008, Process Basis of Design," dated September 17, 2004
- CCN: 102932, "ICD-14 Team Meeting," Meeting Minutes, dated October 26, 2004
- CCN: 104146, "ICD-14: Consensus to Proceed to DRR-I Team Meeting," Meeting Minutes, dated November 10, 2004
- CCN: 104744, "ICD-15: Consensus to Proceed to DRR-I Team Meeting," Meeting Minutes, dated November 17, 2004
- CCN: 106467, "ICD-15 Path Forward to Resolve Issues 15-18 & 15-20 Action Team Meeting," Meeting Minutes, dated December 17, 2004
- CCN: 118527, "ICD-19 Waste Feed Staging Guidelines Working Meeting," Meeting Minutes, dated March 17, 2005
- CCN: 153644, letter, J.R. Eschenberg, ORP, to C.M. Albert, BNI, "The U.S. Department of Energy, Office of River Protection's (ORP) Review of the Contract Deliverable 1.4 – Interface Management Plan," dated March 7, 2007
- D-06-DESIGN-035, *Design Product Oversight Plan – Waste Engineering Division Assessment of Waste Treatment Plant Interface Management*, December 15, 2006
- DE-AC27-01RV14136, 2000, *Bechtel National, Inc., Design, Construction, and Commissioning of the Hanford Tank Waste Treatment and Immobilization Plant*, U.S. Department of Energy, Office of River Protection, Richland, Washington
- DE-AC27-99RL14047, 2001, *CH2M HILL Hanford Group, Inc., Contract*, U.S. Department of Energy, Office of River Protection, Richland, Washington
- FY2006-SPPC-M-0150, *Interface Program – Management Assessment Report*, September 26, 2006
- HNF-SD-WM-SP-012, *Tank Farm Contractor Operation and Utilization Plan, Rev. 5D*, CH2M HILL Hanford Group, Inc., Richland, Washington

ORP DI 220.1 "Conduct of Design Oversight," Rev. 1, U.S. Department of Energy, Office of River Protection, Richland, Washington

ORP M 220.1, *Integrated Assessment Plan*, Rev. 4, U.S. Department of Energy, Office of River Protection, Richland, Washington

RPP-20437, *ILAW Transportation Optimization Study*, Rev. 0, CH2M HILL Hanford Group, Inc., Richland, Washington

RPP-3207, *ILAW Waste Form Technical Requirements Document (IWTRD)*, Rev. 0, CH2M HILL Hanford Group, Inc., Richland, Washington

RPP-8402, *Waste Acceptance Criteria for the Immobilized Low-Activity Waste Disposal Facility*, Rev. 0, CH2M HILL Hanford Group, Inc., Richland, Washington

WTP Preliminary Safety Analysis Report (COA No. 23)

WTP-RPT-153, 2007, *Estimate of Hanford Waste Insoluble Solid Particle Size and Density Distribution*, Rev. 0, Pacific Northwest Division (Battelle) prepared for Bechtel National, Inc., Richland, Washington

**Appendix A**

**Review of WTP Interface Control Documents**  
**Lines of Inquiry and Assessment**

---

## REVIEW OF WTP INTERFACE CONTROL DOCUMENTS LINES OF INQUIRY AND ASSESSMENT

### General

1. Have any Corrective Action Reports (CAR) been identified related to Interface Control Documents (ICD)? Please provide copies of all open CARs related to ICDs.

Assessment: Bechtel National, Inc. (BNI) searched project records for CARs applicable to ICDs and found one CAR. CAR 24590-WTP-CAR-QA-03-004 addressed an instance where an ICD was issued without resolution of all comments and was found to be irrelevant to this assessment.

2. Are ICD open items and action items tracked in the Action Tracking System (ATS)? What is the status of open items and action items in ICDs 14, 15, and 19?

Assessment: BNI searched for Action Tracking System (ATS) entries applicable to the ICDs and did not find any. BNI stated this was because actions and open items were previously being tracked through the ICDs.

ICDs 14, 15, and 19 contain lists of open and action items. Open items in ICDs 14, 15, and 19 have not been formally statused for several years. Many due dates identified in the ICDs have passed. Project schedules have also changed significantly since the 2003 issuance of the ICDs. Open and action items were reviewed for ICDs 14, 15, and 19. Based on this review, the assessors did not find any instances where BNI's failure to track these open and action items had an impact to project design or construction. However, this condition puts the project at risk that a critical interface activity may not be completed when required.

The *Interface Control Procedure*, 24590-WTP-GPP-MGT-003, Rev. 2, effective January 18, 2007, requires action items to be tracked in ATS. Section 3.3.1.5 states:

“An action item is an activity necessary to maintain the compatibility of the interface. Action items may be assigned to resolve an identified issue, or to complete the interface definition at a future time when additional information is available. These items are documented in team meeting minutes and tracked in the WTP Action Tracking System. The WTP core team member enters the item in the Action Tracking System and assigns responsibility for resolution with the concurrence of the appropriate IO.”

