FOR INFORMATION ONLY

PROJECT COVER SHEET

Document Title

PROCESS CONTROL PROGRAM FOR THE INCONTAINER SOLIDIFICATION OF RADWASTE FILTER CAKE (50 Weight Percent Powdered Resin - 50 Weight Percent Diatomaceous Earth)

Project Document Number

F458-P-009, Rev. 0

for

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Shoreham Nuclear Power Station

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REVISION LOG

PROCESS CONTROL PROGRAM FOR THE INCONTAINER SOLIDIFICATION OF RADWASTE FILTER CAKE (50 WEIGHT PERCENT POWDERED RESIN -50 WEIGHT PERCENT DIATOMACEOUS EARTH)

. 1.0 PURPOSE

To define the analysis to be performed on samples taken from HITTMAN Liners while processing Radwaste Filter Cakes for solidification, and the parameters for the test solidification.

2.0 REFERENCES

HNDC Document F458-P-012, "Operating Procedure for Mobile Incontainer Solidification of 50% Powdered Resin/50% Diatomaceous Earth Filter Sludge."

3.0 DISCUSSION

The type of waste covered by this document is powdered resin mixed with diatomaceous earth. In order to ensure that the contents of the liner to be processed fall within the acceptable range with respect to the parameters, samples of the liner contents must be analyzed prior to solidification. Analysis includes pH, detergents, a visual determination of oil content and an isotopic analysis.

4.0 APPARATUS

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4.1 pH meter

4.2 Disposable beakers

4.3 Top loading balance

4.4 Electric lat mixer (optional)

5.0 CHEMICALS

5.1 50% NaOH solution

5.2 Anhydrous Sodium Metasilicate

5.3 Pertland Type I Cement

6.0 PREREQUISITES

- 6.1 Ensure that the contents of the HITTMAN liner are adequately mixed prior to sampling.
- 6.2 Ensure that a Waste Solidification Data Sheet, Attachment A, has been initiated for the solidification of liner contents consisting of powdered resin mixed with diatomaceous earth.

- 6.3 Samples are available for analysis for pH, oil and an isotopic analysis.
- 7.0 PROCEDURE
 - NOTE: Data taken as instructed in this section shall be recorded on the attached Waste Solidification Data Sheet, Attachment A.
 - 7.1 Chemical Analysis
 - 7.1.1 EXAMINE the samples for evidence of detergents. If large quantities of detergents are present, the sample should be treated with an anti-foaming agent. The quantity of anti-foaming agen' required shall be recorded on Attachment A.
 - 7.1.2 EXAMINE the surface of the sample for any signs of oil. If a measurable quantity of oil exists, determine the volume and record it as a percent of the total sample volume, otherwise note "none" or "less than one percent" (<1%) by volume. If the quantity of oil is greater than 1% by volume, the oil shall be reduced to less than 1% by skimming, prior to recording volume.</p>
 - 7.1.3 MEASURE the pH of the sample and record.
 - NOTE: If necessary, adjust the pH to greater than 4 using 50 weight percent sodium hydroxide solution. The quantity of sodium hydroxide added shall be recorded on Attachment A.
 - 7.1.4 PERFORM an isotopic analysis of an appropriate aliquot of the sample.
 - 7.1.5 PERFORM a test solidification in accordance with 7.2.
 - 7.2 Test Solidification
 - 7.2.1 MEASURE 226.4 gms (~200 ml) of waste from the liner into a 1000 ml disposable teaker or similar sized container.
 - 7.2.2 MEASURE out the required quantities of cement and anhydrous sodium metasilicate as shown below.

Grams Cement Grams Anhydrous Sodium Metasilicate

171.6

17.2

- 7.2.3 MIX the cement and additive together and slowly add this mixture to the test sample while it is being stirred. Stirring can be accomplished by an electrical mixer or by hand.
- 7.2.4 After sufficient mixing (2 minutes after all cement and anhydrous sodium metasilicate have been added) so that a homogeneous mixture is obtained, allow the waste to CURE for a minimum of 24 hours.

7.3 Solidification Acceptability

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The following criteria define an acceptable solidification process and process parameters.

- 7.3.1 The sample solidifications are considered acceptable if there is no visual or drainable free water.
- 7.3.2 The sample solidifications are considered acceptable if upon visual inspection the waste appears that it would hold its shape if removed from the beaker and it resists penetration.

7.4 Solidification Unacceptability

- 7.4.1 If a test sample fails to provide acceptable solidification perform the following steps:
 - a. Mix equal volumes of dry cement and water to ensure that the problem is not a bad batch of cement.
 - Add additional caustic to raise the pH above 8.
 - c. If the waste is only partially solidified, use lower waste to cement and additive ratios. Using the quantities of cement and anhydrous sodium metasilicate as identified in 7.2.2, reduce the sample volume by 28.3 gms (25 ml).
 - d. Perform another test solidification using the revised waste to cement ratios. Continue lowering the waste to cement ratios until the acceptability criteria of 7.3 are met.

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		ATTACHMENT A	
	WASTE	SOLIDIFICATION DATA SHEET	
For	Powdered	Resin - Distomaceous Farth	M

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Liner Sampled:	Batch No: +
Sample No:	
Sampled By:	
Sample Volume, ml:	(1)
Sample pH: Volume 50%	NaOH used to adjust pH ml ¹ (2)
Quantity of Oil %	
Quantity of Anti-Foaming Agent, ml	(3)
Temperature at Solidification:	(4)
Other Major Constituents:	(6)
Quantity of Cement Added:	Cement Ratio (lbs/Ft. ³ Waste) ²
gns	(7)
Quantity of Additive Added: ³	Additive Ratio (lbs/Ft. ³ Waste) ⁴
gms	(8)
Volumetric Ratio: Waste to Product:	
	(9)
Product Acceptable: Sample A	Yes No
Radionuclides Present: (Isotopes & Conc	entrations)
Test Solidification Done By	

Additional batches s-lidified based on this test solidification:

No.	Vol.	Date	Batch No.	Batch Vol.	Date	Batch No.	Batch Vol.	Date
2								
3			4			8		
4						9		
			1			10		