MILITARY BATTERY DEBRIS REMOVAL AND DISPOSAL AFTER ACTION REPORT:

PLUM ISLAND ANIMAL DISEASE CENTER
SUFFOLK COUNTY, NEW YORK

Contract No. 53-3K06-4-0300

FINAL

Prepared for:
U.S. Department of Homeland Security
Science and Technology Directorate
Office of Research and Development
Plum Island Animal Disease Center
Plum Island, New York

Prepared by:
BMT Entech, Inc.
7918 Jones Branch Drive, Suite 500
McLean, Virginia

April 2004
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<td>Agricultural Research Service</td>
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<td>BMT Entech, Inc.</td>
<td>Entech</td>
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<td>CERCLA</td>
<td>Comprehensive Environmental Response, Compensation, and Liability Act</td>
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<tr>
<td>COTR</td>
<td>Contracting Officer’s Technical Representative</td>
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<td>Department of Homeland Security</td>
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<td>HASP</td>
<td>Health and Safety Plan</td>
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<td>NFA</td>
<td>No Further Action</td>
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<tr>
<td>NYSDEC</td>
<td>New York State Department of Environmental Conservation</td>
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<tr>
<td>PAH</td>
<td>Polycyclic Aromatic Hydrocarbons</td>
</tr>
<tr>
<td>PA/SI</td>
<td>Preliminary Assessment/Site Inspection</td>
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<td>PIADC</td>
<td>Plum Island Animal Disease Center</td>
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<tr>
<td>PID</td>
<td>Photo Ionization Detector</td>
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<td>PPE</td>
<td>Personal Protective Equipment</td>
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<td>SCDHS</td>
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<td>USDA</td>
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1. INTRODUCTION

This After-Action Report: Military Battery Debris Removal and Disposal (hereinafter referred to as the After-Action Report or Report) is submitted by BMT Entech, Incorporated (Entech), in partial fulfillment of the requirements of Contract No. 53-3K06-4-0300. This After-Action Report pertains to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) investigations of the Plum Island Animal Disease Center (PIADC), Plum Island, Suffolk County, New York. The facility is presently owned and operated by the United States Department of Homeland Security (DHS), the successor to the United States Department of Agriculture - Agricultural Research Service (USDA-ARS) for responsibility of Plum Island.

1.1 Military Battery Background

The activities addressed in this Report comprise part of a larger CERCLA program to investigate and, where necessary, remediate sites that have historically been used to store or dispose of hazardous substances and other solid wastes. A total of 49 individual sites on this 840-acre island have been investigated under PIADC’s CERCLA Program. Preliminary Assessment/Site Inspection (PA/SI) activities undertaken at PIADC by Entech in 1999 led to the development of a comprehensive baseline report (the PIADC CERCLA Program Report) that documents the historical use, site reconnaissance findings, media sampling and analysis results, and regulatory status of each of the 49 sites. Fifteen of the sites have currently been designated No Further Action (NFA). The remaining 34 sites require further consideration, investigation, or remediation before being granted NFA status. The 11 former military fortifications (Batteries) addressed in this Report represent a subset of those 34 remaining sites.

The Batteries are grouped separately from the other active CERCLA sites based partly on the contaminants they contain and their historical use. “Baseline” analytical data from 1999 indicate that elevated polycyclic aromatic hydrocarbons (PAHs), pesticides, and metals are present in the sediments within many of the Battery drainage structures, manholes, and possibly gun emplacements. These contaminants, at least in part, are thought to be associated with historical USDA-ARS activities conducted within these former military fortifications.

Many of the former military fortifications found on Plum Island were used in the initial decades of PIADC’s operation as animal holding facilities. Various species of animals used in veterinary diagnostic research were reared and/or held in these fortifications for a period of days, weeks, or months until needed in the biocontainment laboratories. Although various chemicals and other surplus materials later came to be stored and eventually abandoned in the Batteries, the long-time use of these structures for animal maintenance activities is the most likely cause of the elevated pesticide residue detections around these
former fortifications. The sources of other elevated contaminants in battery sediments, such as heavy metals and PAHs, are much less certain.

This Report documents the field activities that were undertaken over the coarse of this removal action. This action was a necessary precursor step designed to support a second, more significant removal program that will address contaminated sediments and soils in and around the Battery drainage systems. In order to adequately and efficiently perform the drainage system removal action, a significant amount of debris (e.g. animal cages, abandoned construction materials, and demolition debris) found in the Batteries needed to be removed. These waste materials were removed from the following Military Batteries: Bradford, Dalliba, Dimick, Eldridge, Floyd, Greble, Kelly, Steele, Stoneman, Bomb-Proof Switch Room, and Battery 217.

