



2022 Secretary of Defense

Environmental Awards

Environmental Restoration, Installation
Moody Air Force Base

Introduction

Moody Air Force Base (AFB) is located 10 miles northeast of the City of Valdosta in Lowndes and Lanier counties in south-central Georgia. Comprising approximately 11,000 acres of federally owned land, the installation includes the main base, Grand Bay Range, and the Grassy Pond Recreational Annex. Military use of this area began in early 1942 with the establishment of the Moody Field Advanced Pilot Training School. The installation was closed in 1946 but was reopened permanently in 1951 to train pilots during the Korean conflict. Moody Field gained official, permanent status as an AFB in 1954.

Moody AFB is home to the 23rd Wing (23WG), whose mission is to optimally

organize, train, equip and deploy precision attack, personnel recovery, and combat support to win today's fight. The 23WG organizes, trains, and employs combat-ready A-10C, HC-130J, HH-60W, and Guardian Angel Air-Deployable Rescue Vehicles used in Combat Search and Rescue and Personnel Recovery operations. The 23WG is home to the Air Force's legendary "Flying Tigers" and consists of five groups, with 21 squadrons comprised of more than 4,000 Airmen, over 700 civilian employees, and over 71 aircraft at two locations throughout the continental U.S. The 23WG provides A-10C Thunderbolt II aircraft for close air support, forward air control, and combat support for combatant commander requirements worldwide.

The Environmental Restoration Program (ERP) is a unique and key component of environmental stewardship on Moody AFB. Like most Department of Defense (DoD) installations, Moody AFB has sites where soil and groundwater have been contaminated by past industrial operations essential to the base mission. These sites include areas formerly used for landfills, fire protection training, and waste disposal. Moody AFB has been aggressively pursuing clean-up at these sites to protect human health and the environment as well as return these assets to productive use in installation military readiness operations.

Background

The Moody AFB ERP is comprised of 43 Installation Restoration Program (IRP) sites and one Military Munitions Response Program (MMRP) site. Initial investigations began in the mid-1980s under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Since investigations began, 44 sites have been identified. Those sites include former underground storage tanks, landfills, surface disposal areas, fire training areas, spill areas, and an inactive skeet range. Primary contaminants at Moody AFB include petroleum products, chlorinated solvents, metals, and polycyclic aromatic hydrocarbons (PAH). The levels of contamination did not require Moody AFB to be included in the United States Environmental Protection Agency's National Priorities List; therefore, regulatory authority was delegated to the State of Georgia. In 1989, the State of Georgia Environmental Protection Division (GA EPD) began regulating the Moody IRP sites under a Resource Conservation and Recovery Act (RCRA) Permit.

The Moody AFB Restoration Program is comprised of one full-time civilian employee who works closely with Installation leadership and personnel, is mindful of community interests, and remains in close contact with stakeholders. The program has become a

model ERP for the DoD through environmental excellence, stewardship of community resources, and sustainability of the warfighter. Through streamlined investigations, innovative and cost-effective cleanup actions, and a great rapport with the regulators, the program has closed out 80% of the installation's 44 ERP sites.

Accomplishments

Accelerated Environmental Cleanup

Moody AFB Restoration Program is exceeding all goals. Of the total 44 ERP sites on Moody AFB, investigations are complete at all sites, corrective actions are being implemented at nine sites, and 35 sites have been closed. Three sites are on track for response complete (RC) and site closure (SC) in 2026. Remediation activities were conducted under an \$18M Performance Base Remediation contract from September 2012 through September 2020, which included remediation activities at 12 sites and achieved SC at three sites. A separate \$3M contract achieved site closeout for the MMRP site in 2020. A seven-year Optimized Remediation Contract (ORC) of \$7.3M was successfully negotiated and awarded, via source selection board (SSB), in September 2020 to continue remediation activities at the remaining nine IRP sites. Due to COVID, this was only the second SSB to be held virtually for the DAF Environmental Restoration Eastern Division and was used as a framework for future contract awards. The Air Force Civil Engineer Center's Restoration Program Manager (RPM) for Moody also obtained FY20 funds and awarded a \$700K contract for remedial investigation of Per- and Polyfluoroalkyl Substances (PFAS) at five sites, expediting contract award by three years.

