

Fort Stewart/Hunter Army Airfield

Army nomination for Environmental Restoration - Installation

Introduction

Fort Stewart/Hunter Army Airfield (FS/HAAF) is home to the 3rd Infantry Division and also services many diverse units. Fort Stewart occupies a contiguous land area in southeast Georgia of 79,270 acres (approximately 39 miles across from east to west and 19 miles from north to south) making it the largest, most effective, and efficient armor training base in the Eastern United States.

Hunter Army Airfield (HAAF) covers almost 5,370 acres in Chatham County, on the southwest side of Savannah. HAAF is home to the Army's longest runway on the east coast (11,375 feet) and the Truscott Air Deployment Terminal. From the airfield, Soldiers from the 3rd Infantry Division's Immediate Ready Company can deploy within 22 hours, and the brigade combat team within 72 hours, to any area of operation around the globe. FS/HAAF fused together is the Army's premier training and power projection platform on the Atlantic Coast. Combined assets allow rapid and effective deployment, which sustain forces from multiple dispersed locations to respond to crises, contribute to deterrence and enhance regional stability.

Recent population assessment denoted the combined current population of FS/HAAF to consist of 26,570 military tenants and 8,664 Civilians. Soldiers, Civilians, Retirees and Family Members make up the FS/HAAF community. With populations on both posts projected to increase, FS/HAAF is constantly striving to meet the many challenges of sustaining the installation's military mission to train and deploy combat-ready Soldiers. Restoration and preservation of training lands for future generations are critical elements in sustaining the military mission.

Geomorphologic conditions exist in this region such as porous sub-surface medium and scattered clay lenses coupled with a high water table. Additionally, natural environmental conditions such as wetlands, flood plains, and threatened and endangered species present challenges to environmental restoration.


Background

Past and current military activities present complex restoration challenges. Fort Stewart was formed in June 1940 when Congress authorized funding for the purchase of property in coastal Georgia to build an anti-aircraft artillery training center. It would be located just outside of Hinesville, Ga., some 40 miles southwest of Savannah. On July 1, 1940, the first 5,000 acres were bought and subsequent purchases soon followed, ultimately forming a reservation that stretched over five counties. The large expanse of property was required for the firing ranges and impact areas which an anti-aircraft artillery training center would need for live-fire training.

HAAF began as the Savannah Municipal Airport in 1929. The U.S. Army Air Corps leased the property from the city of Savannah in 1940. After World War II, the airport was transferred back to the city, then to the Air Force and ultimately to the U.S. Army. Although the installations are not on the National Priority List, there are two sites listed on the state's hazardous site inventory, as well as numerous sites in various stages of investigation and remediation, which must be managed by a limited staff.

The majority of Installation Restoration Program (IRP) sites on FS/HAAF needed cleanup due to motor pool fueling operations. Fuel tanker purging operations during Desert Storm and fire training activities prior to 1992 also required similar restoration. The installation initially identified 127 IRP sites on FS/HAAF lands. After intense scrutiny to accelerate investigations and implement corrective actions, the installation now has only 16 remaining sites.

The FS/HAAF Directorate of Public Works (DPW) Environmental Division leverages its diversely experienced personnel to assess environmental problems. The division's management style enables the organization to explore and select the most effective strategies and engage regulatory agencies, key stakeholders and community partners early in the restoration design process.



On this page: U.S. Soldiers from 3rd Combat Aviation Brigade transport Soldiers from Fort Stewart, Ga., to Camp Blanding, Fl., in support of Sudden Response training exercise.

Photo credit: TSgt. Dennis J. Henry., Jr.

JUDGING CRITERIA



Program Management



Orientation to Mission



Technical Merit



Transferability



Stakeholder Interaction

These symbols are used throughout this document to identify narrative that relates to key criteria.

Background (continued)

The FS/HAAF overall management approach is decentralized, allowing restoration personnel to be responsible and accountable for their assigned projects from conception to completion. Successful completion of each project is a collaborative effort of various installation personnel.



The Environmental Division at FS/HAAF developed cleanup partnerships with their local, state and federal colleagues, by complying with regulations, statutes and Executive Orders governing the cleanup program. The intent is to be diligent and timely with all restoration activities to ensure any substantial and imminent threat to human health, public safety and the environment will be resolved expeditiously.

