

U.S. NUCLEAR REGULATORY COMMISSION  
REGION I

INSPECTION REPORT

Inspection No.: 04008610/2008001  
Docket No.: 04008610  
License No.: STC-1333  
Licensee: Stepan Company  
Location: 100 West Hunter Avenue  
Maywood, NJ 07607  
Inspection Dates: May 8 and November 21, 2008  
Dates Follow-up  
Information Received: December 11, 2008 and February 6, 2009

Inspector:      / **RA by Randolph C. Ragland Jr. For** /      02/09/09       
Mark Roberts  
Senior Health Physicist  
Decommissioning Branch  
date

Approved By:      / **RA by Randolph C. Ragland Jr. /**      02/09/09       
Randolph C. Ragland Jr., Chief  
Decommissioning Branch  
Division of Nuclear Materials Safety  
date

## EXECUTIVE SUMMARY

Stepan Company  
NRC Inspection Report No. 04008610/2008001

This inspection was a series of announced site visits by one regional inspector and two representatives from the Nuclear Regulatory Commission's (NRC) Office of Federal and State Materials and Environmental Management Programs to review environmental monitoring data and discuss specific details of the transfer of control of onsite radioactive waste burial pits to the U.S. Army Corps of Engineers for the purpose of remediation of thorium wastes. Under the Formally Utilized Sites Remedial Action Program (FUSRAP) and the terms of a Settlement Agreement, the U.S. Army Corps of Engineers will sequentially take control of the three onsite burial pits, conduct decontamination and remediation activities, and return the remediated areas back to the licensee. The licensee will retain control of areas not under control by the U.S. Army Corps of Engineers.

Discussions held between the licensee, NRC staff, representatives of the New Jersey (NJDEP) Department of Environmental Protection, and representatives of the U.S. Army Corps of Engineers confirmed the specific details regarding timing of the actions and responsibilities of each of the parties.

Annual gamma radiation surveys above each of the burial pits did not identify any radiation exposure rates in excess of the licensee's action level. Gross alpha concentrations measured in water samples from monitoring wells down gradient of each the burial pits were typically less than the detection limit for the analysis.

One Severity Level IV violation was identified for the failure to sample and analyze water for each monitoring well during each half of every calendar quarter as required by the NRC License Condition No. 12, Amendment 3. Specifically, from September 2006 through February 6, 2009, Stepan Company did not sample and analyze water from Well #6, nor did they obtain relief from the requirement through a license amendment.

## **REPORT DETAILS**

### **I. Organization and Scope of the Program**

#### **a. Inspection Scope**

The inspector interviewed the plant manager and individuals representing the U.S. Army Corps of Engineers to assess the scope and schedule for future onsite remediation activities that will be conducted by the U.S. Army Corps of Engineers under the FUSRAP. The inspector also discussed the role of the NJDEP with the NJDEP representatives.

#### **b. Observations and Findings**

Stepan Company (Stepan) is authorized under its NRC license to possess thorium tailings in three underground burial pits at its Hunter Avenue site. The radioactive material in the burial pits was the result of thorium extraction and manufacturing activities conducted at the site by the Maywood Chemical Works during the period 1916 – 1956. Stepan purchased the 19-acre property in 1959 and subsequently buried waste material in three pits in 1966, 1967, and 1986. The decontamination and remediation of the three burial pits will be performed by the U.S. Army Corps of Engineers as part of a Settlement Agreement reached between the United States government and Stepan, and as part of the Formally Utilized Sites Remedial Action Program. In 1981, the U.S. Army Corps of Engineers and the NRC signed a Memorandum of Understanding for Coordination of Cleanup & Decommissioning of the Formally Utilized Sites Remedial Action Program (FUSRAP) Sites with NRC-Licensed Facilities, to avoid unnecessary duplication of regulatory requirements. Under these agreements, the U.S. Army Corps of Engineers is not required to obtain an NRC License for the onsite remediation activities.

On October 21, 2008, the NRC issued an Order modifying NRC License No. STC-1333, which allows for the serial suspension of Stepan's NRC license for each of the burial pits. The U.S. Army Corps of Engineers will provide written notification that it is taking physical possession of a burial pit for the purposes of control of the radioactive material and that it is responsible for the public health and safety consistent with the requirements of 10 CFR Part 20. The Order also allows NRC representatives to observe in-process remediation activities conducted by the U.S. Army Corps of Engineers. The licensee will retain control of the areas that are not under the control of the U.S. Army Corps of Engineers. On December 11, 2008, the U.S. Army Corps of Engineers notified the NRC by letter that it had taken physical possession of Burial Pit 3. Discussions with the representative of the U.S. Army Corps of Engineers indicated that the removal of the waste from the three pits will take several years to complete. The U.S. Army Corps of Engineers representative stated that he meets regularly with local officials to keep them informed on the status of the Stepan Company and other nearby FUSRAP remediation projects.

