

## CSSG TASKING 2016-03

Date Issued: June 1, 2016

**Task Title:** *Review of Criticality Safety Issues at the Waste Treatment Plant*

### **Background:**

The Criticality Safety Support Group (CSSG) has supported the Criticality Safety basis for the Waste Treatment Plant (WTP) being built at Hanford for a number of years. A Technical assist visit in 2008 resulted in a number of Recommendations and Opportunities for Improvement. During a 2009 CSSG technical review of the Criticality Safety basis of the Hanford Tank Farm operations, the Office of River Protection asked the team to comment on the implication on WTP regarding a recent revelation that some plutonium particles in the tank farms may not remain associated with nuclear poisons. The resultant report contained two additional Recommendations for the WTP contractor. A subsequent assessment of The WTP criticality safety posture by an Independent Review Team, initiated by Secretary Chu, was issued in 2013 and three CSSG members were on this team. Subsequently the WTP contractor issued a Plan for Resolution of Criticality Technical Issues in May 2014 (T2 Plan).

### **Task Statement:**

The CSSG is tasked with reviewing the Recommendations and Opportunities for Improvements associated with WTP from the 2008 and 2009 assessments to determine if these have been properly addressed. This is Task 1 and is limited to the co-precipitated plutonium that is currently in WTP scope. Task 2 is to review progress on the T2 plan and subsequent documents dealing with addressing the identified technical issues related to potential heavy plutonium particulate which is outside of the current WTP scope but anticipated to be incorporated in the next couple of years. The CSSG is asked to review the preliminary analysis and provide perspective and guidance as to how to effectively incorporate this material into the WTP design. This heavy plutonium particulate was a significant concern of the Secretary of Energy's S-1 Team and identified in the Independent Review Team (IRT) assessment of WTP criticality safety. The Task 2 review should also address the consistency between the IRT report and the WTP study. A more detailed tasking description as provided by DOE/ORP including specific references is provided as an attachment. Both Tasks will be addressed in a single letter report.

### **Resources:**

CSSG Task 2016-03 Team Members: (potential)

Robert Wilson (Team Leader)

David Erickson

Michaele Brady Raap

Fitz Trumble


William Pointer (ORNL, Fluid Dynamics)

Contractor CSSG members of the team will use their NCSP CSSG support funding as appropriate; DOE CSSG members of the team will utilize support from their site offices.

**Task Deliverables:**

1. CSSG Subgroup to hold task 'kickoff' telecom by June 30, 2016.
2. CSSG Subgroup to receive all necessary documentation prior to: June 15, 2016
3. Subgroup will meet at Richland: July 25-28, 2016
4. CSSG Subgroup to provide draft assessment to full CSSG for review: August 18, 2016
5. Full CSSG to provide review comments to Task Team Leader: September 1, 2016
6. CSSG team to issue final report to NCSP Manager: September 15, 2016

**Task Completion Date:** September 30, 2016

Signed: 

**Jerry N. McKamy, Manager US DOE NCSP  
Office of the Chief of Defense Nuclear Safety, NA-511**

## ATTACHMENT

### CSSG Tasking Description for Review of WTP Criticality Safety Documents, 5/18/16

#### **Task #1 – Evaluate Preliminary WTP Co-Precipitated CSER:**

Review and comment on the recently submitted Preliminary Co-Precipitated CSER for the WTP Project. Review the Bechtel National, Inc. (BNI) responses to the CSSG report of December 2008 and additional WTP issues from the December 2009 of the ORP Tank Farms Criticality Safety Program. Provide a determination if the CSSG comments are effectively resolved.

#### Documents for Review:

- 24590-WTP-CSER-ENS-08-0001, Rev. 1, *Preliminary Co-Precipitated Plutonium Criticality Safety Evaluation Report for the WTP Project.*
- 24590-WTP-ZOC-W11T-00013, Rev. 2, *Pu Absorber Limits from MCNP Calculations.*
- 24590-WTP-ZOC-W11T-00018, Rev. 0, *Validation of MCNP5 for Hanford Waste Criticality Safety Calculations.*
- 24590-PTF-RPT-NS-15-001, Rev. 0, *Criticality Hazards Assessment Report for the High Solids Vessels in the Pretreatment Facility.*
- 24590-HLW-RPT-NS-15-001, Rev. 0, *Criticality Hazards Assessment for the High Solids Vessels in the High-Level Waste Facility.*
- 24590-WTP-RPT-ENG-14-059, Rev. 0, *Process Engineering Study to Support WTP Criticality Safety – WTP Process Analysis.*
- 24590-QL-HC9-WA49-00001-03-00056, PNNL-23468, WTP-RPT-234, Rev. 1, *Chemical Disposition of Plutonium in Hanford Site Tank Wastes, May 2015.*
- 24590-QL-HC9-WA49-00001-03-00055, PNNL-23717, WTP-RPT-235, Rev. 1, *Effects Influencing Plutonium-Absorber Interactions and Distributions in Routine and Upset Waste Treatment Plant Operations, May 2015.*

Schedule: It is desired to complete this review by the CSSG with a final letter report provided to ORP (Joe Christensen) by September 30, 2016

#### **Task #2 – Pretreatment Criticality Safety Evaluation Engineering Study in Support of T2:**

Review and comment on the Criticality Safety Evaluation – Engineering Study (CSE-ES) for Hanford waste containing heavy plutonium particulate (HPP) consisting of plutonium oxide and plutonium metal fines. Provide CSSG perspective on the report recommendations of proposed HPP criticality controls and the supporting basis for the control strategy. The CSSG review is intended to be information only since this form of plutonium is not currently included in the WTP basis of design. CSSG review comments should provide input and consideration as the CSE-ES is more thoroughly evaluated into a future criticality safety evaluation report.

Documents for Review:

- 24590-WTP-PTF-ES-NS-15-002, Rev. 2, *Pretreatment Criticality Safety Evaluation Engineering Study in Support of T2.*
- 24590-WTP-ES-ENG-14-018, Rev. 0, *Engineering Study of Fluid Dynamics of PHM Mixed Vessels to Support Nuclear Criticality Evaluations.*
- 24590-WTP-Z1C-W11T-00004, Rev. A, *Heavy Plutonium Particulate Mass Limits in a Vessel and Pipe.*

Redundant documents from Task #1:

- 24590-PTF-RPT-NS-15-001, Rev. 0, *Criticality Hazards Assessment Report for the High Solids Vessels in the Pretreatment Facility.*
- 24590-HLW-RPT-NS-15-001, Rev. 0, *Criticality Hazards Assessment for the High Solids Vessels in the High-Level Waste Facility.*
- 24590-WTP-RPT-ENG-14-059, Rev. 0, *Process Engineering Study to Support WTP Criticality Safety – WTP Process Analysis.*
- 24590-QL-HC9-WA49-00001-03-00056, PNNL-23468, WTP-RPT-234, Rev. 1, *Chemical Disposition of Plutonium in Hanford Site Tank Wastes*, May 2015.
- 24590-QL-HC9-WA49-00001-03-00055, PNNL-23717, WTP-RPT-235, Rev. 1, *Effects Influencing Plutonium-Absorber Interactions and Distributions in Routine and Upset Waste Treatment Plant Operations*, May 2015.

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