

## **Recent Improvements in Interface Management for Hanford's Waste Treatment and Immobilization Plant – 13263**

Stuart T. Arm\* (stuart\_t\_arm@rl.gov), Garth M. Duncan\*\* (gduncan@bechtel.com), Christopher C. Harrington\*\*\* (chris\_c\_harrington@orp.doe.gov), Michael J. Pell\*\* (mpell@bechtel.com) and Jeffery S. Van Meighem\* (jeff\_s\_van\_meighem@rl.gov)

\* Washington River Protection Solutions, P.O. Box 850, Richland, Washington, 99352

\*\* Bechtel National Inc., 2435 Stevens Center Place, Richland, Washington, 99352

\*\*\* Department of Energy – Office of River Protection, 2440 Stevens Center Place, Richland, Washington, 99352

### **ABSTRACT**

The U.S. Department of Energy (DOE), Office of River Protection (ORP) is responsible for management and completion of the River Protection Project (RPP) mission, which includes the Hanford Site tank farms operations and the Waste Treatment and Immobilization Plant (WTP). The RPP mission is to store, retrieve and treat Hanford's tank waste; store and dispose of treated wastes; and close the tank farm waste management areas and treatment facilities by 2047. The WTP is currently being designed and constructed by Bechtel National Inc. (BNI) for DOE-ORP. BNI relies on a number of technical services from other Hanford contractors for WTP's construction and commissioning. These same services will be required of the future WTP operations contractor. Partly in response to a DNFSB recommendation, the WTP interface management process managing these technical services has recently been improved through changes in organization and issue management. The changes are documented in an Interface Management Plan. The organizational improvement is embodied in the One System Integrated Project Team that was formed by integrating WTP and tank farms staff representing interfacing functional areas into a single organization. A number of improvements were made to the issue management process but most notable was the formal appointment of technical, regulatory and safety subject matter experts to ensure accurate identification of issues and open items. Ten of the thirteen active WTP Interface Control Documents have been revised in 2012 using the improved process with the remaining three in progress. The value of the process improvements is reflected by the ability to issue these documents on schedule and accurately identify technical, regulatory and safety issues and open items.

### **INTRODUCTION**

The U.S. Department of Energy (DOE), Office of River Protection (ORP) is responsible for management and completion of the River Protection Project (RPP) mission, which comprises both the Hanford Site tank farms operations and the Waste Treatment and Immobilization Plant (WTP). The RPP mission is to store, retrieve and treat Hanford's tank waste; store and dispose of treated wastes; and close the tank farm waste management areas and treatment facilities.

The purpose of the WTP is to treat and immobilize the waste currently stored in underground storage tanks that has been generated from processing nuclear material at Hanford since the 1940s. The WTP's Pretreatment Facility will separate the tank waste into Low Activity Waste (LAW) and High Level Waste (HLW) portions that will be immobilized into glass in separate vitrification facilities to generate Immobilized LAW (ILAW) and Immobilized HLW (IHLW). Tank waste treatment is scheduled to be completed by 2047.

The WTP is currently being designed and constructed by Bechtel National Inc. (BNI) for DOE-ORP. BNI relies on a number of technical services from other Hanford contractors (herein referred to as Interface Partners) for WTP's construction and commissioning. These same services will be required by the future WTP operations contractor. Coordination and planning for WTP's outside services are critical for the plant's successful operation in processing the tank waste at a rate sufficient to satisfy stakeholders such as the Environmental Protection Agency, the State of Washington and the Department of Energy. Therefore, BNI has an active interface management program.

BNI's interface management program has recently been improved through organizational and issue management changes as a result of fulfilling a Commitment in DOE-ORP's Response Plan [1] for the Defense Nuclear Facilities Safety Board's (DNFSB's) Recommendation 2010-2 *Pulse Jet Mixing at the Waste Treatment and Immobilization Plant* [2]. Improvements were implemented through an updated Interface Management Plan that strengthened roles, responsibilities, authorities, and accountabilities for identifying, tracking, managing and allocating the technical, regulatory and safety-related issues and risks.

## **CONTRACTOR AND DOE RESPONSIBILITIES TO THE WTP**

This section describes the inter-relationships between the Interface Partners for WTP as necessary background information to discussion of the interface management improvements. The WTP Interface Partners have the general responsibilities outlined in the following sections.

### **Mission Support Contractor**

The Mission Support Contractor (MSC) is responsible for providing utility and infrastructure services to WTP including the following:

- Electricity for construction and commissioning
- Raw and potable water
- Roads (external to the WTP site)
- Land for siting
- Aggregate for concrete construction
- Backfill material for construction

Mission Support Alliance, LLC is the current MSC.