1.2 Work Plan Development

In order to accomplish the goal of removing the debris that had accumulated within the former military fortifications during the past 50 years of USDA-ARS occupation, a Work Plan was developed to direct the actions of the Entech removal team. Prior field reconnaissance and environmental media sampling investigations conducted over the course of the larger, ongoing PIADC CERCLA Program resulted in a substantial body of physical, chemical, and spatial information regarding the Batteries. This information, supplemented by Entech’s general knowledge of these fortifications, provided the basis for creating the detailed plan for undertaking this removal activity. The Plan (or “Junk Plan” as it was commonly referred to) was created in October 2003 and provided a Battery-by-Battery assessment of the physical layout and hazard constraints for each of the named fortifications. Additionally, the plan also summarized the types of debris items found within the multiple rooms that comprise each of these largely subterranean, reinforced concrete structures. Special attention was paid, and overt warnings were made in the Plan’s text, to particularly dangerous conditions (e.g, slip, trip, and fall hazards) or known chemical hazards (e.g, pesticide residues) known to be present in the several Batteries. A graphical presentation of this information was also provided in each Battery discussion. Hazard warnings and debris placement information was graphically conveyed using detailed line drawings of the “floor plans” for each fortification.

In addition to the Battery-specific information provided in the Plan, general information regarding the implementation and general performance expectations of the project was also presented for field team member’s use. Information regarding appropriate health and safety measures to observe during the removal program and on- and off-island emergency contact information was present in the initial chapters of the Plan. Additionally, directions regarding how to manage various wastes and potentially recyclable materials generated by this action were also discussed. Taken together, the elements of the Plan were
designed to provide stand alone direction for successfully completing the field aspects of this project.

1.3 Health and Safety

Protection of the general safety and health of removal personnel was the principle concern and primary consideration of Entech’s Field Operations Manager (and each Entech participant) during this project. During the course of the two separate field events required to complete this removal action, no injuries or ill health effects were experienced by the team members engaged in this work. This safety record is due, in large part, to the use of common sense by team members and the donning of appropriate Personal Protective Equipment (PPE). A hard hat was worn at all times when crew members were in the immediate vicinity of deteriorating Battery structures. Extreme care was also taken around buildings with evidence of spalling concrete surfaces. Such hazards are particularly common along high retaining walls and other building surfaces that are present in and around the several Batteries. During removal operations, respiratory protection was necessary to protect against airborne particulates. Dust was a major respiratory concern and safety impediment (reduced visibility) during this action. Additionally, operations involving the collection and safe removal of Malathion and muriatic acid wastes required increased respiratory protection, and in the case of the corrosive acids, chemical protective suits, boots, and gloves. Periodic Photo Ionization Detector (PID) readings were also taken in the work space as an added safety precaution against contact with volatile contaminants. Because of the rough, sharp, and physically hazardous nature of the debris present in the Batteries, heavy gloves and eye protection were worn by all personnel at all times.

1.4 Removal Operations

This section provides a brief overview of the removal and disposal operations that took place during the two field events required to complete this project. Entech initially began clean-out operations on December 8, 2003 and concluded its first round of field activities on December 16, 2003. A subsequent 10-day field program was undertaken in February 2004 (February 2nd through the 11th) to complete all remaining removal activities. All waste materials removed from the fortification were transported off-island for disposal or, in cases where substantial metallic objects were encountered, to off-site recycling facilities. All materials were transported via dumpster-like containers (commonly referred to as “roll-offs” or “boxes”) provided by Entech’s transport and disposal subcontractor, North Fork Sanitation.

As shown in Figure 1, the 10 former military fortifications present at PIADC are situated in various geographic areas of the island. Due to the varying types and quantities of materials found in the individual Batteries and their accessibility to a heavy lift, multi-axle truck, roll-off boxes were not available for placement at each fortification. Boxes were instead positioned in strategic, readily accessible location to
serve more than one Battery. For instance, during the removal process, the open area near the entrance
to Battery Stoneman was used as a staging ground for boxes used to contain wastes/recyclables from
Batteries Stoneman, Kelly, Dimick, and Bradford. The physical limitations of roll-off placement were
determined by North Fork Sanitation. On occasion, partially filled boxes were moved to other locations to
receive additional materials. Every effort was made to minimize the amount of debris transfer required
between the Batteries to the roll-off boxes. In some instances, debris was placed directly into a bucket of
a Bobcat skid-steer loader or into a pick-up truck for transfer to the roll-offs.

Nearly all of the debris present in the fortifications was thought to be associated with USDA-ARS’s
historical presence on the island. Entech personnel also encountered objects or structures in some
Batteries that were not original to the military function of the fortifications. Many objects/structures were
more or less permanent fixtures of those Batteries. Examples of such features include animal pens,
gates, wooden fences/walls, and machinery attached to the walls and floors of the fortifications. These
fixtures were not disassembled or destroyed during the removal and disposal process. Similarly, structural
materials such as sand and brick placed in the Batteries for re-use by USDA-ARS were not removed
during the clean-up actions.

Before removal activities commenced, it was thought that all hazardous materials historically
stockpiled/stored in the Batteries had been removed during an earlier island-wide clean-out project.
During the course of the removal action; however, a relatively small quantity of hazardous materials were
uncovered. Approximately 35 plastic carboys of muriatic acid were discovered in Battery Eldridge and 5
one-gallon cans of the pesticide Malathion were discovered in the Bomb-Proof Switch Room. The
discovery of these materials is discussed in greater detail in the individual sections pertaining to these
Batteries.