BNI stated that the project plans to track open and action items using their ATS. BNI stated that the open and action items in ICD 19 would be the first to be entered into the ATS with the balance to follow. The project is currently at risk due to failure to track ICD open and action items.

Failure to track action items in ATS is a **Finding D-06-AMWTP-DESIGN-035-F01**.

---

3. How are schedules between ICD parties being maintained?

Assessment: Schedules between ICD parties have not been formally tracked for several years. Revision 2 of the *Interface Management Plan* (24590-WTP-PL-MG-01-001, effective January 18, 2007) removed the requirement to include schedule milestones in ICDs. 24590-WTP-PL-MG-01-001, Section 3.3.5.3 states:

“Key interface milestones for each ICD are included in the WTP project schedule. These milestones mark activities or project phases when significant interaction between the interface participants begin. WTP Project Controls provides these milestones to ORP for integration with other contractors as part of routine schedule reporting. The ICD Team Lead is responsible for tracking the milestones related to the ICD and informing project management when a significant incompatibility between organization schedules has developed. Other key activities for the interface are referenced to the activity numbers in the project schedule. Dates are not included in the ICD, but are looked up in the project schedule when needed.”

The assessors discussed ORP integration of interface schedules and milestones with Federal Subproject Directors to determine how this integration activity was performed. The Federal Subproject Directors stated that systems are not currently in place for ORP to integrate interface schedule and activities at this time.

### ICD 19 - Interface Control Document for Waste Feed

1. How are rheology assumptions and design basis being addressed with the waste feed interface?

Assessment: ICD 19, Table 6, provides nominal high-level waste (HLW) transfer properties. This includes consistency viscosity at 25°C of <50cP. The WTP *Basis of Design* (BOD), 24590-WTP-DB-ENG-01-001, does not provide specific waste rheology assumptions. BNI has prepared a list of waste feed parameters for consideration that are needed to protect the WTP design basis as documented in specific calculations. This includes HLW feed consistency viscosity at 25°C of <10cP.

Discussions with BNI indicated BNI plans to propose rheology limits in a revised draft of the ICD in May 2007. Assessment of the impact of proposed feed rheology requirements on the number of batches that may be unacceptable for transfer into WTP has not been performed. The capability to project rheological properties from available tank characterization information is not currently available.

2. How are particle size and density assumptions and design basis being addressed with the waste feed interface?

Assessment: ICD 19, Table 6, provides nominal HLW transfer properties. This includes a particle size distribution with a mean of 7.5 microns and particle density of 2.9. The BOD does not provide specific particle size and density requirements. BNI has prepared a list of waste feed parameters for consideration that are needed to protect the

WTP design basis. This includes a particle size of 11 micron median size and density of 2.9, which is subject to change pending resolution of External Flowsheet Review Team issue M1, "Line Plugging."

BNI and the Tank Farms Contractor (TFC; CH2M HILL Hanford, Group, Inc.) have worked jointly to establish particle size and density distributions for Hanford tank wastes, WTP-RPT-153, *Estimate of Hanford Waste Insoluble Solid Particle Size and Density Distribution*. Discussions with BNI indicated BNI plans to propose particle size and density limits in a revised draft of the ICD in May 2007. Implementation of these requirements across the waste feed interface will lead to administrative controls and potentially require engineered systems to protect the WTP. Controls range from requiring low-activity waste (LAW) feed be performed with floating suction or stick pumps with a specified height above tank solids while the tank is not mixed, to use of hydrocyclones to separate larger and denser particulate, to grinders to size reduce solids.

3. How are criticality assumptions and design basis being addressed with the waste feed interface?

Assessment: The BOD does not provide Criticality Safety Limits (CSL). BNI's CSLs are defined in the *Preliminary Criticality Safety Evaluation Report for the WTP* (CSER), 24590-WTP-RPT-NS-01-001, and are part of the WTP Authorization Basis. Evaluation of historical feed vectors identified that waste from double-shell tank C-104 was projected to exceed the CSL. The Tank Farm Contractor has included requirements in their feed control list to blend tank C-104 solids to meet the WTP CSL.

ICD 19, Section 3.3.4, states, "The CSER is in the process of a significant update and approval by ORP. Consequently, no specifications are included in this revision of the ICD (see Action Item A19-10)." The expected completion date for Action Item A19-10 was December 2003. The need date in the ICD was set at six months prior to transfer of the first HLW feed to WTP. While continued slippage of this task has not resulted in an issue, this action should be completed to institutionalize the need for the TFC to screen waste feed batches against the CSLs. This screening will identify waste batches that could potentially exceed the CSL in time to allow efficient blending in the tank farms. BNI stated in discussion that the CSLs would be included in a revised draft of the ICD in May 2007.

