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NSWC WHITE OAK
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DRAFT SITE SCREENING REPORT FOR SITE 27/ SWMU 48 NSWC WHITE OAK MD

5/1/2002

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May 9, 2002

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Subject: Site Screening Investigation for SWMU-48, Storm Sewers
NSWC White Oak
CTO-0093

Dear Walter:

Enclosed please find two copies of the Draft Site Screening Investigation report for the storm sewers at the former NSWC-White Oak. Based on standard review times identified by the partnering team, comments are due on this document within 45 days, or by June 24, 2002. Please contact me if you have any questions regarding this document. We look forward to receiving your comments.

Sincerely,

CH2M HILL

Scott MacEwen
Activity Manager

WDC\Document2
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Draft

Site Screening Report for White Oak Storm Sewer Lines (IR Site 27/SWMU 48) in the Former NSWC White Oak Facility

Former NSWC White Oak
Silver Spring, Maryland

Contract Task Order 0093

May 2002

Prepared for

Department of the Navy
Engineering Field Activity, Chesapeake
Naval Facilities Engineering Command

Under the

LANTDIV CLEAN II Program
Contract N62470-95-D-6007

Prepared by

Herndon, Virginia

SIGNATURE PAGE

Draft

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Former NSWC White Oak
Silver Spring, Maryland

Contract Task Order 0093
Contract N62470-95-D-6007
Navy CLEAN II Program

Prepared by

CH2M HILL

May 2002

Approved by: _____ Date: 5/8/2002
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Project Engineer

Approved by: _____ Date: 5/8/02
Scott MacEwen, P.E.
Senior Reviewer

WDC012960002.ZIP/TAF

Executive Summary

A site screening investigation (SSI) was conducted for storm sewer lines (IR Site 27 or SWMU 48) at the former Naval Surface Warfare Center (NSWC) White Oak. The principal objective of the investigation was to evaluate whether the storm sewer lines or pipe bedding could be serving as a continuing source of contamination or a preferred pathway for contaminant migration.

The SSI consisted of a review of data from previous investigations. Storm sewer locations and construction materials were identified, and known sewer line elevations were compared to historical groundwater elevations to determine whether subsurface lines might serve as conduits for preferential groundwater flow. Historical data on release of potential contaminants to the sewer lines were reviewed to identify lines that may have served as points for release of contamination to the environment.

Of the six identified areas containing storm sewer lines within NSWC-White Oak, two potentially received or may currently transport contamination. Storm sewer lines in a portion of the 100 Area are located below the water table in an area where groundwater contains hexavalent chromium. Sewer lines in this area could intercept contaminated groundwater flow and discharge it to the storm sewer outfall, potentially bypassing the downgradient monitoring well network for Site 11.

The 300 Area is of concern due to the past practice of releasing explosive-contaminated wastewater into the storm sewers leading from Building 318. A variety of chemicals were handled at Building 318 and reportedly released untreated to the storm sewer system between the 1950s and 1979. Groundwater, surface water, and sediment samples collected downgradient of Building 318 have been analyzed for explosive compounds as part of other investigations. These analyses included most of the components of the chemicals potentially released at Building 318. Available analytical data show no evidence of any continued release from the storm sewers. Compounds detected in groundwater, surface water, and sediment in areas potentially affected by the Building 318 storm sewer system do not pose a human health risk based on available data.

Ongoing investigations of the 100 Area (Site 11 RFI) and the 300 Area (Site 9 RFI, OU-1 RI/FS) are addressing areas of groundwater, surface water, and sediment contamination separately. This investigation of SWMU 48 found no indication that additional separate investigation or remedial action is necessary.

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Acronyms and Abbreviations

ALC	Adelphi Laboratory Center
AOC	Area of Concern
BRAC	Base Realignment and Closure
CERCLA	Comprehensive Environmental Resource Conservation and Liability Act
EFA	Engineering Field Activity
EPA	U.S. Environmental Protection Agency
GIS	Geographic Information System
GSA	General Services Administration
HMX	High Melting Explosive (octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine)
IR	Installation Restoration
MCL	Maximum Contaminant Level
MS/MSD	matrix spike/matrix spike duplicate
NPDES	National Pollutant Discharge Elimination System
NSWC	Naval Surface Warfare Center
NTO	3-nitro-1,2,4-triazol-5-one
PETN	Pentaorythritol tetranitrate
POTW	Publicly owned treatment works
ppb	parts per billion
PVC	Polyvinyl chloride
RBC	risk-based concentration
RCRA	Resource Conservation and Recovery Act
RDX	Royal Demolition Explosive (cyclotrimethylenetrinitramine)
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
RI/FS	Remedial Investigation/Feasibility Study
SSI	Site Screening Investigation
SWMU	Solid Waste Management Unit
TNT	2,4,6-trinitrotoluene
WSSC	Washington Suburban Sanitary Commission

1. Introduction

This report describes the results of a site screening investigation of the storm sewer lines on the former Naval Surface Warfare Center White Oak (NSWC-White Oak or the Facility). Separate investigations at NSWC-White Oak are determining the nature and extent of groundwater contamination at several identified sites, resulting from past materials handling practices at the Facility. These investigations indicate that some storm sewers are located in areas where groundwater contamination is present. The report is provided in response to a scope of work provided by Naval Facilities Engineering Command, Engineering Field Activity (EFA) Chesapeake on December 15, 1998, as part of a modification to Navy Contract N624470-95-D-6007, Contract Task Order – 0093.

1.1 Objectives and Scope of Work

The principal objective of the storm sewer line site screening investigation is to evaluate whether the storm sewer pipes or pipe bedding could be serving as a source of contamination, or a preferred pathway for contaminant migration. The storm sewers are identified as Installation Restoration (IR) Site 27 or Solid Waste Management Unit (SWMU) 48.

1.2 Report Organization

This report presents the facility background and physical setting (Section 1), conceptual model of potential contaminant transport routes related to the storm sewer lines and a summary of investigation activities (Section 2), and potential contaminant release and transport mechanisms by area (Section 3). This is followed by a summary and conclusions (Section 4).

1.3 Base Background and Status

The following background information is from the Draft Base Realignment and Closure (BRAC) Cleanup Plan for Former Naval Surface Warfare Center, Dahlgren Division, White Oak Detachment (Tetra Tech NUS, September 10, 1998).

The former NSWC-White Oak is located east of Maryland Route 650 (New Hampshire Avenue), approximately 1 mile north of Interstate 495, the Washington, DC beltway and is located in Silver Spring, Maryland, in both Montgomery and Prince George's counties (see Figure 1-1). At the time of its closure as a Navy facility in 1997, the facility encompassed approximately 710 acres. Approximately 635 acres of land at the Facility is undeveloped. Located adjacent to the south and east end of the property is the U.S. Army's Adelphi Laboratory Center (ALC). Additional properties adjacent to NSWC-White Oak include residential, commercial, industrial, and wooded parcels.

In 1946 the Naval Ordnance Laboratory moved to the White Oak site from the Washington Navy Yard. To accomplish its mission, the laboratory conducted research, development, and evaluation of the Navy's underwater mine systems; magnetic fields reduction technology for ships; energetic technology; materials research; fusing for projectiles and bombs; battery technology; strategic systems for the Navy's first strategic missiles; and hypervelocity wind tunnel, hydroballistics, and hydroacoustic testing.

To support these activities, the laboratory operated administrative and technical offices; laboratories; environmental test facilities; machining, plating, carpenter, and print shops; and a photographic laboratory. The laboratory also maintained a full-service public works department. These facilities were in turn supported by an infrastructure that included heating plants and fuel oil distribution and containment, electrical transformers, wastewater treatment, and pesticide control.

In 1995, NSWC-White Oak was selected for closure on the Base Realignment and Closure (BRAC) IV list. The mission termination date was January 1997, and operations ceased in July 1997. The U.S. Army took possession of 48 acres along the eastern and southern edges of the facility. The General Services Administration (GSA) took possession of the remaining 662 acres at NSWC-White Oak to facilitate property reuse.

1.3.1 General Base Characteristics

General base characteristics are provided in the *Master Work Plan* for the former NSWC-White Oak (Brown and Root Environmental, June 1998). The following section summarizes key relevant information from that document.

1.3.1.1 Physiography

The facility is located on the boundary between the Piedmont and Coastal Plain physiographic provinces. The facility lies in gently rolling terrain. Stream channels are deeply incised in the central and western portions of the facility. Local drainage patterns are dominated by Paint Branch and its tributaries.

1.3.1.2 Geology

The boundary between the Piedmont and Coastal Plain physiographic provinces, known as the Fall Line or Fall Zone, runs generally southwest to northeast and is generally parallel to the Montgomery – Prince George's County line in the White Oak area. Physically, the Fall Line represents the contact where older Piedmont rocks, exposed to the northwest, dip beneath Coastal Plain sediments that increase in thickness to the southeast.

Within the facility boundaries, Coastal Plain sediments are only a few tens of feet thick and in many places have been entirely eroded away (*e.g.*, in the vicinity of the more prominent creeks). The underlying or exposed Piedmont bedrock is the Wissahickon Formation metamorphic gneiss of late Precambrian age. The upper 50 to 70 feet of the Wissahickon gneiss has been highly weathered to a clay saprolite material, which retains the character of the parent material but is unconsolidated. The gneiss bedrock tends to crop out in or near the Paint Branch channel, where overlying sediments have been removed by erosion.

1.3.1.3 Hydrogeology

Groundwater occurs in both unconfined and confined conditions under the Facility. The sand and gravel units of the Coastal Plain Province and the uppermost weathered zone of the saprolite of the Wissahickon Formation comprise the unconfined or water-table aquifer. The thickness of the saprolite varies with the degree of weathering. Where erosion has removed the overlying sediments, the saprolite is thicker because of greater exposure to weathering processes. The saprolite appears to act as an aquitard in places where it has a high clay content and unfractured texture. Therefore, the saprolite can limit the water flow between the overlying water table and the underlying fractured Wissahickon Formation. Groundwater flow within the competent bedrock is limited to fractures and occurs under confined conditions at most areas of the facility.

1.3.2 Environmental Restoration Program Status

Under BRAC, the Navy is implementing a program to thoroughly investigate and, if necessary, remediate potentially contaminated sites. The BRAC Cleanup Plan (Tetra Tech NUS, September 1998) provides a detailed summary of the status of the former NSWC-White Oak's environmental restoration and associated environmental compliance programs, along with a strategy for implementing response actions to protect human health and the environment.

Environmental restoration programs at the former NSWC-White Oak are performed under the Navy Installation Restoration (IR) Program. The Navy has identified 126 areas at the facility where contaminants were or may have been released. These areas are referred to as Installation Restoration Sites (Sites), Solid Waste Management Unites (SWMUs), or areas of areas of concern (AOCs) depending on their characteristics and the program under which they were initially identified. Eighty-eight of these areas have been found to require no remedial action or have been cleaned up. The other 38 have either not yet been fully evaluated or are in some stage of remediation. These 38 areas are shown in Figure 2-1, and summarized in Table 1-1.

In all but a few cases, site boundaries have been defined and the nature and extent of contamination has been determined.

TABLE 1-1
Summary of Active IR Sites, SWMUs, and AOCs
Site Screening for SWMU-48, Storm Sewers
Former NSWC – White Oak, Silver Spring, Maryland

Identification	Description	BCT Concern	Plan	Status
IR Site 1	Parking Lot Landfill	Landfill needs to be excavated/capped	Remedial design completed in FY01 Part of OU2 Remedial action completed in FY02	CMS complete Landfill closure complete
IR Site 2	Apple Orchard Landfill	Landfill cap needed to address in-place waste Need to determine if groundwater (OU3) is significantly impacted.	Completed RFI/CMS in FY01 Part of OU2 Remedial action completed in FY02	RFI/CMS completed Landfill closure complete
IR Site 3	Pistol Range Landfill	Groundwater contamination not fully characterized	Removal action completed, will prepare a decision document for soil in FY02 Groundwater characterization included with Operable Unit 1	Time-critical removal action completed OU1 RI ongoing
IR Site 4	Chemical Burial Area	Removal action completed to 30 foot depth, residual contamination to be addressed as part of OU1 Groundwater contamination not fully characterized	Removal action completed, will prepare decision document for soil in FY02 Groundwater characterization included with Operable Unit 1	Removal action completed OU1 RI ongoing
IR Site 5	Open Burn Areas	BCT has screened data from SS investigation	Groundwater contamination being addressed within OU 1 investigation RFI will be developed to address soil contamination	Completed SS RFI being developed OU 1 RI ongoing
IR Site 7	Ordnance Burn Area	No remedial action taken to mitigate groundwater and soil contamination	Will complete CMS in FY02 Groundwater characterization included with Operable Unit 1	RFI completed CMS for soil to be developed OU 1 RI ongoing

TABLE 1-1
Summary of Active IR Sites, SWMUs, and AOCs
Site Screening for SWMU-48, Storm Sewers
Former NSWC – White Oak, Silver Spring, Maryland

Identification	Description	BCT Concern	Plan	Status
IR Site 9	Industrial Wastewater Disposal 300 Area	Groundwater requires further investigation Contingency plan for leaching wells that may be encountered during construction needed	Groundwater characterization included with Operable Unit 1	RFI completed OU 1RI ongoing
IR Site 10	Radium Spill at Building 74	Needs plan for remediation	Removal action planned for FY02	Rad sites not under permit
IR Site 11	Industrial Wastewater Disposal 100 Area	Deep aquifer needs further characterization; inorganics identified in shallow groundwater, no sources identified to date Contingency plan for leaching wells that may be encountered during construction and in GSA master plan.	Will complete RFI in FY02 Removal action performed in 1996	Deep aquifer characterization ongoing
IR Site 13	Former Oil Sludge Disposal Area	BCT has screened data from SS investigation along with Site 4 RI	Groundwater contamination being addressed within OU 1 investigation RFI will be developed to address soil contamination	Completed SS RFI being developed OU 1 RI ongoing
IR Site 14	Soil near Building 70	Needs plan for remediation	Removal action planned for FY02	Rad sites not under permit
IR Site 17	Former Building 130 South Leaching Well	Further investigation required	Site screening ongoing Needs BCT review and recommendation	Undergoing SS
IR Site 18	Building 201 Oil/Water Separator	Uncharacterized Unit removed by NSWC-WO personnel	Site screening ongoing Needs BCT review and recommendation	Undergoing SS

TABLE 1-1
Summary of Active IR Sites, SWMUs, and AOCs
Site Screening for SWMU-48, Storm Sewers
Former NSWC – White Oak, Silver Spring, Maryland

Identification	Description	BCT Concern	Plan	Status
IR Site 21	Stoneyard	Uncharacterized	Site screening ongoing Needs BCT review and recommendation	*Undergoing SS*
IR Site 22	Building 305 Wastewater Collection System	Uncharacterized	Site screening ongoing Needs BCT review and recommendation	Undergoing SS
IR Site 23	Building 311 Oxidation ditch	Uncharacterized	Site screening ongoing Needs BCT review and recommendation	Undergoing SS
IR Site 24	Building 30 Washdown System	Uncharacterized	Site screening ongoing Needs BCT review and recommendation	Undergoing SS
IR Site 25	Building 613 Sump	RCRA closure Will evaluate during explosive survey	Explosive Survey completed	Explosives survey completed
IR Site 26	Sanitary Sewer System	Need SS BCT review and recommendation needed	Investigate as appropriate as individual sites, SWMUs, and AOCs are addressed	Draft SS report under review
IR Site 27	Storm Drain System	No concern for entire system but concerns for individual sites, SWMUs and AOCs that have flowed into the storm drains	Investigate as appropriate as individual sites, SWMUs, and AOCs are addressed	Reviewing affected sites, SWMUs and AOCs Investigation ongoing
IR Site 28	Building T-14 Scrapyard	BCT has screened data from SS investigation	Engineering analysis was performed to address soil contamination	Completed SS Removal action planned

TABLE 1-1
Summary of Active IR Sites, SWMUs, and AOCs
Site Screening for SWMU-48, Storm Sewers
Former NSWC – White Oak, Silver Spring, Maryland

Identification	Description	BCT Concern	Plan	Status
IR Site 32/ AOC O	Former NPDES Outfall 009 at Building 112	BCT has screened data from SS investigation during Site 2 RI	Impacted sediment excavated during OU2 RA	Completed SS OU2 RA completed
IR Site 33	Building 25 Plating Shop Equalization Tank	Tank removal recommended	Removal action completed	Removal action completed
IR Site 46 / Operable Unit 1	Investigation south of Building 387 / Watershed east of Westfarm Branch	*Needs further investigation, impact of upgradient sites needs to be addressed, the performance of existing interim measures need to be evaluated* *BCT designated Operable Unit 1, groundwater east of Westfarm Branch, for further investigation*	SI performed FY97/98 Removal action to treat surface water discharge and groundwater is in place Will completed RI in FY02	Draft RI in place, FS to be developed.
IR Site 47	Building 90 Drainage	PCB contamination present in sediment	Removal action imminent	EE/CA complete RA planned
IR Site 48	500 Area Waste Pile Debris east of Site 4	Uncharacterized	Site Screening	Work Plan being developed
IR Site 49	Groundwater contamination 400 Area	TCE contamination in groundwater	Remedial Investigation	RFI Work Plan being developed
SWMU 36	Building 108 Incinerator	Uncharacterized	Site screening ongoing Needs BCT review and recommendation	Undergoing SS
SWMU 47	Former Wastewater Treatment Plant Site	*Uncharacterized*	Site screening ongoing Needs BCT review and recommendation	Undergoing SS

TABLE 1-1
Summary of Active IR Sites, SWMUs, and AOCs
Site Screening for SWMU-48, Storm Sewers
Former NSWC – White Oak, Silver Spring, Maryland

Identification	Description	BCT Concern	Plan	Status
SWMU 87	Building 611 Solid Waste Storage Unit	Uncharacterized	Site screening ongoing Needs BCT review and recommendation	Undergoing SS
AOC K	Pistol Range Transformer Storage Area	Uncharacterized	Included with Site 4 RFI	Refer to Site 4
AOC N	Former Outfall 006 at Building 201	Uncharacterized	Site screening ongoing Needs BCT review and recommendation	Undergoing SS
AOC P	Former Outfall 012 at Building 312	Uncharacterized	Site screening ongoing Needs BCT review and recommendation	Undergoing SS
AOC S	Former Outfall 018 at Building 310A	Uncharacterized	Site screening ongoing Needs BCT review and recommendation	Undergoing SS
EBS AOC 108	Metal Bricks at Building 108	Needs further investigation	Site screening ongoing Being investigated as part of SWMU 36	Refer to SWMU 36
EBS AOC 600	4th of July Pit	Will evaluate during explosive survey	Explosive Survey completed	Explosives survey completed
EBS AOC 630	Small Piles of Soil With Green Discoloration	Will evaluate during explosive survey	Explosive Survey completed	Explosives survey completed

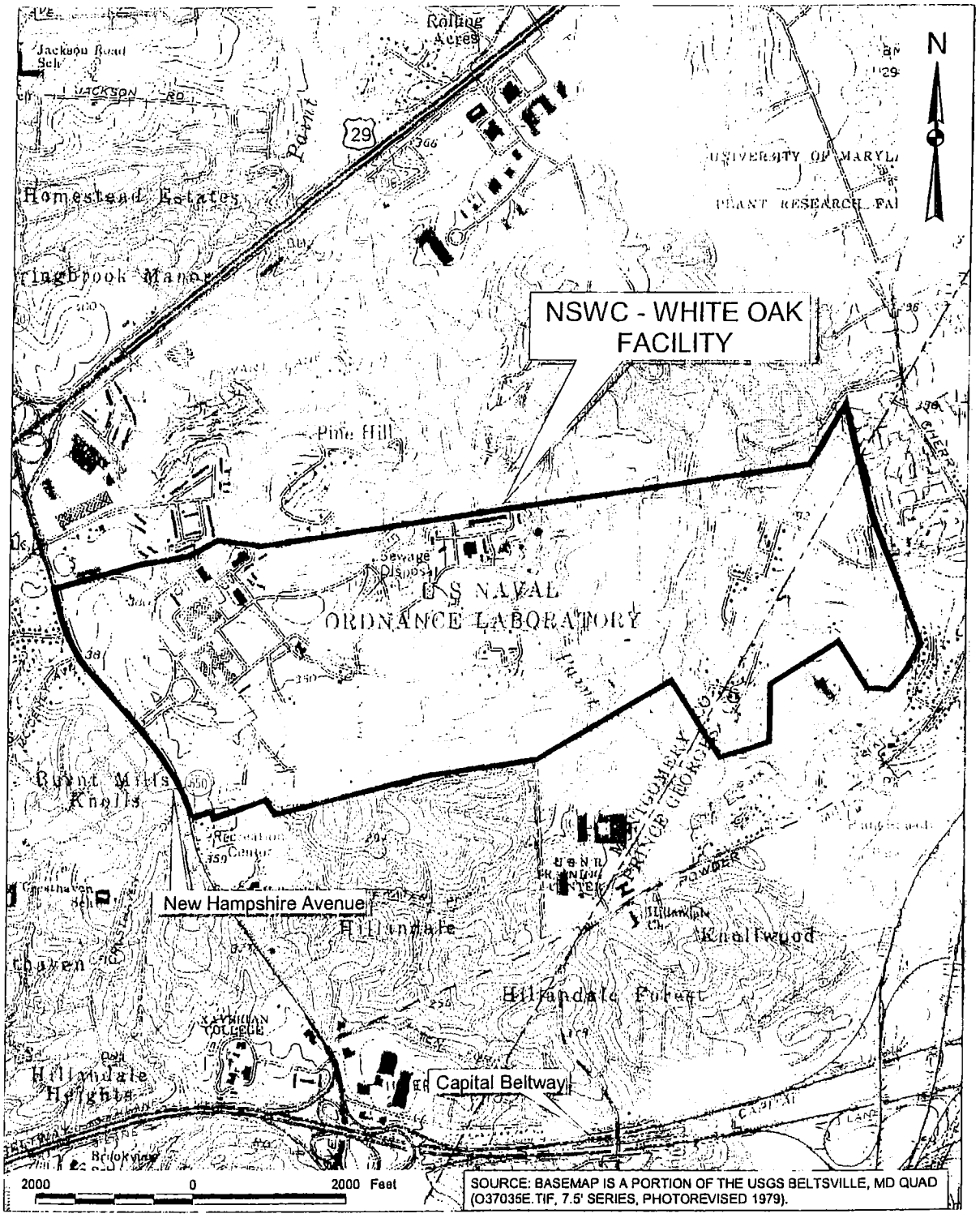

Figure 1-1
SITE VICINITY MAP
Former NSWC - White Oak
Silver Spring, Maryland

MODIFIED FROM
BROWN & ROOT ENVIRONMENTAL, 6/12/98

CH2MHILL

2. Site Conceptual Model and Summary of Investigation Activities

2.1 Site Conceptual Model

2.1.1 Storm Sewer Construction and Function

At the former NSWC-White Oak there exists an extensive network of storm and sanitary sewage systems. These systems are separate from one another, each having their own interconnecting pipes, drainage ditches, and treatment methods. Sanitary sewers carry waste directly from the generator to wastewater treatment plants. Storm sewers, on the other hand, are systems that are designed to carry rainfall runoff as well as other forms of drainage but not typically sewage or other waste streams. This water is not carried to a wastewater treatment plant but instead is carried by underground pipes and open ditches and is ultimately discharged (untreated) into streams or other water bodies. The storm sewers at NSWC-White Oak are a widespread system containing numerous interconnected pipes, lined and unlined drainage ditches, and outfall points. The storm system is presented on Figure 2-1 and is the subject of this report.

The storm sewer system was initially installed in the 1940s and was modified as necessary to accommodate the growth of facilities of the NSWC-White Oak. The storm sewer system consists of approximately 25,867 linear feet of 4 to 42 inch diameter pipes along with concrete-lined and unlined ditches. Pipe materials used in the construction and maintenance of the systems include corrugated metal, polyvinyl chloride (PVC), cast iron, vitrified clay, asbestos cement, and lined pipe (Baker, 1999).

2.1.2 Drainage Patterns at NSWC-White Oak

The storm sewer systems are described according to drainage area, and are depicted in Figure 2-1.

The 100 Area is located on the western side of NSWC-White Oak, and includes a large grouping of buildings. The storm sewer system in the 100 Area consists of ten separate outfalls that collect runoff from a total area of approximately 80 acres. Each of these outfalls discharges flow to unlined channels that are typically dry; these direct storm flow toward five tributaries which ultimately flow into Paint Branch.

The 200 Area is located near the middle of the facility. The storm sewer system in this area collects runoff from approximately 6 acres and includes five outfalls that deposit flow into unlined channels. Flow is directed into a tributary of Paint Branch or directly into Paint Branch.

The 300 Area, located in the eastern portion of the facility, includes numerous concrete-lined and unlined open ditches and culverts directing flow toward multiple outfalls. Runoff is

collected from an area of approximately 18 acres and ultimately drained toward the Isherwood Road stream or toward West Farm Branch.

Located in the north-central portion of the facility is the 400 Area, which is comprised of a small grouping of buildings connected by storm sewers. Nine outfalls collect runoff from an area of approximately 12 acres and direct flow toward Paint Branch or toward an unnamed tributary of Paint Branch.

The 500 Area is located in the northeast corner of the facility. No constructed storm sewer system is present in the 500 Area. Natural flow is directed toward the Floral Drive stream.

The storm sewer system in the 600 Area consists of only a few small culverts that direct surface runoff under rocks. There is one permitted outfall within the 600 Area (Outfall 004) which collects runoff from an area of approximately 2 acres and drains directly into Paint Branch.

The areas noted above contain smaller drainage areas that are identified in Figure 2-1. Drainage areas are identified as the area within which all surface runoff will flow to a common storm sewer outfall. Runoff in each area will be carried by the storm sewer system through a series of pipes and ditches until it reaches the final outfall point. This sewer outfall will be either an unpermitted or a permitted (NPDES) outfall point. All outfalls at White Oak eventually drain into Paint Branch.

