

# PIC 9803362S

## METADATA ON DJVU REPORT

### FILE INFORMATION

*Site Name:* Acid Transporter Analysis Intra Head Neural Surface Warfare Center  
*Location:* Charles County  
*State:* MD  
*W.A.S.:* 0610362S

### SCANNING INFORMATION

*Scanned by:* Dennis L. Liu  
*Date of scan:* 10/19/2007  
*Scanning resolution (independent):* 600 dpi (x-dim)  
*Scanning type:* 24-bit color  
*Scanning hardware:* Epson Expression 1640XL  
*Scanning software:* Perfect PaperManager  
*Operating system used:* Windows XP Professional SP2  
*Image file type/compression format:* DJVU version 3.1

United States  
Environmental Protection  
Agency

Environmental  
Sciences Division  
P.O. Box 93478  
Las Vegas, NV 89193-3478

TS-PIC-9803362S  
February 1998

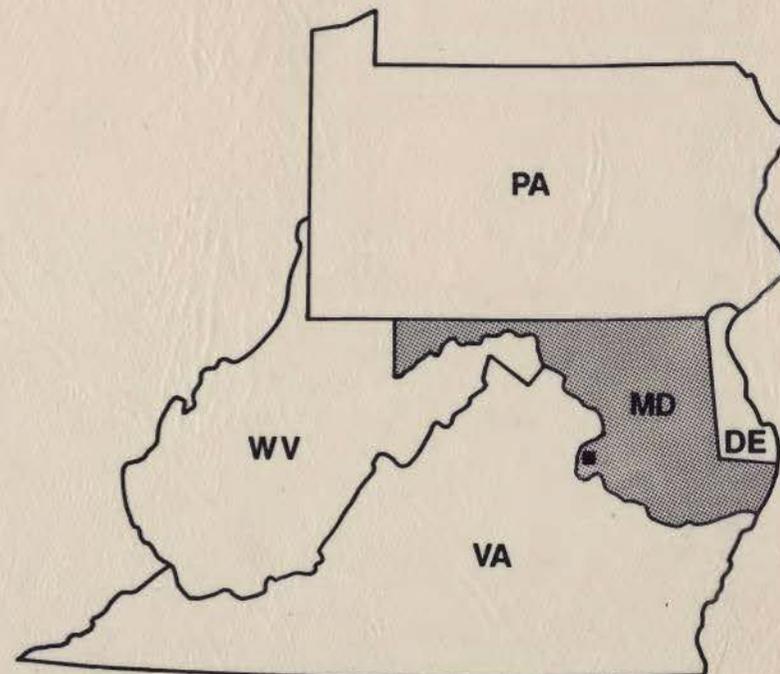
Research and Development



# AERIAL PHOTOGRAPHIC ANALYSIS INDIAN HEAD NAVAL SURFACE WARFARE CENTER

## Charles County, Maryland

EPA Region 3



RA 0003140

AMD FILE COPY

ACCESSION NUMBER 0-98-2583

**DO NOT REMOVE**

TS-PIC-9803362S  
February 1998

AERIAL PHOTOGRAPHIC ANALYSIS  
INDIAN HEAD NAVAL SURFACE WARFARE CENTER

Charles County, Maryland

by

D. W. Williams  
Environmental Services Division  
Lockheed Environmental Systems & Technologies Co.  
Las Vegas, Nevada 89119

Contract No. 68-C5-0065

Work Assignment Manager

E. T. Slonecker  
Landscape Ecology Branch  
Environmental Sciences Division  
Las Vegas, Nevada 89193-3478

ENVIRONMENTAL SCIENCES DIVISION  
NATIONAL EXPOSURE RESEARCH LABORATORY  
OFFICE OF RESEARCH AND DEVELOPMENT  
U.S. ENVIRONMENTAL PROTECTION AGENCY  
LAS VEGAS, NEVADA 89193-3478

NOTICE

This document has undergone a technical and quality control and assurance review and approval by personnel of the U.S. Environmental Protection Agency, Office of Research and Development, Environmental Sciences Division at Las Vegas, Nevada, and is for internal Agency use and distribution only.

## ABSTRACT

This report presents the results of an aerial photographic analysis conducted with historical aerial photographs of the Indian Head Naval Surface Warfare Center located in Charles County, Maryland. Seven dates of black-and-white and color photographs (1956, 1961, 1963, 1967, 1972, 1982, and 1987) were used to analyze the site. Environmentally significant hazardous waste-related features and conditions were identified. The purpose of this report is to provide remote sensing support to field investigations in U.S. Environmental Protection Agency (EPA) Region 3 under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

The site consists of two separate areas (Main Peninsula and Stump Neck Annex) with a total acreage of approximately 3,500 acres. Environmentally significant features that were identified at the site included: excavations used for waste disposal, solid and liquid waste disposal dumping areas, solid waste deposits, staining, waste burning, and ordnance disposal.

The U.S. Environmental Protection Agency, Environmental Sciences Division, Landscape Ecology Branch in Las Vegas, Nevada, prepared this report for the EPA Hazardous Waste Management Division in Region 3, located in Philadelphia, Pennsylvania, and the EPA Office of Emergency and Remedial Response in Washington, D.C.

## CONTENTS

	<u>Page</u>
Abstract . . . . .	iii
Introduction . . . . .	1
Methodology . . . . .	7
Photo Analysis . . . . .	11
Glossary . . . . .	69
References . . . . .	71

## FIGURES

<u>Number</u>		
1	Study area location map, Maryland . . . . .	4
2	Local study area location map, Indian Head, Maryland . . . . .	5
3,4	Indian Head NSWC, Main Peninsula, May 29, 1956 . . . . .	13,14
5-7	Indian Head NSWC, Main Peninsula, August 29, 1961 . . . . .	17,19,21
8-10	Indian Head NSWC, Main Peninsula, March 15, 1963 . . . . .	23,25,27
11-13	Indian Head NSWC, Main Peninsula, September 15, 1967 . . . . .	29,31,33
14-16	Indian Head NSWC, Main Peninsula, April 18, 1972 . . . . .	35,37,39
17-19	Indian Head NSWC, Main Peninsula, March 29, 1982 . . . . .	41,43,45
20-22	Indian Head NSWC, Main Peninsula, April 10, 1987 . . . . .	47,49,51
23	Local study area location map, Indian Head, Maryland . . . . .	53
24	Indian Head NSWC, Stump Neck Annex, May 29, 1956 . . . . .	55
25	Indian Head NSWC, Stump Neck Annex, August 29, 1961 . . . . .	57
26	Indian Head NSWC, Stump Neck Annex, March 15, 1963 . . . . .	59
27	Indian Head NSWC, Stump Neck Annex, September 15, 1967 . . . . .	61
28	Indian Head NSWC, Stump Neck Annex, April 18, 1972 . . . . .	63
29	Indian Head NSWC, Stump Neck Annex, March 29, 1982 . . . . .	65
30	Indian Head NSWC, Stump Neck Annex, April 10, 1987 . . . . .	67

## INTRODUCTION

This report presents the results of an aerial photographic analysis conducted with historical photographs of the Indian Head Naval Surface Warfare Center (NSWC). The site is approximately 3,500 acres in extent and is located adjacent to the Potomac River in Charles County, Maryland (Figures 1, 2, and 23). The site consists of two separate areas (Main Peninsula and Stump Neck Annex) that are characterized as rolling hills with forestland. Some wetlands are present on the eastern and southeastern shorelines. Within the larger area, Main Peninsula (also known as Cornwallis Neck), surface drainage flows north into the Potomac River and south into Mattawoman Creek. The area is approximately 2,500 acres in extent. Drainage for the Stump Neck Annex (1,000 acres in size) flows south and west into Chicamuxen Creek. The purpose of this report is to provide remote sensing support for field investigations in Region 3 under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

Seven dates of black-and-white and color historical photographs (1956, 1961, 1963, 1967, 1972, 1982, and 1987) were used to analyze the site. Of the seven dates of photographs, only the 1956 and 1972 photographs have photoscales of 1:20,000. All other dates have scales ranging from 1:31,000 to 1:60,000. Therefore, the analysis is less definitive or detailed than if it had been performed with larger-scaled photographs.

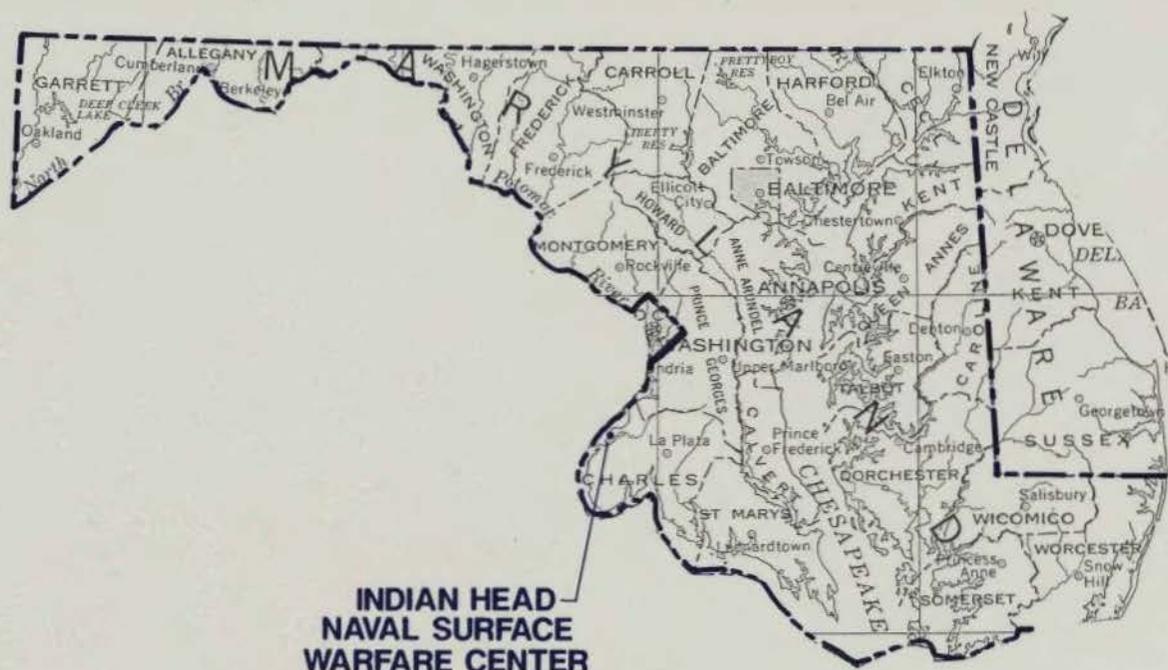
The Main Peninsula was divided into five subareas for purposes of discussion. Few environmentally significant features were observed in Subarea 1 during the study period (1956-1987). Subareas 2 and 3 consisted primarily of storage bunkers and a number of apparent processing facilities. Staining, gray-toned material, and possible solid waste were noted in Subarea 2. The most notable features observed in Subarea 3 during the study period were two large excavations that were used as waste disposal areas. A small lot within Subarea 4 contained stains, a small pit, solid waste, revegetated solid waste, gray-toned material, and truck trailers. The lot appeared to be used for waste disposal throughout the study period. Waste burning was evident during the

study period on a spit at the southern end of the Main Peninsula (Subarea 5). Also, solid waste deposits and derelict tanks were observed at the end of an access road to the east of the waste burning areas.