4. How are hydrogen generation rate assumptions and design basis being addressed with the waste feed interface?

Assessment: The BOD does not include limits for hydrogen generation. ICD 19 does not have limits to address hydrogen generation rates for feed delivered to WTP. BNI has prepared a list of waste feed parameters for consideration that are needed to protect the WTP design basis. This includes hydrogen generation rate for waste feed and references 24590-WTP-M4C-V11T-00004, *Calculation of Hydrogen Generation Rates and Times to Lower Flammability Limit for WTP*. Discussions with BNI indicated BNI plans to propose hydrogen generation rate limits in a revised draft of the ICD in May 2007. These limits will be used to identify waste batches that could potentially exceed the WTP design

basis hydrogen generation rates in time to allow efficient blending in the tank farms. Evaluations of historical feed vectors identified the need to blend solids from double-shell tank AZ-101 to meet WTP hydrogen generation rate criteria. The Tank Farm Contractor has included requirements in their feed control list to blend tank AZ-101 solids to meet the WTP hydrogen generation rate design basis.

5. How are ammonia assumptions and design basis being addressed with the waste feed interface?

Assessment: The BOD does not include limits for ammonia in waste feed. ICD 19 does not have limits to address ammonia content for feed delivered to WTP. An ammonia limit of 0.04M in feed to WTP has been proposed to support closure of a condition of acceptance for the WTP Preliminary Safety Analysis Report (COA No. 23). BNI stated this limit bounded the highest ammonia content projected in the tank waste batches sent to WTP in the HNF-SD-WM-SP-012, *Tank Farm Contractor Operation and Utilization Plan*, Rev. 5D feed vector. Limitation of ammonia in feed helps prevent accumulation of flammable gas in the WTP. BNI has prepared a list of waste feed parameters for consideration that are needed to protect the WTP design basis. These include a limit of 0.04M ammonia for LAW feed and 0.0015M for HLW feed. Discussions with BNI indicated BNI plans to propose ammonia limits in waste feed in a revised draft of the ICD in May 2007. These limits will be used to identify waste batches that could potentially exceed the WTP design basis for ammonia in time to allow efficient blending in the tank farms.

6. How are particle hardness assumptions and design basis being addressed with the waste feed interface?

Assessment: ICD 19 does not provide particle hardness specifications. Additionally, the BOD does not specify particle hardness requirements. BNI's Authorization Basis Amendment Request, 24590-WTP-SE-ENS-04-041, *Authorization Basis Amendment Request, PT Non-Newtonian Vessels (Hydrogen Mitigation)*, required that waste particle characteristics for waste batches have a median hardness of 4.4 Mohs. BNI has prepared a list of waste feed parameters for consideration that are needed to protect the WTP design basis. This includes a median particle hardness of 4.4 Mohs. Discussions with BNI indicated BNI plans to propose particle hardness limits in a revised draft of the ICD in May 2007.

7. How was the transfer line siphoning issues closed to allow Pretreatment Facility design to proceed?

Assessment: ICD Open Issue 19-46 reads:

“Agreement needs to be reached by WTP and TFC on how siphoning of waste between the Tank Farm and WTP will be prevented. The following concerns need to be addressed: reliance on operational procedures versus engineered prevention, WTP receipt vessel drop leg design, and evaluation of WTP to TFC transfers.”



Closure of this action was identified as needed by December 2006 in ICD 19. Discussions with BNI indicated this action has not been closed. BNI stated they anticipate the issue will be addressed in operating procedures, the issue is not expected to impact design, and the issue needs to be captured in ATS with a due date based on the rebaselined project.

## ICD 14 – Interface Control Document for Immobilized High-Level Waste

### 1. Have any temporary storage and or disposal criteria changed?

Assessment: No criteria have formally changed. WTP will not ship waste to the Canister Storage Building (CSB) unless the waste package meets all disposal criteria. There is a provision for temporary storage of up to 45 canisters in WTP.

There is still an outstanding issue for the TFC to prepare integrated storage facility (ISF) acceptance criteria for receipt and storage of the immobilized high-level waste at the CSB. There is a possibility that these criteria may be more restrictive than in the current WTP contract.

