0024266

13 STA 4 OCT 05 1992

ENGINEERING DATA TRANSMITTAL

Page 1 of 1

1. EDT 156153

2. To: (Receiving Organization)	3. From: (Originating Organization)	4. Related EDT No.:
Distribution	Decommissioning Engineering	N/A
5. Proj./Prog./Dept./Div.:	6. Cog. Engr.:	7. Purchase Order No.:
85100	D. L. Smith	N/A
8. Originator Remarks: WHC-SD-DD-TI-072 Rev. 0, "Safety Evaluation for the Interim Stabilization and Decontamination of UN-216-W-24 and UN-216-W-30 Unplanned Release Site," is attached for approval.		9. Equip./Component No.: N/A
		10. System/Bldg./Facility: UN-216-W-24 & -30
11. Receiver Remarks:		12. Major Assm. Dwg. No.: N/A
		13. Permit/Permit Application No.: N/A
		14. Required Response Date: N/A

15. DATA TRANSMITTED

(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	(F) Impact Level	(G) Reason for Transmittal	(H) Originator Disposition	(I) Receiver Disposition
1	WHC-SD-DD-TI-072		0	Safety Evaluation for the	3S	1		
				Interim Stabilization and				
				Decontamintion of UN-216-W-24				
				and UN-216-W-30 Unplanned				
				Release Sites				

16. KEY

Impact Level (F)	Reason for Transmittal (G)		Disposition (H) & (I)	
1, 2, 3, or 4 (see MRP 5.43)	1. Approval	4. Review	1. Approved	4. Reviewed no/comment
	2. Release	5. Post-Review	2. Approved w/comment	5. Reviewed w/comment
	3. Information	6. Dist. (Receipt Acknow. Required)	3. Disapproved w/comment	6. Receipt acknowledged

17. SIGNATURE/DISTRIBUTION (See Impact Level for required signatures)

(G) Reason	(H) Disp.	(J) Name (K) Signature (L) Date (M) MSIN	(J) Name (K) Signature (L) Date (M) MSIN	(G) Reason	(H) Disp.
1	1	Cog.Eng. D. L. Smith R2-77	9/30/92		
1	1	Cog. Mgr. P. W. Griffin 9-30-92 R2-77			
1	1	QA R. G. Dieffenbacher 9-30-92 H4-16			
1	1	Safety F. A. Schmorde 9-30-92 L6-57			
		Env.			

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18.	19.	20.	21. DOE APPROVAL (if required)
D. L. Smith 9/30/92		P. W. Griffin 9-30-92	Ltr. No.
Signature of EDT Originator Date	Authorized Representative for Receiving Organization Date	Cognizant/Project Engineer's Manager Date	[] Approved [] Approved w/comments [] Disapproved w/comments

BD-7400-172-2 (07/91) GEF097

BD-7400-172-1 (02/89)

SUPPORTING DOCUMENT

1. Total Pages 8

2. Title	3. Number	4. Rev No.
Safety Evaluation for the Interim Stabilization and Decontamination of UN-216-W-24 and UN-216-W-30 Unplanned Release Site	WHC-SD-DD-TI-072	0

5. Key Words

Interim Stabilization, Decontamination, Unplanned Release Sites

6. Author

Name: D. L. Smith

D. L. Smith 9/30/92
Signature

Organization/Charge Code 85100/PJ21F

7. Abstract

The risk and consequences of the decontamination and interim stabilization of UN-216-W-24 and UN-216-W-30 are compared with similar activities analyzed for 216-A-24 crib. The risk is found to be acceptable and the 216-A-24 Safety Evaluation is applicable.

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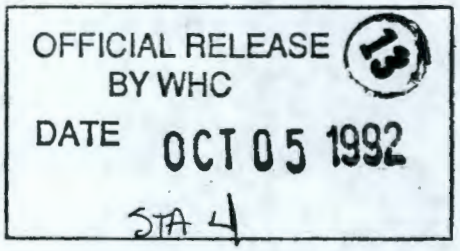

SAFETY EVALUATION FOR THE INTERIM STABILIZATION AND DECONTAMINATION OF UN-216-W-24 AND UN-216-W-30 UNPLANNED RELEASE SITE

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September 1992

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LIST OF TABLES

SAFETY EVALUATION FOR THE INTERIM STABILIZATION AND DECONTAMINATION OF UN-216-W-24 AND UN-216-W-30 UNPLANNED RELEASE SITES