2.1.3 NPDES Permits

Twelve of the stormwater outfalls at NSWC-White Oak are permitted under the National Pollutant Discharge Elimination System (NPDES). NPDES permits are used to monitor and limit the amount of pollutants released into the waters of the United States. The Clean Water Act prohibits anybody from discharging "pollutants" through a "point source" into a "water of the United States" unless they have an NPDES permit (http://cfpub.epa.gov/npdes/). Monitoring and reporting requirements, as well as other provisions, are used to ensure that the discharge does not adversely impact water quality or human health. NPDES permits are issued by states as delegated by the U.S. Environmental Protection Agency (EPA).

NSWC-White Oak has a facility-wide NPDES permit that currently contains no specific limits on the material discharged into the waterways (Appendix A). The fact there are no specific limits is based on prior demonstration that the water that is released is clean. The permit currently requires that the facility must monitor specified outfalls (002, 010 and 011; see Figure 2-1). NSWC-White Oak is authorized to discharge steam condensate, groundwater, and storm water from outfalls 002 and 010, and groundwater and storm water from Outfall 011. This discharge is limited and monitored at the outfall pipes. Monitoring includes flow, and total volatile organics for the groundwater and condensate only. The facility is not currently required to monitor the remaining nine NPDES outfalls.

Seven of the twelve NPDES outfalls were designated as an "area of concern" (AOC) in the 1990 RFA. A site screening investigation subsequently performed and finalized in 2002 (TtNUS, 2002) has concluded that the majority of these outfalls do not require further investigation nor do they require remedial actions. The specific outfalls that have been identified as AOCs are specified in the discussions below.

The 100 Area is composed of ten storm water drainage areas. Five NPDES outfalls are in the 100 Area. One of these five, Outfall 009 (Site 32/AOC-O), has been identified as an AOC. The drainage area for Outfall 009 encompasses the northern portion of the 100 Area. This outfall drains directly into tributary 187. This outfall contained contaminated sediments polychlorinated biphenyls (PCBs) which have been attributed to the Site 1 and Site 2 landfills rather than the storm sewer system. The sediments were excavated in 2001.

In the 200 Area, there are six storm water drainage areas separating the small complex of buildings. This area contains only one NPDES outfall (NPDES Outfall 006, AOC N). Outfall 006 deposits water directly into tributary 188 before flowing to Paint Branch. Dieldrin, a pesticide, was detected in the soil at this outfall during the AOC 2 site screening investigation. However, concentrations are expected to be below site-specific ecological risk-based levels and this area is not expected to require further investigation or any remediation. The final determination of this AOC will be documented in the AOC Group 2 Report.

In the 300 Area there are two principal drainage areas (12/17 and 14, named for the NPDES Outfalls located within them) and many small areas. The 300 Area contains four NPDES Outfalls, shown in Figure 2-1: 017F/AOC R, 012/AOC P, 018/ AOC S, and 014/AOC Q. All four outfalls drain into the Isherwood Road stream.

As part of the AOC Group 2 site screening investigation, the BCT determined that Outfall 014/AOC Q and Outfall 017F/AOC R did not require any further investigation or remedial action. Outfall 012/AOC P is proposed for additional soil sampling because the initial samples were not collected close enough to the outfall. Outfall 018/AOC S is being further evaluated due to low concentrations of mercury found in the Isherwood Road stream sediments downstream of this outfall. Mercury concentrations are being evaluated to determine if they pose a risk to ecological receptors. Outfall 018 receives discharges from a single 20-foot-long storm sewer pipe connected to Building 310A. If this outfall and storm sewer pipe are required to undergo additional investigation or remediation, it will be done under the designation of AOC S.

The 400 Area and the 500 Area contain no NPDES Outfalls. The 600 Area contains only one NPDES Outfall located at its far southern tip. This outfall receives storm water from a 2 acre drainage area (Outfall 004/AOC M), and drains directly into Paint Branch. The AOC Group 2 Site Screening report determined that Outfall 004/AOC M did not warrant any further investigation or any remedial action.

2.1.4 Storm Sewer-Groundwater Interactions

Storm sewers and sewer bedding could serve as conduits for preferential transport of groundwater where the sewers are located below the water table. If the sewer is located above the water table, materials in the storm sewer could be released through the pipes if they contain deficiencies. If deficiencies are present, flow from the pipe or lined ditch could be released to the soil and potentially to the groundwater below.

Under normal circumstances (the vast majority of cases) seepage out of storm sewers into the ground is not cause for concern, and can actually be considered desirable from an environmental standpoint. The water in the storm sewers is typically rainfall runoff that would naturally infiltrate the ground if not for the presence of manmade impervious

surfaces such as parking lots, roads and buildings. In fact, modern stormwater management systems typically consist of retention ponds which encourage groundwater recharge rather than direct discharges to surface water bodies. The concern with seepage out of storm sewers only exists when chemicals are disposed of in the storm sewers.

Likewise, infiltration of groundwater into sewers is not necessarily a cause for alarm unless the groundwater contains contaminants that would be detrimental to the receiving surface water body.

Previous investigations by Baker identified deficiencies in the sewer systems at NSWC-White Oak. In the July 1999 Storm Sewer Investigation, Baker noted that defects were observed in the storm sewer system that could potentially allow materials to enter or exit these systems from or to the surrounding environment (Baker, 1999). The most likely indicators that materials could be migrating into or out of the sewers are deposition and infiltration. Additional indicators include the presence of roots or an offset corbel (that portion of a manhole which slopes upward and inward), which may provide evidence as to whether materials migrated into and out of other systems (Baker, 1999).

2.2 Summary of Investigation Activities

This investigation included a review of available data from previous investigations. Storm sewer locations and construction materials were identified, and known sewer line elevations were compared to historical groundwater elevation data to determine whether subsurface lines might serve as conduits for preferential groundwater flow. Historical data on release of potential contaminants to the sewer lines were reviewed to identify lines that may have served as points for release of contamination to the environment. Areas requiring additional evaluation were identified, and follow-up actions are recommended in this report as appropriate.

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NPDES OUTFALLS 002, 010
SITE 10
SITE 1
NPDES OUTFALL 009
SITE 32/AOC-0
SITE 21
SITE 2
TRIBUTARY 187
SEE INSERT ON THIS SHEET FOR DETAIL OF THIS AREA
SITE 14
SITE 33
SITE 47
AREA 100
SITE 11
NPDES OUTFALL 011
NPDES OUTFALL 007
UNNAMED TRIBUTARY A
NPDES OUTFALL 003
SWMU 47
SITE 49
SWMU 36
AREA 400
EBS AOC 600
EBS AOC 630
SITE 25
PAINT BRANCH
UNNAMED TRIBUTARY B
AREA 600
AREA 200
TRIBUTARY 188
SITE 18
NPDES OUTFALL 006
AOC N
SITE 28
SITE 17
TRIBUTARY 189
SITE 3
AOC K
SITE 13
SITE 5
SITE 4
SITE 48
SITE 7
AREA 500
WEST FARM BRANCH
SITE 22
SITE 24
AREA 300
ISHERWOOD ROAD STREAM
FLORAL DRIVE STREAM
NPDES OUTFALL 014
AOC Q
SITE 46
NPDES OUTFALL 018
AOC S
SITE 23
SEE INSERT ON THIS SHEET FOR DETAIL OF THIS AREA
SWMU 87
NPDES OUTFALL 004
AOC M
SITE 9
NPDES OUTFALL 017F
AOC R
NPDES OUTFALL 012
AOC P
ARMY RESEARCH LABORATORY

0 400 800 1200
Scale In Feet

N

LEGEND

- NPDES OUTFALL
- IR SITE, SWMU, OR AOC THAT WILL OR MAY REQUIRE REMEDIAL ACTION
- STREAMLINE
- PROPERTY LINE
- STORM SEWER SYSTEM DRAINAGE DIVIDE
- 380 — WATER TABLE ELEVATION CONTOUR
- AREA WHERE WATER TABLE MAY OCCASIONALLY RISE ABOVE STORM SEWER INVERT
- DESIGNATED AREA
- STORM SEWER
- CONCRETE LINED OPEN CHANNEL

DEPTH= 18.0 FT
ELEVATION= 326.0
DEPTH= 13.8 FT
ELEVATION= 335.2
DEPTH= 19.0 FT
ELEVATION= 338.0
DEPTH= 19.0 FT
ELEVATION= 341.0
DEPTH= 20.3 FT
ELEVATION= 339.7
DEPTH= 19.2 FT
ELEVATION = 341.0
DEPTH= 7.7 FT
ELEVATION UNKNOWN
11GW27
HEXAVALENT CHROMIUM
FOUND IN GROUNDWATER
DEPTH= 4.9 FT
ELEVATION UNKNOWN

Figure 2-1
WHITE OAK STORM SEWER SYSTEM
Former NSWC - White Oak
Silver Spring, Maryland
CH2MHILL

3. Potential Contaminant Release and Transport Mechanisms

This section discusses specific potential interactions between the storm sewer systems and groundwater. The concerns associated with potential storm water-groundwater interaction within each area of NSWC-White Oak are analyzed and additional followup actions recommended as appropriate.

3.1 The 100 Area

Within the 100 Area, there are approximately 10,900 feet of storm sewer lines, 22 storm sewer manholes, 151 storm sewer inlet structures, and 23 stormwater culverts. The storm sewers in this area were inspected by Baker and defects were found in many of the structures (Baker, 1999). Manholes and pipes were examined and numerous defects including leaking joints, open joints, broken pipes, longitudinal cracks, and protruding laterals were catalogued. In addition to the physical defects in the concrete pipe structure, debris and sediment deposits also were observed. Groundwater in a small portion of the 100 Area occasionally rises above the storm sewer invert. This area is identified in Figure 2-1.

Previous investigations have been conducted in the 100 Area in conjunction with the Site 11 RCRA Facility Investigation (TtNUS, February 2000). Site 11 consists of a series of former leaching wells located throughout the 100 area, and any soil and groundwater that may have been contaminated by releases from these former wells. Groundwater near one of these leaching wells (located between Buildings 20 and 25) has been found to contain hexavalent chromium. The location of the chromium contamination coincides with the area where the 100-Area storm sewers are potentially located below the water table. As a result, the sewer line and associated bedding could intercept contaminated groundwater flow and discharge it to the storm sewer outfall, potentially bypassing the downgradient monitoring well network for Site 11.

In order to determine whether contaminated groundwater is being transported through sewer line bedding materials or through the sewer lines themselves, additional investigation is being conducted as part of the ongoing Site 11 RFI (Nesbit 2002). TtNUS will collect samples from the storm drains adjacent to Buildings 20 and 25. Details of this investigation are provided in (Nesbit 2002), and include a determination as to whether groundwater is infiltrating into the storm drains where these drains are suspected to be below the water table, and collection of surface water samples from the storm drains if water is present in them.

Any further evaluation and remedy of this area will be determined separately as part of ongoing investigations for Site 11.

3.2 The 200 Area

No contaminant releases are known or suspected into the storm sewers in the 200 Area. A review of available groundwater-level and sewer as-built data indicates the storm sewers are located above the water table and therefore could not serve as preferential pathways for groundwater flow.

3.3 The 300 Area

Within the 300 Area, there are approximately 800 feet of storm sewer lines, 23 storm sewer inlets, and 57 stormwater culverts. The field investigations identified deficiencies in several storm sewer structures and lines that would allow the potential migration of materials from the sewers outside of the line into soil and groundwater (Baker, 1999).

3.3.1 Building 318 History

The 300 Area is of concern due to the past practice of releasing explosive-contaminated wastewater into the storm sewers from Building 318. Building 318 was the site of explosive milling and shaping operations. The disposal process for wastewater generated from Building 318 is described in the Phase II RCRA Facility Assessment (RFA) (Kearney/Centaur Division, 1990) and is summarized here. From the building's construction in the 1950s until 1979, wastewater produced in the building went into a sump (SWMU 42B), which overflowed into the Storm Drain System (SWMU 48) and then discharged to the Isherwood Road stream through NPDES Outfall 017 (AOC R) (Figure 2-1). From 1979 to 1982, the wastewater in the sump went through the Former Building 318 Pilot Treatment Plant (SWMU 43), discharged into the Sanitary Sewer System (SWMU 46) and was treated in the Former Wastewater Treatment Plant (SWMU 47). By 1982, wastewater generated in Building 318 was treated in the Carbon Absorption Treatment System (SWMU 44), before being discharged into the Sanitary Sewer System. From the time the Former Wastewater Treatment Plant was deactivated in 1982 until base closure in 1997, the wastewater was discharged directly to a Publicly Owned Treatment Works (POTW) operated by the Washington Suburban Sanitary Commission (WSSC).

3.3.2 Chemicals Potentially Released

According to the RFA (Kearney, 1990), a variety of chemicals were handled at Building 318 and potentially released to the storm sewer system prior to treatment. Table 3-1 presents the list of chemicals known or suspected to have been handled at Building 318.

Many of the listed chemicals are mixtures of compounds. For example, Minol is a mixture of TNT, ammonium nitrate, and powdered aluminum. PBX is a mixture of RDX, HMX, NTO, I-RDX, and polymeric binders. Pentolite is composed of PETN and TNT, and Amatol is a mixture of ammonium nitrate and TNT. Baratol is composed of barium nitrate and TNT. Destex is composed of TNT with aluminum, Composition D-2, acetylene carbon black, and lecithin. No specific information was located on the composition of Petratol.

3.3.3 Analytical Results from Previous Investigations

Several investigations have been conducted in the vicinity of Building 318, including the RFI for Site 9 (TtNUS, October 2000) and the OU-1 groundwater investigation (CH2M HILL, 2001). Samples collected downgradient of Building 318 have been analyzed for explosive compounds, including most of the components of the chemicals potentially released at Building 318. PETN, picratol (ammonium picrate), and NTO were not analyzed for and the composition of Petratol has not been determined. Figure 3-1 shows locations for the samples collected in the vicinity of Building 318. Tables 3-2, 3-3, 3-4, and 3-6 present detected analytical data for explosives in surface water, sediment, and groundwater (permanent and temporary monitoring wells, respectively). Complete analytical data for these components are provided in Appendix B.

HMX and RDX have been detected at low concentrations (less than 10 parts per billion, ppb) in groundwater both upgradient and downgradient of Building 318. TNT was detected in only one of 84 groundwater samples, at 3 ppb in a temporary well downgradient of Building 318.

RDX has been detected at higher concentrations (greater than 100 ppb) in the groundwater in wells within the 300 Area (well 09GW01) but this plume appears to originate in an area that is not downgradient of the Building 318 storm sewer system.

RDX was detected in surface water at four locations in the Isherwood Road stream, with three of these locations upgradient of the point where the storm water drainage from Building 318 discharges into the stream. Concentrations at all locations were less than 1.5 ppb. HMX and TNT were not detected in surface water. One detection of TNT was reported in sediment in the Isherwood Road stream, in a sample collected in 1986 well upgradient of the Building 318 storm water discharge point.

3.3.4 Contaminant Fate and Transport

Between the 1950s and 1979, untreated wastewater from Building 318 was discharged into a storm sewer inlet on the north side of Browne Road. From this inlet, wastewater flowed through drainage pipes and unlined ditches, reaching the Isherwood Road stream and ultimately Paint Branch. The storm water system around Building 318 was examined by Baker in 1998 and no defects have been identified in those structures.

The available data indicate that the storm sewers in the vicinity of Building 318 and the soils beneath the storm sewers are not currently acting as sources of groundwater contamination for RDX, HMX, or TNT. Although analytical data from PETN, picratol, and NTO are not available, the data for these other compounds suggest that no significant releases are occurring from the storm sewers downgradient of Building 318. The system is primarily (90%) open channels, with closed pipes used only when the system crosses under a road. This makes it easy to determine whether potentially contaminated sediments have built up in the storm sewer system. No sediments are present within the storm sewer system near Building 318, indicating no future or continuing exposure pathway or source of contaminants within the storm sewer system.

Table 3-6 presents physical, chemical, and half-life data for components of the explosive compounds known to have been used at Building 318. These data indicate that PETN and

picratol are unlikely to have volatilized (low Henry's law constants, K_H) and have a moderate tendency to adsorb to organic components of soil (moderate octanol-water partition coefficients, log K_{ow} or organic carbon partition coefficients, log K_{oc}). The solubility of picratol is quite high at 12,800 mg/l, so if it were discharged to groundwater or surface water, it likely would be transported at close to the rate of flow and is unlikely to have remained in significant quantities in soil or sediment. The solubility and partitioning tendency (log K_{ow} or log K_{oc}) of PETN are much lower, close to that of RDX, so if released to the environment, PETN probably would follow similar transport mechanisms to RDX.

Detailed toxicity information for chemicals used at Building 318 is presented in Appendix B. Available information for PETN suggests that it is relatively nontoxic. The only available data for picratol suggests that dermatitis is the most common occupational health risk from exposure to air concentrations, but no oral or inhalation toxicity data are available. No toxicity data are available for NTO, or 3-nitro-1,2,4-triazol-5-one, a component of PBX that has not been analyzed at this site.

3.3.5 Other Investigations

Ongoing investigations of Site 9 and OU-1 are addressing known areas of contamination in the vicinity of Building 318. An area of elevated explosives contamination in groundwater southwest of Building 318 (near well 09GW01) does not appear to be linked to activities at Building 318 or releases to the storm sewers, and the ongoing OU-1 FS will address appropriate remedial action in this area. No further investigation is recommended outside of these ongoing studies.

3.4 The 400 Area

No contaminant releases are known or suspected into the storm sewers in the 400 Area. A review of available groundwater-level and sewer as-built data indicates the storm sewers are located above the water table and therefore could not serve as preferential pathways for groundwater flow.

3.5 The 500 Area

No contaminant releases are known or suspected into the storm sewers in the 500 Area. A review of available groundwater-level and sewer as-built data indicates the storm sewers are located above the water table and therefore could not serve as preferential pathways for groundwater flow.

3.6 The 600 Area

No contaminant releases are known or suspected into the storm sewers in the 600 Area. A review of available groundwater-level and sewer as-built data indicates the storm sewers are located above the water table and therefore could not serve as preferential pathways for groundwater flow.

Table 3-1
Chemicals Used at Building 318
Site Screening for SWMU-48, Storm Sewers
Former NSWC - White Oak, Silver Spring, Maryland

2,4,6-Trinitrotoluene (TNT)
Amatol
Ammonium Nitrate
Baratol
Destex
HMX
Minol
PBX
Pentaorythritol Tetranitrate (PETN)
Pentrolite
Petratol
Picratol
RDX

Source: RCRA Facility Assessment (Kearney 1990)

Table 3-2
Compounds Detected in Historic Surface Water Samples
Building 318
Site Screening for SWMU-48, Storm Sewers
Former NSWC - White Oak, Silver Spring, Maryland

Station	09SW202	09SW203	41SW01	41SW02	41SW02	41SW03	09SW102	09SW103	09SW105
Sample ID	009SW2020001	009SW2030001	41-SW-01	41-SW-02	41-SW-02-D	41-SW-03	9SW1020001	9SW1030001	9SW1050001
Sample Date	3/11/00	3/21/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00
Chemical Name									
Explosives (UG/L)									
RDX	2.6 U	2.6 U	0.5 U	1.5	NA	1.3	1.1	0.74	0.5 U
Total Metals (UG/L)									
Aluminum	35.7 U	35.7 U	402	48.8	44.6	159	76.3 U	395 U	90.3 U
Dissolved Metals (UG/L)									
No Detections									
Wet Chemistry (MG/L)									
Ammonia	0.473	0.1 U	NA	NA	NA	NA	NA	NA	NA
Nitrate	1.46	0.21	NA	NA	NA	NA	NA	NA	NA

NA - Not analyzed

Table 3-2
Compounds Detected in Historic Surface Water Samples
Building 318
Site Screening for SWMU-48, Storm Sewers
Former NSWC - White Oak, Silver Spring, Maryland

Station	09SW105	BG-SW-07	BG-SW-09
Sample ID	9SW1050001-D	BG-SW-07(OLD)	BG-SW-09(OLD)
Sample Date	1/1/00	1/1/00	1/1/00
Chemical Name			
Explosives (UG/L)			
RDX	0.5 U	NA	NA
Total Metals (UG/L)			
Aluminum	59.4 U	20 U	21.4 U
Dissolved Metals (UG/l			
No Detections			
Wet Chemistry (MG/L)			
Ammonia	NA	NA	NA
Nitrate	NA	NA	NA

NA - Not analyzed

Table 3-3
Compounds Detected in Historic Sediment Samples
Building 318
Site Screening for SWMU-48, Storm Sewers
Former NSWC - White Oak, Silver Spring, Maryland

Station	41SD01	41SD02	41SD02	41SD03	41SD04	41SD05	41SD06
Sample ID	41-SD-01	41-SD-02	41-SD-02-D	41-SD-03	41-SD-04	41-SD-05	41-SD-06
Sample Date	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00
Chemical Name							
Explosives (UG/KG)							
2,4,6-Trinitrotoluene	250 U	250 U	NA	250 U	250 U	250 U	250 U
2,4-Dinitrotoluene	250 U	250 U	NA	250 U	53 J	250 U	250 U
2-Amino-4,6-dinitrotolue	250 U	110 J	NA	250 U	250 U	250 U	250 U
4-Nitrotoluene	250 U	100 J	NA	250 U	250 U	250 U	250 U
Total Metals (MG/KG)							
Aluminum	448 J	931 J	532 U	590 J	2,040 J	892 J	922 J

NA - Not analyzed

Table 3-3
Compounds Detected in Historic Sediment Samples
Building 318
Site Screening for SWMU-48, Storm Sewers
Former NSWC - White Oak, Silver Spring, Maryland

Station	09SD08-[86]	09SD08-[86]	09SD09-[86]	09SD09-[86]
Sample ID	9SD08-(0-1) 02/01/86(OLD)	9SD08-(1-2) 02/01/86(OLD)	9SD09-(0-1) 02/01/86(OLD)	9SD09-(1-2) 02/01/86(OLD)
Sample Date	1/1/00	1/1/00	1/1/00	1/1/00
Chemical Name				
Explosives (UG/KG)				
2,4,6-Trinitrotoluene	20,000 U	20000 U	20000 U	20000 U
2,4-Dinitrotoluene	NA	NA	NA	NA
2-Amino-4,6-dinitrotolue	NA	NA	NA	NA
4-Nitrotoluene	NA	NA	NA	NA
Total Metals (MG/KG)				
Aluminum	NA	NA	NA	NA

NA - Not analyzed

Table 3-3
Compounds Detected in Historic Sediment Samples
Building 318
Site Screening for SWMU-48, Storm Sewers
Former NSWC - White Oak, Silver Spring, Maryland

Station	09SD10	09SD10	09SD10-[86]	09SD10-[86]	09SD102	09SD103
Sample ID	9SD10 a mp(OLD)	9SD10 b mp(OLD)	9SD10-(0-1) 02/01/86(OLD)	9SD10-(1-2) 02/01/86(OLD)	9SD1020001	9SD1030001
Sample Date	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00
Chemical Name						
Explosives (UG/KG)						
2,4,6-Trinitrotoluene	NA	0.94 U	20000 U	20000 U	250 U	250 U
2,4-Dinitrotoluene	NA	NA	NA	NA	250 U	250 U
2-Amino-4,6-dinitrotolue	NA	NA	NA	NA	250 U	250 U
4-Nitrotoluene	NA	NA	NA	NA	250 U	250 U
Total Metals (MG/KG)						
Aluminum	40 U	40 U	NA	NA	623 J	1,220 J

NA - Not analyzed

Table 3-3
Compounds Detected in Historic Sediment Samples
Building 318
Site Screening for SWMU-48, Storm Sewers
Former NSWC - White Oak, Silver Spring, Maryland

Station	09SD105	09SD105	09SD14-[86]	09SD14-[86]
Sample ID	9SD1050001	9SD1050001-D	9SD14-(0-1) 05/01/86(OLD)	9SD14-(1-2) 05/01/86(OLD)
Sample Date	1/1/00	1/1/00	1/1/00	1/1/00
Chemical Name				
Explosives (UG/KG)				
2,4,6-Trinitrotoluene	250 U	250 U	20000 U	20000 U
2,4-Dinitrotoluene	250 U	250 U	NA	NA
2-Amino-4,6-dinitrotolue	250 U	250 U	NA	NA
4-Nitrotoluene	250 U	250 U	NA	NA
Total Metals (MG/KG)				
Aluminum	520 J	875 J	NA	NA

NA - Not analyzed

Table 3-3
Compounds Detected in Historic Sediment Samples
Building 318
Site Screening for SWMU-48, Storm Sewers
Former NSWC - White Oak, Silver Spring, Maryland

Station	09SD15-[86]	09SD15-[86]	09SD9	09SD9	BG-SD-07	BG-SD-09
Sample ID	9SD15-(0-1) 05/01/86(OLD)	9SD15-(1-2) 05/01/86(OLD)	9SD9 a mp(OLD)	9SD9 b mp(OLD)	BG-SD-07(OLD)	BG-SD-09(OLD)
Sample Date	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00
Chemical Name						
Explosives (UG/KG)						
2,4,6-Trinitrotoluene	20000 U	20000 U	NA	0.94 U	NA	NA
2,4-Dinitrotoluene	NA	NA	NA	NA	NA	NA
2-Amino-4,6-dinitrotolue	NA	NA	NA	NA	NA	NA
4-Nitrotoluene	NA	NA	NA	NA	NA	NA
Total Metals (MG/KG)						
Aluminum	NA	NA	40 U	40 U	918	3,750

NA - Not analyzed

Table 3-4
Compounds Detected in Historic Monitoring Well Samples
Building 318
Site Screening for SWMU-48, Storm Sewers
Former NSWC - White Oak, Silver Spring, Maryland

Station	09GW001	09GW001	09GW101	09GW101	09GW103	09GW103
Sample ID	009GW001000	5009GW001000	6009GW101000	5009GW101000	6009GW103000	5009GW103000
Sample Date	3/4/00	5/6/00	3/5/00	5/6/00	3/4/00	5/19/00
Chemical Name						
Explosives (UG/L)						
1,3,5-Trinitrobenzene	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
2,4,6-Trinitrotoluene	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
2-Amino-4,6-dinitrotoluene	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
3-Nitrotoluene	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U
4-Amino-2,6-dinitrotoluene	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
4-Nitrotoluene	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U
HMX	12	9.9	2.6 U	2.6 U	1.4 J	1.5 J
Perchlorate	201	178	5 U	5 U	5 U	5 U
RDX	121	115	1 J	2.6 U	1.5 J	1.8 J
Total Metals (UG/L)						
Aluminum	792	4,010	48 B	349	676	221 B
Dissolved Metals (UG/L)						
Aluminum	35.7 U	59.7 B	35.7 U	31.7 U	35.7 U	185 B
Wet Chemistry (MG/L)						
Ammonia	0.1 U	NA	0.1 U	NA	0.1 U	NA
Nitrate	0.559	NA	0.793	NA	0.319	NA

