UNC NUCLEAR INDUSTRIES

A UNC RESOURCES Company

P.O. Box 490
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Memorandum

To: G. L. Smith

Date: October 28, 1986

From: A. P. Larrick

Subject: PLANT EVENT REPORT D/T 86-01 CLOSEOUT

Corrective actions as designated in the subject PER have been completed and the closeout line on the PER can be signed off by you. Corrective actions taken are as follows:

1. We have decided to use the epoxy as little as possible to evaporate the laboratory and pilot plant wastes. Instead, we are installing a spare K Basin ion exchange column and will process the waste from the storage tank through the column. This should take out essentially all the salts, ions, and chemicals from the waste water and convert them to a solid, immobile form on the ion exchange resin suitable for burial. The purified water will be analyzed for impurities to see if it can be directly released. If it cannot be released, it will be placed in the epoxy evaporation drum, without epoxy, and evaporated to residual solids.

On the rare circumstance that the epoxy must be used, we will provide continuous attendance during operation to monitor epoxy temperature and shut the system down and/or add extra water for cooling. We will also limit the number of reheats on the epoxy to as low as practicable as we feel only aged, reheated epoxy gives us problems.

2. The material data sheets were reviewed, and one component of the epoxy formulation was stated to exhibit exothermic reactions with a variety of other chemicals. We tried to simulate an exothermic excursion in the laboratory using small quantities of waste from our waste collection tank and epoxy from the solidification system. We were unable to achieve an exothermic reaction when operated at normal conditions. However, when we increased the epoxy temperature to above 500°F, we were able to make dense white fumes come out of the laboratory test glassware and it continued to react even without external heating. The fumes resembled those observed in the solidification system when it overheated.

APL:cab

cc: KC Oberg
APL:File/LB

T-1-3

PLANT EVENT REPORT DISTRIBUTION

TITLE: "EPOXY OVERHEAT IN 1706-KER 100K"

REPORT REVIEWED BY: S.W. Heaberlin REVIEW DATE: 9-25-86

PLANT REPORT No.: D|T 86-01

REPORT REVIEW FROM OUTSIDE SECTION NEEDED: Yes ☐ No ☒

IS FURTHER ACTION REQUIRED: Yes ☒ No ☐

CORRECTIVE ACTION ASSIGNMENT

Action assigned to C|WTT, Technology, Development|Technology by 10-30-86

REPORT DISTRIBUTION

HAC ☐	Director, Reactor Maintenance	PE	LINDSTROM	☐	Manager, N Plant Maintenance (1) 1100N/207/R6
MAP ☐	Director, Reactor Plant	DB	WEBLEY	☐	Manager, N Plant Scheduling 105N/133/H7
CAJ/REW	N Plant Operations (4) ELW/CCH	TD	BLANKENSHIP	☐	Manager, Fuel Processing 1100N/129/R3
	OPERATIONS PLANNING & CONTROL	RD	WARNER	☐	Manager, Nuclear Safety 1100N/222/R8
☐	Manager	DW	HAMILTON	☐	Manager, Plant Engineering 1101N/326/N15
LEE ☐	Shift Manager - A	RJ	KUHTA	☐	Manager, Plant Mechanical Engineering 1101N/328/N16
JAH ☐	Shift Manager - B	KL	FALCONER	☐	Manager, Plant Instrument Engineering 1103N/A5/T7
DKF ☐	Shift Manager - C	SR	SMITH	☐	Manager, Plant Electrical Engineering 1101N/317/N14
GLB ☐	Shift Manager - D	KD	BONSER	☐	Manager, Reactor Operations Training (6) 1115N/30/E3
?RR ☐	Shift Manager - E	JJ	DORIAN	☐	Manager, Environ. & Emergency Prep. Section 1114N/2/S3
SP ☐	Shift Manager - Relief (2)	RJ	KOBELSKI	☐	Manager, Occupational Safety Section 1114N/4/S4
JD ☐	Ops. Emergency Preparedness Coord	SL	PARIS	☐	Director, Quality Assurance & Control 1104N/15A/E9
	105/109 OPERATIONS				
DLW ☐	Manager, 105/109	RA	RAMSDELL	☐	Manager, Procedures Development 1115N/28/E1
TEA/DGP	Manager, Control Room	JR	BELLOMY	☐	Manager, Standards Engineering 1103N/A7/T6
GHP/JRS	Manager, 105 Bldg. (2)	MS	COCHRANE	☐	Manager, QA Audits and Administration 1104N/28/E6
RCC/RHB	Manager, 109 Bldg. (2)	JW	BLOOM	☐	Manager, N-Plant Production Control 1100N/214/R5
PB/PW ☐	Ops. Radiological Assistant	%GL	LEWIS	☐	Manager, Plant Operations Review Board 1103N/C15/T3
	AUXILIARY OPERATIONS	EE	LEITZ	☐	Manager, N Reactor Systems Analysis 1103N/A23/T11
TND ☐	Manager, Auxiliary			☐	Steve Roakes/Plan. Analyst 1110N/7/S2
JPZ ☐	Manager, Auxiliary Day Shift			☐	Ed K. Hamshar 1111N/6/E4
				☐	MC Jones/Trng. Rep. Sfty. Trng/ 1115N/31/E3
				☐	JW Oppelt 1103N/A17/T7

FINAL DISPOSITION: ☐ Referred To: _____ Date: _____

☐ Recommendation Received: Satisfactory ☐ Unsatisfactory ☐

If Unsatisfactory What Is The Final Disposition Of The PER? _____

☐ Corrective Action Taken. _____

☐ Verified Complete By: _____ Date: _____

A-5600-137 (4-86)

UNC

PLANT EVENT REPORT

D|T 86-01

TO: MANAGER, N-PLANT OPERATIONS AND/OR N-PLANT MAINTENANCE
DIRECTOR, REACTOR PLANT DEPARTMENT AND/OR REACTOR MAINTENANCE DEPARTMENT.

