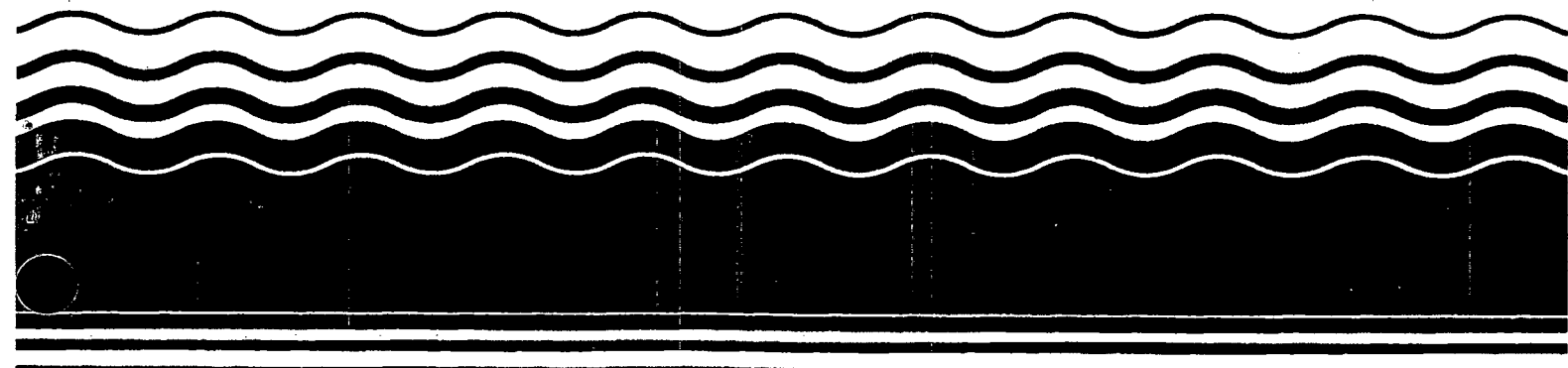


**PB99-963901**  
**EPA541-R99-005**  
**1999**

**EPA Superfund**  
**Record of Decision:**

**USA Fort George G. Meade**  
**(TAP) OU**  
**Fort Meade, MD**  
**7/20/1999**





**FINAL  
RECORD OF DECISION**

**TIPTON AIRFIELD PARCEL (TAP)  
OPERABLE UNIT**

**FORT GEORGE G. MEADE  
FORT MEADE, MARYLAND**

**JUNE 1999**



## TABLE OF CONTENTS

SECTION	PAGE
DECLARATION FOR THE RECORD OF DECISION REMEDIAL ALTERNATIVE SELECTION.....	iv
1.0 DECISION SUMMARY.....	1-1
1.1 INTRODUCTION.....	1-1
2.0 SITE INFORMATION.....	2-1
2.1 SITE DESCRIPTION.....	2-1
2.1.1 Description of AREEs 10 and 11.....	2-1
3.0 SITE HISTORY AND ENFORCEMENT ACTIVITIES.....	3-1
3.1 PREVIOUS ASSESSMENTS AND INVESTIGATIONS.....	3-1
3.2 OTHER ARMY ACTIONS AND SAFETY PRECAUTIONS.....	3-2
4.0 HIGHLIGHTS OF COMMUNITY PARTICIPATION.....	4-1
4.1 PUBLIC COMMENT PERIOD.....	4-1
4.2 PUBLIC MEETING.....	4-1
4.3 ADDITIONAL PUBLIC INFORMATION.....	4-1
5.0 SCOPE AND ROLE OF THE OPERABLE UNIT RESPONSE ACTION.....	5-1
5.1 SELECTION OF REMEDY.....	5-1
6.0 SITE CHARACTERISTICS.....	6-1
6.1 SITE TOPOGRAPHY.....	6-1
6.2 ADJACENT LAND USE.....	6-1
6.3 SURFACE WATER HYDROLOGY.....	6-1
6.4 GEOLOGY / HYDROGEOLOGY.....	6-1
6.5 ECOLOGY.....	6-2
7.0 SUMMARY OF SITE RISKS.....	7-1
7.1 EXPOSURE ASSESSMENT.....	7-1
7.2 HUMAN HEALTH RISK ASSESSMENT FOR AREEs 10 AND 11.....	7-2
7.3 ECOLOGICAL RISK ASSESSMENT FOR AREEs 10 AND 11.....	7-5
7.4 CONCLUSION.....	7-6
8.0 DESCRIPTION OF THE "NO FURTHER ACTION" ALTERNATIVE.....	8-1
9.0 RESPONSIVENESS SUMMARY.....	9-1

## LIST OF FIGURES

### Number

- Figure 1 Site Location MAP of the Tipton Airfield Parcel (TAP)  
Figure 2 Surface Drainage Features at the TAP OU

## LIST OF TABLES

### Number

- Table 1 Summary of the Human Health Risk Assessment  
Table 2 Summary of the Ecological Risk Assessment

## LIST OF ACRONYMS

ASL	Active Sanitary Landfill
BEC	BRAC Environmental Coordinator
BRAC	Base Closure and Realignment
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
DRMO	Defense Reutilization and Marketing Office
FGGM	Fort George G. Meade
FTA	Fire Training Area
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
HHA	Helicopter Hangar Area
HI	Hazard Index
IAL	Inactive Landfill
MCL	Maximum Contaminant Level
MDE	Maryland Department of the Environment
MDNR	Maryland Department of Natural Resources
NPL	National Priorities List
ODA	Ordnance Demolition Area
O&M	Operations and Maintenance
PA	Preliminary Assessment
PRR	Patuxent Research Refuge
RBCs	Risk-Based Concentrations
RI	Remedial Investigation
ROD	Record of Decision
SARA	Superfund Amendments and Reauthorization Act
SI	Site Inspection
TAA	Tipton Airfield Area
TAP	Tipton Airfield Parcel
TAL	Target Analyte List





**DECLARATION FOR THE RECORD OF DECISION  
REMEDIAL ALTERNATIVE SELECTION  
FOR THE TIPTON AIRFIELD PARCEL OPERABLE UNIT**

Site Name and Location

Tipton Airfield Parcel Operable Unit (TAP OU)  
Areas Requiring Environmental Evaluation (AREEs) 10 and 11  
Fort George G. Meade (FGGM)  
Fort Meade, Maryland

Statement of Basis and Purpose

This Record of Decision (ROD) presents a determination that no further action is necessary to protect human health and the environment for the TAP OU, which includes a final determination for Tipton groundwater, and the following AREEs:

- AREE 10       -       Inactive Landfill No. 1 (IAL1)
- AREE 11       -       Inactive Landfill No. 2 (IAL2)

This determination was developed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), 42 U.S.C. §§ 9601 et seq., and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 C.F.R. Part 300.