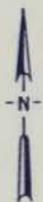
The most significant features seen at the Stump Neck Annex were located at two waste disposal areas in the southern portion of the annex. Beginning in 1961 small craters indicative of ordnance detonation were observed at these two areas. Fill material was used to cover the areas and new craters were observed each year. Smoke, burning waste and staining were also observed.

A glossary, defining features or conditions identified in this report, follows the analysis section. Sources for all maps, aerial photographs, and collateral data used in the production of this report are listed in the References section. A list of all aerial photographs that were identified and evaluated for potential application to this study can be obtained by contacting the EPA Work Assignment Manager.

The U.S. Environmental Protection Agency (EPA), Environmental Sciences Division, Landscape Ecology Branch in Las Vegas, Nevada, prepared this report for the EPA Region 3 Hazardous Waste Management Division in Philadelphia, Pennsylvania, and the EPA Office of Emergency and Remedial Response in Washington, D.C.



**INDIAN HEAD  
NAVAL SURFACE  
WARFARE CENTER**



UNITED STATES  
(1972)

Figure 1. Study area location map, Maryland (USGS 1972). Approximate scale 1:2,500,000.



Figure 2. Local study area location map, Main Peninsula, Indian Head, Maryland (USGS 1978). Scale 1:24,000.

## METHODOLOGY

This report was prepared using a standard methodology that includes the following steps:

- data identification and acquisition,
- photographic analysis and interpretation, and
- graphics and text preparation.

These steps are described below. Subsections also address details related to specific kinds of analyses that may be required to identify environmental features such as surface drainage and wetlands.

Data identification and acquisition included a search of government and commercial sources of historical aerial photographs to identify and obtain photographs with optimal spatial and temporal resolution and image quality for the study area. In addition, U.S. Geological Survey (USGS) topographic maps were obtained to show the study area location and to provide geographic and topographic context.

To conduct this analysis, the analyst obtained diapositives (transparencies) of historical aerial photographs showing the study area. Diapositives are most often used for analysis instead of prints because the diapositives have superior photographic resolution. They show minute details of significant environmental features that may not be discernible on a paper print.

A photographic analyst uses a stereoscope to view adjacent, overlapping pairs of diapositives on a backlit light table. In most cases, the stereoscope is capable of various magnifications up to 60 power. Stereoscopic viewing involves using the principle of parallax (observing a feature from slightly different positions) to observe a three-dimensional representation of the area of interest. The stereoscope enhances the photo interpretation process by allowing the analyst to observe vertical as well as horizontal spatial relationships of natural and cultural features.

The process of photographic analysis involves the visual examination and comparison of many components of the photographic image. These components include shadow, tone, color, texture, shape, size, pattern, and landscape context of individual elements of a photograph. The photo analyst identifies objects, features, and "signatures" associated with specific environmental conditions or events. The term "signature" refers to a combination of components or characteristics that indicate a specific object, condition, or pattern of environmental significance. The academic and professional training, photo interpretation experience gained through repetitive observations of similar features or activities, and deductive logic of the analyst as well as background information from collateral sources (e.g., site maps, geologic reports, soil surveys) are critical factors employed in the photographic analysis.

The analyst records the results of the analysis by using a standard set of annotations and terminology to identify objects and features observed in the diapositives. Significant findings are annotated on overlays attached to the photographs in the report and discussed in the accompanying text. Annotations that are self-explanatory may not be discussed in the text. The annotations are defined in the legend that accompanies each photograph and in the text when first used.

Objects and features are identified in the graphics and text according to the analyst's degree of confidence in the evidence. A distinction is made between certain, probable, and possible identifications. When the analyst believes the identification is unmistakable (certain), no qualifier is used. Probable is used when a limited number of discernible characteristics allow the analyst to be reasonably sure of a particular identification. Possible is used when only a few characteristics are discernible, and the analyst can only infer an identification.

Photographic enlargements are used in this report. Although the enlargements allow effective display of the interpretive annotations, they also result in loss of photographic resolution. Therefore, some of the objects and features identified in the original image and described in the text may not be clearly discernible on the prints in this report.

Study area boundaries shown in this report were determined from aerial photographs or collateral data and do not denote legal property lines or ownership.

### Surface Drainage

The surface drainage analysis produced for this report identifies the direction and potential path that a liquid spill or surface runoff would follow based on the topography of the terrain and the presence of discernible obstacles to surface flow. The analyst determines the direction of surface drainage by stereoscopic analysis of the aerial photographs and by examining USGS topographic maps. Site-specific surface drainage patterns are annotated on the map or photo overlay. Where the direction of subtle drainage cannot be determined, an indeterminate drainage line symbol is used. Regional surface flow is ascertained from the USGS topographic maps.

## PHOTO ANALYSIS

The Indian Head NSWC site consists of two separate areas, Main Peninsula and Stump Neck Annex. The Main Peninsula (also known as the Cornwallis Neck) is approximately 2,500 acres in extent and the surface drainage is north into the Potomac River and to the south and west into Mattawoman Creek. The Stump Neck Annex is approximately 1,000 acres in extent and drainage is in a southerly direction into Chickamuxen Creek. Because of its size and complexity, the Main Peninsula has been divided in this report into five subareas. Discussion of environmentally significant features and conditions and their changes over time is thus simplified. No divisions were made of the Stump Neck Annex.

For each date of photographs, environmentally significant conditions and changes of each important feature are discussed. If an important feature or condition is not extant or no change has occurred since the last photographic date, no discussion is given. Should activity resume, the significant features and changes will again be discussed.

### MAIN PENINSULA

MAY 29, 1956 (FIGURE 3)

Because of the overall site complexity, a separate surface drainage and railroad network overlay has been added to the 1956 photographs (Figures 3 and 4).

#### Subarea 1

This northernmost subarea consists primarily of residential units and institutional buildings such as schools and office buildings. Staining (ST) is visible at a loading/unloading dock on the Potomac River shoreline. To the south, six horizontal high pressure tanks (PT) and a small stain are noted. To the southeast is a large area of dark-toned material (DTM) (probably coal). Adjacent roads and an industrial facility lot (not annotated) have apparently been covered with this material.

### Subarea 2

This subarea consists of three processing facilities (F1-F3) and storage bunker complexes (not annotated). A series of isolated buildings serviced by parallel rail lines is located at the northern end of this subarea. Standing liquid (SL) adjacent to two pipelines is also visible.

Northeast of Facility 1 (F1), large accumulations of possible crates (CR) are visible adjacent to several buildings. Further to the southeast, at Facility 2 (F2), are possible derelict tanks and an outfall (OF). To the south is a deposit of possible solid waste (SW). At Facility 3 (F3) is a power plant with a deposit of dark-toned material (probably coal). A small impoundment (IM) is visible nearby. Stains are present within two large storage tank containments.

### Subarea 3

This portion of Subarea 3 consists of several storage bunkers (not annotated).

CRS 29 MAY 56 W 1473



### INTERPRETATION CODE

#### BOUNDARIES AND LIMITS

- x-x-x-x FENCED SITE BOUNDARY
- UNFENCED SITE BOUNDARY
- x x x x x FENCE
- STUDY AREA

#### DRAINAGE

- DRAINAGE
- FLOW DIRECTION
- INDETERMINATE DRAINAGE

#### TRANSPORTATION/UTILITY

- ===== VEHICLE ACCESS
- +++++ RAILWAY

#### SITE FEATURES

- |||||| DIKE
- ===== STANDING LIQUID
- SL STANDING LIQUID
- ⊖ EXCAVATION, PIT (EXTENSIVE)
- ⊕ MOUNDED MATERIAL (EXTENSIVE)
- MM MOUNDED MATERIAL (SMALL)
- CR CRATES/BOXES
- DR DRUMS
- HT HORIZONTAL TANK
- PT PRESSURE TANK
- VT VERTICAL TANK
- CA CLEARED AREA
- DG DISTURBED GROUND
- FL FILL
- IM IMPOUNDMENT
- LG LAGOON
- OF OUTFALL
- SD SLUDGE
- ST STAIN
- SW SOLID WASTE
- TR TRENCH
- VS VEGETATION STRESS
- WD WASTE DISPOSAL AREA
- WV WETLAND VEGETATION

Figure 3. Indian Head NSWC, Main Peninsula, May 29, 1956. Approximate scale 1:18,860.

MAY 29, 1956 (FIGURE 4)

Subarea 1

A small deposit of possible solid waste and revegetated mounded material (MM) are visible.

Subarea 3

This portion of the subarea is composed primarily of storage units (not annotated) and one processing facility (F1). Staining and standing liquid are noted in the northern portion of this subarea. In the southern portion is a large excavation with moist soil. One outfall, an accumulation of crates, and staining are associated with the nearby facility (F1).

Subarea 4

Within the western portion of this subarea, a possible outfall from an adjacent building is indicated by a small area of lush vegetative growth. Two deposits of possible solid waste are visible to the northeast. An outfall is visible on the eastern shoreline. To the south, staining and a small pit are visible within a small lot.

Subarea 5

Three accumulations of fill (FL) are visible in this subarea as well as erosion.



## INTERPRETATION CODE

### BOUNDARIES AND LIMITS

- x-x-x-x FENCED SITE BOUNDARY
- UNFENCED SITE BOUNDARY
- x x x x x x FENCE
- STUDY AREA

### DRAINAGE

- DRAINAGE
- FLOW DIRECTION
- INDETERMINATE DRAINAGE

### TRANSPORTATION/UTILITY

- ===== VEHICLE ACCESS
- +++++ RAILWAY

### SITE FEATURES

- |||||| DIKE
- ===== STANDING LIQUID
- SL STANDING LIQUID
- ⊖ EXCAVATION, PIT (EXTENSIVE)
- ⊖ MOUNDED MATERIAL (EXTENSIVE)
- MM MOUNDED MATERIAL (SMALL)
- CR CRATES/BOXES
- DR DRUMS
- HT HORIZONTAL TANK
- PT PRESSURE TANK
- VT VERTICAL TANK
- CA CLEARED AREA
- DG DISTURBED GROUND
- FL FILL
- IM IMPOUNDMENT
- LG LAGOON
- OF OUTFALL
- SD SLUDGE
- ST STAIN
- SW SOLID WASTE
- TR TRENCH
- VS VEGETATION STRESS
- WD WASTE DISPOSAL AREA
- WV WETLAND VEGETATION

Figure 4. Indian Head NSWC, Main Peninsula, May 29, 1956. Approximate scale 1:19,550.

AUGUST 29, 1961 (FIGURE 5)

Subarea 2

Since 1956 there has been a change in the location of possible crates northeast of Facility 1 (F1) which may indicate usage and replacement of the possible crates. Southwest of Facility 2 (F2) are five derelict tanks and possible solid waste in an open storage area. A large storage tank seen in 1956 has been removed. To the southwest is a new vertical tank (VT).

