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INSITU NEUTRALIZATION OF URANLY NITRATE HEXAHYDRATE

03/17/95

DOE-0740-95
DOE-FN EPAS
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LETTER



Department of Energy
Fernald Environmental Management Project
 P. O. Box 398705
 Cincinnati, Ohio 45239-8705
 (513) 648-3155

MAR 17 1995

DOE-0740-95

Mr. James A. Saric, Remedial Project Director
 U.S. Environmental Protection Agency
 Region V - 5HRE-8J
 77 W. Jackson Boulevard
 Chicago, Illinois 60604-3590

Mr. Tom Schneider, Project Manager
 Ohio Environmental Protection Agency
 401 East 5th Street
 Dayton, Ohio 45402-2911

Dear Mr. Saric and Mr. Schneider:

INSITU NEUTRALIZATION OF URANYL NITRATE HEXAHYDRATE

- Reference: 1) DOE-0558-95. J.R. Craig, DOE-FN to J.A. Saric, U.S. EPA and T.A. Schneider, OEPA. "Revised Schedule for Uranyl Nitrate Hexahydrate Neutralization Project," dated February 10, 1995.
- 2) DOE-2328-94. J.R. Craig, DOE-FN to J.A. Saric, U.S. EPA and T.A. Schneider, OEPA. "Revised Uranly Nitrate Hexahydrate Removal Action Workplan," dated September 2, 1994.

In Reference 1, the Department of Energy, Fernald Area Office (DOE-FN) committed to evaluating operational options to advance the schedule for initiating neutralization of the Uranyl Nitrate Hexahydrate (UNH) solutions. As a result of these evaluations, DOE-FN intends to proceed with insitu neutralization of the UNH solution in the following tanks:

- Tank F1-1
- Tank F1-2
- Tank F1-302
- Tank F1-303
- Tank F1-308
- SW CD Blend Tank

Our current schedule calls for insitu neutralization to commence no later than April 17, 1995.

Enclosed is our workplan for the insitu neutralization. By this letter, I request that the approved Removal Action Workplan for the UNH Neutralization Project (Reference 2) be amended to include insitu neutralization of the six tanks identified above.

The DOE-FN is continuing to explore options to shorten the time required to complete neutralization. A preliminary plan has been developed which would result in a significant acceleration of the schedule presented in Reference 1. These plans will be discussed with you as soon as they are finalized.

If you have any questions, please contact Chris White at (513) 648-3172.

Sincerely,

Glenn Griffiths
for Jack R. Craig
Director

FN:White

Enclosure: As Stated

cc w/enc:

K. H. Chaney, EM-423/QO
D. R. Kozlowski, EM-423/QO
G. Jablonowski, USEPA-V, 5HRE-8J
J. Kwasniewski, OEPA-Columbus
P. Harris, OEPA-Dayton
M. Proffitt, OEPA-Dayton
S. McClellan, PRC
R. Cohan, GeoTrans
F. Bell, ATSDR
R. Owen, ODOH
L. Zull, DNFSB
R. D. George, FERMCO/52-2
R. Heck, FERMCO/1
D. Ofte, FERMCO/1
T. Patton, FERMCO/65-2
AR Coordinator, FERMCO
J. P. Hamric, DOE-OH
W. Kehew, DOE-FN
J. W. Reising, DOE-FN

cc w/o encs:

