

**EPA Superfund  
Record of Decision:**

**ABERDEEN PROVING GROUND (EDGEWOOD AREA)  
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OU 09  
EDGEWOOD, MD  
09/30/1996**

CARROLL ISLAND  
ABERDEEN PROVING GROUND, MARYLAND

RECORD OF DECISION  
OPERABLE UNIT A

Submitted to

Environmental Conservation and  
Restoration Division  
Aberdeen Proving Ground, Maryland 21010

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In accordance with Army Regulation 200-2, this document is intended to  
comply with the National Environmental Policy Act (NEPA) of 1969.

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## 1. DECLARATION OF THE RECORD OF DECISION

### 1.1 SITE NAME AND LOCATION

Carroll Island, Operable Unit A, Edgewood Area, Aberdeen Proving Ground (APG), Maryland.

### 1.2 STATEMENT OF BASIS AND PURPOSE

This Record of Decision (ROD) document presents the selected remedial action to reduce the risks posed by the disposal pits/area in 13 sites and Areas of Concern (AOCs) located at Carroll Island in the Edgewood Area of APG, Maryland. These 13 disposal pits/ areas are designated as Operable Unit A. The remedial action is chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986, and, to the extent practicable, with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The information supporting the decisions on the selected remedy is contained in the administrative record. Section 2.2 lists the documents contained in the administrative record.

The U.S. Environmental Protection Agency (USEPA) and the Maryland Department of the Environment (MDE) concur with the selected remedy.

### 1.3 ASSESSMENT OF SITE

Actual or threatened releases of hazardous substance from these sites, if not addressed by implementing the remedial action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

### 1.4 DESCRIPTION OF SELECTED REMEDY

The cleanup of Operable Unit A is part of a comprehensive environmental investigation and remediation currently being performed at APG under the CERCLA program. APG is divided into 13 study areas that include 55 sites that represent potential sources of contamination.

Carroll Island has 32 sites and AOCs, 13 of which contain disposal pits/areas. The 13 disposal pits/areas are designated as Operable Unit A and potentially contain chemical warfare material (CWM) or other hazardous substances. The disposal pits/areas are located at the following sites and AOCs:

- ! Lower Island Disposal Area (Site 1),
- ! AOC Associated With Test Grid 1 (Site 3),
- ! AOC Associated With Test Aerial Spray Grid (Site 6),
- ! 3-Quinuclidinylbenzilate (BZ) Test Burn Pit (Site 7),
- ! Decontamination Pits (Site 8),
- ! Edgewood Proving Ground Dump (Site 9),
- ! Bengies Point Road Dump (Site 10),
- ! Service Area (Site 13),
- ! AOC Associated With Service Area (Site 13),
- ! Old Carroll Island Road Dump (Site 19),
- ! Test Grid 1 Disposal Area (Site 21),
- ! Woods South of Wind Tunnel Road (AOC), and
- ! Animal Shelter Woods (AOC).

The removal and disposal or treatment of the entire volume of waste in the disposal pits/areas addresses the principal threat to human health and the environment at Operable Unit A of Carroll Island by removing source materials and eliminating the potential release of contaminants to the environment. This is the first of two operable units. the rest of Carroll Island will be addressed by a separate Operable Unit.

The major components of the selected remedy for Operable Unit A include:

- ! hand excavation of the waste in the disposal pits/areas and
- ! segregation and disposal or treatment of excavated waste.

### 1.5 STATUTORY DETERMINATION

The selected remedy is protective of human health and the environment, complies with federal and state requirements that are legally applicable or relevant and appropriate requirements (ARARs) to the remedial action, and is cost-effective. The remedy uses permanent solutions and alternative treatment technologies to the maximum extent practicable. The selected remedy meets the statutory preference for treatment.

## 2. DECISION SUMMARY

### 2.1 SITE NAME, LOCATION, AND DESCRIPTION

Carroll Island is located in the westernmost portion of the Edgewood Area of APG in Baltimore County, Maryland (see Fig. 1). It is located approximately 1 mile south of Gunpowder Falls State Park and is separated from the rest of the Edgewood Area by the Gunpowder River. The closest residents are located on Beach Road, approximately 0.5 miles from Carroll Island; the community of Carrollwood Manor is approximately 1.5 miles away.

Carroll Island encompasses approximately 855 acres, of which 680 are classifiable wetlands. It is bounded by Seneca and Saltpeter Creeks, the Gunpowder River, and Chesapeake Bay. Portions of its shoreline are subject to severe storm surge and wave erosion. Because the peak elevation at Carroll Island is only 13 ft above mean sea level and much of the island is less than 10 ft above mean sea level, extensive areas are subject to flooding and sediment transport.

Structures on the island include paved and gravel roads, a riprap erosion control berm, the remains of two iron test towers, a small building, and numerous concrete pads (several of which are building foundations). Access to Carroll Island is strictly controlled by military police patrols and other physical measures.

### 2.2 SITE HISTORY AND ENFORCEMENT ACTIVITIES

#### 2.2.1 Site History

Carroll Island was acquired by the U.S. Army in 1918 as part of the original Edgewood Arsenal. Documentation on the use of Carroll Island before the 1940s is limited, but there is no evidence of U.S. Army activity during this period.

In 1944, the U.S. Army reportedly used Carroll Point and the area north of Lower Island Point to test white phosphorus (a smoke munition) and high explosive ordnance. Also, a large field on the northeastern part of Carroll Island was cleared during the latter part of that decade and, along with other parts of the island, used as a CWM test area. Nerve and blister agents were released at the test area through 1969; riot control exercises and smoke-producing and simulant materials testing were conducted through 1971.

Waste from testing activities was discarded via dumping or burial on the island. In 1975, the CWM testing facilities at Carroll Island were decommissioned [U.S. Army Environmental Hygiene Agency (USAEHA) 1989].

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#### 2.2.2 Enforcement Activities

From 1984 to 1985, APG was evaluated as a potential National Priorities List (NPL) site under CERCLA (USEPA 1985). In 1985, the Edgewood Area of APG was proposed for inclusion on the NPL; it was listed on the NPL in 1990. In 1986, between the time of the proposed listing and the final listing, a Resource Conservation and Recovery Act (RCRA) corrective action permit (MD3-21-002-1355) was issued by USEPA Region III to address solid waste management units (SWMUs) in the Edgewood and Aberdeen Areas of APG. As part of the RCRA permit, USAEHA performed a RCRA Facility Assessment (RFA) study for the Edgewood Area. Fifteen sites were identified as either SWMUs or areas with potential prior releases (USAEHA 1989). In addition to the RFA, the RCRA permit required that a RCRA Facility Investigation (RFI) be performed at Carroll Island. However, because of the final listing of the Edgewood Area on the NPL in 1990, the RFI was not completed. Further investigations at Carroll Island were to be performed under CERCLA.

In 1986, before the Edgewood Area was on the NPL list, the U.S. Geological Survey (USGS), in cooperation with the U.S. Army, conducted a hydrogeologic assessment of Carroll Island. A remedial investigation (RI) for Carroll Island was initiated in 1991 to determine the nature and extent of contamination of the sites. The RI did not detect contaminants migrating from Operable Unit A to the surrounding environment. However, the potential of contaminant migration from the Operable Unit A disposal pits/areas to groundwater, soil, surface water, and sediment exists as long as the wastes remain buried on Carroll Island. Therefore, the ongoing RI recommended that Operable Unit A be addressed in a Focused Feasibility Study (FFS). The FFS for Operable Unit A identified and evaluated alternatives to remediate the disposal pits/areas presented in this ROD. The Proposed Plan for Operable Unit A presented the alternatives and the recommended remedial alternative (APG 1996).

In 1993, an interim remedial action was performed at the Lower Island Disposal Area (Site 1). This action

included the removal of the contents of an open pit.

The following documents provide details of the site investigations and assessments of cleanup actions for Operable Unit A.

