Site Briefing

for

Stauffer Chemical Company Superfund Site

Tarpon Springs, Florida

United States Environmental Protection Agency Region 4

November 29, 1999

Site Background

Site Summary

- The Stauffer Chemical Company and their predecessor manufactured elemental phosphorous at the 130-acre facility from 1947-1981. See Figure 1-1 for site location. See Figure 1-2 for a key map of the site.

- The facility was shut down in 1981 and dismantled in early '90's. Only a few structures remain on-site. See Figure 2-3 for the layout of the Stauffer Plant as it existed in operation.

- The site is located along the Anclote River, approximately two miles from the City of Tarpon Springs and two miles upstream of the Gulf of Mexico.

- Surrounding land use is a mixture of light commercial and residential. The nearest commercial/industrial facility is directly across the street to the east of the site; the nearest single family residences are directly adjacent on the west site, a few hundred feet to the north and to the east of the site. The Gulfside elementary school is directly north of the site.

- Approximately 9,000-10,000 people live within a mile of the site; also within a mile of the site are a nursing home, and childrens' group home.

- The school is approximately 600 feet to the north of the slag processing area.

- Hydrogeology: 1) Sandy thin surficial aquifer - depth to aquifer is 8 feet below surface. Used for irrigation purposes.
  2) Squeaky Clay "semi-confining" layer
  3) Floridan Aquifer - Limestone - depth to aquifer ranges from 17- 37 feet below surface. Floridan is primary source of potable water.
  4) Ground water flows to the southwest, into the Anclote River

- Approximately 300,000 cubic yards (cy) of radiologically and chemically contaminated soils, pond sediments, and slag materials are present at the Stauffer Site. 300,000 cy is equivalent to an area of 30 football fields piled 6 feet high. Soils also contain elemental phosphorus, which spontaneously ignites when in contact with air.

Stauffer Process Summary

- Elemental Phosphorous was produced by mining phosphate ore, heating the ore in an electric arc furnace, removing the elemental phosphorous in its gaseous state, and returning it a liquid state in an on-site condenser. The ore was mined by others offsite.

- Remaining phosphorous sludge was re-heated to recover remaining phosphorous.

- Process wastes were disposed of in on-site, unlined lagoons.

- By-products included slag, which contained radium-226, arsenic, beryllium, and other heavy metals. The slag was processed and sold as aggregate from the slag processing area in the northern part of the site.

Regulatory History/Site Status

- The site was proposed for the National Priorities List in 1992 and was listed in 1994.

- Stauffer entered into a voluntary Administrative Order on Consent to conduct the Remedial Investigation/Feasibility Study (RI/FS) in 1992. They completed it in 1996.

- Stauffer conducted a removal action in 1997 to remove crude phosphorous material from above ground storage tanks in the clarifier.

- EPA signed the Record of Decision addressing source materials in July 1998. Ground water, while evaluated as part of this RI/FS, will be addressed under a separate OU.

- The EPA and Stauffer have signed the Consent Decree (CD). The CD is currently being routed through the Department of Justice.

Record of Decision (ROD)

The major components of the remedy include the following. The estimated cost is $9M.

- Limited excavation of radiologically and chemically contaminated soils which exceed residential cleanup standards, consolidation and capping materials on-site.

- Institutional controls including deed restrictions, land use ordinances, physical barriers, and water supply well restrictions. These controls will prohibit residential use.

- In-situ solidification/stabilization of contaminated materials below the water table, in the consolidation areas only. Note: Capped soils above the water table will not be solidified

Note: EPA is proceeding with the remedy selected; however, the ROD does not cast the remedy in stone. If during the design or construction of the remedy, EPA finds that it is not protective of human health and the environment, we will revisit the remedy and make the necessary changes.

Contaminants of Concern at the Site, Maximum Detected Concentrations, and Cleanup Standards

Contaminant	Max Detected Concentration	Cleanup Standard
Arsenic	127 ppm	21.1 ppm
Antimony	32.2 ppm	28.1 ppm
Beryllium	1.6 ppm	120 ppm
Elemental Phosphorous	0.854 ppm	1.4 ppm
Thallium	13.4 ppm	1.4 ppm
Radium-226	73.8 pCi/g	5 pCi/g(all depths)
Radium-226 Dose	140 uR/hr	20 uR/hr

Reasons the Current Remedy was Selected

- Estimated Volume of Contaminated Material to be shipped off is at least 300,000 cubic yards.