### **Plateau Remediation Contractor**

During WTP's construction, the Plateau Remediation Contractor (PRC) has been responsible for disposing of construction-related flush water at the Treated Effluent Disposal Facility (TEDF). During WTP's commissioning and operation, the PRC will be responsible for the following:

- Disposal of WTP's radioactive solid waste (RSW) at the engineered near-surface repository, the Hanford Integrated Disposal Facility (IDF)
- Disposal of WTP's ILAW at the IDF
- Disposal of WTP's non-radioactive, non-dangerous liquid effluents at the TEDF
- Treatment and disposal of WTP's radioactive dangerous liquid effluents at Hanford's Liquid Effluent Retention Facility / Effluent Treatment Facility (LERF/ETF)

LERF/ETF will be upgraded in order to be able to treat the radioactive dangerous effluents generated by WTP. The solid material that results from the treatment of the radioactive dangerous effluents will be disposed of at the IDF.

CH2MHill Plateau Remediation Company is the current PRC.

### **Tank Operations Contractor**

Overall, the Tank Operations Contractor (TOC) is contractually responsible for planning, coordinating and paying for the WTP's requirements for infrastructure, utility and service support from the MSC, PRC and TOC consistent with contract terms. This requirement puts the TOC in an interface management position unique among the Hanford site contractors. During WTP's design and construction, the TOC has been responsible for providing tank waste samples to the WTP contractor for waste treatability studies. No samples have been provided for several years and none are planned but this interface remains active.

During commissioning and operations, the TOC is responsible for the following:

- Delivering tank waste to the WTP
- Transporting RSW and ILAW to the IDF
- Transporting IHLW to the Interim Hanford Storage Facility (IHS), currently being designed

Washington River Protection Solutions, LLC (WRPS) is the current TOC.

### **Department of Energy**

There are two DOE offices at Hanford. Both are involved in the WTP interface management

process. Each DOE office monitors the interfaces between the contractors with whom they have contracts and the WTP to ensure the interfaces remain functional, optimized and aligned with site funding priorities.

- The DOE - Richland Operations Office (DOE-RL) has contracts with PRC and MSC.
- DOE-ORP has contracts with WTP and TOC.

DOE-ORP and DOE-RL are jointly responsible for ensuring the viability of interfaces and that each contractor's contract is consistent with their interface responsibilities.

## **ORGANIZATIONAL CHANGES IMPROVING WTP INTERFACE MANAGEMENT**

### **The One System Integrated Project Team**

In October 2011, BNI and WRPS submitted a proposal that provides the RPP an integrated management and technical execution approach for waste feed delivery (WFD) and WTP startup as well as demonstrate the team's ability and commitment to work together to execute this technical work scope. This approach is called "2020 Vision One System" (herein referred to as One System). Implementation of this approach has demonstrated the ability and commitment of WTP and TOC to work together to execute this technical work scope.

The One System strategy is to assure successful completion of all activities necessary to achieve WTP Initial Plant Operations by 2022, lower costs and risks, and accelerate completion of the RPP mission. The overall objective of this strategy is to increase the team's combined focus on accelerating completion of key supporting work scope elements and to instill accountability for jointly initiating the One System. The key elements of the One System strategy are:

- Embrace One System as the overarching approach to the tank waste treatment and closure mission.
- Create a One System integrated project team (IPT) that is mission-focused and staffed by both contractors.
- Modify baseline workscope for each contractor, as needed, to meet One System goals.
- Define joint and complementary incentives for both WTP and TOC.

Since the formation in late 2011 of the One System IPT has provided significant interface management efficiency advantages by implementing a mission-focused approach to provide an effective connection between the TOC, responsible for coordinating, planning and paying for WTP's requirements from the Hanford contractors, and WTP. Within the One System IPT, the Technical Interface Integration Group assumes the following interface related responsibilities:

- Facilitating and coordinating identification and resolution of all interfacing WTP/TOC technical issues.

- Maintaining a formal management program for all WTP Interface Control Documents (ICDs).
- Monitoring interface performance against the ICDs.
- Coordinating the revision of all WTP ICDs as necessary.
- Planning and coordinating WTP support activities of WTP Interface Partners.

### **Interface Management Structure**

Planning and operation of WTP's interfaces has been ongoing since the WTP Project's inception. This effort is currently managed according to an Interface Management Plan (IMP) produced by BNI with WRPS' assistance in the One System IPT. The WTP interface management program, as delineated in the IMP, was recently improved in response to the DNFSB's Recommendation 2010-2 to formally incorporate nuclear safety and regulatory input to interface management. The updated IMP was transmitted by DOE-ORP to the DNFSB in July 2012 [3].