Nearly all of the materials located in the Batteries were classified as construction/demolition debris.
However, significant quantities of steel and stainless steel suitable for recycling were also present.
Whenever possible, debris and recyclable materials were segregated and packed into the roll-offs as
neatly as possible to minimize voids and wasted spaces. In addition, larger debris was size-reduced prior
to placement in the roll-off boxes. Those materials that could be recycled were managed separately and
segregated according to their composition. All disposal/recycling was conducted in appropriate off-island
facilities.

In all, nine 20-cubic yard and four 30-cubic yard roll-offs were used to contain and transport the materials
removed from the 10 former military fortifications. Of the 13 roll-offs used, three 30-cubic yard roll-offs
were used for debris and one for stainless steel. The remaining 20-cubic yard boxes were utilized for
recycling activities. Approximately, 46.75 tons of recyclable steel and 1.67 tons of stainless steel were
recycled for beneficial re-use. The monetary value of these recycled materials totaled $1,603.00. These proceeds were used as a credit with the waste hauler to defray the overall tipping fees and transportation costs associated with the project.
2. BATTERY BRADFORD

Battery Bradford, which is located on the far eastern end of the island, is constructed of reinforced concrete and is approximately 3,125 square feet in size. The Battery consists of two gun emplacements that are located on an upper level and numerous individual rooms and former explosive magazines that are situated on a lower, or base floor, level. The main entrance to the Battery (located on the southwest side of the fortification) opens to a large concrete-paved courtyard. Weeds, shrubs, and vines have grown through the deteriorated concrete of the courtyard. The southeastern gun emplacement is overgrown with vegetation (e.g., cattails). The stairs leading to the northeastern gun emplacement are covered with concrete rubble from the collapsed roof, making access difficult and dangerous. This gun emplacement is also overgrown with vegetation. No debris of note was found on the upper gun emplacement level of this Battery during the initial reconnaissance phase of this action. Entech personnel did not access this upper level during the subsequent renewal phase because of this lack of debris and, most importantly, because of safety reasons.

2.1 Removal and Disposal Activities

Entech personnel mobilized to Battery Bradford on December 12, 2003. Removal and disposal activities took approximately one day. Initial removal activities focused on the metal animal cages located in a large, centrally located interior room. In an effort to use space efficiently in roll-offs, the racks holding the cages and the cages themselves were crushed using a Bobcat skid-steer loader. In addition to the metal cages, two rooms containing knee-high deep wood debris from deteriorating wooden crates were addressed. Due to the large quantities of this deteriorating wooden debris, these materials were scooped and swept into large trash cans and buckets, loaded into pick-up trucks, and subsequently disposed in a roll-off box. Elsewhere, within the Battery, miscellaneous wooden debris (including large planks) and large blast protection doors, were removed. A large metal animal pen that was located in the front open area was cut into pieces using a portable cut-off saw and a water tank was crushed in order to more efficiently use space in the metals recycling roll-off box. A smaller water tank and feed hopper were also removed from Battery Bradford for recycling.

Due to the construction and location of Battery Bradford, roll-offs had to be centrally staged in the open lot near the entrance to Battery Stoneman. Entech personnel collected and loaded debris onto pick-up trucks for transport to the roll-offs. It is estimated that ½ of a 30-cubic yard roll-off was filled with wood and other debris and one 20-cubic yard roll-off was filled with recyclable scrap metal from this Battery. Figure 2 shows the layout of Battery Bradford and where the various types of debris were located within the former military fortification.
Battery Bradford

Hallway leading to wooden crates.

Metal cages and racks located inside room off of front courtyard.
Battery Bradford

Wooden crates located inside room off of the front courtyard.

Metal shelved moved into front courtyard waiting to be cut-up.
Unloading metal scrap from Battery Bradford into roll-off box staged near entrance to Battery Stoneman.

Post-removal condition of the animal cage storage room.
Post-removal condition of one of two wooden crate storage rooms.

Post-removal condition of wooden crate storage area.
Battery Bradford

Area where iron doors and heavy metal machinery were located.

Front courtyard after the removal and disposal activities have been completed.
3. BATTERY DALLIBA

Battery James Dalliba, a single-story structure located on the far east end of Plum Island, is approximately 1,850 square feet in size and is constructed of reinforced concrete. The front and sides of the Battery are at grade; the rear and roof of the structure are concealed by an earthen embankment. The Battery itself is comprised of a central magazine with a gun emplacement on either side. Both gun emplacements are completely overgrown with vegetation. The interior of the central magazine is divided into three rooms, each accessed from its own entrance located at the front of the structure. The floors throughout the Battery are concrete.