FS/HAAF formed an alliance with the Environmental Protection Agency Region IV (EPA) and the Georgia Environmental Protection Division (GA EPD) through participation in quarterly Tier I and II meetings. The Tier I meetings are coordinated directly with GA EPD to discuss changing technologies and possible implementation of expedited remedial activities on both Installations. Tier II meetings include EPA, GA EPD, Army, Navy, Air Force, Marines, Army Environmental Command and Army Corps of Engineers representatives. These meetings provide a brief summary of cleanup activities implemented, discuss any particular impasses that may be taking place on various Department of Defense installations and collaborate on solutions.



Each year, prior to preparing the environmental restoration Installation Action Plan (IAP), FS/HAAF restoration personnel meet individually with GA EPD regulatory officials and project managers for Resources Conservation and Recovery Act (RCRA), Underground Storage

Tank (UST) Management, and Hazardous Site Response Act (HSRA), to review site conditions and discuss site-specific concerns, potential monitoring, and remedial action alternatives and requirements. Gaining regulatory buy-in prior to submitting corrective action plans and addendums assists in prioritizing activities.

After a FY 2009 command inspection, the U.S. Army Installation Management Command commended FS/HAAF for their exceptional efforts and success in developing strong partnerships with the local communities, municipalities, civic and environmental organizations.

FS/HAAF has coordinated a number of restoration agreements and plans.

Consent Order (CO)

In 1993, the GA EPD performed a RCRA inspection that indicated a number of deficiencies, which included a suspected release at a former Property Disposal Operation Yard. These deficiencies were documented in an official CO Agreement (GA4210022733), signed into effect in March 1994. The requirements of the CO were met in FY2008.

Hazardous Site Inventory (HSI)

In 1999, two HAAF installation restoration program (IRP) sites: Fire Training Area, HSI #10395, and barracks construction site, HSI #10521, were listed on the Georgia HSI, a state implementation of the Hazardous Site Response Act.

Milestone Schedules

The GA EPD requires the submittal of a milestone schedule for each IRP site/project. The installation is held to these schedules, which constitute an agreement to perform the required work in the time specified.

Installation Action Plan (IAP)

The IAP summarizes the multi-year restoration

and completion status. It has expanded since 1995 to include remediation sites other than the centrally-funded Army Environmental Restoration Program, which provides a more comprehensive overview of the entire IRP. The document also defines the annual funding requirements, discusses contaminants of concern, previously completed work and its results, lessons learned, and remaining work. The IAP is a vital management tool for the IRP and is an excellent historical synopsis of the overall program. It is available to the public.



Hazardous Waste Facility Permit No. HW-045 (Storage) - Fort Stewart

This important permit was initially issued on Aug. 14, 1987 and renewed in 2007.

Program Summary

The Environmental Division is focused on finding ways to remediate facilities and training lands while maximizing their operational potential; essentially, minimizing the impact on Soldiers and units using these areas.

Restoration Objectives:

- **Reclaim and Restore Training Lands and Other Facilities in Support of the Installation's Readiness Mission.**

FS/HAAF identified 11 transferred or transferrable ranges eligible as Military Munitions Response (MMRP) sites. Between 2007 and 2010, FS/HAAF performed site inspections to categorize actions needed on these sites. The goals of the field sampling activities were to determine if there were any munitions or explosive constituents of concern. During the phase I historical records review, 516.5 acres were identified that required field sampling. Of those, only 111.5 acres were determined to require further investigation. This action allowed 405 acres to transfer back to usable real property. These evaluations resulted in a reduction from a projected \$17 million in remedial action costs to \$4 million. During the phase II historical records review, it was determined that only 1,626 of 4,240 acres of the cantonment area required additional investigation. These investigative actions allowed 2,614 acres to transfer back to usable real property.