NA - Not analyzed

Table 3-4
Compounds Detected in Historic Monitoring Well Samples
Building 318
Site Screening for SWMU-48, Storm Sewers
Former NSWC - White Oak, Silver Spring, Maryland

Station	09GW105	09GW105	09GW107	09GW107	09GW107
Sample ID	009GW1050005	009GW1050006	009GW1070005	009GW1070006	009GW1079906
Sample Date	3/5/00	5/6/00	3/4/00	5/20/00	5/20/00
Chemical Name					
Explosives (UG/L)					
1,3,5-Trinitrobenzene	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
2,4,6-Trinitrotoluene	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
2-Amino-4,6-dinitrotoluene	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
3-Nitrotoluene	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U
4-Amino-2,6-dinitrotoluene	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
4-Nitrotoluene	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U
HMX	1.5 J	1.4 J	2.6 U	2.6 U	2.6 U
Perchlorate	13.6	14.6	5 U	5 U	5 U
RDX	4.5	3.6	2.6 U	2.6 U	2.6 U
Total Metals (UG/L)					
Aluminum	774	481	56.2 B	62.1 B	57.4 B
Dissolved Metals (UG/L)					
Aluminum	35.7 U	31.7 U	35.7 U	39.9 B	31.7 U
Wet Chemistry (MG/L)					
Ammonia	0.1 U	NA	0.1 U	NA	NA
Nitrate	0.445	NA	0.05 U	NA	NA

NA - Not analyzed

Table 3-4
Compounds Detected in Historic Monitoring Well Samples
Building 318
Site Screening for SWMU-48, Storm Sewers
Former NSWC - White Oak, Silver Spring, Maryland

Station	09GW01	09GW01	09GW01	09GW01	09GW01	09GW01	09GW01	09GW01	09GW02
Sample ID	9GW01 02/01/86(OLD	9GW01 05/01/86(OLD	9GW010001	9GW010001-D	9GW010002	9GW010003	9GW010003-F	9GW010004	9GW02 02/01/86(OLD
Sample Date	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00
Chemical Name									
Explosives (UG/L)									
1,3,5-Trinitrobenzene	20 U	20 U	4 U	4 U	4 U	4 U	NA	4 U	20 U
2,4,6-Trinitrotoluene	20 U	20 U	4 U	4 U	4 U	4 U	NA	4 U	20 U
2-Amino-4,6-dinitrotoluene	NA	NA	4 U	4 U	4 U	4 U	NA	4 U	NA
3-Nitrotoluene	NA	NA	4 U	4 U	4 U	4 U	NA	4 U	NA
4-Amino-2,6-dinitrotoluene	NA	NA	4 U	4 U	4 U	4 U	NA	4 U	NA
4-Nitrotoluene	NA	NA	4 U	4 U	4 U	4 U	NA	4 U	NA
HMX	20 U	20 U	10	10	13	11	NA	12	20 U
Perchlorate	NA	NA	5 U	5 U	NA	240	NA	798	NA
RDX	97	20 U	130	130	150	160	NA	150	20 U
Total Metals (UG/L)									
Aluminum	NA	NA	114 U	70 U	161	616	NA	101	NA
Dissolved Metals (UG/L)									
Aluminum	NA	NA	NA	NA	NA	NA	29.4 U	NA	NA
Wet Chemistry (MG/L)									
Ammonia	NA	NA	NA	NA	NA	NA	NA	0.2 U	NA
Nitrate	NA	NA	NA	NA	NA	NA	NA	NA	NA

NA - Not analyzed

Table 3-4
Compounds Detected in Historic Monitoring Well Samples
Building 318
Site Screening for SWMU-48, Storm Sewers
Former NSWC - White Oak, Silver Spring, Maryland

Station	09GW02	09GW02	09GW02	09GW02	09GW02
Sample ID	)GW02 05/01/86(OLD	9GW020001	9GW020002	9GW020002-D	9GW020002-F
Sample Date	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00
Chemical Name					
Explosives (UG/L)					
1,3,5-Trinitrobenzene	20 U	0.2 U	0.2 U	0.2 U	NA
2,4,6-Trinitrotoluene	20 U	0.2 U	0.2 U	0.2 U	NA
2-Amino-4,6-dinitrotoluene	NA	0.2 U	0.2 U	0.2 U	NA
3-Nitrotoluene	NA	0.2 U	0.2 U	0.2 U	NA
4-Amino-2,6-dinitrotoluene	NA	0.2 U	0.2 U	0.2 U	NA
4-Nitrotoluene	NA	0.2 U	0.2 U	0.2 U	NA
HMX	20 U	0.5 U	0.5 U	0.5 U	NA
Perchlorate	NA	5 U	NA	NA	NA
RDX	20 U	0.5 U	0.5 U	0.75	NA
Total Metals (UG/L)					
Aluminum	NA	766	19.1 U	75.1 U	NA
Dissolved Metals (UG/L)					
Aluminum	NA	NA	NA	NA	16.6 U
Wet Chemistry (MG/L)					
Ammonia	NA	NA	NA	NA	NA
Nitrate	NA	NA	NA	NA	NA

NA - Not analyzed

Table 3-4
Compounds Detected in Historic Monitoring Well Samples
Building 318
Site Screening for SWMU-48, Storm Sewers
Former NSWC - White Oak, Silver Spring, Maryland

Station	09GW02	09GW02	09GW02	09GW02	09GW02	09GW01	09GW01	09GW01	09GW01
Sample ID	9GW020002-F-D	9GW020003	9GW020003-D	9GW020004	9GW020004-F	9GW1 1989(OLD)	9GW1 1991(OLD)	9GW1 a mp(OLD)	9GW1 b mp(OLD)
Sample Date	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00
Chemical Name									
Explosives (UG/L)									
1,3,5-Trinitrobenzene	NA	0.2 U	0.2 U	0.2 U	NA	NA	0.2 U	NA	0.2 U
2,4,6-Trinitrotoluene	NA	0.2 U	0.2 U	0.2 U	NA	NA	NA	NA	NA
2-Amino-4,6-dinitrotoluene	NA	0.2 U	0.2 U	0.2 U	NA	NA	NA	NA	NA
3-Nitrotoluene	NA	0.2 U	0.2 U	0.2 U	NA	NA	NA	NA	NA
4-Amino-2,6-dinitrotoluene	NA	0.2 U	0.2 U	0.2 U	NA	NA	NA	NA	NA
4-Nitrotoluene	NA	0.2 U	0.2 U	0.2 U	NA	NA	NA	NA	NA
HMX	NA	0.5 U	0.5 U	0.5 U	NA	10 U	18.6	10 U	10.6
Perchlorate	NA	4 U	4 U	8 U	NA	NA	NA	NA	NA
RDX	NA	0.63	0.65	0.5	NA	150	214	150	214
Total Metals (UG/L)									
Aluminum	NA	99.2	166	796	NA	NA	NA	NA	NA
Dissolved Metals (UG/L)									
Aluminum	20.9 U	NA	NA	NA	16.2 U	NA	NA	NA	NA
Wet Chemistry (MG/L)									
Ammonia	NA	NA	NA	0.2 U	NA	NA	NA	NA	NA
Nitrate	NA	NA	NA	NA	NA	NA	NA	NA	NA

NA - Not analyzed

Table 3-4
Compounds Detected in Historic Monitoring Well Samples
Building 318
Site Screening for SWMU-48, Storm Sewers
Former NSWC - White Oak, Silver Spring, Maryland

Station	09GW100	09GW100	09GW100	09GW100	09GW100	09GW100	09GW100
Sample ID	9GW1000001	9GW1000001-F	9GW1000002	9GW1000002-F	9GW1000003	9GW1000003-F	9GW1000004
Sample Date	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00
Chemical Name							
Explosives (UG/L)							
1,3,5-Trinitrobenzene	1 U	NA	2 U	NA	0.2 U	NA	1 U
2,4,6-Trinitrotoluene	1 U	NA	2 U	NA	0.2 U	NA	1 U
2-Amino-4,6-dinitrotoluene	1 U	NA	2 U	NA	0.2 U	NA	1 U
3-Nitrotoluene	1 U	NA	2 U	NA	0.2 U	NA	1 U
4-Amino-2,6-dinitrotoluene	1 U	NA	2 U	NA	0.2 U	NA	1 U
4-Nitrotoluene	1 U	NA	2 U	NA	0.2 U	NA	1 U
HMX	3	NA	5.1	NA	0.5 U	NA	2.5
Perchlorate	5 U	NA	NA	NA	4 U	NA	8 U
RDX	41	NA	66	NA	0.5 U	NA	32
Total Metals (UG/L)							
Aluminum	8,730	NA	3,240	NA	11,100	NA	2,720
Dissolved Metals (UG/L)							
Aluminum	NA	59.1 U	NA	132	NA	30.6 U	NA
Wet Chemistry (MG/L)							
Ammonia	NA	NA	NA	NA	NA	NA	0.2
Nitrate	NA	NA	NA	NA	NA	NA	NA

NA - Not analyzed

Table 3-4
Compounds Detected in Historic Monitoring Well Samples
Building 318
Site Screening for SWMU-48, Storm Sewers
Former NSWC - White Oak, Silver Spring, Maryland

Station	09GW100	09GW101	09GW101	09GW101	09GW101	09GW103	09GW103	09GW103	09GW103	09GW103
Sample ID	9GW1000004-F	9GW1010001	9GW1010002	9GW1010003	9GW1010004	9GW1030001	9GW1030001-D	9GW1030002	9GW1030002-D	9GW1030003
Sample Date	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00
Chemical Name										
Explosives (UG/L)										
1,3,5-Trinitrobenzene	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2,4,6-Trinitrotoluene	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2-Amino-4,6-dinitrotoluene	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
3-Nitrotoluene	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
4-Amino-2,6-dinitrotoluene	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
4-Nitrotoluene	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
HMX	NA	0.5 U	0.5 U	0.5 U	0.5 U	1.3	1.4	1.6	1.7	1.5
Perchlorate	NA	5 U	NA	4 U	7	10.7 K	11.5 K	NA	NA	4 U
RDX	NA	0.83	1.3	0.5 U	0.9	2.7	2.8	2.9	3	3.6
Total Metals (UG/L)										
Aluminum	NA	331	1,100	60 U	60.8 U	90.5 U	91.8 U	114 U	75.4 U	408
Dissolved Metals (UG/L)										
Aluminum	22.7 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry (MG/L)										
Ammonia	NA	NA	NA	NA	0.09	NA	NA	NA	NA	NA
Nitrate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

NA - Not analyzed

Table 3-4
Compounds Detected in Historic Monitoring Well Samples
Building 318
Site Screening for SWMU-48, Storm Sewers
Former NSWC - White Oak, Silver Spring, Maryland

Station	09GW103	09GW103	09GW103	09GW104	09GW104	09GW104	09GW104	09GW104	09GW104	09GW104
Sample ID	9GW1030003-F	9GW1030004	9GW1030004-D	9GW1040001	9GW1040001-F	9GW1040002	9GW1040002-F	9GW1040003	9GW1040003-F	9GW1040004
Sample Date	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00
Chemical Name										
Explosives (UG/L)										
1,3,5-Trinitrobenzene	NA	0.2 U	0.2 U	0.2 U	NA	0.2 U	NA	0.2 U	NA	0.2 U
2,4,6-Trinitrotoluene	NA	0.2 U	0.2 U	0.2 U	NA	0.2 U	NA	0.2 U	NA	0.2 U
2-Amino-4,6-dinitrotoluene	NA	0.2 U	0.2 U	0.2 U	NA	0.2 U	NA	0.2 U	NA	0.2 U
3-Nitrotoluene	NA	0.2 U	0.2 U	0.2 U	NA	0.2 U	NA	0.2 U	NA	0.2 U
4-Amino-2,6-dinitrotoluene	NA	0.2 U	0.2 U	0.2 U	NA	0.2 U	NA	0.2 U	NA	0.2 U
4-Nitrotoluene	NA	0.2 U	0.2 U	0.2 U	NA	0.2 U	NA	0.2 U	NA	0.2 U
HMX	NA	1.8	1.7	0.5 U	NA	0.5 U	NA	0.5 U	NA	0.5 U
Perchlorate	NA	4 U	4 U	5 U	NA	NA	NA	4 U	NA	4 U
RDX	NA	2.5	2.3	0.5 U	NA	0.5 U	NA	0.5 U	NA	0.5 U
Total Metals (UG/L)										
Aluminum	NA	84.1 U	68.3 U	157	NA	48.9 U	NA	77.4	NA	68.3 U
Dissolved Metals (UG/L)										
Aluminum	41.8 U	NA	NA	NA	12.7 U	NA	152	NA	29.4 U	NA
Wet Chemistry (MG/L)										
Ammonia	NA	0.1	0.09	NA	NA	NA	NA	NA	NA	0.1
Nitrate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

NA - Not analyzed

Table 3-4
Compounds Detected in Historic Monitoring Well Samples
Building 318
Site Screening for SWMU-48, Storm Sewers
Former NSWC - White Oak, Silver Spring, Maryland

Station	09GW104	09GW105	09GW105	09GW105	09GW105	09GW105	09GW105	09GW105	09GW107	09GW107
Sample ID	9GW1040004-F	9GW1050001	9GW1050002	9GW1050002-F	9GW1050003	9GW1050003-F	9GW1050004	9GW1050004-F	9GW1070001	9GW1070002
Sample Date	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00
Chemical Name										
Explosives (UG/L)										
1,3,5-Trinitrobenzene	NA	0.2 U	0.2 U	NA	0.2 U	NA	0.2 U	NA	0.2 U	0.2 U
2,4,6-Trinitrotoluene	NA	0.2 U	0.2 U	NA	0.2 U	NA	0.2 U	NA	0.2 U	0.2 U
2-Amino-4,6-dinitrotoluene	NA	0.2 U	0.2 U	NA	0.2 U	NA	0.2 U	NA	0.2 U	0.2 U
3-Nitrotoluene	NA	0.2 U	0.63	NA	0.2 U	NA	0.2 U	NA	0.2 U	0.2 U
4-Amino-2,6-dinitrotoluene	NA	0.2 U	0.2 U	NA	0.2 U	NA	0.2 U	NA	0.2 U	0.2 U
4-Nitrotoluene	NA	0.2 U	0.2 U	NA	0.2 U	NA	0.2 U	NA	0.2 U	0.2 U
HMX	NA	0.79	1	NA	1	NA	1.5	NA	0.5 U	0.5 U
Perchlorate	NA	5 U	NA	NA	8.4	NA	16	NA	5 U	NA
RDX	NA	4.2	3.9	NA	4	NA	5.7	NA	0.5 U	0.5 U
Total Metals (UG/L)										
Aluminum	NA	199	1,580	NA	3,340	NA	356	NA	59.5 U	60.2 U
Dissolved Metals (UG/L)										
Aluminum	17.4 U	NA	NA	243	NA	59.3 U	NA	28.3 U	NA	NA
Wet Chemistry (MG/L)										
Ammonia	NA	NA	NA	NA	NA	NA	0.1	NA	NA	NA
Nitrate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

NA - Not analyzed

Table 3-4
Compounds Detected in Historic Monitoring Well Samples
Building 318
Site Screening for SWMU-48, Storm Sewers
Former NSWC - White Oak, Silver Spring, Maryland

Station	09GW107	09GW107	09GW108	09GW108	09GW108	09GW108	09GW108	09GW108	09GW108
Sample ID	9GW1070003	9GW1070004	9GW1080001	9GW1080002	9GW1080003	9GW1080003-F	9GW1080004	GW108-00-04[10/29/99	9GW1080004-F
Sample Date	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00
Chemical Name									
Explosives (UG/L)									
1,3,5-Trinitrobenzene	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	NA	NA
2,4,6-Trinitrotoluene	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	NA	NA
2-Amino-4,6-dinitrotoluene	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	NA	NA
3-Nitrotoluene	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	NA	NA
4-Amino-2,6-dinitrotoluene	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	NA	NA
4-Nitrotoluene	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	NA	NA
HMX	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	NA	NA
Perchlorate	4 U	4 U	5 U	NA	4 U	NA	NA	4 U	NA
RDX	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	NA	NA
Total Metals (UG/L)									
Aluminum	129	47.5 U	231 U	160	267	NA	322	NA	NA
Dissolved Metals (UG/L)									
Aluminum	NA	NA	NA	NA	NA	29.4 U	NA	NA	16.2 U
Wet Chemistry (MG/L)									
Ammonia	NA	0.3	NA	NA	NA	NA	NA	NA	NA
Nitrate	NA	NA	NA	NA	NA	NA	NA	NA	NA

NA - Not analyzed

Table 3-4
Compounds Detected in Historic Monitoring Well Samples
Building 318
Site Screening for SWMU-48, Storm Sewers
Former NSWC - White Oak, Silver Spring, Maryland

Station	09GW110	09GW110	09GW110	09GW02	09GW02	09GW57D	09GW57D	09GW57D	09GW57D
Sample ID	9GW1100002	9GW1100003	9GW1100004	9GW2 a mp(OLD)	9GW2 b mp(OLD)	9GW57D a mp(OLD)	9GW57D b mp(OLD)	9GW57D0001	9GW57D0002
Sample Date	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00
Chemical Name									
Explosives (UG/L)									
1,3,5-Trinitrobenzene	0.2 U	0.2 U	0.2 U	NA	0.00E+00 R	NA	0.2 U	0.2 U	0.2 U
2,4,6-Trinitrotoluene	0.2 U	0.2 U	0.2 U	NA	NA	NA	NA	0.2 U	0.2 U
2-Amino-4,6-dinitrotoluene	0.2 U	0.2 U	0.2 U	NA	NA	NA	NA	0.2 U	0.2 U
3-Nitrotoluene	0.2 U	0.2 U	0.2 U	NA	NA	NA	NA	0.2 U	0.2 U
4-Amino-2,6-dinitrotoluene	0.2 U	0.2 U	0.2 U	NA	NA	NA	NA	0.2 U	0.2 U
4-Nitrotoluene	0.2 U	0.2 U	0.2 U	NA	NA	NA	NA	0.2 U	0.2 U
HMX	2.1	2.6	2.4	10 U	4.2 U	10 U	1.6	2.5	2.5
Perchlorate	NA	7	8	NA	NA	NA	NA	39.1 K	NA
RDX	2.2	1.9	1.9	10 U	1.6 U	10 U	12.3	6.1	6.5
Total Metals (UG/L)									
Aluminum	103 U	110	62.4 U	NA	NA	NA	NA	21.4 U	157
Dissolved Metals (UG/L)									
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry (MG/L)									
Ammonia	NA	NA	0.2	NA	NA	NA	NA	NA	NA
Nitrate	NA	NA	NA	NA	NA	NA	NA	NA	NA

NA - Not analyzed

Table 3-4
Compounds Detected in Historic Monitoring Well Samples
Building 318
Site Screening for SWMU-48, Storm Sewers
Former NSWC - White Oak, Silver Spring, Maryland

Station	09GW57D	09GW57D	09GW57S	09GW57S	09GW57S	09GW57S	09GW57S	09GW57S	09GW57S
Sample ID	9GW57D0003	9GW57D0004	9GW57S a mp(OLD)	9GW57S b mp(OLD)	9GW57S0001	9GW57S0001-F	9GW57S0002	9GW57S0002-F	9GW57S0003
Sample Date	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00
Chemical Name									
Explosives (UG/L)									
1,3,5-Trinitrobenzene	0.2 U	0.2 U	NA	0.2 U	0.2 U	NA	0.2 U	NA	0.2 U
2,4,6-Trinitrotoluene	0.2 U	0.2 U	NA	NA	0.2 U	NA	0.2 U	NA	0.2 U
2-Amino-4,6-dinitrotoluene	0.2 U	0.2 U	NA	NA	0.2 U	NA	0.2 U	NA	0.2 U
3-Nitrotoluene	0.2 U	0.2 U	NA	NA	0.2 U	NA	0.2 U	NA	0.2 U
4-Amino-2,6-dinitrotoluene	0.2 U	0.2 U	NA	NA	0.2 U	NA	0.2 U	NA	0.2 U
4-Nitrotoluene	0.2 U	0.2 U	NA	NA	0.2 U	NA	0.2 U	NA	0.2 U
HMX	2.8	2.6	25	2	0.88	NA	0.68	NA	1.1
Perchlorate	27	34	NA	NA	17.6 K	NA	NA	NA	16
RDX	6.7	5.5	10 U	12.1	1.5	NA	0.85	NA	1.9
Total Metals (UG/L)									
Aluminum	34.6 U	28.5 U	NA	NA	108,000	NA	22,800	NA	10,400
Dissolved Metals (UG/L)									
Aluminum	NA	NA	NA	NA	NA	12.7 U	NA	30.8 U	NA
Wet Chemistry (MG/L)									
Ammonia	NA	0.2 U	NA	NA	NA	NA	NA	NA	NA
Nitrate	NA	NA	NA	NA	NA	NA	NA	NA	NA

NA - Not analyzed

Table 3-4
Compounds Detected in Historic Monitoring Well Samples
Building 318
Site Screening for SWMU-48, Storm Sewers
Former NSWC - White Oak, Silver Spring, Maryland

Station	09GW57S	09GW57S	09GW57S	9TW0020001	09GW01	09GW02	09GW57D	09GW57S
Sample ID	9GW57S0003-F	9GW57S0004	9GW57S0004-F	9TW0020001	WO-9GW01(OLD)	WO-9GW02(OLD)	WO-9GW57D(OLD)	WO-9GW57S(OLD
Sample Date	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00
Chemical Name								
Explosives (UG/L)								
1,3,5-Trinitrobenzene	NA	0.2 U	NA	0.2 U	0.6 U	0.6 U	0.6 U	0.6 U
2,4,6-Trinitrotoluene	NA	0.2 U	NA	0.2 U	0.6 U	0.6 U	0.6 U	0.6 U
2-Amino-4,6-dinitrotoluene	NA	0.2 U	NA	0.2 U	0.6 U	0.6 U	0.6 U	0.6 U
3-Nitrotoluene	NA	0.2 U	NA	0.2 U	1.3 U	1.3 U	1.3 U	1.3 U
4-Amino-2,6-dinitrotoluene	NA	0.2 U	NA	0.2 U	0.6 U	0.6 U	0.6 U	0.6 U
4-Nitrotoluene	NA	0.2 U	NA	0.2 U	1.3 U	1.3 U	1.3 U	1.3 U
HMX	NA	0.78	NA	2.2	9.3	1.3 U	1.9	1.7
Perchlorate	NA	8 U	NA	7.9 L	NA	NA	NA	NA
RDX	NA	0.93	NA	2.9	101	1.3 U	5.6	3.7
Total Metals (UG/L)								
Aluminum	NA	2,970	NA	5,000	609 J	528 J	142 U	506 J
Dissolved Metals (UG/L)								
Aluminum	29.4 U	NA	16.2 U	NA	NA	NA	NA	NA
Wet Chemistry (MG/L)								
Ammonia	NA	0.2 U	NA	NA	NA	NA	NA	NA
Nitrate	NA	NA	NA	NA	0.57	0.32	0.73	0.94

NA - Not analyzed

Table 3-5
Physical, Chemical, and Half-Life Data of Representative Chemicals
Site Screening for SWMU-48, Storm Sewers
Former NSWC-White Oak, Silver Spring, Maryland

CHEMICAL	Molecular Weight	Specific Gravity	Water Solubility	Vapor Pressure	Henry's Law Constant	Log K_{ow}	Log K_{oc}	K_d	Half-Life Range (days)					
									Soil		Groundwater		Surface Water	
	(g/mole)	(unitless)	(mg/l)	(mmHg)	(atm-m^3/mole)	(ml/g)	(ml/g)	(ml/g)	Low	High	Low	High	Low	High
Explosives														
HMX	296.16	1.87	6.63	NA	NA	NA	3.80	7.6	NA	NA	NA	NA	NA	NA
RDX	222.26	1.82	38.6	1×10^{-9}	1.2×10^{-5}	NA	1.80	7.63×10^{-1}	NA	NA	NA	NA	NA	NA
2,4,6-Trinitrotoluene	227.13	1.654	130	0.05	1.37×10^{-5}	NA	1.00	1.9×10^{-2}	28	180	28	365	0.1	25
Ammonium Nitrate	80.06	1.72	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PBX	222.26	1.82	59.8	NA	NA	0.87	NA	NA	NA	NA	NA	NA	NA	NA
Pentaorythritol Tetranitrate (PET	316.14	1.773	43	1×10^{-10}	1.22×10^{-11}	1.61	NA	NA	NA	NA	NA	NA	NA	NA
Picratol	246.14	1.72	1.28×10^{4}	7.5×10^{-8}	1.7×10^{-8}	1.33	NA	NA	NA	NA	NA	NA	NA	NA

Notes

K_{oc} = Organic carbon partition coefficient

f_{oc} = fraction organic carbon in soil (1.21×10^{-3})

ρ = 1.85 g/cm^3 (bulk density of soil)

n_e = 0.25 (bulk porosity of soil)

K_d = K_{oc} * f_{oc} (water - soil partition coefficient, for orgar

NA = Not available

NR = Not relevant for the indicated organic

NU = Not Known; form of inorganic is not identified

Specific gravity, solubility, and vapor pressure are at 20 °C, if available, or nearest temperature

[a] Mean K_d values from Dragun, J.