- ! USAEHA, 1989. RCRA Facility Assessment Report, Edgewood Area, Aberdeen Proving Ground, Maryland, for the U.S. Army environmental Hygiene Agency, Aberdeen Proving Ground, Maryland, Report No. DRXTH-AS-FR-82185.
- ! USGS, 1991. Hydrogeologic Data Report for Carroll Island, Aberdeen Proving Ground, Maryland, Open File Report 89-388, 1991.
- ! APG, 1994. The Remediation of Carroll Island Lower Island Disposal Site, Aberdeen Proving Ground, Maryland, Technical Report, January 1994.
- ! APG, 1995. Focused Feasibility Study, Operable Unit A, Carroll Island, Aberdeen Proving Ground, Edgewood, Maryland, December 1995.
- ! APG, 1996. Proposed Plan for Operable Unit A, Disposal Pits, Carroll Island, Aberdeen Proving Ground, Maryland, July 1996.

### 2.3 HIGHLIGHTS OF COMMUNITY PARTICIPATION

The Proposed Plan for Operable Unit A was released to the public in July 1996 at the four information repositories listed below:

- ! Harford County Public Library, Aberdeen Branch,
- ! Harford County Public Library, Edgewood Branch,
- ! Miller Library at Washington College, Chestertown, and
- ! Baltimore County Department of Environmental Protection, Towson.

The notice of availability of these documents was published on July, 1996, in four newspapers: The Cecil Whig, Kent County News, The Avenue, and The Aegis. A public comment period was held from July 15 through August 29, 1996. A fact sheet that contained a summary of the Proposed Plan was distributed to approximately 2,600 residents around the area. In addition, a public meeting was held at Oliver Beach Elementary School on August 21, 1996, to inform the public about the preferred remedial alternative for Carroll Island and to seek public comments. At this meeting, representatives from the U.S. Army, USEPA, and MDE answered questions about the site and remedial alternatives under consideration. Responses to the comments received during this period are included in the Responsiveness Summary in Sect. 3 of this document.

### 2.4 SCOPE AND ROLE OF OPERABLE UNIT A

Carroll Island represents one component of a comprehensive environmental investigation and cleanup presently being performed at APG. Carroll Island is divided into two Operable Units (A and B). Operable Unit A addresses 13 disposal pits/areas at Carroll Island while Operable Unit B addresses the rest of the island. A Feasibility Study is currently being conducted on Operable Unit B.

The disposal pits/areas in Operable Unit A pose a threat to human health and the environment because of the potential risk of migration of wastes from these sites to groundwater, soil, surface water, or sediment. The purpose of the remedial action is to prevent future environmental impacts as a result of the migration of contaminants to areas where humans and environmental receptors may be exposed.

### 2.5 SUMMARY OF SITE CHARACTERISTICS

Numerous sites and features at Carroll Island have been investigated as part of RI activities. Based on historical information, visual site inspections, and geophysical surveys (to detect ferrous metals and disturbed soil indicative of buried wastes), the 13 disposal pits/areas were identified as requiring remedial action.

Although results of the RI work suggest no contaminants have yet migrated from these disposal pits/areas to the surrounding environment, there is the potential for contaminant migration, as waste in the pits breaks down or is exposed from erosion or other surface disturbance such as flooding. Contaminants that may be contained in the pits include CWM, agent degradation products (e.g., methylphosphonic acid), explosives, volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides/polychlorinated biphenyls (PCBs), and inorganics. These materials could adversely affect site workers, nearby residents, trespassers, and recreational visitors if exposed.

The total volume of waste in the 13 disposal pits/areas is approximately 12,420 cubic yards, as estimated through visual observation and geophysical surveys. The disposal pits/areas cover a total area of about 1.9 acres and are believed to extend to an average depth of 3.3 ft.

## 2.6 SUMMARY OF SITE RISKS

A quantitative Risk Assessment (RA) was not conducted for the individual pits/area because data were not collected. The data were not collected because of the potential hazards associated with the pits. However, a qualitative RA was conducted to analyze the major concerns associated with the disposal pits/areas, potential contaminants, potential receptors, and exposure pathways.

Significant risks or hazards to human health and the environment exist if the contents of the disposal pits/areas are exposed or transported to the Chesapeake Bay and surrounding water bodies. This determination is based on historical information concerning the contents of the disposal pits/areas, the high toxicity of some of the potential contaminants, the diverse array of potential human and ecological receptors, and the numerous potential exposure pathways.

! Major concerns Although the investigation results for these sites indicate contaminants from the disposal pits/ areas have not migrated to the surrounding groundwater, soil surface water, or sediment, such migration may occur following the breakdown of waste in the pits. In addition, the potential for shoreline erosion at some of these sites, and for shallow groundwater and surface flooding at all sites, may expose wastes and transport the contents to the surrounding areas-including surface water bodies and the Chesapeake Bay.

! Potential contaminants Based on the information available, contaminants that could potentially be released from the disposal pits/areas include CWM, CWM degradation products, explosives, VOCs, SVOCs, pesticides/PCBs, and inorganics. In addition, munition fragments, munitions, debris, and scrap metal may be exposed. The potential effects of these contaminants are dependent on the specific chemical, route of exposure, and exposure point concentration.

! Potential receptors and exposure pathways The major concern with the disposal pits/ areas is potential exposure to receptors if the contaminants are exposed or transported to the surrounding environment and the Chesapeake Bay. If such exposure occurs, potential human receptors may include outdoor maintenance workers, security workers, construction/excavation workers, nearby off-site residents, nearshore fishermen, consumers of fish caught near Carroll Island, hunters and trappers, consumers of game from Carroll Island, nearshore swimmers, and trespassers or visitors.

These potential receptors may be exposed to contamination via incidental ingestion or direct dermal contact with soil, surface water, sediment, or exposed wastes. Consumers of fish and game from Carroll Island may be exposed to contaminants that bioconcentrate in fish or game tissue. In addition, chemical releases to the air-including CWM- exposes receptors via inhalation.

! Environmental receptors Environmental receptors are present at, and in the vicinity of, Carroll Island. The variety of habitats found on the island includes upland forest, wetlands, ephemeral ponds, and the surrounding estuaries with tidal wetlands. Carroll Island is surrounded by the Gunpowder River, Saltpeter Creek, Seneca Creek, and the Chesapeake Bay. A diverse array of mammals, birds, plants, fish, and invertebrates are found at and in the vicinity of Carroll Island. These ecological species could be exposed to contamination via ingestion of contaminated media, uptake via roots and foliage (plants), respiration of chemicals in surface water/sediment (fish), or direct dermal contact with contaminated media. In addition, they may be exposed via accumulation of contaminants in the food web.

## 2.7 DESCRIPTIONS OF ALTERNATIVES

The U.S. Army considered a range of alternatives for remediating the disposal pits/areas at Operable Unit A. The following alternatives were evaluated.

- ! Alternative 1 No action.
- ! Alternative 2 Hand excavation and disposal/treatment of excavated material.
- ! Alternative 3 Conventional excavation in an armored filtered air shelter and disposal/treatment of excavated material.
- ! Alternative 4 Telerobotic excavation in a an armored filtered air shelter and disposal/treatment of excavated material.

### 2.7.1 Alternative 1: No Action

The no action alternative involves no remedial actions to contain, remove, or treat the waste in the

disposal pits/areas. In the long term it will not be protective of human health and the environment. It is evaluated to provide a baseline against which to compare all other alternatives.

With respect to ARARs, this alternative does not meet RCRA requirements for general closure [Code of Maryland Regulations (COMAR) 26.13.05.07] or for closure of a landfill (COMAR 26.13.05.14).

#### 2.7.2 Alternative 2: Hand Excavation and Disposal/Treatment of Excavated Material

This alternative includes the following activities.