- **Minimize the Impact to Operations and Training Activities During Remediation.**

Corrective actions also have been taken on FS/HAAF to protect the environment. These are alternatives implemented in a manner causing minimal disruption to training and flight operations. Keeping these areas available for the Army mission is top priority. Restoration personnel work closely with Base Operations and Range Control when coordinating remediation actions in any area that will impact the mission. The Prevention and Compliance Restoration Section strives to clean up formerly contaminated sites using methodologies that are the least intrusive to operations and military training activities. The groundwater contamination under the airfield taxiway at HAAF was originally addressed using monitored natural attenuation. Through optimization, the restoration section reassessed the corrective action and incorporated enhanced bioremediation. This action will prevent impacting active military flight operations and expedite site closeout.



Accomplishments

Accelerated Environmental Cleanup

By participating in what is called a Tier I meeting, the installation has quarterly technical reviews with remediation contractors and state regulators to assess and discuss



Two 5,000 gallon USTs, installed in the 1950s, were uncovered during the pavement and building renovation for a 3rd Infantry Division tactical unit, causing a high risk of delays and potential loss of funds. Since the original thick bituminous asphalt exterior coatings were still intact, the steel shells had not deteriorated or leaked diesel or gasoline into the environment. The USTs were removed from the site with a modification to the construction contract and a clean closure action resulted with approval of a no further action required from the regulator.

remedial objectives. These meetings are designed to determine which courses of actions are working and which actions may need optimization.



Of the total 127 Environmental Restoration, Army (ER,A) eligible sites identified at Hunter Army Airfield and Fort Stewart, 105 have been cleaned up to date. Of the 16 sites remaining, 11 are response complete and five have remedial actions in progress.

The FS/HAAF DPW Environmental Division works closely with their DPW Base Master Planning Division assessing future construction projects to strategically plan and incorporate remediation projects that will reduce impacts to future military construction projects. It is the FS/HAAF DPW Environmental goal to reduce impact to the Army mission. For construction planned for FY 2010-2012, FS/HAAF DPW Environmental worked closely with the Savannah and Baltimore District Corps of Engineers to implement time critical removal actions that expedited unexploded ordnance clearance surveys for over 700 acres. By knowing in advance the areas designated for construction, FS/HAAF DPW Environmental staff can coordinate with the remedial contractors to discuss potential impacts to current remedial actions and ensure construction and remediation can be conducted congruently.



Innovative Technology Demonstration/ Validation and Implementation

Comprehensive ranges of corrective actions are taken into consideration at FS/HAAF when assessing their potential impact to the Army mission. Due to FS/HAAF's location in the Coastal Plain Province, which hydrogeologically can be relatively homogeneous, both installations have been used by several entities for validating new sub-surface techniques. These techniques have been piloted at petroleum-contaminated sites resulting in rapidly decreasing the overall area and concentration of contamination and thus reducing restoration costs. Partnering with a variety of organizations has benefited the installation by leveraging limited resources and

implementing hot-spot treatments at certain locations, as well as providing valuable information to aid in further investigative and remediation efforts at FS/HAAF and other facilities.



Product Recovery System Pilot Study.

A pilot study, which consists of combining surfactant injection and a multi-phase extraction system to recover trapped free-phase product under an active 500,000 gallon capacity aboveground storage tank was implemented in 2011. Petrosolv™ is being injected into nine injection points and then extracted with the groundwater and free product from two existing monitoring wells. The challenge for this remediation effort is it is located within an active fueling facility where daily operations must not be impacted. Fluids extracted from the wells flow through a liquid/vapor separator.

Sep-



A pilot-study tracer system was implemented to determine the feasibility of the proposed corrective action by the remediation contractor. An eosine, fluorescein, and rhodamine solution was injected into the deeper zone of a Trichloroethylene plume to trace the dispersion radius.

arated vapors are sent to the air stripper vapor discharge, while the liquid is sent to a tank. The water from the tank continues on to an oil/water separator (OWS) where oil is separated from extracted water and stored in drums for off-site disposal as free-phase product. Following the OWS, extracted water passes through an ultra-filtration system to remove any remaining surfactant and/or free product. All removed surfactant and free product is stored for off-site disposal as petroleum-impacted water. Treated water is passed through a liquid-phase granular activated carbon as a final polishing step and discharged to the HAAF wastewater treatment plant.



A pilot-scale product recovery system consisting of a combination of a surfactant called Petrosolv™ and a multi-phase extraction system was implemented to recover free-phase product from under a 500,000 gallon aboveground storage tank (AST).