Subarea 3

Construction-related fill is observed in this subarea.



## INTERPRETATION CODE

### BOUNDARIES AND LIMITS

- x-x-x-x FENCED SITE BOUNDARY
- UNFENCED SITE BOUNDARY
- x x x x x FENCE
- - - - STUDY AREA

### DRAINAGE

- - - - DRAINAGE
- ← FLOW DIRECTION
- - - - INDETERMINATE DRAINAGE

### TRANSPORTATION/UTILITY

- ==== VEHICLE ACCESS
- + + + + RAILWAY

### SITE FEATURES

- ||||| DIKE
- ▨ STANDING LIQUID
- SL STANDING LIQUID
- ⊖ EXCAVATION, PIT (EXTENSIVE)
- ⊖ MOUNDED MATERIAL (EXTENSIVE)
- MM MOUNDED MATERIAL (SMALL)
- CR CRATES/BOXES
- DR DRUMS
- HT HORIZONTAL TANK
- PT PRESSURE TANK
- VT VERTICAL TANK
- CA CLEARED AREA
- DG DISTURBED GROUND
- FL FILL
- IM IMPOUNDMENT
- LG LAGOON
- OF OUTFALL
- SD SLUDGE
- ST STAIN
- SW SOLID WASTE
- TR TRENCH
- VS VEGETATION STRESS
- WD WASTE DISPOSAL AREA
- WV WETLAND VEGETATION

Figure 5. Indian Head NSWC, Main Peninsula, August 29, 1961. Approximate scale 1:11,230.

AUGUST 29, 1961 (FIGURE 6)

Subarea 1

A new group of buildings (also partially visible in Figure 5) is visible in the western portion of Subarea 1. To the south is an old aircraft in an open field. Presence of old aircraft in these conditions may indicate a possible fire training area. Further to the south a small group of houses has been removed since 1956.

Subarea 3

New storage bunkers and standing liquid are visible in the northern portion of this subarea. To the southwest, possible solid waste is observed at a storage bunker (not annotated). Photographic tones at the large excavation to the southeast have changed since 1956 indicating continued use of extracted materials. Further to the south, surface erosion is visible.

Subarea 4

Possible solid waste is visible at the northern end of Subarea 4. To the south is the small lot where a small pit and staining was observed in 1956. In 1961 a deposit of mounded solid waste is visible. New construction activity is present to the northwest.



## INTERPRETATION CODE

### BOUNDARIES AND LIMITS

- x—x—x—x FENCED SITE BOUNDARY
- UNFENCED SITE BOUNDARY
- x x x x x x FENCE
- STUDY AREA

### DRAINAGE

- DRAINAGE
- ← FLOW DIRECTION
- INDETERMINATE DRAINAGE

### TRANSPORTATION/UTILITY

- ===== VEHICLE ACCESS
- + + + + + RAILWAY

### SITE FEATURES

- ||||| DIKE
- ===== STANDING LIQUID
- SL STANDING LIQUID
- ⊖ EXCAVATION, PIT (EXTENSIVE)
- ⊕ MOUNDED MATERIAL (EXTENSIVE)
- MM MOUNDED MATERIAL (SMALL)
- CR CRATES/BOXES
- DR DRUMS
- HT HORIZONTAL TANK
- PT PRESSURE TANK
- VT VERTICAL TANK
- CA CLEARED AREA
- DG DISTURBED GROUND
- FL FILL
- IM IMPOUNDMENT
- LG LAGOON
- OF OUTFALL
- SD SLUDGE
- ST STAIN
- SW SOLID WASTE
- TR TRENCH
- VS VEGETATION STRESS
- WD WASTE DISPOSAL AREA
- WV WETLAND VEGETATION

Figure 6. Indian Head NSWC, Main Peninsula, August 29, 1961. Approximate scale 1:11,800.

AUGUST 29, 1961 (FIGURE 7)

Subarea 4

Mounded solid waste and revegetating solid waste are present in the small lot in the eastern portion of this subarea. To the south, three tanks seen in 1956 have been removed.

Subarea 5

A new excavation with standing liquid is visible on the western shoreline. Further to the south there is burning waste and mounded material. To the east at the end of a spit is a probable waste burning area where dark stains are visible. A large deposit of light- and dark-toned solid waste is visible in the center of the subarea. Solid waste is also visible to the south at the end of an access road.



## INTERPRETATION CODE

### BOUNDARIES AND LIMITS

- x-x-x-x FENCED SITE BOUNDARY
- UNFENCED SITE BOUNDARY
- x x x x x FENCE
- - - - STUDY AREA

### DRAINAGE

- - - - DRAINAGE
- ← FLOW DIRECTION
- - - - INDETERMINATE DRAINAGE

### TRANSPORTATION/UTILITY

- ===== VEHICLE ACCESS
- + + + + RAILWAY

### SITE FEATURES

- |||||| DIKE
- ~~~~~ STANDING LIQUID
- SL STANDING LIQUID
- ⊖ EXCAVATION, PIT (EXTENSIVE)
- ⊕ MOUNDED MATERIAL (EXTENSIVE)
- MM MOUNDED MATERIAL (SMALL)
- CR CRATES/BOXES
- DR DRUMS
- HT HORIZONTAL TANK
- PT PRESSURE TANK
- VT VERTICAL TANK
- CA CLEARED AREA
- DG DISTURBED GROUND
- FL FILL
- IM IMPOUNDMENT
- LG LAGOON
- OF OUTFALL
- SD SLUDGE
- ST STAIN
- SW SOLID WASTE
- TR TRENCH
- VS VEGETATION STRESS
- WD WASTE DISPOSAL AREA
- WV WETLAND VEGETATION

Figure 7. Indian Head NSWC, Main Peninsula, August 29, 1961. Approximate scale 1: 11,800.

MARCH 15, 1963 (FIGURE 8)

Subarea 2

The storage of possible crates is visible east of Facility 1 (F1). Drainageways that flow west from one of the possible crate storage areas are visible in this photograph; however, no staining is observed.



MARCH 15, 1963 (FIGURE 9)

Subarea 2

The open storage area near Facility 2 (F2) is larger than in 1961. Poor photographic resolution precludes identification of specific features within the storage area.

Subarea 3

Possible solid waste seen in 1961 near a storage bunker is not present in this photograph. To the southeast the excavation seen in 1961 is larger in extent and a small number of possible drums (DR) are noted.



## INTERPRETATION CODE

### BOUNDARIES AND LIMITS

- x-x-x-x FENCED SITE BOUNDARY
- UNFENCED SITE BOUNDARY
- x x x x x x FENCE
- STUDY AREA

### DRAINAGE

- DRAINAGE
- > FLOW DIRECTION
- > INDETERMINATE DRAINAGE

### TRANSPORTATION/UTILITY

- ===== VEHICLE ACCESS
- +++++ RAILWAY

### SITE FEATURES

- |||||| DIKE
- ===== SL STANDING LIQUID
- SL STANDING LIQUID
- ⊖ EXCAVATION, PIT (EXTENSIVE)
- ⊖ MOUNDED MATERIAL (EXTENSIVE)
- MM MOUNDED MATERIAL (SMALL)
- CR CRATES/BOXES
- DR DRUMS
- HT HORIZONTAL TANK
- PT PRESSURE TANK
- VT VERTICAL TANK
- CA CLEARED AREA
- DG DISTURBED GROUND
- FL FILL
- IM IMPOUNDMENT
- LG LAGOON
- OF OUTFALL
- SD SLUDGE
- ST STAIN
- SW SOLID WASTE
- TR TRENCH
- VS VEGETATION STRESS
- WD WASTE DISPOSAL AREA
- WV WETLAND VEGETATION

Figure 9. Indian Head NSWC, Main Peninsula, March 15, 1963. Approximate scale 1:11,200.

MARCH 15, 1963 (FIGURE 10)

Subarea 4

Solid waste visible in a small lot in 1961 is no longer present; however the revegetated solid waste to the west is still present.

Subarea 5

Erosion of fill continues along the riverbank in the western portion of the subarea. To the east, fill has been placed in an area where light- and dark-toned solid waste was observed in 1961. Five mounds of material are visible to the south. Two of the mounds consist of natural vegetation cleared from the surrounding land. Three mounds are deposits of solid waste. The extent of dark stains at the end of the long spit has increased since 1961. The area is definitely being used for burning of waste. No evidence of waste burning seen in 1961 is visible on the small peninsula of land to the west.



## INTERPRETATION CODE

### BOUNDARIES AND LIMITS

- x-x-x-x FENCED SITE BOUNDARY
- UNFENCED SITE BOUNDARY
- x x x x x x FENCE
- STUDY AREA

### DRAINAGE

- DRAINAGE
- ← FLOW DIRECTION
- INDETERMINATE DRAINAGE

### TRANSPORTATION/UTILITY

- ===== VEHICLE ACCESS
- + + + + + RAILWAY

### SITE FEATURES

- ||||||| DIKE
- SL STANDING LIQUID
- SL STANDING LIQUID
- EXCAVATION, PIT (EXTENSIVE)
- MOUNDED MATERIAL (EXTENSIVE)
- MM MOUNDED MATERIAL (SMALL)
- CR CRATES/BOXES
- DR DRUMS
- HT HORIZONTAL TANK
- PT PRESSURE TANK
- VT VERTICAL TANK
- CA CLEARED AREA
- DG DISTURBED GROUND
- FL FILL
- IM IMPOUNDMENT
- LG LAGOON
- OF OUTFALL
- SD SLUDGE
- ST STAIN
- SW SOLID WASTE
- TR TRENCH
- VS VEGETATION STRESS
- WD WASTE DISPOSAL AREA
- WV WETLAND VEGETATION

Figure 10. Indian Head NSWC, Main Peninsula, March 15, 1963. Approximate scale 1:10,150.

SEPTEMBER 15, 1967 (FIGURE 11)

Subarea 2

Possible crates are visible east of Facility 1 (F1). Three stains are present where one set of possible crates was observed in 1963. A large stain is visible at the open storage west of Facility 2 (F2). Sixteen derelict tanks are visible near Facility 2 (F2).



## INTERPRETATION CODE

### BOUNDARIES AND LIMITS

- X—X—X—X— FENCED SITE BOUNDARY
- UNFENCED SITE BOUNDARY
- X X X X X X FENCE
- STUDY AREA

### DRAINAGE

- > DRAINAGE
- > FLOW DIRECTION
- <----- INDETERMINATE DRAINAGE

### TRANSPORTATION/UTILITY

- ===== VEHICLE ACCESS
- + + + + + RAILWAY

### SITE FEATURES

- |||||| DIKE
- ~~~~~ STANDING LIQUID
- SL STANDING LIQUID
- ⊖ EXCAVATION, PIT (EXTENSIVE)
- ⊕ MOUNDED MATERIAL (EXTENSIVE)
- MM MOUNDED MATERIAL (SMALL)
- CR CRATES/BOXES
- DR DRUMS
- HT HORIZONTAL TANK
- PT PRESSURE TANK
- VT VERTICAL TANK
- CA CLEARED AREA
- DG DISTURBED GROUND
- FL FILL
- IM IMPOUNDMENT
- LG LAGOON
- OF OUTFALL
- SD SLUDGE
- ST STAIN
- SW SOLID WASTE
- TR TRENCH
- VS VEGETATION STRESS
- WD WASTE DISPOSAL AREA
- WV WETLAND VEGETATION

Figure 11. Indian Head NSWC, Main Peninsula, September 15, 1967. Approximate scale 1:11,850.