The no further action decision is supported by documents contained in the Administrative Record.

The State of Maryland concurs with the no further action remedy.

Description of the Selected Remedy

A no further action alternative is the selected remedy for the TAP OU.

Past military training activities resulted in the presence of unexploded ordnance (UXO) at Fort Meade. The Army has previously taken multiple safety measures and actions at the TAP OU, some of which are summarized in this ROD. Existing land use restrictions, as established by the *Tipton Airfield Decision Document (July, 1998)* and the *Decision Document Addendum (November, 1998)*, include a prohibition on conducting any surface or subsurface excavations, digging, well drilling, or other disturbances of soil, or below paved surfaces, without prior written approval of the U.S. Government. This approval is also required for activities in the first four feet, where there was previous clearance of ordnance items. Exceptions can be made for emergency repair of existing utilities. Residential use without evaluation of residential exposure risks is prohibited, as is groundwater use for any potable or nonpotable purposes except for environmental studies. This ROD assesses these previously

established land use restrictions and evaluates their protectiveness of human health and the environment.

The Army studied the groundwater, conducting an additional investigation after the ROD for the Tipton Airfield Area (TAA) was signed, to evaluate TAA-wide effects and the potential off-site impacts related to chemical migration. This ROD also assesses the previously established land use restrictions and evaluates their protectiveness of human health and the environment with regard to groundwater contamination. The remedy for Tipton-area groundwater that is presented in this ROD, is the final remedy anticipated by the previous TAA ROD. Results of groundwater investigations covering the remainder of the areas at Fort Meade will not be necessary for purposes of finalizing the groundwater remediation decision for the Tipton area.

The selected remedy represents a final remedial action determination with regard to soils and groundwater, which together address the contamination at the TAP OU.

### Declaration

The RI reports, which include the Baseline Risk Assessment, document the findings associated with the TAP OU. These findings indicate that contaminants detected in the environment do not pose an unacceptable risk to human health and the environment under the conditions of restricted use. The risk calculated under the current and reasonably anticipated future land use scenarios for the TAP OU is within the EPA's acceptable risk range. Previously established land-use restrictions focus on maintaining these land use assumptions.

The RI report for IAL#3 also documents Maximum Contaminant Level (MCL) exceedances of the volatile organic compound, benzene, in well MW3-2 during two sampling rounds. Benzene has an MCL of 5.0  $\mu\text{g/l}$ . The average benzene concentration detected during the two sampling events is 9.05  $\mu\text{g/l}$ . The RI investigation did not reveal a likely source area. Although the average concentration of 9.05  $\mu\text{g/l}$  exceeds the MCL, the risks associated with benzene in the Tipton area groundwater as a whole were relatively low. Even if the groundwater were used residentially, the benzene risks would be as follows: for a child, the Hazard Index (HI) would be 0.04; for an adult, the HI would be 0.07; and the cancer risk would be  $2 \times 10^{-6}$ . Therefore, it has been determined that benzene is not a risk driver for groundwater.

An isolated detection of 2-amino-4, 6-dinitrotoluene was observed at 0.522  $\mu\text{g/l}$  in well MW3-2. This compound, an explosives degradation product, was detected at lower depths (Arundel Confining Layer) during one of two sampling rounds. This isolated detection resulted in an HI less than 1 for commercial/industrial use scenarios.

4-amino-2,6-dinitrotoluene was detected in both sampling rounds in well MW3-2. The average sample concentration is 28.6  $\mu\text{g/l}$  resulting in a HI of 2 (EPA Region 3 risk-based screening concentration = 2.2  $\mu\text{g/l}$ ; Hazard Quotient of 1). The area-wide evaluation of groundwater concluded that the contamination was not originating from an identifiable source area within the TAP, but was the result of past activities at Fort Meade. There is no known carcinogenic risk associated with 4-amino-2,6-

dinitrotoluene. The aminodinitrotoluenes (particularly 4-A-2,6-DNT) are associated with HIs greater than 1 for groundwater use by workers or residents. Because of the land use restrictions already in effect, it has been determined that no exposure pathways to the public exist due to this class of contaminants, provided restrictions continue. This is also true of metals, bis(2-ethylhexyl)phthalate, and acetophenone, which could contribute further to risks (both carcinogenic and noncarcinogenic) if residential receptors were ever exposed to the groundwater. In addition, a study of groundwater migration does not indicate expected migration of these chemicals to off-post residential wells above unacceptable concentrations. Given the relatively low concentrations of the aminodinitrotoluenes, the lack of a known carcinogenic risk relating to this class of contaminants, the lack of an identifiable source of these contaminants within the TAP, and the lack of an exposure route, it has been determined that no active groundwater remediation is required.

Because of these findings, every two years after the date of the ROD, groundwater will be sampled from certain wells. Monitoring results will be provided to EPA, MDE, and the Army. In addition, the Tipton area will be inspected to assure compliance with the land use restrictions. A review every 5 years will be conducted to evaluate the frequency and need for continued monitoring. This is to ensure that the remedy continues to provide adequate protection of human health and the environment. This is the final planned response action for the TAP OU.



JOHN D. FRKETIC  
Colonel, Military Intelligence  
Commanding

13 July 1999  
Date



ABRAHAM FERDAS  
Director, Hazardous Site Cleanup Division  
U.S. EPA Region III

7/20/99  
Date



## 1.0 DECISION SUMMARY

### 1.1 INTRODUCTION

On April 1, 1997, Fort George G. Meade (FGGM) was proposed for inclusion on the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) National Priorities List (NPL). FGGM was added to the final NPL on July 28, 1998.

A CERCLA remedial action is often divided into OUs. As defined in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), an OU means a discrete action that comprises an incremental step toward comprehensively addressing site problems. This discrete portion of a remedial response manages migration, or eliminates or mitigates a release, threat of a release, or pathway of exposure. The cleanup of a site can be divided into a number of OUs, depending on the complexity of the problems associated with the site. OUs may address geographical portions of a site, specific site problems, or initial phases of an action. OUs may also consist of any set of actions performed over time or any actions that are concurrent but located in different parts of a site. This ROD presents a determination that no further action is necessary to protect human health and the environment at the TAP OU, which consists of IAL1 and IAL2 (see Figure 1), located at Fort Meade, Maryland. This no further action decision is the final action for the TAP OU.

Based on the previously taken safety measures and actions, including restrictions on future land use, and the results of the risk evaluation, it was determined that the TAP OU poses no current or future potential, unacceptable human health risks. Therefore, the conditions at the TAP OU do not require further action to be protective of human health and the environment.



