Office Of Environmental Management
safety ◆ performance ◆ cleanup ◆ closure

U.S. DEPARTMENT OF ENERGY

HIGH-LEVEL WASTE CORPORATE BOARD NEWSLETTER

3 June 2008

UPCOMING EVENTS:

Next High-Level Waste Corporate Board meeting will be held at DOE-ID on 24 July 2008. Meeting details will be presented here and e-mailed to those persons with an interest to participate. Topics for discussion include:

- **Strategic Planning Initiative**
- **Technology Development / Needs Collection / Prioritization**
- **Waste Acceptance Product Specification**

This meeting will include a members-only executive session

OTHER NEWS

DOE SELECTS WASHINGTON RIVER PROTECTION SOLUTIONS, LLC FOR TANK OPERATIONS CONTRACT AT HANFORD SITE

WASHINGTON, DC - The U.S. Department of Energy (DOE) today announced that Washington River Protection *Solutions* (WRPS), LLC has been selected as the tank operations contractor to store, retrieve and treat Hanford tank waste and close the tank farms at DOE's Hanford Site in southeastern Washington State.

The first High-Level Waste Corporate Board meeting on 1 April 2008 generated such a spirited discussion of HLW issues that a monthly Newsletter seems like a natural extension of the meeting. The purpose of this Newsletter, then, is to promote and encourage the continuation of the discussion that began at Savannah River. Such a Newsletter fits within the instructions of the Board's draft charter, which directs the Board to build consensus, to identify needs and develop policies, and to evaluate implications of HLW issues to the HLW community. The Newsletter also serves a monthly bulletin board where members can post ideas and opinions and receive a broader audience than is otherwise conveniently available.

So, to start things off, here is a brief review of the first meeting:

Inés R. Triay (EM-2, Principal Deputy Assistant Secretary)

Dr. Triay's view of the Corporate Board is that it should be a means of identifying common procedures and practices between the sites when common problems arise. The Board also should be an instrument to assess similarities and differences among the sites' management processes. Its efforts should result in information transfer improvement, cross-complex integration, and the use of Lessons Learned. It is her wish to use the corporate approach to identify areas of agreement with RW (already an Advisor to the Board), EPA, and NRC. She noted that the TRU Waste Corporate Board could serve as a prototype for the HLW Corporate Board.

It is Dr. Triay's desire that the Board focus its concentration on the following six precepts: Performance Assessments, Quality Assurance, Waste Inventory Methods, Chemical Processing, Waste Forms, and Waste Disposition. She believes the HLW Corporate Board should be developing its own precepts using the foregoing as a starting point and that nothing should be off the table for discussion. Dr. Triay's final comment was that she is stepping aside and EM-20 (M. Gilbertson) will carry the Board forward and serve as Chair.

The contract is a cost-plus award-fee contract valued at approximately $7.1 billion over ten years (a five-year base period with options to extend it for up to five years).

WRPS is a limited liability company comprised of Washington Group International, Inc and Energy*Solutions* Federal Services, Inc. The team also includes Areva as a major subcontractor.

Recent Events:

HIGH LEVEL LIQUID WASTE TANK INTEGRITY WORKSHOP

A Department of Energy workshop on the leak and structural integrity of infrastructure used to store and transport high level waste was held May 13-15, 2008, at the Center for Hydrogen Research in Aiken, South Carolina. The purpose of the workshop was to exchange technical information on high level waste tank structural integrity among DOE sites, particularly Hanford and the Savannah River. The workshop attendance included forty participants from the Hanford and Savannah River sites, support contractors, national laboratories, university, and the Defense Nuclear Facilities Safety Board. Approximately thirty participants participated via live webcast for two days of technical presentations which included site tank histories, ultrasonic testing at the Savannah River Site, corrosion probes at Hanford, structural analysis and corrosion work.

Dr. Triay's Presentation

Mark A. Gilbertson (EM-20, Deputy Assistant Secretary, Engineering and Technology)

Mark noted that this inaugural meeting was laying the ground work for future meetings. He thought that, given the range of topics before the Board and the interest they generate, meeting frequency will have to be greater than semiannual for the near term. Mark also would like to see the Board deal with some external issues, such as plant extension of life, and life cycle management.