SEPTEMBER 15, 1967 (FIGURE 12)

Subarea 1

The old aircraft seen in 1961 along the riverbank has been removed.

Subarea 3

A small excavation is observed in the eastern portion of the subarea. In the southern portion, the excavation seen in 1963 is larger in extent and two stains and disturbed ground (DG) are noted. The area is possibly being used for waste disposal. To the west is a new area of fill that is probably related to construction activities.

Subarea 4

The revegetated solid waste seen in 1963 in the small lot in the eastern portion of the subarea has been removed.



Figure 12. Indian Head NSWC, Main Peninsula, September 15, 1967. Approximate scale 1:12,000.

## INTERPRETATION CODE

### BOUNDARIES AND LIMITS

- x—x—x—x—x FENCED SITE BOUNDARY
- UNFENCED SITE BOUNDARY
- x x x x x x FENCE
- STUDY AREA

### DRAINAGE

- DRAINAGE
- ← FLOW DIRECTION
- INDETERMINATE DRAINAGE

### TRANSPORTATION/UTILITY

- ===== VEHICLE ACCESS
- + + + + + RAILWAY

### SITE FEATURES

- |||||| DIKE
- ~~~~~ STANDING LIQUID
- SL STANDING LIQUID
- ⊖ EXCAVATION, PIT (EXTENSIVE)
- ⊖ MOUNDED MATERIAL (EXTENSIVE)
- MM MOUNDED MATERIAL (SMALL)
- CR CRATES/BOXES
- DR DRUMS
- HT HORIZONTAL TANK
- PT PRESSURE TANK
- VT VERTICAL TANK
- CA CLEARED AREA
- DG DISTURBED GROUND
- FL FILL
- IM IMPOUNDMENT
- LG LAGOON
- OF OUTFALL
- SD SLUDGE
- ST STAIN
- SW SOLID WASTE
- TR TRENCH
- VS VEGETATION STRESS
- WD WASTE DISPOSAL AREA
- WV WETLAND VEGETATION

SEPTEMBER 15, 1967 (FIGURE 13)

Subarea 5

In the center of the subarea a large cleared area (CA) and new storage bunkers have been constructed. To the southeast at the end of the access road are eleven derelict tanks, another larger derelict tank, and mounded debris. Three small piles of waste and a pile of burning waste are visible at the end of the spit. To the northwest is an outfall adjacent to a small building. It flows south into a cleared area.



## INTERPRETATION CODE

### BOUNDARIES AND LIMITS

- x-x-x-x FENCED SITE BOUNDARY
- UNFENCED SITE BOUNDARY
- x x x x x x FENCE
- - - - STUDY AREA

### DRAINAGE

- - - - DRAINAGE
- ← FLOW DIRECTION
- - - - INDETERMINATE DRAINAGE

### TRANSPORTATION/UTILITY

- ==== VEHICLE ACCESS
- + + + + RAILWAY

### SITE FEATURES

- |||||| DIKE
- ~~~~~ SLANDING LIQUID
- SL SLANDING LIQUID
- ⊖ EXCAVATION, PIT (EXTENSIVE)
- ⊖ MOUNDED MATERIAL (EXTENSIVE)
- MM MOUNDED MATERIAL (SMALL)
- CR CRATES/BOXES
- DR DRUMS
- HT HORIZONTAL TANK
- PT PRESSURE TANK
- VT VERTICAL TANK
- CA CLEARED AREA
- DG DISTURBED GROUND
- FL FILL
- IM IMPOUNDMENT
- LG LAGOON
- OF OUTFALL
- SD SLUDGE
- ST STAIN
- SW SOLID WASTE
- TR TRENCH
- VS VEGETATION STRESS
- WD WASTE DISPOSAL AREA
- WV WETLAND VEGETATION

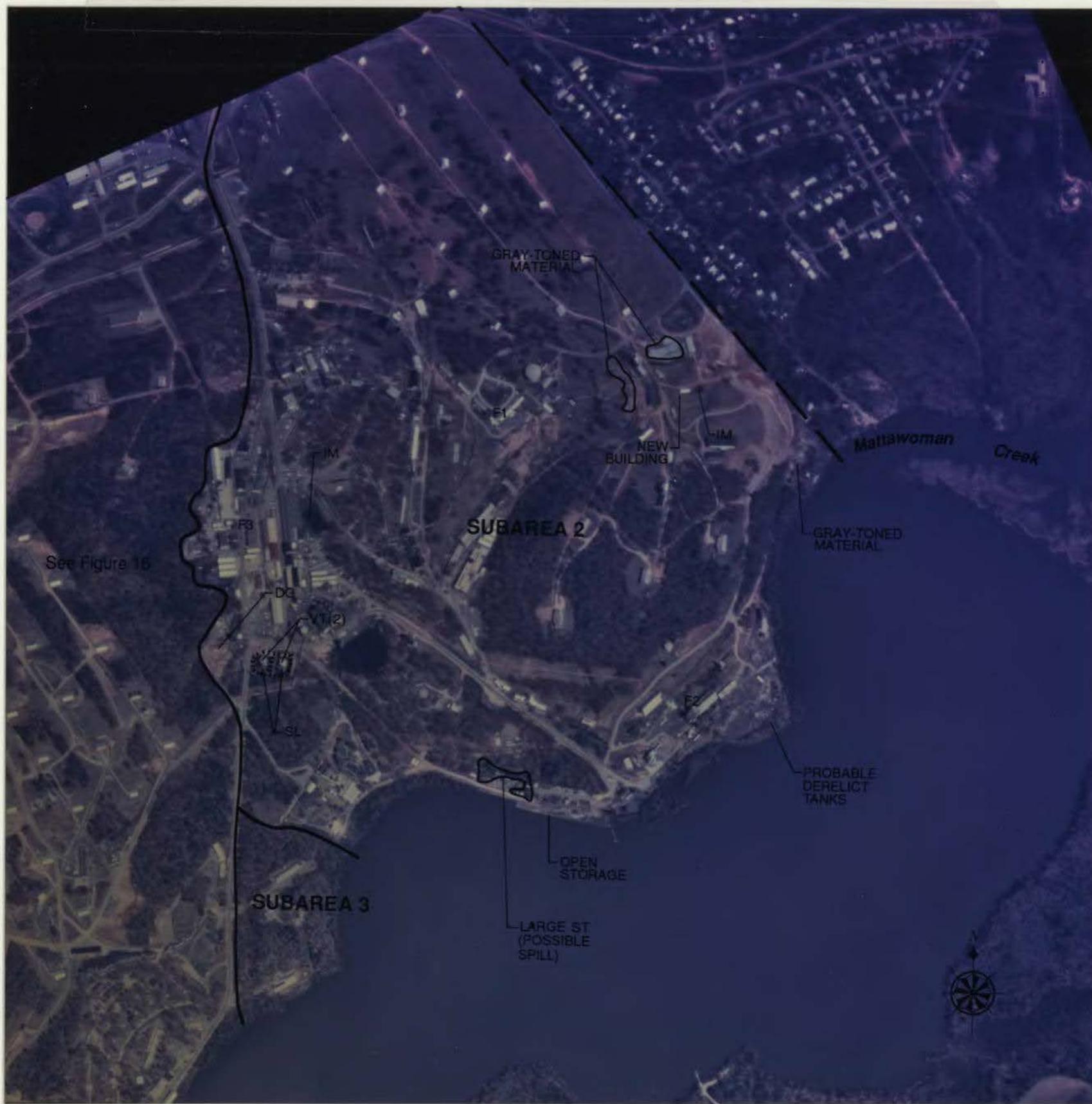
Figure 13. Indian Head NSWC, Main Peninsula, September 15, 1967. Approximate scale 1:12,000.

APRIL 18, 1972 (FIGURE 14)

The 1972 photographs did not cover the northern portion of the site; however, no new features or changes were evident on 1975 photographs that were examined.

#### Subarea 2

The possible crates seen in earlier photographs are actually accumulations of gray-toned material. This positive identification was possible due to improved photographic resolution in the 1972 photograph. To the south is a new small building. Liquid originates from this building and flows east where it is retained in a small, apparently unlined impoundment (IM). Gray-toned material that has been spread onto the ground is located to the southeast. Several probable derelict tanks are noted adjacent to Facility 2 (F2). West of this facility at the open storage area a large dark-toned stain is visible. The stain may be the result of a spill because it is also present on the top of an embankment that is adjacent to the storage area. South of Facility 3 (F3) is an area of disturbed ground. Nearby, standing liquid is present within the containments of two large storage tanks.



## INTERPRETATION CODE

### BOUNDARIES AND LIMITS

- x-x-x-x FENCED SITE BOUNDARY
- UNFENCED SITE BOUNDARY
- x x x x x x FENCE
- STUDY AREA

### DRAINAGE

- DRAINAGE
- > FLOW DIRECTION
- <----- INDETERMINATE DRAINAGE

### TRANSPORTATION/UTILITY

- ===== VEHICLE ACCESS
- +++++ RAILWAY

### SITE FEATURES

- ||||| DIKE
- ===== SLANDING LIQUID
- SL SLANDING LIQUID
- ⊖ EXCAVATION, PIT (EXTENSIVE)
- ⊖ MOUNDED MATERIAL (EXTENSIVE)
- MM MOUNDED MATERIAL (SMALL)
- CR CRATES/BOXES
- DR DRUMS
- HT HORIZONTAL TANK
- PT PRESSURE TANK
- VT VERTICAL TANK
- CA CLEARED AREA
- DG DISTURBED GROUND
- FL FILL
- IM IMPOUNDMENT
- LG LAGOON
- OF OUTFALL
- SD SLUDGE
- ST STAIN
- SW SOLID WASTE
- TR TRENCH
- VS VEGETATION STRESS
- WD WASTE DISPOSAL AREA
- WV WETLAND VEGETATION

Figure 14. Indian Head NSWC, Main Peninsula, April 18, 1972. Approximate scale 1:9,450.

APRIL 18, 1972 (FIGURE 15)

Subarea 1

A new possible dump is observed in this portion of the subarea. A small access road leads from a nearby building complex to the possible dump.

Subarea 3

Two areas of disturbed ground are observed in the northern portion of this subarea. To the south the excavation seen in 1967 is larger and contains gray-toned mounded material. Further to the south, solid waste and standing liquid are visible at the excavation that was identified as a possible waste disposal area in 1967.