- Local landfills may not accept these materials due to large volumes, radiation, and phosphorous in the waste. Estimated cost to ship to Envirocare in Utah = $200,000,000, based on the RI/FS.

- Short term impacts would be more severe for off-site shipping. Adverse effects would include transporting hazardous waste through narrow streets, large volume truck traffic to haul clean fill to the site, dust creation, traffic nuisances and hazards. Truck volume would exceed 15,000 trucks per year.

- Leaving waste on site minimizes movement; in-situ remedy reduces amount of excavated waste to 120,000 cubic yards.

- On-site consolidation is compatible with soils, slag, and sediments

- Cap over consolidated materials will provide impermeable cover to ensure that rain water does not transport wastes into the ground water. On-site soil cover will provide necessary shielding from radiation. On-site cover will allow the use of vegetation to prevent erosion.

- Selected remedy provides short and long term protection of human health and the environment, prevents future residential land use, yet allows future commercial and/or recreational use of the site.

- EPA considers the cleanup standards to be protective of human health and the environment.

- The anticipated future land use is commercial/industrial. However, the cleanup standards assume future residential land use. The more stringent requirements were put in place to address community concerns. The Stauffer Management Company currently is considering the construction of a golf course and marina at the site.

Ground Water Issues

- Materials to be solidified/stabilized will be within the surficial aquifer. Quality control and long term effectiveness are primary concerns. EPA plans to address these issues during design.

- Slight vertical gradient between the Surficial and Floridan Aquifer. Direction of gradient dependent on location within the site.

- More characterization of Floridan Aquifer required. Current data shows little impact.

Community Concerns/EPA Community Relations

EPA is sensitive to the concerns of the Tarpon Springs community regarding this remedy and will address them as we proceed through the design of the remedy. EPA has worked closely with the community, holding many public hearings from 1993 to the present. In 1999 alone, EPA made a site visit to each individual home that EPA sampled to discuss results of the offsite sampling effort. This was followed with a public meeting to formally announce the results of offsite sampling to the community at large. In addition, the EPA will invite the community to assist in the review

In addition, the EPA will invite the community to assist in the review and comment on the design submissions.

Studies Conducted to Date

1. Hydrogeologic Assessment - 1987 - Seaburn and Robertson, Inc.

    a. Study the hydrogeologic characteristics of the surficial and Floridan aquifers at the site.

2. Final Expanded Site Investigation - 1989 - NUS, Inc.

    a. Evaluate surface soils, ground water, subsurface soils, ground water in surficial and Floridan aquifers, surface water in Anclote River.

3. Interim Final Listing Site Inspection - 1991 - NUS, Inc.

    a. Evaluate surface soils at school, re-sample ground water, collect sediment samples from the Anclote River.

4. Radiological Studies - 1990 - PBS&J.

    a. Conducted external gamma radiation surveys of roadways, ponds

5. Site Sampling Program - 1989 and 1990 - Weston.

    a. Soil and pond sampling.

6. Environmental Sampling Program - 1990 - Weston.

    a. Characterize soil and disposal pond materials.

7. Sediment Sampling Program - 1991 - Weston.

    a. Collected 13 sediment samples on from the Anclote River.

8. Elemental Phosphorous Borings Program - 1991 - Weston

    a. Collected samples from 47 phosphorous soil borings.

9. Treatability Study - Bench Scale Oxidation Study - 1991 - Weston

    a. Evaluate performance of various oxidizers in treating elemental phosphorous.

Studies Conducted to Date, continued

10. Chemical Oxidation of Phosphorous Study

    a. Determine feasibility of oxidizing elemental phosphorous clarifier using Nitric Acid

11. Phosphorous Recovery, Bench Scale and Treatability Testing Studies

    a. Determine if elemental phosphorous can be recovered, separated from other materials and effectively treated on-site. Excavation and treatment difficult.