- ! Clearance of unexploded ordnance (UXO) from the disposal pits/areas before and during excavation.
- ! Clearing and grubbing disposal pits/areas.
- ! Excavation of disposal pits/areas (estimated total of 12,420 cubic yards) with hand tools and equipment.
- ! Segregation of waste into soil, debris, and rubble fractions.
- ! Characterization and disposal or treatment of excavated material. Waste is disposed of in accordance with APG protocol and federal and state regulations.
- ! At least sites, where feasible, excavated disposal pits/areas will be left open to create wildlife habitat enhancement ponds; otherwise, the pits will be backfilled using clean material from grading operations at other sites

The following major ARARs are cited for Alternative 2. A complete list of all ARARs are cited listed in Section 2.11.2.

- ! Excavation is performed in accordance with Maryland Erosion and Sediment Control Regulations (COMAR 26.17.01). Dust suppression techniques are incorporated to minimize the airborne transport of contaminated dust.
- ! If excavated material is hazardous, it is handled as a hazardous waste in accordance with Maryland Regulations for Identifications and Listing of Hazardous Waste (COMAR 26.13.02).

Assuming that 30% of the soil fraction is hazardous, the costs for Alternative 2 are estimated as follows:

- ! Capitol cost: \$11,641,102
- ! Operation and maintenance (O&M) cost: none
- ! Net present worth: \$11,641,102

The estimate time to implement this year is one year.

#### 2.7.3 Alternative 3: Conventional Excavation in an Armored Filtered Air Shelter and Disposal/Treatment of Excavated Material

This alternative includes the following activities.

- ! Clearance of UXO from the disposal pits/areas before and during excavation.
- ! Clearing and grubbing of disposal pits/areas.
- ! Conventional (backhoe/mechanical equipment) excavation of the entire volume of waste in the disposal pits/areas (estimated total of 12,420 cubic yards) within an armored filtered air shelter. (The shelter will be tested after assembly, but prior to use, to ensure harmful materials will not escape. Real-time air monitoring will be used to confirm the protectiveness of the air shelter.)
- ! Segregation of waste into soil, debris, and rubble fractions.
- ! Characterization and disposal or treatment of excavated material. Waste is disposed of in accordance with APG protocol and federal and state regulations.
- ! At selected sites, where feasible, excavated disposal pits/ areas will be left open to create wildlife habitat enhancement ponds; otherwise, the pits will be backfilled using clean material from grading operations at other sites. (Excess clean fill material will be spread out at upland areas of Carroll Island.)

The following major ARARs are cited for Alternative 3.

- ! Excavation is performed in accordance with Maryland Erosion and Sediment Control Regulations (COMAR 26.17.01). Dust suppression techniques are incorporated to minimize the airborne transport of contaminated dust.
- ! If excavated material is hazardous, it is handled as a hazardous waste in accordance with Maryland Regulations for Identification and Listing of Hazardous Waste (COMAR 26.13.02).



Assuming that 30% of the soil fraction is hazardous, the costs for Alternative 3 are estimated as follows:

- ! Capital cost: \$12,470,137
- ! O&M cost: none
- ! Net present worth: equal to capital cost.

The estimated time to implement this action is twenty-six months.

#### 2.7.4 Alternative 4: Telerobotic Excavation in an Armored Filtered Air Shelter and Disposal/Treatment of Excavated Material

This alternative includes the following activities.

- ! Clearance of UXO from the disposal pits/areas before and during excavation.
- ! Clearing and grubbing of disposal pits/areas.
- ! Telerobotic excavation of the entire volume of waste in the disposal pits/areas (estimated total of 12,240 cubic yards) within an armored filtered air shelter. (The shelter will be time air monitoring will be used to confirm the protectiveness of the air shelter.)
- ! Segregation of waste into soil, debris, and rubble fractions.
- ! Characterization and disposal or treatment of excavated material. All waste will be disposed of in accordance with APG protocol and federal and state regulations.
- ! At selected sites, where feasible, excavated disposal pits/areas will be left open to create wildlife habitat enhancement ponds; otherwise, the pits will be backfilled using clean material from grading operations at other sites. (Excess clean fill material will be spread out at upland areas of Carroll Island.)

The following major ARARs are cited for Alternative 4.

- ! Excavation is performed in accordance with Maryland Erosion and Sediment Control Regulations (COMAR 26.17.01). Dust suppression techniques are incorporated to minimize the airborne transport of contaminated dust.
- ! If excavated material is hazardous, it is handled as a hazardous waste in accordance with Maryland Regulations for Identification and Listing of Hazardous Waste (COMAR 26.13.02).

Assuming that 30% of the excavated soil is hazardous, the costs for Alternative 4 are estimated as follows:

- ! Capital cost: \$13,325,325
- ! O&M cost: none
- ! Net present worth: equal to capital cost.

The estimated time to implement this action is twenty-six months.

### 2.8 SUMMARY OF THE COMPARATIVE ANALYSIS OF ALTERNATIVES

As required by CERCLA, for each disposal pit/area at Operable Unit A, the four remedial alternatives were evaluated using the nine criteria specified by USEPA (Table 2-1). This section and Table 2-2 summarize the relative performance of each alternative.

#### 2.8.1 Threshold Criteria

- ! Overall protection of human health and the environment Alternative 2 (hand excavation and disposal/treatment of excavated material) provides overall protection of human health and the environment because it removes the sources of contamination at Operable Unit A disposal pits/areas. It also reduces the risk of an uncontrolled release of contaminants to the environment during removal activities by requiring that removal of the waste be conducted using hand excavation tools. Of the four alternatives evaluated, Alternative 2 provides the greatest level of protection to human health and the environment although there are short-term risks during excavation and handling. This alternative removes the potential sources of contamination at the disposal pits/areas and reduces the potential risk of release of contaminants to the environment.

Alternative 4 (telerobotic excavation inside an armored filtered air shelter and disposal/treatment of excavated material) provides overall protection of human health and the environment because it removes the potential sources of contamination at Operable Unit A disposal pits/areas. The armored filtered air shelter shields workers from an uncontrolled

release of contaminants and prevents the potential migration of contaminants to the environment outside the shelter. However, Alternative 4, overall, is less protective of human health and the environment than Alternative 2 because the use of a hydraulic excavator increases the risk of rupturing/detonating UXO, UXO filled with CWM, or other items containing CWM or other chemicals.

TABLE 2-1.

USEPA Evaluation Criteria for Remedial (Cleanup) Alternatives

1. Overall protection of human health and the environment  
Addresses whether a cleanup method adequately protects human health and the environment and describes how risks presented by each pathway are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.
2. Compliance with ARARs  
Addresses whether a cleanup method meets all ARARs (federal and state environmental requirements) and provides grounds for invoking a waiver.
3. Long-term effectiveness and permanence  
Refers to the ability of the cleanup method to reliably protect human and the environment over time, after the action is completed.
4. Reduction of toxicity, mobility, or volume through treatment  
Addresses the effectiveness of a cleanup method in reducing the toxicity, mobility, or volume of hazardous substances through treatment.
5. Short-term effectiveness  
Addresses the period of time needed to complete the cleanup, and any adverse impacts on human health and the environment that may occur during construction and operation.
6. Implementability  
Refers to the technical and administrative feasibility of a cleanup method, including the availability of required materials and services.
7. Cost  
Includes the estimated capital and O&M costs of each cleanup method.
8. State acceptance  
Indicates whether the State of Maryland agrees with the preferred cleanup method.
9. Community acceptance  
Indicates whether public concerns are addressed by the cleanup method and whether the community has a preference. (Public comment is an important part of the final decision.)

