One System Integrated Project Team Progress in Coordinating Hanford Tank Farms and the Waste Treatment Plant – 14214

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ABSTRACT

The One System Integrated Project Team (IPT) was formed at the Hanford Site in late 2011 as a way to improve coordination and integration between the Hanford Tank Waste Treatment and Immobilization Plant (WTP) and the Tank Operations Contractor (TOC) on interfaces between the two projects, and to eliminate duplication and exploit opportunities for synergy. The IPT is composed of jointly staffed groups that work on technical issues of mutual interest, front-end design and project definition, nuclear safety, plant engineering system integration, commissioning, planning and scheduling, and environmental, safety, health and quality (ESH&Q) areas. In the past year important progress has been made in a number of areas as the organization has matured and additional opportunities have been identified. Areas covered in this paper include:

- Support for development of the Office of Environmental Management (EM) framework document to progress the Office of River Protection's (ORP) River Protection Project (RPP) mission,
- Stewardship of the RPP flowsheet,
- Collaboration with Savannah River Site (SRS), Savannah River National Laboratory (SRNL), and Pacific North National Laboratory (PNNL),
- Operations programs integration, and
- Further development of the waste acceptance criteria.

INTRODUCTION

The IPT consists of about 175 TOC and WTP co-located employees. A TOC manager heads the IPT, and a WTP manager is the deputy. They report to the President of TOC and the Project Director of WTP. There are six divisions, each headed by a TOC and WTP co-manager. The divisions are Project Integration and Controls, ESH&Q, Commissioning, Technical Front-End Design and Project Definition, and Nuclear Safety & Engineering Systems Integration. The direct customer of the IPT is the ORP Startup and Commissioning Integration Manager and staff. Other key interfaces are with the Manager of ORP, ORP' s Assistant Manager for the Tank Farm Project, and the ORP Assistant Manager for the WTP.

The IPT was created from staff, scope, and budget from the two parent organizations. Its primary focus is on topics and areas where there are WTP and TOC interfaces, in areas of mutual interest (technical and otherwise), areas where programs, assumptions, input, and methods should be similar, areas where alignment is beneficial to the two projects and/or the US Department of Energy (DOE), and areas where duplication of effort can be avoided.

In 2013, some of the key activities included supporting development of EM's framework document for progressing the RPP mission, stewardship of the RPP flowsheet, collaboration with SRS, SRNL, and PNNL on issues of mutual interest, integrations of operations programs, and

continued development of the WTP Pretreatment (PT) waste acceptance criteria.

ONE SYSTEM PROGRESS IN 2013

Support of Development of the EM Framework Document

A key event in 2013 for ORP was the release in September of the framework document [1]. The document describes a strategic framework for addressing the risks and challenges to completing the RPP mission as soon as practical by implementing a multiple and phased approach to accomplish the following:

- Begin immobilization of liquid tank waste as soon as possible by directly feeding the Low-Activity Waste (LAW) vitrification facility,
- Process transuranic (TRU) wastes for disposal at the Waste Isolation Pilot Plant (WIPP) (assuming the waste can be properly classified as TRU and permitted for disposal at WIPP), and
- Resolve technical issues in the PT and High-Level Waste (HLW) facilities (including determining how to adequately mix and sample the waste before processing) to enable completion of design and construction and allow startup and operations.

The Manager of ORP and his staff were assisted by the One System Technical and Front End Engineering and Project Definition, and Project Integration and Controls groups in developing the framework. Various conceptual studies cost and schedule approximations, business case evaluations, and modeling were performed to underpin and substantiate the framework. Figure 1 shows the Phase 1 Flow Diagram for direct feed to LAW. As seen in the figure, pretreatment of direct feed is necessary to remove solids and cesium to be within the design basis of LAW.

