U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

Region I

Report No. 40-8610/81-03

Docket No. 40-8610

License No. STC-1333 Priority IV Category E

Licensee: Stepan Chemical Company

100 Hunter Avenue

Maywood, New Jersey 07607

Facility Name: Stepan Chemical Company

Inspection at: Maywood, New Jersey

Inspection conducted: July 1, 1981

Inspectors: for Francis M. Costello — July 7, 1981
M. Campbell, Radiation Specialist — date signed

for Francis M. Costello — July 7, 1981
J. McGinness, Radiation Specialist — date signed

Approved by: for Francis M. Costello — July 7, 1981
J. D. Kinneman, Chief, Materials Radiological Protection Section — date signed

Inspection Summary:
Inspection on July 1, 1981 (Report Number 40-8610/81-03)
Areas Inspected: Announced, special inspection of former thorium processing facility including radiological analyses of the licensee's products and raw material. This inspection involved 8 inspector-hours onsite by two regional based inspectors.
Results: No items of noncompliance were identified and no detectable thorium was found in any of the licensee's products or raw materials.

DETAILS

1. Individuals Contacted

Mr. John O'Brian, General Manager
Mr. Ernest Swanson, Plant Manager
Mr. Henry Morton, Consultant Physicist, Nuclear Safety Associates

2. Background

In 1916 the Maywood Chemical Works began processing ores to extract thorium. In 1954 this activity was first licensed by the AEC. Processing ceased in 1956. In 1959 the Stepan Chemical Company bought the Maywood Chemical Works. The former thorium processing area and known waste storage areas were decontaminated between 1963 and 1968. In late 1980 onsite and offsite thorium contamination was discovered. NRC activities in this regard are documented in Report No. 40-8610/80-01.

The licensee has three divisions which make commercial products. These are the Natural Products Division, the Specialty Chemical Division, and the Protein Detergent Division. The licensee manufactures approximately 40 different substances which are incorporated by other commercial firms into a variety of products including food, cosmetics, pharmaceuticals and industrial products.

3. Analysis of Samples of the Licensee Products

The inspectors took 25 samples of the licensee's products. Some of these samples were mixed together for ease in counting, resulting in a total of 15 samples being analyzed. These included samples of all products which are incorporated into food products and pharmaceuticals. The inspectors also sampled approximately half of the other products. Since many of the products are made in the same process vessels, those sampled should indicate if thorium contamination were present in any products at the licensee's facility. These samples were analyzed for radioactivity at the USNRC, Region I Laboratory.

Within the constraint of counting time, no detectable thorium contamination was found in any of the samples analyzed. A summary of the analyses is included as Attachment 1. Naturally occurring potassium-40 was found in all samples and a low level of cesium-137, resulting from worldwide fallout, was found in one of the licensee's raw materials.

4. Exit Interview

The licensee's attorney was informed of the results of the sample analysis by telephone on July 7, 1981.

Attachment 1

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Results of Analyses of Samples

The samples of products were analyzed for radioactivity using an intrinsic germanium detector (Princeton Gamma Tech) coupled to a computer-based multi-channel analyzer (Nuclear Data).

Sample ID	Isotope (Microcuries per milliter) TH-234	TH-228	K-40	Cs-137	Volume	Counting Time Min.
# 1	< 2.61 E-7	< 1.70 E-7	(1.36 ± 0.09) E-5	< 1.47 E-7	450 ml	60
# 2	< 2.61 E-7	< 1.81 E-7	(1.42 ± 0.10) E-5	< 1.35 E-7	450 ml	60
# 3*	< 6.64 E-8*	< 7.82 E-8*	(1.40 ± 0.06) E-5*	(1.8 ± 0.2) E-7*	479 g	60
# 4	< 2.68 E-7	< 2.67 E-7	(1.22 ± 0.15) E-5	< 1.96 E-7	500 ml	20
# 5	< 2.65 E-7	< 3.32 E-7	(4.4 ± 1.1) E-5	< 2.32 E-7	420 ml	20
# 6	< 2.65 E-7	< 3.32 E-7	(1.50 ± 0.16) E-5	< 2.62 E-7	420 ml	20
# 7	< 2.36 E-7	< 3.33 E-7	(1.37 ± 0.18) E-5	< 3.12 E-7	430 ml	20
# 8	< 2.61 E-7	< 3.21 E-7	(1.26 ± 0.15) E-5	< 2.45 E-7	450 ml	20
# 9	< 2.28 E-7	< 2.73 E-7	(1.32 ± 0.16) E-5	< 3.15 E-7	450 ml	20
#10	< 2.40 E-7	< 3.02 E-7	(9.8 ± 1.3) E-6	< 2.23 E-7	500 ml	20
#11	< 2.34 E-7	< 2.89 E-7	(1.57 ± 0.18) E-5	< 2.75 E-7	450 ml	20
#12	< 2.46 E-7	< 2.89 E-7	(5 ± 1) E-5	< 2.80 E-7	450 ml	20
#13	< 2.60 E-7	< 3.48 E-7	(4 ± 1) E-5	< 3.06 E-7	450 ml	20
#14	< 2.33 E-7	< 3.13 E-7	(3.3 ± 0.6) E-5	< 2.28 E-7	450 ml	20
#15	< 2.25 E-7	< 3.36 E-7	(1.13 ± 0.15) E-5	< 2.45 E-7	430 ml	20
Deionized Water (Blank)	< 2.61 E-7	< 2.93 E-7	(1.19 ± 0.13) E-5	< 1.96 E-7	500 ml	20

* Sample is a powder. All results are in microcuries per gram.