A feasibility study, which normally develops and examines remedial action alternatives for a site, was not performed for the TAP OU since the results of the risk evaluation indicate that no further remedial action is required.

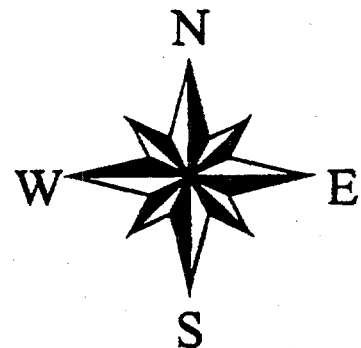
# Record of Decision- Tipton Airfield



3000 0 3000 6000 Feet

Tipton Property Boundary for Record of Decision

-  Property included in Record of Decision signed December 1998
-  Inactive Landfill #1 and #2



## **2.0 SITE INFORMATION**

### **2.1 SITE DESCRIPTION**

Fort George G. Meade (FGGM) is located in Fort Meade, Maryland. FGGM formerly occupied 13,596 acres of land in the northwest corner of Anne Arundel County. The site is a Base Closure and Realignment Act of 1988 (BRAC) parcel, located east of State Route 198 and south of Highway 32. It is bounded on the west by the Baltimore-Washington Parkway and by the Patuxent River to the south. The Amtrak railroad track right-of-way and State Route 175 form the southeast and northeast site boundaries, respectively.

The facility was authorized by Congress in 1917 as a training cantonment for troops during World War I. The U.S. Government commandeered 4,000 acres, most of which was then farm land, and named the installation Camp Meade in honor of Major General George G. Meade. In January 1941, additional training areas were added within the installation, expanding the post to 13,596 acres. During the 1940s, the facility underwent widespread growth to accommodate several regiments who moved their base of operations to FGGM, including the Second U.S. Army and the Eleventh Cavalry. Tipton Army Airfield was completed in 1963, replacing a small airstrip which had been in operation since 1928.

In 1988, the Defense Authorization Amendments and Base Closure and Realignment Act of 1988 mandated the closure and/or realignment of approximately 9,000 acres, encompassing the southernmost two-thirds of the installation. In 1991, the Army transferred 7,600 of the 9,000 acres to the Department of the Interior's Patuxent Research Refuge (PRR), formerly known as the Patuxent Wildlife Research Center. A second land transfer of approximately 500 acres to the PRR took place in January, 1993.

#### **2.1.1 Description of AREEs 10 and 11**

##### **2.1.1.1 Site Location and Operational History of AREE 10 - Inactive Landfill 1 (IAL1)**

IAL1 is located in the north-central portion of the BRAC parcel between the Little Patuxent River and Bald Eagle Drive. IAL1 is considered part of the Tipton Airfield parcel although it is physically separated from the airfield by the Little Patuxent River. A small concrete blockhouse, formerly used as a communications building, is present on the northwest corner of the area. The PRR has recently erected a cluster of outbuildings on the west side of Bald Eagle Drive, west of IAL1, which are collectively known as the Hunter Control Station.

According to the Enhanced Preliminary Assessment (PA) report (USAEC, 1989), IAL1 was used as an unlined sanitary landfill from approximately 1950 to 1964. No information has been found indicating the types of material disposed of at this location. Select historical aerial photographs of IAL1, compiled by the USEPA (1990 and 1996), are presented in the Final RI report (USACE, 1998a). The earliest known aerial photograph (1938) shows IAL1 as a cultivated field. In subsequent aerial photographs

from 1943, 1952, and 1957, IAL1 appears as an open clearing or training area, with no evidence of ground scarring or landfill activity. Landfill activities were first indicated in aerial photographs from 1963, which show barren areas and what appear to be trenches, probable debris, and mounded material presumably associated with landfill activities (USEPA, 1990). Aerial photographs from 1970 on show the area as inactive. The 1963 treeline, which appears to correspond to the maximum extent of man-made activities, persists to the present. Areas of mounded materials located on the north side of IAL1, which were first observed on the 1970 photographs, also persist to the present.

IAL1 has an approximate extent of 16 acres as indicated on Figure 1. This boundary was developed based on the extent of historical operations, aerial photographs, and subsequent site investigation activities. A possible former burial trench location, corresponding to the mounded area and an area of strong magnetic responses, was tentatively located in the northern part of IAL1.

#### **2.1.1.2 Site Location and Operational History of AREE 11 – Inactive Landfill 2 (IAL2)**

IAL2 is located within the BRAC parcel on approximately 10 acres of land north of New Tank Road (now Wildlife Loop), approximately 450 feet north and east of the Little Patuxent River. The bulk of IAL2 is separated from the PRR by the perimeter fence which runs along New Tank Road then turns north along the western side of IAL2. A dirt access road runs north, from a locked gate in the fence, through IAL2 to Tipton Airfield. Other unnamed tracks provide access to the area between IAL2 and the Little Patuxent River. No buildings or structures are present at IAL2. The approximate extent of IAL2 is indicated on Figure 1. This boundary was developed based on the extent of historical operations, aerial photographs, and subsequent site investigations.

Select historical aerial photographs of IAL2 from USEPA photo compilations are presented in the Final RI report (USACE, 1998a). IAL2 was initially operated as a soil borrow area. Large active excavations are apparent in aerial photographs from 1938 and 1943 (USEPA, 1996). By 1952, the borrow area was mostly overgrown. According to the Enhanced PA (USAEC, 1989), the area was subsequently operated as an unlined rubble disposal area. In 1957 and 1963, at its maximum extent, mounded materials and probable fill material are visible in the southern portion of the area. IAL2 was little used between 1963 and 1970, with aerial photographs showing the area being increasingly revegetated. A single north-northwest trending trench is visible along the east side of the access road in 1970 (USEPA, 1990). Continued disposal activity occurred after 1980 in the northern portion of IAL2 where graded and disturbed areas are visible in 1986. During RI fieldwork, piles of rubble material (brush, concrete and asphalt debris) which appear to be of more recent origin were observed in a marshy area on the north side of IAL2.

The Enhanced PA report (USAEC, 1989) referred to a potential encounter with mustard gas canisters in the mid-1950s northwest of IAL2. An attempt was made by the installation to locate the burial site using geophysical methods, but proved inconclusive (USAEC, 1992b). The Final Environmental Impact Statement indicates that the FGGM



Directorate of Engineering and Housing concluded that there was no further reason to suspect the presence of mustard agent buried on-post.