There are three levels of staff existing for each Interface Partner that manage their respective interfaces. Technical, nuclear safety and regulatory leads provide the subject matter expertise for each interface. Although such subject matter experts (SMEs) had previously been involved in the interface management process, SME appointment is now formalized in direct response to the DNFSB's Recommendation 2010-2 to ensure technical, safety and regulatory issues and risks are identified. Interface owners (IOs), in consultation with other managers within their organization, are responsible for appointing the subject matter leads. Interface Owners ensure the accuracy of ICDs in reflecting organizational baselines with input from respective SMEs. Additionally, interface managers ensure interface management processes remain functional and responsive. The interface management staff from each Interface Partner collectively represent the Interface Review Team (IRT). The IRT is led by a designated WTP staff member responsible for each ICD's content, setting the Team's agenda and deciding when an interface review is warranted. When required by the IRT Lead, IOs ensure the status of each interface, as reflected in the appropriate ICD, is reviewed by the appropriate subject matter experts, including designated technical, nuclear safety and regulatory leads. These leads can then further delegate portions of the interface for review.

For the TOC, the IO and technical, nuclear safety and regulatory leads are part of the One System IPT, which is advantageous in facilitating their focus on the interface. For the WTP, some IRT Leads are part of the One System IPT. However, WTP's Interface Coordinator resides in the One System IPT to provide an effective link to the IRT, technical, nuclear safety and regulatory leads dispersed in the project.

## **CHANGES IN ISSUE MANAGEMENT IMPROVING WTP INTERFACE MANAGEMENT**

As already indicated, ICDs are the documentary vehicle by which the physical and administrative natures of each of the interfaces are controlled and described. WTP's interfaces, as reflected in the ICDs, are regularly reviewed by the Interface Partners and updated as the WTP Project and other Hanford Contractors' interfacing systems mature. During the course of these reviews, Interface Partners may identify Issues and Open Items:

- ICD Issues are documented where:
  - An incompatibility across the interface is identified with respect to contractor technical, safety, regulatory or contractual baselines
  - An incomplete interface is identified
- Open Items reflect areas in the ICD where additional information is needed in order to completely define the interface. Open Items may develop into Issues if new information indicates an incompatibility across the interface or an incomplete interface.

Both Issues and Open Items are required to be explicitly described in the ICD and are tracked by the One System IPT. Issues, in particular, are formally assigned to individuals by the applicable IO to resolve through the appropriate Interface Partners' action tracking system. Open items are also assigned to individuals by the applicable IO but not necessarily using an action tracking system since they are typically of less significant impact than Issues. The assigned individual then leads a team to resolve the Issue or close the Open Item.

A proposed closure of an Open Item is presented to the appropriate IRT which must agree to the Open Item's closure by consensus or request additional actions to be completed by the closure team.

As shown in Figure 1, there are three management levels at which Issue resolution may be successively agreed upon if prior levels fail to do so. At the first level, the assigned individual presents a proposed resolution to the IRT, led by the WTP's Team Lead. If the proposed resolution fails to be accepted by consensus of the IRT then it is elevated to the Interface Owners Group, which is convened and led by the TOC. Likewise, if the Interface Owners fail to reach consensus on resolution then the Issue is elevated to the Contractor Interface Board (CIB) and/or Hanford Contractors Alignment Board (HCAB). The CIB consists of upper level management, including the Interface Managers, from each Interface Partner, who are convened by the MSC. The HCAB consists purely of upper level managers from DOE-ORP and DOE-RL. Any Issues not resolved by the IOG must be resolved by the CIB and/or HCAB.