12. Treatability Study - Solidification/Stabilization Study of Pond Wastes - 1991 - Weston

    a. Evaluated various stabilization mixes to see which would meet strength and economic feasibility requirements

        1. Calcium oxide and fly ash
        2. Cement kiln, dust, flyash
        3. Pozzolanic Agent and Liquid Activator

13. Soil Depth Cover Study - 1994 - Weston

    a. Recommended 24" soil cover to minimize gamma radiation dose

14. Soil/Slag Leachability Study - 1997 - Parsons Engineering

    a. Determined that contaminants leaching from soil and slag in the slag field are minimal.

15. Asbestos Sampling - On-site soil and air - July 1998 - Parsons Engineering

    a. Soils - site was divided into 147 - 200' x 200' grids; each grid was sampled. Asbestos was detected in only one soil sample.
    b. Personal air monitoring - no air concentrations exceeding NIOSH standard.
    c. Ambient air monitoring - Well within background concentrations reported by the Health Effects Institute.

16. Final Remedial Investigation Report - December 1993 - Weston

    a. Evaluated all media.

Studies Conducted to Date, continued

17. 1994 Elemental Phosphorous Soil and Ground Water Sampling Program

    a. Distinguish between elemental and total phosphorous.

18. Background soil sampling for Arsenic and Beryllium - 1999

    a. Background levels below State of Florida Cleanup Levels

19. On-going surficial ground water monitoring program

Summary - Anclote River and Meyers Cove Sediments

- 27 Samples collected
- One sample each of mercury and cadmium exceeded NOAA Effect Range-Low guideline values in Meyers Cove, but were below the NOAA Effect-Range medium Values. We are unsure if these are site-related.

Summary - Anclote River Surface Water Results

- 15 Samples were collected.
- Site related contaminants were not detected above background levels.

Summary - Surface Soil Sampling On-Site

- Approximately 53 surface soil samples were collected on-site. The table below provides a summary of the results. With the exception of slag and one arsenic sample, the sample locations exceeding the cleanup standards were in the western and southern parts of the site. All slag roads, the slag processing area, and the pond areas, exceed their respective cleanup standards.

Contaminant	Max Detected Concentration	Cleanup Standard	No. Samples Exceeding Standard
Arsenic	127 ppm	21.1	3
Antimony	32.2 ppm	28.1	1
Beryllium	1.6 ppm	120	0
Elemental Phosphorous	0.854 ppm	1.4	Pond Material Only
Thallium	13.4 ppm	1.4	4
Radium-226	73.8 pCi/g	5 (all depths)	All Slag/Roads
Radium-226 Dose	140 uR/hr	20 uR/hr	All Slag/Roads

Summary - Subsurface Soil Sampling On-Site

- 28 samples have been collected on the site. The table below provides a summary of the results. Elemental phosphorous has not been found in any locations other than the pond material.

Summary - Subsurface Soil Sampling On-Site, continued

Contaminant	Max Detected Concentration	Cleanup Standard	No. Samples Exceeding Standard
Arsenic	46.6 ppm	21.1	1
Antimony	22.6 ppm	28.1	0
Beryllium	0.28 ppm	120	0
Elemental Phosphorous	0.854 ppm	1.4	Pond Material
Thallium	4.3 ppm	1.4	2
Radium-226	73.8 pCi/g	5 (all depths)	All Slag/Roads and some ponds
Radium-226 Dose	140 uR/hr	20 uR/hr	All Slag/Roads

Summary - Pond Material Sampling

- Approximately 150 borings to depths ranging from surface to 20 feet below ground surface were conducted to delineate the extent of elemental phosphorous in the pond materials. Per the 1993 remedial investigation, there are an estimated 1900 cubic yards of elemental phosphorous in the ponds at depths up to 15 feet below ground surface. Elemental phosphorous has been found at a very low level in one surficial aquifer and has not been detected in the Floridan aquifer. Most pond materials do not contain elemental phosphorous.

- The majority of the borings were conducted in search of elemental phosphorous. The pond materials are primarily a sludge material consisting of by-products from the elemental phosphorous production and include the heavy metals and radionuclides addressed above.In some locations, the pond materials are below the ground water table. The estimated volume of soil requiring solidification/stabilization is 15,000 cubic yards, over an area of less than two acres; the material will be stabilized from an elevation of 1' above the saturated zone to the bottom of the pond material.