Mark Gilbertson's Presentation

Steven L. Krahn (EM-21, Director, Office of Waste Processing)

Steve spoke about the EM Technology Roadmap and some major technology demonstrations. Congress directed the Roadmap in 2007 to identify technical risks and uncertainties in the EM program over the long term (up to 10 years). This document includes the areas of Waste Processing, Groundwater and Soil Remediation, Deactivation and Decommissioning, Facility Engineering, Spent Nuclear Fuel, Challenging Materials, and Integration. In concert with the Roadmap, the Office of Waste Processing established strategic initiatives to address technical risks. The National Research Council Committee on Development and Implementation of a Cleanup Technology Roadmap reviewed this EM-Roadmap and agreed with the major program areas. The Roadmap was sent to Congress in March 2008.

Multiyear Program Plan (MYPP) is being developed to implement the initiatives of the Roadmap. There been many successes already:

- Sludge Mass Reduction – will reduce the number of canisters for disposal (perhaps as many as 900) with a corresponding reduction in life cycle costs;
- Small Column Ion Exchange – to remove cesium (Cs), has the potential for accelerating tank closure with concomitant reductions in waste treatment and life cycle costs;
- Steam Reforming – to destroy organics (principally tetraphenylborate, TPB) in SRS Tank 48. This technology will get Tank 48 back into useful service quicker and improve the flow of waste processing;
- Cold Crucible Induction Melter – use increases waste loading and waste throughput. Reduces life cycle cost and schedule.

Steven Krahn's Presentation

The challenge put forth to workshop participants was to discuss on-going waste tank integrity and service life issues with the goal of identifying opportunities and recommending solutions to improve these areas at the Savannah River and Hanford sites. Participants identified four areas that need further work; 1) better understanding of in tank conditions and chemistry, 2) better understanding of corrosion mechanisms, e.g. vapor space effects, 3) improved nondestructive examination of secondary liner and concrete, and 4) development of a tank integrity roadmap and execution plan for structural integrity activities. Action items were assigned to workshop participants for each of these areas.

Details concerning workshop presentations can be found at http://www.em.doe.gov/Pages/Worksops.aspx

STACY CHARBONEAU BECOMES THE ASSISTANT MANAGER OF THE TANK FARMS PROJECT

Stacy L. Charboneau is the Assistant Manager for the Tank Farms Project for the U.S. Department of Energy's Office of River Protection (ORP). Ms Charboneau has over 15 years of experience managing projects involving nuclear operations, maintenance, deactivation and environmental remediation.

As Assistant Manager, Ms. Charboneau manages the storage, treatment, and disposal of more

Delmar Noyes (Acting Assistant Manger, Tank Farm Project)

The presentation by the Office of River Protection Tank Farm generated a lively discussion on tank farm management. The topics covered included the scope and mission of the River Protection Project which is the cleanup and closure of the tank farm and concomitant construction of the Waste Treatment Plant. Del then described the challenge of this cleanup project: the volume of waste is nearly 50% larger than the Savannah River Site and would cover a football field to a depth of 150 feet. A distance of seven miles separates the two tank farms and the Waste Treatment Plant is being built adjacent to the East tank farm. The first tanks are of single shell construction (149 tank containing 32 M gallons of waste). Later, double shell tanks with larger capacity were built (28 containing 22 M gallons of waste). The waste in these to tank farms will be processed through the Waste Treatment Plant when its construction is complete.

Possibly the biggest challenge for the Tank Farm is waste retrieval. The waste in the tanks is in three forms: a crystalline Saltcake, a supernatant liquid, and sludge. The methods used to retrieve these waste include sluicing, saltcake dissolution, and vacuum dissolution. Experience shows that better retrieval methods are necessary to reduce the amount of water consumed and cleaned up before reuse and to overcome known sampling challenges. Newer technologies under investigation are a remote water lance (steerable), at least two different mobile retrieval tools that can move about on the tank floor, and a high pressure mixer. Many clever engineering solutions were found to get these mobile devices through narrow openings in the tanks. All this effort is a part of DOE's commitment to finding cleanup methods that are better, faster, and cheaper. Del concluded his presentation with an overview of the Waste Treatment Plant construction and the disposal plans for both vitrified products.

Delmar Noyes' Presentation

Jan Hagers (Manager, Idaho Cleanup Project)

Idaho has four stainless steel tanks containing acidic HLW liquid. Tank closure sequence is a complex, multistep process ending with filling tanks, piping, and vaults with grout. DOE-ID is building the Integrated Waste Treatment Unit (IWTU) to help accelerate tank closure. The ITWU will treat about 900,000 gallons of liquid waste by a steam reforming process, creating a carbonate wasteform which will be shipped to WIPP.