Data sources:

Montgomery and Welkom, 1989, *Groundwater Chemicals Desk Reference,* Volume 1

U.S. Department of Health and Human Services (ATSDR), 1993, *Toxicological Profile for RDX (Draft)*

U.S. EPA Office of Drinking Water, 1989, *Trinitrotoluene Health Advisory*

Half-lives from Howard, Ph. H. et al, 1991, *Handbook of Environmental Degradation Rates* and from *ATSDR, 1993*

Dragun, James. *The Soil Chemistry of Hazardous Materials*

Table 3-6
Physical, Chemical, and Half-Life Data of Representative Chemicals
Site Screening for SWMU-48, Storm Sewers
Former NSWC-White Oak, Silver Spring, Maryland

CHEMICAL	Molecular Weight	Specific Gravity	Water Solubility	Vapor Pressure	Henry's Law Constant	Log K_{ow}	Log K_{oc}	K_d	Half-Life Range (days)					
									Soil		Groundwater		Surface Water	
	(g/mole)	(unitless)	(mg/l)	(mm Hg)	(atm-m^3/mole	(ml/g)	(ml/g)	(ml/g)	Low	High	Low	High	Low	High
Explosives														
HMX	296.16	1.87	6.63	NA	NA	NA	3.80	7.6	NA	NA	NA	NA	NA	NA
RDX	222.26	1.82	38.6	1×10^{-9}	1.2×10^{-5}	NA	1.80	7.63×10^{-1}	NA	NA	NA	NA	NA	NA
2,4,6-Trinitrotoluene	227.13	1.654	130	0.05	1.37×10^{-5}	NA	1.00	1.9×10^{-2}	28	180	28	365	0.1	25
Ammonium Nitrate	80.06	1.72	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PBX	222.26	1.82	59.8	NA	NA	0.87	NA	NA	NA	NA	NA	NA	NA	NA
Pentaorythritol Tetranitrate (PET	316.14	1.773	43	1×10^{-10}	1.22×10^{-11}	1.61	NA	NA	NA	NA	NA	NA	NA	NA
Picratol	246.14	1.72	1.28×10^{4}	7.5×10^{-8}	1.7×10^{-8}	1.33	NA	NA	NA	NA	NA	NA	NA	NA

Notes

K_{oc} = Organic carbon partition coefficient

f_{oc} = fraction organic carbon in soil (1.21×10^{-3})

ρ = 1.85 g/cm^3 (bulk density of soil)

n_e = 0.25 (bulk porosity of soil)

$K_d = K_{oc} * f_{oc}$ (water - soil partition coefficient, for orgar

NA = Not available

NR = Not relevant for the indicated organic

NU = Not Known; form of inorganic is not identified

Specific gravity, solubility, and vapor pressure are at 20 °C, if available, or nearest temperature

[a] Mean K_d values from Dragun, J.

Data sources:

Montgomery and Welkom, 1989, *Groundwater Chemicals Desk Reference,* Volume 1

U.S. Department of Health and Human Services (ATSDR), 1993, *Toxicological Profile for RDX (Draft)*

U.S. EPA Office of Drinking Water, 1989, *Trinitrotoluene Health Advisory*

Half-lives from Howard, Ph. H. et al, 1991, *Handbook of Environmental Degradation Rates* and from *ATSDR, 1993*

Dragun, James. *The Soil Chemistry of Hazardous Materials*

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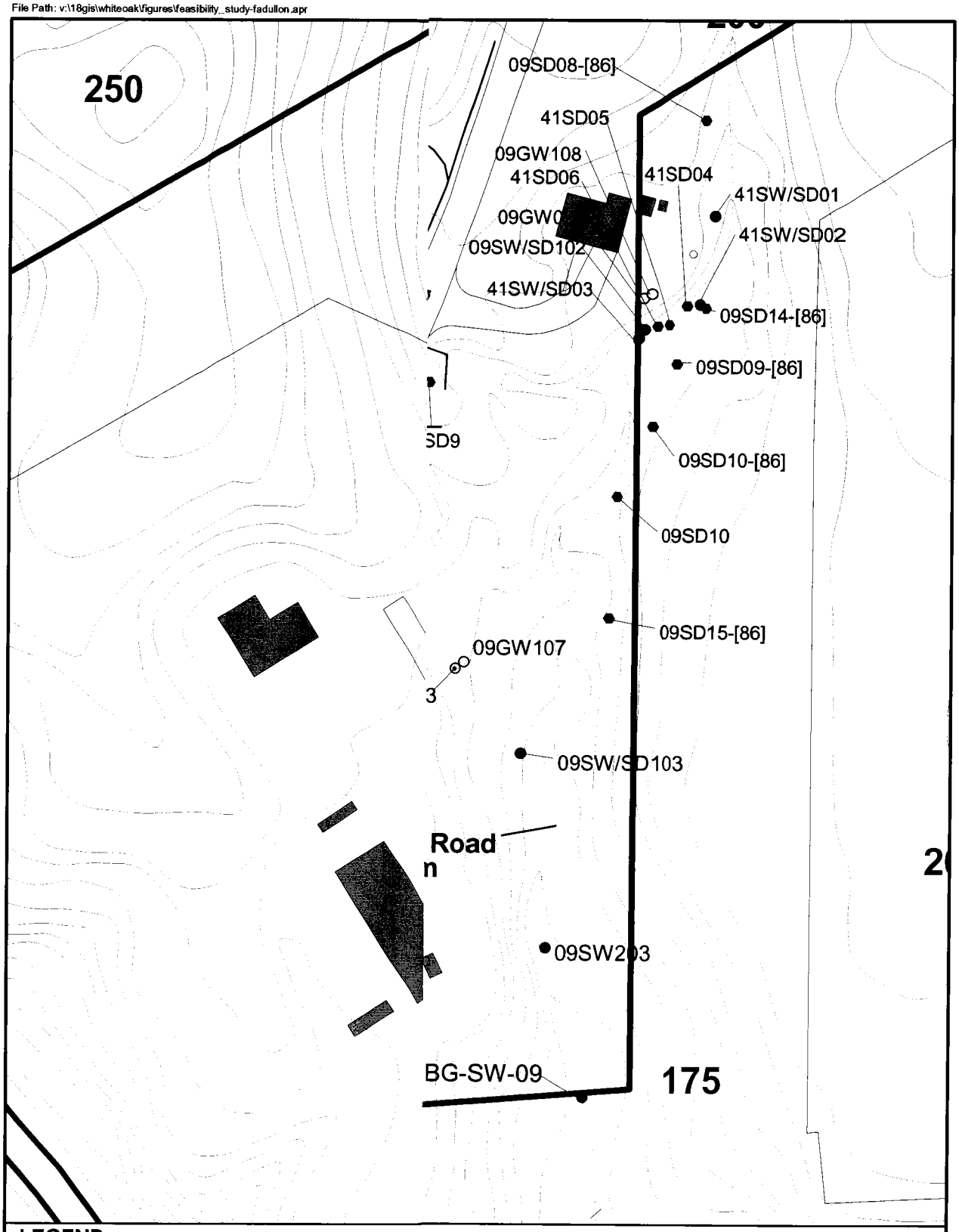

LEGEND

- Temporary Well Location
- Leaching Well Location
- Monitoring Well Location
- Surface Water/Sediment Sample Locati
- Outfall Location
- Base Boundary

Figure 3-1
Historic Sample Locations
Vicinity of Building 318
Storm Sewer Site Screening Investigation
NSWC White Oak, Silver Spring, Maryland

CH2MHILL

4 Summary and Conclusions

This investigation included a review of available data from previous investigations. Storm sewer locations and construction materials were identified, and known elevations were compared to historical groundwater elevation data to determine whether subsurface lines might serve as conduits for preferential groundwater flow. Historical data on the potential release of contaminants to the sewer lines were reviewed to identify lines that may have served as points for release of contamination to the environment. This section summarizes the results of these reviews and provides recommendations regarding further action.

4.1 Site Conceptual Model

An extensive network of storm sewers at former NSWC-White Oak was designed to carry rainfall runoff as well as other forms of drainage. Pipes, concrete-lined ditches, and unlined ditches carry this water through the facility and discharge it into various streams, ultimately draining into Paint Branch. The storm sewer system was initially installed in the 1940s and was modified as necessary to accommodate the growing facility.

A facility-wide NPDES permit covers twelve permitted outfalls. No specific monitoring requirements are currently in place, with the exception of flow and total volatile organics for three outfalls that carry steam condensate and groundwater along with storm water.

Storm sewers and sewer pipe bedding may serve as conduits for preferential transport of groundwater where the sewers are located below the water table. If the sewer is located above the water table, storm water may be released through the pipes if these contain deficiencies. An inspection of the storm water system (Baker, 1999) identified a variety of defects that could potentially allow materials to enter or exit the system from or to the surrounding environment. Indicators of these defects include deposition and infiltration, as well as the presence of roots or an offset corbel.

4.2 Potential Contaminant Release and Transport

Two areas have been identified as potentially receiving or currently transporting contamination. Storm sewer lines in a portion of the 100 Area are potentially located below the water table, in an area where groundwater contains hexavalent chromium. Sewer lines in this area could intercept contaminated groundwater flow and discharge it to the storm sewer outfall, potentially bypassing the downgradient monitoring well network for Site 11. The ongoing RFI for Site 11 will address the question of whether the storm sewer system is providing this preferential flow pathway, and subsequent remedial actions for Site 11 will include any necessary remedial action.

Past practices at Building 318, in the 300 Area, included the release of untreated wastewater contaminated with explosives compounds directly to the storm sewer system. Previous investigations in this area have included the collection of multiple groundwater, surface water, and sediment samples, and analytical results from these samples were reviewed for

the presence of explosives compounds known or suspected to have been used at Building 318. Most of the compounds used at Building 318 were mixtures containing TNT, HMX, and RDX, along with other compounds such as PETN, ammonium nitrate, ammonium picrate, and NTO. TNT, HMX, and RDX were included in previous analyses, while the other compounds have not specifically been analyzed for.

HMX and RDX are present at low concentrations in surface water and groundwater both upgradient and downgradient of Building 318. There is no evidence of past or continuing releases of these compounds from Building 318. TNT has been detected in one groundwater sample, from a temporary monitoring well downgradient of Building 318, and there was one historical sediment detection upgradient of Building 318. A review of physical and chemical characteristics of the compounds used suggests that HMX, RDX, and TNT have similar transport characteristics to PETN and the other compounds that were not analyzed for. Because HMX, RDX, and TNT do not show evidence of any significant release from Building 318, it is unlikely that the other compounds are present in significant quantities. A review of toxicological data indicates that human health risks from these compounds are either unknown or are relatively low.

The other areas identified within the storm sewer system have no known or suspected releases of hazardous compounds, and are not present below the water table. As a result, no further evaluation was conducted for these areas.

4.3 Recommendations

Ongoing investigations and planned remedial actions both in the 100 Area (Site 11 RFI) and in the 300 Area (Site 9 RFI and OU-1 RI/FS) will address known contamination and contaminant transport mechanisms for these areas. No further sampling or other action is recommended outside of those investigations.

5. References

Baker. *Draft Report for the Storm and Sanitary Sewer Investigation at the NSWC – White Oak Laboratory.* July 1999.

Brown and Root Environmental. *Master Work Plans for the former NSWC – White Oak.* June 1998.

Department of the Navy. *Draft Base Realignment and Closure Cleanup Plan for Former Naval Surface Warfare Center, Dahlgren Division White Oak Detachment.* September 1998.

Kearney/Centaur Division. *Phase II RCRA Facility Assessment of the Naval Surface Warfare Center, White Oak Laboratory, Silver Spring, Maryland.* November 1990.

Nesbit, Scott. Site 11 Storm Drain and Sanitary Sewer Sampling; Leaching Well 14 Investigation; Leaching Well 8,9, and 10 Investigation. TtNUS. Memorandum to White Oak BRAC Cleanup Team. March 13, 2002.

Tetra Tech NUS. *Background Investigation Report, Former Naval Surface Warfare Center, White Oak.* December 1998.

Tetra Tech NUS. *RCRA Facility Investigation for Site 11, Naval Surface Warface Center White Oak.* February 2000.

Tetra Tech NUS. *RCRA Facility Investigation for Sites 2, 3, 4, 7, 8, 9 and Paint Branch, Silver Spring, Maryland.* October 2000.

Tetra Tech NUS. *BRAC Cleanup Plan, Former Naval Surface Warfare Center, White Oak.* October 2001.

USEPA. *Guidance on the Documentation and Evaluation of Trace Metals Data Collected for Clean Water Act Compliance Monitoring.* April 1995.

Withington and Froelich. *Generalized Geologic Map, Naval Surface Warfare Center White Oak, Silver Spring, Maryland.* 1974.

Appendix A
NPDES Permit for NSWC-White Oak

MDE

MARYLAND DEPARTMENT OF THE ENVIRONMENT
2500 Broening Highway • Baltimore Maryland 21224
(410) 631- 3000 • 1- 800 -633-6101 • http:// www. mde. state. md. us

Parris N. Glendening
Governor

Jane T. Nishida
Secretary

July 2, 1999

Steven Richard, Safety Manager
General Services Administration
7th and D Streets, SW
Room 2080
Washington, DC 20407

RE: State Discharge Permit No. 94DP2512 (MD0002283)
FEDERAL RESEARCH CENTER AT WHITE OAK

Dear Permittee:

The Maryland Department of the Environment, Wastewater Permits Program, is now issuing discharge permits by watershed. All the dischargers in a watershed will be evaluated and issued permits in the same year. Under this procedure I am writing to notify you of a new schedule for submission of your next discharge permit renewal application. Your permit renewal application is now required to be submitted no later than **11/02/2002.**

The watershed approach helps discharge permits protect the quality of State waters. This method of issuing permits will also allow us to implement the watershed approaches in the federal Clean Water Action Plan and related requirements to limit, where appropriate, the Total Maximum Daily Load (TMDL) of pollutants discharged in a watershed. While the operation of the National Pollutant Discharge Elimination System program and its reporting mechanisms will remain the same, we will need to interrupt the existing permit issuance cycle to shift to watershed-based permitting.

The new system divides the State into five major geographic regions (watersheds). Our objective is to cycle all permits in each region once every five years. During the transition phase, it may be necessary to issue some permits for periods shorter than five years, while others may be extended for periods longer than five years. There may also be reasons such as plant expansions or upgrades that will require processing permits outside the normal cycle time.

Your facility is located in the fourth watershed region being evaluated (the Washington Metropolitan Area which includes the Patuxent River and Lower Potomac River watersheds). **The new schedule for issuance of your next permit requires that you submit your next permit application by 11/02/2002.** Issuance of all surface discharge permits in your watershed is scheduled to begin at the end of the year 2002. Application forms for renewal of the above discharge permit will be provided under separate cover.

If you have any questions regarding the revised renewal application submittal deadline for your facility, please contact Ed Stone at (410) 631-3323.

Sincerely,

J. James Dieter

J. James Dieter, Administrator
Wastewater Permits Program
Water Management Administration

JJD/mr

cc: Paul Stoner
File: 94DP2512

MDE

MARYLAND DEPARTMENT OF THE ENVIRONMENT
2500 Broening Highway • Baltimore Maryland 21224
(410) 631- 3000 • 1- 800 -633-6101 • http:// www. mde. state. md. us

Parris N. Glendening
Governor

Jane T. Nishida
Secretary

JUL 09 1998

CERTIFIED MAIL

Steven Richard, Safety Manager
General Services Administration, Room 2080
7th & D Streets
Washington, DC 20407

Re: State Discharge Permit 94-DP-2512 (NPDES Permit MD0002283)

Dear Mr. Richard:

Enclosed is the above discharge permit with the effective date indicated on the cover page. The permittee is responsible for complying with all permit conditions. You are therefore advised to read the permit carefully and become thoroughly familiar with the requirements.

Enclosed are Discharge Monitoring Report forms (EPA No. 3320-1) which must be completed for each reporting period and submitted to the Department in accordance with the requirements of the permit. You will also find enclosed a copy of the Federal Register, Part 136 -"Guidelines Establishing Test Procedures for Analysis of Pollutants". Unless otherwise specified, these guidelines are to be used for the analyses required by this permit.

Please direct all future correspondence regarding permit compliance to the following address:

Maryland Department of the Environment
Water Management Administration
Inspection and Compliance Program
2500 Broening Highway
Baltimore, Maryland 21224

If you have any questions, please do not hesitate to call Edward S. Gertler, Industrial Discharge Permits Division, at (410) 631-3323.

Sincerely,

J.L. Hearn, Director
Water Management Administration

JLH:mc

Enclosures

MDE

MARYLAND DEPARTMENT OF THE ENVIRONMENT

2500 Broening Highway • Baltimore Maryland 21224
(410) 631- 3000 • 1- 800 -633-6101 • http:// www. mde. state. md. us

Parris N. Glendening
Governor

Jane T. Nishida
Secretary

STATE DISCHARGE PERMIT NUMBER	94-DP-2512
NPDES PERMIT NUMBER	MD0002283
EFFECTIVE DATE	August 1, 1998
EXPIRATION DATE	July 31, 2003

Pursuant to the provisions of Title 9 of the Environment Article, Annotated Code of Maryland, and regulations promulgated thereunder, and the provisions of the Clean Water Act, 33 U.S.C. § 1251 et seq. and implementing regulations 40 CFR Parts 122, 123, 124, and 125, the Department of the Environment, hereinafter referred to as the "Department," hereby authorizes

General Services Administration
Room 2080, 7th & D Streets SW
Washington, DC 20407

TO DISCHARGE FROM

the Federal Research Center at White Oak (a former naval research and development facility)

LOCATED AT

10903 New Hampshire Avenue, Silver Spring, Montgomery County, Maryland 20903-1049

VIA OUTFALLS

002, 010, 011 as identified and described herein

TO

unnamed tributary to Paint Branch which is protected for water contact recreation, fishing, aquatic life (natural trout waters), and wildlife in accordance with the following special and general conditions and map(s) made a part hereof.

I. SPECIAL CONDITIONS

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the effective period of this permit, the permittee is authorized to discharge steam condensate, groundwater, and storm water from outfalls 002 (Md. Coord. 805.0E, 438.5N) and 010(Md. Coord. 806.2E, 438.0N), and groundwater and storm water from Outfall 011(Md. Coord. 805.0E, 438.5N).

As specified below, such discharge shall be limited and monitored at the respective outfall pipes, which are identified by signs, to unnamed tributaries to Paint Branch.

EFFLUENT CHARACTERISTICS	EFFLUENT LIMITATIONS				MONITORING REQUIREMENTS	
	(lbs/day)		Other Units			
	Quarterly Average	Daily Maximum	Quarterly Average	Daily Maximum	Measurement Frequency	Sample Type
Flow	N/A	N/A	(1) gpd	(1) gpd	1/Month	Measured
Total Volatile Organics(2)	N/A	N/A	(1) µg/l	(1) µg/l	1/Quarter	Grab

There shall be no discharge of floating solids or persistent foam in other than trace amounts. Persistent foam is foam that does not dissipate within one half-hour of point of discharge.

The above measurement are for the groundwater and condensate only and therefore shall be monitored during fair weather only.

(1) Monitoring required.

(2) Total Volatile Organics is defined as the sum of the concentrations of the constituents present in the wastewater according to EPA methods 601 and 602. The permittee shall include in the quarterly Discharge Monitoring Report the total sum and each individual concentration of detected constituents.

I. SPECIAL CONDITIONS

B. DEFINITIONS

1. The "monthly, quarterly, semi-annual, or annual average" effluent concentration means the value calculated by computing the arithmetic mean of all the daily determinations of concentration made during any calendar-month, 3-month, 6-month, or 12-month period respectively.

2. The "daily maximum" effluent concentration means the highest reading of any daily determination of concentration.

3. "Daily determination of concentration" means one analysis performed on any given sample representing flow during a calendar day, with one number in mg/l or other appropriate units as an outcome.

4. "Grab sample" means an individual sample collected in less than 15 minutes. Grab samples collected for pH and total residual chlorine shall be analyzed within 15 minutes of time of sample collection.

5. "Estimated" flow means a calculated volume or discharge rate which is based on a technical evaluation of the sources contributing to the discharge including, but not limited to, pump capabilities, water meters, and batch discharge volumes.

6. "Measured" flow means any method of liquid volume measurement the accuracy of which has been previously demonstrated in engineering practice, or for which a relationship to absolute volume has been obtained.

C. TOXIC POLLUTANT REPORTING

The permittee shall notify the Department as soon as it is known or suspected that any toxic pollutants which are not specifically limited by this permit have been discharged at levels specified in 40 CFR Part 122.42(a).

D. REMOVED SUBSTANCES

1. Within 30 days after notification by the Department, the permittee shall provide information on the disposal of any removed substances, as defined by General Condition B.7, including the following information:

   a. A suitable map showing all areas used for disposal of removed substances.

   b. The physical, chemical, and biological characteristics, as appropriate; quantities of any removed substances; and the method of disposal.

   c. If disposal is handled by persons other than the permittee, identification of the contractor or subcontractor, their mailing address, and the information specified in a and b above.

2. The Department's notification may also require the permittee to provide the above information prior to the use of new or additional disposal areas, contractors, or subcontractors.

E. ANALYTICAL LABORATORY

Within 30 days after the effective date of this permit, the permittee shall submit to the Department (attn: Industrial Discharge Permits Division) the name and address of the analytical laboratory (including the permittee's own laboratory) which is used to perform the monitoring required by this permit.

If the laboratory changes during the effective period of this permit, the permittee shall notify the Department of the new laboratory within 30 days after the change.

F. FLOW MONITORING

In lieu of providing measured flow (defined in Special Condition B), the permittee may estimate flows and submit the following information with their discharge monitoring report in the first quarter of each calendar year:

a. a description of the methodology used to estimate flow at each outfall where flow measurement equipment is not present;

b. documentation appropriate to the methodology utilized which provides information necessary to support the validity of the reported flow estimate. If actual measurements or observations are made, a description of typical sampling times, locations, and persons performing the measurements/observations should also be provided.

c. a description of the factors (e.g., batch discharges, intermittent operation, etc.) which cause flow at the outfall to fluctuate significantly from the estimate provided.

G. FLOW BASIS FOR ANNUAL DISCHARGE PERMIT FEE

The Department will calculate permit fees annually and will invoice the permittee based upon average discharge flow. Permit fees are payable in advance to the Department by July 1 of each fiscal year (July 1 through June 30).

The permittee shall provide to the Department's Industrial Discharge Permits Division by May 1 of each year an updated average discharge flow value for the next billing period if the flow volume used to calculate the most recent annual permit fee (or, if the permit was renewed within the past year, the flow volume used to calculate the application fee) differs significantly from either of the following flow determinations:

a. average flow data from the current fiscal year as reported on the permittee's discharge monitoring reports, or

b. the estimated flow volume for the next billing period based upon recent changes at the facility.

The permittee shall include with their flow revision notification a summary of flow data reported on discharge monitoring reports for the previous year and any other supporting documentation to be used as the basis for the flow determination.

H. TOXICITY REDUCTION EVALUATION

The permittee shall conduct a Toxicity Reduction Evaluation (TRE) when a review of toxicity test data by the Department indicates unacceptable acute or chronic effluent toxicity. A TRE is an investigation conducted to identify the causative agents of effluent toxicity, isolate the source(s), determine the effectiveness of control options, implement the necessary control measures and then confirm the reduction in toxicity.

1. Within 90 days following notification by the Department that a TRE is required, the permittee shall submit a plan of study and schedule for conducting a TRE. The permittee shall conduct the TRE study consistent with the submitted plan and schedule.

2. This plan should follow the framework presented in Generalized Methods for Conducting Industrial Toxicity Reduction Evaluations (EPA/600/2-88/070).

3. Beginning 60 days following the date of the Department's acceptance of the TRE study plan and every 60 days thereafter, the permittee shall submit progress reports including all relevant test data to the Department. This shall continue until completion of the toxicity reduction confirmation.

4. Within 60 days following completion of the toxicity identification, or the source identification phase of the TRE, the permittee shall submit to the Department a plan and schedule for implementing those measures necessary to eliminate acute toxicity and/or reduce chronic toxicity to acceptable levels. The implementation of these measures shall begin immediately upon submission of this plan.

5. Within 60 days after completing implementation of the control measures to eliminate or reduce toxicity, the permittee shall submit to the Department for approval a study plan to confirm the elimination or reduction of toxicity by using biomonitoring.

6. If, for any reason, the implemented measures do not result in compliance with the Department's toxicity limitations, the permittee shall continue the TRE.

I. OUTFALL 014

The permittee is authorized to discharge uncontaminated spring water via Outfall 014 (Md. Coord. 812.1E, 437.7N).

J. STORM WATER DISCHARGES ASSOCIATED WITH INDUSTRIAL ACTIVITY (This condition becomes applicable only if the facility stores, or disposes of controlled hazardous substances in quantities or for durations requiring permitting under RCRA). The permittee shall notify the Industrial Discharge Permits Division prior to start-up of such practices.

1. Storm Water Pollution Prevention Plans - General

The permittee shall develop a storm water pollution prevention plan for each area of the facility with point source discharges of storm water associated with industrial activity. The storm water pollution prevention plan shall be prepared in accordance with sound engineering practices. The plan shall identify potential sources of pollution which may reasonably be expected to affect the quality of storm water discharges associated with industrial activity from the facility. In addition, the plan shall describe and ensure the implementation of practices which are to be used to reduce the pollutants in storm water discharges associated with industrial activity at the facility and to assure compliance with the terms and conditions of this permit.

a. In developing this plan, the permittee shall use as a reference "Storm Water Management for Industrial Activities: Developing Pollution Prevention Plans and Best Management Practices" (EPA Document #EPA832-R-92-006) or, when it is available, an EPA-published summary document on the same subject. These documents can be obtained from the National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia 22161 (phone: 703-487-4600).

b. The plan shall be signed in accordance with II.C.18, and be retained on site in accordance with II.C.1 of this permit. The plan shall be completed and the permittee shall comply with the terms of the plan by the start-up date of any facility or activity

generating hazardous wastes. In the case of facilities which prior to this permit were covered under the Department's genera permit for storm water associated with industrial activity or w required to have a plan under their previous individual NPDES permit, the plan shall be completed and implemented prior to the effective date of this permit. The permittee shall make plans available upon request to the Department, and in the case of a storm water discharge associated with industrial activity which discharges to a municipal separate storm sewer system with an NPDES permit, to the municipal operator of the system.

c. If the plan is reviewed by the Department, the Department may notify the permittee, at any time, that the plan does not meet one or more of the minimum requirements of this Part. After such notification from the Department, the permittee shall make changes to the plan to meet the objections of the Department and shall submit to the Department a written certification that the requested changes have been made and implemented. Unless otherwise provided by the Department, the permittee shall have 90 days after such notification to make the necessary changes.

d. The permittee shall amend the plan whenever there is a change in design, construction, operation, or maintenance which has a significant effect on the potential for the discharge of pollutants to the waters of the State or if the storm water pollution prevention plan proves to be ineffective in achieving the general objectives of controlling pollutants in storm water discharges associated with industrial activity. Amendments to the plan may be reviewed by the Department in the same manner as 1.c above.

