



FY 2015 Secretary of Defense

Environmental Awards

Environmental Restoration, Installation
Cannon Air Force Base Environmental Restoration Program

Introduction

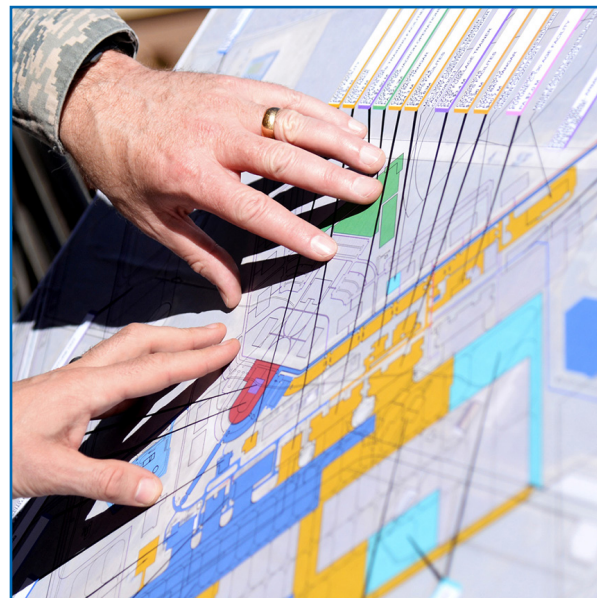
Cannon Air Force Base (AFB) is home to the 27th Special Operations Wing (SOW), whose primary mission is to provide and enable specialized airpower under the Air Force Special Operations Command (AFSOC). To accommodate this mission, Cannon supports the largest Military Construction (MILCON) program in the world, which requires investing in new infrastructure and retrofitting old infrastructure. Consequently, previously vacant land is now projected for construction, and existing buildings are being expanded. The MILCON program in Fiscal Year (FY) 13 was \$408M, and the FY15-18 MILCON program is projected at \$66.7M. The total AFSOC beddown is \$1.29B.

Located 7 miles west of Clovis in the arid high plains of eastern New Mexico, Cannon AFB is home to approximately 5,400 military and 600 civilian personnel. The 3,789 acre installation and 71,000 acre Melrose Air Force Range (AFR) are surrounded by farmland and short grass prairie. In 2013, the economic impact of Cannon AFB to the local community was estimated at \$591M.

Background

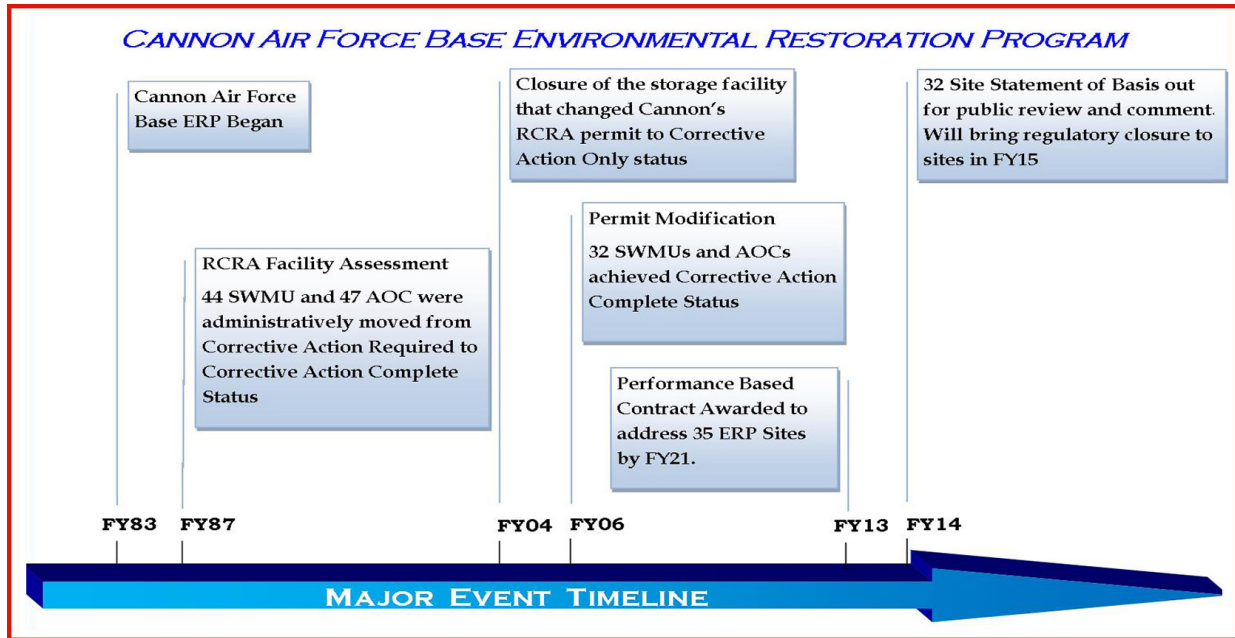
The Cannon AFB Environmental Restoration Program (ERP) commenced in 1983 with 16