## INTERPRETATION CODE

### BOUNDARIES AND LIMITS

- x-x-x-x FENCED SITE BOUNDARY
- UNFENCED SITE BOUNDARY
- x x x x x FENCE
- STUDY AREA

### DRAINAGE

- DRAINAGE
- > FLOW DIRECTION
- <----- INDETERMINATE DRAINAGE

### TRANSPORTATION/UTILITY

- ===== VEHICLE ACCESS
- + + + + + RAILWAY

### SITE FEATURES

- ||||||| DIKE
- ===== STANDING LIQUID
- SL STANDING LIQUID
- EXCAVATION, PIT (EXTENSIVE)
- ⊖ MOUNDED MATERIAL (EXTENSIVE)
- MM MOUNDED MATERIAL (SMALL)
- CR CRATES/BOXES
- DR DRUMS
- HT HORIZONTAL TANK
- PT PRESSURE TANK
- VT VERTICAL TANK
- CA CLEARED AREA
- DG DISTURBED GROUND
- FL FILL
- IM IMPOUNDMENT
- LG LAGOON
- OF OUTFALL
- SD SLUDGE
- ST STAIN
- SW SOLID WASTE
- TR TRENCH
- VS VEGETATION STRESS
- WD WASTE DISPOSAL AREA
- WV WETLAND VEGETATION

Figure 15. Indian Head NSWC, Main Peninsula, April 18, 1972. Approximate scale 1:9,420.

APRIL 18, 1972 (FIGURE 16)

Subarea 4

A new area of standing liquid is observed in the eastern portion of this subarea. At the small lot to the north, photographic tones and patterns of soil and waste material have changed since 1967 indicating continuing disposal activity. Three stains, two truck trailers, and mounded material are visible.

Subarea 5

Standing liquid seen in the eastern portion of the subarea in 1967 is no longer present. Several new significant features are visible in the western portion of the subarea. Three new probable dump sites are visible. Orange-toned liquid material is existent at one probable dump and light-toned solid material is visible at the other two probable dumps. To the south is a deposit of gray-toned material, a derelict tank, and standing liquid. The waste burning area at the end of the spit appears to be active. To the east at the end of the access road are three mounds of solid waste.



## INTERPRETATION CODE

### BOUNDARIES AND LIMITS

- x-x-x-x FENCED SITE BOUNDARY
- UNFENCED SITE BOUNDARY
- x x x x x FENCE
- - - - STUDY AREA

### DRAINAGE

- - - - DRAINAGE
- ← FLOW DIRECTION
- - - - INDETERMINATE DRAINAGE

### TRANSPORTATION/UTILITY

- ===== VEHICLE ACCESS
- + + + + RAILWAY

### SITE FEATURES

- ||||| DIKE
- ⊞ STANDING LIQUID
- SL STANDING LIQUID
- ⊞ EXCAVATION, PIT (EXTENSIVE)
- ⊞ MOUNDED MATERIAL (EXTENSIVE)
- MM MOUNDED MATERIAL (SMALL)
- CR CRATES/BOXES
- DR DRUMS
- HT HORIZONTAL TANK
- PT PRESSURE TANK
- VT VERTICAL TANK
- CA CLEARED AREA
- DG DISTURBED GROUND
- FL FILL
- IM IMPOUNDMENT
- LG LAGOON
- OF OUTFALL
- SD SLUDGE
- ST STAIN
- SW SOLID WASTE
- TR TRENCH
- VS VEGETATION STRESS
- WD WASTE DISPOSAL AREA
- WV WETLAND VEGETATION

Figure 16. Indian Head NSWC, Main Peninsula, April 18, 1972. Approximate scale 1:9,250.

MARCH 29, 1982 (FIGURE 17)

Subarea 1

A new excavation is visible within this portion of the subarea.

Subarea 2

A new open storage area is visible in Subarea 2. Probable derelict tanks are again visible at Facility 2 (F2).



## INTERPRETATION CODE

### BOUNDARIES AND LIMITS

- X—X—X—X— FENCED SITE BOUNDARY
- UNFENCED SITE BOUNDARY
- X X X X X X FENCE
- STUDY AREA

### DRAINAGE

- DRAINAGE
- > FLOW DIRECTION
- <----- INDETERMINATE DRAINAGE

### TRANSPORTATION/UTILITY

- ===== VEHICLE ACCESS
- + + + + + RAILWAY

### SITE FEATURES

- ||||| DIKE
- ===== STANDING LIQUID
- SL STANDING LIQUID
- ⊖ EXCAVATION, PIT (EXTENSIVE)
- ⊖ MOUNDED MATERIAL (EXTENSIVE)
- MM MOUNDED MATERIAL (SMALL)
- CR CRATES/BOXES
- DR DRUMS
- HT HORIZONTAL TANK
- PT PRESSURE TANK
- VT VERTICAL TANK
- CA CLEARED AREA
- DG DISTURBED GROUND
- FL FILL
- IM IMPOUNDMENT
- LG LAGOON
- OF OUTFALL
- SD SLUDGE
- ST STAIN
- SW SOLID WASTE
- TR TRENCH
- VS VEGETATION STRESS
- WD WASTE DISPOSAL AREA
- WV WETLAND VEGETATION

Figure 17. Indian Head NSWC, Main Peninsula, March 29, 1982. Approximate scale 1:11,600.

MARCH 29, 1982 (FIGURE 18)

Subarea 1

Photographic soil and waste material tonal patterns at the possible dump have changed since 1972 indicating continued possible waste disposal activity.

Subarea 2

Gray-toned material seen in 1972 in the northern portion of the subarea is not present in this year. Also, the large stain southwest of Facility 2 (F2) (1972) is no longer visible. Standing liquid seen in 1972 south of Facility 3 (F3) is no longer present.

Subarea 3

The excavation in the eastern portion of the subarea (first observed in 1967, Figure 12) is somewhat larger in extent than in 1972. Three new mounds of material and ground scarring are observed. The excavation is a possible waste disposal area. To the south the excavation observed in 1956 has ground scars, but no visible evidences of waste disposal.



Figure 18. Indian Head NSWC, Main Peninsula, March 29, 1982. Approximate scale 1:11,350.

## INTERPRETATION CODE

### BOUNDARIES AND LIMITS

- x-x-x-x FENCED SITE BOUNDARY
- UNFENCED SITE BOUNDARY
- x x x x x x FENCE
- STUDY AREA

### DRAINAGE

- DRAINAGE
- ← FLOW DIRECTION
- INDETERMINATE DRAINAGE

### TRANSPORTATION/UTILITY

- ===== VEHICLE ACCESS
- ++++ RAILWAY

### SITE FEATURES

- ////// DIKE
- ~~~~~ STANDING LIQUID
- SL STANDING LIQUID
- ⊖ EXCAVATION, PIT (EXTENSIVE)
- ⊖ MOUNDED MATERIAL (EXTENSIVE)
- MM MOUNDED MATERIAL (SMALL)
- CR CRATES/BOXES
- DR DRUMS
- HT HORIZONTAL TANK
- PT PRESSURE TANK
- VT VERTICAL TANK
- CA CLEARED AREA
- DG DISTURBED GROUND
- FL FILL
- IM IMPOUNDMENT
- LG LAGOON
- OF OUTFALL
- SD SLUDGE
- ST STAIN
- SW SOLID WASTE
- TR TRENCH
- VS VEGETATION STRESS
- WD WASTE DISPOSAL AREA
- WV WETLAND VEGETATION

MARCH 29, 1982 (FIGURE 19)

Subarea 4

Within the small lot in the eastern portion of this subarea, there are nine truck trailers, staining seen in 1972 and new staining adjacent to the trailers and in the western portion of the lot. Waste disposal activity seen in 1972 appears to be ongoing.

Subarea 5

The three probable dumps seen in 1972 appear to be inactive in 1982. Only one small mound of material is visible. Near the western shoreline of the site a new open storage area containing crates is visible. At the end of the access road in the eastern portion of the subarea are two mounds of solid waste. This area continues to be used as a waste disposal area. Six new sheds and buildings as well as a new impoundment are visible nearby. At the end of the spit, five small waste burning areas are observed. Standing liquid is visible on the small peninsula to the west.



## INTERPRETATION CODE

### BOUNDARIES AND LIMITS

- x-x-x-x FENCED SITE BOUNDARY
- UNFENCED SITE BOUNDARY
- x x x x x x FENCE
- STUDY AREA

### DRAINAGE

- DRAINAGE
- ← FLOW DIRECTION
- - - - - INDETERMINATE DRAINAGE

### TRANSPORTATION/UTILITY

- ===== VEHICLE ACCESS
- + + + + + RAILWAY

### SITE FEATURES

- |||||| DIKE
- ~~~~~ STANDING LIQUID
- SL STANDING LIQUID
- ⊖ EXCAVATION, PIT (EXTENSIVE)
- ⊕ MOUNDED MATERIAL (EXTENSIVE)
- MM MOUNDED MATERIAL (SMALL)
- CR CRATES/BOXES
- DR DRUMS
- HT HORIZONTAL TANK
- PT PRESSURE TANK
- VT VERTICAL TANK
- CA CLEARED AREA
- DG DISTURBED GROUND
- FL FILL
- IM IMPOUNDMENT
- LG LAGOON
- OF OUTFALL
- SD SLUDGE
- ST STAIN
- SW SOLID WASTE
- TR TRENCH
- VS VEGETATION STRESS
- WD WASTE DISPOSAL AREA
- WV WETLAND VEGETATION

Figure 19. Indian Head NSWC, Main Peninsula, March 29, 1982. Approximate scale 1:11,680.

APRIL 10, 1987 (FIGURE 20)

Subarea 2

Staining is evident in the open storage area. No other significant features are observed in this portion of Subarea 2.