Moody AFB has developed a dynamic restoration program focused primarily on expediting site cleanups, management to protect human health and the environment, and closure of contaminated sites to allow for unrestricted land use (UU/UE), i.e., residential

use. Through superb program development and project management, the Moody ERP is on track to restore over 1,000 acres to UU/UE, eliminating all future liabilities. Moody AFB managed a \$3M project to remediate the Former Skeet Range MMRP site during the achievement period. The selected remedy was excavating lead and PAH contaminated soil and sediment over an 11-acre site. Although restricted use with land use controls would have been a feasible option for the site, the contaminated sediments in 3.7-acres of wetland presented an unacceptable ecological risk. Excavation activities were conducted between June 2019 and January 2020, removing 16,000 tons of lead-contaminated soils and sediments from the site that were stockpiled and treated with a lead stabilization amendment, EnviroBlend®. This allowed the soil to be disposed of off-site as non-hazardous waste and resulted in over \$1.5M of disposal cost savings. The EnviroBlend® technology stabilizes the metals of concern by regulating pH and forming insoluble compounds that will not leach into the environment alleviating liability of exposure.



MMRP Dirt Work

Dump truck moving east from the “Mount Moody” stockpile toward the Former Skeet Range Excavation area. The project used approximately 3,055 cubic yards of soil from the existing stockpile area as backfill material, resulting in a cost savings of \$11,000.

The RPM also approached Moody AFB with the request to sample a soil stockpile located near the site as a potential backfill source for

the MMRP project. Through this effort, 3,055 cubic yards of backfill were used from that source resulting in over \$11K in project cost savings. The site achieved RC and SC in March 2021, and the property has been designated as UU/UE.



Soil stockpile being sprayed with water as it is being mixed with a powdered lead stabilizer (EnviroBlend®). This limited the EnviroBlend® from escaping into the air during the mixing process. Using the lead stabilizer allowed the soils to be disposed of as non-hazardous waste, saving \$1.5M on disposal costs.

Innovative Technology Demonstration/ Validation and Implementation

The Moody AFB ERP strives to implement remedial strategies that are innovative, have proven effectiveness, and will accelerate cleanups that bring contaminated property back to productive use in installation military readiness operations. Through collaboration with GA EPD, and demonstrating effectiveness through pilot studies, Moody has initiated the use of direct push injection (DPI) methods. While challenges with the complex subsurface lithology has slowed the overall progress to achieving SC during previous contracts, this has been overcome with the identified DPI methodology. Due to the complex nature of the subsurface lithology at the sites, injections need to be adjusted during field implementation. The versatility of the injection technique allows the use of different injection substrates based on the type of contaminant and site conditions. Substrates

used at Moody AFB include emulsified vegetable oil, slurried organic carbon and zero-valent iron solution, sodium lactate, and slurried calcium peroxide. The Moody ERP injected over 300,000 gallons of amendments and reduced contaminant concentrations by more than 65% across multiple ERP sites between October 2019 and September 2021. The DPI technique at the former Service Station site fully remediated a benzene plume after only one injection event, using a slurried calcium peroxide. Decades of remedial activities had occurred at the site with limited success. However, an optimized approach using DPI technology allowed the treatment of multiple subsurface intervals, and achieved maximum radial distribution of the injected slurry and dissolved oxygen away from the injection points. The injection achieved a 94% mass reduction and accelerated the former Service Station site closeout over 20 years.



Direct Push Technology

Contractors use a GeoProbe rig to install temporary injection points at a Moody AFB ERP site. The rig can also be used to perform injections directly into the subsurface. Direct push injection allows better distribution of the injection substrates and more precise targeting of the source areas.

The Moody ERP annually performs remedial process optimization (RPO) evaluations on each site. The evaluation includes optimizing the effectiveness of existing remedies and long-term monitoring systems, better tracking of remediation progress, re-evaluating cleanup goals, reducing operation and maintenance costs, continuing protectiveness,

and expediting cleanup times and site closure. Annual RPO evaluations are presented to GA EPD for approval prior to implementation. This optimization effort allowed Moody AFB to spearhead a base-wide well abandonment event of over 300 remediation wells, eliminating future liabilities and garnering savings of \$120K per year. Continued sampling of over 420 monitoring wells allows the ERP to better define groundwater contamination extents and protect the environment and health of over 6,000 base personnel.

