

4

Stauffer Chemical Company

Tarpon Springs, Florida

CERCLIS #FL010596013

Site Exposure Potential

The 65-hectare Stauffer Chemical site is on the north bank of the Anclote River near Tarpon Springs in Pinellas County, Florida (Figure 1). The facility is about 1 km from the mouth of the Anclote River, a tidal estuary that flows into the Gulf of Mexico. The Anclote Key State Preserve is located in the Anclote Keys, about 7 km west of the site.

From 1950 to 1981, the facility manufactured elemental phosphorus from phosphate ore, disposing over 450,000 metric tons of processing wastes on the site. Waste scrubber material was deposited in unlined lagoons, and 900 drums containing approximately 31 metric tons of

roaster fines were buried 1 to 2 m below the surface in several areas near the river (Figure 2). Slag discharged to a concrete-lined pit was also used to fill a portion of Myers Cove for construction of an access road. In 1986, activities at the site were decreased to decommission the plant. At that time, precipitated material containing calcium fluoride was dredged from two of the waste lagoons and deposited in piles 12 m from the Anclote River (NUS 1988).

Groundwater discharge and surface water runoff are the potential pathways of contaminant transport from the site to NOAA trust resources and associated habitats. There is groundwater in two

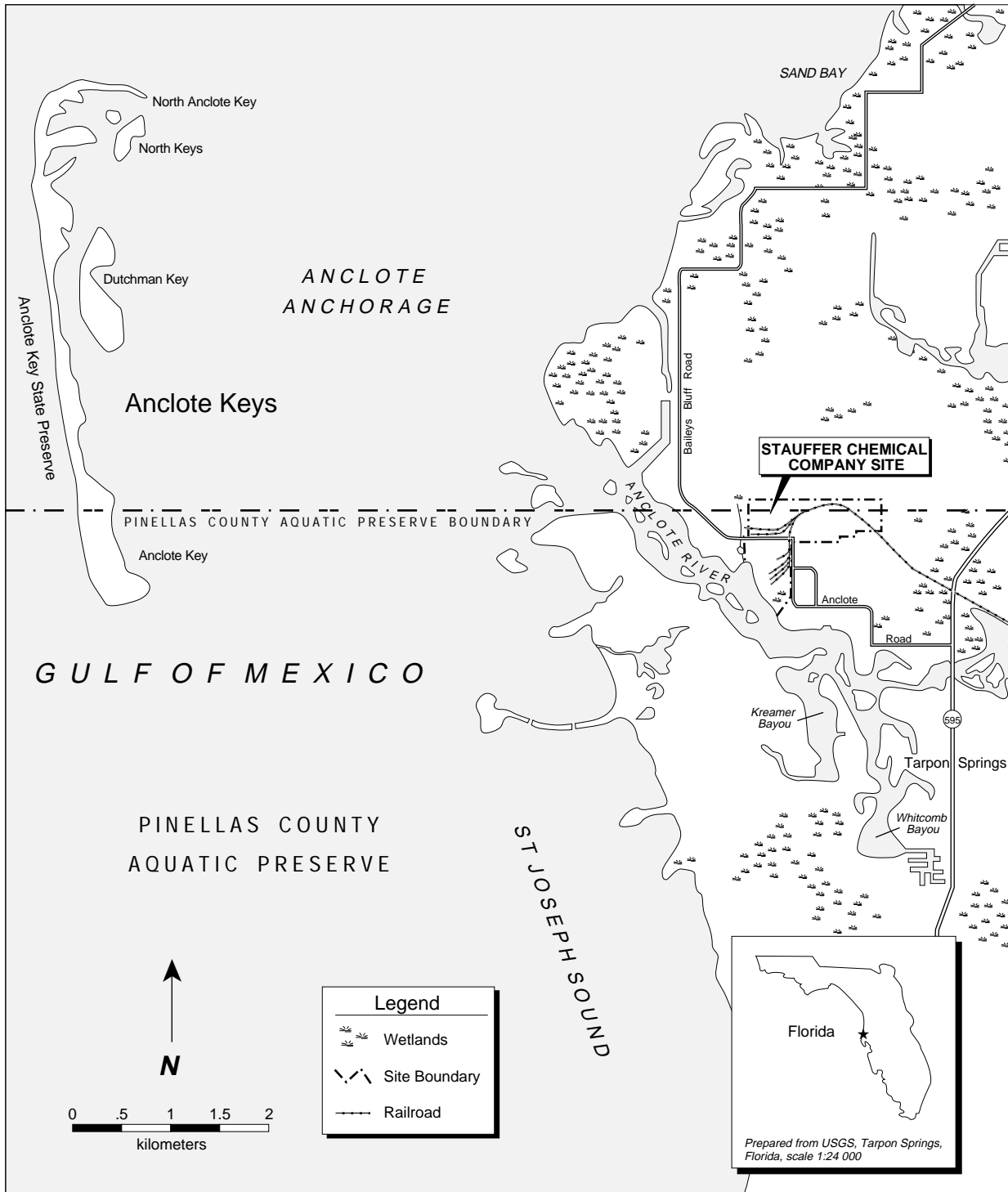


Figure 1. The Stauffer Chemical Company site, Tarpon Springs, Florida.