identified sites. In 1987, the Environmental Protection Agency (EPA) completed a Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) that identified Solid Waste Management Units (SWMUs) with potential hazardous waste contamination.



Cannon AFB Military Construction Projects

Air Force leaders discuss upcoming construction projects at Cannon AFB. The particular item being discussed is the FY16 Squadron Operations Facility, marked in green. It is a project that has been coordinated through the Cannon AFB ERP.



Cannon AFB ERP Timeline

This timeline represents major milestones in the Cannon AFB ERP. The most notable entries are the 2006 Permit Modification and 32 Site Statement of Basis. Ongoing work is represented by the FY13 Performance Based Contract award.

Today, the Cannon AFB ERP continues to remediate 62 SWMUs under a RCRA Corrective Action Permit administered by the New Mexico Environment Department (NMED). To date, 127 SWMUs have achieved Corrective Action Complete status. Most sites require remediation resulting from leaking Underground Storage Tanks (USTs) and landfills. A 10-year, \$7.1M, Performance Based Remediation (PBR) contract will address open sites to achieve closure at all sites by FY21.

In addition to the sites at Cannon, there are seven SWMUs on the Melrose AFR. Due to the training mission, site remediation has been deferred and interim long-term groundwater monitoring is in place. The Cannon AFB ERP manages biannual groundwater monitoring at Melrose.

Organization/Management Approach

Through recent transformation, the ERP is set up so the Air Force Civil Engineer Center (AFCEC) provides management and oversight functions while the Wing Commander holds responsibilities related to the RCRA permit.

The Cannon AFB ERP is managed at the base level by the AFCEC Restoration Program Manager (RPM) and one support position. These personnel work directly with the 27th Special Operations Civil Engineer Squadron (SOCES) personnel and Commander to manage the permit requirements associated with the program. These requirements are coordinated with the Mission Support Group Commander, who has signature authority for the Wing Commander on permit correspondence. The contracting, financial, and reporting functions of the program are managed by Program Managers at AFCEC who develop these requirements with the RPM.

Community Involvement

The Cannon AFB ERP strives for strong community partnerships through public meetings and notices about ERP sites. The base gauged community interest through a Restoration Advisory Board (RAB). A RAB was initially established at Cannon in 1995. As the Cannon AFB ERP matured, concerns from the community diminished and the RAB was dissolved in 2009.

Cannon AFB continues to promote the RAB as an avenue for public involvement and conducted its most recent solicitation in FY14, which concluded that the community remains confident in the direction of the ERP and saw no need to re-establish the RAB.



Restoration Program Manager

Restoration Program Manager (RPM), Laura Peters, reviews documentation during field work. This area is one of the fenced landfills. The large South East Development Area construction can be seen in the background.

Challenges

Large areas of Cannon AFB are being developed to support the new mission. Resulting MILCON projects are coordinated through the Cannon AFB ERP. MILCON and ERP sites that overlap are further coordinated with 27th SOCES personnel to find new siting options. This coordination becomes significantly more challenging when MILCON projects change. Changes significantly reduce the time available for ERP evaluation, as the construction timeline requires a shortened review period. To mitigate challenges, Cannon AFB ERP personnel review updated construction maps on a regular basis. In addition, a strong relationship with MILCON personnel fosters quick problem resolution.