3.1 Removal and Disposal Activities

Removal and disposal activities began at Battery Dalliba on December 12, 2003. As shown in Figure 3, the three rooms in Battery Dalliba each housed large quantities of materials most of which were recyclable. The far western magazine room contained pipe fittings and valves of various sizes. The heavier fittings and valves were removed using a Bobcat skid-steer loader. The smaller fittings and valves were hauled away in four pick-up truck loads. The eastern magazine room also contained pipe fittings and valves in addition to a large spool of copper wire. Another large empty wire spool was also found in this chamber. A large quantity of ceramic electrical insulators was also located in the eastern magazine room. The eastern and central magazine rooms both had various unidentifiable machinery and other metal scrap. These rooms also contained large motors, pumps, and other equipment that were removed with the Bobcat skid-steer loader. Some of the larger metal pieces were subsequently size-reduced using a portable cut-off saw.

Due to the location and construction of the Battery, roll-offs could not be placed at the Battery. Roll-off boxes were placed at both Battery 217 and at the open area near the entrance to Battery Stoneman. Due to the large quantities and weight of the metal debris present in this fortification, recyclable metal items were distributed among two roll-off boxes. In addition, the large spool of cooper wire was given to PIADC’s Operations and Maintenance office to be recycled with other cooper wire waste being marshaled near the PIADC motor pool (Building 38).
Battery Dalliba

Example of ceramic insulators located in eastern magazine room.

Various metal equipment located in central magazine room.
Pipe valves, flanges, and other fittings located in eastern magazine room.

Pipe valves, flanges, and other fittings located in western magazine room.
Battery Dalliba

Pipe valves, flanges, and fittings located in western magazine room.

Western magazine room after removal process.
Battery Dalliba

Central magazine room after the removal process.

Eastern magazine room after the removal process.
4. BATTERY DIMICK

Battery Justin Dimick, a two-story structure located on the far eastern portion of the island, is approximately 1,100 square feet in size and constructed of reinforced concrete. The front and sides of the Battery are at grade; the rear and roof of the structure are concealed by an earthen embankment. The Battery itself is comprised of a central magazine with a gun emplacement on either side.

The interior of the central magazine is divided into seven rooms on the first level and a single room on the second floor. The second floor room is accessed by two sets of stairs located on the front exterior of the Battery. Due to the potential structural instability of the Battery, the Entech field crew did not access the second floor. The floors throughout the Battery are concrete.

4.1 Removal and Disposal Activities

Removal activities at Battery Dimick commenced on December 11, 2003. This Battery contained only a small amount of scattered debris comprised of scrap metal, wood, wire fencing, a feed hopper, and wooden crates. Figure 4 shows the general distribution of the debris within the former fortification. The abandoned materials observed within Battery Dimick were consistent with the building’s former use as a small animal breeding facility. A large metal gate was also removed from the Battery with the help of the Bobcat skid-steer loader. Additionally, numerous rusted iron doors that had fallen off their hinges were removed from the hallway that runs behind the Battery. A few iron doors were left behind as they were still partially attached to the walls. Also, debris located in a room that historically was used to store pesticides like Malathion was not recovered during the field activities. The obvious smell of pesticides in this room suggested that contamination incompatible with the “non-hazardous” status of the debris being collected during this project was present among the items found within this particular room. These presumably pesticide contaminated materials (including floor sweepings) will be collected during the subsequent soil and sediment removal program that is scheduled to be undertaken after this debris removal project is completed.

Due to the location of this Battery, all recoverable debris was loaded into the Bobcat skid-steer loader or a pick-up truck for subsequent transfer to waste roll-off boxes staged near the entrance to Battery Stoneman. It is estimated that ¼ of a 20-cubic yard roll-off box was filled with recyclable metal scrap that included the blast doors and other unidentifiable metal objects. One truckload of wood and other debris designated for disposal was removed from Battery Dimick.
Battery Dimick

Side room near southern gun emplacement.

Disposing of recyclable metal debris from Battery Dimick.
Side room after removal activities.

Area with trash can and doors
Entrance to back hallway that contained iron doors.
5. BATTERY ELDRIDGE

Battery Eldridge, a single-story structure located on the southwestern coast of Plum Island, is approximately 1,850 square feet in size and constructed of reinforced concrete. The front and sides of the Battery are at grade; the rear and roof of the structure are concealed by an earthen embankment. The Battery itself is comprised of a central magazine with a gun emplacement on either side. Both gun emplacements are completely overgrown with vegetation. The grounds surrounding the exterior of the Battery are also heavily overgrown. The interior of the central magazine is divided into three rooms, each accessed from its own entrance located at the front of the structure. The floors throughout the Battery are concrete.

5.1 Removal and Disposal Activities

The rooms at Battery Eldridge were filled with construction-type materials. As shown in Figure 5, these materials consisted of scrap metal, lumber, a wheelbarrow, metal screens, and heating/air conditioning ducting. Entech personnel mobilized to this Battery on December 8, 2003. Due to the readily accessible design of this Battery and the large quantities of recyclable metals present at the site, a roll-off designated for metal scrap was placed directly in front of this former fortification. The roll-off for non-metal debris was staged at nearby Battery Floyd. Due to the large size and surface area of the ducting, a bobcat skid-steer loader was used to crush the light sheet metal ducts into manageable and compatible sizes.