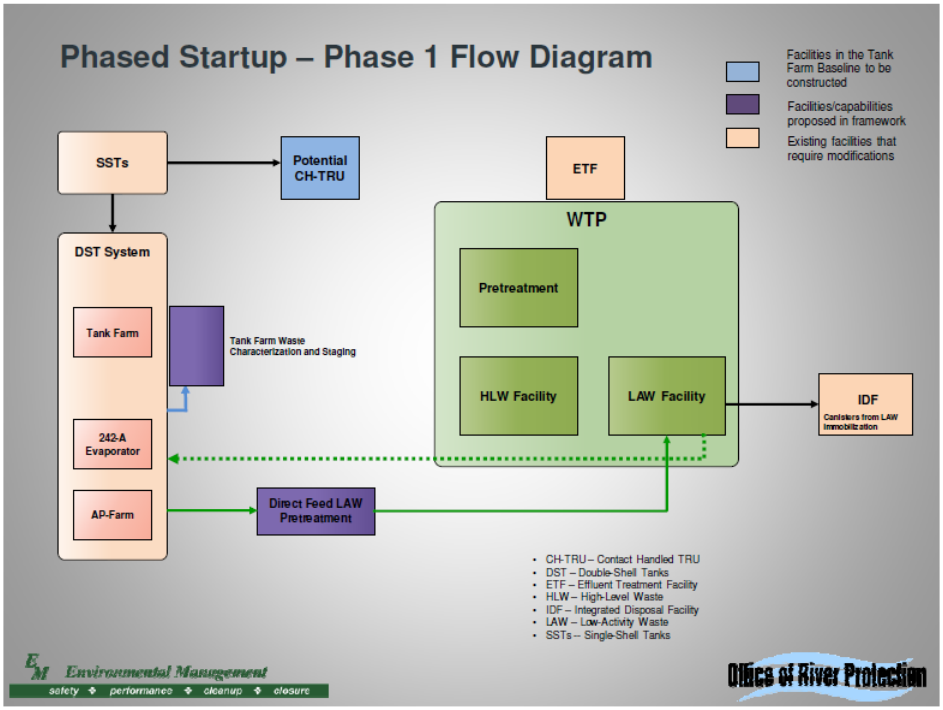

Fig. 1. Framework Phase 1 Flow Diagram

Treatment of the supernate for delivery to WTP involves an interim pretreatment system that are the same technologies to be used in the WTP PT facility (cross-flow ultrafiltration and spherical resorcinol formaldehyde ion exchange). Figure 1 also shows a tank farm waste characterization and staging facility. This facility will provide the means to obtain a representative sample with high confidence in the results. The facility would process and sample HLW slurry for feed to WTP.

Stewardship of the RPP Flowsheet

The Manager of ORP has tasked IPT with assuming stewardship of the RPP flowsheet. The flowsheet encompasses the entirety of current and planned ORP operations including tank retrievals, waste blending and staging, 242A evaporator operations, TRU waste handling, WTP operations, WTP effluent streams, and disposal of the TRU, glass products, and secondary waste.

Washington River Protection Solutions and Bechtel National, Inc. have contractual responsibility and design authority over their facilities and operations, and stewardship of the flowsheet does not interfere with that. Stewardship entails the examining and managing interfaces between the different parts of the flowsheet. Figure 2 shows the flowsheet. The red hexagons are the interface points.

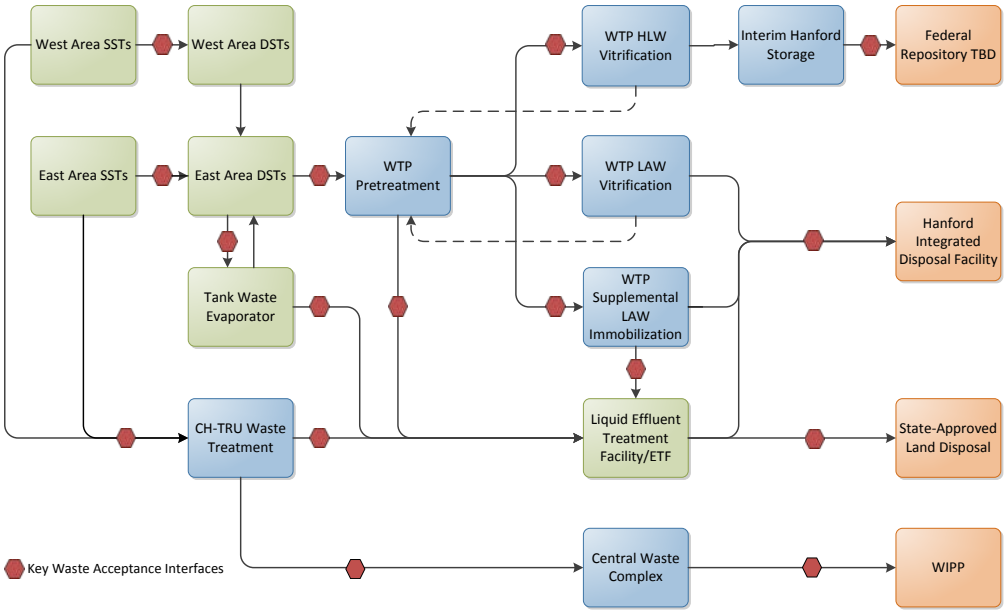

Fig. 2 The RPP Flowsheet

A key part of the task is involvement of national labs (specifically PNNL and SRNL) in this stewardship. The goal is maintain lab viability and capability in the support of ORP technology and operational needs over the entire mission.