From the BOD, Section 6.4:

*High-level waste - This glass product is produced by the HLW melter. The glass will be contained in an austenitic stainless steel container (2 ft [0.61 m] diameter by 14.8 ft [4.5 m] height). The HLW canister neck design and grapple is the type used by DOE at West Valley Nuclear Services, New York. The IHLW product storage at the WTP is capable of storing up to 45 canisters, prior to returning them to DOE ORP (see ICD 14, 24590-WTP-ICD-MG-01-014A). After product acceptance, DOE ORP delivers a shipping container and transport vehicle to the WTP. The WTP operator places the IHLW canisters into the shipping container. DOE ORP transports the IHLW canisters to a DOE-operated storage facility. See ICD 14 for transfer frequency and interface details. The detailed requirements for the HLW glass product are contained in Contract Specification 1.*

From the WTP contract, Standard 5(f)(1)(i):

*Waste Form Qualification Tests: The Contractor shall complete WTP waste form qualification testing during cold commissioning to demonstrate the production of qualified non-radioactive products (ILAW and IHLW) and secondary wastes. Process unit operations, sampling and analysis (or equivalent), and process control systems shall be utilized in these qualification tests. Test results will be evaluated and documented as part of the waste form qualification reports identified in Standard 6, Product Qualification, Characterization, and Certification (Table C.5-1.1, Deliverable 5.3).*

From the WTP contract, Section 1.2.2.1.3

*1. "Fill Height: Fill height shall be equivalent to at least 87% of the volume of the empty canister. The average fill height over all the canisters shall be at least 95% of the volume of the empty canister."*

2. *“Maximum Heat Generation Rate: The maximum heat generation rate for any single canister shall not exceed 1500 watts per canister when delivered to DOE.”*

3. *“Surface Contamination Limitations: Removable contamination on the external surfaces of the package shall not exceed 3,670 Bq/m<sup>2</sup> for alpha and 36,700 Bq/m<sup>2</sup> for beta-gamma. (M047)*

The WTP contract, Section 2.2.2.9, “Surface Dose Rate Limitations”:

*The dose rate at any point on the external surface of the package shall not exceed 500 mRem/hr.*

2. What is the status of the open issue pertaining to potential incompatibility of waste acceptance as defined in the WTP and TFC contracts?

Assessment: The TFC contract has the following requirement in Section C.3 (a)(4)(i):

*The IHLW storage facility will receive IHLW, where the product will be stored until shipped to a geologic repository. Storage of the product in a storage facility will consolidate the high level waste in one area and provide safe, environmentally sound storage. In addition HLW storage will provide load-out capability for shipment of IHLW canisters to a geologic repository.*

However, specific acceptance criteria for IHLW at the CSB have not been issued (see item 1 above).

3. What is the status of the open issue pertaining to potential incompatibility on maximum surface contamination between the TFC contract and the WTP contracts?

Assessment: There is still an outstanding issue for the TFC to prepare ISF Acceptance Criteria for receipt and storage of the IHLW at the CSB. There is a possibility that these criteria may be more restrictive than in the current WTP contract (see item 1 above).

4. What are the current requirements for canister heat generation rates and dose rates? Are they consistent with the CSB design basis?

Assessment: See item 1 above.

5. Have “on hold” issues been resolved, such as transport cask and vehicle?

Assessment: The transport cask and vehicle are to be provided by the TFC. Design of the IHLW transport system is complete.

6. What will be done with non-conforming waste packages?

Assessment: Section 13.2 of the WTP contract reads:

*In the event the product is identified as non-conforming, the product shall be segregated and a corrective action plan shall be prepared for DOE approval for the non-conforming product along with a plan to correct and prevent recurrence of the non-conforming condition. The Contracting Officer shall be notified within*

*24-hours after the Contractor has determined that a non-conforming product has been produced.*

*If DOE agrees that the non-conforming condition cannot be reasonably corrected based upon the analysis of the non-conforming product presented in the corrective action plan, DOE will agree to take possession of the non-conforming product.*

*In the event that the Contractor produces non-conforming waste during the commissioning activity, the non-conforming product will not be credited in determining the plant production capability.*

This means that each occurrence will be handled on a case-by-case basis. Because of the process controls within WTP, this would be a low-probability event.

### **ICD 15 - Interface Control Document for Immobilized Low-Activity Waste**

1. Have the disposal criteria changed?

Assessment: The requirements for the immobilized low-activity waste (ILAW) product are in Specification 2 of the WTP contract. Criteria for waste acceptance are in RPP-8402 *Waste Acceptance Criteria for the Immobilized Low-Activity Waste Disposal Facility*. These documents need to be reviewed to ensure there are no incompatibilities. Also, confirmation is needed that the final Integrated Disposal Facility (IDF) waste acceptance criteria will not be more restrictive than those in RPP-8402 and the WTP contract.

2. What will be done with non-conforming waste packages?

Assessment: Section 13.2 of the WTP Contract reads:

*In the event the product is identified as non-conforming, the product shall be segregated and a corrective action plan shall be prepared for DOE approval for the non-conforming product along with a plan to correct and prevent recurrence of the non-conforming condition. The Contracting Officer shall be notified within 24-hours after the Contractor has determined that a non-conforming product has been produced.*

*If DOE agrees that the non-conforming condition cannot be reasonably corrected based upon the analysis of the non-conforming product presented in the corrective action plan, DOE will agree to take possession of the non-conforming product.*

*In the event that the Contractor produces non-conforming waste during the commissioning activity, the non-conforming product will not be credited in determining the plant production capability.*

This means that each occurrence will be handled on a case-by-case basis. Because of the process controls within WTP, this would be a low-probability event.