During the course of removing debris in the central room, approximately 33 containers (plastic, 4 to 5-gallon “carboy” containers) of an unknown liquid were discovered. Upon further investigation, a piece of crumbling cardboard and a label was found on one of the containers stating that the liquid present was muriatic acid. The field crew cleared away all materials that surrounded the muriatic acid to improve access to these acid-filled vessels. The field crew subsequently demobilized from Battery Eldridge until a decision regarding how and when the acid could be removed from the fortification could be made.

During the project’s second field mobilization in February 2004, Entech subcontracted with Clean Ventures to collect and dispose of the muriatic acid. Using a pump, acid was removed from each container into a plastic 55-gallon drum. Due to the type of pump being used, small amounts of muriatic acid remained in the bottom of each container. Using a giant funnel, the acid containers were upended and placed in the funnel to drain into a separate plastic 55-gallon overpack drum. Each container was left to drain for 3 to 5 minutes. After all the plastic containers were emptied, they were crushed and placed in a large 85-gallon metal drum. In addition, the cardboard scraps - each plastic carboy had originally been packaged in a cardboard box- that were either on the plastic container or on the ground and floor sweepings were placed...
in another lined 55-gallon metal drum. The total of six drums (four plastic 55-gallon drums that contained
the muriatic acid and two metal drums that contained the floor sweepings, plastic carboys, and cardboard)
were taken off the island to a licensed disposal facility.
Battery Eldridge

Northern magazine room.

Central magazine room with ducting. Muriatic acid was later found beneath this material.
Battery Eldridge

Duct crushing technique.

Example of the crushed ducting.
Muriatic acid carboys located in central magazine room (overlying ducting removal).

Muriatic acid carboys located in central magazine room.
Battery Eldridge

Draining muriatic acid out of the original plastic carboys.

The pump used to pump the acid out of the containers.
Draining muriatic acid out of the original plastic carboys.

Eight-five-gallon drum used to contain the plastic carboys.
Battery Eldridge

Loading the drums containing muriatic acid.

Post-removal view of center magazine room where the muriatic acid was located.
6. BATTERY FLOYD

Battery Floyd, a 2-story structure located on the southwestern shore of Plum Island, is approximately 1,100 square feet in size and constructed of reinforced concrete. The front and sides of the Battery are at grade; the rear and roof of the structure are concealed by an earthen embankment. The grounds surrounding the exterior of the structure are heavily overgrown with vegetation. The Battery itself is comprised of a central magazine with a gun emplacement on either side. Both gun emplacements are also overgrown with vegetation; however, a path has been cut through the vegetation to the northern emplacement. The gun pit present at this emplacement has been covered with a sheet of plywood.

The interior of the central magazine is divided into seven rooms on the first floor, and a single room on the second floor. The second floor room is accessed by two sets of stairs located on the front exterior of the Battery. The floors throughout the Battery are concrete.

6.1 Removal and Disposal Activities

The Entech field crew mobilized to Battery Floyd on December 10, 2003 and spent approximately one day removing and disposing of materials. Figure 6 shows the layout of Battery Floyd and the locations of varied materials scattered throughout the fortification. These materials included brick, wood scrap, metal scrap, ceramic bowls, empty 8-ounce glass bottles, metal animal troughs, and cages. In addition to these smaller materials, the Battery housed some larger pieces of equipment including an air handling unit, an autoclave, two large shelving units, a metal conveyor/roller, a large metal gate, and other unidentifiable pieces of metal equipment. To access many of these larger items, it was necessary to demolish one of the wooden walls that partitioned an interior room. Additionally, in order to accommodate all the material in the designated metal roll-off box, some pieces were size reduced using a portable cut-off saw.

Due to the ready accessibility of the Battery, a roll-off box designated for metals recycling was placed immediately in front of the former fortification. The proximity of this box permitted the Entech team to complete operations at Battery Floyd in a single day. In addition to the large amounts of metal scrap recovered, approximately two truck loads of debris were removed from the Battery for disposal.
Battery Floyd

Eastern magazine side.

Eastern magazine room.
Battery Floyd

Center room before removal activities.

Western magazine room.
Battery Floyd

Using the portable cut-off saw to break down large pieces of equipment.

Using the portable cut-off saw to break down large pieces of equipment.
Battery Floyd

Removing inner wooden wall in order to remove larger pieces of equipment.

Removing inner wooden wall in order to remove larger pieces of equipment.
Battery Floyd

Eastern magazine room after removal activities.
7. BATTERY GREBLE

Battery Greble, which is located on the northern shore at the far eastern end of the island, is a single-story structure approximately 1,850 square feet in size and constructed of reinforced concrete. The front and sides of the Battery are at grade; the rear and roof of the structure are concealed by an earthen embankment. The Battery itself is comprised of a central magazine with a gun emplacement on either side. Both gun emplacements are completely overgrown with vegetation. The ground surrounding the exterior of the structure is also heavily overgrown.

The interior of the central magazine is divided into three rooms, each accessed by its own entrance located at the front of the Battery. The abandoned materials observed within Battery Greble were consistent with the building’s former use as a small animal breeding facility. More recently, other non-animal rearing materials have been deposited in this fortification. The floors throughout the Battery are concrete.