FROM: A. P. Larrick — TIME OF EVENT: 12:35 p.m.

JOB TITLE: Manager, C&WTT — DATE OF EVENT: 08-18-86

WORK AREA: 1706-KER 100K — SHIFT: A ☐ B ☐ C ☐ D ☐ E ☐

N-PLANT STATUS AT TIME OF INCIDENT:

Shutdown ☐ Startup ☐ Operating ☐ Power Level: NA

1. DESCRIPTION OF INCIDENT

Waste solutions were being added to 12 gallons of epoxy in a 30 gallon vessel in a purchased waste solidification system. The epoxy was being heated with external heaters to evaporate the waste solution to residual salts prior to solidifying the epoxy. After about a hour of operation the operator left for lunch. At about the time of returning, the fire alarm sounded and thick white vapors were observed coming from the room containing the heated epoxy resin. Some resin was ejected through an observation port onto the ceiling and adjoining wall. There was no property damage and no fire. The waste was slightly radioactively contaminated and there was no release of contamination outside the radiation zone. During the system heatup and the first hour of systme operation all functions were operating normally and smoothly. During previous operating periods all functions also performed normally.

2. WITNESSES

K. C. Oberg

3. APPARENT REASON FOR, OR CAUSE OF INCIDENT

The epoxy overheated causing emission of the thick, white vapors. The resin ejection was probably due to formation of a steam pocket within the epoxy from evaporation of the water. The epoxy was being stirred.
The cause of the overheating is unknow but could have been due to an exothermic reaction between the epoxy and the salts. the waste was a mixture of laboratory wastes collected and neutralized in a storage tank over many months of time. The external heaters were determined to be operating properly following the incident.

4. CORRECTIVE ACTION TAKEN AND RESULTS

1. Electricity to the waste solidification system was shutoff.
2. The fire department personnel entered the area and determined there was no fire. They did not fill out a fire report.
3. Air samples of the white fumes were taken at two locations and were free of radioactivity.
4. The epoxy expelled from the container was cleaned up.
5. The equipment was checked and was working properly and there was no damage.
6. Checked with manufacturer for advice and if the correct resin had been used. He knew of no reason why the resin behaved as it did and verified that the PNS-01 resin used was that supplied with the system.

5. SUGGESTED PERMANENT CORRECTIVE ACTION

1. Provide continuous attendance during operation to monitor epoxy temperature. If temperature starts to rise above operating point, shut system down and add extra water for cooling. The type of overheating found occurs slowly and sufficient time is available to take corrective action.
2. Check Material Safety Data Sheets to see if any mention of exothermic reactions are possible and any corrective action. Run a laboratory test with actual waste to see if an exothermic reaction can be obtained.

6. REPORTED TO NPO/NPM MANAGER AS A POTENTIAL UNUSUAL OCCURRENCE:

Yes ☐ No ☒

PLANT EVENT INVESTIGATION REPORT

PER No.: D|T 86-01

. INVESTIGATION RESULTS

The incident involved the overheating of epoxy in a waste solidification vessel at 1706-KER 100K. This caused the area to be filled with thick smoke. The investigation showed the responsible operators took the proper action in shutting off the power and obtaining fire department assistance. The exact cause of the overheating has not been discovered.

2. SIGNIFICANCE OF OFF-NORMAL EVENT

(Discuss frequency of occurrence, similar past events, impact on schedules and operations, maintenance time required for repair, repair costs involved, etc.)

No equipment damage occurred and there was no release of radioactivity outside the radiation zone. The waste involved was only slightly contaminated. The significance of the event was that an unknown and as yet unexplained phenomenon occurred.

3. CORRECTIVE ACTIONS

(Include Responsible Organization and Due Dates)

1. Provide continuous attendance during operation to monitor epoxy temperature. If temperature starts to rise above operating point, shut system down and add extra water for cooling. The type of overheating found occurs slowly and sufficient time is available to take corrective action. C and WTT|next operating period

2. Check Material Safety Data Sheets to see if any mention of exothermic reactions are possible and any corrective action. Run a laboratory test with actual waste to see if an exothermic reaction can be obtained. C and WTT|10-30-86

4. DESIGNATION OF APPARENT CAUSE BASED ON RESULTS OF THE INVESTIGATION OF THIS OFF-NORMAL EVENT REPORT.

Design ☐ Material ☒ Personnel ☐ Procedure ☐ Other ☐

5. APPROVALS

Originator: G P Lorrick Date: 9-25-86

Section Manager: [signature] Date: 9/25/86

Action Approvals: G P Lorrick Date: 9-25-86
(Managers)

CORRECTIVE ACTION CLOSEOUT

Actions completed - PER closeout: ______________ Date: ______
Section Manager