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To: Frank Pennebaker, 773-42A SRR-CWDA-2011-00172, Rev. 0

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Subject: Tank 6 Composite Samples Volumetric Proportions

Summary

The volumetric proportioning for the three composite samples for the Tank 6 characterization analyses are presented in Table 1. These proportions are to satisfy the requirements from Section 3.7 of the *Tank 6 Sample and Analysis Plan.* [SRR-LWE-2010-00300] The composite samples will be used to provide characterization of the final residual material for tank closure. The volumetric proportions allow the composite samples to accurately represent the material as a whole.

The volumetric proportions were varied to account for the uncertainty in the volume estimates. By building the volume uncertainty directly into the composite samples, the final sample analysis results will contain the volumetric uncertainty and will not require an adjustment to account for this uncertainty. This means the uncertainty will be measured (although not separately) instead of having to estimate it and add an adjustment to the analyzed values.

Table 1 - Composite Samples Volumetric Distribution

		Composite Sample					
		1		2		3	
Region	Location	Vol%	Sample ID	Vol%	Sample ID	Vol%	Sample ID
1	SW Accumulation	31%	6-A1a	27%	6-A2a	25%	6-A3a
		31%	6-A1b	27%	6-A2b	25%	6-A3b
2	East Accumulation	11.5%	6-B1a	13%	6-B2a	31%	6-B3b
		11.5%	6-B1b	13%	6-B2b		
3	Remainder of the Tank	15%	6-C1a	20%	6-C2a	19%	6-C3a
	Total	100%		100%		100%	

For example: 31 vol% of composite sample 1 should come from sample 6-A1a

Methodology

The final residual volume in Tank 6 was determined as documented in SRR-LWE-2011-00245. As part of the final volume determination, three unique regions of material were identified within Tank 6. The volume of material in these areas was established, which included a determined value, a low end and a high end volume for each of the regions as presented in Table 2.

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Table 2 - Tank 6 Final Volume Distributions

Region	Location	Low End Volume (gal)	Determined Volume (gal)	High End Volume (gal)
1	SW Accumulation	1344	1726	2112
2	East Accumulation	637	794	950
3	Remainder of the Tank	254	494	909
	Total	2235	3014	3971

To account for the volume uncertainty, three separate volume configurations were developed where each configuration was represented by one of the composite samples as presented in Table 3. The volume configurations were developed to reflect the volume uncertainty in the three regions of the tank. Using the range of volumes for the three regions in Tank 6, triangle distributions were setup in GoldSim. The low end, determined, and high end values from the volume determination established the parameters for the distributions. A probabilistic model was run that randomly generated volumes for the three regions in three separate realizations. This produced a volume for each region of the tank, in each realization, that was proportioned to the total to provide each composite sample's volumetric proportions.

Table 3 - Tank 6 Probabilistic Volumes and Proportions for Compositing

		Realization					
		1		2		3	
Region	Location	Vol%	Volume (gal)	Vol%	Volume (gal)	Vol%	Volume (gal)
1	SW Accumulation	62%	1940	54%	1670	50%	1440
2	East Accumulation	23%	737	26%	821	31%	893
3	Remainder of the Tank	15%	471	20%	632	19%	531
	Total	100%	3150	100%	3120	100%	2860

Based on the volumetric distribution in Table 3, the composite samples should be proportioned similarly. Since each composite sample will contain two samples from each of the accumulations, the proportion of each sample was split evenly. This is with the exception of composite sample 3. During the sampling activities, one of the 15 samples was not collected. To account for this missing sample, composite 3 will created with only one sample from the east accumulation. This is based on the recommendation from *Justification for Changes to the Tank 6 Sampling and Analysis Plan*. [SRR-CWDA-2011-00159] For details on sample identification refer to Section 3.4.2 of SRR-LWE-2010-00300.

Data Validation

For the data validation sample, use composite sample 2. This sample was randomly selected between composite samples 1 and 2. Composite sample 3 was not included in the selection process since it did not contain all the planned samples.

References

SRR-CWDA-2011-00159, *Justification for Changes to the Tank 6 Sampling and Analysis Plan*, Savannah River Site, Aiken, SC, Rev. 0 November 1, 2011.
SRR-LWE-2010-00300, *Tank 6 Sampling and Analysis Plan*, Savannah River Site, Aiken, SC, Rev. 1, January 5, 2011.
SRR-LWE-2011-00245, *Tank 6 Final Volume Determination and Uncertainty Estimate*, Savannah River Site, Aiken, SC, Rev. 0, November 10, 2011