- Approximately 32 samples have been taken in the pond areas. The table below provides a summary of the results.

Summary - Pond Material Sampling, continued

Contaminant	Max Detected Concentration	Cleanup Standard
Arsenic	205 ppm	21.1 ppm
Antimony	52.0 ppm	28.1 ppm
Beryllium	2.0ppm	120 ppm
Elemental Phosphorous	0.854 ppm	1.4 ppm
Thallium	37.0 ppm	1.4 ppm
Radium-226	34.0 pCi/g	5 pCi/g(all depths)
Radium-226 Dose	35 uR/hr	20 uR/hr

Summary - Surficial Aquifer Sampling

- Sampling of nine on-site production wells started in 1974.
- Seven surficial monitoring wells have been added since 1988.
- Stauffer is working with the FDEP to monitor the surficial aquifer.
- The Floridan and Surficial Aquifers are separated by a semi-confining layer.
- Local ground water flows to the southwest, drains into Anclote River under all conditions.
- Surficial and Floridan aquifers separated by a clay semi-confining layer; depth to top of clay layer ranges from 7 to 36 feet. The Floridan Aquifer appears to be shallowest near MW-93-2 along Anclote Road.
- The ATSDR prepared a Health Consultation for five private well samples in the Tarpon Springs area. The samples were collected by Pinellas County in April 1999 and were evaluated for inorganics and radionuclides. The maximum contaminant levels found were below MCLs. The ATSDR concluded that carcinogenic and non-carcinogenic illnesses are unlikely in children or adults due to exposure to the chemicals evaluated.

Summary - Floridan Aquifer Sampling

- The Floridan aquifer is Tampa limestone formation.
- Radon levels ranged from 390 to 2536 pCi/l. Background was also determined to be high.
- Four wells were sampled All four wells exceeded secondary MCLs for aluminum and

iron. There were no exceedances of MCLs for site related contaminants. There were elevated levels of radon detected.

Summary - Floridan Aquifer Sampling, continued

- The Floridan aquifer flows to the southwest.

- The ATSDR is preparing a Petitioned Health Assessment for the Holiday Utilities municipal water supply in Tarpon; it is currently out for public comment. The ATSDR has concluded that, based upon 1989 sampling results, the contaminants present do not pose a health hazard. The Florida Department of Environmental Protection will continue to monitor the site.

Soil Sampling - Gulfside Elementary School

- 13 surface soil samples were collected at the school; all samples collected were below the residential soil cleanup criteria.

Air Monitoring

- Air monitoring results obtained during the remedial investigation indicated that airborne volatile organic compounds are not a problem at the site unless construction activities are in progress. In this case, the potential for ignition of elemental phosphorous may cause a problem. This will be taken into consideration during the design.

Summary - Work Done by the ATSDR

- Petitioned Health Consultation - Holiday Utilities - Tarpon Springs, Florida - Currently out for public comment.

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- Health Consultation - Five Tarpon Springs Private Wells - August 13, 1999

    A. ATSDR Tested for inorganics and radionuclides. No contaminant levels exceeded MCLs. ATSDR determined that no adverse health effects are expected.

- Public Health Assessment Addendum for the Stauffer Chemical Company Vicinity Properties - March 1999

A. The ATSDR conducted this Public Health Assessment Addendum in conjunction with the EPA's and sampling of slag materials in the Tarpon Springs area in August of 1998. The ATSDR evaluated four homes and determined that there are no expected adverse health effects due to gamma radiation in the homes. They recommend providing public health education to the local residents to better understand the effects of radiation. The ATSDR and Florida Department of Health conducted several sessions with the community.

- Health Consultation - Gulfside Elementary School - July 28, 1998

A. ATSDR evaluated potential health threat to students and staff due to chemicals and radionuclides in soils and the air at the Gulfside Elementary School. They concluded that illnesses are unlikely in adults, pica children, and non-pica children due to exposure from contaminants in soil, aggregate, and air at the school.

- Public Health Assessment - Stauffer Chemical Company Superfund Site, Tarpon Springs - March 1993

A. The ATSDR conducted a health assessment to determine if the site posed a public health hazard. They determined that the site is a public health hazard and recommended characterization of the site and surrounding residential area