TABLE 2-2

## Comparison of Remedial Action Alternatives

Remedial Alternative	Evaluation Criteria							Capitol
	Overall Protection of Human Health and the Environment	Compliance With ARARs	Long-Term Effectiveness and Permanence	Reduction of Toxicity, Mobility, and Volume	Short-Term Effectiveness	Implementability	Cost (a)	
Alternative 1 No action	Does not provide adequate protection or meet remedial action objectives	No	Does not reduce risks	No	Has no impacts on community or worker health or the environment	Requires no construction, equipment, storage, or disposal	None (no O&M)	
Alternative 2 Hand Excavation and Disposal/Treatment of Excavated Material	Offers high level of protection to the immediate environment; reduces potential for UXO/CWM incidents by hand excavation	Yes	Removes the source of potential contamination; requires no O&M	Yes; permanently reduces toxicity, mobility, and volume	Moderately increases short-term noise and dust; reduces risk of CWM release by hand excavation	Requires labor and equipment that are readily available (no O&M)	\$11,641,102	
Alternative 3 Conventional Excavation in an Armored Filtered Air Shelter and Disposal/Treatment of Excavated Material	Offers high level of protection to the immediate environment; reduces potential for off-site contamination by use of armored filtered air shelter	Yes	Removes the source of potential contamination; requires no O&M	Yes; permanently reduces toxicity, mobility, and volume	Moderately increases short-term noise and dust; provides protection in case of accidental release of CWM through use of armored filtered air shelter	Requires labor and equipment that are readily available; uses specialized equipment that could delay implementation	\$12,470,137	
Alternative 4 Telerobotic Excavation in an Armored Filtered Air Shelter and Disposal/Treatment of Excavated Material	Offers high level of protection to the immediate environment; reduces potential for off-site contamination by use of armored filtered air shelter	Yes	Removes the source of potential contamination; requires no O&M	Yes; permanently reduces toxicity, mobility, and volume	Moderately increases short-term noise and dust; provides protection in case of accidental release of CWM through use of armored filtered air shelter; increases level of protection to on-site workers via telerobotic excavator	Requires labor and equipment that are readily available; uses specialized equipment that could delay implementation	\$13,325,325	

(a) It is assumed that 30% of the excavated soil is hazardous.

Alternative 3 (conventional excavation in an armored filtered air shelter and disposal/treatment of excavated material) provides overall protection of human health and the environment because it removes the potential source of contamination at Operable Unit A disposal pits/areas and because excavation activities are conducted within a blast containment and air filtering system. In the event of an uncontrolled release of contaminants during excavation activities, the shelter prevents the migration of contaminants to the outside environment. However, because Alternative 3 requires workers to be inside the shelter during excavation activities, it is less protective of worker health and safety than either Alternative 2 or Alternative 4.

Alternative 1 (no action) is not protective of human health and the environment because it does not remove the wastes from the disposal pits/areas.

- ! Achievement of ARARs All three excavation and disposal or treatment alternatives (i.e., Alternative 2, 3, and 4) comply with all ARARs. Alternative 1 (no action) does not comply with ARARs.

#### 2.8.2 Primary Balancing Criteria

- ! Long-term effectiveness Alternatives 2, 3, and 4 provide the same degree of long-term effectiveness and permanence because the contents of the disposal pits/areas are permanently removed from the site, thus eliminating the potential for human exposure to waste or leaching of contaminants to groundwater or surface water. Any waste not reclaimed or treated is placed in a permitted disposal facility. Alternative 1 is the least effective over the long term.
- ! Reduction in toxicity, mobility, or volume of contaminants Alternatives 2, 3, and 4 reduce the toxicity, mobility, and volume of the waste because it is excavated and removed from the site then treated or placed in a permitted disposal facility. Alternative 1 does not achieve these objectives.
- ! Short-term effectiveness Alternative 2 is the most protective of the surrounding communities and workers involved in the cleanup because it reduces the risk of an uncontrolled release of contaminants to the environment by hand excavation of the disposal pits/areas. Alternatives 3 and 4 mitigate the risk of exposure from a release but increase the risk of release. Alternative 1 provides less short-term effectiveness.
- ! Implementability Alternative 1 is the easiest alternative to implement. Alternative 2 achieves a high level of protection for human health and the environment in the shortest time of any of the excavation alternatives. No major implementation considerations are associated with Alternative 2 (hand excavation). The use of an armored filtered air shelter in Alternatives 3 and 4 requires the implementation of engineering controls and testing certification of the equipment and structures. Additionally, as an innovative technology, the telerobotic excavator proposed for Alternative 4 requires additional testing and certification before implementation.
- ! Cost Because no O&M costs are associated with Alternatives 1, 2, 3, or 4, the capital cost for each alternative is equal to the net present worth. Alternative 1 has a capital cost of \$0; Alternative 2, \$11,641,102; Alternative 3, \$12,470,137; and Alternative 4, \$13,325,325. Cost estimates were based on professional judgement that 30% of the waste is hazardous.

#### 2.8.3 Modifying Criteria

- ! State acceptance The State of Maryland concurs with the selected alternative.
- ! Public acceptance APG solicited input from the public on the development of alternatives and on the alternatives identified in the Proposed Plan. The public is in agreement with the cleanup objectives and the preferred alternative. A detailed summary of concerns and APG's responses are contained in Section 3.0.

#### 2.9 SELECTED REMEDY

The selected remedy for cleanup of the Operable Unit A disposal pits/areas is Alternative 2 (hand excavation and treatment or disposal of excavated material). This alternative is protective of human health and the environment; complies with all ARARs; has a high degree of long-term effectiveness and permanence; and reduces the toxicity, mobility, and volume of wastes to be disposed of through segregation, treatment, and reclamation to the maximum extent practicable. Although this alternative presents some short-term risks

during excavation and handling, it is a demonstrated and easily implementable technology; and it is significantly more cost-effective than the other excavation alternatives.

Alternative 2 involves removing the entire volume of waste in the disposal pits/areas using hand excavation tools and equipment. UXO support is required before and during excavation to locate and remove UXO encountered during the removal of disposal pit/area contents. Each UXO sweep is performed in 2-ft lifts. Embedded metallic objects are unearthed by hand. An excavator, backhoe, or similar mechanical equipment may be used in excavating surface soil that is free of metallic objects. CWM-filled containers or UXO items are handled and disposed of by U.S. Army Technical Escort Unit in accordance with APG protocol. Recovered UXO determined to be unsafe to store or move may be detonated on-site. Remedial activities include real-time monitoring of air emissions for CWM.

The limit of excavation is initially established by visual observation. After all visual waste and debris are removed, soil samples are collected and analyzed to determine if remediation goals have been achieved or if additional excavation is required. Excavated material is separated into soil, debris, and rubble fractions.

The soil fraction is screened for CWM, placed in roll-offs, and analyzed to determine if it is hazardous. For the purpose of cost comparison, it is assumed that 30% of all excavated soil is hazardous and requires treatment.

All debris and rubble recovered during the excavation process are considered to be potentially contaminated with CWM. For the purpose of this remedial action, debris is defined as metal, glass, and plastic; rubble includes concrete, bricks, and wood. All collected debris and rubble are monitored for CWM. All waste is then disposed of or treated in accordance with APG protocol and federal and state requirements.

At some sites, it may be necessary to dewater excavated material, drain standing water (e.g., Bengies Point Road Dump), or drain pooled water in the pits. Any such water is screened for CWM, tested, and disposed of based on analytical results.

Where feasible, the cavities created by excavation are left open as part of habitat enhancement to support establishment of natural resources. Areas that cannot feasibly be used for this purpose are backfilled, compacted, graded, and seeded.

Alternative 2, as described herein, may require some modification as a result of the remedial design or construction processes. Table 2-3 summarizes the costs for Alternative 2.

## 2.10 PERFORMANCE STANDARDS

The selected remedy for Operable Unit A involves removing the entire volume of waste from the pits and disposing of the waste in accordance with applicable or relevant and appropriate Federal and state requirements. The initial limit of excavation is established by removing all visible waste and debris. Soil excavation will continue until all contaminated soil is removed. Soil will be considered contaminated if levels exceed (a) industrial risk-based concentrations for protection of human health or (b) ecological screening criteria and background concentrations, or bioassays show an adverse impact.

## 2.11 STATUTORY DETERMINATION

The selected remedy satisfies the requirements under Sect. 121 of CERCLA to:

- ! protect human health and the environment,
- ! comply with ARARs,
- ! be cost-effective,
- ! use permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable, and
- ! satisfy the preference for treatment as a principal element.