Partnerships Addressing Environmental Restoration Issues between DoD and Other Entities

Through partnering, Moody AFB has an outstanding rapport with the GA EPD, which plays an integral role in the success of the ERP. GA EPD provides regulatory guidance and support, resulting in expediting clean-up processes. The Moody RPM successfully initiated partnering with the GA EPD and continues to foster open communications and teamwork throughout the years. The RPM has collaborated with GA EPD to develop and prioritize a list of ERP documents needing regulatory review, thereby reducing document review times by 80%. During this achievement period, the Moody ERP obtained regulatory approval for over 42 documents, oversaw effective implementation of remedial actions, and kept projects on schedule. The Moody RPM also established monthly teleconferences with GA EPD, U.S. Army Corps of Engineers, and the remediation contractors. These teleconferences provide an opportunity to keep GA EPD informed of project progress and mitigate potential issues before they result in project delays. The collaboration between the multiple agencies continues to expedite the implementation of restoration fieldwork, and GA EPD continually praises the Moody AFB ERP on the excellent quality of documents submitted and their implementation in the field.

Activities at ERP sites on the active flight line require coordination with Airfield Operations to meet Federal Aviation Administration requirements and avoid adverse impacts to the base flying mission. To ensure ERP activities were successfully completed in a timely manner and to avoid mission impacts, the Moody ERP staff worked with the contractor to conduct DPI and investigation activities on the airfield during extended airfield closure times, such as holiday closures. This eliminated the need for airfield waivers, which often take months to get approved, and expedited the contract activities by three months.

Due to the maturity of the Moody AFB ERP and remedies being in place at all sites, the Moody AFB Restoration Advisory Board was adjourned in 2011. However, proactive community engagement and public outreach are still priorities for the Moody ERP. Moody AFB publishes a semiannual fact sheet on the Restoration Program for mailing to former RAB members and the local community. These fact sheets provide continued public awareness on installation restoration initiatives and provide Moody AFB an opportunity to solicit community interest in the re-establishment of the RAB. The Moody ERP also proficiently built and maintains a digital Administrative Record of over 2700 documents. More than 90 additional new entries were added during the achievement period, ensuring ensure the Administrative Record fully captures the correspondence, technical volumes, and other documents for public access.

The Moody ERP staff performs annual site inspections with over 1,200 remediation wells on nine sites across 5,000 acres to ensure protectiveness of the environment and no risk to base personnel. GA EPD conducts semiannual inspections to ensure compliance with the RCRA Corrective Action Permit. The last inspection occurred in August 2021 with, once again, no major findings. A testament to the superior program management, the Moody

ERP has had no Notice of Violations or major findings in over 21 years.



Georgia Environmental Protection Division (GA EPD) conducted a Corrective Action Permit Inspection in August 2021. All active remediation wells and systems were inspected to ensure compliance with permit requirements.

Reducing Risk to Human Health and the Environment

The safety and health of the Moody airmen, their families, and the surrounding community is a top priority for the Moody Restoration Program. The program remains committed to identifying and addressing the environmental impacts of all contaminants, including emerging contaminants. The Moody ERP has initiated the investigation of PFAS at five identified release sites on the installation. The U.S. Environmental Protection Agency (EPA) characterized PFAS as emerging environmental contaminants based on increasing regulatory interest, the potential risk to human health and the environment, and evolving regulatory standards. Although there are no promulgated PFAS standards in the State of Georgia, EPA has an established a drinking water lifetime health advisory level of 70 parts per trillion for perfluorooctane sulfonate and perfluorooctanoic acid (PFOS and PFOA) that is recognized by the DoD. Sampling has confirmed that drinking water is not impacted at Moody AFB. However, the Moody ERP found it prudent to continue to gather data to ensure no risk is present. A \$700K contract was awarded in September

2020 to fully delineate PFAS on Moody and ensure no off-base migration. An additional contract was awarded in July 2021 to conduct an off-base well inventory and sampling of private wells, if needed. Fieldwork began in September 2021 and is currently ongoing. In accordance with CERCLA, these efforts will evaluate the unacceptable risk to human health and the environment to determine the necessary response and clean-up actions.



