Rockwell International
Rocketdyne Division

UNUSUAL OCCURENCE REPORT

1. UOR NO. Internal #1
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3. DIVISION OR PROJECT:
Atomics International Development and Test

4. FACILITY, SYSTEM, OR EQUIPMENT:
NAME: 350 cu ft Tank at T009 FUNCTION Temporary Storage
DWG NO. OR SPEC NO. NAA 9693-973218 COMPONENT ID NO.
TYPE CODES & STDS BUILT TO 1956
VENDOR C. E. Howard VENDOR SERIAL NO. 6344
OTHER REFERENCE DOCUMENTS N0010P19003 Sodium Burn Fac.-OP

2. STATUS AND DATE:
☐ INITIAL
☐ INTERIM
☒ FINAL 6-10-86

5. DATE OF OCCURRENCE:
5-29-86

6. TIME OF OCCURRENCE:
0945

7. SUBJECT OF OCCURRENCE (TITLE):
Sodium Hydroxide Spill at T009

8. APPARENT CAUSE
DESIGN ☐ MATERIAL ☐ TEST ☐ PROCEDURE ☐ CHECKOUT ☐ CONSTRUCTION ☐ PERSONNEL ☐
MANUFACTURE ☐ INSTALLATION ☐ SHIPPING ☐ PACKAGING ☒ OTHER ☐ (EXPLAIN IN BLOCK 11)

9. DESCRIPTION OF OCCURRENCE:

The tank was observed at 0930 in a normal state. At 1000 it was noted that a reaction had taken place. Apparently a sodium hydroxide solution voluntarily discharged from a 350 cu ft metal tank being stored temporarily on the west side of Building T009. It appeared that 10's of gallons of caustic solution sprayed out of one or two of the pipe penetrations at the top of the tank, coating the tank, part of the yard, an adjoining grass embankment and some scrap being removed from the building. Some sodium hydroxide solution puddled up under the tank and in the surrounding yard area.

10. OPERATING CONDITIONS OF FACILITY AT TIME OF OCCURRENCE:

The tank was in its normal storage position where it has been for 11 years. Routine operations were taking place within the building. No operations were being performed near the tank.

11. IMMEDIATE EVALUATION:

The tank was known to have contained a small amount of sodium and/or sodium reaction products at the time it was moved to the Bldg. 9 yard in 1976. The tank originated at a non-radioactive portion of SRE. It was a secondary sodium tank and had been drained of sodium except for a small amount left in the cold trap in the bottom of the tank. The tank openings were sealed at the time of removal at the SRE. It is assumed the method of sealing was tuck tape and plastic. The most likely scenerio of what happened seems to be, sometime recently (ballpark estimate of months), the seals had deteriorated to the extent that the tanks breathed, allowing significant amounts of moist air to enter the tank. This moist air could result in a layer of liquid sodium hydroxide on top of the sodium hydroxide encrusted sodium heel. A hydrogen bubble or other minor disruption could then allow intimate contact between dilute sodium hydroxide and metallic sodium, releasing hydrogen. A subsequent hydrogen explosion then ejected the liquid sodium hydroxide and dry reaction products from the various ports of the tank. A similar explosion during a sodium moist air cleaning test was documented in Tech Data Record NAA-SR-12403 "Sodium Air Reaction Test at Ambient Conditions," by F. W. Poucher, dtd. 4-3-67.

12. IMMEDIATE ACTION TAKEN AND RESULTS:

Management, Health & Safety, the Emergency Spill Team, Security and Environmental were notified. The area was roped off and a plan was formed to stabilize the spill. Citric acid powder was sprinkled over the area to help neutralize the solution. A drainage ditch adjoining the spill area was dammed to contain the spill. Water was flushed over the spill area to wash it into the drainage ditch where ~1000 gallons of neutral solution were sucked up into the tank on a disposal transport truck by Disposal Control Service. The tank was plumbed and purged with CO_2 gas. Photographs were taken of the tank and surrounding area within one hour of the observed incident.

INITIAL DISPOSITION

MODIFIED _____ SUBJECT TO FURTHER TESTS _____

USED AS IS _____ ADJUSTED _____ REPAIRED _____ REMOVED _____

ELIMINATED X SENT TO MAINT _____ SENT TO MFG _____ OTHER _____

13. IS FURTHER EVALUATION REQUIRED? YES ☐ NO ☒

IF "YES," BEFORE FURTHER OPERATION? YES ☐ NO ☐

IF "YES," BY WHOM? _____ WHEN? 6/14/86

14. FINAL EVALUATION AND LESSONS LEARNED:

The major lesson from this incident is that unused tanks, even with small amounts of sodium residues, can represent a hazard if proper sealing of the tank is not maintained, since over long periods of time, sealing methods may deteriorate and active surveillance and maintenance programs of stored vessels with Na residues is required.

15. CORRECTIVE ACTION: ☒ TAKEN ☐ RECOMMENDED ☐ TO BE SUPPLIED

The tank was vented and a vent pipe was plumbed from the tank to a containment vessel to prevent further spills. The tank was moved to Building 133 (the Sodium Burn Facility) for treatment of any remaining material, cleaning, and disposal. The tank has been cleaned of sodium.

Seals on other unused uncleaned Na tanks and cold traps were checked and long term storage of such items will be minimized whereever possible.

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16. PROGRAMMATIC IMPACT:

No direct programmatic impact. About 12 hours mechanics time and the support of Disposal Control Services to clean up the neutralized solution.

17. IMPACT CODES AND STANDARDS:

18. SIMILAR UNUSUAL OCCURRENCE REPORT NUMBERS:

19. SIGNATURES:

ORIGINATOR _____ DATE 6/10/86

ORIGINATOR MANAGER _____ DATE 6/18/86

QA DIRECTOR _____ DATE _____

J.O. COORDINATOR _____ DATE _____

PROGRAM MANAGER _____ DATE _____