### 3.0 SITE HISTORY AND ENFORCEMENT ACTIVITIES

#### 3.1 PREVIOUS ASSESSMENTS AND INVESTIGATIONS

Several environmental investigations have been performed at FGGM since BRAC '88, including an Enhanced PA (USAEC, 1989), a study by the Maryland Department of Natural Resources (MDNR), an RI (USAEC, 1992a), a Site Inspection (SI) Study (USAEC, 1992b), a Draft SI Addendum (which included an Environmental Impact Statement (EIS) and a Wetland Identification Study) (USACE, 1991), an Ordnance and Explosives (OE) Removal Action (USACE, 1997), RI reports (USACE 1998a and 1998b), and sampling and data evaluation for the Defense Reutilization and Marketing Office (DRMO) (USACE, 1999).

The Enhanced PA includes a review of all available records related to air, soil, surface water, and groundwater, and identifies six areas of concern requiring additional investigation at FGGM: active and inactive landfills, underground storage tanks, asbestos, unexploded ordnance, surface water, and burning grounds.

MDNR conducted an evaluation of the surplus property in January 1990. The study describes the natural features and land uses associated with the 9,000 acres to be excessed from FGGM and discusses the degree of development of the retained land.

In January 1991, a wetland identification study was prepared by RGH/CH2M Hill, Inc. to complete the study of the closure and use/reuse alternatives for the 9,000-acre parcel at FGGM (USAEC, 1994). The report describes the methods used to identify wetlands on the parcel and presents a map of wetlands distribution.

A Final EIS for the comprehensive base realignment and partial closure for FGGM and Fort Holabird was prepared by the U.S. Army Corps of Engineers, Baltimore District, in August, 1991. This report focuses on the environmental and socioeconomic impacts associated with the planned base realignment and partial closure at FGGM and Fort Holabird. The EIS covers the 9,000-acre BRAC parcel at FGGM.

A Draft SI report was submitted by EA Engineering, Science and Technology (EA) in January, 1992. This report discusses conditions at the Helicopter Hangar Area (HHA), four inactive landfills (IAL1 to IAL4), the DRMO, the Fire Training Area (FTA), the Ordnance Demolition Area (ODA), underground storage tanks, and asbestos. The Final SI was submitted in October 1992 (USAEC, 1992b).

A Draft SI Addendum (SIA) report, prepared by Arthur D. Little, Inc., addresses data gaps identified in the previous SI report (USAEC, 1994a). The SIA focused on the following six areas of investigation: DRMO Salvage Yard, the FTA, the HHA, IAL2, the ODA, and Soldiers Lake. Another study, a Remedial Investigation Addendum (RIA), was conducted concurrently with the SIA (USAEC, 1993a). Two sites, the Active Sanitary Landfill (ASL) and the Clean Fill Dump (CFD), are included in the RIA study. The results of the RIA are reported as a separate document. However, some basewide data, such as geology, general hydrogeology, and background soil concentrations, are reported in both reports.

An OE Removal was conducted by Human Factors Applications, Inc. (HFA) over the Tipton Airfield parcel in 1996 (USACE, 1997a). With the exception of the interior areas of the inactive landfill sites and areas beneath water, all unpaved areas of the parcel were searched for potential UXO to a depth of four feet.

RI reports (USACE, 1998a and USACE, 1998b) of IAL1, IAL2, IAL3, the CFD, the FTA, and the HHA were prepared by ICF Kaiser. In addition, an ecological risk assessment was performed for the BRAC parcel, which included data from the inactive landfills, the CFD, FTA, and HHA.

RI sampling data for the DRMO area (USACE, 1999) was recently approved by EPA and MDE. This report investigated the potential for the DRMO area to act as an upgradient source for groundwater contamination in the Tipton area. The RI data evaluation determined that the DRMO area was not impacting the groundwater at the Tipton area. While other groundwater studies will still be conducted for separate operable units at Fort Meade, no other upgradient areas are suspected as sources of Tipton area groundwater contamination.

The RI reports for the TAP were performed to characterize potential environmental contamination and to conduct baseline ecological and human health risk assessments. The "Summary of the Risks" section presents the results of the risk assessments.

### 3.2 OTHER ARMY ACTIONS AND SAFETY PRECAUTIONS TAKEN IN THE TIPTON AIRFIELD AREA

The following is a list of many actions and safety precautions taken by the Army at the TAA:

- Ordnance Survey (1994): The Army commissioned an ordnance survey covering all areas of the airfield to assess the extent of ordnance remaining at the site and surrounding areas. During this survey, ordnance was searched for to a depth of six inches below the surface, and 10% of the remaining area was surveyed for ordnance to a depth of five feet. During this action, a total of 1,400 ordnance items were recovered from the site and surrounding areas.
- Ordnance Clearance (1995-1997): The Army searched for ordnance from all accessible areas to a four-foot depth. Inactive landfill areas, wetlands, and all paved surfaces were excluded. During this action, 1,548 ordnance items were recovered, rendered safe, and disposed of. In addition, more than 33 tons of scrap (concrete, metal, and miscellaneous debris) were recovered incidental to the ordnance removal. Much of this material was recycled at local facilities.
- Miscellaneous Debris Removal (Summer 1998): Several items that were identified during ordnance removal projects were recovered for disposal. Items removed included several 55-gallon drums and an old vehicle-mounted storage tank.
- Ordnance Safety Measures, Inactive Landfill 3 (1998): The Army performed ordnance survey work in and around IAL3. The safety plan for this area includes

developing a long-term monitoring plan for the site. The first step in this effort was to identify the depth of soil cover over any landfill debris at this site. The Army will now develop a schedule for periodic surface sweeps of the area to ensure that no ordnance items have migrated to the surface through frost action.

- Ordnance Safety Measures, Inactive Landfill 2 (1998): IAL2, located at the southern most end of the Tipton parcel, could not be cleared of suspected ordnance because the area contains large amounts of rubble debris and is partially composed of wetlands with a shallow water table. The selected response action for this site was the installation of a passive engineering control consisting of a seven-foot high chain link fence with three-strand barbed wire surrounding the entire site. The fence ties into an existing like fence along Wildlife Loop Road, and encompasses an area of 24.68 acres that will be retained by FGGM. IAL2 will not be included in the Tipton parcel transfer to Anne Arundel County.
- Ordnance Safety Measures, Building Debris Site (1999): The Army took additional ordnance safety measures at a 2 1/2-acre area designated as the Building Debris Site. Because of its central location, this area has been made a priority for reuse. The selected response action for the site is a combination of additional ordnance clearance and construction of a vehicle parking lot.
- Ordnance Safety Measures, Inactive Landfill 1 (1998-1999): The selected response action for the site is a combination of ordnance clearance to a four-foot depth and construction of a safety cover. During this action, 54 ordnance items were recovered, rendered safe, and disposed. In addition, more than 760 tons of scrap (concrete, metal, and miscellaneous debris) were recovered incidental to the ordnance removal, and recycled at local facilities. The area of IAL1 not cleared of suspected ordnance is approximately 5.5 acres. A three-foot thick safety cover has been constructed.