3. What is the status of action items pertaining to final DOE acceptance of ILAW occurring two months after disposal?

Assessment: This is still an open issue as stated in the ICD and should be transferred to the ATS.

4. What is the status of action items pertaining to clarification of the concept of ILAW "acceptance" as defined in the WTP and TFC contracts?

Assessment: See item 3 above.

5. Have the Product Acceptance and Custody Transfer issues been resolved? These include:
  - a. Impact of deletion of lag storage from the WTP design.
  - b. Impact of delaying final DOE acceptance of ILAW product up to 90 working days.

Assessment: Issue 15-18 in ICD-15 includes a recommendation to eliminate unnecessary container storage and acceptance process steps for the ILAW product. BNI sent a formal request for approval of this recommendation to DOE on August 29, 2002 (CCN: 039604). A WTP Interface Change Form (24590-LAW-ICF-G-02-001) was attached to the letter. The specific changes proposed were:

1. The basis for transportation and disposal of ILAW packages will be WTP certification that the ILAW packages are compliant with all applicable *Resource Conservation and Recovery Act of 1976*/disposal and contractual requirements. Interim and final DOE acceptance, as described in WTP contract, DE-AC27-01RV14136, Specification 13, will be eliminated.
2. The requirement for the WTP LAW Facility to provide for lag storage of 450 ILAW packages will be eliminated. Transportation services availability will be increased, as necessary, to support this change.
3. The description of the transportation container as being removable from the trailer will be eliminated.
4. The administrative transfer of the container will be revised.

The ICF proposed specific changes to the WTP contract language and to ICD-15 to implement the proposed changes.

- The proposed changes to the WTP contract to implement items 1, 3, and 4 above were not made.
- Elimination of lag storage per item 2 above was implemented as part of 24590-WTP-BODCN-ENG-04-0008, *Basis of Design Change Notice*, issued June 10, 2004, that was approved by ORP on September 17, 2004 (CCN: 100429). The specific change approved was deletion of the following sentence from Section 6.4 of the BOD (24590-WTP-DB-ENG-01-001):

“The product lag storage capacity at the WTP is based on storing containers from 90 days production, which is equal to 150 containers prior to returning to DOE ORP (see ICD 15).”

The CSF was removed from the ILAW facility design (TN-24590-02-0456) on the basis that the Tank Farm Contractor would “increase the fleet size of the shipping casks to support elimination of the CSF.” An *ILAW Transportation Optimization Study* (RPP-20437) completed in April of 2004 concluded 14 trailers would be needed. The TFC is currently updating this study.

The only remaining lag storage for ILAW product are the 18 container park stands located in the buffer store/rework area between the Container Pour Handling System and the LAW Container Finishing Handling System (24590-LAW-3YD-LPH-00001, *System Description for LAW LPH Container Pour Handling System*, Rev. 0).

6. Have all issues related to loan of a container from WTP to the TFC been resolved?

Assessment: The current BNI schedule shows the container available in April 2011 and the cask/trailer available in October 2011. The current schedule for transfer of the first container of ILAW product is June 2012.

7. Does the container design comply with the Package Specific Safety Document?

Assessment: The package specific safety document is a Tank Farm Contractor prepared document to evaluate hazards associated with the transport of ILAW containers from WTP to the disposal site. The TFC point of contact for the document is Kris Colosi (509-372-3395). The document does not yet exist, but preparation is scheduled to start in April 2012 and finish in October 2014.

### Potential need for additional ICDs

1. How are facility design requirements for receipt and use of contaminated sodium hydroxide (NaOH) converted from sodium recovered from sodium cooled reactors documented? What specific design features to receive and use the NaOH are included in the design? Is an ICD for this material warranted?

Assessment: The WTP contract, DE-AC27-01RV14136, Facility Specification, Section C.7(a)(10) states, “The WTP shall be designed to have the ability to receive NaOH slightly contaminated with radioactive Na for use as a process chemical.”

Approximately 1,100 MT of slightly contaminated sodium will be converted to 19M caustic for use in the WTP as a process reagent. WTP can receive contaminated caustic through temporary design modifications to allow use in the WTP process. Interface details need to be established for reagent transfer volume, frequency, and physical interface. A draft revision of the WTP Contract requires development of an ICD for waste sodium.

2. How are facility design requirements to provide feed to the Hanford supplemental LAW facility documented? What specific design features to feed supplemental LAW are included in the design? Is an ICD for this feed stream warranted?