7.1 Removal and Disposal Activities

Entech personnel began removal activities at Battery Greble on February 4, 2004. Removal activities were concentrated in the western and central room of the Battery (Figure 7). The eastern room and the area surrounding the outside of the Battery did not contain debris stockpiled materials. The western magazine room was filled with approximately 15 spools (some very large) of communication cable and wire, wooden racks, and scrap metal (remains of animal cages). Materials located in the central magazine included a 2-basin, stainless steel sink, wooden shelving and crates, a metal lockers, and cardboard. No recyclable materials were recovered from this Battery. The communication cable was determined to be of no value to PIADC and was therefore discarded.

Due to the difficulty of accessing Battery Greble, debris was transferred from the Battery to roll-off boxes located at the entrance to Battery Stoneman. Because of the large size and weight of some of the spools of cable a Bobcat skid-steer loader was used to move many of the spools to the disposal roll-off box.
Battery Greble

Eastern magazine room full of double-braided communication cables.

Eastern magazine room full of double-braided communication cables.
Battery Greble

Center magazine room before removal activities commenced.

Western magazine room after removal activities were completed.
Battery Greble

Center magazine room after removal activities were completed.

Eastern magazine room.
8. BATTERY KELLY

Battery Kelly, which is located on the far eastern end of the island, consists of two small subsurface fortifications. Kelly No. 1 is the easternmost of the two structures. Both Kelly Nos. 1 and 2 are constructed of reinforced concrete with entrance stairs that provide access to two subsurface rooms. The floors of the rooms are concrete. Both Kelly Nos. 1 and 2 are equipped with a second set of stairs that lead from the subsurface rooms to a single gun emplacement. Those stairs that lead to the gun emplacements are completely covered with soil, vegetation, vines, and trees. The gun emplacements are filled with soil and gravel and overgrown with vegetation.

8.1 Removal and Disposal Activities

Entech personnel mobilized to Battery Kelly in December 11, 2003. Figure 8 shows the layout of Battery Kelly and the distribution of debris. A small amount of wood debris was identified at Kelly No. 1 and removed. At Kelly No. 2, a large quantity of metal rods (rebar) was discovered half buried in one of the rooms. Additionally, wood debris, that included large planks, were scattered throughout Kelly No. 2. A few bags of hardened concrete were also discovered in the fortification. In order to move the concrete, it was necessary to smash it into manageable pieces. One of the Kelly No. 2 rooms contained 2 wooden boxes, one empty and one full of nuts and bolts. Nuts and bolts were also scattered throughout the room and were collected using shovels. Due to the location and limited access to Battery Kelly, the roll-off boxes designated to receive wastes from this Battery were placed in the open area near the entrance to Battery Stoneman. Approximately 2 pick-up truck loads of material was removed from the Kelly fortification.
Battery Kelly

Area in Kelly No.1 where wood debris was removed.

Room in Kelly No. 2 with concrete, nuts and bolts, and miscellaneous wood debris.
Battery Kelly

Room in Kelly No.2 with rebar pile and miscellaneous wood debris.
9. BATTERY STEELE

Battery Steele, which is located in the central “neck” portion of Plum Island, is an extremely large, multi-level Battery constructed of reinforced concrete. The sides and rear of the structure are covered by earthen material. The Battery has two gun emplacements that differ in elevation by approximately 12 feet. Numerous subterranean powder magazines, shell and shot chambers, and connecting corridors are associated with each of the two emplacements. The “courtyards” associated with the gun emplacements were historically used to corral cattle and other large livestock. Magazine (and related) rooms in the vicinity of these courtyards were likely used to house animals as well. The advancing physical deterioration of this Battery has resulted in a number of concrete spalling sites along the high walls of the “courtyards” and passageways within the fortification.

9.1 Removal and Disposal Activities

Battery Steele contained a limited amount of debris, but a substantial quantity of recyclable stainless steel in the form of animal cages. Figure 9 shows the layout of the Battery and the location of the debris and cages found throughout the fortification. The cages were primarily concentrated in a single magazine room located off the lower courtyard of the Battery. The quantity of the stainless steel cages present in this room was enough to fill one 30-cubic yard roll-off box. The racks that held the cages were not stainless steel and therefore could not be recycled with the cages. The racks were instead crushed and then placed in a roll-off designated for general metal scrap. The bulk of the remaining debris found in the Battery consisted of hay bales that were left over from prior animal management activities. The hay was removed from the Battery and spread in two open-air locations around the Battery. The organic material posed no environmental hazard and will deteriorate rapidly with exposure to the elements. Remaining wood and metal debris scattered about the fortification (approximately 3 pickup loads) were transferred to appropriate recyclable or debris designated roll-off boxes.

Due to accessibility limitations, roll-off boxes were placed in an open area adjacent to Building 94 and adjacent to the access road that leads to Battery Steele. Material was removed from the Battery, loaded in pick-up trucks and then unloaded at the roll-off boxes. It took approximately four pick-up truck loads to haul the crushed cages and three loads for the remaining miscellaneous wood and metal debris that was scattered in the various rooms throughout the Battery. Numerous trips were required to transfer the stainless steel cages.
Battery Steele

Spalling concrete in lower courtyard.

