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Saltstone Grout Sampling (U)

Reference:
1. Industrial Solid Waste Landfill Permit Application for Proposed Z-Area Saltstone Disposal Facility, dated 4/2/86
2. Industrial Solid Waste Landfill (ISWLF) Permit #025500-1603
3. Correspondence, "Saltstone Density and Compressive Strength Sampling," Liner (WSRC) to Mowbray (SCDHEC), dated 9/4/03

Introduction

Table C-9, found on page C-17 of the Saltstone Industrial Solid Waste Landfill Application, dated 4/2/86, includes the sample parameters and test methods for the saltstone grout. Table C-9 states that the grout will be sampled daily for density, weekly for compressive strength, and monthly for the hazardous waste characteristic of toxicity. In order to keep personnel radiation exposure As Low as Reasonably Achievable (ALARA), the sampling strategy will be revised per Attachment #1. Based on the proposed Saltstone Production and Disposal Facility operating schedule, the reduced sampling frequency is expected to reduce personnel exposure by at least 5,500 mrem/yr.

Discussion

Density

The grout density is a product quality indicator that provides assurance that the saltstone dry material mix is appropriate for the salt solution being processed. Extensive testing is performed in the laboratory with actual salt solution to determine the appropriate saltstone dry material mix. From the laboratory tests, the Saltstone Facility develops an optimum performance recipe for dry material mix and salt solution. Salt solution is not transferred to the Saltstone Facility unless it meets the Saltstone Facility Waste Acceptance Criteria (WAC). The Saltstone Facility WAC ensures the optimum performance

recipe is being met as required by the laboratory tests. In the future, as outlined in Attachment #1, the salt solution will be sampled on a quarterly basis at Tank 241-950H (Tank 50) to ensure the WAC requirements are being met. For transfers during the quarter, a material balance will be used to ensure salt solution parameters are within the Saltstone Facility WAC limits. The material balance will be periodically reset based on the quarterly sample results. In addition, installed density instrumentation in the saltstone wastewater treatment process will be used as a real time assurance that the saltstone dry material mix is appropriate. Historical data shows that the laboratory derived dry material mix is consistent with that required to produce acceptable grout. The real time density instrumentation provides an accurate measurement that confirms the laboratory derived dry material mix. Laboratory testing, quarterly sampling at Tank 241-950H (Tank 50) to confirm compliance with the Saltstone Facility WAC, and installed real time density monitoring is sufficient, which eliminates the radiation exposure associated with the daily density sampling. The risk of grout being made with an unacceptable density is low, which is mitigated by the historical density results of the saltstone grout, proper recipe formulation for new batches, quarterly sampling at Tank 241-950H (Tank 50), and in-line density instrumentation. If the saltstone facility would see a problem with the grout being produced, as indicated by a downward trend on the installed density instrumentation, appropriate actions would be taken to troubleshoot and correct.

Compressive Strength

Previously, compressive strength provided a go/no-go check to verify gross acceptability of the saltstone grout 28 days after processing. Historically, measured values for saltstone grout compressive strength have fallen in the range from 600 to 900 pounds/square inch (psi.), which is greater than the requirement of 300 psi. As with the density measurement, extensive testing is performed in the laboratory with actual salt solution to determine the appropriate saltstone dry material mix. From the laboratory tests, the Saltstone Facility develops an optimum performance recipe for dry material mix and salt solution. Salt solution is not transferred to the Saltstone Facility unless it meets the Saltstone Facility Waste Acceptance Criteria (WAC). The Saltstone Facility WAC ensures the optimum performance recipe is being met as required by the laboratory tests. In the future, as outlined in Attachment #1, the salt solution will be sampled on a quarterly basis at Tank 241-950H (Tank 50) to ensure the WAC requirements are being met. For transfers during the quarter, a material balance will be used to ensure salt solution parameters are within the Saltstone Facility WAC limits. The material balance will be periodically reset based on the quarterly sample results. Based on past operational performance, the compressive strength of the saltstone produced has been two (2) to three (3) times the strength of what the requirement specifies. The proposed saltstone wastewater treatment facility modifications will not alter the treatment process. Therefore, the compressive strength test is not required and the risk of grout being made with an unacceptable compressive strength is low, which is mitigated by the historical compressive strength results of the saltstone grout, proper recipe formulation for new batches, and quarterly sampling at Tank 241-950H (Tank 50) to confirm compliance with the Saltstone Facility WAC. These measures eliminate the radiation exposure associated with the weekly compressive strength sampling. Periodically, the optimum performance recipe may be verified using laboratory testing.

Hazardous Waste Toxicity Characteristic Testing

In accordance with the current referenced permit, the saltstone grout is sampled on a monthly basis to verify the non-hazardous nature of the grout. The Toxicity Characteristic Leaching Procedure (TCLP) is completed on the grout sample. Saltstone Facility influent chemical constituent concentrations are

controlled through sampling at Tank 241-950H (Tank 50) to ensure the non-hazardous nature of the grout. Salt solution is not transferred to the Saltstone Facility unless it meets the Saltstone Facility Waste Acceptance Criteria (WAC). The Saltstone Facility WAC ensures that non-hazardous grout is produced. Operating data has confirmed that the grout is non-hazardous in nature by controlling the Saltstone Facility influent using the WAC. In the future, as outlined in Attachment #1, the salt solution will be sampled on a quarterly basis at Tank 241-950H (Tank 50) to ensure the WAC requirements are being met. For transfers during the quarter, a material balance will be used to ensure salt solution parameters are within the Saltstone Facility WAC limits. The material balance will be periodically reset based on the quarterly sample results. In addition, a portion of the quarterly Tank 241-950H (Tank 50) sample will be made into grout in the laboratory. Once cured, the grout sample will be analyzed using the TCLP test to confirm the non-hazardous nature of the grout. Laboratory testing is sufficient which eliminates the radiation exposure associated with the monthly TCLP sampling.

Vault classification
In accordance with the South Carolina Regulation 61-107.16.4.f (1), vault classification samples will be completed every five years or when there is a change in waste stream. (See Attachment #1)

Conclusion

As outlined above the reduction of sampling does not affect the saltstone product quality. The risks associated with the reduced sampling have been mitigated. The benefit of reduced personnel exposure far outweighs any associated risks.

Your concurrence with the reduction of sampling is requested by April 1, 2005. If you have any additional questions I can be contacted at 803-208-6466.

Sincerely,

Keith Liner
Environmental Project Support
Environmental Services Section
Westinghouse Savannah River Company, LLC

Attachment #1

Sample Strategy

	CURRENT		PROPOSED		
	Frequency	Method	Frequency	Method	Justification
Density	Daily	Manual grout sample	Not Required	Not Required	No change to treatment process; historical values shown to be acceptable; in-line monitor
Compressive Strength	Weekly	Manual grout sample	Not Required	Not Required	No change to treatment process; historical values shown to be 2-3 times of that required
Salt Solution - Chemical Analysis	Quarterly	Manual liquid sample	Quarterly	Manual liquid sample	No change
Salt Solution - Radionuclide Analysis	Semi-Annual	Manual liquid sample	Semi-Annual	Manual liquid sample	No change
TCLP	Monthly	Manual grout sample	Quarterly	Grout sample prepared in lab from salt solution sample	No change to treatment process; historical values shown to be acceptable
Vault Classification	New waste stream	Manual grout sample	Every 5 Years or When Waste Stream Changes	Grout sample prepared in lab from salt solution sample	In accordance with SC Regulation 61-107.16.4.f(1)

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