Assessment: The WTP contract, DE-AC27-01RV14136, and BOD currently do not require provisions to feed a supplemental LAW facility. However, the ability to transfer feed to a supplemental LAW processing facility has been evaluated and it was deemed that the existing transfer lines which were provided in the PT Facility design for the second WTP LAW vitrification facility could be used for that purpose. The transfer lines would have to be connected to a supplemental facility and the existing WTP design would require evaluation to make sure the associated systems were capable of making transfers with appropriate pump capacity and discharge head based on the location of a new facility.

Design of the supplemental LAW facility is currently unfunded. Interface development to provide supplemental LAW a design basis for treated LAW feed composition, transfer rate, transfer volume, transfer frequency, and physical properties will be needed when design resumes. However, development of a supplemental LAW ICD should be deferred until project design is funded.

An effort was initiated in 2005 technical integration activities developing plans for an ICD; however, the task was never completed.

3. How are facility design requirements to receive cesium (Cs) and strontium (Sr) product from potential conversion of the Cs and Sr capsule material documented? What specific design features to receive the Cs and Sr material are included in the design? Is an ICD for this potential stream to the WTP process warranted?

Assessment: The WTP contract, DE-AC27-01RV14136, Facility Specification, Section C.7(c)(2), states, "Pretreatment can connect to a potential new facility designed to receive and treat the Hanford Cs and Sr capsules prior to incorporation into the HLW feed for immobilization in the HLW Vitrification Facility. The scope shall be limited to the installation of process piping between an appropriately identified HLW feed preparation vessel and a location adjacent to the Pretreatment Facility where connections to a potential new facility could be easily accomplished."

There are provisions in the PT Facility to receive Cs and Sr waste from a capsule processing facility and the piping connections are depicted on 24590-PTF-M5-V17T-00008, *Process Flow Diagram HLW Lag Storage and Feed Blending System HLP*. The Cs/Sr waste stream would be blended with the treated pretreatment slurry and fed to the HLW Vitrification Facility. The assessors concluded that an ICD should not be prepared at this time. If DOE decides to send the Cs and Sr capsule material to WTP for incorporation into HLW glass, an ICD should be prepared following the decision when interface details can be realistically defined.

## **Appendix B**

### **Design Product Oversight Plan**

U.S. Department of Energy, Office of River Protection

**DESIGN PRODUCT OVERSIGHT PLAN**

**WASTE ENGINEERING DIVISION ASSESSMENT OF WASTE  
TREATMENT PLANT INTERFACE MANAGEMENT**

**December 15, 2006**

**Design Oversight:** D-06-DESIGN-035

**Team Lead:** Robert A. Gilbert

**Submitted by:**

original signed by \_\_\_\_\_ Date 12/11/2006  
R. A. Gilbert, Team Lead  
WTP Engineering Division

**Concurrence:**

original signed by \_\_\_\_\_ Date 12/11/2006  
Lew Miller Jr, Acting Director  
WTP Engineering Division

original signed by \_\_\_\_\_ Date 12/11/2006  
John Eschenberg, Project Manager WTP



## **1.0 BACKGROUND, PURPOSE AND OBJECTIVES**

### **1.1 Background**

The Waste Engineering Division (WED) has responsibility for the design oversight of the Waste Treatment Plant (WTP) project. Per Contract, DOE will use a partnering approach to manage interaction between DOE, the Contractor, the Tank Farm Contractor, and other Hanford Site contractors. The Contractor shall provide resources necessary to establish and implement the partnering approach. The contractor shall, in cooperation with DOE (as lead), Tank Farm Contractor, and the other Hanford Site contractors, establish an interface management process to assure effective control of technical, administrative, and regulatory interfaces. Interface control documents shall reflect all interfaces and services needed in the construction and performance testing phases, and projected interface and services needed for the future commissioning and operating phases. The ICDs shall be an element of the design basis. ICDs shall be updated as required.

### **1.2 Purpose**

This design oversight assessment will review BNIs management of ICD design basis requirements associated with physical design and process design.

### **1.3 Objectives**

The following are the specific objectives of this oversight:

1. Review WTP implementation of ICD 19, Waste Feed, design basis requirements associated with physical and process design.
2. Review WTP implementation of ICD 14, Immobilized High-Level Waste, design basis requirements associated with physical and process design.
3. Review WTP implementation of ICD 15, Immobilized Low-Activity Waste, design basis requirements associated with physical and process design.
4. Assess whether ICDs are currently not available that should be developed for potentially critical interfaces required to support physical and process design or future operations. (e.g., FFTF NaOH, Cs and Sr capsules, feed to supplemental LAW)

## **2.0 PROCESS**

This oversight shall be conducted within the guidelines of ORP M 220.1 and the WED Desk Instruction DI 220.1 Rev. 1 as revised January 13, 2006, "Conduct of Design Oversight."