J. Thiesing, FERMCO
M. Yates, FERMCO/9

ACTIVITY ID	REM DUR	PCT	EARLY START	EARLY FINISH	LATE START	LATE FINISH	TOTL FLT	1995											
								FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV		
I0000	0	100	2MAR95A					KICK-OFF/AUDITABLE SAFETY REPORT											
I0092	0	100	2MAR95A	7MAR95A				KICK-OFF PREPARE DRAFT AUDITABLE SAFETY REPORT REVIEW & APPROVAL - AUDITABLE SAFETY REPORT											
I0094	1	0	13MAR95A	15MAR95	6APR95		16	MAINTENANCE											
I0020	0	100	7MAR95A	14MAR95A				RIGGING PLAN											
I0040	0	100	2MAR95A	8MAR95A				HEALTH & SAFETY REQUIREMENTS MATRIX											
I0042	2	0	15MAR95	16MAR95	10APR95	11APR95	18	WORK PERMIT/RWP											
I0060	0	100	2MAR95A	3MAR95A				DRAFT SOP											
I0050	0	100	2MAR95A	6MAR95A				BATCH SHEET DEVELOPMENT											
I0070	2	75	6MAR95A	16MAR95	12APR95		19	DRAFT SOP REVIEW CYCLE TABLE TOP WALKDOWN											
I0080	1	0	17MAR95	17MAR95	13APR95	13APR95	19	ISSUE FINAL SOP											
I0082	0	100	3MAR95A	3MAR95A				DEPARTMENT OF ENERGY											
I0084	0	100	7MAR95A	13MAR95A				HARRIS TO BOBLITZ LETTER											
I0086	0	0	14MAR95		12APR95		21	DOE APPROVAL											
I0087	2	0	22MAR95	23MAR95	12APR95	13APR95	15	DOE ISSUE NOTICE TO PROCEED DISSEMINATIONS ON SITE, READINESS REVIEW											
I0100	0	100	2MAR95A	3MAR95A				ADMINISTRATION											
I0112	2	80	2MAR95A	18MAR95	6APR95		15	DRAFT WORKPLAN HEADNESS IMPLEMENTATION PLAN											
I0110	1	70	3MAR95A	15MAR95	6APR95		16	FINAL WORKPLAN											
I0120	1	0	17MAR95	17MAR95	7APR95		15	READY TO OPERATE LETTER											
I0140	1	0	22MAR95	22MAR95	13APR95		16	NOTIFICATION LETTER & DOE CONCURRENCE											
I0130	2	0	22MAR95	23MAR95	12APR95		15	READINESS ASSESSMENT											
I0142	1	0	23MAR95	23MAR95	13APR95		15	NOTIFICATION LETTER TO OETA											
I0150	1	85	2MAR95A	15MAR95	11APR95		19	TRAINING REQUIREMENTS MATRIX											
I0160	2	0	16MAR95	17MAR95	12APR95		19	PRE-JOB SOP & SAFETY BRIEFING & QUALIFICATION											
I0170	0	0	24MAR95		17APR95		15	COMMENCE OPERATIONS											
I0188	11	0	24MAR95	7APR95	17APR95	1MAY95	15	NEUTRALIZE TANK F1-302											
I0188	20	0	24MAR95	21APR95	17APR95	12MAY95	15	NEUTRALIZE TANK F1-303											
I0190	27	0	24APR95	3MAY95	15MAY95	21JUN95	15	NEUTRALIZE TANK F1-308											
I0182	27	0	1JUN95	10JUL95	22JUN95	31JUL95	15	NEUTRALIZE TANK F1-2											
I0184	31	0	1JUN95	14JUL95	22JUN95	4AUG95	15	NEUTRALIZE TANK F1-1											
I0192	78	0	1JUN95	18SEP95	22JUN95	30OCT95	15	NEUTRALIZE (SW) COBI END TANK											
I0189	0	0	18SEP95		30OCT95		15	NEUTRALIZATION OPERATIONS COMPLETE											

PREPARED BY WCC - 16MAR95 0695	Checked	Approved
Date	Revision	

Sheet 1 of 1

FERMCO

INH IN-SITU NEUTRALIZATION SCHEDULE

WORK PLAN FOR IN-SITU NEUTRALIZATION OF UNH

Purpose

This work plan provides a description of the activities to be performed prior to and during the in-situ neutralization of UNH in six UNH storage tanks.

Discussion

A review was performed on all eighteen (18) UNH storage tanks to determine which tanks contain UNH that could be neutralized in place. Only six UNH Storage Tanks were found to be suitable for In-Situ Neutralization based on the following criteria:

- 1) The uranium concentration must be 100 grams per liter or less. This is required because a higher concentration can cause the formation of an undesirable sludge that will not pass the waste criteria for disposal.
- 2) The tanks must have enough freeboard above the current level to allow for addition of chemicals (MgO) without overflowing.
- 3) Agitation must be available. This agitation is required to cause mixing and wetting of the MgO. Without agitation, it is unlikely that neutralization would occur.
- 4) The radionuclide contents of the tank must be less than hazard category 3, so a Readiness Assessment is authorized by DOE Order 5480.31.
- 5) The tank must be easily accessible to an operator.
- 6) The normality of the free acid must be less than 3, to reduce potential for NO_x emissions.