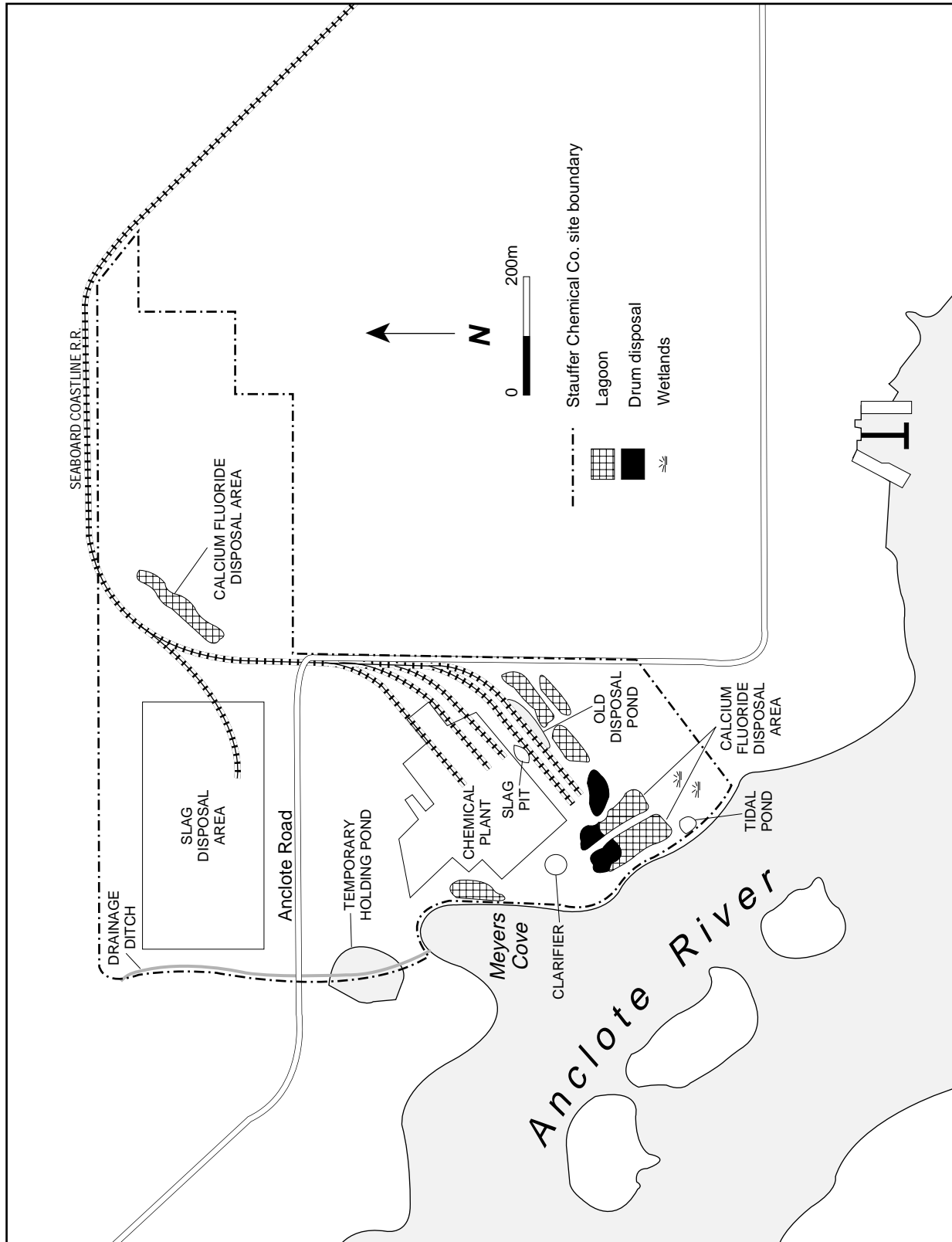


Figure 2. Detail of Stauffer Chemical Company site (NUS 1988; EPA 1991).

aquifers separated by a semi-confining layer that allows an interchange of water between the two zones. The primarily sand surficial aquifer is about 2.5 m below land surface; the primarily limestone Floridan aquifer is about 5 to 11 m below land surface. Even though there is a semi-confining layer, there is no significant vertical gradient between the surficial and Floridan water-bearing zones. The geological formations dip southwesterly from the site, and groundwater flows generally southwest towards the Anclote River. Groundwater quality and water levels near the site may be significantly affected by tidal influences due to the site's proximity to the estuary.

Surface water features on the site include a drainage ditch leading to Myers Cove, a tidal pond with a culvert leading to the river, and a series of lagoons. The drainage ditch runs through a temporary sludge holding pond, and the tidal pond is surrounded with dredge material. Although there is no direct outlet from the lagoons, they are unlined and may be discharging to the groundwater (NUS 1988). Surface water drains from the site directly to the Anclote River.

NOAA Trust Habitats and Species

Habitats of concern to NOAA are surface water and associated bottom substrate of the Anclote River and Anchorage and the Gulf of Mexico.

The lower Anclote River is tidally influenced as far as 23 km upstream. A 4.5-m deep ship channel has been dredged from the river mouth to the city of Tarpon Springs. In the lower reaches of the Anclote River, the river meanders through swampy, tidally affected lowlands bordered by several large developments. The river broadens to an average width of 460 m from Tarpon Springs to the Gulf of Mexico, with a mean depth, except for a dredged channel, of about 1 m. Salinity in the mouth of the Anclote River ranges from 0.8 ppt to 32.7 ppt. Salinities in Anclote Anchorage vary seasonally with rainfall and runoff, and diurnally with the tides, generally falling within 14 to 31 ppt. Water quality is generally good in the lower Anclote River above Tarpon Springs (Wolfe 1990).

