

**EA Operational Awareness Record
(December 2014)****Report Number:** EA-WTP-LAW-2014-08-18(b)**Site:** Hanford Site**Subject:** Operational Awareness Record of the Waste Treatment and Immobilization Plant Low Activity Waste Facility Waste Handling Systems Hazard Analysis Activities**Dates of Activity:** 08/18/14 - 08/28/14**Report Preparer:** James O. Low**Activity Description/Purpose:**

The U.S. Department of Energy (DOE) Office of Environment, Safety and Health Assessments, within the independent Office of Enterprise Assessments (EA), reviewed hazard analysis (HA) documents for the waste systems of the Waste Treatment and Immobilization Plant Low Activity Waste (LAW) Facility. These systems include the melter handling system (LMH), the melter equipment support handling system (LSH), the radioactive solid waste handling system (RWH), and the radioactive liquid waste disposal system (RLD). EA reviewed HA event tables developed for the LMH, LSH, and RWH systems; observed a portion of the HA activities for RLD system; and met with Bechtel National, Incorporated (BNI) personnel to discuss comments on the HA event tables. This EA observation is part of a planned multi-phase review (Ref. 1) focusing on the technical adequacy of select BNI-issued LAW HA reports (HARs) and subsequent submittal of the LAW Documented Safety Analysis (DSA) and Technical Safety Requirements for the DOE Office of River Protection's review and approval.

Result:

During this review, EA observed the LAW waste systems HA team (HAT) complete the hazard identification (HID) and "what if" questions for development of HA events related to the LAW RLD system. EA also reviewed the draft HA event tables for the LAW waste systems (08/22/14 versions for LMH, LSH, and RWH systems) and the "what if" questions list and HID tables for the RLD system.

As described in previous EA reports (Refs. 2 through 7), the HA process performed by each BNI HAT focuses on identifying and evaluating potential events (i.e., process upset conditions that lead to adverse consequences to facility workers, co-located workers, or the public). Considering the simplicity of the waste system, the HAT decision to use the "what if" hazard evaluation methodology is appropriate. EA provided comments (regarding the LMH, LSH, and RWH systems "what if" and HID checklists and HA event tables) to BNI for written response. After reviewing the BNI responses, EA met with BNI personnel to establish a mutual understanding of the responses, which led to their subsequent revision (Ref. 8). BNI responses identified a number of actions to modify the checklists and hazard evaluation tables to resolve specific comments.

EA noted several positive aspects of the HA process. While observing the LAW RLD HA activities, the HAT lead conducted the HID and "what if" activities in a manner that engaged team members, frequently soliciting input and developing consensus. The HAT also effectively used the piping and instrumentation diagrams to systematically develop the "what if" questions list. EA also observed that event consequences for all the waste handling systems were conservatively estimated, and that HA event tables for the waste handling systems included accident types appropriate to the analyzed systems (e.g., fires and loss of confinement). Overall, appropriate hazards have been identified by the HAT and included in the hazard evaluation tables.

EA's analysis of the HA event tables resulted in 13 comments. The comments identified areas that need further clarification, such as additional description of controls and control attributes to provide assurance that the analyzed hazard events will result in the identification of appropriate and adequate control. The comments also identified some gaps that will be filled in with additional HAT actions. The comments were satisfactorily responded to by BNI (Ref. 8) and some included committed actions. However, eight of the 13 review comments on the LMH, LSH, and RWH HA event tables were examples of two previously identified potential concerns: Potential Concern 3 (comments 4, 8, and 13), and Potential Concern 4 (comments 5, 6, 10, 11, and 12). A summary of the applicable previously identified potential concerns is attached. EA did not identify new potential events that would result in high consequences to the public or co-located workers nor new potential concerns of a systemic nature.

In the HA event tables, some events, involving unmitigated system effects (USEs) due to waste system component impacts on support systems for the melter and offgas systems, resulted in high consequences (Risk Rank I and II) to co-located workers and the public. EA will evaluate the disposition of USEs in conjunction with its oversight activities in the LAW offgas and melter systems HA.

EA Participants	References
1. James O. Low (lead)	1. DOE/HQ HS-45, <i>Plan for the Independent Oversight Review of the Hanford Site Waste Treatment Plant Low Activity Waste Facility Documented Safety Analysis Development</i> , April 22, 2013.
2. Daniel Schwendenman	2. DOE/HQ HS-40 Letter, JS Boulden III to SL Samuelson, IEA Review of the Hanford Site Waste Treatment & Immobilization Plant Low Activity Waste Melter Process System Hazard Analysis Activity, dated December 21, 2012.
3. David Odland	3. DOE/HQ HS-45 Report Number: HIAR-WTP-2013-05-13, <i>Activity Report for Waste Treatment and Immobilization Plant Low Activity Waste Melter Off-gas Process System Hazards Analysis Activity Observation</i> .
4. Mary Miller	4. DOE/HQ HS-45 Report Number: HIAR-WTP-2013-10-21, <i>Activity Report for Observation of Waste Treatment and Immobilization Plant Low Activity Waste Melter and Melter Off-gas Process System Hazards Analysis Activities</i> .
	5. DOE/HQ HS-45 Report Number: HIAR-WTP-2014-01-27, <i>Activity Report for the Observation of Waste Treatment and Immobilization Plant Low Activity Waste Facility Off-gas Systems Hazards Analysis Activities</i> .
	6. DOE/HQ EA-30 Report Number: IAR-WTP-2014-3-31, <i>Office of Environment, Safety and Health Assessments Activity Report for the Observation of the Waste Treatment and Immobilization Plant Low Activity Waste Facility Hazards Analysis Activities</i> .
	7. DOE/HQ EA-30 Report Number: IEA-WTP-2014-06-02, <i>Operational Awareness Record of the Observation of Waste Treatment and Immobilization Plant Low Activity Waste Facility Reagent Systems Hazards Analysis Activities</i> .
	8. E-mail: Stan Hill to James Low, Subject: Final EA-31 Comment Resolution, August 27, 2014 9:26 AM (PST).

Were there any items for EA follow up? Yes No

EA Follow-Up Items:

- EA will evaluate the disposition of USEs in conjunction with its oversight activities in the offgas and melter systems.

Attachment 1
Potential Concerns excerpt from Ref. 5 (revised)

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HIAR-WTP-2013-05-13, Activity Report for Waste Treatment and Immobilization Plant Low Activity Waste Melter Off-gas Process System Hazards Analysis Activity Observation, included the following potential concerns about the interim results of the analysis. The items identified by the EA team were labeled as potential concerns because the analysis process is incomplete until the HARs are completed, internally reviewed, approved by BNI, and thus ready for DOE review. Nonetheless, the following potential concerns, which involve event records with unmitigated high consequences to facility workers or co-located workers, could lead to weaknesses in the final HARs:

- Potential Concern 3: The development and documentation of the HA event tables is not always performed in sufficient detail to lead to full analysis of all process parameter deviations that could potentially affect system performance.
- Potential Concern 4: Some hazard events did not identify all of the related causes, and the hazard events did not always have a clear relationship between identified causes and subsequent candidate controls.

Note: Potential Concern 3 has been revised to delete the original specific instance.