In summary, the Army's prior response actions address the explosives risks related to UXO and protect human health and the environment. The specifics of the *Tipton Airfield Decision Document (July, 1998)*, and the *Decision Document Addendum (November, 1998)* include the establishment and enforcement of land use restrictions, initially via the FGGM Master Plan and, subsequent to property transfer, via deed restrictions. Existing land use restrictions include a prohibition on conducting any surface or subsurface excavations, digging, well drilling, or other disturbances of soil, or below paved surfaces, without prior written approval of the U.S. Government. This approval is also required for the first four feet which was previously cleared of ordnance items. Exceptions can be made for emergency repair of existing utilities. Groundwater use at the TAP is restricted for any potable or non-potable purposes except for environmental studies. Furthermore, the existing land use restrictions prohibit residential use of the property without evaluation of residential exposure risk.

## **4.0 HIGHLIGHTS OF COMMUNITY PARTICIPATION**

### **4.1 PUBLIC COMMENT PERIOD**

The Army provided a 30-day comment period from April 21, 1999 to May 21, 1999, to provide an opportunity for public involvement in the decision-making process. During the comment period, the public was invited to review the Proposed Plan and the environmental investigation reports. These reports were made available to the public and are located in the Administrative Record. The Administrative Record is the body of documents that forms the basis for the selection of a particular response at a site. The Administrative Record includes documents that support the response decision, relevant documents that were relied upon in selecting the response action, and documents that were considered but not used in the decision making process.

The Administrative Record was made available to the public at the locations listed below.

- 1) Provinces Public Library  
2624 Annapolis Road  
Severn, MD 21144  
Phone: (410) 222-6280  
Hours: Mondays, Tuesdays and Thursdays - 1:00 p.m. to 9:00 p.m.;  
Wednesdays and Saturdays - 9:00 a.m. to 5:00 p.m.; and  
Fridays - 1:00 p.m. to 5:00 p.m.
- 2) U.S. Army  
Directorate of Public Works  
Attn: ANME-PWE, Bldg. 239  
2-1/2 Street and Ross Road  
Fort Meade, MD 20755  
Phone: (410) 962-7677

### **4.2 PUBLIC MEETING**

The Army held a public meeting on the Proposed Plan on May 12, 1999 at 7:00 p.m., to accept oral comments. The meeting was held at the EPA Environmental Science Center at Fort Meade. This meeting provided an opportunity for the public to comment on the Proposed Plan. No comments were received during the public meeting.

### **4.3 ADDITIONAL PUBLIC INFORMATION**

The Proposed Plan provided a summary of the actions considered and the results of environmental studies conducted at the TAP OU. The public is encouraged to consult the Administrative Record for a more detailed explanation.

The notice of availability of the Proposed Plan document was published in the Baltimore Sun on April 21, 1999 and in the Capitol Gazette April 22, 1999. A Responsiveness Summary, included as part of this ROD, has been prepared to respond to the comments, criticisms, and any new relevant information received during the comment

period. Upon signing the ROD, the Army will publish a notice of availability of this ROD in the Baltimore Sun and the Capitol Gazette, and place the ROD in the Administrative Record located in the repositories mentioned above.

## **5.0 SCOPE AND ROLE OF THE OPERABLE UNIT RESPONSE ACTION**

### **5.1 SELECTION OF REMEDY**

This ROD, the second for the Fort Meade NPL site, presents the selection of the final remedial alternative for soils and groundwater at the TAP OU, which together address all of the known contamination at the TAP OU. In addition, the final groundwater remedy in this ROD serves as the final remedial alternative for the TAA OU. This ROD does not address other OUs at Fort Meade. The remaining OUs are currently under independent investigations and will be addressed separately in future Proposed Plans and RODs.

No further action is necessary at the TAP OU to protect human health and the environment. Under the no further action alternative, no remedial action will be taken at the TAP OU based upon both the current level of risk posed by contamination at the TAP OU and the protectiveness provided by prior actions. This is the final response action for the TAP OU.

Based upon these findings, the remedy also requires that every two years after the date of this ROD, groundwater will be sampled from certain wells. Monitoring results will be provided to EPA, MDE, and the Army. In addition, the Tipton area will be inspected to assure compliance with the land use restrictions. A review every 5 years will be conducted to evaluate the frequency and need for continued monitoring. This is to ensure that the remedy continues to provide adequate protection of human health and the environment. This is the final planned response action for the TAP OU.

## **6.0 SITE CHARACTERISTICS**

### **6.1 SITE TOPOGRAPHY**

The TAP OU lies within the Coastal Plain Physiographic Province. The site is characterized by low rolling uplands and low-gradient streams. Within the TAP OU, the relief varies over a range of approximately 90 feet (ft); the lowest elevation (90 ft) occurs within the Little Patuxent River; whereas the highest elevation (180 ft) occurs on the northern boundary of the TAP OU. The majority of the site topography, which has been modified to accommodate the airfield, slopes gently to the west or south.

### **6.2 ADJACENT LAND USE**

The TAP OU is bordered to the north by State Highway 32. The OU is bounded to the south, east, and west by the Department of Interior's Patuxent Research Refuge (see Figure 1).

### **6.3 SURFACE WATER HYDROLOGY**

Figure 2 shows the surface drainage features at the TAP OU. Runoff originating within the perimeter portions of the TAP OU is conveyed by drainages west or south to tributaries or drainages of the Little Patuxent River. Runoff from the central portion of the area flows into a stormwater collection and conveyance system beneath the airfield which discharges, via french drains, to the Little Patuxent River or its drainages.

