Internal Letter

Rockwell International

Date: August 13, 1984

No. 65950-84-486

TO: (Name, Organization, Internal Address)
Distribution

FROM: (Name, Organization, Internal Address, Phone)
N. E. Bell
SIS Unit/TF&EPE
3-1151

Subject: LONG-TERM RECOMMENDATIONS OF THE TASK FORCE ON PRESSURIZATION OF TANK 101-SY

Reference: Letter, July 23, 1984, N. E. Bell to Distribution, "Short-Term Solution of Tank 101-SY Pressurization Problem"

Pressurization of Tank 101-SY is believed to be caused by the reaction of organics in the waste to form gases. These gases collect in the waste, causing the waste surface to rise until a sudden gas release occurs and the liquid level drops. Sharp rises in radiation readings on the SY-Farm exhaust filters after pressurization are strong evidence that release of airborne contamination through unfiltered tank openings may be occurring. Calculations show that airborn contamination exceeding release limits probably would not be measurable as increases in ground contamination. Based on the composition of gases generated during laboratory experiments and calculations of the volume of gas released during Tank 101-SY pressurizations, there is also a possibility that hydrogen concentrations in the tank void space exceed tank operating specifications during pressurization.

Several methods have been suggested to provide continuous, low-volume gas release in Tank 101-SY. The existing ventilation system should be capable of controlling low volume emissions, thus preventing pressurization, release of air borne contamination, and high hydrogen concentrations. However, all these methods depend on the location of the gas buildup in the waste, which is unknown. Temperature readings in the waste and radiation readings in the annulus indicate that the original waste layers have mixed and then separated to form a crust, a middle liquid layer, and a bottom solids layer. In this case, gases could be collecting either just under the crust or in the solids layer.

The task force recommends the following actions:

1. As a short-term solution, the tank should be routinely lanced before the liquid level reaches 409 inches to prevent pressurization. Hot water should be used.

2. No long-term solution should be implemented until more is known about gas buildup in the tank.

3. The location of gas buildup should be further investigated.

   a. The tank should be lanced with a modified lance held in stages to determine the depth of the gases. This staged lancing should begin when the tank liquid level reaches 408 inches. The first lancing should be done to a depth of six feet under the surface

in three different risers. If the gas has not released after a 36 to 48 hour wait, the tank should be lanced to a depth of 15 feet from the top in three risers. This should be the center of the liquid layer. If the gas has not released after a 36 to 48 hour wait, the tank should be lanced to a depth of four feet from the bottom in three risers. This should be the center of the solids layer. If this is unsuccessful, the tank should be lanced to the bottom and the existing lance be used to force a gas release.

b. Temperature readings should be collected at all available locations weekly.

c. Photographs of the tank surface should be taken just after lancing.

d. A steel LOW should be installed just after the next lancing. Gamma and neutron scans of the tank should be performed once every two weeks to show changes in the waste. Installation of a fiberglass LOW for acoustic (density) readings should be investigated. Density readings should indicate how thick the various layers are and where the gas is collecting.

4. The potential for release of airborne contamination should be further investigated. An air sampler should be placed over a release point in time to measure the next release.

5. The potential for high hydrogen concentration should be further investigated. A hydrogen detection device, perferably a meter with stripchart recorder should be placed over a release point or at the exhaust filters.

6. A core sample should be taken at each of the three layers. The physical properties and chemical composition of each layer are important in determining which engineering solutions will be effective.

C. M. Walker (TF&EPE) will be responsible for continued surveillance and evaluation of Tank 101-SY, W. J. Powell (TF&EPE) will be responsible for installation of equipment at Tank 101-SY.

Task Force members and their responsibilities are:

- o N. E. Bell - Chairperson
- o W. J. Powell - Procedures and Hardware
- o L. M. Sasaki - Technology and Laboratory Support
- o D. M. Tulberg - Technology Support
- o R. E. Van der Cool - Technical Consultant
- o C. M. Walker - Surveillance
- o R. A. Van Meter - Research and Engineering Interface
- o O. Strunk - Operations Support
- o D. R. Ellingson - Health, Safety and Environment Support

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