1. INTRODUCTION

In the near future, Environmental Restoration Operations intends to decontaminate UN-216-W-24 (W-24) and UN-216-W-30 (W-30) Unplanned Release Sites (URS). As a result of this work, the 216-S-1, -2, -8, -9, -18, and -23 cribs and the 207-S retention basin will be interim stabilized. The job site area is located in the south central portion of the 200 West area. The planned actions are described in WHC-SD-DD-TI-067, *Interim Stabilization Plan and Alternatives Evaluation for UN-216-W-24, -26, and -30 and 207-S* (WHC 1992), and are necessary in order to control migrating surface contamination until a record of decision is made for final remediation. The work consists mainly of consolidating a large area of shallow surface contamination from both W-24 and W-30 into the much smaller space over the 216-S-9 and 216-S-23 cribs and the 207-S retention basin. The consolidated soil will then be stabilized with 18 to 24 inches of uncontaminated soil. In addition, some of the wells in the area will be extended and remaining contaminated areas stabilized with uncontaminated soil material. Any vents, risers, or other abovegrade structures associated with the waste sites will be blanked and isolated from the interim stabilization activities. The equipment and methods used are the same as those successfully used for interim stabilization or decontamination of 1,100 acres at Hanford over the past 13 years.

In 1988, a safety evaluation (WHC 1989) was prepared for the stabilization of the 216-A-24 crib (A-24 for the rest of the document), which is located just outside the east fence of 200 East Area. After analyzing explosion, resuspension of contaminated soils, and resuspension of excavated soils scenarios, it was concluded that the consequences of these scenarios were well within the radiological and toxicological risk acceptance guidelines. Note that the explosion scenario does not apply for these facilities. The reason is that the waste disposed of in these facilities contained no potentially explosive organics, and the potentially explosive inorganics were of a highly soluble nature. This indicates that the potential for explosive concentrations of these inorganics is low. The work planned at the 216-S-1, -2, -8, -9, -18, and -23, and 207-S waste sites is similar to the work performed at A-24, with distances to onsite structures being similar. As a result, the two resuspension scenarios are appropriate for both cases, and provided there are no differences between the facilities which cause the results of the evaluation to exceed the risk guidelines, the safety evaluation is applicable to both. Excavated soil at the A-24 crib was contaminated with radioactive material at levels comparable to those found at W-24 and W-30. The hazards associated with this work were found to be within the risk acceptance guidelines. Therefore, the hazards associated with excavating contaminated soil from both W-24 and W-30 should also be within the risk acceptance guidelines.

2. COMPARISON OF RADIONUCLIDES INVENTORIES AND RISK

Table 1 presents the radionuclides inventories for the A-24 crib and 216-S-1, -2, -8, -9, -18, and -23, and the 207-S retention basin. The data for A-24 was taken from the safety evaluation (WHC 1989), the data for the cribs and retention basin was taken from the Waste Inventory Data Sheets (WIDS) (WHC 1991b). The inventories are decayed to 1986 for A-24 and 1989 for the cribs and retention basin. To establish a reasonable basis for comparison, the quantities of the major dose contributing isotopes for each crib/trench were added together. This value was then divided by the value for the A-24 crib. The results are shown in the bottom row of Table 1. The 216-S-1 and -2 cribs has the highest ratio at 2.95 times that of A-24. Using this number as a multiplier for the doses from the A-24 evaluation should provide a reasonable estimation of the consequences from similar events at 216-S-1, -2, -8, -9, -18, and -23, and 207-S waste sites. Table 2 presents the results of this calculation and a comparison of radiological risk at A-24 and 216-S-1, -2, -8, -9, -18, and -23, and 207-S waste sites. Clearly, the radiological risk for these waste sites is much below the risk acceptance guidelines.

3. CRITICALITY

There are no criticality concerns (WHC 1991a) associated with the 216-S-8, -9, -18, and -23, and 207-S waste sites, as the plutonium contents are small and the uranium content is not enriched to over 1.0 percent. Criticality concerns for the 216-S-1 and -2 cribs were evaluated against the WHC-SD-SQA-CSA-20342, *CSAR 80-024, Addendum 5; Criticality Hazard Reveiws of Restoration Work Plans for WHC Deativated Cribs* (WHC 1991a), and the proposed scope of work. Based on the work scope, interim stabilization of the 216-S-1 and 216-S-2 cribs will not present a criticality hazard.

4. COMPARISON OF CHEMICAL INVENTORIES AND RISK

Table 3 presents the reported chemical inventories for the A-24 Crib and the 216-S-1, -2, -9, and -23 waste sites. There is no reported chemical inventories for the 216-S-8, -18, and 207-S waste sites (WHC 1991b). The cribs received different inventories of chemicals, with the A-24 crib receiving the most hazardous material. The explosion scenario generated the worst case release of hazardous chemicals at A-24 and this was shown to be within the acceptance guidelines. Because the 216-S-1, -2, -9, and -23 waste sites received highly soluble material, it is not likely that dangerous concentrations of these chemicals have accumulated. This further reduces risk associated with these chemicals. Since the results of the explosion scenario was shown to also be within the risk acceptance guidelines for A-24, the risk for similar work at these waste sites is also within the risk acceptance guidelines.