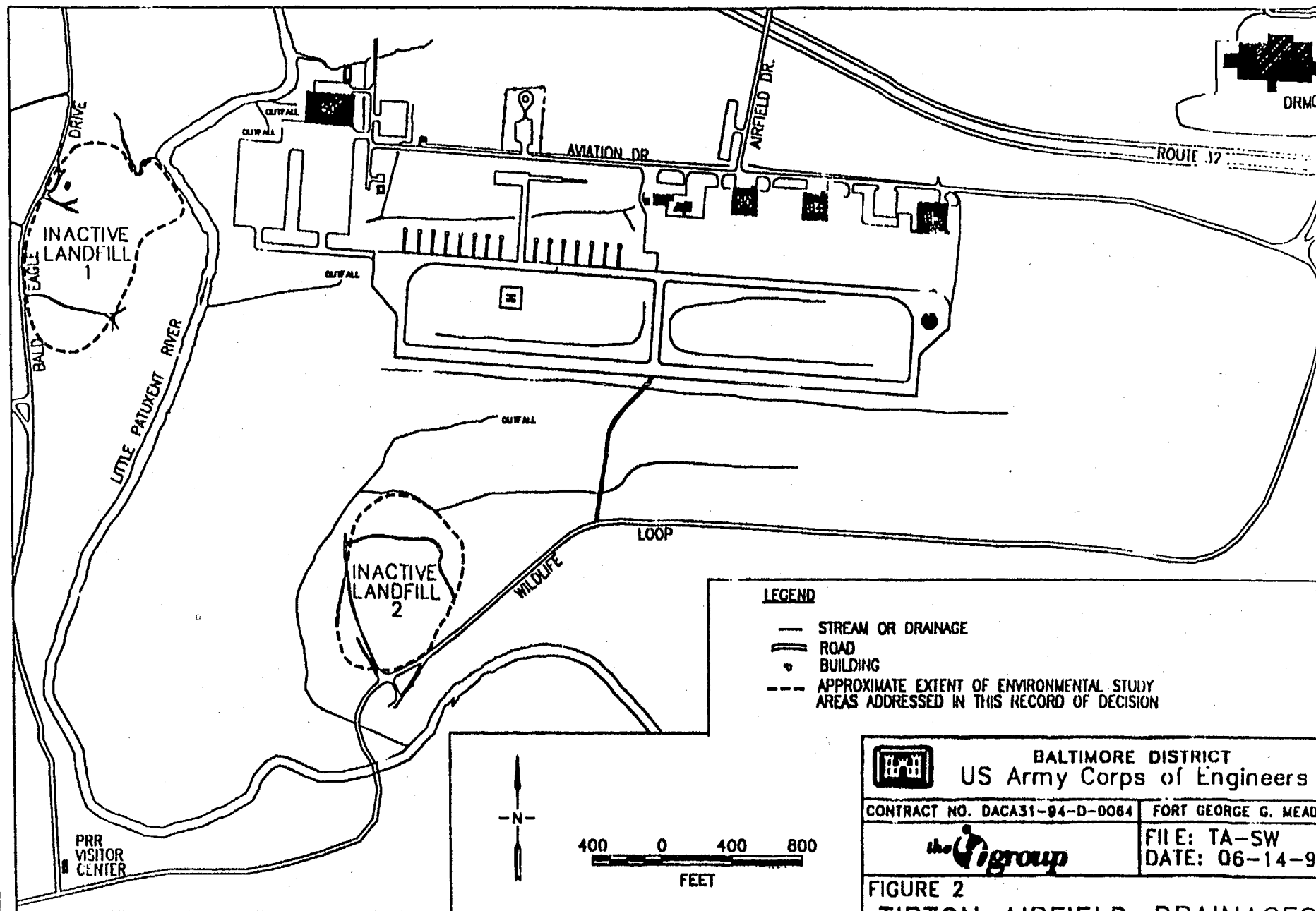
### **6.4 GEOLOGY / HYDROGEOLOGY**



FGGM is located on the unconsolidated sands, clays, and silts of the Coastal Plain which were deposited from the Cretaceous to the Quaternary geologic periods. The Coastal Plain sediments dip and thicken to the east and southeast.

The surficial deposits present beneath the TAP OU are primarily from the lower Cretaceous age Potomac Group. Quaternary alluvium and river terrace deposits are locally present adjacent to the Little Patuxent River. The Potomac Group consists of, from youngest to oldest, the Patapsco Formation, Arundel Clay, and Patuxent Formation. The lower portion of the Patapsco Formation outcrops at the TAP OU. It consists of up to 40 feet of silty sands. Airfield construction fill was locally obtained from this unit. The Arundel Formation consists of massive beds of red, brown and gray clay with local zones of more permeable layers. The Arundel Clay is approximately 265 feet thick. The Arundel Clay was penetrated during RI activities at IAL2. The Patuxent Formation consists of a thick sequence of sand-rich sediments which are underlain by crystalline bedrock of the Baltimore Mafic Complex at 600 to 800 feet below ground surface.

At the TAP OU, the water table is present, generally at depths less than ten feet below ground surface, within the lower portion of the Patapsco formation. The water table aquifer extends down to the top of the Arundel Clay and has a maximum saturated thickness of approximately 25 feet in this area. Unconfined groundwater flow is controlled by topography and flow is generally west or south toward the Little Patuxent River. The Arundel Clay acts as a regional confining layer below the Patapsco aquifer. However, groundwater is locally found in confined or semi-confined sand lenses within the upper portions of the Arundel Clay. The Patuxent Aquifer, which is present





 <b>BALTIMORE DISTRICT</b> <b>US Army Corps of Engineers</b>	
CONTRACT NO. DACA31-94-D-0064	FORT GEORGE G. MEADE
	FILE: TA-SW DATE: 06-14-99
<b>FIGURE 2</b> <b>TIPTON AIRFIELD DRAINAGES</b>	

between the Arundel Clay and bedrock, is a regionally important groundwater source. Regional groundwater flow in the Patuxent aquifer is to the east-southeast.

## 6.5 ECOLOGY

The habitat in the TAP OU has been heavily altered and is likely to only support limited flora and fauna typical of disturbed urban/light industrial areas. As delineated, the TAP OU contains no wetlands or protected or endangered species. Wetlands, protected species, sensitive environments are present in nearby areas of the PRR and the Little Patuxent River. Any drainage from the TAP OU would flow, via surface runoff or the airfield stormwater management system into the Little Patuxent River. An ecological risk assessment has concluded that there is a very limited potential for adverse effects to terrestrial plant and invertebrate communities and to aquatic life (USACE, 1998a).

## 7.0 SUMMARY OF SITE RISKS

### 7.1 EXPOSURE ASSESSMENT

Health risks are based on a conservative estimate of the potential carcinogenic risk or potential to cause other health effects not related to cancer. Carcinogenic risks and non-carcinogenic risks were evaluated as part of the risk assessment; three factors were considered: (1) nature and extent of chemicals at the site, (2) the pathways through which human and ecological receptors are or may be exposed to those chemicals at the site, and (3) potential toxic effects of those chemicals.

Cancer risks are expressed as numbers reflecting the increased chance that a person will develop cancer, if he/she is directly exposed (e.g., through working at the site) to the chemicals found in the groundwater and soil at the site over a period of time. For example, EPA's acceptable risk range for Superfund sites is  $10^{-4}$  to  $10^{-6}$ , meaning there is one additional chance in ten thousand ( $1 \times 10^{-4}$ ) to one additional chance in one million ( $1 \times 10^{-6}$ ) that a person will develop cancer if exposed to a certain hazardous substance. The risk associated with developing other health effects is expressed as an HI, which is the ratio of the existing level of exposure to contaminants at a site to an acceptable level of exposure. At or below an HI of 1, adverse effects are not expected. A HI is also used to evaluate ecological risks.

