



April 14, 2010

Ms. Yolanda Norman  
US Nuclear Regulatory Commission  
2 White Flint North  
11545 Rockville Pike  
Rockville MD 20852-2738

Docket: 40-8610; License STC-1333

Dear Ms. Norman:

Stepan Company requests the NRC recognize or authorize exemption of certain soil stockpiled on its plant site in Maywood, New Jersey from requirements of regulation in 10 CFR Part 40. After the USACE performed final status surveys demonstrating compliance with its cleanup criteria, Stepan removed some soil in preparation for construction and stockpiled the soil on-site. Now, Stepan wants to dispose of the stockpiled soil off-site in an EPA RCRA Subtitle C landfill. Both USACE surveys on the land areas from which the soil was removed and analyses of samples of soil Stepan took from the stockpiles confirm uranium and thorium series radionuclides in the stockpiled soil are near background concentration and are only about 0.1 of the 0.05 wt% U + Th concentration threshold of source material. Disposal in a Subtitle C landfill will provide additional assurance the soil will be isolated from exposure to members of the public.

A more extensive description of the subject soil, its origin, and proposed provisions of disposal are attached hereto.

Stepan Company believes that the proposed disposal will satisfy our mutual interests in disposing of waste soil safely. We will appreciate it if you will confirm the acceptability of this proposed disposition of waste as soon as you reasonably can.

If you have any questions or comments about the enclosed analysis, please contact me at telephone 201 712 7644.

Sincerely Yours,

Mark Stanek  
Plant Manager

Enc.

cc: Doc. Ctrl. Desk



# PROPOSED DISPOSAL OF SOIL FROM THE MAYWOOD PLANT SITE

## 1. CIRCUMSTANCE

Under the FUSRAP, the USACE is decontaminating the Maywood Plant site to cleanup standards established by formal agreement between the US DOE and the US EPA pursuant to a Federal Facility Agreement and specified in a Record of Decision.

In some areas of Stepan's Maywood plant separate from the 3 licensed thorium residue burial sites, the USACE has remediated survey units, performed final status surveys demonstrating compliance with its Record of Decision, and has released each survey unit. To continue use of two of these areas after USACE release, Stepan has excavated some soil from these areas and stockpiled it. The two areas of interest are diagrammed in Figure 1.

In addition to final status surveys of the survey units by the USACE, Stepan has sampled the stockpiled soil had analyses for uranium and thorium series performed. These analyses confirm radioactivity concentrations less than the USACE concentration criteria and an unimportant concentration, *i.e.*, less than 0.05 wt% source material in the soil.

## 2. PHYSICAL DESCRIPTION

The subject soil of interest for disposal off-site and now stockpiled on Stepan's Maywood Plant site is estimated to be 1500 yd<sup>3</sup> of soil. Relative locations of each of the soil piles are identified on Figure 1 herewith.

Pile A. To enable Stepan to build a new warehouse, the USACE remediated and performed a final status survey of an area north of thorium burial site 3. Afterward, in preparation of the base of the new warehouse, Building 9, Stepan excavated about 1000 yd<sup>3</sup> of soil from the area attended by the USACE and stored it as Pile A.

Piles B, C, and D. In order to install a concrete pad to support nitrogen storage tankage west of Building 10, Stepan excavated soil comprising small piles B, C, and D from an area that had been subject to final status survey and release by the USACE.

Pile E. Following USACE remediation, final survey, and release, Stepan excavated for sewerage and paved a concrete containment roadway around Building 10. During excavation for the sewerage and the pavement, about 500 yd<sup>3</sup> of soil was removed and stored as Pile E.

## 3. RADIOACTIVITY

Area Origin of Piles. Areas from which stockpiled soil was excavated were subject to final radiation status survey by the USACE before removal of soil to stockpiles A through E. Ra<sup>226</sup> + Th<sup>232</sup> concentration measured in soil sampled during those final status surveys is summarized in Table A1.

In the area from which soil in pile A was excavated, a summary of USACE final status survey measurements of Th<sup>232</sup>+Ra<sup>226</sup> concentration in soil, considering Ra<sup>226</sup> a surrogate for U<sup>238</sup>, is in Table A1.

