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Westinghouse
Savannah River Company

P.O. Box 616
Aiken, SC 29802

ESH-FSS-94-0407

June 30, 1994

Mr. John J. Schnabel, P. E.
Facility Engineering Section
Division of Solid Waste Management
South Carolina Department of Health
and Environmental Control
2600 Bull Street
Columbia, SC 29201

Dear Mr. Schnabel:

FOLLOW-UP TO MEETING REGARDING Z-AREA DISPOSAL VAULTS (U)

John, per your request, we are forwarding you a summary of the recent events that have happened at the Z-Area Saltstone Facility. This is a follow-up to the inspection of the Saltstone Facility by Tim Fox, Bob Benson, and yourself on Thursday, June 30, 1994.

The summary includes a brief history of what has happened recently at the facility, what steps we have taken thus far, and what steps we propose to take in the future to prevent a reoccurrence of a problem. Per our discussion on June 30, we plan to submit our design modifications for the facility to your office in approximately two weeks. If you have any questions or if I can be of further help, please let me know.

Sincerely,

Larry C. Haney

Larry C. Haney

LH:lw
Attachment

CC: Tim Fox, SCDHEC-Aiken
Bob Benson, SCDHEC-Aiken
A. B. Gould, DOE-703-47A
A. L. Towns, DOE-ECD, 704-S
W. C. Whitaker, 703-47A
D. G. Thompson, 704-Z
Kim Cauthen, 704-15S
Ron Reeves 704-15S
Don Morris, 742-A
Sandra J. Carroll, 742-A
Lori Coward, 742-5A
Records Administration, 773-52A
EPD File, 742-A

SUMMARY REPORT - SALTSTONE VAULT 1 STRUCTURAL IRREGULARITY (U)

BACKGROUND

The Saltstone Disposal Facility (SDF) is located at Z-Area of the Savannah River Site (SRS). The SDF is a permitted Industrial Solid Waste Disposal Facility, permit # IWP-217. The SDF is used for the disposal of saltstone waste generated by the Saltstone Industrial Wastewater Treatment Facility (WWTF), permit #12,683.

The saltstone waste is formed when salt solution is mixed with cement, flyash, and slag at the WWTF. This process forms a pumpable grout which is transferred to concrete vault cells at the SDF where it hardens into a concrete -like monolith called saltstone. The vault cells are covered with a portable metal roof during filling. After filling, and before moving the portable roof, each cell is covered with a clean grout protective layer for radiation control. The cell is capped with a sloped concrete roof after the portable roof is moved. The subject vault is referred to as vault 1. It is 100 feet wide by 600 feet long and 25 feet deep. The vault is divided into 6 cells with dimensions of 100' x 100' x 25'. The cells are identified as A through F from North to South.

DISCOVERY OF STRUCTURAL IRREGULARITY

Cell A of vault 1 was filled with saltstone and covered with the concrete protection layer in April of this year. The portable roof was moved and a reinforced sloped cap was constructed. On June 13, 1994, an operator was performing the daily vault inspection when he noticed moisture around the site of some existing cracks on the north wall of vault 1, cell A. This condition was reported to management immediately. Further investigation revealed a noticeable outward deflection of several inches on the three exterior walls of cell A. The fourth wall which is the wall between cells A and B did not deflect because cell B is full of saltstone. As a result of the deflection, there was a space created between the saltstone monolith and the interior of the cell wall. This space contained water which was seeping through the existing cracks in the wall. Approximately 80 gallons of water (much of which was the accumulation of rain water from outside the vault) was on the ground at the base of the north wall.

REMEDIAL ACTIONS

Operations immediately controlled the area and began investigations to determine structural stability, environmental impacts, probable cause, and corrective actions. The following table summarizes these actions and results.

Immediate and Ongoing actions	Results
Temporarily seal space between monolith and vault wall to prevent further water intrusion.	A waterproof tarp was immediately placed to minimize further water intrusion.
Water on the ground was collected and analyzed.	Presence of some salts indicate some of the water came from the vault interior. The contaminants will be removed to background levels; however, there was no adverse impact to human health or the environment due to this release.
Developed plan to remove free water from inside the vault.	Strategically placed holes were drilled through the vault walls and the rain water was pumped to a tanker for disposal on site. The space is frequently inspected for the accumulation of additional rainwater.
Water inside vault was sampled and analyzed.	The water taken from inside the vault was very clear in appearance. Sample results validate that the saltstone waste form is functioning per design.
Initiated daily surveys of vault walls to monitor wall movement.	Survey measured a maximum deflection of 4.25". Once the water was removed, deflection was reduced to 3.0". Calculations verified structural stability and identified the causative agent to be hydrostatic loading.
Experiments are being performed on saltstone samples to determine if changes occur due to the presence of water after setting.	The experiments on saltstone samples are ongoing, but preliminary results show no indication of detrimental changes in the saltstone due to the presence of water.
Developed task team to re-design vault cap to prevent re-occurrence.	In progress.
Soil investigations will be conducted to determine if further cleanup is required.	In progress.

There has been no release of a reportable quantity (RQ) of any hazardous substance to the environment. The amount of tritium released was several orders of magnitude below the RQ of one curie.

PROBABLE CAUSE

It is believed that sometime during activities for the placement of the temporary cap on Cell A of Vault 1, rain water was trapped in an imperceptible space that exists between the saltstone monolith and the interior vault walls. This occurred after the protective layer of clean grout was poured on the saltstone and the rolling metal roof was moved. The trapped water formed a 25' column which had sufficient hydrostatic pressure to deflect the exterior walls of Cell A and open an appreciable space between the saltstone monolith and the vault wall. Continuing rains added water to the space as it widened. The Probable cause appears to be a deficiency in the design requirements for the structural cap, which can easily be modified to prevent re-occurrence.

PATH FORWARD

A task team composed of operations, design, and construction personnel has been formed to design and install a seal to prevent further inleakage into cell A. Operational and construction/design changes will be developed to permanently correct the current situation and to prevent this from happening in the future. A design package will be submitted to the appropriate SCDHEC permitting officials for approval. It is estimated that the design will be ready for submittal within two weeks.

As previously stated, a waterproof tarp was immediately placed over the top of cell A to minimize water intrusion. Additionally, temporary flashing will be installed over the gap between the wall and the cap. The flashing is needed to further restrict the entry of water into the space. The temporary flashing has been discussed with the SCDHEC engineer and will be implemented as soon as possible.

CONCLUSION

At this point, all indications are that the saltstone waste form is performing as expected. The contaminants found in the water that was pumped from the inside of the cell are at expected levels, and actually validate the performance of the saltstone waste form. Cleanup and structural repairs will be completed as expeditiously as possible. This situation is still being studied and the content of this report may need revision as further information is obtained.

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L. C. Haney

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