The RI reports included both ecological and human health risk assessments to address the potential current and future risks posed to human health and the environment associated with the site. The human health risk assessment was based on exposure to soil, surface water, sediment, and supplementary evaluations of groundwater. The ecological risk assessment was based on exposure to soil, sediments, and surface water. The risk assessment included estimates of the risk posed to human health and the environment assuming the continuation of the current industrial (non-residential) land use scenario, as well as risk in the absence of restrictions, or in the event of contaminant migration. The establishment of land use restrictions eliminates the exposure route to the contaminated groundwater and, therefore, protects human health and the environment. The groundwater assessment supports the continuation of these restrictions. The current land use scenario estimates the level of risk posed by Fort Meade's current use of the land. The current land use scenario is based on the assumption that the property remains under U.S. Government authority to enforce existing land use restrictions and continues in current or like use and assumes the migration to off-site receptors will not occur at unacceptable levels.

Existing land use restrictions, as established by the *Tipton Airfield Decision Document* (July, 1998) and the *Decision Document Addendum* (November, 1998), include a prohibition on conducting any surface or subsurface excavations, digging, well drilling, or other disturbances of soil, or below paved surfaces, without prior written approval of the U.S. Government. This approval is also required for the first four feet which was previously cleared of ordnance items. Exceptions can be made for emergency repair of existing utilities. Groundwater use at the Tipton area is restricted for any potable or nonpotable purposes except for environmental studies.

In the unlikely event that the site's use would change, the property will revert back to the U.S. Government. The human health risk assessment will need to be evaluated for residential receptors in the unlikely event that the site would be developed for residential use.

Local hydrogeology shows shallow groundwater discharging to surface waters prior to leaving the Tipton area. After several decades, sanitary waste materials at the TAA and TAP do not appear to be degrading groundwater quality in the shallowest saturated zone (water table aquifer), with the exception of the inorganics arsenic, iron, manganese, and chromium. Of this group, arsenic most frequently exceeds risk-based screening guidance. Arsenic, which may be naturally occurring, has been found to be pervasive throughout the TAA and TAP, both in the study areas and in background samples of soils, sediments, and groundwater. The concentrations of detected iron and manganese are within published regional values and also may be occurring naturally.

The aquifers underlying the TAA and TAP are used as sources of groundwater by residents located off-post to the east (i.e., regionally downgradient). However, based on existing information regarding the nature/extent of chemicals and hydrogeology, the likelihood that chemicals from the Tipton area are migrating to these residential wells is unlikely. Furthermore, the Tipton area does not appear to be significantly impacting the shallow aquifers. Large sections of clay in the upper portions of the Arundel Clay Layer and high hydraulic head differences between the shallow and deep wells in the western part of the TAA suggest little potential for communication between the water table aquifer and the deeper confined aquifers. Groundwater samples collected from the upper portions of the Arundel Clay at IAL#3 (where MCL exceedences for certain contaminants have been identified) show a westward gradient toward the Little Patuxent River. Downgradient wells in the upper portions of the Arundel Clay did not show this contamination. Overall, a downward vertical gradient is evident between the shallow and deep monitoring wells. Data from other areas suggest that deeper water-bearing zones in the Arundel Clay may follow the deeper regional flow to the east.

## 7.2 HUMAN HEALTH RISK ASSESSMENT FOR AREES 10 AND 11

Two potential human receptors were identified based on current and reasonably anticipated future land use:

- Worker contact (dermal contact and incidental ingestion) with surface soils and worker ingestion of groundwater (supplemental assessment); and
- Trespassers: soil ingestion and dermal contact; surface water dermal contact; sediment ingestion and dermal contact

Even though residential use is not anticipated in this area and no target receptors exist due to land use restrictions, residential calculations for groundwater were evaluated for informational purposes only.

Health risk levels, determined using EPA Guidelines to ensure that conservative estimates of potential health effects, differ depending on the assumed land use because human exposure differs with land use. As outlined above, a conservative estimate of risk was developed incorporating the potential exposure pathways. Plausible receptors that may be exposed to soil, groundwater, surface water, and sediment at the site and which were evaluated in the risk assessment included daily workers and occasional recreational users.

Levels below unacceptable risk-based concentrations of pesticides were widely, if infrequently, found. Metals were ubiquitous. Based on the reasonably anticipated future land use, risk associated with direct contact with the environment under occupational or recreational scenarios were at the low end of EPA's acceptable risk range of  $10^{-4}$  to  $10^{-6}$ . The HIs calculated using the same reasonably anticipated future land use were all below 1. Additionally, since these risks are driven mainly by metals, they appear to be partially or wholly due to inorganic chemicals that may be occurring naturally.

**TABLE 1 – SUMMARY OF THE HUMAN HEALTH RISK ASSESSMENT**

In the following table, cancer risk estimates are compared with the USEPA's target risk range for health protectiveness at Superfund sites of  $1 \times 10^{-4}$  to  $1 \times 10^{-6}$ .

The potential for adverse non-carcinogenic effects was assessed by comparing the non-carcinogenic hazard indices to a value of 1. An HI less than 1 indicates that adverse non-carcinogenic health effects would not be expected to occur.

Medium of Concern	AREEs 10 & 11	
	Cumulative Cancer Risk	Cumulative Hazard Risk
<b>Surface soil</b> <i>Receptors – Site worker and trespasser pathways</i>		
Incidental ingestion by site workers:	$8 \times 10^{-7}$	$<1 (5 \times 10^{-3})$
Dermal absorption by site workers:	$2 \times 10^{-6}$	$<1 (1 \times 10^{-2})$
Incidental ingestion by trespassers:	$2 \times 10^{-7}$	$<1 (3 \times 10^{-3})$
Dermal absorption by trespassers:	$2 \times 10^{-7}$	$<1 (3 \times 10^{-3})$
<b>Surface Water</b> <i>Receptor – Trespasser pathway</i>		
Dermal absorption by trespassers:	$9 \times 10^{-6}$	$<1 (1 \times 10^{-2})$
<b>Sediments</b> <i>Receptor – Trespasser pathway</i>		
Incidental ingestion by trespassers:	$9 \times 10^{-7}$	$<1 (9 \times 10^{-3})$
Dermal absorption by trespassers:	$3 \times 10^{-5}$	$<1 (2 \times 10^{-2})$
<b>Groundwater (Supplemental Assessment)</b> <i>Receptor – Future site worker pathway</i>		
Incidental ingestion by site worker:	$2 \times 10^{-5}$	$3 \times 10^0$

As always, the physical hazards associated with UXO are a potential concern. Fort Meade has already conducted UXO surveys at the site to address this risk. As discussed previously, an Ordnance and Explosives (OE) Removal was conducted by Human Factors Applications, Inc (HFA) over the Tipton airfield parcel, in 1996 (USACE, 1997a). With the exception of the interior areas of the inactive landfills, all unpaved areas of the parcel were searched for potential UXO to a depth of four feet. Other UXO work performed by the Army is also discussed in this ROD.