### 2.11.1 Protection of Human Health and the Environment

The selected remedy, Alternative 2 (hand excavation and disposal/treatment of excavated material), reduces the risks posed to human health and the environment through hand excavation and disposal or treatment of the entire volume of waste in the disposal pits/areas. Alternative 2 is protective of the surrounding environment because it removes the source of contamination. Additionally, Alternative 2 eliminates the potential for surface water contamination as a result of erosion, flooding, or runoff.

Precautions are taken to ensure the safety of site workers, who wear appropriate personal protective equipment. Real-time air monitoring helps ensure workers are protected from exposure to unsafe levels of

chemical vapor or dust. Dust and erosion control measures are implemented to minimize exposure to potentially hazardous substances. This alternative will not pose any unacceptable short-term risks.

#### 2.11.2 Compliance With ARARs

The selected remedy, Alternative 2 (hand excavation and disposal/treatment of the excavated material), complies with all chemical-, location-, and action-specific ARARs, as outlined below.

##### 2.11.2.1 Chemical-Specific ARARs

- ! Federal Toxic Substances Control Act [15 USC 2605, Regulation of Hazardous Chemical Substances and Mixtures]
  - 40 (CFR) 761 (PCB requirements)
    - If PCB-contaminated material is encountered during excavation activities, it must be managed in accordance with federal disposal regulations (applicable).

##### 2.11.2.2 Location-Specific ARARs

- ! Federal Wetlands Regulations [33 USC 1344 Permits for Dredged or Fill Material]
  - 40 CFR Part 6, Appendix A, and Executive Orders 11988 and 11990 (Flood Plain or Wetlands)

Excavation in 9 of the 13 disposal pits/areas is subject to USEPA standards. Construction activities at wetlands sites must be modified to minimize adverse impacts (applicable).

TABLE 2-3

Cost Summary for Alternative 2, Hand Excavation and  
 Disposal/Treatment of Excavated Material  
 Carroll Island, Aberdeen Proving Ground (a)

Item	Rate	(\$)	Quantity	Unit	Cost 5% of		Cost 30% of	
					Soil is Haz	1995 (&)	Soil is Haz.	1995 (\$)
Summary: 13 FFS Sites								
SITE PREPARATION								
UXO clearing	904.00	/day	13	day		11,752		11,752
Cut and chip trees to 12-in. diameter	3,950.00	/acre	2.01	acre		7,940		7,940
Grub stumps and remove	2,500.00	/acre	2.01	acre		5,025		5,025
SUBTOTAL						24.717		24.717
SITE STAGING AND DECONTAMINATION AREA								
UXO cleaning	904.00	/day	11	day		9,944		9,944
Cut and chip trees to 12-in. diameter	3,950.00	/acre	1.1	acre		4,345		4,345
Grub stumps and remove	2,500.00	/acre	1.1	acre		2,750		2,750
Stabilize construction entrance	500.00	/ea	11	ea		5,500		5,500
Grade berms, staging area	1.43	/sy	5,324	sy		7,613		7,613
Geosynthetic liner	0.33	/sf	47,916	sf		15,812		15,812
Filter fabric	0.35	/sf	47,916	sf		16,771		16,771
Crushed stone	0.73	/sf	47,916	sf		34,979		34,979
Decontamination water and holding tanks(2crews)	202.38	/day	166	day		33,595		33,595
Characterize decontamination water	125.00	/load	13	load		1,625		1,625
Dispose of decontamination water	1.80	/gal	13,000	gal		23,400		23,400
SUBTOTAL						164.784		164.784



TABLE 2-3 (Cont'd)

Item	Rate (\$)	Quantity	Unit	Cost 5% of	Cost 30% of		
				Soil is Haz 1995 (\$)	Quantity	Unit	Soil is Haz. 1995 (\$)
EXCAVATION OF WASTE							
UXO clearing	904.00 /day	13	day	11,752	11,752		
Sediment and erosion control	2.00 /lf	11,369	lf	22,738	22,738		
Mechanical excavation of 1st foot	685.85 /day	15	day	10,288	10,288		
Excavation, hand tools (2 crews)	12,656.00/day	166	day	2,100,896	2,100,896		
Load rubble, debris, and soil into roll-offs/trucks (2 crews)	1,371.70 /day	166	day	227,702	227,702		
Haul rubble/debris and soil to central staging area	3.31 /ton	15,532	ton	51,532	51,411		
Post-excavation sampling	3,533.00 /ea	216	ea	763,128	763,128		
Dewatering equipment (2 crews)	395.46 /day	166	day	65,646	65,646		
Disposal of holding tank water	2,575.00 /site	13	site	33,475	33,475		
SUBTOTAL				3,287,036	,287,036		
DISPOSAL OF RUBBLE FRACTION							
Transport and dispose of rubble at on-post landfill	2.26 /ton	1,400	ton	3,164	3,164		
SUBTOTAL				3,164	3,164		
DISPOSAL OF SOIL FRACTION							
Characterize excavated material	3,533.00 /ea	96	sample	339,168	339,168		
Transport and dispose of nonhazardous soil	2.19 /cy	10,029	cy	21,964	7,392	cy	16,188
Transport and treat hazardous soil	425.00 /ton	790	ton	335,750	4,755	ton	2,020,875
Characterize and dispose of hazardous ash	296.78 /ton	123	tons	36,504	714	ton	211,901
SUBTOTAL				733,385			2,588,132
DISPOSAL OF DEBRIS FRACTION							
Transport debris by boat to ERDEC	1,000.00 /week	34	week	34,000	34,000		
Dispose of debris at ERDEC	527.50 /ton	852	ton	449,430	449,430		
SUBTOTAL				483,430	483,430		

TABLE 2-3 (cont'd)

Item	Rate (\$)	Cost 5% of Soil is Haz		Cost 30% of Soil is Haz.	
		Quantity	Unit	Quantity	Unit
DISPOSAL OF CWM					
Punch, drain, and dispose of CWM-filled UXO	12,000.00	ea	13	ea	156,000
SUBTOTAL					156,000
CONSTRUCTION SUBTOTAL (13 FFS Sites)				4,852,516	6,707,263
CENTRAL STAGING AREA					
UXO clearing	904.00	/day	1	day	904
Stabilize construction entrance	500.00	/ea	1	ea	500
Grade berms, decon/staging area	1.43	/sy	2,130	sy	3,046
Geosynthetic liner	0.33	/sf	19,167	sf	6,325
Filter fabric	0.35	/sf	19,167	sf	6,708
Crushed stone	0.73	/sf	19,167	sf	13,992
Decontamination water and holding tanks	101.19	/day	186	day	18,821
Characterize decontamination water	125.00	/load	13	load	1,625
Transport decontamination water for disposal	650.00	/load	13	load	8,450
Dispose of decontamination water	1.80	/gal	13,000	gal	23,400
Panelize system building	59,100.00	/is	1	ea	59,100
Waste separation	1,589.60	/day	186	day	295,666
Load soil into roll-offs/trucks for disposal	695.85	/day	186	day	129,428
20-cy roll-off containers, drop off charge	500.00	/ea	24	ea	12,000
20-cy roll-off containers, rental	480.00	/day	186	day	89,280
Perimeter fence	15.15	/lf	563	lf	8,529
Contractor/engineer trailers	14.67	/day	186	day	2,729
Telephone, lights, HVAC, and portable toilet	39.38	/day	186	day	7,325
Security	367.20	/day	186	day	68,299

TABLE 2-3 (cont'd)

Item	Rate (\$)		Quantity	Unit	Cost 5% of	Cost 30% of	1995 (\$)
					Soil is Haz	Soil is Haz.	
	7,500	ea	1	ea	7,500	7,500	
Meteorological station/monitoring							
Technical Escort Unit							
Temporary bunker (portable magazine)	10,000.00	ea	1	ea	10,000		10,000
Pier and waterway improvement	265,000.00	ls	1	ls	265,000		265,000
Closedown of waterway	1,200.00	ea	34	ea	40,800		40,800
SUBTOTAL					1,079,427		1,079,427
CONSTRUCTION SUBTOTAL (Central Staging Area)					5,931,944		7,786,690
Construction contingencies (20%)					1,186,389		1,557,338
Health and safety training and equipment (including air monitoring and dust control equipment) at 10%					593,194		778,669
TOTAL CONSTRUCTION COST					7,711,527		10,122,698
Engineering and administration at 15%					1,156,729		1,518,405
TOTAL CAPITOL COST					8,868,256		11,641,102

(a) ea = each.  
 sy = square yard.  
 sf = square foot.  
 gal = gallon.  
 lf = linear foot.  
 cy = cubic yard.  
 ls = lump sum.

