



2022 Secretary of Defense

# Environmental Awards

Environmental Quality, Non-Industrial Installation  
Shaw Air Force Base

## Introduction

Shaw Air Force Base (SAFB) South Carolina, located 7 miles west of Sumter and 36 miles east of Columbia, encompasses 3,326 acres, surrounded by a semi-rural area consisting of wooded and agricultural lands. SAFB operates two satellite properties, the extraordinarily diverse Poinsett Bombing, Gunnery and Electronic Warfare Range (PBGEWR), a 12,521-acre parcel 7.5 miles south of the base, and Wateree Recreation Area (WRA), a 26-acre parcel 30 miles north of the base. SAFB is home to the 20th Fighter Wing, the Department of the Air Force's (DAF) largest F-16 "Fighting Falcon" combat wing, whose mission is to provide combat-ready airpower and combat-ready airmen. The base comprises 1,215 facilities, including base housing, with

infrastructure worth \$1.75 billion and an operations/maintenance budget of \$88.6 million.

SAFB provides essential services to the surrounding community through a variety of activities, facilities, and programs. It is home to 7,259 active-duty members, 764 civilians, and 700+ contractors. The installation also supports over 23,300 family members and off-base retirees, providing a \$1.8 billion total economic impact annually in South Carolina.

## Background

Merging mission and environmental stewardship, SAFB has implemented an Environmental Management System (EMS) consistent with International Standards Organization (ISO) 14001, *Environmental*

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*Management Systems.* The 20th Fighter Wing Commander publicly states his commitment to environmental stewardship in his memorandum posted on SAFB's home page. With outstanding participation from base Public Affairs, Shaw's EMS emphasizes base-wide outreach using a dedicated SharePoint site for documenting and publishing the status of its environmental programs.

SAFB actively supports the commander's commitment by employing a dynamic, EMS-centric Cross-Functional Team (CFT), chaired by Shaw's Deputy Director/Installation Support. The CFT engages personnel across a broad range of specialties and oversees several workgroups including the Petroleum, Oils and Lubricants (POL) CFT, the Hazardous Material Management Process Team, Water Work Group, Storm Water Pollution Prevention Team, and Qualified Recycling Program Team. Additionally, the CFT chair leads a quarterly Action Team meeting to address environmental concerns and support EMS initiatives. The result of all these robust teams operating under one organization is a fully conforming EMS.

The Environmental Quality (EQ) program is spearheaded by four civilian personnel specializing in air quality, hazardous materials and waste, water quality and petroleum storage tanks. With 75% of the staff being former Authority Having Jurisdiction (AHJ) inspectors, environmental compliance is a serious matter at SAFB. All have established relationships and communicate regularly with their AHJ counterparts. Each functional position is cross-trained to manage another member's primary function in addition to their own and is concurrently attentive to the relevant aspects of pollution and spill prevention, waste reduction, and conservation.

Safeguarding the integrity of SAFB environmental programs, EQ personnel (1) conduct monthly internal inspections; (2) review project designs and work requests and (3) manage compliance with six state-

issued Clean Water Act and Clean Air Act permits, two drinking water system registrations, and nine underground storage tank (UST) registrations.

In addition, the staff oversees content and implementation of six installation-level management plans that instill procedures, best management practices and controls on environmental aspects of the mission. These plans are (1) Integrated Contingency Plan, including Emergency Contingency Plans for hazardous waste handling, Nov-2021; (2) Integrated Solid Waste Management Plan, Jan-2021; (3) Hazardous Waste Management Plan, May-2021; (4) Hazardous Materials Management Plan, Oct-2021; (5) Storm Water Pollution Prevention Plan, May-2020; and (6) Storm Water Management Plan, May-2020.

## Accomplishments

### Environmental Management

#### Groundwater/Drinking Water

Protection of groundwater, which provides drinking water for base personnel, is a high priority for the DAF and SAFB. The installation is at the forefront of DoD's initiatives to address legacy Perfluorooctanesulfonate/Perfluorooctanoic Acid (PFOS/PFOA) impacted soil. The base constructed a \$3.2M PFOS/PFOA filtration system for its \$75M groundwater treatment plant and is currently evaluating its legacy volatile organic compound treatment units and viability of newer systems that may improve contaminant removal efficiency. Separately, Shaw installed a supervisory controls and data acquisition system to continuously monitor production and treatment from its six wells that provide drinking water to 5,125 service taps.