## INTERPRETATION CODE

### BOUNDARIES AND LIMITS

- x-x-x-x FENCED SITE BOUNDARY
- UNFENCED SITE BOUNDARY
- x x x x x x FENCE
- - - - - STUDY AREA

### DRAINAGE

- - - - - DRAINAGE
- ← FLOW DIRECTION
- - - - - INDETERMINATE DRAINAGE

### TRANSPORTATION/UTILITY

- ===== VEHICLE ACCESS
- + + + + + RAILWAY

### SITE FEATURES

- ||||||| DIKE
- ~~~~~ STANDING LIQUID
- SL STANDING LIQUID
- ⊖ EXCAVATION, PIT (EXTENSIVE)
- ⊕ MOUNDED MATERIAL (EXTENSIVE)
- MM MOUNDED MATERIAL (SMALL)
- CR CRATES/BOXES
- DR DRUMS
- HT HORIZONTAL TANK
- PT PRESSURE TANK
- VT VERTICAL TANK
- CA CLEARED AREA
- DG DISTURBED GROUND
- FL FILL
- IM IMPOUNDMENT
- LG LAGOON
- OF OUTFALL
- SD SLUDGE
- ST STAIN
- SW SOLID WASTE
- TR TRENCH
- VS VEGETATION STRESS
- WD WASTE DISPOSAL AREA
- WV WETLAND VEGETATION

Figure 20. Indian Head NSWC, Main Peninsula, April 10, 1987. Approximate scale 1:11,250.

APRIL 10, 1987 (FIGURE 21)

Subarea 1

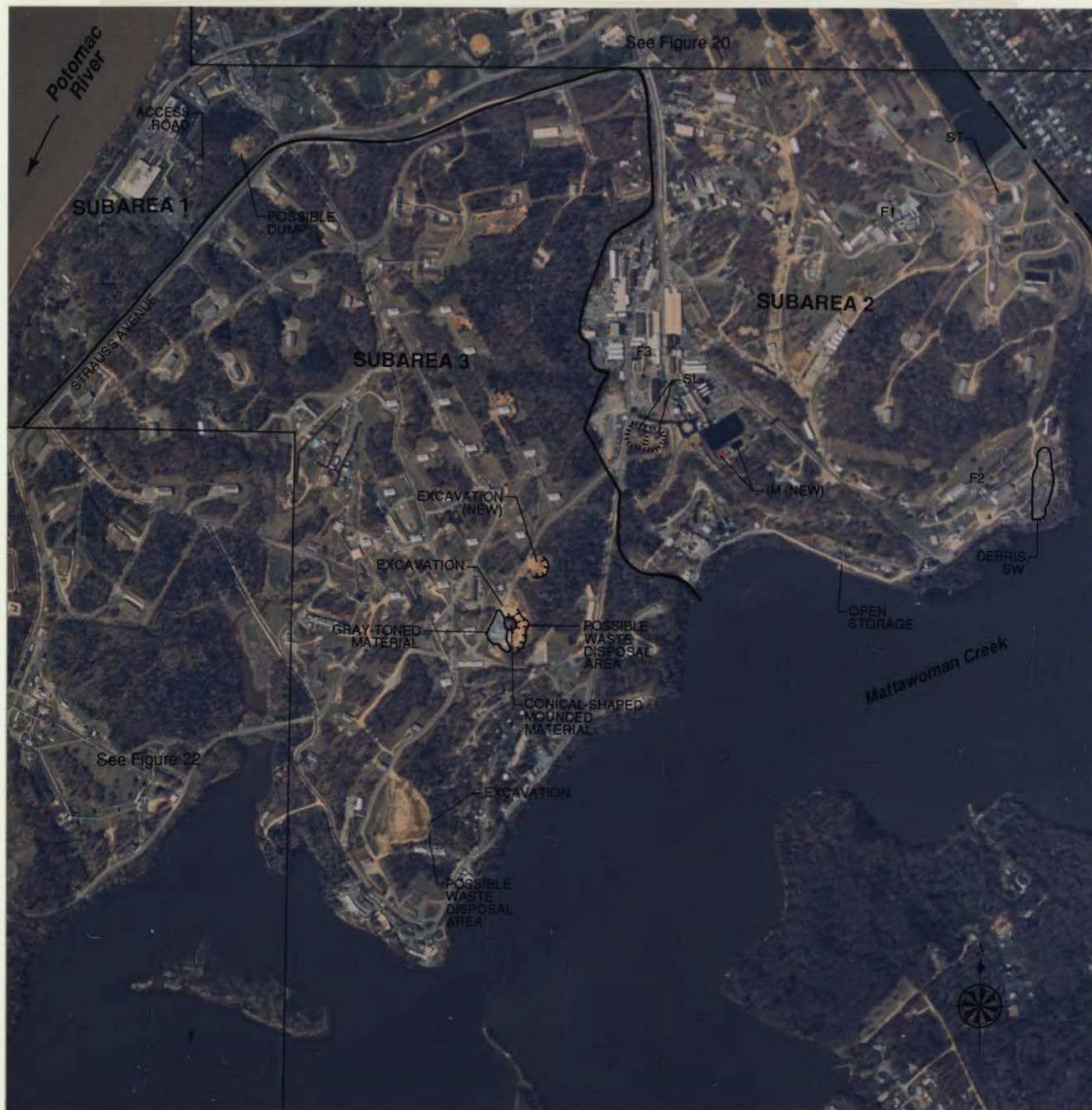
Photographic tones and patterns of soil and possible waste material at the possible dump in this subarea (first observed in 1972) are different than in 1982 indicating possible continuing waste disposal activity.

Subarea 2

Staining is seen east of Facility 1 (F1). East of Facility 2 (F2) are large deposits of debris and solid waste where probable derelict tanks were present in 1982. This may be an area of waste disposal. Southeast of Facility 3 (F3) are two new impoundments, one with a dark-toned liquid and the other contains orange-toned liquid. South of Facility 3 (F3) standing liquid is again present within the containments for the large storage tanks.

Subarea 3

In the southeastern portion of this subarea the possible waste disposal area consists of a large deposit of gray-toned material and a conical-shaped deposit of dark-toned mounded material. A new excavation is visible to the north. The large excavation at the southern end of the subarea exhibits no significant change since 1982.



## INTERPRETATION CODE

### BOUNDARIES AND LIMITS

- x-x-x-x FENCED SITE BOUNDARY
- UNFENCED SITE BOUNDARY
- x x x x x FENCE
- STUDY AREA

### DRAINAGE

- DRAINAGE
- ← FLOW DIRECTION
- INDETERMINATE DRAINAGE

### TRANSPORTATION/UTILITY

- ===== VEHICLE ACCESS
- + + + + RAILWAY

### SITE FEATURES

- |||||| DIKE
- ~~~~~ STANDING LIQUID
- SL STANDING LIQUID
- ⊖ EXCAVATION, PIT (EXTENSIVE)
- ⊖ MOUNDED MATERIAL (EXTENSIVE)
- MM MOUNDED MATERIAL (SMALL)
- CR CRATES/BOXES
- DR DRUMS
- HT HORIZONTAL TANK
- PT PRESSURE TANK
- VT VERTICAL TANK
- CA CLEARED AREA
- DG DISTURBED GROUND
- FL FILL
- IM IMPOUNDMENT
- LG LAGOON
- OF OUTFALL
- SD SLUDGE
- ST STAIN
- SW SOLID WASTE
- TR TRENCH
- VS VEGETATION STRESS
- WD WASTE DISPOSAL AREA
- WV WETLAND VEGETATION

Figure 21. Indian Head NSWC, Main Peninsula, April 10, 1987. Approximate scale 1:10,970.

APRIL 10, 1987 (FIGURE 22)

Subarea 4

At the small lot in the eastern portion of this subarea, nine truck trailers and gray-toned material spread on the surface of the ground are observed.

Subarea 5

In the eastern portion of the subarea the solid waste deposits present at the end of the access road in 1982 are no longer present. Four small areas of continuing waste burning activity are visible on the spit. A blue tarp possibly used as a covering for solid waste is also noted. No other significant features are observed.



