



## SAVANNAH RIVER SITE

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LWO-LWE-2007-00190,

Rev. 0

Retention: Until Waste Tank 4 is  
removed from service

Disposal Auth: NCI-434-78-2

Track #: 10080

September 6, 2007

TO: M. J. Green, 241-108F  
Tank 4 Project Owner

*Vijaya Chander*  
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FTF Closure Engineering

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### **TANK 4 PROBING RESULTS AND COMPLETION OF BURKEITE REMOVAL PROCESS** **(Revision 0)**

#### **Purpose**

The purpose of this document is to provide the engineering evaluation for the completion of Burkeite dissolution and removal.

#### **Background**

A hard layer of salt was encountered during mining operations and installation of waste removal equipment in Tank 4 during late 2004. This hard layer was determined to be Burkeite Salt (Ref. 6) and needed to be dissolved prior to initiation of Bulk Sludge Mixing in Tank 4. While preparing for Bulk Sludge Mixing, several efforts of riser mining, using a 22 inch diameter mechanical tool (P-PN-G-0017), was unable to penetrate this hard layer of material. In addition, a high pressure hydro lance tool (P-PM-F-00275) was used to dissolve and penetrate the hard layer (Ref. 8). Based on these results, the probing was selected as a method to show that burkeite layer was dissolved.

The hard layer of Burkeite Salt was estimated to be 6 inches thick in addition to 6.6 inches of common waste tank salt layer as determined by sampling results. There was also approximately 120 inches of concentrated supernate above the Burkeite layer. Engineering evaluations (Ref. 2) and lab tests showed that the hard layer of Burkeite including salt would easily dissolve in IW. The sludge and salt levels were estimated at 33.5 inches and 46 inches respectively from the tank bottom. To support the Burkeite Dissolution and transfer, the bottom of the installed (P-PA-F-3550) submersible transfer pump (STP) was moved from 12.5 feet to 42 inches from tank bottom. Burkeite dissolution and transfer process was performed using the methodology provided in the strategy discussed in reference 14.

#### WASHINGTON SAVANNAH RIVER COMPANY

**The WSRC Team:** Washington Savannah River Company LLC • Bechtel Savannah River, Inc. • BNG America Savannah River Corporation • BWXT Savannah River Company • CH2 Savannah River Company

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**Discussion**

**Probing - Burkeite Dissolution and Removal from Tank 4**

Probing activities were completed on 08/28/07 using an 8 inch port within the Tank 4 center riser per work package (# 799129). The probe showed a resistance at approximately 44 inches above the bottom of the tank; however, the probe penetrated the waste layer with little pressure and slid to approximately 6 inches above the bottom of the tank. Based on these probing results, it is concluded that the Burkeite has been dissolved and transferred to Tank 33 (Ref. 14). The burkeite dissolution process was completed after the completion of the 4 th batch transfer from Tank 4 to 33.

**Conclusions**

The burkeite dissolution and removal process was successfully completed on 8/28/07 by way of probing as the technical validation method of the Tank 4 Burkeite Dissolution Flow Sheet (Ref. 2).

**References**

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2. CBU-PIT-2005-00232, Tank 4 Burkeite Dissolution Flow Sheet, Q. L. Nguyen, February 10, 2006.
3. X-CLC-F-00666, Tank 4 Burkeite/Salt Gas Release Mode Evaluation, Hilary Bui, March 4, 2007.
4. X-ESR-F-00095, Corrosion Evaluation of Tank 4 during the Burkeite Removal Process, B. J. Weirsmas, March 10, 2007.
5. T-CLC-F-00399, Type I Tank Liner Integrity Under Burkeite Removal, Charles Mckeel, March 10, 2007.
6. WSRC-TR-2005-00441, Characterization of Core Samples from Hardened Crust Layer in Tank 4F, M. S. Hay, September 16, 2005.
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11. LWO-LWE-2007-00063 Rev. 1, Tank 4 Burkeite Dissolution And Removal Strategy, V. A. Chander, May 9, 2007.
12. LWO-LWE-2007-00063 Rev. 2, Tank 4 Burkeite Dissolution And Removal Strategy, V. A. Chander, June 19, 2007.
13. LWO-LWE-2007-00063 Rev. 3, Tank 4 Burkeite Dissolution And Removal Strategy, V. A. Chander, July 26, 2007.
14. LWO-LWE-2007-00063 Rev. 4, Tank 4 Burkeite Dissolution And Removal Strategy, V. A. Chander, August 4, 2007.
15. LWO-LWE-2007-00116, Rev. 0, Tank 4 Burkeite Dissolution and Removal Strategy Alternatives Path Forward, M. Hubbard/Q. L. Nguyen, June 6, 2007.

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**Approval Signatures**

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9/7/07  
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