In the area from which soil in Piles B, C, and D was excavated, Ra<sup>226</sup> + Th<sup>232</sup> concentrations in soil samples taken during final status survey of that land area are

summarized in Appendix A, Table A1.

In the area from which soil in Pile E was excavated, a summary of USACE final status survey measurements of  $\text{Th}^{232} + \text{Ra}^{226}$  concentration in soil appears in Appendix A, Table A1.

Mean and median concentration in soil sampled on land areas from which stockpiled soil was removed are approximately 4 pCi  $\text{Ra}^{226} + \text{Th}^{232}/\text{g}$  soil. Natural uranium and radium series are only about 3 times the natural background concentration in the region and are less than 0.1 of the 0.05 wt% threshold of source material.

Piles A through E. Natural uranium and thorium concentrations in subject soil, combined, are substantially less than 0.05 wt% natural uranium plus natural thorium and are near the natural background concentration in soil in New Jersey. The average concentrations of thorium series and uranium series in soil piles A through E are:

Radionuclide	Arithmetic Average (pCi/g)	Standard Deviation (pCi/g)
Thorium-232	1.88	0.97
Uranium-238	1.07	1.00

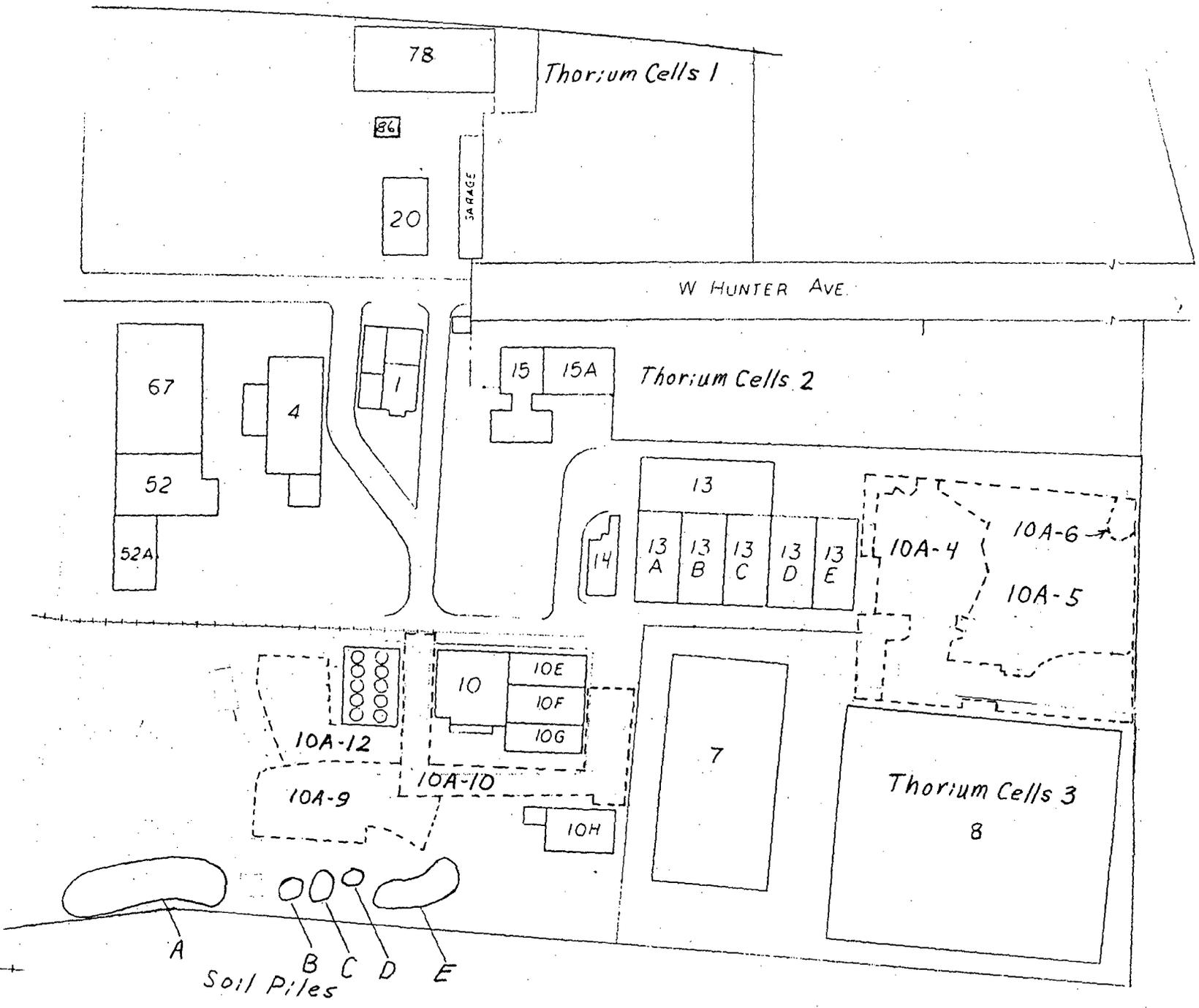
The radionuclide concentrations measured in soil sampled from piles A through E on which these averages are derived are provided in Appendix A, Table A2.