Potential impact from legacy open burn/open detonation and munitions burial at PBGEWR is closely monitored to protect groundwater. In FY21, the base installed 11 additional monitoring wells within the 18 acres of

concern, bringing the total to 37 wells and increasing data from annual sampling and assessments by 40%.

### Energy

In partnership with Duke Energy, SAFB took a marked step forward in energy management and efficiency by installing a 9375 KW Micro-Grid. This generator system ensures stable power to essential operations facilities during extreme peak loads and power outages while reducing demand on Duke Energy's grid that powers the surrounding community.

With Shaw's conversion of oil-burning facilities to cleaner, more efficient natural gas units, only five oil-heated facilities remain on the installation. For greatest efficiency, these units are tuned annually, above and beyond the 5-year tune-up required by the state AHJ.

In FY21, SAFB awarded a project to bury 5000 ft of overhead utility lines, continuing its endeavor to move overhead lines underground throughout the installation and improve base beautification, safety, and electric service reliability for mission operations.

### Fuel and Oil Storage Tanks

In FY21, SAFB reduced its in-service regulated USTs by 42% from twelve to just seven. The base eliminated a gasoline storage requirement and consolidated diesel and jet fuel storage into two all-new above-ground storage tank (AST) systems. The double wall steel tanks were installed with electronic interstitial monitoring and line leak detection for the piping, replacing a total underground storage capacity of 48,000 gallons with only 11,000 gallons of environmentally safer, above-ground storage.

SAFB has a total petroleum storage capacity of 2.1M gallons, consisting of 125 shop fabricated ASTs and three field-constructed jet fuel storage tanks. It manages compliance, safety, and spill prevention measures in accordance with a 750-page Integrated Contingency Plan and maintains membership in the Charleston Liquid Spillage Control

Committee (LSCC). The LSCC participates in joint spill training exercises and maintains a rapid response spill recovery contract to react quickly in the event of a major release involving its members.



### New Above-ground Storage Tanks

Two newly installed above-ground storage tanks replaced three aging, problematic underground storage tanks in the Aerospace Ground Equipment yard.

The installation employs a rigorous inspection program to ensure tank system integrity, documenting the condition and compliance status using a DAF-maintained database. Shaw's tank program suggested numerous improvements to the platform and recommended twelve significant updates to the DAF tank inspection checklist. The DAF reviewed, accepted, and universally implemented the majority of these recommendations. Likewise, when suitable tank equipment and inspection training media were needed, the SAFB tanks program manager created required material. This training was subsequently posted on a web-based environmental training platform, available to every tank custodian and manager across the DAF. All new tank custodians at SAFB receive training using these improved tools.

### Wastewater

Shaw AFB maintains and operates a 1.2M gallon/day wastewater treatment plant (WWTP) serving approximately 20,000 military members, civilians, dependents, and contractors. This mission-critical WWTP is

diligently maintained by experienced operators with expert oversight from the installation's water management program. It has operated without interruption or permit violation for more than 12 years. Daily, weekly, bi-weekly, and monthly monitoring of wastewater parameters are consistently 75-90% below the allowable limits of the National Pollutant Discharge Elimination System permit. The WWTP discharges clean, clear water in a highly visible location without a single complaint ever noted.



#### **Installation Wastewater Treatment Plant**

Plant operator and state inspector reviewing the aerator basins at Shaw's wastewater treatment plant. South Carolina Department of Health and Environmental Control conduct annual inspections and compliance sampling at both the Shaw plant and the satellite plant at Wateree Recreation Area.

#### **Air Emissions**

SAFB has a Clean Air Act Title V operating permit that governs its air emissions from over 1000 area/permitted sources. With six regulatory compliance reports, a state emissions inventory system report, and 32 hours of regulatory inspections during FY20-21, the installation has maintained full compliance with state regulations and conditions of the permit. Continued success is built on repetitive training for five key shops totaling 15 personnel that ensured required documentation was complete and accurate. These five shops are responsible for operating/managing a majority of air emission sources on base (generators, boilers, refrigeration systems, etc.).



#### **Jet Engine in Afterburner Mode**

Jet engine undergoing tests following maintenance. Run times and other parameters are logged to calculate quantities of emission constituents.