Aquatic habitats near the site are likely to support diverse and abundant populations of NOAA trust resources; however, there have been no recent ecological studies to identify the Anclote River's aquatic resources. NOAA resources are likely both to migrate and reside near the site for extended periods during sensitive life stages. According to biologists at the South Florida Management District and the Florida Department of Environmental Regulation, limited state funding hindered proposed investigations of the Anclote River. Investigations in the area have been postponed indefinitely (Flannery personal communication 1992; McMichael personal communication 1992; Wolfe personal communication 1992). The most recent sampling studies, done in 1971, identified a variety of trophic levels in the Anclote River and included as many as 112 species of fish. Finfish species found in

greatest numbers included anchovy, drum, flounder, grunt, herring, jack, pompano, killifish, mojarra, mullet, porgy, sea catfish, stingray, and tarpon (NUS 1988).

Anclote Anchorage, a shallow area of seagrass beds, is about 4 km west of the site (Figure 1). This anchorage is thought to provide suitable breeding habitat for marine species. Some of the numerous clam and scallop shellfish beds in the estuary are harvested by local residents. The Anclote Key State Preserve is on the Anclote Keys, islands that are west of the Anclote Anchorage. The offshore area south of the Anclote Anchorage is designated as the Pinellas County Aquatic Preserve, a state aquatic preserve (NUS 1988). No information was available to determine the extent of commercial or recreational harvests from these areas.