#### 4. MIXED WASTE

Analytical information indicates the subject soil does not contain hazardous chemicals or metals.

#### 5. PROPOSED DISPOSITION

While measurements indicate the subject soil would qualify for disposal as a non-hazardous waste, Stepan proposes to dispose of it by transfer to a RCRA Subtitle C landfill facility.



10A-x Legend for FUSRAP survey unit

Figure 1. Location of Soil Stockpiles on Stepan Company Plant Site in Maywood

## APPENDIX A

### RADIOACTIVITY CONCENTRATION MEASUREMENTS IN SOIL

#### Before Excavation

Areas from which stockpiled soil was excavated were subject to final radiation status survey by the USACE before removal of soil to stockpiles A through E. Ra<sup>226</sup> + Th<sup>232</sup> concentration measured in soil sampled *in-situ* during those final status surveys is summarized in Table A1.

Table A1. Survey of Land Source of Stockpiled Soil

Stockpile	Survey Unit of Origin	Sampling	Number of Samples	Ra226 + Th232 Concentration in Soil <sup>B</sup>		
				Mean (pCi/g soil)	Median (pCi/g soil)	Maximum (pCi/g soil)
A	10A-4	systematic	15	2.47	2.03	4.2
A	10A-4	biased	20	3.51	2.56	8.54
A	10A-5	systematic	51	3.0	2.6	10.7
A	10A-5	biased	6	2.8	2.4	5.0
A	10A-6	biased <sup>A</sup>	4	3.5	3.7	4.7
B, C, & D	10A-9	systematic	22	2.3	1.7	9.8
B, C, & D	10A-9	biased	24	5.0	4.5	15.4
E	10A-10	systematic	63	4.7	5.1	7.4
E	10A-10	biased	28	5.7	5.6	10.7
B, C, & D	10A-12	systematic	20	3.2	2.3	11.6
B, C, & D	10A-12	biased	19	6.0	6.1	11.2

<sup>A</sup> Area of survey unit 10A-6 is too small to justify a systematic sampling grid.

<sup>B</sup> Regional background Ra<sup>226</sup> + Th<sup>232</sup> concentration average = 1.64 pCi/g soil has not been subtracted from tabulated data.

Regional average background concentration in soil of Ra<sup>226</sup> = 0.7 pCi/g, of Th<sup>232</sup> = 1.0 pCi/g, and of U<sup>238</sup> = below minimum detectable, reported by the USACE.

Mean and median concentration in soil sampled on land areas from which stockpiled soil was removed are approximately 4 pCi Ra<sup>226</sup> + Th<sup>232</sup>/g soil. Natural uranium and radium series are only about 3 times the natural background concentration in the region and are less than 0.1 of the 0.05 wt% threshold of source material.

#### In Stockpile

Soil removed from areas previously surveyed, then stockpiled and sampled, exhibits uranium series and thorium series concentrations in Table A2.