The installation has persistently worked to reduce air emissions. Refrigeration systems are upgraded to environmentally compatible refrigerants, internal combustion engines on emergency generators and pumps are maintained in excellent mechanical condition, and the base's fleet Vehicle Maintenance shop reduced regulated paint emissions by an estimated 20% when it decommissioned one paint booth and removed another from service.

#### **Hazardous Waste and Hazardous Materials**

The Hazardous Waste program oversaw the collection and disposition of 73,000 pounds of hazardous waste in FY20-21 without incident. The program manager accomplished this by performing or overseeing 96 work-center staff assistance visits and inspections, 104 inspections of the waste Central Accumulation Area, and over 1000 spot checks of satellite accumulation areas. During this time, 254 personnel completed training to properly handle and manage hazardous waste and hazardous materials.

To reduce hazardous waste generation, the installation reviewed 180 material handling processes while administering 1400 hazardous material purchases each year. Robust management of processes and purchases by more than 110 trained, qualified personnel also enabled comprehensive material data collection for 15M lbs daily average of Emergency Planning and Community Right-

to-Know Act (EPCRA) tier II chemicals. The EPCRA Tier II report is shared with the state and local emergency planning committees, thus improving awareness of the chemicals used on the installation and public safety as a result of this coordination with state and local agencies.



#### **Hazardous Waste Management**

Hazardous waste is stored in a 90-Day Central Accumulation Area as it awaits shipment to a Treatment, Storage and Disposal Facility.

#### **Waste Reduction Efforts**

##### Diversification

SAFB annually diverted 600 tons of its solid waste from landfill disposal, excluding all dispositions to Defense Logistics Agency, by supporting continued use of discarded materials, such as a free-issue program for used household paints and chemicals. Utilizing the EMS CFT and the approval of the 20th Fighter Wing Commander, the installation established goals to divert up to 40% of its waste from landfills and reduce its total solid waste generation by an average of 2% per year by FY25. During FY20-21, SAFB reduced its total waste by 10% over the previous 2-yr period, or an average of 210 tons per year. The base segregated and diverted an additional 39 tons of non-hazardous waste from the landfill during FY20-21 by transporting it, along with its regulated hazardous waste, to a treatment facility to avoid leaching of substances to the soil.

##### Recycling

Recycling represents the largest portion of Shaw's diversion efforts. The base operates a Recycling Center that receives an average of 165 tons of recyclable materials per year, including paper, cardboard, scrap metals, cans, plastics and tires. The installation also collects an average of 34 tons of food waste per year from its commissary and dining facilities, enabling a local composting facility to produce a beneficial soil amendment.

##### Reuse

Base personnel elected to repair over 45 dormitory beds destined for disposal, saving \$20,000 in replacement costs and eliminating a significant waste stream. Shaw's EQ programming includes a comprehensive waste stream analysis to identify similar opportunities.

##### Water Resource Conservation

Ongoing repairs of 50,000 feet of sanitary sewer pipe reduced peak rainwater inflow and infiltration to sanitary pipes by 6,000 gallons per hour and coincidentally reduced WWTP chemical (e.g., lime, chlorine) usage by 20%.

##### Enhancements to Avoid Adverse Impacts to Natural Assets

The recycling program at SAFB generates revenue, of which a percentage funds pollution prevention projects. To correct an unfunded design deficiency, the installation approved a portion of these proceeds for the construction of a fuel delivery driveway for its 27,000-gallon capacity Micro-Grid generator system. By allowing delivery trucks to park closer to the diesel tank fill points, the concrete driveway precludes placing numerous sections of delivery hoses over a grassy area and prevents small, inevitable spills during fuel transfers.

To mitigate off-base impact of a spill, the installation repaired a 20,000-gallon oil-water separator (OWS) serving a major flightline outfall. Returning this OWS to service

prevents potential fuel releases from reaching off-base surface waters.

### **National Environmental Policy Act (NEPA)**

During FY20-21, SAFB completed 24 AF Form 813s, *Requests for Environmental Impact Analyses*, including major action for temporary bed-down of Kingpin, a tactical command and control unit that serves as the lead control and reporting center directly enabling air operations across U.S. Central Command area of responsibility. Furthermore, Shaw completed Environmental Impact Assessment (EIA) processes for \$434M in mission critical projects supporting Air Force Central Command, base security and operations for the MQ-9 Reaper, the primary offensive strike unmanned aerial vehicle for the U.S. Air Force.