2. Storm Water Pollution Prevention Plan - Contents

The plan shall include, at a minimum, the following items:

a. The plan shall provide a **description of potential sources** which may be reasonably expected to add significant amounts of pollutants to storm water discharges. The plan shall identify all activities and significant materials which may potentially be significant pollutant sources. Each plan shall include:

i. A site map indicating an outline of the drainage area of each storm water outfall; each existing structural control measure to reduce pollutants in storm water runoff; and surface water bodies, including drainage ditches and wetlands.

ii. A topographic map (or other map, if a topographic map is unavailable), extending one-quarter of a mile beyond the property boundaries of the facility. The requirements of this condition may be included in the site map required under 2.a.i. above, if appropriate.

iii. A narrative description of significant materials that have been treated, stored, or disposed in a manner which allowed exposure to storm water at anytime from three years prior to date of issuance of this permit until the time the present method of on-site storage or disposal was initiated; materials management practices employed to minimize contac of these materials with storm water runoff; materials loading and access areas; the location and a description or existing structural and non-structural control measures to reduce pollutants in storm water runoff; and a description of any treatment the storm water receives.

iv. For each area of the facility that generates storm water discharges associated with industrial activity with a reasonable potential for containing significant amounts of pollutants, a prediction of the direction of flow, and an estimate of the types of pollutants which are likely to be present in storm water discharges associated with industrial activity; and

v. A summary of all existing sampling data describing pollutants in storm water discharges.

b. The permittee shall develop a description of **storm water management controls** appropriate for the facility, and implement such controls. The appropriateness and priorities of controls in a plan shall reflect identified potential sources of pollutants at the facility. The description of storm water management controls shall address the following minimum components, including a schedule for implementing such controls:

i. **A preventive maintenance** program that involves timely inspection and maintenance of storm water management devices (cleaning oil/water separators, catch basins) as well as inspecting and testing plant equipment and systems to uncover conditions that could cause breakdowns or failures resulting in discharges of pollutants to surface waters.

ii. **Good housekeeping** that requires the maintenance of a clean, orderly facility.

iii. **Spill prevention and response** procedures shall be identified in the plan and made known to the appropriate personnel. The necessary equipment to implement a cleanup shall be available to the appropriate personnel.

iv. The plan shall **prevent sediment and erosion** by identifying areas which, due to topography, activities, or other factors, have a high potential for significant soil erosion, and identifying measures to limit erosion.

v. The plan shall contain a narrative consideration of the appropriateness of traditional **storm water management practices** (practices other than those which control the generation or source(s) of pollutants) used to divert, infiltrate, reuse, or otherwise manage storm water runoff in a manner that reduces pollutants in storm water discharges from the site. The plan shall provide that measures determined to be reasonable and appropriate shall be implemented and maintained. The potential of various sources at the facility to contribute pollutants to storm water discharges associated with industrial activity (see 2.a. - description of potential pollutant sources) shall be considered when determining reasonable and appropriate measures. Appropriate measures may include: vegetative swales and practices, reuse of collected storm water (such as for a process or as an irrigation source), inlet controls (such as oil/water separators), snow management activities, infiltration devices, and wet detention/retention devices.

vi. Qualified plant personnel shall be identified to **visually inspect** designated equipment and plant areas. A site inspection shall be conducted annually by such personnel verify that the description of potential pollutant sources required under 2.a. is accurate, the drainage map has been updated to reflect current conditions, and the controls to reduce pollutants identified in the storm water pollution prevention plan are being implemented and are adequate. In particular, material handling areas shall be inspected for evidence of, or the potential for, pollutants entering the drainage system. A tracking or follow-up procedure shall be used to ensure that each inspection results in an appropriate response.

vii. Spills or other discharge incidents, and information describing the quality and quantity of storm water discharges shall be in the **facility records.** Maintenance activities shall be documented and recorded with inspection and discharge records. All records shall be maintained at the facility, for a minimum of three years. This period shall be automatically extended during the course of litigation, or when requested by the Department.

c. Storm water management programs may include requirements for Spill Prevention Control and Countermeasure (SPCC) plans under Section 311 of the Clean Water Act or Best Management Practices (BMPs) programs otherwise required by an NPDES permit and may incorporate any part of such plans into the storm water pollution prevention plan by reference.

d. Special Requirements for Storm Water Discharges Associated with Industrial Activity to Municipal Separate Storm Sewer Systems Serving a Population of 100,000 or More: Facilities covered by this permit shall comply with applicable requirements in municipal storm water management programs developed under State/NPDES permits issued for the discharge of the municipal separate storm sewer system that receives the facility's discharge, provided the municipal operator has notified the discharger of such conditions. These facilities shall make storm water pollution prevention plans available to the municipal operator of the system upon request.

e. **Storage piles of salt** used for deicing or other commercial or industrial purposes shall be enclosed or covered to prevent exposure to precipitation.

f. The description of the storm water **Pollution Prevention Committee** shall identify specific individuals within the plant organization who are responsible for developing the storm water pollution prevention plan and assisting the plant manager in its implementation, maintenance, and revision. The activities and responsibilities of the committee should address all aspects of the facility's storm water pollution prevention plan.

g. **Employee training** programs shall inform personnel at all levels of responsibility of the components and goals of the storm water pollution prevention plan. Training should address topics, such as spill response, good housekeeping and material management practices. A pollution prevention plan shall identify periodic dates for such training.

3. Storm Water Pollution Prevention Plan - Additional Requirements For Facilities Subject To SARA Title III, Section 313 Requirements

Storm water pollution prevention plans for facilities subject to reporting requirements under SARA Title III, Section 313 (42 U.S.C.§11023) are required to include, in addition to the information listed in condition 2., a discussion of the facility's conformance with the following (appropriate) guidelines:

a. In areas where Section 313 water priority chemicals are stored, processed or otherwise handled, appropriate containment, drainage control and/or diversionary structures shall be provided. At a minimum, one of the following preventive systems or its equivalent shall be used:

   i. Curbing, culverting, gutters, sewers or other forms of drainage control to prevent or minimize the potential for storm water runoff to come into contact with significant sources of pollutants; or

   ii. Roofs, covers, liners, or other forms of appropriate protection to prevent storage piles from leaching or exposure to storm water and wind.

b. The storm water pollution prevention plan shall include a complete discussion of measures taken to conform with the following applicable guidelines, other effective storm water pollution prevention procedures, and applicable State rules, regulations, and guidelines.

   i. No tank or container shall be used for the storage of a Section 313 water priority chemical unless its material and construction are compatible with the material stored and conditions of storage, such as pressure and temperature, etc. **Liquid storage areas for Section 313 water priority chemicals** shall be operated to minimize discharges of Section 313 chemicals by means such as secondary containment for at least the entire contents of the largest single tank plus sufficient freeboard to allow for precipitation, a strong spill contingency and integrity testing plan, and/or other equivalent measures.

   ii. **Truck and rail car loading and unloading areas for liquid Section 313 water priority chemicals** shall be operated to minimize discharges of Section 313 water priority chemicals by means such as the placement and maintenance of drip pans (including the proper disposal of materials collected in the drip pans) where spillage may occur (such as hose connections, hose reels and filler nozzles) for use when making and breaking hose connections; a strong spill contingency and integrity testing plan; and/or other equivalent measures.

   iii. **In plant areas where Section 313 water priority chemicals are transferred, processed or otherwise handled,** piping, processing equipment and materials handling equipment shall be designed and operated so as to prevent discharges of Section 313 chemicals, and be composed of materials that are compatible with the substances handled. Additional protection, such as covers or guards to prevent wind blowing, spraying or releases from pressure relief vents from causing a discharge of Section 313 water priority chemicals to the drainage system shall be provided, as appropriate, to control the releases.

iv. **Discharges from secondary containment areas.**

(a) Drainage from secondary containment shall be restrained by valves or other positive means to prevent a spill or other excessive leakage of Section 313 water priority chemicals into the drainage system. After a visual inspection of the storm water and determination that no product is present, containment areas may be emptied by pumps or ejectors; however, these shall be manually activated.

(b) Flapper-type drain valves shall not be used to drain containment areas. Valves used for the drainage of containment areas shall be of manual, open-and-close design.

(c) Records of the frequency and estimated volume (in gallons) of discharges from containment areas shall be kept at the facility for a minimum of three years.

(d) In lieu of facility drainage engineered as described above, the final discharge of all in-facility storm sewers shall be equipped with a diversion system that could, in the event of an uncontrolled spill of Section 313 water priority chemicals, return the spilled material to the facility.

(e) Areas of the facility [those not addressed in paragraphs (i), (ii), or (iii)], from which runoff which may contain Section 313 water priority chemicals or spills of Section 313 water priority chemicals and which could cause a discharge shall incorporate the necessary drainage or other control features to prevent discharge of spilled or improperly disposed material and ensure the mitigation of pollutants in runoff or leachate.

c. Facilities shall have the **necessary security** systems to prevent accidental or intentional entry which could cause a discharge. Security systems shall be described in the plan and address fencing, lighting, vehicular traffic control, and securing of equipment and buildings.

d. The storm water pollution prevention plan shall **assess the potential of various sources at the plant to contribute pollutants** to storm water discharges associated with industrial activity. The plan shall include an inventory of the types of materials handled. Facilities shall include in the plan a description of releases to land or water of SARA Title III water priority chemicals that have occurred at any time after July 1, 1989. Each of the following shall be evaluated for the reasonable potential for contributing pollutants to runoff: loading and unloading operations; outdoor storage activities; outdoor manufacturing or processing activities; significant dust or particulate generating processes; and on-site waste disposal practices. Factors to consider include the toxicity of chemicals; quantity of chemicals used, produced, or discharged: the likelihood of contact with storm water; and history of significant leaks or spills of toxic or hazardous pollutants.

4. Storm Water Pollution Prevention Plan - Additional Requirements For Construction Activity

This permit also authorizes the discharge of storm water associated with construction activity controlled by the permittee and associated with an industrial facility that is or will be regulated by this permit. *"Construction activity"* means clearing, grading, and excavation activities except: operations that result in the disturbance of less than five acres (or whatever threshold is currently specified in 40 CFR 122.26) of total land area which are not a part of a larger common plan of development or sale. *"Storm water associated with construction activity"* means the discharge from any conveyance which is used for collecting and conveying storm water and which is directly related to clearing, grading, and excavation activities. For this permit, groundwater that seeps into construction excavations shall be considered and regulated as storm water.

a. If the permittee is planning construction activity (disturbing five or more acres) at this facility, the permittee must submit an amendment to the permit application, which includes the party responsible for the construction activity, at least 48 hours prior to any land disturbing activities. The amendment, which may be presented using the Notice of Intent Form provided for the general permit for storm water associated with industrial activity, shall include the following information:

i. County, name and address (location) of the facility;

ii. Name and telephone number of the facility contact;

iii. Written description of industrial activity taking place;

iv. One four-digit SIC code that best represent the principal products or activities provided by the facility;

v. Watershed basin code;

vi. The latitude and longitude of the approximate center of the facility to the nearest 15 seconds;

vii. The name of the receiving water(s), or if the discharge is to a municipal separate storm sewer, the name of the municipal operator of the storm sewer and the ultimate receiving water(s);

viii. Permit number of any other NPDES permit issued for the facility;

ix. Area of industrial activity at facility in acres;

x. Status of owner/operator (private, Federal, etc);

xi. Federal tax ID number;

xii. Name and mailing address of applicant (company that operates the permitted facility);

xiii. Name and telephone number of operator contact;

xiv. A summary of all existing quantitative data, if any, describing the concentration of pollutants in storm water discharges;

xv. Where construction is involved, a brief project description, icluding existing and proposed land uses.

"Project" means the total area upon which construction activity will occur through stages or phases over time;

xvi. Where construction is involved, the total site area, the total proposed disturbed area, the type(s) of storm water management best management practice(s) (BMP) proposed, and the total drainage area to be controlled by each type of BMP; and

xvii. Signature of permittee.

b. Prior to commencing construction, the permittee shall obtain approved erosion and sediment control plans in accordance with the requirements established in Title 4, Subtitle 1 of the Environment Article, Annotated Code of Maryland (Sediment Control); and in Code of Maryland Regulations (COMAR) 26.09.01 (Erosion and Sediment Control); and shall obtain approved storm water management plans in accordance with the requirements established in Title 4, Subtitle 2 of the Environment Article, Annotated Code of Maryland (Storm Water Management); and in COMAR 26.09.02 (Storm Water Management).

c. For the purposes of monitoring, permittees must do all of the following:

i. During construction, maintain at the site the approved erosion and sediment control plan.

ii. Conduct the following inspections:

(a) weekly inspections of implemented erosion and sediment controls; and

(b) inspections of erosion and sediment controls the next business day after a rainfall event resulting in runoff.

iii. During construction, maintain at the site written reports of all inspections conducted by the permittee that include:

(a) the date and time of the inspection;

(b) the name(s) of the individual(s) who performed the inspection;

(c) an assessment of the condition of erosion and sediment controls;

(d) a description of any erosion and sediment control implementation and maintenance performed; and

(e) a description of the site's present phase of construction.

iv. Maintain all inspection reports and enforcement actions issued to the permittee by the appropriate enforcement authority.

v. Permittees must retain the records described in condition 4.b.i, iii, and iv. and records of all data used to amend the application for this permit for a period of three (3 years from the date that the site is finally stabilized.

d. It is a condition of this permit that the permittee comply with erosion and sediment control and storm

water management plans approved in accordance with the laws and regulations cited in condition 4.a. above, and with all conditions of this general permit.

e. Once construction has commenced, it is a condition of this permit that erosion and sediment control and storm water management plan approvals be kept in effect. Construction activity may not continue if these plans have expired, but may resume once plans are renewed without payment of an additional fee.

II. GENERAL CONDITIONS

A. MONITORING AND REPORTING

1. REPRESENTATIVE SAMPLING

Samples and measurements taken as required herein shall be taken at such times as to be representative of the quantity and quality of the discharges during the specified monitoring periods.

2. REPORTING-MONITORING RESULTS SUBMITTED QUARTERLY

Monitoring results obtained during the calendar quarter shall be summarized on a Discharge Monitoring Report form (EPA No. 3320-1). For each effluent characteristic monitored at a frequency of once per month or less, the results obtained during the reporting period shall be summarized on a single report form for each quarter. More frequently monitored effluent characteristics shall be reported on a separate form for each calendar month of the reporting period. Results shall be submitted to the Department postmarked no later than the 28th day of the month following the end of the reporting period. Calendar quarter reporting periods end on the last day of the following months: March, June, September and December.

The reports shall be submitted to:

Maryland Department of the Environment
Water Management Administration
Inspection and Compliance Program
2500 Broening Highway
Baltimore, Maryland 21224

3. SAMPLING AND ANALYSIS METHODS

The analytical and sampling methods used shall conform to procedures for the analysis of pollutants as identified in Title 40 CFR Part 136 - "Guidelines Establishing Test Procedures for the Analysis of Pollutants" unless otherwise specified.

4. DATA RECORDING REQUIREMENTS

For each measurement or sample taken pursuant to the requirements of this permit, the permittee shall record the following information:

a. the exact place, date, and time of sampling or measurement;
b. the person(s) who performed the sampling or measurement;
c. the dates and times the analyses were performed;
d. the person(s) who performed the analyses;
e. the analytical techniques or methods used; and
f. the results of all required analyses.

5. MONITORING EQUIPMENT MAINTENANCE

The permittee shall periodically calibrate and perform maintenance procedures on all monitoring and analytical instrumentation to insure accuracy of measurements.

II. GENERAL CONDITIONS

A. MONITORING AND REPORTING

6. ADDITIONAL MONITORING BY PERMITTEE

If the permittee monitors any pollutant, using approved analytical methods as specified above, at the locations designated herein more frequently than required by this permit, the results of such monitoring, including the increased frequency, shall be included in the calculation and reporting of the values required in the Discharge Monitoring Report form (EPA No. 3320-1).

7. RECORDS RETENTION

All records and information resulting from the monitoring activities required by this permit, including all records of analyses performed, calibration and maintenance of instrumentation, and original recordings from continuous monitoring instrumentation shall be retained for a minimum of three years. This period shall be automatically extended during the course of litigation, or when requested by the Department.

B. MANAGEMENT REQUIREMENTS

1. CHANGE IN DISCHARGE

All discharges authorized herein shall be consistent with the terms and conditions of this permit. The discharge of any pollutant identified in this permit at a level in excess of that authorized shall constitute a violation of the terms and conditions of this permit. Anticipated facility expansions, production increases or decreases, or process modifications, which will result in new, different, or an increased discharge of pollutants, shall be reported by the permittee by submission of a new application or, if such changes will not violate the effluent limitations specified in this permit, by notice to the Department. Following such notice, the permit may be modified by the Department to specify and limit any pollutants not previously limited.

2. NONCOMPLIANCE WITH EFFLUENT LIMITATIONS

If, for any reason, the permittee does not comply with or will be unable to comply with any daily maximum or daily minimum effluent limitation specified in this permit, the permittee shall notify the Inspection and Compliance Program by telephone at (410) 631-3510 within 24 hours of becoming aware of the noncompliance. Within five calendar days, the permittee shall provide the Department with the following information in writing:

a. a description of the noncomplying discharge including its impact upon the receiving waters;

b. cause of noncompliance;

c. anticipated time the condition of noncompliance is expected to continue or if such condition has been corrected, the duration of the period of noncompliance;

d. steps taken by the permittee to reduce and eliminate the noncomplying discharge:

e. steps to be taken by the permittee to prevent recurrence of the condition of noncompliance; and

f. a description of the accelerated or additional monitoring by the permittee to determine the nature and impact of the noncomplying discharge.

3. FACILITIES OPERATION

All treatment, control and monitoring facilities, or systems installed or used by the permittee, are to be maintained in good working order and operated efficiently.

II. GENERAL CONDITIONS

B. MANAGEMENT REQUIREMENTS

4. ADVERSE IMPACT

The permittee shall take all reasonable steps to minimize or prevent any adverse impact to waters of the State or to human health resulting from noncompliance with any effluent limitations specified in this permit, including such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge.

5. BYPASSING

Any bypass of treatment facilities necessary to maintain compliance with the terms and conditions of this permit is prohibited unless:

a. the bypass is unavoidable to prevent a loss of life, personal injury or substantial physical damage to property, damage to the treatment facilities which would cause them to become inoperable, or substantial and permanent loss of natural resources;

b. there are no feasible alternatives;

c. notification is received by the Department within 24 hours (if orally notified, then followed by a written submission within five calendar days of the permittee's becoming aware of the bypass). Where the need for a bypass is known (or should have been known) in advance, this notification shall be submitted to the Department for approval at least ten calendar days before the date of bypass or at the earliest possible date if the period of advance knowledge is less than ten calendar days; and

d. the bypass is allowed under conditions determined by the Department to be necessary to minimize adverse effects.

6. CONDITIONS NECESSARY FOR DEMONSTRATION OF AN UPSET

An upset shall constitute an affirmative defense to an action brought for noncompliance with technology-based effluent limitations only if the permittee demonstrates, through properly signed, contemporaneous operating logs, or other relevant evidence, that:

a. an upset occurred and that the permittee can identify the specific cause(s) of the upset;

b. the permitted facility was at the time being operated in a prudent and workman-like manner and in compliance with proper operation and maintenance procedures;

c. the permittee submitted a 24-hour notification of upset in accordance with the reporting requirements of General Condition II.B.2 above;

d. the permittee submitted, within five calendar days of becoming aware of the upset, documentation to support and justify the upset; and

e. the permittee complied with any remedial measures required to minimize adverse impact.

7. REMOVED SUBSTANCES

Wastes such as solids, sludges, or other pollutants removed from or resulting from treatment or control of wastewaters, or facility operations, shall be disposed of in a manner to prevent any removed substances or runoff from such substances from entering or from being placed in a location where they may enter the waters of the State.

II. GENERAL CONDITIONS

B. MANAGEMENT REQUIREMENTS

8. POWER FAILURE

In order to maintain compliance with the effluent limitations and prohibitions of this permit, the permittee shall either:

a. provide an alternative power source sufficient to operate the wastewater collection and treatment facilities or,

b. halt, reduce or otherwise control production and all discharges upon the reduction, loss, or failure of the primary source of power to the wastewater collection and treatment facilities.

C. RESPONSIBILITIES

1. RIGHT OF ENTRY

The permittee shall permit the Secretary of the Department, the Regional Administrator for the Environmental Protection Agency, or their authorized representatives, upon the presentation of credentials to:

a. enter upon the permittee's premises where an effluent source is located or where any records are required to be kept under the terms and conditions of this permit;

b. access and copy, at reasonable times, any records required to be kept under the terms and conditions of this permit;

c. inspect, at reasonable times, any monitoring equipment or monitoring method required in this permit;

d. inspect, at reasonable times, any collection, treatment, pollution management, or discharge facilities required under this permit; and

e. sample, at reasonable times, any discharge of pollutants.

2. TRANSFER OF OWNERSHIP OR CONTROL OF FACILITIES

In the event of any change in ownership or control of facilities from which the authorized discharge emanates, the permit may be transferred to another person if:

a. the permittee notifies the Department in writing, of the proposed transfer;

b. a written agreement, indicating the specific date of proposed transfer of permit coverage and acknowledging responsibilities of current and new permittees for compliance with the liability for the terms and conditions of this permit, is submitted to the Department; and

c. neither the current permittee nor the new permittee receive notification from the Department, within 30 calendar days, of intent to modify, revoke, reissue or terminate the existing permit.

3. REAPPLICATION FOR A PERMIT

At least 180 calendar days before the expiration date of this permit, unless permission for a later date has been granted by the Department, the permittee shall submit a new application for a permit or notify the Department of the intent to cease discharging by the expiration date. In the event that a timely and sufficient reapplication has been

II. GENERAL CONDITIONS

C. RESPONSIBILITIES

submitted and the Department is unable, through no fault of the permittee, to issue a new permit before the expiration date of this permit, the terms and conditions of this permit are automatically continued and remain fully effective and enforceable.

4. AVAILABILITY OF REPORTS

Except for data determined to be confidential under Section 308 of the Clean Water Act, 33 U.S.C. § 1318, all submitted data shall be available for public inspection at the offices of the Department and the Regional Administrator of the Environmental Protection Agency.

5. PERMIT MODIFICATION

A permit may be modified by the Department upon written request of the permittee and after notice and opportunity for a public hearing in accordance with and for the reasons set forth in 40 CFR § 122.62 and 122.63.

6. PERMIT MODIFICATION, SUSPENSION, OR REVOCATION

After notice and opportunity for a hearing, this permit may be modified, suspended, or revoked and reissued in whole or in part during its term for causes including, but not limited to, the following:

a. violation of any terms or conditions of this permit;

b. obtaining this permit by misrepresentation or failure to disclose fully all relevant facts;

c. a change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge; or

d. a determination that the permitted discharge poses a threat to human health or welfare or to the environment and can only be regulated to acceptable levels by permit modification or termination.

7. TOXIC POLLUTANTS

If a toxic effluent standard or prohibition (including any schedule of compliance specified in such toxic effluent standard or prohibition) is established by the U.S. Environmental Protection Agency, or pursuant to Section 9-314 of the Environment Article, Annotated Code of Maryland, for a toxic pollutant which is present in the discharges authorized herein and such standard is more stringent than any limitation upon such pollutant in this permit, this permit shall be revoked and reissued or modified in accordance with the toxic effluent standard or prohibition and the permittee so notified. Any effluent standard established in this case for a pollutant which is injurious to human health is effective and enforceable by the time set forth in the promulgated standard, even absent permit modification.

8. OIL AND HAZARDOUS SUBSTANCES PROHIBITED

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibility, liability, or penalties to which the permittee may be subject under Section 311 of the Clean Water Act (33. U.S.C. § 1321), or under the Annotated Code of Maryland.

II. GENERAL CONDITIONS

C. RESPONSIBILITIES

9. CIVIL AND CRIMINAL LIABILITY

Except as provided in permit conditions on "bypassing," "upset," and "power failure," nothing in this permit shall be construed to preclude the institution of any legal action nor relieve the permittee from civil or criminal responsibilities and/or penalties for noncompliance with Title 9 of the Environment Article, Annotated Code of Maryland or any federal, local, or other State law or regulation.

10. PROPERTY RIGHTS/COMPLIANCE WITH OTHER REQUIREMENTS

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, State or local laws or regulations.

11. SEVERABILITY

The provisions of this permit are severable. If any provisions of this permit shall be held invalid for any reason, the remaining provisions shall remain in full force and effect. If the application of any provision of this permit to any circumstances is held invalid, its application to other circumstances shall not be affected.

12. WATER CONSTRUCTION AND OBSTRUCTION

This permit does not authorize the construction or placing of physical structures, facilities, or debris, or the undertaking of related activities in any waters of the State.

13. COMPLIANCE WITH WATER POLLUTION ABATEMENT STATUTES

The permittee shall comply at all times with the provisions of the Environment Article, Title 7, Subtitle 2 and Title 9, Subtitle 3 of the Annotated Code of Maryland and the Clean Water Act, 33 U.S.C. § 1251 et seq.

14. ACTION ON VIOLATIONS

The issue or reissue of this permit does not constitute a decision by the State not to proceed in administrative, civil, or criminal action for any violations of State law or regulations occurring before the issue or reissue of this permit, nor a waiver of the State's right to do so.

15. CIVIL PENALTIES FOR VIOLATIONS OF PERMIT CONDITIONS

In addition to civil penalties for violations of State water pollution control laws set forth in Section 9-342 of the Environment Article, Annotated Code of Maryland, the Clean Water Act provides that any person who violates Section 301, 302, 306, 307, 308, 318 or 405 of the Act, or any permit condition or limitation implementing any of such sections in a permit issued under Section 402 of the Act or in a permit issued under Section 404 of the Act, is subject to a civil penalty not to exceed $25,000 per day for each violation.