## INTERPRETATION CODE

### BOUNDARIES AND LIMITS

- x-x-x-x FENCED SITE BOUNDARY
- UNFENCED SITE BOUNDARY
- x x x x x FENCE
- STUDY AREA

### DRAINAGE

- DRAINAGE
- ← FLOW DIRECTION
- INDETERMINATE DRAINAGE

### TRANSPORTATION/UTILITY

- ===== VEHICLE ACCESS
- + + + + + RAILWAY

### SITE FEATURES

- |||||| DIKE
- ~~~~~ STANDING LIQUID
- SL STANDING LIQUID
- ⊖ EXCAVATION, PIT (EXTENSIVE)
- ⊕ MOUNDED MATERIAL (EXTENSIVE)
- MM MOUNDED MATERIAL (SMALL)
- CR CRATES/BOXES
- DR DRUMS
- HT HORIZONTAL TANK
- PT PRESSURE TANK
- VT VERTICAL TANK
- CA CLEARED AREA
- DG DISTURBED GROUND
- FL FILL
- IM IMPOUNDMENT
- LG LAGOON
- OF OUTFALL
- SD SLUDGE
- ST STAIN
- SW SOLID WASTE
- TR TRENCH
- VS VEGETATION STRESS
- WD WASTE DISPOSAL AREA
- WV WETLAND VEGETATION

Figure 22. Indian Head NSWC, Main Peninsula, April 10, 1987. Approximate scale 1:10,960.



## STUMP NECK ANNEX

This small peninsula consists of forestland with wetlands present on the southeastern side of the peninsula. It is approximately 1,000 acres in extent. Natural surface drainage would probably be in a southerly direction into Chickamuxen Creek.

MAY 29, 1956 (FIGURE 24)

In the northeast portion of the annex is a graded area with one large mound of material. Directly across Archer Avenue is a small disturbed area behind two buildings. Continuing southwest, there is an area of cleared land where a berm has been constructed. Further southwest is a large area of fill that has been graded, possibly prior to construction activity. One cleared area is visible to the southwest. At the tip of the peninsula are two other cleared areas and two deposits of possible solid waste.



## INTERPRETATION CODE

### BOUNDARIES AND LIMITS

- x-x-x-x-x FENCED SITE BOUNDARY
- UNFENCED SITE BOUNDARY
- x x x x x x FENCE
- STUDY AREA

### DRAINAGE

- DRAINAGE
- FLOW DIRECTION
- INDETERMINATE DRAINAGE

### TRANSPORTATION/UTILITY

- ===== VEHICLE ACCESS
- + + + + + RAILWAY

### SITE FEATURES

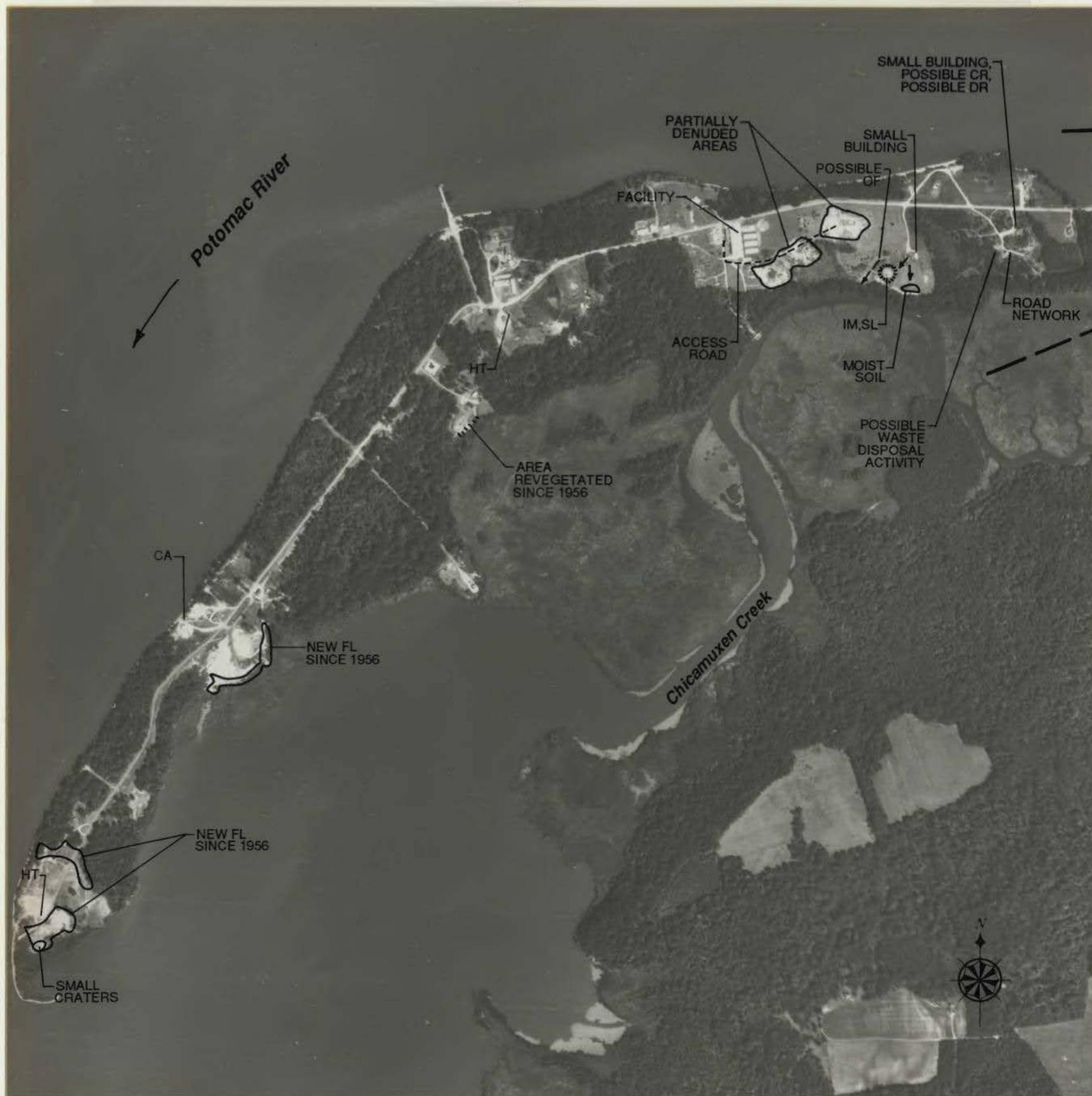
- |||||| DIKE
- SL STANDING LIQUID
- SL STANDING LIQUID
- EXCAVATION, PIT (EXTENSIVE)
- MOUNDED MATERIAL (EXTENSIVE)
- MM MOUNDED MATERIAL (SMALL)
- CR CRATES/BOXES
- DR DRUMS
- HT HORIZONTAL TANK
- PT PRESSURE TANK
- VT VERTICAL TANK
- CA CLEARED AREA
- DG DISTURBED GROUND
- FL FILL
- IM IMPOUNDMENT
- LG LAGOON
- OF OUTFALL
- SD SLUDGE
- ST STAIN
- SW SOLID WASTE
- TR TRENCH
- VS VEGETATION STRESS
- WD WASTE DISPOSAL AREA
- WV WETLAND VEGETATION

Figure 24. Indian Head NSWC, Stump Neck Annex, May 29, 1956. Approximate scale 1:19,400.

AUGUST 29, 1961 (FIGURE 25)

The most significant change in the northeastern portion of the annex since 1956 is a new road network and the presence of possible crates and possible drums. Possible waste disposal activity is also present. Poor resolution of this photograph precludes a more definitive assessment of features and conditions.

At the east end of the site is a small building with surface drainage flowing south to an area of moist soil. A bermed impoundment containing standing liquid is visible nearby. A drainage channel apparently originates near the impoundment (a possible outfall) and flows southwest into Chicamuxen Creek. Partially denuded areas are visible nearby. An access road leads from these areas to a nearby facility. Further down the peninsula is an area of fill that has increased in extent since 1956. A new cleared area is also observed just across Archer Road. At the tip of the peninsula several small craters are visible which indicate probable ordnance disposal (by detonation). The extent of fill on the peninsula is larger when compared to 1956. One horizontal tank (HT) is noted. Possible solid waste seen in 1956 is not present.



## INTERPRETATION CODE

### BOUNDARIES AND LIMITS

- X-X-X-X FENCED SITE BOUNDARY
- UNFENCED SITE BOUNDARY
- X X X X X X FENCE
- STUDY AREA

### DRAINAGE

- DRAINAGE
- ← FLOW DIRECTION
- INDETERMINATE DRAINAGE

### TRANSPORTATION/UTILITY

- ===== VEHICLE ACCESS
- + + + + RAILWAY

### SITE FEATURES

- |||||| DIKE
- ===== STANDING LIQUID
- SL STANDING LIQUID
- ⊖ EXCAVATION, PIT (EXTENSIVE)
- ⊖ MOUNDED MATERIAL (EXTENSIVE)
- MM MOUNDED MATERIAL (SMALL)
- CR CRATES/BOXES
- DR DRUMS
- HT HORIZONTAL TANK
- PT PRESSURE TANK
- VT VERTICAL TANK
- CA CLEARED AREA
- DG DISTURBED GROUND
- FL FILL
- IM IMPOUNDMENT
- LG LAGOON
- OF OUTFALL
- SD SLUDGE
- ST STAIN
- SW SOLID WASTE
- TR TRENCH
- VS VEGETATION STRESS
- WD WASTE DISPOSAL AREA
- WV WETLAND VEGETATION

Figure 25. Indian Head NSWC, Stump Neck Annex, August 29, 1961. Approximate scale 1:10,870.

MARCH 15, 1963 (FIGURE 26)

The possible crates and possible drums seen in 1961 in the northeast portion of the site are not present in 1963. The partially denuded areas seen in 1961 have revegetated. Further down the peninsula, soil tonal patterns have changed at the large area of fill which indicates continuing probable ordnance disposal activity. The specific type of activity could not be determined. At the tip of the peninsula new fill has been placed over a portion of the area and numerous small craters are evident indicating continued probable ordnance disposal.



## INTERPRETATION CODE

### BOUNDARIES AND LIMITS

- X—X—X—X— FENCED SITE BOUNDARY
- UNFENCED SITE BOUNDARY
- X X X X X X FENCE
- STUDY AREA

### DRAINAGE

- DRAINAGE
- ← FLOW DIRECTION
- INDETERMINATE DRAINAGE

### TRANSPORTATION/UTILITY

- ===== VEHICLE ACCESS
- + + + + + RAILWAY

### SITE FEATURES

- |||||| DIKE
- SL STANDING LIQUID
- SL STANDING LIQUID
- EXCAVATION, PIT (EXTENSIVE)
- MOUNDED MATERIAL (EXTENSIVE)
- MM MOUNDED MATERIAL (SMALL)
- CR CRATES/BOXES
- DR DRUMS
- HT HORIZONTAL TANK
- PT PRESSURE TANK
- VT VERTICAL TANK
- CA CLEARED AREA
- DG DISTURBED GROUND
- FL FILL
- IM IMPOUNDMENT
- LG LAGOON
- OF OUTFALL
- SD SLUDGE
- ST STAIN
- SW SOLID WASTE
- TR TRENCH
- VS VEGETATION STRESS
- WD WASTE DISPOSAL AREA
- WV WETLAND VEGETATION

Figure 26. Indian Head NSWC, Stump Neck Annex, March 15, 1963. Approximate scale 1:10,600.

SEPTEMBER 15, 1967 (FIGURE 27)

Bare soil within the revegetating areas seen in 1963 has not revegetated. This may be due to soil contaminants that preclude vegetation reestablishment or natural soil infertility. Further down the peninsula to the southwest is the area where probable ordnance disposal was occurring in 1963. Six new small craters are observed in and near new fill that has been deposited in this area since 1963. At the end of the peninsula the craters existing in 1963 have been covered with new fill. Eight new small liquid-filled craters are visible on the eastern side of the fill. Three craters contain orange-toned liquid.



## INTERPRETATION CODE

### BOUNDARIES AND LIMITS

- x-x-x-x FENCED SITE BOUNDARY
- UNFENCED SITE BOUNDARY
- x x x x x x FENCE
- - - - STUDY AREA

### DRAINAGE

- - - - DRAINAGE
- ← FLOW DIRECTION
- - - - INDETERMINATE DRAINAGE

### TRANSPORTATION/UTILITY

- ==== VEHICLE ACCESS
- + + + + RAILWAY

### SITE FEATURES

- ||||| DIKE
- ||||| STANDING LIQUID
- SL STANDING LIQUID
- ⊖ EXCAVATION, PIT (EXTENSIVE)
- ⊖ MOUNDED MATERIAL (EXTENSIVE)
- MM MOUNDED MATERIAL (SMALL)
- CR CRATES/BOXES
- DR DRUMS
- HT HORIZONTAL TANK
- PT PRESSURE TANK
- VT VERTICAL TANK
- CA CLEARED AREA
- DG DISTURBED GROUND
- FL FILL
- IM IMPOUNDMENT
- LG LAGOON
- OF OUTFALL
- SD SLUDGE
- ST STAIN
- SW SOLID WASTE
- TR TRENCH
- VS VEGETATION STRESS
- WD WASTE DISPOSAL AREA
- WV WETLAND VEGETATION

Figure 27. Indian Head NSWC, Stump Neck Annex, September 15, 1967.  
Approximate scale 1:12,000.

APRIL 18, 1972 (FIGURE 28)

Solid waste is visible within the impoundment in the eastern portion of the annex. To the southwest, gray-toned material is observed adjacent to a small building and in a nearby area that had been cleared sometime prior to 1956. A new revegetating mound of material is visible to the southwest. Small craters, smoke, and burning waste are evident in the area where craters and fill were seen in 1967. At the end of the peninsula numerous small craters are again present suggesting continued disposal of ordnance. An area of staining is seen nearby.