Chemical Oxidation.

Groundwater remediation using chemical oxidation is a relatively new technology that has recently been adapted for use on cleanup sites. Chemical oxidation involves the use of concentrated chemical oxidants to facilitate the chemical breakdown of hydrogen compounds in the soil and groundwater. The chemical oxidation process chemically converts hazardous contaminants to non-hazardous or less toxic compounds that are more stable, less mobile, and/or inert. The oxidants react with hydrocarbons producing innocuous substances such as carbon dioxide, water and inorganic salts. The reactions are fast and generally have high treatment efficiency (e.g., >90%) for unsaturated aliphatic hydrocarbons (e.g., trichloroethylene) and aromatic hydrocarbons (e.g., benzene).



Chemical oxidation methods are fast and economical and generally do not require the installation of a costly fixed-based remediation system. Unlike biological treatments, chemical oxidation does not depend upon viable populations of micro-organisms but only on contact between the oxidant and intended contaminant. Based on the rapid effectiveness and cost, chemical oxidation was selected to be implemented at several former UST sites throughout FS/HAAF. Sodium persulfate is being injected as a pilot study to address the

residual benzene contamination in the smear zone and groundwater at this site. The sodium persulfate activation is accomplished using the naturally occurring iron in the formation, an iron additive, a dilute solution of hydrogen peroxide and heat or a high pH activator. Experience has shown that activated sodium persulfate produces a reaction that tends to be sustained over a longer timeframe. The plan for chemical oxidation treatment includes full in-situ chemical oxidation (ISCO) treatment in the elevated concentration areas at these sites.

Partnerships Addressing Environmental Restoration Issues Between DoD and Other Entities

FS/HAAF is actively engaged in numerous initiatives with the surrounding communities. One of the most recent undertakings was expediting remedial activities at an active taxiway in concurrence with a recently formed Joint Management Agreement between Fort Stewart and the city of Hinesville in Liberty County, Georgia. The Joint Management Agreement allows use of the airfield at Fort Stewart for commercial and personal aircraft in conjunction with military operations. Fort Stewart received approval of no further action required for this site in 2011.

This effort was accomplished because of the great communication and coordination with GA EPD. The strong working relationship with



During construction of a MILCON-funded project to build facilities to accommodate deployed units as they returned, unexploded ordnance was encountered. Fort Stewart's environmental staff was able to expedite a time critical removal action to survey and clear the 661-acre parcel of munitions and explosives of concern, allowing the construction to be completed on schedule.



Two USTs were removed to eliminate releases into the soil and groundwater. Due to the extensive amount of clay at this site, it was necessary to remove additional soil before a no further action approval was received from regulators. This site at Wright Army Airfield is now part of a 'Joint-use Airfield' benefiting the Army and Liberty County.

regulators allowed Fort Stewart to change the regulatory driver for this site which lowered the cost for cleanup. This site also provided the opportunity for an enhanced use lease agreement, maximizing the utility and value of this available non-excess property.

By working closely with the state regulators, the installation has received no further action required for 105 of 127 ER,A-eligible sites in which corrective actions were implemented. In 2008 the installation had one of their HAAF sites delisted off Georgia's HSI list, which is comparable to the National Priorities List.

RABs

FS/HAAF surveyed the local off-post community in FY08 and FY10 to gauge the interest in development of a Restoration Advisory Board (RAB). The local communities repeatedly conveyed a clear message: the public trusts the installation to care for public lands in a sustainable and sensitive manner that will not harm the public health or the environment. This is due in part to the installation's continual community outreach efforts and the open communication between the installation and community government leaders. A robust and mature Strategic Planning Process and in-depth evaluations supporting National Environmental Policy Act compliance and community involvement are key



contributors. The installation found regular collaboration between themselves and regulators, key stakeholders and community members, results in a well-rounded, cost-efficient, and streamlined process. Restoration personnel take into account usage of in-house resources in project planning to determine if economies may be realized by utilizing the vast experience and resources of this organization.



Opportunities for Small and Small Disadvantaged Businesses in Environmental Restoration

FS/HAAF believes that by working with small businesses you can tap into resources that help create solutions and often give quick turnaround to help solve complex problems. FS/HAAF IRP affords numerous opportunities for small businesses, either directly or through large business contracts that include provisions for using local smaller businesses (e.g., equipment rental, surveying, drilling, etc.).