A phased approach is planned. In 2014, activities include establishing the flowsheet and managing its configuration, reviewing and documenting existing technical bases, identifying gaps, and evaluating program risks. In ensuing years actions will be recommended and implemented to

mitigate gaps. Actions will also be taken to optimize the interfaces. An example of this is the feed delivery to WTP PT, wherein the tank waste blending scheme will be adjusted (taking into account ongoing retrievals and other limitations) to improve PT operations and minimize the effects of the more difficult to treat wastes types.

Collaboration with SRS, SRNL, and PNNL

This area involves two related initiatives. One involves transferring lessons learned and methodologies from SRS that relate to similar scope at Hanford. The second addresses national lab activity in support of advancing the RPP.

In 2013, two working sessions were held, in January in Richland and in May at SRS to exchange information about the two sites of value to the other site. The January meetings covered such topics as the SRS liquid waste system, SRS salt batching and processing, technology development at both sites, direct feed scenarios at Hanford, and system planning at both sites. In May, the focus was on experience from the Defense Waste Processing Facility (DWPF). DWPF has operated successfully for 17 years and has produced over 3000 canisters of vitrified waste. While there are differences in the waste and processes at the two sites, much of what DWPF does to stage, accept, and immobilize the waste is applicable to Hanford. Such topics as the waste feed qualification, feed batch planning, waste acceptance criteria, and sampling and analysis for feed qualification were covered. This information was presented by SRNL and Savannah River Remediation personnel. Similar information on TOC/WTP plans for the same activities was shared so that there could be a better understanding, and therefore more opportunity, to leverage what has been learned at on site to apply at the other. The meeting's discussions were captured in summary notes [2] and [3].

The two national labs who provide support to SRS and Hanford, SRNL and PNNL participated in the meetings described above. Additionally, ORP engaged the IPT staff to work with them and the labs to identify areas where additional information, evaluation, and investigation would be beneficial to TOC and WTP. A variety of studies were commissioned and delivered by the end of FY 2013. These included studies on representativeness for DWPF melter feed samples [4], statistical methods and tools for Hanford feed sampling [5], rheology modification of waste [6], radionuclide scaling factors for HLW characterization [7], and SRS sludge batch qualification [8].

Integration of Operations Programs

The IPT sponsors the One System Program Integration Council. The makeup and activities of this council are defined in a charter [9]. The purpose of the council is to drive integration between WTP and TOC in processes where it makes sense to do so. Membership includes some of the IPT managers, plus senior parent company managers who help identify and drive the integration. The current focus is on the programs that need to be developed for WTP to support commissioning and operations. There are 33 program development requirement areas, including 17 safety management programs.

The basic premise for the development of new programs for WTP is to start from the corresponding tank farm program and make adjustments as necessary. This allows program development more quickly and has the advantage of starting from programs that are already proven and accepted by DOE at Hanford. The process also examines the TOC programs procedures for potential improvements. The effort to develop and implement these programs is

essential to achieve the readiness that will be necessary to achieve a successful operational readiness review necessary to start radioactive operations at WTP.

Eventually, the plan is that tank farms and the WTP will be operated by the same contractor, and having programs and procedures that are substantially similar will smooth the transition.

Integration progresses in phases as depicted in Figure 3 below.