Figure 28. Indian Head NSWC, Stump Neck Annex, April 18, 1972. Approximate scale 1:11,800.

## INTERPRETATION CODE

### BOUNDARIES AND LIMITS

- x-x-x-x FENCED SITE BOUNDARY
- UNFENCED SITE BOUNDARY
- x x x x x x FENCE
- - - - STUDY AREA

### DRAINAGE

- - - - DRAINAGE
- ← FLOW DIRECTION
- - - - INDETERMINATE DRAINAGE

### TRANSPORTATION/UTILITY

- ===== VEHICLE ACCESS
- + + + + RAILWAY

### SITE FEATURES

- ||||| DIKE
- SL STANDING LIQUID
- SL STANDING LIQUID
- EXCAVATION, PIT (EXTENSIVE)
- MOUNDED MATERIAL (EXTENSIVE)
- MM MOUNDED MATERIAL (SMALL)
- CR CRATES/BOXES
- DR DRUMS
- HT HORIZONTAL TANK
- PT PRESSURE TANK
- VT VERTICAL TANK
- CA CLEARED AREA
- DG DISTURBED GROUND
- FL FILL
- IM IMPOUNDMENT
- LG LAGOON
- OF OUTFALL
- SD SLUDGE
- ST STAIN
- SW SOLID WASTE
- TR TRENCH
- VS VEGETATION STRESS
- WD WASTE DISPOSAL AREA
- WV WETLAND VEGETATION

MARCH 29, 1982 (FIGURE 29)

The impoundment in the eastern portion of the annex no longer contains solid waste as seen in 1972. To the southwest, fill has been added at the area where craters, smoke, and burning waste were noted in 1972. No craters or burning areas are observed; however, several old craters are seen adjacent to the south end of the fill area. At the tip of the peninsula, craters and waste burning are evident as observed in 1972, but the location of the craters has changed indicating continuing disposal of ordnance.



## INTERPRETATION CODE

### BOUNDARIES AND LIMITS

- x-x-x-x FENCED SITE BOUNDARY
- UNFENCED SITE BOUNDARY
- x x x x x x FENCE
- STUDY AREA

### DRAINAGE

- DRAINAGE
- ← FLOW DIRECTION
- INDETERMINATE DRAINAGE

### TRANSPORTATION/UTILITY

- ===== VEHICLE ACCESS
- + + + + RAILWAY

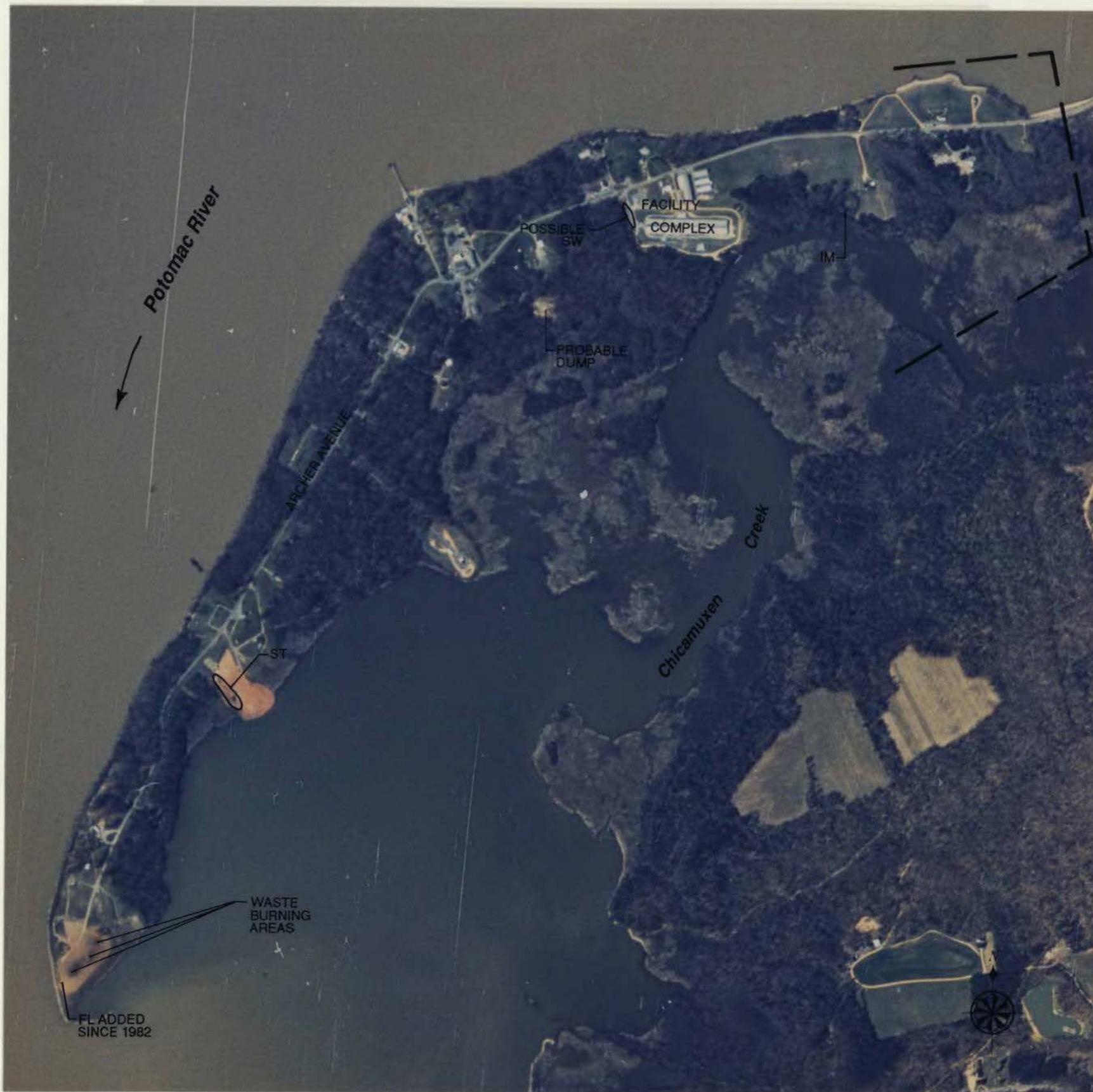
### SITE FEATURES

- ||||| DIKE
- ▨ STANDING LIQUID
- SL STANDING LIQUID
- EXCAVATION, PIT (EXTENSIVE)
- ⊖ MOUNDED MATERIAL (EXTENSIVE)
- MM MOUNDED MATERIAL (SMALL)
- CR CRATES/BOXES
- DR DRUMS
- HT HORIZONTAL TANK
- PT PRESSURE TANK
- VT VERTICAL TANK
- CA CLEARED AREA
- DG DISTURBED GROUND
- FL FILL
- IM IMPOUNDMENT
- LG LAGOON
- OF OUTFALL
- SD SLUDGE
- ST STAIN
- SW SOLID WASTE
- TR TRENCH
- VS VEGETATION STRESS
- WD WASTE DISPOSAL AREA
- WV WETLAND VEGETATION

Figure 29. Indian Head NSWC, Stump Neck Annex, March 29, 1982. Approximate scale 1:11,880.

APRIL 10, 1987 (FIGURE 30)

Possible solid waste is observed in a gully on the western side of a large facility complex. A probable dump is also evident to the southwest. Further to the southwest, changes are identified at the ordnance and waste disposal area. New fill covers the old craters seen in 1982 and staining is present on the south side of the fill. At the tip of the peninsula new fill has been added since 1982 covering craters and waste burning areas seen in 1982. Three distinct new waste burning areas are seen on this fill area.



## INTERPRETATION CODE

### BOUNDARIES AND LIMITS

- x-x-x-x FENCED SITE BOUNDARY
- UNFENCED SITE BOUNDARY
- x x x x x x FENCE
- - - - STUDY AREA

### DRAINAGE

- - - - DRAINAGE
- FLOW DIRECTION
- - - - INDETERMINATE DRAINAGE

### TRANSPORTATION/UTILITY

- ==== VEHICLE ACCESS
- + + + + RAILWAY

### SITE FEATURES

- |||||| DIKE
- ===== STANDING LIQUID
- SL STANDING LIQUID
- ⊖ EXCAVATION, PIT (EXTENSIVE)
- ⊕ MOUNDED MATERIAL (EXTENSIVE)
- MM MOUNDED MATERIAL (SMALL)
- CR CRATES/BOXES
- DR DRUMS
- HT HORIZONTAL TANK
- PT PRESSURE TANK
- VT VERTICAL TANK
- CA CLEARED AREA
- DG DISTURBED GROUND
- FL FILL
- IM IMPOUNDMENT
- LG LAGOON
- OF OUTFALL
- SD SLUDGE
- ST STAIN
- SW SOLID WASTE
- TR TRENCH
- VS VEGETATION STRESS
- WD WASTE DISPOSAL AREA
- WV WETLAND VEGETATION

Figure 30. Indian Head NSWC, Stump Neck Annex, April 10, 1987. Approximate scale 1:10,860.

## GLOSSARY

Access Road - A paved or unpaved route of vehicular access.

Cleared Area (CA) - An area from which man has removed trees, shrubs, or other natural vegetative cover.

Dark, Medium, or Light-Toned - Tones of features in question are compared with the darkest and lightest tones of gray (if using B&W photography) on the print.

Debris - The remains of anything that can be identified as being broken down, destroyed, demolished, or dismantled.

Disturbed Ground (DG) - A rough area where the ground surface has been dug up or overturned.

Drums (DR) - Metal cylinders used for the storage, transportation, or disposal of materials.

Excavation Area - An area where earth or other material is being removed in order to alter the ground level (e.g., building construction).

Fill (FL) - Earth, stones, or other material that is used to build up the level of an area of ground.

Ground Scar - An area of bare soil, apparently the result of human activity.

Impoundment (IM) - A liquid containment area that appears to be related to activity on a site but does not appear to be used for waste storage, disposal and/or treatment.

Mounded Material (MM) - Piles of raw or waste materials on or in the vicinity of the site.

Open Storage Area - An area of open-air (outdoor) storage of containerized, raw or waste materials, within industrial or manufacturing sites.

Outfall (OF) - The place where an effluent is discharged into the environment.

Solid Waste (SW) - Any garbage, refuse, or sludge from a waste treatment, water supply treatment plant, or air pollution control facility, and other discarded material, including solid or semi-solid material resulting from industrial, commercial, mining, and agricultural operations, and from community activities; does not include solid or dissolved material in domestic sewage, or solid or dissolved materials in irrigation return flows or industrial discharges.

Stain (ST) - A residue or discoloration resulting from a spill, discharge, or removed/dispersed materials.

Standing Liquid (SL) - A small, shallow, temporary collection of liquid, not necessarily waste. Not to include liquid contained in impoundments, trenches, pits, etc.

Tanks - Vertical tanks (VT), horizontal tanks (HT), pressure tanks (PT), tank farms, and solid waste management units. A large receptacle, container, or structure for holding liquid or gas.

Vegetation Stress - Describes a condition wherein vegetation has been weakened (but not irreversibly damaged) by lack of water, disease, or exposure to toxic substances.

Waste Disposal Area - An area where waste materials are discarded.

## REFERENCES

### MAPS

Source <sup>a</sup>	Figure	Name	Scale	Date
USGS	1	United States	1:2,500,000	1972
USGS	2,23	Indian Head, MD	1:24,000	1978

### COLLATERAL INFORMATION

EPA. Background information provided by Region 3; Remote Sensing Services Request Form. 4pp.

### AERIAL PHOTOGRAPHS

Photo source <sup>a</sup>	Figure <sup>b</sup>	Date of acquisition	Original scale	Film type <sup>c</sup>	Mission I.D.	Source frame #
NOS	3-4,24	05-29-56	1:20,000	B&W	56W	1473,1471,1462
NOS		06-14-58	1:40,000	B&W	58S	
NOS	5-7,25	08-29-61	1:31,000	B&W	61S	3476,3477,3454
USGS	8-10,26	03-15-63	1:36,000	B&W	VAQW	130,131
NOS	11-13,27	09-15-67	1:40,000	B&W	67L	6141,6142,6115
ADR		11-00-75	1:60,000	B&W	111816	
ROB	14-16,28	04-18-72	1:20,000	CC	01190302	83,84,87
ROB	17-19,29	03-29-82	1:60,000	B&W	2794	0903
ASC	20-22,30	04-10-87	1:60,000	CC	-	9-05,9-04

- <sup>a</sup>ADR Aerial Data Reduction Association, Pennsuaken, New Jersey  
 ASC Air Survey Corporation, Sterling, Virginia  
 NOS National Oceanic Service, Coast and Geodetic Survey, Silver Spring, Maryland  
 ROB Robinson Aerial Surveys, Inc., Newton, New Jersey  
 USGS U.S. Geological Survey, Salt Lake City ESIC, Salt Lake City, Utah  
<sup>b</sup>Photographs listed with no figure number were analyzed but not placed in this report because no significant features or changes had occurred since the previous photographs  
<sup>c</sup>B&W Black-and-white  
 CC Conventional Color