### **2.1 Scope**

This oversight will include review of ICDs 14, 15, and 19; the Interface Management Plan; and relevant sections of the Basis of Design, Piping and Instrumentation Diagrams, Process Flow Diagrams, System Descriptions, and flowsheet information including the Basis, Assumptions,

and Requirements Document. Interviews and discussions will also be conducted with cognizant WTP Engineering management and staff.

The team will be comprised of two members of the ORP WTP Engineering Division to assess technical requirement implementation and Sub-Federal Project Directors for each of the WTP facilities to assess interface management process.

## **2.2 Preparation**

1. Identify the Contractor Point of Contact for the Review.
2. Confirm with Contractor staff that documentation being reviewed is the most current approved revision.
3. Obtain plans for future revisions of ICDs and the creation of new ICDs.
4. Obtain a list of the BNI individuals responsible for the Interface Management Plan and ICDs 14, 15, and 19.

## **2.3 Document Review**

The oversight will review the requested documentation to assess each of the Objectives identified in Section 1.3 of this plan. Based on this assessment, specific lines of inquiry for use in discussion and interviews will be prepared. Notes should be retained identifying the document title and number reviewed and any results of the review for use in preparing assessment notes which will be written by each team member as input to the report.

De-brief ORP and Contractor management periodically as required. The team lead will prepare a draft report that summarizes the activities, the results, conclusions and recommendations of the review. Issue the Draft Design Oversight Report for review and comment of ORP management and cognizant Contractor personnel. The final report will resolve comments received on the draft report.

## **3.0 SCHEDULE OF ACTIVITIES**

Table 2 summarizes the schedule for completion of this oversight.

## **4.0 DOCUMENTATION**

The final report of this task shall contain the sections and content as summarized in ORP DI 220.1 Rev. 1 draft as revised March, 2006, "Conduct of Design Oversight."

The issues identified in this oversight shall be listed in the final report. Each issue shall be assigned a type of issue and an item number for tracking to resolution through the Consolidated Action Reporting System (CARS). These shall also be tracked to resolution by the Contractor through the Correspondence Control Number (CCN) that will be assigned to the transmittal of the report from ORP to Contractor.

## 5.0 CLOSURE

The Team Lead, with concurrence of the Director, shall confirm that the items from this oversight are adequately resolved.

**Table 1 – Initial Information Requirements**

1.	Listing of the latest revisions of ICD 14, 15, and 19. Identification of the lead for each of these ICDs
2.	Listing of the latest revision of the Interface Management Plan; Basis of Design; and Basis, Assumptions, and Requirements Document.
3.	Schedule for ICD updates.
4.	Plans for new ICDs.

**Table 2 – Schedule**

<b>Activity Description</b>	<b>Responsibility</b>	<b>Complete By</b>
Develop Design Oversight Plan.	Gilbert	12/08/06
Obtain approved plan and advise Contractor of planned oversight, provide Design Process Oversight Plan to identify needed Contractor support, and obtain Point of Contract (POC).	Eschenberg/Miller	12/15/06
Obtain Contractor documentation defined in Table 1 above to support review and provide to team members	Gilbert	12/22/06
Qualify Team members	Gilbert/Miller	01/05/07
Kick-off meeting with Contractor to outline objectives, scope, schedule, and establish points of contact.	Gilbert/Team	03/19/07
Review documents from Contractor and provide oversight strategy, lines of inquiry, and interview requests to team lead.	Team	03/20/07
Review Contractor documents, participate in relevant Contractor internal meetings and meet with Contractor as required.	Team	03/23/07
Prepare Draft Design Oversight Report Notes.	Team	04/10/07
ORP and Contractor Exit Briefing.	Team and Contractor	04/12/07
Draft Report	Team	04/19/07
Resolve comments and place Final Report into concurrence including factual accuracy review with Contractor.	Gilbert	04/23/07
Approve Final Report	All on Concurrence	04/30/07