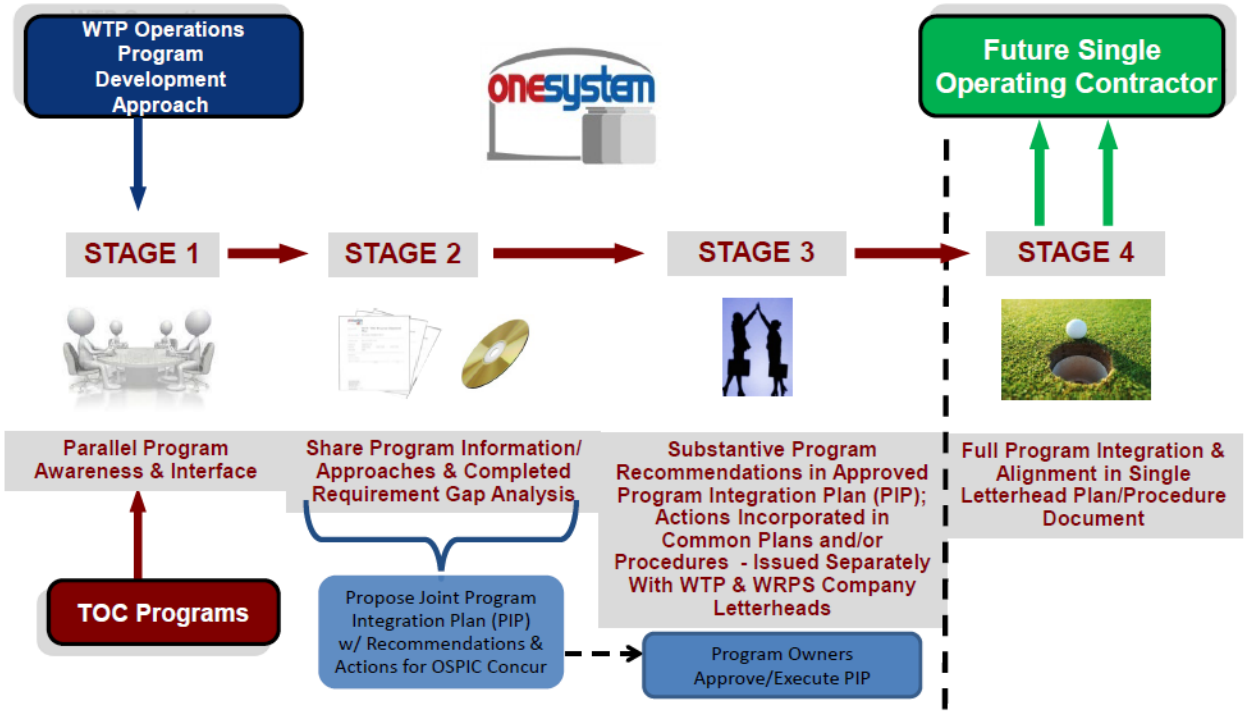

Fig. 3 Program Integration Progression

As can be seen the objective ahead of the operational readiness review is to be at stage 3 for the programs. The One System Program Integration Council reviews and concurs in the integration plans and in those areas where integration is not practical or possible. To enable better integration, a parallel effort has been undertaken by IPT to bring the TOC and WTP contracts into alignment, to the extent possible in the area of specified DOE Orders and versions.

Continued Development of the Waste Acceptance Criteria (WAC) for WTP PT

The WAC for feed delivered to the PT facility is contained in interface Control Document (ICD) 19 [10]. ICDs are WTP contract deliverables, but are jointly approved by WTP, TOC, and ORP. The One System IPT Technical Division is responsible for administering the program all 14 ICDs, and for the content of ICD-19.

The WAC have been stable over the years, but there remain some key unresolved issues. In 2013, a substantial effort was made to improve the document in terms of clarity, completeness, and accuracy. That was achieved in September with revision 6. Key open issues remain, however, in the areas of allowable particle properties (size/density), the adequacy of the criticality

limits, and in the ability to actually reliably measure some of the specified properties, such as those related to erosion. In addition resolution of open technical issues in PT and HLW may result in additional or modified WAC. All open issues and items relating to the ICD are captured within the document itself. There remain a fair number of issues, some of them significant, in the ICD. The One System Technical Division will continue to work on these issues in concert with the WTP design and nuclear safety organizations.

CONCLUSIONS

As evidenced by the discussions above the IPT concept and organization continues to work well in addressing issues and opportunities related to the relationship between the tank farms and WTP, and the RPP mission.

REFERENCES

1. U. S. Department of Energy, *Hanford Tank Waste Retrieval, Treatment, and Disposition Framework,* September 24, 2013
2. SRS-Hanford Waste Feed Qualification Integration Meeting – Summary Notes, SRR-STI-2013-00344, June, 2013
3. Memorandum, P.A. Benson and A. V. Arakali to Distribution, “Trip Report for: Hanford-Savannah River Waste Feed Qualification Meeting May 7-9, 2013 at Savannah River Site, CCN 248474, May 31, 2013
4. Shine, E. P. and M. R. Poirier, *Defining and Characterizing Sample Representativeness for DWPF Melter feed Samples,* Savannah River National Laboratory, SRNL-STI-2013-00544, October, 2013
5. Fountain, M. S. et al, *Statistical Methods and Tools for Hanford Stage Feed Sampling,* Pacific Northwest National Laboratory, PNNL-22901, rev. o, October 2013
6. Pareizs, J. M., *Review of Rheology Modifiers for Hanford Waste,* Savannah River National Laboratory, SRNL-STI-2013-00493, September, 2013
7. Reboul, S. E., *Potential Application of Radionuclide Scaling Factors to High Level Waste Characterization,* Savannah River National Laboratory, SRNL-STI-2013-00492, September, 2013
8. Cercy, M. J., et al, *SRS Sludge Batch Qualification and Processing: Historical Perspective and Lessons Learned,* Savannah River National Laboratory, SRNL-STI-2013-00585, September, 2013
9. *One System Program Integration Council Charter,* RPP-RPT-53085/24590-WTP-CH-MGT-12-005, Rev. 2, February 2013
10. *ICD-19 – Interface Control Document for Waste Feed,* 24590-WTP-ICD-MG-01-019, Rev. 6, September 30, 2013.