Stainless steel cages located adjacent to the lower courtyard.
Stainless steel cages and racks located adjacent to the lower courtyard.

Hay bales adjacent to lower courtyard.
Battery Steele

Hay bales adjacent to upper courtyard.

Technique used to crush cage racks.
Battery Steele

One of many truckloads of crushed racks.

Stacking stainless steel cages in roll-off box.
Battery Steele

Removing debris from large room located off of the lower courtyard.

Room that formerly held the stainless steel cages.
Battery Steele

Corridor adjacent to upper courtyard post removal activities.

Road leading to upper level where the hay bales were separated and then spread.
Battery Steele

Large room adjacent to lower courtyard after the removal process.

Lower courtyard corridor subsequent to hay bale removal.
Battery Steele

Empty room after the removal process.

Empty room after the removal process.
10. BATTERY STONEMAN

Battery Stoneman, which is located in the center of the eastern end of the island, is a large, below-grade structure that is accessible via an approximately 50-foot long tunnel. The single-story structure is constructed of reinforced concrete and is comprised of numerous subterranean structural elements and two large courtyards that historically served as “mortar pits”. All floors within the structure are concrete. The interior structural elements of Battery Stoneman are divided into three main units separated by the two courtyards. Each of these units are further divided into numerous rooms.

10.1 Removal and Disposal Activities

Entech personnel mobilized to Battery Stoneman on December 8, 2003. The removal process took approximately 2 ½ days. The most significant volume of material removed from Battery Stoneman was a type of non-asbestos containing insulation board that had been stockpiled in two separate areas within the fortification (see Figure 10). This deteriorating material filled approximately 1 ½, 30-cubic yard roll-off boxes. In addition to the insulation board, there were a large number of tar paper rolls located in the middle section of the Battery. Miscellaneous wood and metal debris were found throughout all the rooms in the Battery, including large metal beams that were located in the front northwestern rooms. Other large pieces of metal (e.g. animal troughs and gates) were found in other scattered areas of the Battery. These items were size reduced using a portable cut-off saw.

Due to access limitations associated with Battery Stoneman, roll-off boxes could not be placed directly inside the fortification. As a result, roll-off boxes for this Battery were placed in the large open lot that is situated at the head of the brick-paved entrance ramp that leads down into the fortification. Debris and recyclable metal items were transported to the roll-off boxes primarily via pick-up trucks. Items too large or too heavy for transport via this method were hauled out of the Battery using the bobcat skid-steer loader. It is estimated that one 20 cubic-yard roll-off was filled with recyclable metal debris and 1 ½ 30 cubic-yard roll-offs were filled with the fiber board, wood debris, and other miscellaneous waste.
Battery Stoneman

West magazine room with insulation board.

Central magazine room that contains tar paper and insulation board.
Battery Stoneman

East magazine room with animal chute.

Loading insulation board onto pick-up truck.
Battery Stoneman

Post-removal view of west magazine room where insulation board had been stored.

Post-removal view of central magazine where insulation board and tar paper had been stored.
Battery Stoneman

Example of typical chamber after debris removal
11. **BOMB-PROOF SWITCH ROOM**

The Bomb-Proof Switch Room (BSR), which is located in the central “neck” portion of the island, is approximately 480 square feet in size and is constructed of reinforced concrete. The rectangular-shaped structure is built into a hillside (manmade) and covered with earth on three sides. The fourth side of the structure is at grade and contains the building’s only entrance. In order to ensure that the Switchboard Room was blast proof, the building was constructed with both an inner and outer structure. The outer structure has 8-foot-thick concrete walls; the inner communication building (Switchboard Room) is constructed inside this concrete bunker. The interior of the Switchboard Room is divided into three rooms.

11.1 **Removal and Disposal Activities**

Entech personnel mobilized to the BSR on February 3, 2004. Outside the entrance to the BSR was a large, jumbled pile of wood and metal debris. Removal activities inside the BSR could not commence until the large exterior pile blocking the entrance had been removed. Figure 11 shows the layout of the BSR and the location of debris.

The interior of the BSR was found to contain burlap bags, wooden stakes, bales of barbed wire, wood and metal scrap, cardboard, and pipe. During the removal of the burlap bags and wooden stakes, five 1-gallon cans labeled Malathion were discovered. Four of the five cans were empty and deteriorating. One can still contained approximately half a gallon of Malathion. The burlap and wooden stakes that had been in direct contact or in close proximity to this pesticide were segregated from the other “clean” burlap and wooden stakes. The pesticide tainted materials were placed in a 55-gallon drum. The 1-gallon can that contained the Malathion product was placed in a separate 5-gallon plastic bucket and surrounded with kitty litter. A subsequent inspection of the floor where the pesticide cans had been observed was found to be made of concrete. The floor did not appear to be cracked, nor did it exhibit any visual evidence or residual pesticide contamination; however, a strong pesticide odor was still present in the Battery days after the Malathion cans and burlap were removed from the site.