From a technical perspective, the Cannon AFB ERP faces challenges associated with deep soil contamination. In some areas, contamination has been found at depths over 100ft. This presents a challenge because many remedial technologies rely on oxygen to work correctly, which is not readily available at that depth. However, the Cannon AFB ERP is looking at mitigating this challenge through an enhanced soil vapor extraction pilot test at one site in FY18.

Initiatives

The following series of initiatives provide the foundation for the Cannon AFB ERP. These initiatives are the tools used to resolve problems and achieve significant accomplishments, proving that quality initiatives lead to effective work.

Work Clearance Requests: To support construction, the 27th SOCES holds weekly work clearance request meetings where construction managers and SOCES program managers meet to review upcoming intrusive work. The RPM compares the proposed project with ERP site locations. Conflicting projects are resolved by working directly with the groups involved. For example, Emergency Services at Melrose AFR needed to construct an equipment storage building. Through this initiative, the construction manager was notified that the identified storage location was a landfill. The RPM and the community planner worked together to find an alternate location, allowing the construction to move forward and support the mission.

Site Specific Electronic Files: In FY13, Cannon AFB ERP personnel changes resulted in new personnel lacking familiarity with ERP sites. Thus, site specific electronic folders (e-files) were developed to organize all Administrative Record (AR) documentation by site. Initially, the AR table of documents was modified to include a date-searchable column to facilitate sorting and searching for records by date. This sorting feature reduced the time to pull historical site reports from hours to minutes. The AR table was filtered

by date to locate historic reports for each site and filed. This initiative aided the Cannon AFB ERP in timely responses to audit and Freedom of Information Act requests that came in FY14. Because this effort has been so valuable to Cannon AFB, the Holloman AFB ERP has also begun a similar implementation.

Site Status Reviews: SWMUs listed on Table A of the current Cannon AFB RCRA permit represent those sites that still require remediation. In order to ensure that these sites were on track to meet or exceed Department of Defense ERP goals, personnel initiated a complete program review.

Sites on Table A were reviewed to verify programming requirements. Issues found from the Table A review included: two sites previously closed but being billed by NMED, one omitted site, two sites un-programmed for work, and four sites requiring programming for closure. As a result of this review, new programming will achieve closure and save \$5,250 per year in annual permit fees by FY16. This success also led to a program review for the Holloman AFB ERP, whose Table A review resulted in new programming to attain closure at 22 sites by FY18, an annual savings of \$16,500 in permit fees.

Summary of Accomplishments

The FY13-14 objective of the Cannon AFB ERP was to reduce cost and support the mission in an effective and efficient manner. This objective was achieved by implementing initiatives, supporting MILCON, and working together with NMED and other 27th SOCES programs. The following accomplishments demonstrate the high level of success that was achieved through this objective.

ST-26

Restoration site ST-26 includes two SWMUs that were former USTs. The aforementioned Site Status Review initiative identified these SWMUs as un-programmed for work. Past soil removals failed to excavate all contaminated soil above regulatory levels, resulting in NMED denying closure in 2010.

In February 2014, Restoration personnel and NMED discussed ways to achieve site closure. Development of a 95% Upper Confidence Limit (UCL) was identified as the best way to determine if the site could be closed without additional sampling. A 95% UCL is a site-specific soil average of petroleum contamination that is compared against regulatory soil levels.

Cannon AFB ERP personnel performed this calculation in-house, using the EPA software program ProUCL. The 95% UCL for three comprehensive scenarios were found to be below the regulatory soil levels. A report documenting this was written and submitted for review to NMED. In September 2014, NMED approved the report without comment, approving the site for closure.

As a result of this action and a strong relationship with NMED, site ST-26 went from un-programmed to approved-for-closure in seven months. Normal contracting and field work would have cost approximately 18 months in time and over \$100K. Once the formal closure request is submitted to NMED, they will complete a permit modification, removing a \$1500 annual permit fee.

Landfill 4

Landfill 4 was a nine acre, 1960s trench and burn mixed waste landfill. A new cover was placed over Landfill 4 in FY12, but uncharacteristic weather conditions in FY13 caused erosion problems. As a result, a contracting action was initiated and NMED issued a requirement to remediate the erosion.