In FY08 a Performance Based Acquisition (PBA) contract was awarded to a large business remediation contractor for over \$12M, of which 41 percent is sub-contracted to small businesses. Another large business, Science Applications International Corporation, sub-contracted Mid-Atlantic Environmental Equipment (a small business) to design and implement the multi-phase recovery system that was constructed in order to minimize waste disposal at one site. In an effort to expedite the UXO survey clearance conducted for over 700 acres, an Alaskan Native-owned small business, Bering Sea Environmental, LLC, was used to implement an aggressive schedule to clear the project prior to troops returning from deployment. The intricate details of what it takes to implement remedial actions on an installation could not be conducted without small businesses.

This takes place from design, through steps to clear the site before remediation can begin, and all the way to the site closeout to abandon the monitoring wells and systems. FS/HAAF also directly contracts two small businesses who are

conducting remedial actions on FS/HAAF: J2 Engineering and SES Environmental. Even these remedial contractors use small business subcontractors. A total of 38 small businesses have supported environmental restoration on FS/HAAF.

Reducing Risk to Human Health and the Environment

As with all restoration sites, contamination levels, environmental settings, and potential exposure pathways vary on FS/HAAF. To establish the selection of suitable remedies that would reduce risk to human health and the environment at each site, data was collected to identify and characterize hazards during the Remedial Investigation/ Feasibility Study phases. A "background" database employed in conjunction with fate and transport modeling conservatively evaluated potential human health and environmental implications.

Since the inception of the Restoration Agreements and Plans, FS/HAAF has worked closely with GA EPD in partnership meetings to continually re-evaluate remedies and incorporate new information and technology. FS/HAAF has eliminated or reduced immediate and potential health and environmental risks by implementing interim remedial actions, which immediately remove the source of contamination, and by improving site management and characterization techniques.

Through continual coordination with the state regulators, FS/HAAF was able to transfer the remedial criteria for FST-035, Resource Conservation Recovery Act corrective action site, to Georgia's UST Management Program. This joint effort enabled the installation to achieve cleanup at reduced remedial levels. With the approval of the reduced remedial criteria, FS/HAAF initiated an interim removal action to remove over 3,244 tons of petroleum-laden soil within the Wright Army Airfield Bulk Fuel Facility. The removal of this source area reduced the risk to human health and the environment. After this removal action FS/ HAAF received a no further action required for this site.



Green Remediation Potable water used during remediation efforts at HAAF's Bulk Fuel Facility required an estimated 54,000 gallons of water per week for four to six weeks. A pilot-scale product recovery treatment system was implemented to take petroleum-impacted water extracted from the site through a process that allowed what would otherwise have required hazardous waste disposal to be re-categorized as non-hazardous.

During the first phase of the process, liquid flows through a liquid/vapor separator. Separated vapors are sent to an air stripper vapor discharge, while the liquid is held in a tank. Water from the tank continues to the oil/water separator (OWS), where the oil is separated from the extracted water and stored for off-site disposal as free-phase product. Following the OWS, extracted water is then passed through an ultra-filtration system to remove any remaining surfactant and/or free product. The treated water is passed through liquid-phase granular activated carbon as a final polishing step. These actions allow water to be discharged safely into a storm water drain in the immediate proximity of the remediation site.



Conclusion

The installation's successful management strategies ensure that cleanup sites are prioritized by risk to human health as well as the creation of strong relationships between key stakeholders, state regulators, contractors, and neighboring communities. All of these relationships have allowed FS/HAAF to best prioritize and plan its program through the development of the coordinated annual IAP. FS/HAAF's IRP has met the Defense Environmental Restoration Program requirement to ensure remedies are in place for medium-risk as of FY11 and low-risk sites will be implemented by the end of FY14. FS/HAAF's IRP will continually support the installation's readiness mission by setting and following realistic goals and objectives, encouraging pollution prevention, perpetually seeking efficient cleanup technologies, sharing lessons learned, and most importantly, performing risk-based cleanup efforts to restore and reclaim Army training lands.