An isolated detection of 2-amino-4, 6-dinitrotoluene was observed at  $0.522 \mu\text{g/l}$  in well MW3-2. This compound, an explosives degradation product, was detected at lower depths (Arundel Confining Layer) during one of two sampling rounds. This isolated detection resulted in an HI less than 1 for commercial/industrial use scenarios.

4-amino-2,6-dinitrotoluene was detected in both sampling rounds in well MW3-2. The average sample concentration is  $28.6 \mu\text{g/l}$  resulting in a HI of 2 (EPA Region 3 risk-based screening concentration =  $2.2 \mu\text{g/l}$ ; Hazard Quotient of 1). The area-wide evaluation of groundwater concluded that the contamination was not originating from an identifiable source area within the TAP, but was the result of past activities at Fort Meade. There is no known carcinogenic risk associated with 4-amino-2,6-

dinitrotoluene. The aminodinitrotoluenes (particularly 4-A-2,6-DNT) are associated with HIs greater than 1 for groundwater use by workers or residents. Because of the land use restrictions already in effect, it has been determined that no exposure pathways to the public exist due to this class of contaminants, provided restrictions continue. This is also true of metals, bis(2-ethylhexyl)phthalate, and acetophenone, which could contribute further to risks (both carcinogenic and noncarcinogenic) if residential receptors were ever exposed to the groundwater. In addition, a study of groundwater migration does not indicate expected migration of these chemicals to off-post residential wells above unacceptable concentrations. Given the relatively low concentrations of the aminodinitrotoluenes, the lack of a known carcinogenic risk relating to this class of contaminants, the lack of an identifiable source of these contaminants within the TAP, and the lack of an exposure route, it has been determined that no active groundwater remediation is required.

The RI report also documents MCL exceedances of the volatile organic compound, benzene, in well MW3-2 during two sampling rounds. Benzene has an MCL of 5.0  $\mu\text{g/l}$ . The average benzene concentration detected during the two sampling events was 9.05  $\mu\text{g/l}$ . The RI investigation did not reveal a likely source area. Although the average concentration of 9.05  $\mu\text{g/l}$  exceeds the MCL, the risks associated with benzene in the Tipton area groundwater as a whole were relatively low. Even if the groundwater were used residentially, the benzene risks would be as follows: for a child, the HI would be 0.04; for an adult, the HI would be 0.07; and the cancer risk would be  $2 \times 10^{-6}$ . Therefore, it has been determined that benzene is not one of the risk drivers for groundwater.

### 7.3 ECOLOGICAL RISK ASSESSMENT FOR AREES 10 AND 11

The following pathways were identified as sources of potential exposure:

- Root uptake from contaminated soil;
- Contact and absorption, incidental ingestion, and feeding on contaminated food and soil; and
- Bioaccumulation from vegetation or animal prey.

The ecological risk assessment evaluated exposure of terrestrial and aquatic receptors from surface soil, sediments, and surface water exposures from the site. The use of the site as the approach area for the airport located on the TAP will discourage terrestrial ecological receptors.

Several metals (including chromium, aluminum, and vanadium) and low levels of pesticides exceeded the ecological screening criteria for the various plant and invertebrate receptors. The site's commercial and/or occupational use will discourage a diverse plant community. This will also significantly reduce the natural habitat of terrestrial receptors. By considering the reasonably anticipated future land use and

expected management practices, the results support the plan for no further action at the site.

**TABLE 2 – SUMMARY OF THE ECOLOGICAL RISK ASSESSMENT (ERA)**

Medium of Concern	AREEs 10 and 11 (ERA Findings)
<b>Surface soil</b> <i>Effects to:</i> (a) Terrestrial plant communities; and (b) Terrestrial invertebrate communities (as represented by earthworms) <i>Pathways:</i> Direct contact with chemicals	Minimal risk – Aluminum, chromium, and vanadium exceeded the earthworm TRVs at all sample locations. However, the detected background concentrations also exceeded plant TRVs, suggesting the on-site concentrations are, at many locations, reflective of the local/regional soil type, in which case earthworms are likely to be adapted to these levels.

#### **7.4 CONCLUSION**

Because the human health and ecological risk assessments concluded that site conditions, in light of the existing land-use restrictions established under the prior response action, do not pose an unacceptable risk to potential human and ecological receptors, no further action is deemed appropriate to protect human health and the environment.



**8.0 DESCRIPTION OF THE "NO FURTHER ACTION" ALTERNATIVE**

The selected remedy for the TAP OU is no further action. At the time of this ROD, future land-use of the TAP OU was determined to be an industrial airport. The TAP OU was used as a military airfield from the early 1960s to September 1995, when it was closed. The airport conversion of this airfield was initially planned as a partnership between Howard County and Anne Arundel County. Anne Arundel County currently has one lease on three buildings at the TAP OU. The second lease, which is pending, will include additional hangar areas, the runway and taxiways.

The current land-use scenario is based on the assumption that the property remains under U.S. Government authority to enforce existing land-use restrictions and continues in current or like use. When title to this BRAC property is transferred, the restrictions on future land use will be embodied in the deed. The U.S. Government will retain the ability to enforce those use restrictions established in prior Decision Documents. In addition, after transfer of title to the property, in the unlikely event that the TAP OU's use as an airport would change, title to the property will revert back to the U.S. Government. A human health risk assessment will need to be evaluated for residential receptors in the unlikely event that the TAP OU would be developed for residential use

Because of these findings, every two years after the date of this ROD, groundwater will be sampled from certain wells. Monitoring results will be provided to EPA, MDE, and the Army. In addition, the Tipton area will be inspected to assure compliance with the land use restrictions. A review every 5 years will be conducted to evaluate the frequency and need for continued monitoring. This is to ensure that the remedy continues to provide adequate protection of human health and the environment. This is the final planned response action for the TAP OU and groundwater in the Tipton Area, which includes the TAA OU.

## 9.0 RESPONSIVENESS SUMMARY

The purpose of the Responsiveness Summary is to provide the public with a summary of citizen comments, concerns, and questions regarding the TAP OU. No comments were received during the 30-day public comment period from April 21, 1999 to May 21, 1999.

In addition, no verbal comments were presented during the May 12, 1999 public meeting regarding the TAP OU.

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