

NOAA Hazardous Waste Site Report

Chisman Creek (III-27)  
York County, Virginia  
April 13, 1984

Location and Nature of Site:

The Chisman Creek site covers 27 acres in a suburban area of York County, Virginia between Rt. 17 and the Poquoson River (Figure 1).

During the period from 1957-1974, the Virginia Electric Power Company (VEPCO) entered into an agreement with a private operator to haul away fly-ash collected at the company's Yorktown Power Generating Station. The operator disposed large quantities of the ash in abandoned borrow pits located in the Chisman Creek Basin, roughly two miles to the south of the energy facility. The last deposits of fly-ash here were made in the mid-1970's. Since then, the ash in one of the landfills has been removed and backfilled with "clean" material. No other cleanup of the pits has occurred since that time. At present, three pits in the Chisman Creek watershed are known to contain fly-ash. The fate of much of the ash that was produced can never be accounted for because it was common practice in the past to use fly-ash as a supplemental building material.

In 1980, a domestic well in the vicinity of the pits was reported to be producing green-colored water. In the fall of 1980, the State Board of Health, in conjunction with the State Water Control Board, sampled 33 household wells in the vicinity of the pits to look for trace elements in groundwater which might be present as a result of leaching of the nearby fly-ash. The results showed extremely high levels of vanadium in two of the samples taken from wells immediately adjacent to one of the pits. It was concluded that the source of the contaminated groundwater was the ash disposal pit, and that in some cases vanadium and selenium existed at elevated levels. Since then, many of the homes in this neighborhood have been connected to the municipal water supply.

The Chisman Creek site was added to the National Priorities List (NPL) in 1981. VEPCO filed a civil action in December 1983 challenging the NPL listing because the company maintains that fly-ash is not a hazardous substance according to RCRA regulations.

Proximity of Chemical Hazard to Marine Resources:

The Chisman Creek watershed is a 4,200-acre coastal basin located on the Virginia Peninsula bounded by the York and James Rivers on the east and west, respectively, and the Chesapeake Bay on the south. The tidal creek encompasses about 550 acres, and is 3.75 miles long, running