! Federal Conservation of Wildlife Resources

- 50 CFR Part 402 (Endangered Species Act)

If threatened and endangered species are identified during an ecological survey currently in progress at Carroll Island, construction activities will be modified to minimize adverse impacts on the species (applicable).

! Maryland Threatened and Endangered Species Regulations

- COMAR 08.03.08 (Threatened and Endangered Species)

If threatened and endangered species are identified during an ecological survey currently in progress at Carroll Island, construction activities will be modified to minimize adverse impacts on the species (applicable).

! Maryland Water Resources Administration

- COMAR 08.05.04 (Nontidal Wetlands)

For three of the disposal pits/areas, excavation disturbs more than 5,000 square feet of nontidal wetlands and is subject to permitting standards, which may include the creation, restoration, or enhancement of wetlands (applicable).

! Chesapeake Bay Critical Areas Criteria

- Maryland Natural Resources Code (§8-8101 to 8-1816)

Because all disposal pits/areas are within the 1,000-ft buffer of the Chesapeake Bay known as the "Critical Area," excavation activities are subject to natural resource protection standards and restrictions, which require the implementation of storm water runoff control devices (applicable).

2.11.2.3 Action-Specific ARARs.

! Maryland Waste Management Program

- COMAR 26.13.02 (Identification and Listing of Hazardous Waste)

Excavated soil and waste may be hazardous and require sampling and analysis for identification (applicable).

- COMAR 26.13.03 (Standards Applicable to Generators of Hazardous Waste)

Waste excavated on-site is analyzed to determine if it is hazardous. Hazardous waste is identified either by testing or knowledge of the waste based on the material or processes used to produce it. If the excavated waste is determined to be hazardous, USEPA identification numbers are obtained before its treatment, storage, disposal, or transportation. Manifests are prepared for hazardous on-site materials transported to off-site treatment, storage, and disposal facilities. On-site hazardous waste is packaged, labeled, and marked according to U.S. Department of Transportation regulations (49 CFR 172, 17, 178, and 179) (applicable).

- COMAR 26.13.04 (Standards Applicable to Transporters of Hazardous Waste)

A manifest accompanies each off-site shipment of hazardous waste.

- COMAR 26.13.05 (Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities)

As part of the excavation alternative, no hazardous waste is treated on-site; however, it is temporarily stored on-site. All excavated material determined to be hazardous is temporarily stored in containers that meet standards set forth in these regulations before disposal. Any off-site hazardous waste landfill used to dispose of hazardous waste must comply with these regulations (relevant and appropriate).

- COMAR 26.13.05.07 (Closure and Post-Closure)

Requirements for clean closure of waste piles are relevant for excavation of the disposal pits/areas (relevant and appropriate).

- COMAR 26.13.05.09 and 26.13.05.10 (Standards Applicable to Tanks and Containers)

All excavated material determined to be hazardous is temporarily stored in containers that meet these standards before disposal (applicable).

- COMAR 26.13.05.14 (Landfills)

Any off-site hazardous waste landfill used to dispose of hazardous waste must comply with these standards (applicable).

! RCRA - Federal Waste Management Program [42 USC 6921 Identification and Listing of Hazardous Waste]

- 40 CFR Part 261 (Waste Identification)

Waste generated or excavated on-site may qualify as a newly listed waste not yet incorporated into Maryland Hazardous Waste Regulations (applicable).

- 40 CFR Part 264, Subpart S (Corrective Action for Solid Waste Management

Units) [42 USC 6924 Standards Applicable to Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities]

On-site temporary storage of waste in piles is conducted in accordance with this regulation (relevant and appropriate).

- 40 CFR Part 268 [Land Disposal Restrictions (LDR)][42 USC 6924 Standards Applicable to Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities]

All hazardous waste generated or excavated on-site is treated according to LDR levels for constituents in the waste. LDR forms accompany each manifested shipment of waste (applicable).

! Maryland Water Pollution Control Regulations

- COMAR 26.08.02.03 (Surface Water Quality Criteria)

The excavation alternative incorporates methods to contain or control all excavated material so as to prevent contact with surface water. Any collected or contained water is discharged in accordance with this regulation (relevant and appropriate).

! Federal Water Pollution Control Act [33 USC 1311 Effluent Limitations]

- 40 CFR Part 131 (Water Quality Standards)

This standard is applicable for potential contaminants that may enter surface water and are not addressed under state standards. The excavation alternative incorporates methods to contain or control all excavated material in a way that prevents contact with surface water. Any collected or contained water is discharged in accordance with this regulation (applicable).

! U.S. Army Corps of Engineers [33 USC 1341 Certification]

- 33 CFR Part 323 (Permits for Discharges of Dredge or Fill Material into the Water of the United States)

Because 9 of the 13 disposal pits/areas are located in wetlands, excavation activities must follow requirements for wetlands protection or implement engineering controls to minimize or prevent adverse impacts (applicable).

- 33 CFR Part 322 (Construction in Waterways)

The construction of a pier at Carroll Island requires a water quality certification (applicable).

! Federal Clean Air Act [42 USC 7521 Establishment of Standards]

- 40 CFR Part 50 (National Primary and Secondary Ambient Air Quality Standards)

Earth moving operations may emit pollutants that affect ambient air quality standards for criteria pollutants (applicable).

- 40 CFR Part 61 (National Emission Standards for Hazardous Air Pollutants)

Because excavation activities may emit hazardous air pollutants, emission control equipment and compliance with specific standards may be required, depending on the activity and the type of pollutant (applicable).

! Maryland Air Quality Standards

- COMAR 26.11.06.03D (Particulate Matter From Materials Handling and Construction)

Construction activities that generate particulate emissions (e.g., dust), including excavation and vehicular traffic, require reasonable precautions (e.g., wetting of dust) to prevent particulate matter from becoming airborne (applicable).

- COMAR 26.11.06.06B (Control of VOCs From Installations)

The excavation of soil potentially contaminated with solvents or other VOCs may result in VOC emissions in excess of 20 pounds per day, which is prohibited by this regulation unless the total emissions are reduced by 85% through the use of control devices (applicable).

- COMAR 26.11.06.08 (Nuisance)

Excavation is performed in a manner that does not create a nuisance or air pollution (applicable).

- COMAR 26.11.09 (Control of Fuel-Burning Equipment and Stationary Internal Combustion Engines)

Fuel-Burning equipment (including excavation equipment) and stationary combustion engines (including electrical generators and waste-screening equipment) are maintained to comply with visible emission, particulate matter, and other emission standards (applicable).

## ! Maryland Erosion and Sediment Control Regulations

### - COMAR 26.17.01 (Erosion and Sediment Control)

Standard engineering practices are applied to reduce or prevent erosion or sediment building during excavation. These practices may include the installation of sediment traps or a silt fence (applicable).

#### 2.11.3 Cost Effectiveness

Of the three excavation alternatives, Alternative 2 (hand excavation and disposal/treatment of excavated material) is the most cost-effective. It provides maximum long-term protection of human health and the environment with the least expenditure of funds.

#### 2.11.4 Use of Permanent Solutions and Alternative Treatment Technologies or Resource Recovery Technologies to the Maximum Extent Practicable

The selected remedy, Alternative 2 (hand excavation and disposal or treatment of excavated material), is a permanent solution and uses treatment to the maximum extent practicable. It provides the best balance of tradeoffs among the alternatives. Alternatives 2, 3 (conventional excavation), and 4 (telerobotic excavation) meet the threshold criteria and are comparable in terms of degree of long-term effectiveness and reduction in toxicity, mobility, and volume of waste. Alternative 1 (no action) does not meet the threshold criteria of overall protection and compliance with ARARs.