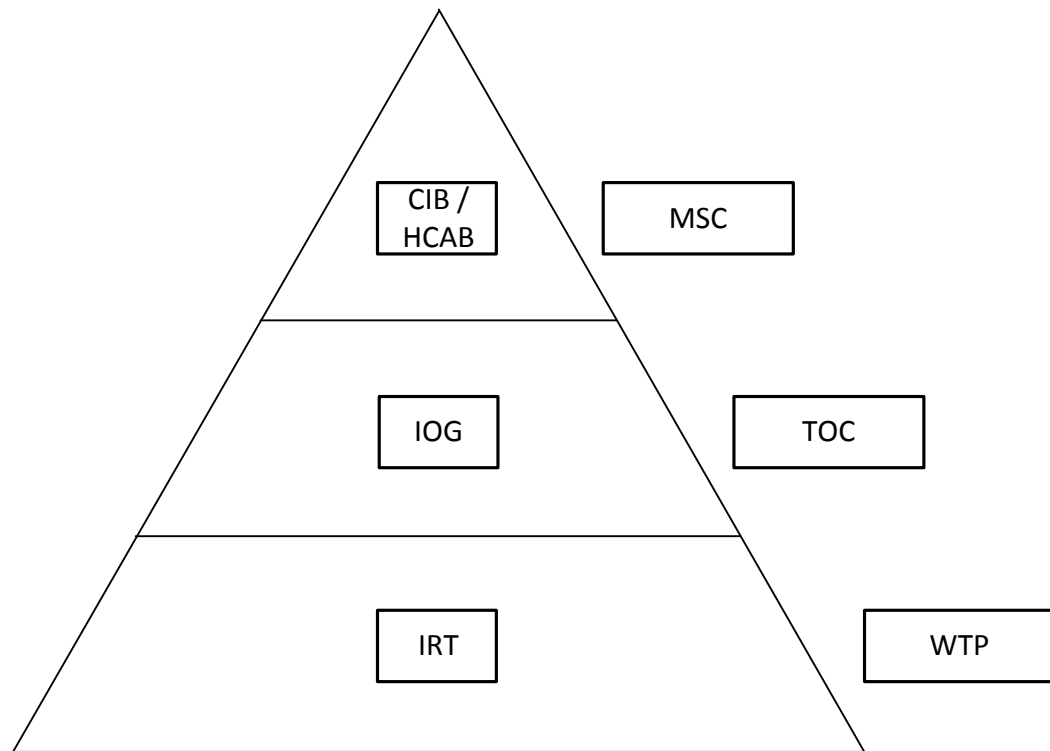


Fig. 1. Management structure for resolving WTP ICD Issues

### **IMPROVEMENTS IN ACTION – INTERFACE FOR RADIOACTIVE DANGEROUS LIQUID EFFLUENTS**

An example of the improved WTP interface management process is provided by the interface for radioactive dangerous liquid effluents. This interface is especially complex because it involves three contractors and both DOE offices, a total of five Interface Partners. During WTP Commissioning and then hot operations, Contractors will generate radioactive dangerous liquid effluents that will be pumped to the site's LERF/ETF. As shown in Figure 2, the LERF/ETF and the primary transfer line are managed by the PRC for DOE-RL. However, a backup transfer line is partially managed by the TOC for DOE-ORP because the PC-5000 portion of the line primarily transfers condensate from the TOC's 242-A Evaporator Facility to the LERF/ETF. Instruments measuring flow rate, pH, radiation and solids concentration transmit their readings to the LERF/ETF control room (242AL-71).