Surface water surrounding Hillsborough and Pinellas counties provides habitat for several threatened and endangered species. There are several federally protected species of turtles in this area, including the threatened green (*Chelonia mydas*), loggerhead (*Caretta caretta*), the endangered hawksbill (*Eretmochelys imbricata*), Kemp's ridley (*Lepidochelys kempi*), and the leatherback turtles (*Dermochelys coriacea*) (Beccasio et al. 1982). The extent to which these species use surface water near the site is unknown. The Florida Power & Light Corporation's Anclote Plant is at the mouth of the river. The cooling canal for the plant, about 1.5 km upstream of the site, is a wintering area for the federally endangered West Indian manatee (*Trichechus manatus*) (NUS 1988).

Site-Related Contamination

Data collected during preliminary site investigations indicate that soil, groundwater, surface water, and sediments are contaminated at the Stauffer site (NUS Corporation 1988, 1989). The primary contaminants of concern to NOAA are trace elements, fluoride, and PAHs. Maximum concentrations of the trace elements detected in media from on-site locations are summarized in Table 1, along with applicable screening guidelines.

The highest trace element concentrations in soils were detected near the lagoons, the temporary holding pond, the clarifier, and the southern calcium fluoride piles. PAHs were found in one of five surface samples collected near the lagoons (646 µg/kg) and in one background subsurface sample from the northeast corner of the site (252 µg/kg). Screening criteria were not available for PAHs in soils.

Groundwater samples were collected throughout the site at three depths below the water table: from temporary wells immediately below the water table, from the surficial aquifer, and from the Floridan aquifer. High concentrations of trace elements were detected at all depths. Nickel, chromium, and copper were detected at high concentrations in groundwater samples from a site downgradient across the Anclote River. Because the detection limit for silver was not available, no conclusions could be drawn about silver concentrations in the groundwater. Trace

Table 1. Maximum concentrations of trace elements at the Stauffer site with applicable screening criteria.

Trace Elements	Water (µg/l)			Soil (mg/kg)		Sediment (mg/kg)	
	Groundwater	Surface Water	AWQC ¹	Soils	Average U.S. ²	Sediment	ER-L ³
Arsenic	210	500	36	340	5	8.5	33
Cadmium	100	ND	9.3	66	0.06	ND	5
Chromium	130	80	50	130	100	30	80
Copper	320	ND	2.9*	ND	30	ND	70
Fluoride	71,000	17,000	NA	410,000	NA	18,000	NA
Lead	110	150	8.5	440	10	21	35
Mercury	0.4	ND	.025	1.1	0.03	ND	0.15
Nickel	240	89	8.3	45	40	14	30
Silver	ND	ND	0.92	9.8	0.05	2.4	1
Zinc	330	470	86	1200	50	62	120

1: Ambient water quality criteria for the protection of aquatic organisms. Marine chronic criteria presented (EPA 1986).
2: Lindsay (1979).
3: Effects range-low ; the concentration representing the lowest 10 percentile value for the data in which effects were observed or predicted in studies compiled by Long and Morgan (1990).
ND: Not detected; detection limit not available.
NA: Screening guidelines not available.
*: Chronic criterion not available; acute criterion presented.

element concentrations were below detection limits (not specified) at off-site monitoring wells situated upgradient from the site. ²²²Radon was detected in groundwater samples at a maximum concentration of 3,112 pCi/l. Concentrations of ²²²radon were detected at similar concentrations in monitoring wells situated upgradient from the site. Concentrations of ²²²radon in groundwater from Sarasota County, Florida have been traced to a phosphate-bearing geological formation (NUS 1988).

Surface water samples were collected in the Anclote River at seven sites: three locations near the site, one location 1 km to the southeast, one location 0.5 km to the northwest, one location in

the Anclote Anchorage, and one background location approximately 3 km southeast of the Stauffer site. In surface water, nickel and lead were detected at concentrations exceeding the marine AWQC at a sampling location near the tidal pond/dredge area. Surface water samples from the Anclote Anchorage were the only other samples to contain detectable concentrations of the contaminants listed in Table 2; arsenic (500 µg/l) was detected at concentrations exceeding the screening criteria. Detection limits were not specified in the study so no conclusions could be drawn about concentrations of cadmium, copper, mercury, and silver in surface water samples.