To address immediate erosion problems, restoration personnel worked with 27th SOCES to make interim soil repairs.

In August 2014, permanent restoration of the landfill cover commenced with seeding, initiation of erosion control measures, and installation of 14,500 linear feet of temporary irrigation pipe.

This effort implemented green and sustainable remediation practices that included: use of 47



Landfill 4 Cover Erosion

Severe erosion on the cover in the fall of 2013. The Playa Lake in the background was the source of water for this project. Playa lake receives an average of 253K gallons of waste water effluent per day or 7.6M gallons per month.

pounds of native prairie grass seed, re-use of 1.3 million gallons of wastewater effluent, biodegradable erosion control, and use of local businesses to reduce transportation related greenhouse gases. Through these sustainable practices and its relationship with 27th SOCES, the Cannon AFB ERP ensured proper remediation of the landfill cover and achieved regulatory requirements.

Real-Time Field Decisions

Site ST-504 is a former UST that supplied diesel fuel for the medical clinic backup generator. In 2008, this site became eligible for the ERP and was programmed for work. Fieldwork in January 2013 revealed significant contamination at a depth of 125 ft. In July 2013, sampling continued to 250 ft. where minor contamination was still evident.



Landfill 4 After Cover Restoration

Top: The irrigation system running on top of the landfill cover. Bottom: Erosion control measures around the previously eroded areas. Newly emerging grass can also be seen in this photo.

At that time, Cannon AFB ERP personnel held discussions with the contractor and NMED to determine the possibility of increasing boring depth to identify the extent of contamination without encountering groundwater, estimated at a depth of 300ft. Avoiding groundwater was imperative to prevent the boring from becoming a conduit for contamination to reach groundwater. The boring was advanced to a depth of 280 ft. and then terminated when migration-inhibiting clay layers were identified. Laboratory analysis indicated that samples below 270 ft. were clear of contamination. Because of real-time field decisions, Cannon AFB ERP personnel were able to prove that this site did not impact groundwater. As a result, NMED did not require installation of groundwater monitoring wells, a cost savings of approximately \$205K.



Work at ST-504

Boart Longyear uses Sonic Drilling technology to complete soil sampling to 280ft. Drilling at this site was carefully coordinated with the Cannon AFB Medical Group to ensure all personnel were aware of the work. The area was also blocked off with Caution ribbon to ensure safety.

Restoration and MILCON Partnerships

Real-time field decisions at ST-504 also facilitated the uninterrupted start of construction for a new medical clinic that is being built approximately 350ft from the current medical facility. During coordination for the new clinic, contamination at ST-504 was raised as a concern. MILCON project contracting personnel indicated that the planned construction of the new clinic would be delayed at a cost of \$50K per day until the area was further investigated.

In response, MILCON personnel contacted Cannon AFB ERP personnel for assistance. ERP personnel compiled recent soil boring results to show contamination at ST-504 had not migrated towards the proposed clinic location. Through the dedication of Cannon AFB ERP personnel to support the mission and strong partnerships with MILCON personnel, the concerns over ST-504 were quickly resolved and costly delays were avoided.

Strong Regulatory Partnerships Achieve Closure

In early FY14, NMED began to pursue a permit modification for 34 ERP sites that Cannon AFB proposed for closure. During this process, NMED is responsible for preparing a Statement of Basis (SOB) that summarizes the history of each site to present for public comment. Once any comments are resolved, NMED then issues a permit modification for approved sites.

While NMED prepared the current SOB, a work plan was submitted to them to complete further evaluation to achieve unrestricted use of two sites on the SOB. NMED stopped work on the SOB to wait until this effort was complete. Because many metrics and milestones relied upon completion of the permit modification, Cannon AFB ERP personnel were committed to moving the SOB forward.

Through Cannon AFB ERP's strong partnership with NMED, an agreement was reached to move the SOB forward by removing these two sites. NMED agreed to complete this permit modification process before January 1, 2015. This permit modification will achieve regulatory closure on approved sites, achieve unrestricted use on 19 sites, and save up to \$24K per year in annual permit fees.