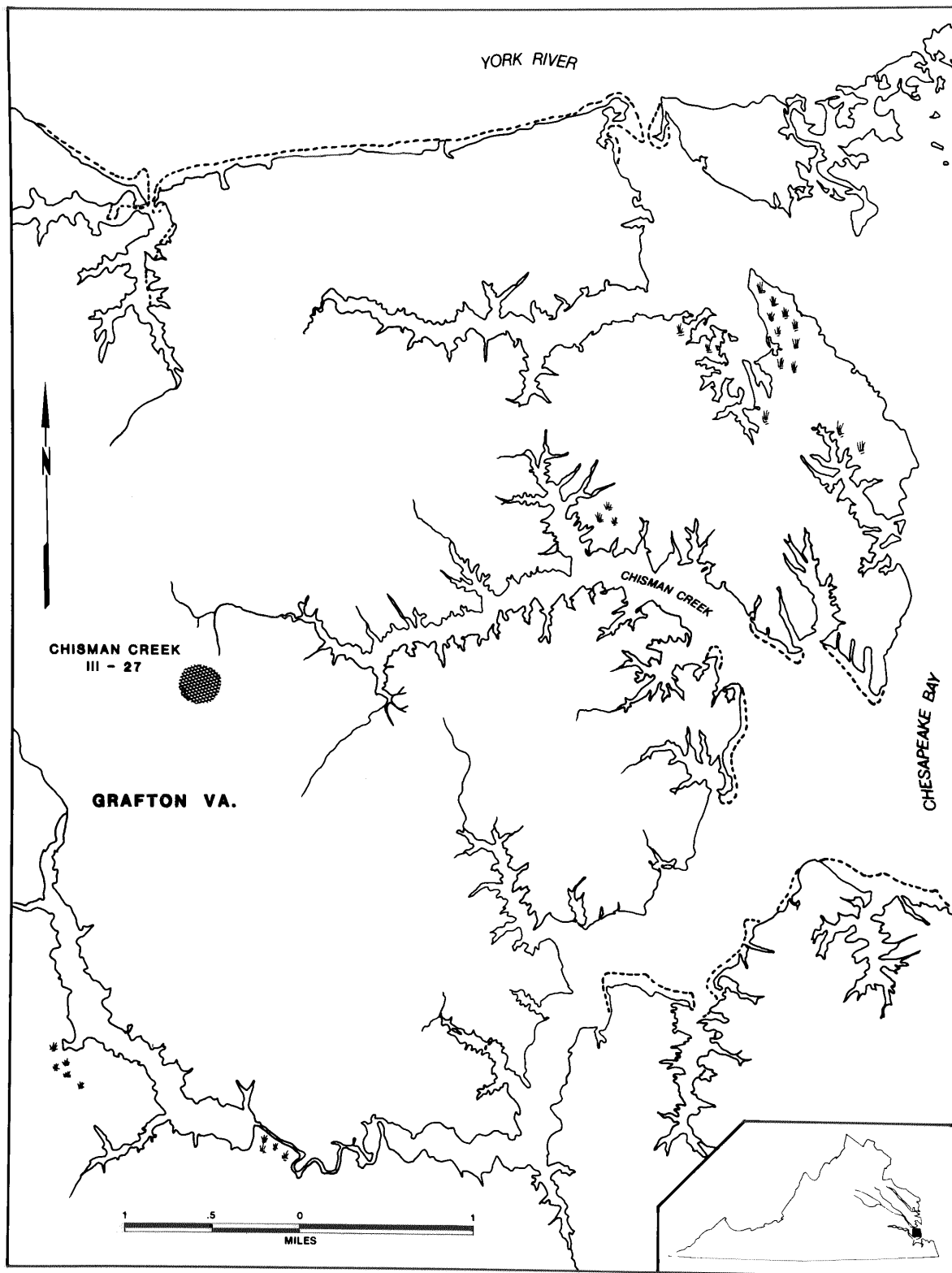


FIGURE 1. Site location.

in an east-west direction from the mouth to the head of the tide. It is approximately 0.5 miles wide at the mouth where the average depth in the channel is 12 feet. Freshwater draining the watershed enters the estuary at the head of the creek and along several branches on both the southern and northern shorelines.

Table 1. Maximum Trace Element Concentrations (micrograms/l) Encountered in Surface and Groundwaters of the Chisman Creek Watershed (2)

	Within the Ash	Deep Wells (Below Ash)	Adjacent Wells	Control	Downstream of Pit C	Marine Hazard Criteria
Cd <sup>1</sup>	130	1.0	3.9	0.08	0.03	10.0
Ni	15000	310	1.7	2.0	25.0	100
V	82500	24	4.0	2.2	22.0	none
Mn <sup>2</sup>	6700*	1580*	157*	150**	350**	100
Fe <sup>2</sup>	51000*	4700*	96	1740**	850**	300
As <sup>1</sup>	123	6.0	3.0	5.0	1.9	50.0
Al	58000	2.1	280	284	230	1500
Cr <sup>1</sup>	7.4	2.1	0.4	0.55	0.36	50.0
Cu <sup>2</sup>	350	10.0	2.0	10.0	4.0	50.0
Se <sup>1</sup>	145*	7.0	1.7	5.0	4.0	10.0
Zn <sup>2</sup>	1640	19.0	36.0	27.0	8.0	none
Ag <sup>1</sup>	0.17	0.13	0.03	0.03	0.03	none
Pb <sup>1</sup>	1.1	4.3	0.3	17.0	4.0	50.0
Mo	690	130	11.0	10.0	9.0	none
Hg <sup>1</sup>	1.0	1.0	1.0	1.0	1.0	0.1
Ba <sup>1</sup>	900	400	800	400	80	1000