**Task# ORP-WTP-2007-0118**

E-STARSTM Report  
 Task Detail Report  
 05/03/2007 0109

TASK INFORMATION			
<b>Task#</b>	ORP-WTP-2007-0118		
<b>Subject</b>	(Concur 07-WTP-113) TRANSMITTAL OF THE U.S. DEPARTMENT OF ENERGY, OFFICE OF RIVER PROTECTION (ORP) DESIGN OVERSIGHT REPORT: REVIEW OF INTERFACE CONTROL DOCUMENTS (D-06-DESIGN-035)		
<b>Parent Task#</b>		<b>Status</b>	CLOSED
<b>Reference</b>		<b>Due</b>	
<b>Originator</b>	Licht, Sarah	<b>Priority</b>	High
<b>Originator Phone</b>	(509) 373-0068	<b>Category</b>	None
<b>Origination Date</b>	04/18/2007 0922	<b>Generic1</b>	
<b>Remote Task#</b>		<b>Generic2</b>	
<b>Deliverable</b>	None	<b>Generic3</b>	
<b>Class</b>	None	<b>View Permissions</b>	Normal
<b>Instructions</b>	Hard copy of the correspondence is being routed for concurrence. Once you have reviewed the correspondence, please approve or disapprove via E-STARS and route to the next person on the list. Thank you.  bcc: MGR RDG file WTP OFF file WTP RGD file M. K. Barrett, AMD J. R. Eschenberg, WTP R. A. Gilbert, WTP R. W. Griffith, WTP		
ROUTING LISTS			
1	Route List		Inactive
	<ul style="list-style-type: none"> <li>• Gilbert, Rob A - Review - Concur - 04/30/2007 1321 <i>Instructions:</i></li> </ul>		
	<ul style="list-style-type: none"> <li>• Griffith, Robert W - Review - Concur - 04/19/2007 1641 <i>Instructions:</i></li> </ul>		
	<ul style="list-style-type: none"> <li>• Eschenberg, John R - Review - Concur - 04/27/2007 1506 <i>Instructions:</i></li> </ul>		
	<ul style="list-style-type: none"> <li>• Olinger, Shirley J - Review - Concur - 05/02/2007 1511 <i>Instructions:</i></li> </ul>		
	<ul style="list-style-type: none"> <li>• Eschenberg, John R - Approve - Approved - 05/03/2007 1309 <i>Instructions:</i></li> </ul>		
ATTACHMENTS			
Attachments	1. 07-WTP-113.RAG.Albert.doc 2. 07-WTP-113.RAG.Attach.06-design-035Report.doc		
COLLABORATION			

**RECEIVED**

**MAY 03 2007**

**DOE-ORP/ORPCC**

<b>Task# ORP-WTP-2007-0118</b>
<b>COMMENTS</b>
<i>No Comments</i>
<b>TASK DUE DATE HISTORY</b>
<i>No Due Date History</i>
<b>SUB TASK HISTORY</b>
<i>No Subtasks</i>

-- end of report --

**Task# ORP-WTP-2007-0118**

E-STARS™ Report  
 Task Detail Report  
 04/19/2007 0404

TASK INFORMATION			
<b>Task#</b>	ORP-WTP-2007-0118		
<b>Subject</b>	(Concur 07-WTP-113) TRANSMITTAL OF THE U.S. DEPARTMENT OF ENERGY, OFFICE OF RIVER PROTECTION (ORP) DESIGN OVERSIGHT REPORT: REVIEW OF INTERFACE CONTROL DOCUMENTS (D-06-DESIGN-035)		
<b>Parent Task#</b>		<b>Status</b>	Open
<b>Reference</b>		<b>Due</b>	
<b>Originator</b>	Licht, Sarah	<b>Priority</b>	High
<b>Originator Phone</b>	(509) 373-0068	<b>Category</b>	None
<b>Origination Date</b>	04/18/2007 0922	<b>Generic1</b>	
<b>Remote Task#</b>		<b>Generic2</b>	
<b>Deliverable</b>	None	<b>Generic3</b>	
<b>Class</b>	None	<b>View Permissions</b>	Normal
<b>Instructions</b>	Hard copy of the correspondence is being routed for concurrence. Once you have reviewed the correspondence, please approve or disapprove via E-STARS and route to the next person on the list. Thank you.  bcc: MGR RDG file WTP OFF file WTP RGD file M. K. Barrett, AMD J. R. Eschenberg, WTP R. A. Gilbert, WTP R. W. Griffith, WTP		
ROUTING LISTS			
1	Route List		Active
	<ul style="list-style-type: none"> <li>Gilbert, Rob A - Review - Awaiting Response <i>ROA</i>  <i>Instructions:</i></li> </ul>		
	<ul style="list-style-type: none"> <li>Griffith, Robert W - Review - Awaiting Response <i>RWGS 4/26/07</i>  <i>Instructions:</i></li> </ul>		
	<ul style="list-style-type: none"> <li>Eschenberg, John R - Review - Awaiting Response <i>JE 4/27 04</i>  <i>Instructions:</i></li> </ul>		
	<ul style="list-style-type: none"> <li>Olinger, Shirley J - Review - Awaiting Response <i>SO</i>  <i>Instructions:</i></li> </ul>		
	<ul style="list-style-type: none"> <li>Eschenberg, John R - Approve - Awaiting Response <i>JE 5/3</i>  <i>Instructions:</i></li> </ul>		
<b>ATTACHMENTS</b>			
Attachments	1. 07-WTP-113.RAG.Albert.doc		
<b>COLLABORATION</b>			

<b>Task# ORP-WTP-2007-0118</b>
<b>COMMENTS</b>
<i>No Comments</i>
<b>TASK DUE DATE HISTORY</b>
<i>No Due Date History</i>
<b>SUB TASK HISTORY</b>
<i>No Subtasks</i>

-- end of report --