Table 1. Radionuclides for the A-24 Crib, 216-S-1, -2, -8, -9, -18, and -23 waste sites, and 207-S Retention Basin.

CURIES DECAYED TO 1986 (A-24) AND 1989 (B-8 THROUGH -51)

RADIONUCLIDES	A-24	S-1/2	S-8	S-9	S-18	S-23	207-S
H-3[1]	3680	-	-	-	-	-	-
Co-60	.0575	-	-	-	-	-	-
Sr-90	52.8	1.25 E3	3.86 E-1	9.63 E1	-	1.14	-
Ru-106	.00005	6.19 E-8	1.30 E-10	2.87 E-4	-	3.49 E-5	-
Cs-137	767	1.1 E3	4.92	2.9 E2	-	3.47	-
Pu-239[2]	.76	7.37 E1	1.23 E-1	3.99	-	6.11 E-2	-
Pu-240	.204	-	-	-	-	-	-
U-238[3]	.441	7.56 E-1	6.50 E-2	1.13 E-2	-	1.29 E-4	-
TOTAL	820.56	2424.46	5.43	390.30	0.00	4.67	?
RATIO SX/A24	1.00	2.95	6.62 E-2	.47	0.00	5.69 E-3	?

1. Major dose contributing radionuclides only, tritium not included to avoid understatement.
2. Reported only as plutonium in WIDS, November 20, 1991.
3. Reported as "U-gross" in WIDS, November 20, 1991.

Table 2. 216-A-24 Crib, 216-S-1, -2, -8, -9, -18, and -23, and 207-S Waste Sites Radiological Risk Comparison.

RECEPTOR	RESUSPENSION OF SURFACE SOIL EDE (rem)	RESUSPENSION OF EXCAVATED SOIL EDE (rem)
Onsite Individual A-24 Crib	4.50 E-6	4.30 E-4
Onsite Individual S-X	1.33 E-5	1.27 E-3
Risk Acceptance Guidelines	5.00 E-1	5.00 E-1
Offsite Individual A-24	4.30 E-6	1.80 E-5
Offsite Individual S-X	1.27 E-5	5.31 E-5
Risk Acceptance Guidelines	1.00 E-1	1.00 E-1

Table 3. Comparison of Chemical Inventories (in metric tons).

CHEMICALS	A-24	S-1/2	S-9	S-23
Paraffin Hydrocarbon	79	-	-	-
Butyl Phosphates	236	-	-	-
Ammonium Carbonate	525	-	-	-
Nitric Acid	-	100,000	30,000	300
Sodium	-	10,000	-	-

Note that there are no chemical inventories reported for 216-S-8, -9, and -18, and 207-S (WHC 1991b).

5. INDUSTRIAL SAFETY HAZARDS

Industrial safety hazards will be addressed in a Job Safety Analysis (JSA). A JSA will be prepared specifically for this interim stabilization and decontamination job and will be reviewed with the workers at the prejob safety meeting. Radiological hazards will be documented in the Radiation Work Permit (RWP).

6. CONCLUSION

Based on the above comparison, the Safety Evaluation for 216-A-24 Crib is applicable to the work planned at 216-S-1, -2, -8, -9, -18, and -23 and 207-S waste sites, and no further evaluation of the risk is required. The risk for excavating contaminated soil from UN-216-W-24 and UN-216-W-30 are also acceptable.

As with previous projects, the work will be performed in accordance with an approved procedure and other operating level documents. All field personnel will have been trained in (as a minimum) to the 24-Hour Hazardous Waste Site Basic training and radiation worker training. In addition, a prejob safety meeting will be conducted and documented. All equipment used on this job will be inspected to assure it is in safe operating condition.

7. REFERENCES

WHC, 1988, *Safety Evaluation of Stabilization of 216-A-24 Crib*, WHC-SD-DD-TI-032 Rev. 0, September 13, 1988, Westinghouse Hanford Company, Richland, Washington.

WHC, 1991a, *CSAR 80-024, Addendum 5; Criticality Hazard Reviews of Restoration Work Plans for WHC Deactivated Cribs*, WHC-SD-SQA-CSA-20342, August 30, 1991, Westinghouse Hanford Company, Richland, Washington.

WHC, 1991b, Waste Inventory Data Sheet, November 20, 1991, Westinghouse Hanford Company, Richland, Washington.

WHC, 1992, *Interim Stabilization Plan and Alternatives Evaluation for UN-216-W-24, -26, -30, and 207-S*, WHC-SD-DD-TI-067 Rev. 0, June 24, 1992, Westinghouse Hanford Company, Richland, Washington.

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Safety Evaluation for the Interim Stabilizaton and Decontamination of UN-216-W-24 and UN-216-W-30 Unplanned Release Site

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