The removal process at the BSR took place over two days. There was a small break in the removal activities after the discovery of the Malathion. This break was necessary in order to obtain the appropriate PPE for the removal of the pesticide-contaminated materials. Due to the remote location of the BSR and the poor condition of the access road leading to the former military structure, the roll-off boxes were placed in an open area along the main road, across from the BSR access lane. Entech personnel used pick-up trucks and a Bobcat skid steer loader to haul materials from the BSR to the roll-offs. The drum containing the Malathion-tainted wastes were removed from the island and taken to a licensed off-site facility for disposal.
Bomb-Proof Switch Room

Malathion cans located under burlap bags and wooden stakes.

Malathion cans located under burlap bags and wooden stakes.
Malathion cans located under burlap bags and wooden stakes.

Burlap bags and wooden stakes removed from front room.
Bomb-Proof Switch Room

Post-removal view of area where Malathion cans were located.

Post removal view of “back room”.
Bomb-Proof Switch Room

Post removal view of “back room”.

Post-removal view of BSR “front room”.

Bomb-Proof Switch Room

Post-removal view of the BSR after the removal of the exterior debris pile.
12. BATTERY 217

Battery 217, located on the far east end of the island, is a single-story structure approximately 8,050 square feet in size. The Battery is at grade, but completely covered on all sides by earth and vegetation. Two exposed gun emplacements are located on either side of the fortification. The Battery is readily accessible from the southern and western sides of the structure. The interior of Battery 217 is divided into approximately 20 rooms. The floors throughout the fortification are concrete; however, an exposed floor pipe chase is present in the main north/south corridor.

12.1 Removal and Disposal Activities

Removal activities at Battery 217 took place over the course of the two field events that were needed to complete this project. Figure 12 shows the layout of Battery 217 and the distribution of debris scattered throughout the fortification. During the first field event in December 2003, removal activities focused on the debris located near the western entrance to the Battery. The debris in the corridor and rooms located in the vicinity of this entrance consisted of radiators, porcelain sinks and toilets, metal sinks, miscellaneous wood scraps, and other metal debris. Due to the weight of the radiators, dollies were used to move the radiators out of the building. The radiators were then loaded onto the Bobcat skid-steer loader which disposed of them in a metals recycling roll-off box set up outside the fortification’s southern door. Non-metallic debris was loaded on a truck and hauled to a debris roll-off box staged near the entrance to Battery Stoneman. Due to inclement weather, Entech personnel were not able to complete all removal and disposal activities at Battery 217 during the first field event.

During the second field event conducted in early February 2004, removal activities focused on the main north/south oriented corridor that runs the length of the Battery (see Figure 12). During this mobilization, it was not possible to stage roll-off boxes at the entrance to the Battery. Instead, two boxes were placed along the security patrol road that passes Battery 217. To minimize the number of times materials were handled, planks were placed on the pipe chases located in the corridor floor to allow the Bobcat skid-steer loader to drive the length of the north/south corridor. The field crew would load the bucket of the skid-steer loader so that it could be driven directly to a roll-off box. Materials removed from this corridor and adjoining rooms consisted of unusual metal framed mortar-filled panels, large metal boiler parts, radiators, porcelain sinks and toilets, metal sinks, iron doors, a large laboratory sink, large wooden crates, animal troughs and cages, and scattered metal and wooden debris. In addition, hay bales were discovered in one of the back rooms of the fortification. Since the hay did not pose an environmental concern, the bales were broken and spread in the open areas to allow the hay to decompose naturally.
It should be noted that during the removal of debris from rooms located by the western entrance, a large quantity of brittle, mason board tiles were discovered. The tiles appeared to have a fibrous material imbedded in the tile matrix. The fibrous material was suspected to asbestos so the tiles were left in place until confirmation of their asbestos content, if any, could be determined.
Battery 217

Southern entrance with radiators, boiler parts, and mortar-filled panels.

North/south corridor looking north.
Battery 217

North/south corridor looking south.

Removing radiators from the western entrance.
Battery 217

Removing radiators from the western entrance.

Northern entrance after removal activities.
Battery 217

Southern entrance after removal activities.

North/south corridor looking north.
Battery 217

Room near the western entrance after removal activities.

Room near the western entrance with possible asbestos tiles scattered on the floor.
Room located along north/south corridor after removal activities.
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**Please detach and return with your payment.**

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**Attn.: Steve Baker**

Mclean, VA 22102

7918 Jones Branch Dr., Suite 500

BMT Enotech

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INVOICE/STATEMENT

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Cutchogue, NY 11935
P.O. Box 985

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- **NOTES**
  - 30 days past due on balance outstanding more than 90 days.
  - 11% late charge due on balances outstanding more than 90 days.

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**Contact Information**

- **Attn:** Steve Baker
- **McLean, VA 22102**
- **7198 Jones Branch Dr., Suite 500**
- **BMT ENTECH**

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**Thank You**

- 30 days from date of invoice (11% per annum)

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**Invoices/Statements**

- North Fork Sanitation Inc.