### **Red-cockaded Woodpecker (RCW) Banding**

The National Environmental Policy Act (NEPA) requires federal agencies to assess the potential environmental effects of proposed actions, providing protection to endangered wildlife and their habitats while sustaining Shaw's combat training mission. Monitoring the Endangered Red Cockaded Woodpecker (RCW) population on PBGEWR includes color banding this 6-day-old nestling.

The base realized substantial savings where possible during the aforementioned period. The installation drafted 11 EIAs internally in support of a Combined Air Operations Center bed-down, 3 mini-Multiple Threat Emitter System (MUTES), and 7 Electronic Combat Range target arrays, saving the Air Force more than \$1.7M, in planned operational costs. Moreover, in an adjoining airspace expansion

project, Shaw coordinated Environmental Assessment roles with the US Army Corps of Engineers to eliminate \$150K in planning costs.

### **Effective Use of Funds**

Experience and expertise has enabled significant savings for Shaw AFB when given an opportunity. Civil Engineer personnel, led by members of the POL CFT, repurposed two out-of-service petroleum storage tanks, eliminating a replacement cost of \$22,000 each. For the minor cost of material expenses, installation of these tanks provided increased operations efficiency (saving ~1000 man-hrs/yr) and allowed a \$230,000 R-11 refueler, taken out of operation to provide for fuel storage, to return to servicing aircraft.

To comply with the Generator Improvements Rule for hazardous waste, the Hazardous Waste manager personally prepared sixteen shop-specific Emergency Contingency Plans, a Quick Reference Guide and maps and realized an estimated \$40,000 in FY20 savings through in-house resources.

Following an aircraft crash on the flightline, SAFB first responders' quick response to the mishap, blocking the storm sewer to contain materials released, and prompt action by EQ staff to complete an in-house assessment with independent sampling, resulted in no cleanup action required. Similarly, SAFB engineers and EQ personnel responded swiftly to a separate HAZMAT incident. They removed 20 drums of soil within one day and verified cleanup through independent sampling and analysis. Their quick action averted a costly environmental assessment and cleanup.

### **Community Relations**

EQ personnel are sharing their knowledge and experience in the community and beyond. The water programs manager is a member of the Santee Lynches Regional Council of Governments that collaborates to enhance the quality of life and advance the four-county region. He also serves as the Municipal

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Separate Storm Sewer System Manager for SAFB and is authorized by South Carolina Department of Health and Environmental Control to approve construction permit applications and associated Storm Water Pollution Prevention Plans for land disturbance involving one or more acres. He, together with the tank manager, also serves the ESF14 (Recovery) function on Shaw's Emergency Operations Center. As experienced spill response professionals, they both participated in Tri-County Emergency Management Program meetings with the South Carolina Emergency Management Division and quarterly meetings with the Charleston LSCC.

Shaw's tank program manager deserves special mention as a Principal Appointee to the National Fire Protection Association Standards Council for Automotive and Marine Service Stations and the Petroleum Equipment Institute Safety Committee, helping to write national policy for service station and storage tank safety. He is also assisting Air Force Civil Engineer Center with the POL Playbook, which provides DAF-wide instruction and guidance on managing storage tanks containing petroleum products.

SAFB routinely promotes environmental stewardship awareness within the base

community. General environmental awareness, and specifically, the installation EMS, are required introductory training courses for all personnel. A wide and varied assortment of different types of outreach campaigns are common as well. Several units participate in South Carolina Department of Transportation's Adopt-A-Highway program on public roads outside the installation gates. Coinciding with America Recycles Day on November 15, 2020, SAFB published an article in its base newspaper about the base Recycling Center operations and what it recycles. The base produced and distributed a pet waste awareness brochure—a campaign that successfully reduced fecal coliform in the privatized housing community below the regulatory standard and averted an increased monitoring requirement at an affected stormwater outfall.

Outdoor activities are plentiful. Over 500 military and civilian personnel participated in public hunts on PBGEWR, including a youth-only hunt sponsored by the South Carolina Department of Natural Resources, netting \$6K to sustain the program. Each year, WRA hosts numerous squadron functions for morale, welfare and recreation, kids fishing tournaments, and Beautify Wateree Day.