Sediment samples were also collected from the above seven Anclote River sites and from three more locations in the drainage ditch. Concentrations of trace elements in all sediments were below ER-L screening guidelines, except for a sample collected from Myers Cove that contained 2.4 mg/kg silver, double the screening guideline for silver in sediments of 1 mg/kg. Concentrations of cadmium, copper, and mercury were below detection limits in all sediment samples.

Maximum concentrations of fluoride in groundwater, soil, and surface water were detected in samples collected near the southern calcium fluoride piles. Maximum fluoride concentrations in sediment were found in a sample collected from a background area east of the site in the Anclote River. A high fluoride concentration (9,100 mg/kg) was also detected in sediment collected near the southern calcium fluoride piles. Since screening guidelines were not available for fluoride no conclusions could be drawn about these concentrations.

Elevated concentrations of gross alpha and gross beta radiation were detected in groundwater (23 pCi/l), surface water (280 pCi/l), and sediments (21 pCi/g). According to the Florida Department of Health and Rehabilitative Services Office of Radiation Control, elevated concentrations of gross alpha and gross beta radiation in tidal areas primarily result from analytical interference of ⁴⁰potassium in seawater (NUS 1988).

Summary

Trace elements, fluoride, and PAHs have been detected in the Stauffer site's soil, sediment, surface water, and groundwater. There were particularly high concentrations of trace elements found in groundwater beneath the site. NOAA is concerned that site contaminants could harm the endangered manatee, several threatened species of turtles, plus finfish and shellfish in county and state aquatic preserves, the Anclote River, Anclote Anchorage, and the Gulf of Mexico.

References

- Beccasio, A.D., N. Fotheringham, A.E. Redfield, R.L. Frew, W.M. Levitan, J.E. Smith, and J.O. Woodrow, Jr. 1982. *Gulf coast ecological inventory: User's guide and information base*. Washington, D.C.: Biological Services Program, U.S. Fish and Wildlife Service. 191 pp.
- Flannery, S., Marine Biologist, South Florida Water Management District, Brooksville, Florida, personal communication, September 24, 1992.
- Lindsay, W.L. 1979. *Chemical Equilibria in Soils*. New York: John Wiley & Sons. 449 pp.

Long, E.R., and L.G. Morgan. 1990. *The potential for biological effects of sediment-sorbed contaminants tested in the National Status and Trends Program*. NOAA Technical Memorandum NOS OMA-52. Seattle: Coastal and Estuarine Assessment Branch, NOAA. 175 pp. + Appendices.

McMichael, R., Fishery Biologist, Florida Department of Natural Resources, Institute of Marine Research, St. Petersburg, Florida, personal communications, April 11, 1989 and February 26, 1992.

NUS Corporation. 1988. Final Expanded Site Investigation Report. Stauffer Chemical Company, Tarpon Springs, Pinellas County, Florida. Atlanta: Waste Management Division, U.S. Environmental Protection Agency.

NUS Corporation. 1989. Final Expanded Site Investigation Report. Stauffer Chemical Company, Tarpon Springs, Pinellas County, Florida. Revision 1. Atlanta: Waste Management Division, U.S. Environmental Protection Agency.

U.S. EPA. 1986. *Quality criteria for water*. EPA 440/5-87-003. Washington, D.C.: Office of Water Regulation and Standards, Criteria and Standards Division, U.S. Environmental Protection Agency.

U.S. EPA. 1991. HRS Documentation Record, Stauffer Chemical Company Region IV. Washington, D.C: U.S. Environmental Protection Agency.

Wolfe, S.H., Florida Department of Environmental Regulation, Tallahassee, Florida, personal communication, September 24, 1992.

Wolfe, S.H., and R.D. Drew, eds. 1990. *An ecological characterization of the Tampa Bay watershed*. U.S. Fish and Wildl. Ser. Biol. Rep. 90(20). 334 pp.