The waste material has been classified by NRC as byproduct material under Section 11.e.(2) of the Atomic Energy Act, i.e., "tailings or wastes produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content." In October 2008, the State of New Jersey submitted an application to

the NRC to become an Agreement State. The inspector confirmed with representatives of the NRC Office of Federal and State Materials and Environmental Management Programs and representatives from NJDEP that New Jersey's application did not request regulatory authority for byproduct material under Section 11.e.(2) of the Atomic Energy Act. Therefore, NRC will retain regulatory authority over licensed material at the Stepan site that has not been taken possession of by the U.S. Army Corps of Engineers.

c. Conclusions

Representatives of the licensee, NJDEP, U.S. Army Corps of Engineers, and the NRC were in agreement regarding the process that will be employed for sequentially turning over burial pits to the U.S. Army Corps of Engineers for remediation. No findings of significance were identified.

## II. Radiation Surveys

a. Inspection Scope

The inspector reviewed the results of the annual radiological surveys and quarterly groundwater sample analyses. The inspector interviewed site personnel, toured the site, and reviewed selected documents. In addition, the inspector performed independent measurements of exposure rates at various locations above the covered burial pits.

b. Observations and Findings

The licensee conducts an environmental monitoring program in accordance with the June 29, 1987, letter to the NRC that is tied down to the license by a specific license condition. The monitoring program includes gamma exposure rate measurements atop each of the burial pits and sampling and analysis of groundwater monitoring well samples. Water is sampled from each of nine groundwater monitoring wells (three wells immediately down gradient of each of the three burial pits), and analyzed for gross alpha activity. The inspector reviewed groundwater monitoring well sample data for the period 2005 through the third quarter of 2008 and found that most wells have gross alpha concentrations that are less than the detection level of a few picocuries per liter (pCi/l). Nearly all of the wells have gross alpha concentrations that are less than 15 pCi/l. Samples that show concentrations in excess of 15 pCi/l are reanalyzed, and if confirmed, specific analyses for Ra-226 and Ra-228 are performed. Water samples from Well # 9 have frequently exceeded 15 pCi/l, but subsequent measurements have not confirmed detectable concentrations of Ra-226 or Ra-228. From his data review, the inspector determined that Well #6 has not been sampled since mid-2006 and there has been no explanation provided for the absence of sample data from this well. The plant manager indicated that the well cannot be found and may have been unintentionally covered during excavation activities. The inspector determined that the failure to collect and analyze water samples from Well # 6 for a period in excess of two years was a violation of License Condition 12 that requires the licensee to conduct its monitoring program in accordance with its June 29, 1987, letter to the NRC. **(VIO 04008610/2008001-01)**

The inspector reviewed the results of the gamma radiation exposure rate surveys conducted annually by a licensee contractor. Survey results from 2005 through 2008 were examined and were consistent for each of the areas over this time period. The exposure rates measured by the contractor in the vicinity of burial pits 2 and 3 were not significantly different than the background exposure rate for the area of approximately 8 – 11 microroentgens per hour ( $\mu\text{R/hr}$ ). Most of the measurements above pit 1 were not remarkable, except for an area in the northwest corner of burial pit 1 that was approximately two to three times the background exposure rate (highest was 27  $\mu\text{R/hr}$ ). The licensee's monitoring program has an action level of 50  $\mu\text{R/hr}$  to consider actions, such as adding cover to reduce the exposure rate. The inspector made independent measurements for these same areas using a Ludlum Measurements, Inc. Model 19 MicroR survey meter. All independent measurements by the inspector were consistent with the licensee's recorded measurements.

c. Conclusions

Gamma walkover measurements conducted annually have shown consistent exposure rates in each of the areas measured. No values greater than the licensee's 50  $\mu\text{R/hr}$  action level were measured. The licensee's groundwater monitoring program shows that most well water sample results are less than the licensee's action level of 15 pCi/l. However, the inspector determined that the licensee failed to collect and analyze water samples from Well # 6 for a period in excess of two years, which is a violation of its license condition for conducting its environmental monitoring program.

### III. Exit Meeting

An exit meeting was held by telephone on February 6, 2009, with the Mark Stanek, plant manager and John Garges, environmental consultant. The licensee acknowledged the inspector's observations and findings. The inspector confirmed that proprietary and safeguard information were not included in this inspection report.

## **PARTIAL LIST OF PERSONS CONTACTED**

### Licensee

Mark Stanek                      Plant Manager  
John Garges                      Environmental Consultant

### FUSRAP representatives

Allen Roos                      Project Manager, U.S. Army Corps of Engineers  
Bill Kollar                      Contractor, Shaw Environmental & Infrastructure

### State of New Jersey

Ed Truskowski                      Health Physicist, Radiological Assessment Section, NJDEP  
Jennifer Goodman \*                      Supervisor, Radiological Assessment Section, NJDEP

\* Via telephone

## **LIST OF ITEMS OPENED, CLOSED AND DISCUSSED**

### Opened

04008610/2008001-01                      VIO      Failure to conduct environmental monitoring in accordance  
with a condition of the license

Closed/Discussed - None

## **LIST OF DOCUMENTS REVIEWED**

Annual gamma radiation exposure rate surveys atop thorium burial sites – 2005 through 2008

Quarterly groundwater monitoring sample results – 2005 through the third of 2008

Letter and Confirmatory Order Modifying License - NRC to Stepan Company – October 21, 2008

Letter from U.S. Army Corps of Engineers to NRC confirming that the U.S. Army Corps of Engineers has taken physical possession of Burial Pit #3 – December 11, 2008

Letter from Stepan to NRC detailing environmental monitoring program - June 29, 1987