Alternatives 2, 3, and 4 differ primarily in terms of short-term effectiveness, implementability, and cost. Alternative 2 provides more short-term effectiveness than Alternatives 3 and 4, which include using the armored filtered air shelter. Alternatives 3 and 4 may be more difficult to implement because of their innovative technologies and higher costs.

#### 2.11.5 Preference for Treatment as a Principal Element

By excavating waste at Operable Unit A; segregating the waste into rubble, soil, and debris fractions; and treating the fractions to destroy contaminants, as appropriate, the proposed remedy addresses the principal environmental threat through treatment to the maximum extent practicable. Therefore, the statutory preference for a remedy that incorporates treatment as a principal element is satisfied.

### 2.12 DOCUMENTATION OF SIGNIFICANT CHANGES

The Proposed Plan presents the selected remedy as the preferred alternative. No significant changes have been made.

### 3. RESPONSIVENESS SUMMARY

The final component of the Record of Decision is the Responsiveness Summary. The purpose of the Responsiveness Summary is to provide a summary of the public's comments, concerns, and questions about the disposal pits/areas at Carroll Island and the Army's responses to these concerns.

During the public comment period, written comments, concerns and questions were received by APG, EPA and MDE.

APG held a public meeting on August 21, 1996, to formally present the Proposed Plan and to answer questions and receive comments. The transcript of this meeting is part of the administrative record for the site. All comments and concerns summarized below have been considered by the Army and EPA in selecting the final cleanup methods for the disposal areas at the Carroll Island.

This responsiveness summary is divided into the following sections:

- 3.1 Overview,
- 3.2 Background on community involvement,
- 3.3 Summary of comments received during public comment period and APG's responses,
- 3.4 Sample newspaper notice announcing public comment period and the public meeting.

#### 3.1 OVERVIEW

At the time of the public comment period, the Army endorsed a preferred alternative for the cleanup of the former disposal areas at the Carroll Island Study Area. APG's preferred alternative for the disposal areas was to hand excavate the material and dispose of it off-site. EPA concurred with the preferred alternative. Maryland Department of the Environment supported the Army's plan and stated it would finalize its position after the public comment period. MDE now concurs with the preferred alternative.

The community agrees with APG and EPA's preferred alternative of excavating the disposal pits. An important factor for the community is that APG perform the work safely and have plans in place to protect the community.

#### 3.2 BACKGROUND ON COMMUNITY INVOLVEMENT

Citizen's interest in the Carroll Island Study Area increased substantially in 1993. Residents new to the area were unaware of APG's history and current activities, including the cleanup program. APG prepared fact sheets, attended community meetings, hosted tours, and held one-on-one discussions with members of the community to increase their knowledge of APG's activities and address any concerns.

Concerns raised prior to the Proposed Plan included interest in whether any substances had moved off-post from APG through groundwater or surface water. A number of citizens have private wells which were sampled and were not impacted by any substances at Carroll Island. APG has been keeping the community informed about the Remedial Investigation of Carroll Island and the Focused Feasibility Study for the disposal pits through the monthly Restoration Advisory Board meetings, fact sheets, community meetings, personal discussions.

APG's community relations activities for the Proposed Plan for the disposal pits at Carroll Island included the following.

- ! APG released the Proposed Plan for the Carroll Island disposal areas for public comment on July 15, 1996. Copies were available to the public at APG's information repositories at the Aberdeen and Edgewood Branches of Harford County Library, Miller Library at Washington College, and the Baltimore County Department of Environmental Protecting in Towson.
- ! APG issued a press release to APG's full medial list announcing the availability of the Proposed Plan, the dates of the public comment period, and the date and time of the public meeting.
- ! A 45-day public comment period on the Proposed Plan ran from July 15 to August 28, 1996. Upon a request from the citizens group, Aberdeen Proving Ground Superfund Citizens Coalition, the comment period was extended an additional 15 days.
- ! APG placed newspaper advertisements announcing the public comment period and meeting in The Aegis, the Cecil Whig, The Avenue, the Kent County News, and the Bay News.
- ! A fact sheet was prepared and published on the Proposed Plan and copies were mailed to over 2,500

citizens and elected officials on its Installation Restoration Program mailing list. The fact sheet included a form which citizens could use to send APG their comments.

- ! The APG News featured a story on the proposed plan in the July 24 edition and ran reminder notices about the public meeting in later issues.
- ! A reminder notice about the public meeting was also included on the postcards announcing the August Restoration Advisory Board meeting and sent to the 2,500 citizens and elected officials on the mailing list.
- ! On August 21, 1996, an public meeting was held at the Oliver Beach Elementary School. Representatives of the Army, EPA, and MDE were available to answer question about the proposed alternatives under consideration.

### 3.3 SUMMARY OF COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD AND AGENCY RESPONSES

Comments raised during the Carroll Island public comment period on the Focused Feasibility Study and the Proposed Plan are summarized below. The comments are categorized by topic and by source.

#### COMMENTS FROM QUESTIONNAIRE INCLUDED WITH FACT SHEET

As part of its fact sheet on the Proposed Plan, APG included a questionnaire that residents could return with their comments. APG received 23 completed returns.

Responses on the completed returns were

0	Alternative 1: Take no action
19	Alternative 2: Hand-excavation and Disposal/Treatment of Excavated Material
0	Alternative 3: Excavation Using Construction Equipment is a Shelter and Disposal/Treatment of Excavation Material
1	Alternative 4: Telerobotic Excavation in a Shelter and Disposal/Treatment Excavated Material
1	Have no preference
2	No alternative selected

Additional comments on the questionnaires and APG's responses are listed below.

Comment 1: Given cost and time to implement, Alternative 2 is most practicable.

APG Response: APG agrees cost and time are factors to be considered. More importantly, Alternative 2 also meets the first criteria of protecting human health and the environment.

Comment 2: Sooner the better! Protect the workers but move forward and get it done. The sooner you get this done, the sooner you can start on other sites at Edgewood. Good Luck.

APG Response: APG agrees with the dual goals of moving forward as quickly as possible while keeping the protection of human health and the environment as the top priority. Many cleanup projects are progressing simultaneously, including several at sites in Edgewood.

Comment 3: The proposed alternative appears to be the most cost-effective method under current technological capabilities. Is any research currently being done on on-site decontamination of waste materials through chemical or bacteriological means? I know this approach would be a "long shot" alternative but it might be less destructive to the current environment and require less transfer of waste materials from one site to another site.

APG Response: APG agrees with the desire to take advantage of current technological developments. In addition, environmental laws promote the use of in-place treatment so materials are not simply transferred from one location to another. On-site treatment is usually conducted for a continuous waste stream that requires treatment over time, such as contaminated groundwater. However, because it is not known what type of waste will be encountered at the site when the excavation begins, it would be difficult and cost prohibitive to try and treat the waste on-site.

Comment 4: Is it possible to comment and receive updates via Internet E-Mail? Does APG-IRP have a Web site that would allow information exchange?



APG Response: The Installation Restoration Program is in the process of setting up a Web page and an E-Mail address to give the public the ability to communicate with us by computer. We will keep the community informed and let you know when the Web Site and E-Mail address are available for use.

Comment 5: Move deliberately and quickly to cleanup the site.

APG Response: APG appreciates the desire for cleanup to proceed as quickly as possible. By identifying the disposal sites as an area where action could be taken while the comprehensive overall studies continue, APG is able to expedite their cleanup.

Comment 6: Area should be maintained as a wildlife refuge. Cleanup must be thorough and complete, ending any possible contamination of groundwater, surface water or soil.

APG Response: APG appreciates the input on the long-term plan for the site. The current Proposed Plan addresses only the disposal areas. Once APG completes its full studies, it will formally seek input from the public on any remaining issues, such as the long-term use of the site.