Table A2. Uranium Series and Thorium Series Concentration in Soil Pile Inventory

Soil Pile	Sample ID	By Radiochemistry							By Gamma Spectrometry							Best Estimates			
									Thorium Surrogates			Uranium Surrogates				Measured		Imputed by Progeny	
		Th228 (pCi/g)	Th230 (pCi/g)	Th232 (pCi/g)	U234 (pCi/g)	U235 (pCi/g)	U238 (pCi/g)	Ra226 (pCi/g)	Ac228 (pCi/g)	Pb212 (pCi/g)	Tl208 (pCi/g)	Th234 (pCi/g)	Ra226 (pCi/g)	Pb214 (pCi/g)	Bi214 (pCi/g)	Th232 (pCi/g)	U238 (pCi/g)	Th232 (pCi/g)	U238 (pCi/g)
A	S-50681-100608-003	1.03	0.78	0.87	0.42	0.055	0.56	0.58								0.87	0.56	0.95	0.71
A	S-50681-100608-005	1.21	0.65	1.17	0.59	0.008	0.56	0.59								1.17	0.56	1.19	0.51
A	S-50681-100608-007	1.13	0.7	1.04	0.48	0.025	0.58	0.8								1.04	0.58	1.09	0.62
A	S-50681-100608-012	0.95	0.69	0.94	0.55	0.033	0.59	0.61								0.94	0.59	0.95	0.63
A	S-50681-100608-016	1.15	0.83	0.96	0.55	0.025	0.63	0.59								0.96	0.63	1.06	0.63
A	S-50681-100608-019	1.11	0.72	0.99	0.43	0.022	0.65	0.97								0.99	0.65	1.05	0.65
A	S-50681-100608-021	0.96	0.66	1.25	0.54	0.036	0.43	0.68								1.25	0.43	1.11	0.62
A	S-50681-100608-025	1.02	0.67	0.81	0.54	0.037	0.64	0.74								0.81	0.64	0.92	0.68
A	S-50681-100608-031	1.38	0.86	1.26	0.61	0.049	0.63	0.87								1.26	0.63	1.32	0.81
A	S-50681-100608-042	1.73	0.95	1.8	1.06	0.013	0.97	1.52								1.80	0.97	1.77	0.96
A	D-50681-100608-047								1.26	1.14	0.473	1.9		1.24	1.12			1.24	1.90
A	D-50681-100608-048								0.98	1.00	0.266			0.9	0.97			0.91	0.94
A	SO-50681-A-01								1.29	1.60	1.91	0.71	1.00		1.00			2.73	0.71
A	SO-50681-A-01 dup								1.62	1.96	1.26	3.53	1.07		1.07			2.36	3.53
A	SO-50681-A-02								1.36	1.68	1.29	-0.15	0.89		0.89			2.21	-0.15
A	SO-50681-A-03								1.11	1.38	0.95	0.61	0.78		0.78			1.71	0.61
A	SO-50681-A-04								1.32	1.37	1.02	1.08	0.95		0.95			1.84	1.08
A	SO-50681-A-05								1.74	1.98	1.06	2.20	1.15		1.15			2.22	2.20
B	SO-50681-B-01								1.57	1.43	1.16	0.30	0.62		0.62			2.07	0.30
B+C+D	SO-50681-BCD-01								3.33	4.23	3.29	4.91	2.67		2.67			5.57	4.91
E	SO-50681-E-01								1.58	1.93	1.29	2.06	1.15		1.15			2.36	2.06
E	SO-50681-E-02								1.57	2.23	1.30	0.60	1.45		1.45			2.47	0.60
E	SO-50681-E-03								1.48	1.83	1.46	0.84	1.07		1.07			2.45	0.84
E	SO-50681-E-04								1.29	1.60	1.23	0.23	1.04		1.04			2.10	0.23
E	SO-50681-E-05								1.70	2.02	1.60	0.51	1.33		1.33			2.72	0.51
E	SO-50681-E-06								1.62	1.57	1.40	1.13	1.05		1.05			2.36	1.13
E	SO-50681-E-07								1.30	1.67	1.44	1.74	1.08		1.08			2.32	1.74
E	SO-50681-E-08								1.51	1.56	1.29	2.60	1.11		1.11			2.22	2.60