The following tanks were selected for in-situ neutralization/precipitation:

TANK NO.	LOCATION	TANK CAPACITY	UNH VOLUME (gallons)	URANIUM CONCENTRATION	NORMALITY
F1-302	Hot Raffinate	3,200	2,217	13 g/l	0.2
F1-303	Hot Raffinate	3,200	2,075	19 g/l	1.6
F1-308	Hot Raffinate	2,107	1,894	30 g/l	2.3
F1-1	Digestion	3,460	2,818	44 g/l	1.1
F1-2	Digestion	3,460	1,795	69 g/l	2.0
F2E-8	CD Blend (SW)	25,265	22,375	55 g/l	1.5

Work Plan Description

The neutralization of each tank will be performed by adding dry MgO (a fine powder) through a nozzle and funnel located on the top of the tank. The tank agitator will be operated one hour before, during and 2 hours after the MgO addition has been completed for the day. The total amount of MgO required to neutralize each tank and the rate of addition (50 pound bags per day) will be specified by the Process Engineer on individual tank in-situ neutralization batch sheets.

After completing the addition of the required total amount of MgO to neutralize the UNH, samples will be sent to the laboratory for analysis to verify that the tank contents have been neutralized. Verification that the tank contents meet the criteria for filtration, in Plant 8, will be performed after the UNH Neutralization Project has received approval for start-up from EM-1 and the tank contents have been transferred to either Neutralization Tank F1-25 or F1-26.

In order to ensure a slow reaction and to minimize overall project impact, approximately one 50 pound bag of MgO will be added once each work day to the five tanks in Hot Raffinate and Digestion. Because of its larger capacity, approximately two 50 pound bags will be added once each work day to the tank in the CD Blend Area. These values may be adjusted by the UNH Process Engineer with the concurrence of the Plant 2/3 Facility Owner. The total amount of MgO added will be tracked on a log sheet for each tank.

NO_x generation is not expected and, for the small volumes of these tanks, slurring of the MgO can take place as it is dumped into the agitated tank. The increase in volume with the MgO addition has been evaluated and sufficient freeboard is available in each tank. At ambient temperatures, the reaction will proceed gradually and very little, if any, temperature rise will occur.

Development Activities

The following activities will be completed prior to performing the in-situ neutralization and precipitation:

1. Maintenance will perform the following:
 - a. fabricate and install MgO bag lifting equipment,
 - b. install an extension pipe on tank F1-308 nozzle,
 - c. construct scaffolding to the manway on tank F1-308,
 - d. fabricate plexiglass manway covers so level and agitation can be monitored,
 - e. loosen the flange cover on the 4 inch nozzles to allow the operator to install a funnel into the nozzle.
2. A procedure will be developed for the in-situ neutralization operation.
3. A Health and Safety Matrix and required work permits will be developed for the in-situ neutralization/precipitation operation.
4. The Plant 2/3 Facility Owner Standing Orders and Long Term Orders will be used to ensure that Conduct of Operations principles are included in this activity by the Operations Manager and Facility Owner.

Development Activities (cont.)

5. Training for operations personnel performing the in-situ neutralization of UNH will include the following elements:
- a. Selection of UNH neutralization project operating personnel having previously demonstrated prerequisite skills for assignment to the project.
 - b. Developing and presenting briefings to support in-situ operations including:
 1. activity/procedure briefing
 2. equipment specific training (agitators, hoist, etc.)
 3. specific health and safety requirements briefing
 4. long term orders briefing
 - c. Table top and walk-through procedural review.

Qualification of operations personnel will be defined by specifically designated requirements selected from the qualification cards used for operations personnel in the UNH Neutralization Project. The Plant 2/3 Facility Owner will promulgate in-situ qualification requirements in a Facility Owner Long Term Order.

6. An Auditable Safety Record will be prepared for this activity.
7. A readiness assessment (RA) will be conducted by FERMCO in accordance with SM-0005, FERMCO Operational Readiness Manual.

Regulatory Considerations

The Ohio EPA will be notified of the intent to perform in-situ neutralization of the tank contents.

Safety Assessment

A preliminary evaluation of the hazards identified for this operation has been performed. The preliminary safety assessment has determined no potential for nuclear criticality during the operation, and a hazard classification of less than Category 3. The Auditable Safety Record and Health and Safety Matrix will address the worker and process safety issues.

Readiness Assessment

Based on the less than Hazard Category 3 hazard classification for this activity, a readiness assessment (RA) will be performed prior to starting the operation in accordance with SM-0005, FERMCO Operational Readiness Manual.

DOE Approval for In-Situ Neutralization

Following the satisfactory resolution of any findings from the Readiness Assessment, FERMCO will request DOE-FN approval to proceed with the in-situ neutralization operation.

APPROVED BY:

R. Heck
R. HECK, UNH PROJECT MANAGER

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