16. CRIMINAL PENALTIES FOR VIOLATIONS OF PERMIT CONDITIONS

In addition to criminal penalties for violations of State water pollution control laws set forth in Section 9-343 of the Environment Article, Annotated Code of Maryland, the Clean Water Act provides that

II. GENERAL CONDITIONS

C. RESPONSIBILITIES

a. any person who negligently violates Section 301, 302, 306, 307, 308, 318, or 405 of the Act, or any permit condition or limitation implementing any of such sections in a permit issued under Section 402 of the Act, or in a permit issued under Section 404 of the Act, is subject to a fine of not less than $2,500 nor more than $25,000 per day of violation, or by imprisonment for not more than one (1) year, or by both.

b. any person who knowingly violates Section 301, 302, 306, 307, 308, 318 or 405 of the Act, or any permit condition or limitation implementing any of such sections in a permit issued under Section 402 of the Act, or in a permit issued under Section 404 of the Act, is subject to a fine of not less than $5,000 nor more than $50,000 per day of violation, or by imprisonment for not more than three (3) years, or by both.

c. any person who knowingly violates Section 301, 302, 306, 307, 318 or 405 of the Act, or any permit condition or limitation implementing any of such sections in a permit issued under Section 402 of the Act, or in a permit issued under Section 404 of the Act, and who knows at that time that he thereby places another person in imminent danger of death or serious bodily injury, is subject to a fine of not more than $250,000 or imprisonment of not more than 15 years, or both.

d. any person who knowingly makes any false material statement, representation, or certification in any application, record, report, plan, or other document filed or required to be maintained under the Act or who knowingly falsifies, tampers with or renders inaccurate any monitoring device or method required to be maintained under the Act, is subject to a fine of not more than $10,000 or by imprisonment for not more than two (2) years, or by both.

17. DUTY TO PROVIDE INFORMATION

The permittee shall furnish to the Director, within a reasonable time, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit.

18. SIGNATORY REQUIREMENTS

All applications, reports, or information submitted to the Director shall be signed and certified as required by 40 CFR 122.22.

19. REOPENER CLAUSE FOR PERMITS

This permit shall be modified, or alternatively, revoked and reissued, to comply with any applicable effluent standard or limitation issued or approved under Sections 301, 304, and 307 of the Clean Water Act [33 USCS §§ 1311, 1314, 1317] if the effluent standard or limitation so issued or approved:

a. contains different conditions or is otherwise more stringent than any effluent limitation in this permit or

b. controls any pollutant not limited in this permit. This permit, as modified or reissued under this paragraph, shall also contain any other requirements of the Act then applicable.

II. GENERAL CONDITIONS

D. AUTHORITY TO ISSUE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMITS

On September 5, 1974, the Administrator of the U.S. Environmental Protection Agency approved the proposal submitted by the State of Maryland for the operation of a permit program for discharges into navigable waters pursuant to Section 402 of the Clean Water Act, 33 U.S.C. Section 1342.

Pursuant to the aforementioned approval, this discharge permit is both a State of Maryland discharge permit and a NPDES permit.

This permit and the authorization to discharge shall expire at midnight on the expiration date. The permittee shall not discharge after that date unless a new application has been submitted to the Department in accordance with the provisions of General Condition II.C.3 of this permit.

J. L. Hearn, Director
Water Management Administration

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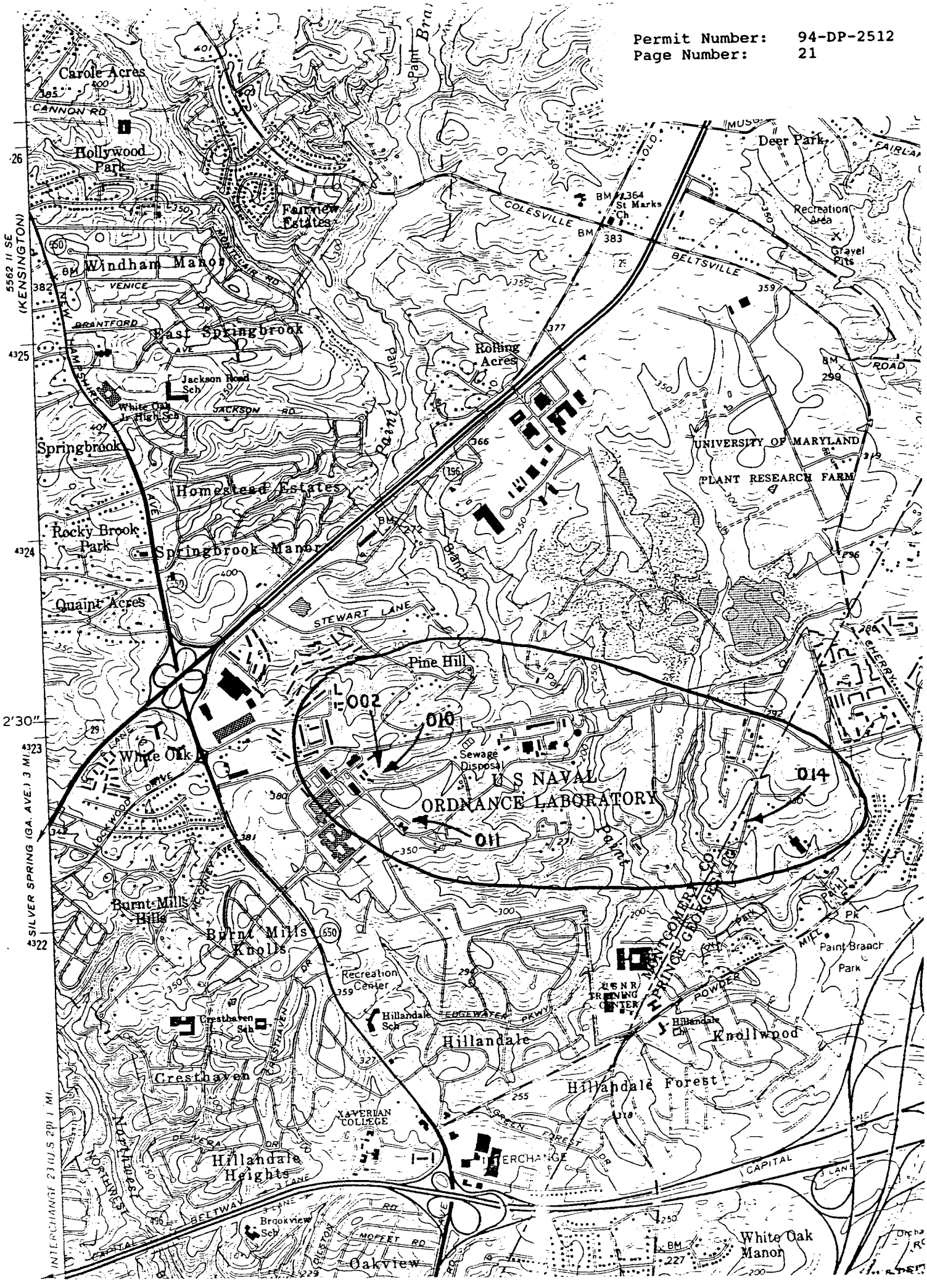

c requested, to the Administrator o[illegible] Environmental Protection Agency, the Regional Administrator of the Environmental Protection Agency for the region in which the violation is alleged to have occurred, the chief administrative officer of the responsible state agency (if any), and the Attorney General for the State in which the violation is alleged to have occurred.

(3) If the alleged violator is a Federal agency, service of notice shall be accomplished by certified mail, return receipt requested, addressed to, or by personal service upon, the head of the Federal agency. A copy of the notice shall be sent by certified mail, return receipt requested, to the Administrator of the Environmental Protection Agency, the Regional Administrator of the Environmental Protection Agency for the region in which the violation is alleged to have occurred, the Attorney General of the United States, the chief administrative officer of the responsible state agency (if any), and the Attorney General for the State in which the violation is alleged to have occurred.

(b) Service of notice of intent to file suit pursuant to section 1449(a)(2) of the Act shall be accomplished by certified mail, return receipt requested, addressed to, or by personal service [illegible] the Administrator of the Environmental Protection Agency, Washington, DC 20460. A copy of the notice shall be sent by certified mail to the Attorney General of the United States.

(c) Notice given in accordance with the provisions of this subpart shall be deemed to have been given on the date of receipt of service, if served personally. If service was accomplished by mail, the date of receipt will be considered to be the date noted on the return receipt card.

§ 135.12 Contents of notice.

(a) *Violation of standard or requirement.* Notice regarding an alleged violation of any requirement prescribed by or under the Act shall include sufficient information to permit the recipient to identify the specific requirement alleged to have been violated, the activity alleged to constitute a violation, the person or persons responsible for the alleged violation, the location of the alleged violation, the date or dates of the alleged violation, and the full name, address, and telephone number of the person giving notice.

(b) *Failure to act.* Notice regarding an alleged failure of the Administrator to perform any act or duty under the Act which is not discretionary with the Administrator shall identify the provision of the Act which requires the act or creates the duty, and shall describe with reasonable specificity the action taken or not taken by the Administrator which is alleged to constitute a failure to perform such act or duty, and shall state the full name, address, and telephone number of the person giving notice.

(c) *Identification of counsel.* All notices shall include the name, address, and telephone number of the legal counsel, if any, representing the person giving notice.

§ 135.13 Timing of notice.

No action may be commenced under section 1449(a)(1) or (a)(2) until the plaintiff has given each of the appropriate parties sixty days notice of intent to file such an action. Actions concerning injection wells disposing of hazardous waste which allege jurisdiction solely under section 7002(c) of the Resource Conservation and Recovery Act may proceed immediately after notice to the appropriate parties.

PART 136—GUIDELINES ESTABLISHING TEST PROCEDURES FOR THE ANALYSIS OF POLLUTANTS

Sec.

AUTHORITY: Secs. 301, 304(h), 307 and 501(a), Pub. L. 95–217, 91 Stat. 1566, et seq. (33 U.S.C. 1251, et seq.) (the Federal Water Pollution Control Act Amendments of 1972 as amended by the Clean Water Act of 1977).

§ 136.1 Applicability.

The procedures prescribed herein shall, except as noted in § 136.5, be used to perform the measurements indicated whenever the waste constituent specified is required to be measured for:

(a) An application submitted to the Administrator, or to a State having an approved NPDES program for a permit under section 402 of the Clean Water Act of 1977, as amended (CWA), and/or to reports required to be submitted under NPDES permits or other requests for quantitative or qualitative effluent data under parts 122 to 125 of Title 40, and.

(b) Reports required to be submitted by discharges under the NPDES established by parts 124 and 125 of this chapter, and.

(c) Certifications issued by States pursuant to section 401 of the CWA, as amended.

[38 FR 28758, Oct. 16, 1973, as amended at 49 FR 43250, Oct. 26, 1984]

§ 136.2 Definitions.

As used in this part, the term:

(a) *Act* means the Clean Water Act of 1977, Pub. L. 95–217, 91 Stat. 1566, et seq. (33 U.S.C. 1251 et seq.) (The Federal Water Pollution Control Act Amendments of 1972 as amended by the Clean Water Act of 1977).

(b) *Administrator* means the Administrator of the U.S. Environmental Protection Agency.

(c) *Regional Administrator* means one of the EPA Regional Administrators.

(d) *Director* means the Director of the State Agency authorized to carry out an approved National Pollutant Discharge Elimination System Program under section 402 of the Act.

(e) *National Pollutant Discharge Elimination System (NPDES)* means the na-

TABLE IB.—LIST OF APPROVED INORGANIC TEST PROCEDURES—Continued

Parameter, units and method	Reference (method number or page)				
	EPA[1,28]	Std. methods 18th Ed.	ASTM	USGS[2]	Other
Electrode	350.3	4500–NH_3 F or G	D1426–89(B)		
Automated phenate, or	350.1	4500–NH_3 H		I–4523–85	
Au[illegible]d electrode					Note 7.
Anti[illegible] Total[4], mg/L; Digestion[4] followed by:					
AA [illegible], aspiration[38]	204.1	3111 B			
AA furnace	204.2	3113 B			
ICP/AES[38]	[5]200.7	3120 B			
Arsenic—Total[4], mg/L:					
Digestion[4] followed by	206.5				
AA gaseous hydride	206.3	3114 B 4.d	D2972–88(B)	I–3062–85	
AA furnace	206.2	3113 B	D2972–88(C)		
ICP/AES[38], or	[5]200.7	3120 B			
Colorimetric (SDDC)	206.4	3500–As C	D2972–88(A)	I–3060–85	
Barium—Total[4], mg/L; Digestion[4] followed by:					
AA direct aspiration[38]	208.1	3111 D		I–3084–85	
AA furnace	208.2	3113 B	D4382–91		
ICP/AES[38]	[5]200.7	3120 B			
DCP[38]					Note 34.
Beryllium—Total[4], mg/L; Digestion[4] followed by:					
AA direct aspiration	210.1	3111 D	D3645–84(88)(A)	I–3095–85	
AA furnace	210.2	3113 B	D3645(88)(B)		
ICP/AES	[5]200.7	3120 B			
DCP, or			D4190–82(88)		Note 34.
Colorimetric (aluminon)		3500–Be D			
Biochemical oxygen demand (BOD_5), mg/L:					
Dissolved Oxygen Depletion	405.1	5210 B		I–1578–78[6]	973.44[3], p.17[9]
Boron[37]—Total, mg/L:					
Colorimetric (curcumin)	212.3	4500–B B		I–3112–85	
ICP/AES, or	[5]200.7	3120 B			
DCP			D4190–82(88)		Note 34.
Bromide, mg/L:					
Titrimetric, or	320.1		D1246–82(88)(C)	I–1125–85	p.S44.[10]
Cadmium—Total[4], mg/L; Digestion[4] followed by:					
AA direct aspiration[38]	213.1	3111 B or C	D3557–90(A or B)	I–3135–85 or I–3136–85.	974.27[3], p.37[9]
AA furnace	213.2	3113 B	D3557–90(D)		
ICP/AES[38]	[5]200.7	3120 B		I–1472–85	
DCP[38]			D4190–82(88)		Note 34.
Voltammetry[11], or			D3557–90(C)		
Colorimetric (Dithizone)		3500–Cd D			
Calcium—Total[4], mg/L; Digestion[4] followed by:					
AA direct aspiration	215.1	3111 B	D511–92(B)	I–3152–85	
ICP/AES	[5]200.7	3120 B			
DCP					Note 34.
Carb[illegible]us biochemical oxygen demand ($CBOD_5$), mg/L[10]:					
Diss[illegible] Oxygen Depletion with nitrification inhibitor		5210 B			
Chemical oxygen demand (COD), mg/L; Titrimetric, or	410.1	5220 C	D1252–88(A)	I–3560–85	973.46[3], p. 17[9]
	410.2			I–3562–85	
	410.3				
Spectrophotometric, manual or automated	410.4	5220 D	D1252–88(B)	I–3561–85	Notes 13 or 14.
Chloride, mg/L:					
Titrimetric (silver nitrate)		4500–Cl B	D512–89(B)	I–1183–85	
Or (Mercuric nitrate)	325.3	4500–Cl C	D512–89(A)	I–1184–85	973.51[3]
Colorimetric, manual or				I–1187–85	
Automated (Ferricyanide)	325.1 or 325.2	4500–Cl E		I–2187–85	
Chlorine—Total residual, mg/L; Titrimetric:					
Amperometric direct	330.1	4500–Cl D	D1253–86(92)		
Iodometric direct	330.3	4500–Cl B			
Back titration ether end-point[15] or	330.2	4500–Cl C			
DPD–FAS	330.4	4500–Cl F			
Spectrophotometric, DPD	330.5	4500–Cl G			
Or Electrode					Note 16.
Chromium VI dissolved, mg/L; 0.45 micron filtration followed by:					
AA chelation-extraction or	218.4	3111 C		I–1232–85	
Colorimetric (Diphenylcarbazide)		3500–Cr D	D1687–92(A)	I–1230–85	
Chromium—Total[4], mg/L; Digestion[4] followed by:					
AA direct aspiration[38]	218.1	3111 B	D1687–92(B)	I–3236–85	974.27[3]
AA chelation-extraction	218.3	3111 C			
AA furnace	218.2	3113 B	D1687–92(C)		
ICP/AES[38]	[5]200.7	3120 B			
DCP[38] or			D4190–82(88)		Note 34.
Colorimetric (Diphenylcarbazide)		3500–Cr D			
Cobalt—Total[4], mg/L; Digestion[4] followed by:					
AA direct aspiration	219.1	3111 B or C	D3558–90(A or B)	I–3239–85	p.37[9]
AA furnace	219.2	3113 B	D3558–90(C)		
ICP/AES	[5]200.7	3120 B			
DCP			D4190–82(88)		Note 34.
Color platinum cobalt units or dominant wavelength, hue, luminance purity:					
Colorimetric (ADMI), or	110.1	2120 E			Note 18.
(Platinum cobalt), or	110.2	2120 B		I–1250–85	
Spectrophotometric	110.3	2120C			
Copper—Total[4], mg/L; Digestion[4] followed by:					
AA direct aspiration[38]	220.1	3111 B or C	D1688–90(A or B)	I–3270–85 or I–3271–85.	974.27[3], p.37[9]
AA furn[illegible]	220.2	3113 B	D1688–90(C)		
ICP/A[illegible]	[5]200.7	3120 B			
DCP[38]			D4190–82(88)		Note 34.
Colorimetric (Neocuproine) or		3500–Cu D			
(Bicinchoninate)		or E			Note 19.
Cyanide—Total, mg/L:					
Manual distillation with $MgCl_2$ followed by		4500–CN C			

TABLE ID.—LIST OF APPROVED TEST PROCEDURES FOR PESTICIDES [1]—Continued

Parameter	Method	EPA [2,7]	Standard methods 18th Ed.	ASTM	Other
54. PCNB	GC		6630 B & C		Note 3, p. 7.
55. Perthane	GC			D3086–90	
56. Prometon	GC				Note 3, p. 83; Note 6, p. S68.
57. Prometryn	GC				Note 3, p. 83; Note 6, p. S68.
58. Propazine	GC				Note 3, p. 83; Note 6, p. S68.
59. Pronam	TLC				Note 3, p. 104; Note 6, p. S64.
60. Propoxur	TLC				Note 3, p. 34; Note 6, p. S60.
61. Secbumeton	TLC				Note 3, p. 33; Note 6, p. S68.
62. Siduron	TLC				Note 3, p. 104; Note 6, p. S64.
63. Simazine	GC				Note 3, p. 33; Note 6, p. S68.
64. Strobane	GC		6630 B & C		Note 3, p. 7.
65. Swep	TLC				Note 3, p. 104; Note 6, p. S64.
66. 2,4,5–T	GC		6640 B		Note 3, p. 115; Note 4, p. 35.
67. 2,4,5–TP (Silvex)	GC		6640 B		Note 3, p. 115
68. Terbuthylazine	GC				Note 3, p. 83; Note 6, p. S68.
69. Toxaphene	GC	608	6630 B & C	D3086–90	Note 3, p. 7; Note 4, p. 30.
	GC/MS	625	6410 B		
70. Trifluralin	GC		6630 B		Note 3, p. 7.

Table ID notes:
[1] Pesticides are listed in this table by common name for the convenience of the reader. Additional pesticides may be found under Table IC, where entries are listed by chemical name.
[2] The full text of Methods 608 and 625 are given at Appendix A, "Test Procedures for Analysis of Organic Pollutants," of this Part 136. The standardized test procedure to be used to determine the method detection limit (MDL) for these test procedures is given at Appendix B, "Definition and Procedure for the Determination of the Method Detection Limit", of this Part 136.
[3] "Methods for Benzidine, Chlorinated Organic Compounds, Pentachlorophenol and Pesticides in Water and Wastewater," U.S. Environmental Protection Agency, September, 1978. This EPA publication includes thin-layer chromatography (TLC) methods.
[4] "Methods for Analysis of Organic Substances in Water and Fluvial Sediments," Techniques of Water-Resources Investigations of the U.S. Geological Survey, Book 5, Chapter A3, 1987.
[5] The method may be extended to include αBHC, βBHC, endosulfan I, endosulfan II, and endrin. However, when they are known to exist, Method 608 is the preferred method.
[6] "Selected Analytical Methods Approved and Cited by the United States Environmental Protection Agency," Supplement to the Fifteenth Edition of Standard Methods for the Examination of Water and Wastewater (1981).
[7] Each analyst must make an initial, one-time, demonstration of their ability to generate acceptable precision and accuracy with Methods 608 and 625 (See Appendix A of this Part 136) in accordance with procedures given in section 8.2 of each of these methods. Additionally, each laboratory, on an-going basis, must spike and analyze 10% of all samples analyzed with Method 608 or 5% of all samples analyzed with Method 625 to monitor and evaluate laboratory data quality in accordance with Sections 8.3 and 8.4 of these methods. When the recovery of any parameter falls outside the warning limits, the analyocal results for that parameter in the unspoked sample are suspect and cannot be reported to demonstrate regulatory compliance. These quality control requirements also apply to the Standard Methods, ASTM Methods, and other Methods cited.
NOTE: These warning limits are promulgated as an "interim final action with a request for comments."

TABLE IE.—LIST OF APPROVED RADIOLOGIC TEST PROCEDURES

Parameter and units	Method	Reference (method number or page)			
		EPA [1]	Standard methods 18th Ed.	ASTM	USGS [2]
1. Alpha-Total, pCi per liter	Proportional or scintillation counter	900	7110 B	D1943–90	pp. 75 and 78. [3]
2. Alpha-Counting error, pCi per liter	Proportional or scintillation counter	Appendix B	7110 B	D1943–90	P. 79.
3. Beta-Total, pCi per liter	Proportional counter	900.0	7110 B	D1890–90	pp. 75 and 78. [3]
4. Beta-Counting error, pCi	Proportional counter	Appendix B	7110 B	D1890–90	p. 79.
5. (a) Radium Total pCi per liter	Proportional counter	903.0	7500Ra B	D2460–90	
(b)Ra, pCi per liter	Scintillation counter	903.1	7500Ra C	D3454–91	p. 81.

Table IE notes:
[1] Prescribed Procedures for Measurement of Radioactivity in Drinking Water," EPA–600/4–80–032 (1980), U.S. Environmental Protection Agency, August 1980.
[2] Fishman, M.J. and Brown, Eugene," Selected Methods of the U.S. Geological Survey of Analysis of Wastewaters," U.S. Geological Survey, Open-File Report 75–177 (1976).
[3] The method found on p. 75 measures only the dissolved porbon while the method on p. 78 measures only the suspended porbon. Therefore, the two results must be added to obtain the "total".

TABLE II—REQUIRED CONTAINERS, PRESERVATION TECHNIQUES, AND HOLDING TIMES—Continued

Parameter No./name	Container[1]	Preservation[2 3]	Maximum holding time[4]
15, 16, 21, 31, 75, Haloethers[11]	...do	Cool, 4°C, 0.008% $Na_2S_2O_3$[5]	Do.
29, 35-37, 80-83, 91, Chlorinated hydrocarbons[11]	...do	Cool, 4°C	Do.
87, TCDD[11]	...do	Cool, 4°C, 0.008% $Na_2S_2O_3$[5]	Do.
Table ID—Pesticides Tests			
1-70, Pesticides[11]	...do	Cool, 4°C, pH 5-9[11]	Do.
Table IE—Radiological Tests:			
1-5, Alpha, beta and radium	P, G	HNO_3 to pH 2	6 months.

Table II Notes

[1] Polyethylene (P) or Glass (G)

[2] Sample preservation should be performed immediately upon sample collection. For composite chemical samples each aliquot should be preserved at the time of collection. When use of an automated sampler makes it impossible to preserve each aliquot, then chemical samples may be preserved by maintaining at 4°C until compositing and sample splitting is completed.

[3] When any sample is to be shipped by common carrier or sent through the United States Mails, it must comply with the Department of Transportation Hazardous Materials Regulations (49 CFR part 172). The person offering such material for transportation is responsible for ensuring such compliance. For the preservation requirements of Table II, the Office of Hazardous Materials Transportation Bureau, Department of Transportation has determined that the Hazardous Materials Regulations do not apply to the following materials: Hydrochloric acid (HCl) in water solutions at concentrations of 0.04% by weight or less (pH about 1.96 or greater); Nitric acid (HNO_3) in water solutions at concentrations of 0.15% by weight or less (pH about 1.62 or greater); Sulfuric acid (H_2SO_4) in water solutions at concentrations of 0.35% by weight or less (pH about 1.15 or greater); and Sodium hydroxide (NaOH) in water solutions at concentrations of 0.080% by weight or less (pH about 12.30 or less).

[4] Samples should be analyzed as soon as possible after collection. The times listed are the maximum times that samples may be held before analysis and still be considered valid. Samples may be held for longer periods only if the permittee, or monitoring laboratory, has data on file to show that for the specific types of samples under study, the analytes are stable for the longer time, and has received a variance from the Regional Administrator under § 136.3(e). Some samples may not be stable for the maximum time period given in the table. A permittee, or monitoring laboratory, is obligated to hold the sample for a shorter time if knowledge exists to show that this is necessary to maintain sample stability. See § 136.3(e) for details. The term "analyze immediately" usually means within 15 minutes or less of sample collection.

[5] Should only be used in the presence of residual chlorine.

[6] Maximum holding time is 24 hours when sulfide is present. Optionally all samples may be tested with lead acetate paper before pH adjustments in order to determine if sulfide is present. If sulfide is present, it can be removed by the addition of cadmium nitrate powder until a negative spot test is obtained. The sample is filtered and then NaOH is added to pH 12.

[7] Samples should be filtered immediately on-site before adding preservative for dissolved metals.

[8] Guidance applies to samples to be analyzed by GC, LC, or GC/MS for specific compounds.

[9] Sample receiving no pH adjustment must be analyzed within seven days of sampling.

[10] The pH adjustment is not required if acrolein will not be measured. Samples for acrolein receiving no pH adjustment must be analyzed within 3 days of sampling.