Most of the HLW at Idaho already has been calcined using fluidized bed technology and is in six bin sets awaiting a

than 50 million gallons of chemical and radioactive waste stored in 177 underground tanks at Hanford. Project activities include engineering, design, procurement, construction, environmental restoration, nuclear safety, hazardous waste management, and operations.

Prior to this position, Ms. Charboneau served as the Deputy Assistant Manager for River Corridor cleanup at the Richland Operations Office. Ms. Charboneau started at Hanford in 1994 as an engineer in the Waste Operations Division. Prior to coming to Hanford, she was at the U.S. Department of Defense's Naval Undersea Warfare Center in Keyport, Washington.

While at the Richland Operations Office, Charboneau served as a Facility Representative and the Program Manager for the Facility Representatives; held the position of Engineering and Construction Projects Manager for the Spent Nuclear Fuel Project; and served as a Federal Project Director in both the River Corridor and Central Plateau projects, including the Plutonium Finishing Plant. Ms. Charboneau also served on a detail as the Acting Tank Farms Operations Division Director at ORP.

Ms. Charboneau holds a Master's Degree in Engineering Management from the University of Massachusetts and a Bachelor's Degree in Electrical Engineering from South Dakota State University.

disposal path. Idaho is considering four possible disposable paths for calcine: direct (in a DOE Standard canister), vitrification, steam reforming, and hot isostatic pressing (HIP). A Record of Decision (ROD) including these four techniques is scheduled for December of 2009. It should be noted that INL has other wastes needing a disposal path

The EPA, under RCRA, classifies calcine as hazardous waste which and the NWPA does not permit hazardous waste into the deep geologic repository. Current modeling of calcine performance under repository conditions suggests no impact to the long term performance of the repository. Calcine is heterogeneous physically. Some of the calcine is high in aluminum (Al) and some is high in zirconium (Zr) and the bins have alternating layers of Al-calcine and Zr-calcine of variable thickness.

Jan Hagers' Presentation

Bryan Bower (Director, West Valley Demonstration Project)

The HLW vitrification campaign is complete and 275 HLW canisters are stored in the pit formerly containing the melter. New York State owns HLW but has not signed disposal contract with DOE. Therefore, WVDP cannot ship the vitrified HLW to a repository. Therefore, WVDP is considering a SRS-like storage building estimated to cost about $15,000,000. Also getting consideration is a variety of commercially available systems as an alternative. Corrosion potential of existing tanks is a continuing concern. Formerly, corrosion was controlled with an inert atmosphere (N2) to eliminate oxidizing conditions but now use in-tank dryers to eliminate moisture and reduce N2 consumption. Although the vitrification campaign is complete, the tanks still contain a small amount of residual waste and both NY and EPA want this waste removed.

Bryan Bower's Presentation

Terrel J. Spears (Assistant Manager, Waste Disposition Project)

The tank farm at Savannah River consists of 49 tanks containing 36,000,000 gallons of HLW. Thus far, more than 2480 canisters have been poured and transferred to the Glass Waste Storage Buildings. The challenge is to remove the waste and close the remaining tanks while safely storing, treating, and stabilizing the legacy waste. Available tank space constrains these operations. There is a total void volume of about 1,300,000 gallons distributed over the 49 tanks. DWPF needs to get some consolidation of tank ullage to get usable tank space.

The Saltstone facility is limited to processing a total of 1,400,000 Curies of a high volume, low activity waste stream initially coming from two upstream processes: the Deliquification, Dissolution, and Adjustment Process (DDA) and Modular Caustic Side Solvent Extraction Unit (MCU). The MCU is in start-up and receives its feed stock from the Actinide Removal Process (ARP), also in start-up. Both of these processes also have an HLW output to the DWPF. The Salt Waste Processing Facility will ultimately replace these two processes. The ARP and MCU have expected operating lives of 5 years. The projected volume of grout to be processed by the Saltstone facility is well within the regulatory curie limits.

There are two in-tank dissolution processes that have met with considerable success. The first is the in-tank Al dissolution of Sludge (Tank 51): 53% of the Al was dissolved by in-tank leaching. The second is the in-tank Salt Dissolution for Saltstone (DDA): the last heel from the DDA process is being removed from Tank 41.

Finally, Tank 48 is central to SRS tank farm operations but its contents need to be removed for it to fulfill this role. This tank needs treatment to destroy the benzene in the tank waste. The baseline technology is Steam Reforming and Wet Air Oxidation is the back-up method if needed.

Terrel Spears' Presentation