PFAS Remedial Investigation

Lori Burnam, Moody AFB Restoration Program Manager, observing GeoProbe drill rig performing PFAS Remedial Investigation sampling activities on the airfield. Investigations are ongoing at five sites to fully delineate the emerging contaminant on Moody AFB.

The Moody ERP ensures that the base effectively meets mission objectives while protecting human health and the environment and has coordinated over \$50M in construction projects during this achievement period. The Moody RPM's knowledge and expertise allowed these construction projects to proceed while ensuring ERP activities are not impacted. For instance, the review and coordination on a Golf Course improvement project prevented damage to over 20 remediation wells and three groundwater recirculation systems within the project footprint. Additionally, reviews of over 350 work requests were conducted to evaluate potential program impacts, vastly facilitating Department of the Air Force mission success without delays. The Moody AFB RPM has provided nine ERP overview briefings this achievement period to installation leadership,

public affairs, unit environmental coordinators, occupational health personnel, and new contractors, creating awareness to ensure the protection of human health and the environment.

Green Remediation

Moody AFB restoration contracts' scopes are prepared with green and sustainable remediation principles in mind, such as the following:

- Evaluating land and vegetation impacts before implementing remediation to limit potential erosion, sedimentation, or other impacts.
- Using minimal maintenance in situ technologies to avoid high-energy solutions, such as pump and treat.
- Reducing investigative derived waste with no-purge sampling techniques.

Moody AFB has successfully implemented and maintains nine source area remedies considered green and sustainable, including six groundwater recirculation systems, and enhanced in situ bioremediation (EISB) treatment areas. These technologies rely on naturally-occurring bacteria to break down chlorinated solvents into harmless compounds. The groundwater recirculation systems extract, treat, and then re-inject groundwater, within natural substrates, with added emulsified vegetable oil, molasses, and sodium lactate to create in-situ bioremediation zones in the subsurface. In one instance, a 15-acre plume had a contaminant mass reduction of 69% with over 10.7 million gallons of treated and re-injected groundwater in a 4-year period. These green remediation strategies help preserve the natural hydrologic cycle through water conservation, eliminating stormwater runoff, and recycling of the treatment process water. The Moody ERP has implemented passive remediation systems, such as DPI technology or gravity feed injections, which use little or no external energy to power mechanical equipment or otherwise treat contaminated environmental

media. With over 1,200 existing remediation wells on nine sites across Moody AFB, this treatment approach reduces permanent remediation infrastructure and long-term operating costs associated with the sites. Use of low energy approaches also reduces installation energy costs, and regulated criteria pollutants and greenhouse gas emissions. The program has strategically selected treatment areas for EISB to treat 90 acres of the source area, achieving a 65% reduction in plume footprint and mitigation of contaminated groundwater over a 1,000-acre expanse.



Mobile in-situ remediation equipment is staged to perform passive injections. Substances such as lactate or vegetable oil are inserted into the subsurface, where they act as a stimulating food source for naturally-occurring microbes. The equipment helps to implement a sustainable approach to efficiently remediate sites at Moody AFB.

In 2021, Moody AFB gained regulatory approval to convert from traditional low-flow sampling procedures to passive no-purge groundwater sampling techniques, which are more sustainable than traditional low-flow sampling methods as they require less field labor and equipment, consume less energy, and generate less waste. Collecting groundwater samples using passive no-purge sampling eliminates the need for instrumentation, pumps, and time for groundwater parameters to stabilize. This in turn reduces field labor by 50-80% and, since there is no groundwater purged from the monitoring well, there is no contaminated water that must be containerized, tested, and disposed of. To expedite decision making regarding the transition, Moody AFB employed both side-by-side and statistical comparisons of no-purge sampling data to traditional purge sampling data. By demonstrating the suitability of the no-purge technique, the transition was implemented in just seven months with full regulatory concurrence. The transition to no-purge sampling accelerated sampling schedules by two weeks and achieved an overall cost reduction of 20%.