[11] When the extractable analytes of concern fall within a single chemical category, the specified preservative and maximum holding times should be observed for optimum safeguard of sample integrity. When the analytes of concern fall within two or more chemical categories, the sample may be preserved by cooling to 4°C, reducing residual chlorine with 0.008% sodium thiosulfate, storing in the dark, and adjusting the pH to 6–9; samples preserved in this manner may be held for seven days before extraction and for forty days after extraction. Exceptions to this optional preservation and holding time procedure are noted in footnote 5 (re the requirement for thiosulfate reduction of residual chlorine), and footnotes 12, 13 (re the analysis of benzidine).

[12] If 1,2-diphenylhydrazine is likely to be present, adjust the pH of the sample to 4.0±0.2 to prevent rearrangement to benzidine.

[13] Extracts may be stored up to 7 days before analysis if storage is conducted under an inert (oxidant free) atmosphere.

[14] For the analysis of diphenylnitrosamine, add 0.008% $Na_2S_2O_3$ and adjust pH to 7–10 with NaOH within 24 hours of sampling.

[15] The pH adjustment may be performed upon receipt at the laboratory and may be omitted if the samples are extracted within 72 hours of collection. For the analysis of aldrin, add 0.008% $Na_2S_2O_3$.

[38 FR 28758, Oct. 16, 1973, as amended at 41 FR 52781, Dec. 1, 1976; 49 FR 43251, 43258, 43259, Oct. 26, 1984; 50 FR 691, 692, 695, Jan. 4, 1985; 51 FR 23693, June 30, 1986; 52 FR 33543, Sept. 3, 1987; 55 FR 24534, June 15, 1990; 55 FR 33440, Aug. 15, 1990; 56 FR 50759, Oct. 8, 1991; 57 FR 41833, Sept. 11, 1992; 58 FR 4505, Jan. 31, 1994]

§ 136.4 Application for alternate test procedures.

(a) Any person may apply to the Regional Administrator in the Region where the discharge occurs for approval of an alternative test procedure.

(b) When the discharge for which an alternative test procedure is proposed occurs within a State having a permit program approved pursuant to section 402 of the Act, the applicant shall submit his application to the Regional Administrator through the Director of the State agency having responsibility for issuance of NPDES permits within such State.

(c) Unless and until printed application forms are made available, an application for an alternate test procedure may be made by letter in triplicate. Any application for an alternate test procedure under this paragraph (c) shall:

(1) Provide the name and address of the responsible person or firm making the discharge (if not the applicant) and the applicable ID number of the existing or pending permit, issuing agency, and type of permit for which the alternate test procedure is requested, and the discharge serial number.

(2) Identify the pollutant or parameter for which approval of an alternate testing procedure is being requested.

(3) Provide justification for using testing procedures other than those specified in Table I.

(4) Provide a detailed description of the proposed alternate test procedure, together with references to published studies of the applicability of the alternate test procedure to the effluents in question.

(d) An application for approval of an alternate test procedure for nationwide use may be made by letter in triplicate to the Director, Environmental Monitoring and Support Laboratory, Cincinnati, Ohio 45268. Any application for an alternate test procedure under this paragraph (d) shall:

(1) Provide the name and address of the responsible person or firm making the application.

(2) Identify the pollutant(s) or parameter(s) for which nationwide approval of an alternate testing procedure is being requested.

(3) Provide a detailed description of the proposed alternate procedure, together with references to published or other studies confirming the general applicability of the alternate test procedure to the pollutant(s) or parameter(s) in waste water discharges from representative and specified industrial or other categories.

(4) Provide comparability data for the performance of the proposed alternate test procedure compared to the performance of the approved test procedures.

[38 FR 28760, Oct. 16, 1973, as amended at 41 FR 52785, Dec. 1, 1976]

§ 136.5 Approval of alternate test procedures.

(a) The Regional Administrator of the region in which the discharge will occur has final responsibility for approval of any alternate test procedure proposed by the responsible person or firm making the discharge.

(b) Within thirty days of receipt of an application, the Director will forward such application proposed by the responsible person or firm making the discharge, together with his recommendations, to the Regional Administrator. Where the Director recommends rejection of the application for scientific and technical reasons which he provides, the Regional Administrator shall deny the application, and shall forward a copy of the rejected application and his decision to the Director of the State Permit Program and to the Director of the Environmental Monitoring and Support Laboratory, Cincinnati.

(c) Before approving any application for an alternate test procedure proposed by the responsible person or firm making the discharge, the Regional Administrator shall forward a copy of the application to the Director of the Environmental Monitoring and Support Laboratory (Cincinnati).

(d) Within ninety days of receipt by the Regional Administrator of an application for an alternate test procedure proposed by the responsible person or firm making the discharge, the Regional Administrator shall notify the applicant and the appropriate State agency of approval or rejection, or shall specify the additional information which is required to determine whether to approve the proposed test procedure. Prior to the expiration of such ninety day period, a recommendation providing the scientific and other technical basis for acceptance or rejection will be forwarded to the Regional Administrator by the Director of the Environmental Monitoring and Support Laboratory, Cincinnati. A copy of all approval and rejection notifications will be forwarded to the Director, Environmental Monitoring and Support Laboratory, Cincinnati, for the purposes of national coordination.

(e) *Approval for nationwide use.* (1) Within 60 days of the receipt by the Director of the Environmental Monitoring Systems Laboratory, Cincinnati (EMSL-CI) of an application for an alternate test procedure for nationwide use, the Director of EMSL-CI shall notify the applicant in writing whether the application is complete. If the application is incomplete, the applicant shall be informed of the information necessary to make the application complete.

PERMITTEE NAME/ADDRESS *(Include Facility Name/L... on if different)*

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM *(NPDES)*
DISCHARGE MON... RING REPORT *(DMR)*

Form Approved
...B No. 2040-0004
App... expires 05-31-98

NAME ______________________________
ADDRESS ______________________________
____
____
FACILITY ______________________________
LOCATION ______________________________

(2-16)	(17-19)
PERMIT NUMBER	DISCHARGE NUMBER

	MONITORING PERIOD						
	YEAR	MO	DAY		YEAR	MO	DAY
FROM				TO			
	(20-21)	(22-23)	(24-25)		(26-27)	(28-29)	(30-31)

NOTE: Read instructions before completing this form.

PARAMETER (32-37)		(3 Card Only) QUANTITY OR LOADING (46-53)	(54-61)		(4 Card Only) QUALITY OR CONCENTRATION (38-45)	(46-53)	(54-61)		NO. EX (62-63)	FREQUENCY OF ANALYSIS (64-68)	SAMPLE TYPE (69-70)
		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM	UNITS			
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
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	PERMIT REQUIREMENT										

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER	I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED HEREIN AND BASED ON MY INQUIRY OF THOSE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION, I BELIEVE THE SUBMITTED INFORMATION IS TRUE, ACCURATE AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT. SEE 18 USC § 1001 AND 33 USC § 1319 *(Penalties under these statutes may include fines up to $10,000 and/or maximum imprisonment of between 6 months and 5 years.)*		TELEPHONE		DATE		
TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE	NUMBER	YEAR	MO	DAY

COMMENT AND EXPLANATION OF ANY VIOLATIONS *(Reference all attachments here)*

EPA Form 3320-1 (Rev. 08-95)

(REPLACES EPA FORM T-40 WHICH MAY NOT BE USED.)

PAGE OF

PERMITTEE NAME/ADDRESS *(Include Facility Name/Location if different)*

NAME

ADDRESS

FACILITY

LOCATION

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM *(NPDES)*
DISCHARGE MONITORING REPORT *(DMR)*

Form Approved
OMB No. 2040-0004
Approval expires 05-31-98.

(2-16)	*(17-19)*
PERMIT NUMBER	DISCHARGE NUMBER

	MONITORING PERIOD						
FROM	YEAR	MO	DAY	TO	YEAR	MO	DAY
	(20-21)	*(22-23)*	*(24-25)*		*(26-27)*	*(28-29)*	*(30-31)*

NOTE: Read instructions before completing this form.

PARAMETER *(32-37)*		*(3 Card Only)* QUANTITY OR LOADING *(46-53)*	*(54-61)*		*(4 Card Only)* QUALITY OR CONCENTRATION *(38-45)*	*(46-53)*	*(54-61)*		NO. EX *(62-63)*	FREQUENCY OF ANALYSIS *(64-68)*	SAMPLE TYPE *(69-70)*
		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM	UNITS			
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
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	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER	I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED HEREIN AND BASED ON MY INQUIRY OF THOSE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION, I BELIEVE THE SUBMITTED INFORMATION IS TRUE, ACCURATE AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT. SEE 18 USC § 1001 AND 33 USC § 1319 *(Penalties under these statutes may include fines up to $10,000 and/or maximum imprisonment of between 6 months and 5 years.)*		TELEPHONE		DATE		
TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE	NUMBER	YEAR	MO	DAY

COMMENT AND EXPLANATION OF ANY VIOLATIONS *(Reference all attachments here)*

PERMITTEE NA \DDRESS *(Include Facility Name/L. on if different)*

NAME
ADDRESS

FACILITY
LOCATION

NATIONAL POLLUTANT DISC 'E ELIMINATION SYSTEM *(NPDES)*
DISCHARGE MO. RING REPORT *(DMR)*

Form Approved
.MB No. 2040-0004
Approval expires 05-31-98

(2-16)	(17-19)
PERMIT NUMBER	DISCHARGE NUMBER

	MONITORING PERIOD						
FROM	YEAR	MO	DAY	TO	YEAR	MO	DAY
	(20-21)	(22-23)	(24-25)		(26-27)	(28-29)	(30-31)

NOTE: Read instructions before completing this form.

PARAMETER (32-37)		(3 Card Only) (46-53)	QUANTITY OR LOADING (54-61)		(4 Card Only) (38-45)	QUALITY OR CONCENTRATION (46-53)	(54-61)		NO. EX (62-63)	FREQUENCY OF ANALYSIS (64-68)	SAMPLE TYPE (69-70)
		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM	UNITS			
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
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	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER	I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED HEREIN AND BASED ON MY INQUIRY OF THOSE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION, I BELIEVE THE SUBMITTED INFORMATION IS TRUE, ACCURATE AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT. SEE 18 USC § 1001 AND 33 USC § 1319 *(Penalties under these statutes may include fines up to $10,000 and/or maximum imprisonment of between 6 months and 5 years.)*		TELEPHONE		DATE		
TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE	NUMBER	YEAR	MO	DAY

COMMENT AND EXPLANATION OF ANY VIOLATIONS *(Reference all attachments here)*

STATE OF MARYLAND - DEPARTMENT OF THE ENVIRONMENT

REMOVED SUBSTANCES REPORTING FORM

INSTRUCTIONS: Use this form to report the disposal of substances resulting from (1) treatment of wastewaters and (2) related manufacturing processes as required by the State of Maryland "Water Quality and Water Pollution Control Regulations", COMAR 26.08.01. Use a separate form for each waste which is disposed of in a different manner. If several wastes are mixed before disposal, each waste must be separately described regardless of the quantity. NOTE: Submission of this form does not replace annual reporting of hazardous wastes as required by State of Maryland Regulation "Disposal of Controlled Hazardous Substances", COMAR 26.13.01.

1. DISCHARGE PERMIT NUMBER _____

2. NAME OF FACILITY _____

3. FACILITY MAILING ADDRESS _____

_____ (Zip) _____

4. LOCATION OF FACILITY (If different from Item 3) _____

_____ (Zip) _____

. FACILITY CONTACT (Name and Phone) _____

6. DESCRIBE the nature of the removed substance (waste oil, sludge, etc.).

_____

_____

7. DESCRIBE the treatment process or the manufacturing process that generated the Removed Substance (precipitation, settling, etc.).

_____

_____

8. DESCRIBE the physical character of the Removed Substance (liquid, solid, sludge, etc.).

_____

_____ If sludge, what per cent solids? _____

Is a chemical analysis attached? _____ Yes _____ No

_____

DENV 122

Appendix B
Complete Analytical Data from Previous Investigations

Table B-1
Raw Analytical Data - Historic Surface Water Samples
Building 318
Former NSWC - White Oak, Silver Spring, Maryland

Station	09SW202	09SW203	41SW01	41SW02	41SW02	41SW03	09SW102	09SW103	09SW105	09SW105	BG-SW-07	BG-SW-09
Sample ID	009SW2020001	009SW2030001	41-SW-01	41-SW-02	41-SW-02-D	41-SW-03	9SW1020001	9SW1030001	9SW1050001	9SW1050001-D	BG-SW-07(OLD)	BG-SW-09(OLD)
Sample Date	3/11/00	3/21/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00
Chemical Name												
Explosives (UG/L)												
1,3,5-Trinitrobenzene	1.2 U	1.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	NA
1,3-Dinitrobenzene	1.2 U	1.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	NA
2,4,6-Trinitrotoluene	1.2 U	1.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	NA
2,4-Dinitrotoluene	1.2 U	1.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	NA
2,6-Dinitrotoluene	1.2 U	1.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	NA
2-Amino-4,6-dinitrotoluene	1.2 U	1.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	NA
2-Nitrotoluene	2.6 U	2.6 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	NA
3-Nitrotoluene	2.6 U	2.6 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	NA
4-Amino-2,6-dinitrotoluene	1.2 U	1.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	NA
4-Nitrotoluene	2.6 U	2.6 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	NA
HMX	2.6 U	2.6 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA
Nitrobenzene	1.2 U	1.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	NA
Perchlorate	5 U	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RDX	2.6 U	2.6 U	0.5 U	1.5	NA	1.3	1.1	0.74	0.5 U	0.5 U	NA	NA
Tetryl	2.6 U	2.6 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	NA
Total Metals (UG/L)												
Aluminum	35.7 U	35.7 U	402	48.8	44.6	159	76.3 U	395 U	90.3 U	59.4 U	20 U	21.4 U
Dissolved Metals (UG/L)												
Aluminum	35.7 U	35.7 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry (MG/L)												
Ammonia	0.473	0.1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrate	1.46	0.21	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

NA - Not analyzed

Table B-2
Raw Analytical Data - Historic Sediment Samples
Building 318
Former NSWC - White Oak, Silver Spring, Maryland

Station	41SD01	41SD02	41SD02	41SD03	41SD04	41SD05	41SD06	09SD08-[86]	09SD08-[86]	09SD09-[86]
Sample ID	41-SD-01	41-SD-02	41-SD-02-D	41-SD-03	41-SD-04	41-SD-05	41-SD-06	9SD08-(0-1) 02/01/86(OLD)	9SD08-(1-2) 02/01/86(OLD)	9SD09-(0-1) 02/01/86(OLD)
Sample Date	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00
Chemical Name										
Explosives (UG/KG)										
1,3,5-Trinitrobenzene	250 U	250 U	NA	250 U	250 U	250 U	250 U	20000 U	20000 U	20000 U
1,3-Dinitrobenzene	250 U	250 U	NA	250 U	250 U	250 U	250 U	NA	NA	NA
2,4,6-Trinitrotoluene	250 U	250 U	NA	250 U	250 U	250 U	250 U	20,000	20000 U	20000 U
2,4-Dinitrotoluene	250 U	250 U	NA	250 U	53 J	250 U	250 U	NA	NA	NA
2,6-Dinitrotoluene	250 U	250 U	NA	250 U	250 U	250 U	250 U	NA	NA	NA
2-Amino-4,6-dinitrotoluene	250 U	110 J	NA	250 U	250 U	250 U	250 U	NA	NA	NA
2-Nitrotoluene	250 U	250 U	NA	250 U	250 U	250 U	250 U	NA	NA	NA
3-Nitrotoluene	250 U	250 U	NA	250 U	250 U	250 U	250 U	NA	NA	NA
4-Amino-2,6-dinitrotoluene	250 U	250 U	NA	250 U	250 U	250 U	250 U	NA	NA	NA
4-Nitrotoluene	250 U	100 J	NA	250 U	250 U	250 U	250 U	NA	NA	NA
HMX	500 U	500 U	NA	500 U	500 U	500 U	500 U	20000 U	20000 U	20000 U
Nitrobenzene	250 U	250 U	NA	250 U	250 U	250 U	250 U	NA	NA	NA
RDX	500 U	500 U	NA	500 U	500 U	500 U	500 U	20000 U	20000 U	20000 U
Tetryl	650 U	650 U	NA	650 U	650 U	650 U	650 U	NA	NA	NA
Total Metals (MG/KG)										
Aluminum	448 J	931 J	532 U	590 J	2,040 J	892 J	922 J	NA	NA	NA

NA - Not analyzed

Table B-2
Raw Analytical Data - Historic Sediment Samples
Building 318
Former NSWC - White Oak, Silver Spring, Maryland

Station	09SD09-[86]	09SD10	09SD10	09SD10-[86]	09SD10-[86]	09SD102	09SD103	09SD105	09SD105
Sample ID	9SD09-(1-2) 02/01/86(OLD)	9SD10 a mp(OLD)	9SD10 b mp(OLD)	9SD10-(0-1) 02/01/86(OLD)	9SD10-(1-2) 02/01/86(OLD)	9SD1020001	9SD1030001	9SD1050001	9SD1050001-D
Sample Date	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00
Chemical Name									
Explosives (UG/KG)									
1,3,5-Trinitrobenzene	20000 U	NA	0.2 U	20000 U	20000 U	250 U	250 U	250 U	250 U
1,3-Dinitrobenzene	NA	NA	NA	NA	NA	250 U	250 U	250 U	250 U
2,4,6-Trinitrotoluene	20000 U	NA	0.94 U	20000 U	20000 U	250 U	250 U	250 U	250 U
2,4-Dinitrotoluene	NA	NA	NA	NA	NA	250 U	250 U	250 U	250 U
2,6-Dinitrotoluene	NA	NA	NA	NA	NA	250 U	250 U	250 U	250 U
2-Amino-4,6-dinitrotoluene	NA	NA	NA	NA	NA	250 U	250 U	250 U	250 U
2-Nitrotoluene	NA	NA	NA	NA	NA	250 U	250 U	250 U	250 U
3-Nitrotoluene	NA	NA	NA	NA	NA	250 U	250 U	250 U	250 U
4-Amino-2,6-dinitrotoluene	NA	NA	NA	NA	NA	250 U	250 U	250 U	250 U
4-Nitrotoluene	NA	NA	NA	NA	NA	250 U	250 U	250 U	250 U
HMX	20000 U	NA	4.2 U	20000 U	20000 U	500 U	500 U	500 U	500 U
Nitrobenzene	NA	NA	NA	NA	NA	250 U	250 U	250 U	250 U
RDX	20000 U	NA	1.6 U	20000 U	20000 U	500 U	500 U	500 U	500 U
Tetryl	NA	NA	3.7 U	NA	NA	650 U	650 U	650 U	650 U
Total Metals (MG/KG)									
Aluminum	NA	40 U	40 U	NA	NA	623 J	1,220 J	520 J	875 J

NA - Not .ed

Table B-2
Raw Analytical Data - Historic Sediment Samples
Building 318
Former NSWC - White Oak, Silver Spring, Maryland

Station	09SD14-[86]	09SD14-[86]	09SD15-[86]	09SD15-[86]	09SD9	09SD9	BG-SD-07	BG-SD-09
Sample ID	9SD14-(0-1) 05/01/86(OLD)	9SD14-(1-2) 05/01/86(OLD)	9SD15-(0-1) 05/01/86(OLD)	9SD15-(1-2) 05/01/86(OLD)	9SD9 a mp(OLD)	9SD9 b mp(OLD)	BG-SD-07(OLD)	BG-SD-09(OLD)
Sample Date	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00
Chemical Name								
Explosives (UG/KG)								
1,3,5-Trinitrobenzene	20000 U	20000 U	20000 U	20000 U	NA	0.2 U	NA	NA
1,3-Dinitrobenzene	NA	NA	NA	NA	NA	NA	NA	NA
2,4,6-Trinitrotoluene	20000 U	20000 U	20000 U	20000 U	NA	0.94 U	NA	NA
2,4-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA
2-Amino-4,6-dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA
2-Nitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA
3-Nitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA
4-Amino-2,6-dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA
4-Nitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA
HMX	20000 U	20000 U	20000 U	20000 U	NA	4.2 U	NA	NA
Nitrobenzene	NA	NA	NA	NA	NA	NA	NA	NA
RDX	20000 U	20000 U	20000 U	20000 U	NA	1.6 U	NA	NA
Tetryl	NA	NA	NA	NA	NA	3.7 U	NA	NA
Total Metals (MG/KG)								
Aluminum	NA	NA	NA	NA	40 U	40 U	918	3,750

NA - Not analyzed

Table B-3
Raw Analytical Data - Historic Monitoring Well Samples
Building 318
Former NSWC - White Oak, Silver Spring, Maryland

Station	09GW001	09GW001	09GW101	09GW101	09GW103	09GW103	09GW105	09GW105	09GW107	09GW107	09GW107
Sample ID	009GW0010005	009GW0010006	009GW1010005	009GW1010006	009GW1030005	009GW1030006	009GW1050005	009GW1050006	009GW1070005	009GW1070006	009GW1079906
Sample Date	3/4/00	5/6/00	3/5/00	5/6/00	3/4/00	5/19/00	3/5/00	5/6/00	3/4/00	5/20/00	5/20/00
Chemical Name											
Explosives (UG/L)											
1,3,5-Trinitrobenzene	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
1,3-Dinitrobenzene	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
2,4,6-Trinitrotoluene	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
2,4-Dinitrotoluene	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
2,6-Dinitrotoluene	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
2-Amino-4,6-dinitrotoluene	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
2-Nitrotoluene	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U
3-Nitrotoluene	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U
4-Amino-2,6-dinitrotoluene	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
4-Nitrotoluene	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U
HMX	12	9.9	2.6 U	2.6 U	1.4 J	1.5 J	1.5 J	1.4 J	2.6 U	2.6 U	2.6 U
Nitrobenzene	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
Perchlorate	201	178	5 U	5 U	5 U	5 U	13.6	14.6	5 U	5 U	5 U
RDX	121	115	1 J	2.6 U	1.5 J	1.8 J	4.5	3.6	2.6 U	2.6 U	2.6 U
Tetryl	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U
Total Metals (UG/L)											
Aluminum	792	4,010	48 B	349	676	221 B	774	481	56.2 B	62.1 B	57.4 B
Dissolved Metals (UG/L)											
Aluminum	35.7 U	59.7 B	35.7 U	31.7 U	35.7 U	185 B	35.7 U	31.7 U	35.7 U	39.9 B	31.7 U
Wet Chemistry (MG/L)											
Ammonia	0.1 U	NA	0.1 U	NA	0.1 U	NA	0.1 U	NA	0.1 U	NA	NA
Nitrate	0.559	NA	0.793	NA	0.319	NA	0.445	NA	0.05 U	NA	NA

NA - Not analyzed

Table B-3
Raw Analytical Data - Historic Monitoring Well Samples
Building 318
Former NSWC - White Oak, Silver Spring, Maryland

Station	09GW01	09GW01	09GW01	09GW01	09GW01	09GW01	09GW01	09GW01	09GW02	09GW02	09GW02
Sample ID	9GW01 02/01/86(OLD)	9GW01 05/01/86(OLD)	9GW010001	9GW010001-D	9GW010002	9GW010003	9GW010003-F	9GW010004	9GW02 02/01/86(OLD)	9GW02 05/01/86(OLD)	9GW020001
Sample Date	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00
Chemical Name											
Explosives (UG/L)											
1,3,5-Trinitrobenzene	20 U	20 U	4 U	4 U	4 U	4 U	NA	4 U	20 U	20 U	0.2 U
1,3-Dinitrobenzene	NA	NA	4 U	4 U	4 U	4 U	NA	4 U	NA	NA	0.2 U
2,4,6-Trinitrotoluene	20 U	20 U	4 U	4 U	4 U	4 U	NA	4 U	20 U	20 U	0.2 U
2,4-Dinitrotoluene	NA	NA	4 U	4 U	4 U	4 U	NA	4 U	NA	NA	0.2 U
2,6-Dinitrotoluene	NA	NA	4 U	4 U	4 U	4 U	NA	4 U	NA	NA	0.2 U
2-Amino-4,6-dinitrotoluene	NA	NA	4 U	4 U	4 U	4 U	NA	4 U	NA	NA	0.2 U
2-Nitrotoluene	NA	NA	4 U	4 U	4 U	4 U	NA	4 U	NA	NA	0.2 U
3-Nitrotoluene	NA	NA	4 U	4 U	4 U	4 U	NA	4 U	NA	NA	0.2 U
4-Amino-2,6-dinitrotoluene	NA	NA	4 U	4 U	4 U	4 U	NA	4 U	NA	NA	0.2 U
4-Nitrotoluene	NA	NA	4 U	4 U	4 U	4 U	NA	4 U	NA	NA	0.2 U
HMX	20 U	20 U	10	10	13	11	NA	12	20 U	20 U	0.5 U
Nitrobenzene	NA	NA	4 U	4 U	4 U	4 U	NA	4 U	NA	NA	0.2 U
Perchlorate	NA	NA	5 U	5 U	NA	240	NA	798	NA	NA	5 U
RDX	97	20 U	130	130	150	160	NA	150	20 U	20 U	0.5 U
Tetryl	NA	NA	4 U	4 U	4 U	4 U	NA	4 U	NA	NA	0.2 U
Total Metals (UG/L)											
Aluminum	NA	NA	114 U	70 U	161	616	NA	101	NA	NA	766
Dissolved Metals (UG/L)											
Aluminum	NA	NA	NA	NA	NA	NA	29.4 U	NA	NA	NA	NA
Wet Chemistry (MG/L)											
Ammonia	NA	NA	NA	NA	NA	NA	NA	0.2 U	NA	NA	NA
Nitrate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

NA - Not analyzed

Table B-3
Raw Analytical Data - Historic Monitoring Well Samples
Building 318
Former NSWC - White Oak, Silver Spring, Maryland