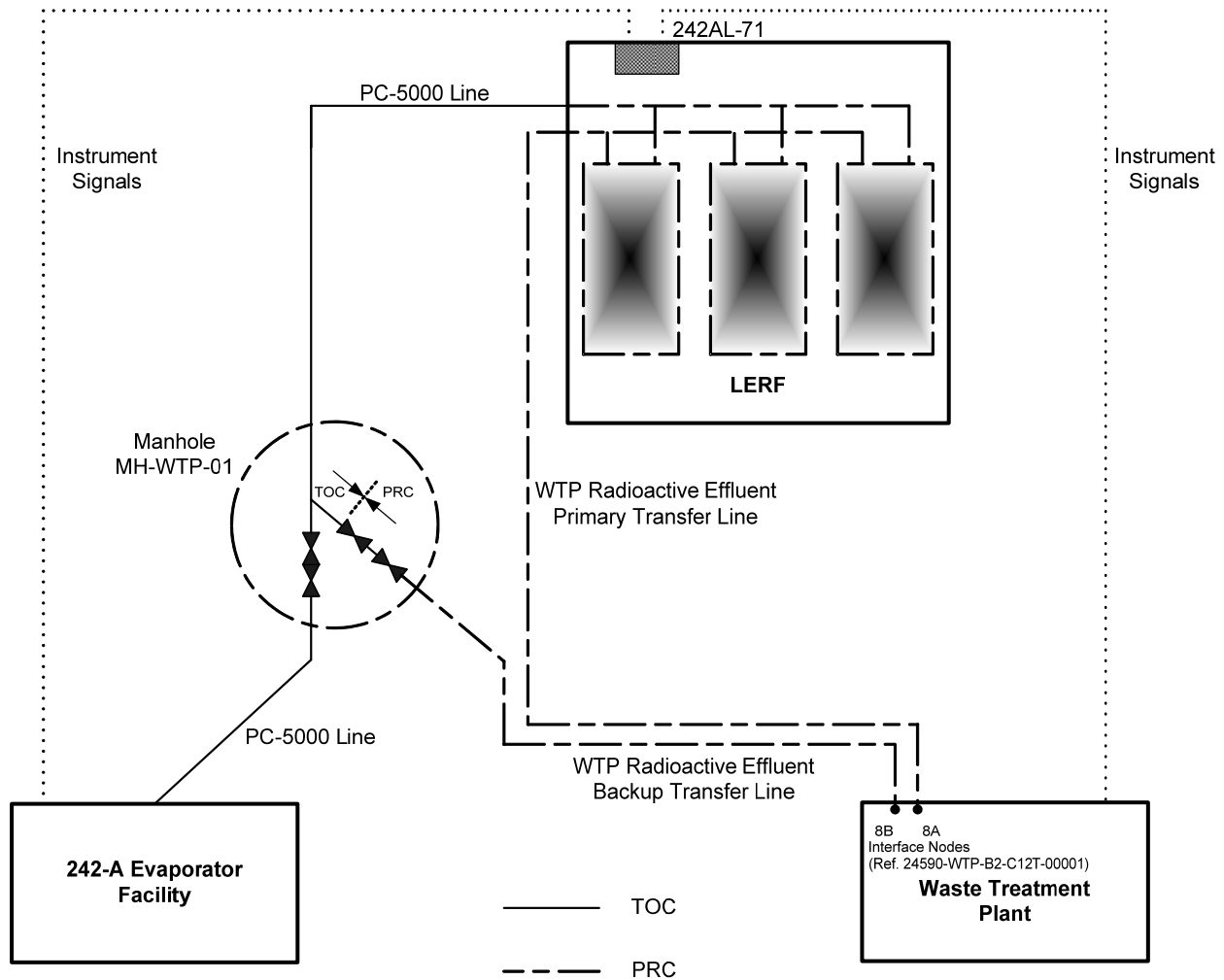


Fig. 2. Configuration of the radioactive dangerous liquid effluent transfer system

Reviews by the TOC's nuclear safety and regulatory leads raised two potential Issues:

- Leak detection on the TOC-owned portion of the back-up line is only communicated to the TOC's evaporator control room. Leaks also need to be communicated to the WTP's control room.
- Leak detectors on the PRC-owned primary line and portion of the secondary line are of an older style than used by the TOC elsewhere in the tank farm and had proved very unreliable (leading to false leak detection). Therefore, the PRC-owned leak detectors need to be replaced.

A meeting of the applicable IRT confirmed these potential issues. Actions to develop the technical scopes and cost estimates for replacing the old-style leak detectors and leak detection communication were assigned to the TOC given its role in coordinating and planning the PRC's



requirements to WTP. The actions are tracked by both the One System IPT and through TOC's E-STARS action tracking system. The TOC will develop the technical scopes and cost estimates closely with PRC engineers since the latter will likely perform the work. Budgeting and scheduling of the work will then be agreed by the Interface Partners to resolve the Issue.

## CONCLUSIONS

The WTP interface management process has recently been improved through changes in organization and technical issue management documented in a revised IMP. The organizational changes include:

- Formation of the One System IPT consisting of TOC and WTP staff holistically focused on the RPP mission.
- IRTs consisting of technical, nuclear safety and regulatory leads, IOs and Interface Managers operating at respectively 3 levels of interface management and providing disciplined review, coordination and oversight of WTP interfaces.

Technical issue management has benefited from a formalized identification, documentation and resolution process. Issues are identified by the IRTs, documented in ICDs and their resolution tracked by the One System IPT. Proposed Issue resolutions are accepted by the affected Interface Partners by consensus at succeeding levels of interface management if needed.

Ten of the thirteen active WTP ICDs have been revised in ten months in 2012 using the improved process with the remaining three in progress. The value of the process improvements is reflected by the ability to issue these documents on schedule and in accurate identification of technical, regulatory and safety Issues and Open Items that are being worked to closure offline from the ICD revision process.

## REFERENCES

1. S. CHU, "Department of Energy Plan to Address Waste Treatment and Immobilization Plant Vessel Mixing Issues. Implementation Plan for Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 2010-2", Rev. 0, U.S. Department of Energy, Washington, DC (2011).
2. P. S. WINOKUR, "Recommendation 2010-2 to the Secretary of Energy *Pulse Jet Mixing at the Waste Treatment and Immobilization Plant*", Defense Nuclear Facilities Safety Board, Washington DC (2010).
3. S. L. SAMUELSON, "Transmittal of Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 2010-2 Implementation Plan (IP) Deliverable 5.7.3.2", DOE-ORP, Richland, WA (2012).