Melrose AFR Well Study

The interim long-term groundwater monitoring program at Melrose AFR includes wells established at closed landfills, in addition to background wells located throughout the range. Many of the background wells were historically agricultural wells that were repurposed for this program. However, lack of documentation related to well installation details caused NMED to question which aquifer was being monitored by each well.

In early FY14, a geophysical and down-hole camera study was completed to determine exact screen depths and aquifer properties. The primary aquifer is composed of sands while the secondary aquifer is composed of clays. These

rock types provide different outputs on the geophysical equipment, allowing for aquifer differentiation. Geophysical data combined with screen data from the down-hole video allowed the project team to determine which aquifer was providing water to each well.

Results of the study indicate that all site wells are screened within the primary aquifer while the majority of background wells are screened between both aquifers. Moving forward, the Cannon AFB ERP will be working with NMED to establish changes to the groundwater monitoring program to ensure the program is gaining information from relevant water sources.

Optimization of Groundwater Monitoring

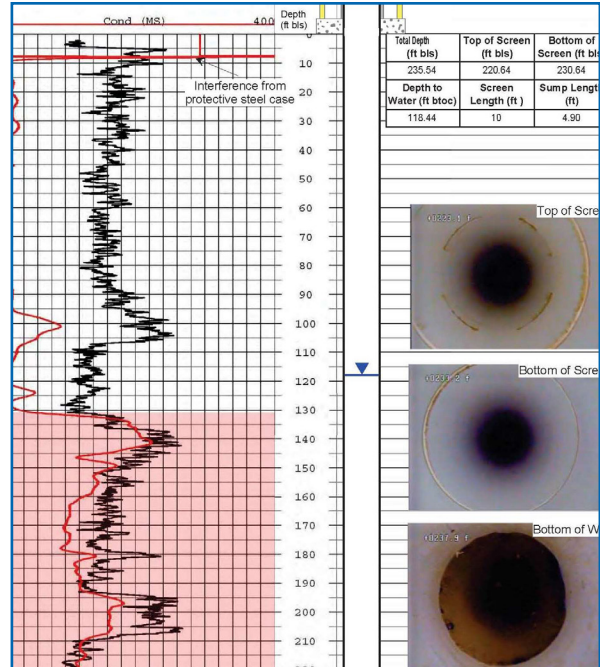
The long-term monitoring program at Cannon AFB includes biennial sampling of 18 groundwater wells located near the closed landfills. The PBR contract included requirements for a strategy to reduce long-term monitoring at Cannon AFB. The Cannon AFB ERP worked with the PBR contractor to develop a plan to reduce the number of wells that required sampling from 18 to 10, a 45% reduction. Areas with a high concentration of wells that have never shown contamination were targeted at a 50% retention rate.

The number of background wells was also targeted for reduction based on proximity to the sites being monitored. Distant wells are less likely to represent true background and thus were targeted for abandonment. This clear reasoning was successful in gaining NMED approval of this reduction. ERP sites at other installations where contamination has decreased or remained non-detected for long periods of time should apply this optimization to their monitoring in order to achieve similar reductions.

Landfill Audit

In FY14, the Air Force Audit Agency completed an audit of landfill activities across all programs at Cannon AFB. This audit reviewed management practices of five landfills under the Cannon AFB ERP. Because

of the Site Specific Electronic Files initiative, the Cannon AFB ERP was able to respond to document requests in a timely manner. As a result, no findings were attributed to the five landfills managed by the Cannon AFB ERP.



Monitoring Well MWQ2 Study Summary

This image displays the results of both the geophysical and camera portions of the study for background well MWQ2. Camera images depict screen slots in the well. The geophysical graph displays the red conductivity output that shows the change in aquifer at 130ft.

Conclusion

The Cannon AFB ERP is dedicated to supporting MILCON activities while operating an effective and efficient program. Techniques such as real-time field decisions and in-house reporting reduce uncertainty and accelerate the program forward, while program management initiatives allow problems to be identified and addressed early on. Key relationships with NMED and other 27th SOCES groups also enhance our ability to support the mission.

Accomplishments during this period have led to an estimated initial savings of \$680K and \$125K in out-year annual costs. These achievements, initiatives, objectives, and relationships are what has made the Cannon AFB ERP the best in the Air Force!