Station	09GW02	09GW02	09GW02	09GW02	09GW02	09GW02	09GW02	09GW02	09GW01	09GW01	09GW01	09GW01
Sample ID	9GW020002	9GW020002-D	9GW020002-F	9GW020002-F-D	9GW020003	9GW020003-D	9GW020004	9GW020004-F	9GW1 1989(OLD)	9GW1 1991(OLD)	9GW1 a mp(OLD)	9GW1 b mp(OLD)
Sample Date	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00
Chemical Name												
Explosives (UG/L)												
1,3,5-Trinitrobenzene	0.2 U	0.2 U	NA	NA	0.2 U	0.2 U	0.2 U	NA	NA	0.2 U	NA	0.2 U
1,3-Dinitrobenzene	0.2 U	0.2 U	NA	NA	0.2 U	0.2 U	0.2 U	NA	NA	NA	NA	NA
2,4,6-Trinitrotoluene	0.2 U	0.2 U	NA	NA	0.2 U	0.2 U	0.2 U	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	0.2 U	0.2 U	NA	NA	0.2 U	0.2 U	0.2 U	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	0.2 U	0.2 U	NA	NA	0.2 U	0.2 U	0.2 U	NA	NA	NA	NA	NA
2-Amino-4,6-dinitrotoluene	0.2 U	0.2 U	NA	NA	0.2 U	0.2 U	0.2 U	NA	NA	NA	NA	NA
2-Nitrotoluene	0.2 U	0.2 U	NA	NA	0.2 U	0.2 U	0.2 U	NA	NA	NA	NA	NA
3-Nitrotoluene	0.2 U	0.2 U	NA	NA	0.2 U	0.2 U	0.2 U	NA	NA	NA	NA	NA
4-Amino-2,6-dinitrotoluene	0.2 U	0.2 U	NA	NA	0.2 U	0.2 U	0.2 U	NA	NA	NA	NA	NA
4-Nitrotoluene	0.2 U	0.2 U	NA	NA	0.2 U	0.2 U	0.2 U	NA	NA	NA	NA	NA
HMX	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	NA	10 U	18.6	10 U	10.6
Nitrobenzene	0.2 U	0.2 U	NA	NA	0.2 U	0.2 U	0.2 U	NA	NA	1.5 U	NA	NA
Perchlorate	NA	NA	NA	NA	4 U	4 U	8 U	NA	NA	NA	NA	NA
RDX	0.5 U	0.75	NA	NA	0.63	0.65	0.5	NA	150	214	150	214
Tetryl	0.2 U	0.2 U	NA	NA	0.2 U	0.2 U	0.2 U	NA	NA	NA	NA	NA
Total Metals (UG/L)												
Aluminum	19.1 U	75.1 U	NA	NA	99.2	166	796	NA	NA	NA	NA	NA
Dissolved Metals (UG/L)												
Aluminum	NA	NA	16.6 U	20.9 U	NA	NA	NA	16.2 U	NA	NA	NA	NA
Wet Chemistry (MG/L)												
Ammonia	NA	NA	NA	NA	NA	NA	0.2 U	NA	NA	NA	NA	NA
Nitrate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

NA - Not analyzed

Table B-3
Raw Analytical Data - Historic Monitoring Well Samples
Building 318
Former NSWC - White Oak, Silver Spring, Maryland

Station	09GW100	09GW100	09GW100	09GW100	09GW100	09GW100	09GW100	09GW100	09GW101	09GW101	09GW101	09GW101	09GW103
Sample ID	9GW1000001	9GW1000001-F	9GW1000002	9GW1000002-F	9GW1000003	9GW1000003-F	9GW1000004	9GW1000004-F	9GW1010001	9GW1010002	9GW1010003	9GW1010004	9GW1030001
Sample Date	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00
Chemical Name													
Explosives (UG/L)													
1,3,5-Trinitrobenzene	1 U	NA	2 U	NA	0.2 U	NA	1 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,3-Dinitrobenzene	1 U	NA	2 U	NA	0.2 U	NA	1 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2,4,6-Trinitrotoluene	1 U	NA	2 U	NA	0.2 U	NA	1 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2,4-Dinitrotoluene	1 U	NA	2 U	NA	0.2 U	NA	1 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2,6-Dinitrotoluene	1 U	NA	2 U	NA	0.2 U	NA	1 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2-Amino-4,6-dinitrotoluene	1 U	NA	2 U	NA	0.2 U	NA	1 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2-Nitrotoluene	1 U	NA	2 U	NA	0.2 U	NA	1 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
3-Nitrotoluene	1 U	NA	2 U	NA	0.2 U	NA	1 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
4-Amino-2,6-dinitrotoluene	1 U	NA	2 U	NA	0.2 U	NA	1 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
4-Nitrotoluene	1 U	NA	2 U	NA	0.2 U	NA	1 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
HMX	3	NA	5.1	NA	0.5 U	NA	2.5	NA	0.5 U	0.5 U	0.5 U	0.5 U	1.3
Nitrobenzene	1 U	NA	2 U	NA	0.2 U	NA	1 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Perchlorate	5 U	NA	NA	NA	4 U	NA	8 U	NA	5 U	NA	4 U	7	10.7 K
RDX	41	NA	66	NA	0.5 U	NA	32	NA	0.83	1.3	0.5 U	0.9	2.7
Tetryl	1 U	NA	2 U	NA	0.2 U	NA	1 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Total Metals (UG/L)													
Aluminum	8,730	NA	3,240	NA	11,100	NA	2,720	NA	331	1,100	60 U	60.8 U	90.5 U
Dissolved Metals (UG/L)													
Aluminum	NA	59.1 U	NA	132	NA	30.6 U	NA	22.7 U	NA	NA	NA	NA	NA
Wet Chemistry (MG/L)													
Ammonia	NA	NA	NA	NA	NA	NA	0.2	NA	NA	NA	NA	0.09	NA
Nitrate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

NA - Not ›d

Table B-3
Raw Analytical Data - Historic Monitoring Well Samples
Building 318
Former NSWC - White Oak, Silver Spring, Maryland

Station	09GW103	09GW103	09GW103	09GW103	09GW103	09GW103	09GW103	09GW104	09GW104	09GW104	09GW104	09GW104	09GW104
Sample ID	9GW1030001-D	9GW1030002	9GW1030002-D	9GW1030003	9GW1030003-F	9GW1030004	9GW1030004-D	9GW1040001	9GW1040001-F	9GW1040002	9GW1040002-F	9GW1040003	9GW1040003-F
Sample Date	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00
Chemical Name													
Explosives (UG/L)													
1,3,5-Trinitrobenzene	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	NA	0.2 U	NA	0.2 U	NA
1,3-Dinitrobenzene	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	NA	0.2 U	NA	0.2 U	NA
2,4,6-Trinitrotoluene	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	NA	0.2 U	NA	0.2 U	NA
2,4-Dinitrotoluene	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	NA	0.2 U	NA	0.2 U	NA
2,6-Dinitrotoluene	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	NA	0.2 U	NA	0.2 U	NA
2-Amino-4,6-dinitrotoluene	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	NA	0.2 U	NA	0.2 U	NA
2-Nitrotoluene	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	NA	0.2 U	NA	0.2 U	NA
3-Nitrotoluene	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	NA	0.2 U	NA	0.2 U	NA
4-Amino-2,6-dinitrotoluene	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	NA	0.2 U	NA	0.2 U	NA
4-Nitrotoluene	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	NA	0.2 U	NA	0.2 U	NA
HMX	1.4	1.6	1.7	1.5	NA	1.8	1.7	0.5 U	NA	0.5 U	NA	0.5 U	NA
Nitrobenzene	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	NA	0.2 U	NA	0.2 U	NA
Perchlorate	11.5 K	NA	NA	4 U	NA	4 U	4 U	5 U	NA	NA	NA	4 U	NA
RDX	2.8	2.9	3	3.6	NA	2.5	2.3	0.5 U	NA	0.5 U	NA	0.5 U	NA
Tetryl	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	NA	0.2 U	NA	0.2 U	NA
Total Metals (UG/L)													
Aluminum	91.8 U	114 U	75.4 U	408	NA	84.1 U	68.3 U	157	NA	48.9 U	NA	77.4	NA
Dissolved Metals (UG/L)													
Aluminum	NA	NA	NA	NA	41.8 U	NA	NA	NA	12.7 U	NA	152	NA	29.4 U
Wet Chemistry (MG/L)													
Ammonia	NA	NA	NA	NA	NA	0.1	0.09	NA	NA	NA	NA	NA	NA
Nitrate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

NA - Not analyzed

Table B-3
Raw Analytical Data - Historic Monitoring Well Samples
Building 318
Former NSWC - White Oak, Silver Spring, Maryland

Station	09GW104	09GW104	09GW105	09GW105	09GW105	09GW105	09GW105	09GW105	09GW105	09GW107	09GW107	09GW107	09GW107	09GW108
Sample ID	9GW1040004	9GW1040004-F	9GW1050001	9GW1050002	9GW1050002-F	9GW1050003	9GW1050003-F	9GW1050004	9GW1050004-F	9GW1070001	9GW1070002	9GW1070003	9GW1070004	9GW1080001
Sample Date	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00
Chemical Name														
Explosives (UG/L)														
1,3,5-Trinitrobenzene	0.2 U	NA	0.2 U	0.2 U	NA	0.2 U	NA	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,3-Dinitrobenzene	0.2 U	NA	0.2 U	0.2 U	NA	0.2 U	NA	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2,4,6-Trinitrotoluene	0.2 U	NA	0.2 U	0.2 U	NA	0.2 U	NA	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2,4-Dinitrotoluene	0.2 U	NA	0.2 U	0.2 U	NA	0.2 U	NA	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2,6-Dinitrotoluene	0.2 U	NA	0.2 U	0.2 U	NA	0.2 U	NA	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2-Amino-4,6-dinitrotoluene	0.2 U	NA	0.2 U	0.2 U	NA	0.2 U	NA	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2-Nitrotoluene	0.2 U	NA	0.2 U	0.2 U	NA	0.2 U	NA	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
3-Nitrotoluene	0.2 U	NA	0.2 U	0.63	NA	0.2 U	NA	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
4-Amino-2,6-dinitrotoluene	0.2 U	NA	0.2 U	0.2 U	NA	0.2 U	NA	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
4-Nitrotoluene	0.2 U	NA	0.2 U	0.2 U	NA	0.2 U	NA	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
HMX	0.5 U	NA	0.79	1	NA	1	NA	1.5	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Nitrobenzene	0.2 U	NA	0.2 U	0.2 U	NA	0.2 U	NA	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Perchlorate	4 U	NA	5 U	NA	NA	8.4	NA	16	NA	5 U	NA	4 U	4 U	5 U
RDX	0.5 U	NA	4.2	3.9	NA	4	NA	5.7	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Tetryl	0.2 U	NA	0.2 U	0.2 U	NA	0.2 U	NA	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Total Metals (UG/L)														
Aluminum	68.3 U	NA	199	1,580	NA	3,340	NA	356	NA	59.5 U	60.2 U	129	47.5 U	231 U
Dissolved Metals (UG/L)														
Aluminum	NA	17.4 U	NA	NA	243	NA	59.3 U	NA	28.3 U	NA	NA	NA	NA	NA
Wet Chemistry (MG/L)														
Ammonia	0.1	NA	NA	NA	NA	NA	NA	0.1	NA	NA	NA	NA	0.3	NA
Nitrate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

NA - Not analyzed

Table B-3
Raw Analytical Data - Historic Monitoring Well Samples
Building 318
Former NSWC - White Oak, Silver Spring, Maryland

Station	09GW108	09GW108	09GW108	09GW108	09GW108	09GW108	09GW110	09GW110	09GW110	09GW02	09GW02	09GW57D
Sample ID	9GW1080002	9GW1080003	9GW1080003-F	9GW1080004	9GW108-00-04[10/29/99]	9GW1080004-F	9GW1100002	9GW1100003	9GW1100004	9GW2 a mp(OLD)	9GW2 b mp(OLD)	9GW57D a mp(OLD)
Sample Date	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00
Chemical Name												
Explosives (UG/L)												
1,3,5-Trinitrobenzene	0.2 U	0.2 U	NA	0.2 U	NA	NA	0.2 U	0.2 U	0.2 U	NA	0.00E+00 R	NA
1,3-Dinitrobenzene	0.2 U	0.2 U	NA	0.2 U	NA	NA	0.2 U	0.2 U	0.2 U	NA	NA	NA
2,4,6-Trinitrotoluene	0.2 U	0.2 U	NA	0.2 U	NA	NA	0.2 U	0.2 U	0.2 U	NA	NA	NA
2,4-Dinitrotoluene	0.2 U	0.2 U	NA	0.2 U	NA	NA	0.2 U	0.2 U	0.2 U	NA	NA	NA
2,6-Dinitrotoluene	0.2 U	0.2 U	NA	0.2 U	NA	NA	0.2 U	0.2 U	0.2 U	NA	NA	NA
2-Amino-4,6-dinitrotoluene	0.2 U	0.2 U	NA	0.2 U	NA	NA	0.2 U	0.2 U	0.2 U	NA	NA	NA
2-Nitrotoluene	0.2 U	0.2 U	NA	0.2 U	NA	NA	0.2 U	0.2 U	0.2 U	NA	NA	NA
3-Nitrotoluene	0.2 U	0.2 U	NA	0.2 U	NA	NA	0.2 U	0.2 U	0.2 U	NA	NA	NA
4-Amino-2,6-dinitrotoluene	0.2 U	0.2 U	NA	0.2 U	NA	NA	0.2 U	0.2 U	0.2 U	NA	NA	NA
4-Nitrotoluene	0.2 U	0.2 U	NA	0.2 U	NA	NA	0.2 U	0.2 U	0.2 U	NA	NA	NA
HMX	0.5 U	0.5 U	NA	0.5 U	NA	NA	2.1	2.6	2.4	10 U	4.2 U	10 U
Nitrobenzene	0.2 U	0.2 U	NA	0.2 U	NA	NA	0.2 U	0.2 U	0.2 U	NA	NA	NA
Perchlorate	NA	4 U	NA	NA	4 U	NA	NA	7	8	NA	NA	NA
RDX	0.5 U	0.5 U	NA	0.5 U	NA	NA	2.2	1.9	1.9	10 U	1.6 U	10 U
Tetryl	0.2 U	0.2 U	NA	0.2 U	NA	NA	0.2 U	0.2 U	0.2 U	NA	NA	NA
Total Metals (UG/L)												
Aluminum	160	267	NA	322	NA	NA	103 U	110	62.4 U	NA	NA	NA
Dissolved Metals (UG/L)												
Aluminum	NA	NA	29.4 U	NA	NA	16.2 U	NA	NA	NA	NA	NA	NA
Wet Chemistry (MG/L)												
Ammonia	NA	NA	NA	NA	NA	NA	NA	NA	0.2	NA	NA	NA
Nitrate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

NA - Not analyzed

Table B-3
Raw Analytical Data - Historic Monitoring Well Samples
Building 318
Former NSWC - White Oak, Silver Spring, Maryland

Station	09GW57D	09GW57D	09GW57D	09GW57D	09GW57D	09GW57S	09GW57S	09GW57S	09GW57S	09GW57S	09GW57S	09GW57S
Sample ID	9GW57D b mp(OLD)	9GW57D0001	9GW57D0002	9GW57D0003	9GW57D0004	9GW57S a mp(OLD)	9GW57S b mp(OLD)	9GW57S0001	9GW57S0001-F	9GW57S0002	9GW57S0002-F	9GW57S0003
Sample Date	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00
Chemical Name												
Explosives (UG/L)												
1,3,5-Trinitrobenzene	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	NA	0.2 U	NA	0.2 U
1,3-Dinitrobenzene	NA	0.2 U	0.2 U	0.2 U	0.2 U	NA	NA	0.2 U	NA	0.2 U	NA	0.2 U
2,4,6-Trinitrotoluene	NA	0.2 U	0.2 U	0.2 U	0.2 U	NA	NA	0.2 U	NA	0.2 U	NA	0.2 U
2,4-Dinitrotoluene	NA	0.2 U	0.2 U	0.2 U	0.2 U	NA	NA	0.2 U	NA	0.2 U	NA	0.2 U
2,6-Dinitrotoluene	NA	0.2 U	0.2 U	0.2 U	0.2 U	NA	NA	0.2 U	NA	0.2 U	NA	0.2 U
2-Amino-4,6-dinitrotoluene	NA	0.2 U	0.2 U	0.2 U	0.2 U	NA	NA	0.2 U	NA	0.2 U	NA	0.2 U
2-Nitrotoluene	NA	0.2 U	0.2 U	0.2 U	0.2 U	NA	NA	0.2 U	NA	0.2 U	NA	0.2 U
3-Nitrotoluene	NA	0.2 U	0.2 U	0.2 U	0.2 U	NA	NA	0.2 U	NA	0.2 U	NA	0.2 U
4-Amino-2,6-dinitrotoluene	NA	0.2 U	0.2 U	0.2 U	0.2 U	NA	NA	0.2 U	NA	0.2 U	NA	0.2 U
4-Nitrotoluene	NA	0.2 U	0.2 U	0.2 U	0.2 U	NA	NA	0.2 U	NA	0.2 U	NA	0.2 U
HMX	1.6	2.5	2.5	2.8	2.6	25	2	0.88	NA	0.68	NA	1.1
Nitrobenzene	NA	0.2 U	0.2 U	0.2 U	0.2 U	NA	NA	0.2 U	NA	0.2 U	NA	0.2 U
Perchlorate	NA	39.1 K	NA	27	34	NA	NA	17.6 K	NA	NA	NA	16
RDX	12.3	6.1	6.5	6.7	5.5	10 U	12.1	1.5	NA	0.85	NA	1.9
Tetryl	NA	0.2 U	0.2 U	0.2 U	0.2 U	NA	NA	0.2 U	NA	0.2 U	NA	0.2 U
Total Metals (UG/L)												
Aluminum	NA	21.4 U	157	34.6 U	28.5 U	NA	NA	108,000	NA	22,800	NA	10,400
Dissolved Metals (UG/L)												
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	12.7 U	NA	30.8 U	NA
Wet Chemistry (MG/L)												
Ammonia	NA	NA	NA	NA	0.2 U	NA	NA	NA	NA	NA	NA	NA
Nitrate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

NA - Not a[illegible]ed

Table B-3
Raw Analytical Data - Historic Monitoring Well Samples
Building 318
Former NSWC - White Oak, Silver Spring, Maryland

Station	09GW57S	09GW57S	09GW57S	9TW0020001	09GW01	09GW02	09GW57D	09GW57S
Sample ID	9GW57S0003-F	9GW57S0004	9GW57S0004-F	9TW0020001	WO-9GW01(OLD)	WO-9GW02(OLD)	WO-9GW57D(OLD)	WO-9GW57S(OLD)
Sample Date	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00	1/1/00
Chemical Name								
Explosives (UG/L)								
1,3,5-Trinitrobenzene	NA	0.2 U	NA	0.2 U	0.6 U	0.6 U	0.6 U	0.6 U
1,3-Dinitrobenzene	NA	0.2 U	NA	0.2 U	0.6 U	0.6 U	0.6 U	0.6 U
2,4,6-Trinitrotoluene	NA	0.2 U	NA	0.2 U	0.6 U	0.6 U	0.6 U	0.6 U
2,4-Dinitrotoluene	NA	0.2 U	NA	0.2 U	0.6 U	0.6 U	0.6 U	0.6 U
2,6-Dinitrotoluene	NA	0.2 U	NA	0.2 U	0.6 U	0.6 U	0.6 U	0.6 U
2-Amino-4,6-dinitrotoluene	NA	0.2 U	NA	0.2 U	0.6 U	0.6 U	0.6 U	0.6 U
2-Nitrotoluene	NA	0.2 U	NA	0.2 U	1.3 U	1.3 U	1.3 U	1.3 U
3-Nitrotoluene	NA	0.2 U	NA	0.2 U	1.3 U	1.3 U	1.3 U	1.3 U
4-Amino-2,6-dinitrotoluene	NA	0.2 U	NA	0.2 U	0.6 U	0.6 U	0.6 U	0.6 U
4-Nitrotoluene	NA	0.2 U	NA	0.2 U	1.3 U	1.3 U	1.3 U	1.3 U
HMX	NA	0.78	NA	2.2	9.3	1.3 U	1.9	1.7
Nitrobenzene	NA	0.2 U	NA	0.2 U	0.6 U	0.6 U	0.6 U	0.6 U
Perchlorate	NA	8 U	NA	7.9 L	NA	NA	NA	NA
RDX	NA	0.93	NA	2.9	101	1.3 U	5.6	3.7
Tetryl	NA	0.2 U	NA	0.2 U	1.3 U	1.3 U	1.3 U	1.3 U
Total Metals (UG/L)								
Aluminum	NA	2,970	NA	5,000	609 J	528 J	142 U	506 J
Dissolved Metals (UG/L)								
Aluminum	29.4 U	NA	16.2 U	NA	NA	NA	NA	NA
Wet Chemistry (MG/L)								
Ammonia	NA	0.2 U	NA	NA	NA	NA	NA	NA
Nitrate	NA	NA	NA	NA	0.57	0.32	0.73	0.94

NA - Not analyzed

Table B-4
Raw Analytical Data - Historic Temporary Well Samples
Building 318
Former NSWC - White Oak, Silver Spring, Maryland

Station	09DP236	09DP224	09DP225	09DP227	09DP228	09DP229	09DP231	09DP232	09DP233	09DP234	09DP235
Sample ID	009DP236-30	09DP224-25	09DP225-30	09DP227-19	09DP228-27	09DP229-35	09DP231-30	09DP232-30	09DP233-25	09DP234-30	09DP235-25
Sample Date	11/14/01	8/27/01	8/27/01	9/10/01	9/10/01	9/10/01	9/20/01	9/20/01	9/20/01	9/25/01	9/25/01
Chemical Name											
Explosives (UG/L)											
1,3,5-Trinitrobenzene	0.26	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U
1,3-Dinitrobenzene	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U
2,4,6-Trinitrotoluene	0.26 U	0.26 U	0.26 U	3.07	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U
2,4-Dinitrotoluene	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U
2,6-Dinitrotoluene	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U
2-Amino-4,6-dinitrotoluene	0.47	0.26 U	0.26 U	0.836	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U
2-Nitrotoluene	0.52 U	0.519 U	0.519 U	0.519 U	0.519 U	0.519 U	0.519 U	0.519 U	0.519 U	0.52 U	0.52 U
3-Nitrotoluene	0.52 U	0.519 U	0.519 U	0.519 U	0.519 U	0.519 U	0.519 U	0.519 U	0.519 U	0.52 U	0.52 U
4-Amino-2,6-dinitrotoluene	0.31	0.26 U	0.26 U	1.43	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U
4-Nitrotoluene	0.52 U	0.519 U	0.519	0.519 U	0.519 U	0.519 U	0.519 U	0.519 U	0.519 U	0.52 U	0.52 U
HMX	3	0.519 U	0.519 U	20.5	11.8	0.519 U	6.71	1.5	0.519 U	2.15	0.52 U
Nitrobenzene	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U
Perchlorate	51.3	5 U	5 U	192	106	218	24.1	28	13	20.8 U	5 U
RDX	3	1.16	2.23 U	66.4	78.9	15	14.2	11.2	0.519 U	10.3	0.52 U
Tetryl	0.52 U	0.519 U	0.519 U	0.519 U	0.519 U	0.519 U	0.519 U	0.519 U	0.519 U	0.52 U	0.52 U
Total Metals (UG/L)											
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dissolved Metals (UG/L)											
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry (MG/L)											
Ammonia	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

NA - Not analyzed

Appendix C
Toxicity Information for Chemicals Handled at Building 318

APPENDIX C

Toxicity Information for Chemicals Handled at Building 318

Toxicity Profiles of Selected Chemicals

Below are toxicological profiles of selected bursting explosives and other constituents: octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX), cyclotrimethylenetrinitramine (RDX), 2,4,6-trinitrotoluene (TNT), amatol, baratol, pentaorythritol tetranitrate (PETN), and picatrol. More detailed toxicity information can be found in USEPA's IRIS database, ATSDR's toxicological profiles, and other published literature.

Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)

Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine or High Melting eXplosive (HMX) is a colorless solid that dissolves slightly in water. HMX is made from hexamine, ammonium nitrate, nitric acid, and acetic acid. HMX explodes violently at high temperatures and is used in other explosives, rocket fuels, and burster chargers. A small amount of HMX is formed in making RDX, another explosive similar in structure to HMX. Most of the HMX that has entered the environment was released into waste water from HMX manufacturing or use in processes. HMX does not evaporate or bind to sediments, sunlight breaks down most of the HMX in surface water. HMX is likely to move from soil into groundwater, particularly in sandy soils. Workers may be exposed to HMX from inhalation of dusts that contain HMX or getting HMX-containing liquids on the skin. The general public in areas near facilities that manufacture or use HMX may also be exposed from ingestion of groundwater containing HMX. One study of workers indicated no observed adverse effects of workers who breathed HMX. However, the study was limited in the number of workers and the concentrations in air were not reported. Studies in animals indicate that HMX may have harmful effects on the liver and central nervous system if ingested or absorbed through the skin.

USEPA has derived a chronic oral reference dose (RfD) of 5E-2 mg/kg/day based on hepatic lesion study. The chronic RfD was derived from a subchronic no observed adverse effects level (NOAEL) of 50 mg/kg/day rather than the chronic low observed adverse effects level (LOAEL) of 150 mg/kg/day for rats. The chronic LOAEL was associated with toxic liver effects in male rats that exhibited effects at lower doses than females in the study.

There is no data on the possible carcinogenicity of HMX. Currently, USEPA has placed HMX in the weight-of-evidence Group D (not a human carcinogen).

Cyclotrimethylenetrinitramine (RDX)

Cyclotrimethylenetrinitramine or Royal Demolition eXplosive (RDX), also know as cyclonite or hexogen, is an insoluble white powder explosive. RDX is a synthetic organic compound which is predominately manufactured and processed by military armament plants as an

by inhaling work place air and it can be absorbed through the skin. In a workplace study of 71 individuals engaged in work with explosives and exposed to air concentrations varying from 0.008 to 0.195 mg/m^3, the most common occupational health problem was dermatitis, which was thought to be due to sensitization and not primary irritation by the picrate. Upper respiratory disease was negligible and systemic toxicity was not recognized among workers. In some cases, cutaneous lesions appeared usually on the exposed parts of the upper extremities. Persons least exposed seemed more liable to acquire dermatitis, which did not develop in those engaged in operations where there was the heaviest exposure.

USEPA's IRIS database currently does not list any oral or inhalation toxicity information for picatrol. No data has been published for picatrol. There is no evidence regarding the carcinogenic effects of picatrol in humans or animals.

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