Comment 7: A resident commented they had no preference at this time but would like more information. Their questions were the following.

a) What will be done with hazardous materials after they are found and how will it then be disposed of?

APG Response: The waste will be segregated and sampled to determine if it is hazardous. All waste will then be disposed of in accordance with Federal and state requirements. These requirements dictate how the material is sampled, handled, transported, treated, and disposed.

b) How has this situation already affected the environment as well as the public?

APG Response: Since the contents of the pits have not migrated and contaminated the groundwater or surface water, there have been minimal impacts to the environment and no impacts to the public.

c) There is a high percentage of cancer in the State of Maryland--does this have anything to do with this situation?

APG Response: The contamination that exists at Carroll Island has not migrated away from the Island and has not impacted any surrounding areas.

d) If there is an accident with contamination what are the effects--health, environment, etc.?

APG Response: If an accident were to occur, the affects to workers could be varied depending on the type of chemical accident. However, APG will be taking the highest degree of precaution. Workers and the surrounding communities will be protected against any accident.

Comment 8: Take material out of area so no chance of area contamination.

APG Response: APG agrees the disposal sites should be excavated and the waste material properly disposed of in accordance with federal, state and local laws.

Comment 9: APG received two comments related to its boating restrictions. One resident asked if the restriction of Maxwell Point was because of surface water contamination or munitions. A second resident expressed concern about the lack of places to anchor on the Gunpowder and encouraged the Army to cleanup the area and allow boaters access or at least the ability to anchor near the shore.

APG Response: Maxwell Point is a restricted area under APG's boating regulations because of the possibility old munitions may be present. For public safety reasons, APG has increased its enforcement of boating restrictions and its efforts to provide information to the public on the restrictions. APG is sensitive to the desire of the public to have unrestricted use of the waterways and is conducting further research and study of the issue.

#### COMMENTS FROM AUGUST 21, 1996 PUBLIC MEETING

APG received the following written comments from Mr. James Gaibrois at the public meeting on August 21, 1996.

Comment 10: The map on page 2 of the fact sheet shows the National Guard on the wrong side of Eastern Avenue.

APG Response: APG apologizes for this error and will correct it in future maps.

Comment 11: In Alternative 1, the showing of "no cost" does not account for monetary liabilities, decrease of property values, recurring security and patrols, etc. which would exist even if nothing is done. These costs would be continued annually if no action was taken but would decrease if mitigating action would be taken.

APG Response: Although APG is concerned about property values, the EP mandates that only long-term monitoring can be considered for the no-action alternative and its associated costs.

Comment 12: In Alternative 3 and 4, the costs may not include the salvage value or the remaining resale value of the newly developed equipment or the heavy hardware to be used. If design rights to the design of this equipment become government property, then the final net cost may be less than stated.

APG Response: Although there may be resale value or equipment that could be reused this is not usually considered in this type of cost estimate. The cost estimates are conducted for comparing one alternative against another. Resale or reuse of equipment is usually not known at this time and not considered in the cost estimate. However, equipment is reused where possible.

Comment 13: Since alternative 2 has a much shorter period for accomplishment, its "short-term effect" should be rated higher than the other alternatives and should be shown as meeting the criterion.

APG Response: Alternative 2 is rated higher than the other alternatives for "short-term effectiveness." This is reflected in this ROD.

#### WRITTEN COMMENTS FROM BALTIMORE COUNTY RESIDENT

Comment 14: APG received the following written comments and questions from a nearby resident. a) The July 1996 fact sheet summarized field work at the Carroll Island site and listed the number of groundwater, surface water, sediment and soil samples taken. However, the fact sheet did not present the actual results of those samples. I would like to review the results of those samples and the locations of where those samples were taken. The fact sheet also stated that analysis showed that past activities have had minimal impact. Please define minimal impact.

APG Response: APG makes available for public review all documents and reports which are part of its decision making process of the cleanup program. The documents are available for public review at the four information repositories listed in section 3.2. The Baltimore County repository is at the Baltimore County Department of Environmental Protection, 401 Bosley Avenue, Room 416, Towson, MD, 21204, (410) 887-2762.

The results of the sampling conducted at Carroll Island are contained in the First, Second, and Third Quarter Technical Memorandums for Carroll Island. A risk assessment is being conducted based on the data gathered in the Remedial Investigation for human health and the environment. There were no risks or impacts to human health from the disposal pits or any other sites at Carroll Island. There were risks to earthworms from some metals found in the sediment. However, at this time, it has not been determined whether the metals are naturally occurring or related to activities that occurred at Carroll Island.

b) Alternative 2 appears to be the best cleanup alternative listed in the fact sheet. Are these the only alternatives?

APG Response: Other technologies were considered in the focused feasibility study which was conducted to determine how to cleanup the site. Other technologies were screened out before they were formulated as alternatives based on implementability, feasibility and cost. Three excavation alternatives were chosen as possible remediation alternatives and presented to the public.

c) I am concern about possible future impacts on the environment. Is there a contingency plan for future chemical substance contamination caused by shoreline erosion and flooding?

APG Response: Yes, a feasibility study is being conducted to address the remainder of the Island. Shoreline erosion and flooding is a problem a Carroll Island and this study will determine how to reduce or eliminate any negative impacts.

d) What about unexploded ordnance. I want to know what has already been planned or how long it will take to plan something.

APG Response: UXO support will be provided by trained specialists. UXO support is required prior to and during excavation to facilitate the location and removal of UXO if encountered. A UXO sweep is performed every two feet to detect any buried UXO. If metallic objects are detected, they are unearthed by hand. If the metallic object is UXO it is inspected to determine the type of munition and whether it is intact. If the UXO is not safe for transport, or storage, it may be detonated on-site.

e) Where are the disposal facilities? What are the plans for eventual disposal?

APG Response: The material has not been classified as hazardous yet. When the disposal pits are excavated the waste will be inspected and sampled to determine if it is hazardous. The 5% to 30% hazardous waste was based on knowledge gained from the excavation of disposal pits at other sites. This was also an assumption that was made for comparable cost estimating purposes. There may actually be more or less hazardous waste present in the pits.

g) Do you have an emergency preparedness program in place? If there is some type of plan, I am not aware of it. When will this information be disseminated to the community?

APG Response: Both APG and the counties surrounding it have comprehensive emergency plans in place to cover any type of hazard-from weather emergencies to a chemical incident at APG or on the highway or railroad. The Baltimore County Office of Emergency Preparedness in Towson is responsible for the plan which covers the off-post community near Carroll Island. The phone number for this office is 887-5996. County plans are coordinated with the Maryland Emergency Management Agency and the Federal Emergency Management Agency.

Before APG begins field work or a remedial action, it prepares all necessary health and safety plans. These plans ensure the protection of workers and the surrounding community. Preparing these plans are part of the next step in the cleanup process. APG will work with Baltimore County and interested citizens in developing appropriate plans for this project and in communicating the plans to the public.

#### 4. REFERENCES

- Aberdeen Proving Ground (APG), 1996. Proposed Plan for Operable Unit A, Carroll Island, Aberdeen Proving Ground, Maryland, July 1996.
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- APG, 1994. The Remediation of Carroll Island Lower Island Disposal Site, Aberdeen Assessment Report, Edgewood Area, Aberdeen Proving Ground, Maryland, Report No. 39-26-0490-90.
- U.S. Army Toxic and Hazardous Materials Agency (USATHAMA), 1983. Environmental Survey of the Edgewood Area of Aberdeen Proving Ground, Maryland, Report No. DRXTH-AS-FR-82185.
- U.S. Environmental Protection Agency (USEPA), 1985. "Amendment to National Oil and Hazardous Substances Contingency Plan; the National Priorities List, "Federal Register, Proposed Rule, 40 CFR Part 300, Vol. 50, No. 69, April 10, 1985.
- USGS, 1991. Hydrogeologic Data Report for Carroll Island, Aberdeen Proving Ground, Maryland, Open File Report 89-388, 1991.