- (1) Primary drinking water contaminant (hazardous to health)  
(2) Secondary contaminant (cause odor, color, corrosion problems)  
(\*) Exceeds drinking water standard (Virginia Dept. of Health, 1982)  
(\*\*) Exceeds marine hazard criteria (NAS, 1973)

The fly-ash disposal pits are located in a 520-acre sub-watershed of the basin which drains into a branch at the head of Chisman Creek on the western end. Drainage of the disposal area occurs through a series of well-defined natural stream channels. The streams are branched so that the pits are isolated from the remainder of the basin and lie within a 100-acre sub-watershed. The natural drainage has been amended to include a series of man-made ponds which were created as a result of excavation of the disposal sites. The ponds and streams were observed to flow continuously. There are 0.7 miles of open stream between the furthest pit (Pit A) and the receiving tidal creek. Pit C, immediately adjacent to the main stream channel, is 600 feet upstream of the tidal creek.

A study by the Virginia Institute of Marine Science (2) was completed in June 1983 on the extent of contamination from the Chisman Creek site (Table 1). from that study indicates results of sampling conducted between February and November 1982. It appears likely that high concentrations of contaminants could reach Chisman Creek; however, concentrations at the mouth of the creek (in close proximity to highly valuable marine resources) are not expected to be significant.

#### Marine Resources at Risk:

Chisman Creek, near the entrance to Chesapeake Bay, supports an extensive bed of commercially and recreationally important Eastern oysters and hard clams, and is a spawning and nursery area for these species and the blue crab.

Anadromous fish migrate through the Chesapeake Bay estuarine system during the early spring on their way to freshwater spawning grounds (Table 2). This occurs in the upper reaches of the major tributaries of Chesapeake Bay and in some of the smaller freshwater tributaries. The adults return to the lower parts of Chesapeake Bay. Juvenile fish, hatched in the spring, remain in the upper parts of Chesapeake Bay until late summer or early fall when they also migrate into the lower parts of the Bay (3).

This site is located in a bald eagle nesting area. Three miles to the northeast at Goodwins Island is an osprey nesting site. Nine miles to the south at the mouth of the Back River is a least tern nesting area. In addition, numerous migratory waterfowl winter in this region.

The Plum Tree Island National Wildlife Refuge is located seven miles downstream from this site.

Table 2. Fishery Resources at the Mouth of Chisman Creek (1,2,4).

Finfish Species	Adult Habitat	Spawning Area	Nursery Area	Comm. Fish.	Rec. Fish.	Migr. Route
<u>Anadromous</u>						
<u>Alewife</u>						
Blueback herring						x
American shad						x
Atlantic sturgeon						x
Striped bass	x			x	x	x
<u>Non-anadromous</u>						
Atlantic menhaden	x			x		
White perch	x		x		x	x
Sheepshead					x	
Weakfish	x	x	x	x	x	x
Spot	x		x	x	x	
Bluefish	x			x	x	
Red drum					x	
Black drum		x	x			
White perch	x			x	x	
Silver perch		x	x		x	
Flounder	x		x	x	x	
<u>Shellfish</u>						
Blue crab	x	x	x	x	x	
Eastern oyster	x	x	x	x	x	
Hard clam	x	x	x	x	x	

Summary of Site-Related Actions:

No enforcement action has been taken yet, pending the outcome of the civil action filed by VEPCO.

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References:

1. National Marine Fisheries, 1974. Anglers Guide to the United State Atlantic Coast.

2. U.S. Fish and Wildlife Service, 1980. Atlantic Coast Ecological Inventory.
3. Breder, C.M. and D.E. Rosen, 1966. Modes of Reproduction in Fishes. TFH Publications.
4. Virginia Institute of Marine Science. Environmental Sensitivity Index - Virginia.
5. Neilson, B., G. Grant, G. Andeson, C. Bosco, 1983. The Nature and Extent of Trace Element Contamination Associated with Fly-Ash Disposal Sites in the Chisman Creek Watershed. Virginia Institute of Marine Science, College of William And Mary. June 1983.