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PERFLUOROALKYL AND POLYFLUOROALKYL SUBSANCES ASSESSMENT FOR
SOLID WASTE MANAGEMENT UNIT (SWMU) 68 FORMER FIRE TRAINING AREA
NAVAL ACTIVITY PUERTO RICO
9/3/2010
CH2M HILL

Per- and Polyfluoroalkyl Substances Assessment for Solid Waste Management Unit 68, Former Southern Fire Training Area, Naval Activity Puerto Rico, Ceiba, Puerto Rico

PREPARED FOR: United States Environmental Protection Agency
Puerto Rico Environmental Quality Board

PREPARED BY: CH2M HILL, Inc. on behalf of the Department of the Navy, Naval Facilities Engineering Command Southeast

DATE: September 2016

1 Introduction

This technical memorandum documents the assessment conducted to evaluate the potential for per- and polyfluoroalkyl substances (PFAS) to be present at Solid Waste Management Unit (SWMU) 68, the Former Southern Fire Training Area, due to historical firefighting activities. SWMU 68 is located within Naval Activity Puerto Rico (NAPR), in Ceiba, Puerto Rico (**Figure 1**). This work was performed for Naval Facilities Engineering Command Southeast Division under the Comprehensive Long-term Environmental Action—Navy contract N62470-08-D-8012, Contract Task Order JM17.

2 Purpose and Approach

The purpose of the assessment was to determine if historical firefighting activities conducted at SWMU 68 potentially released PFAS to the environment and if further site investigations are warranted to determine the presence and define the nature and extent of potential PFAS contamination.

Firefighting training activities at SWMU 68 could have resulted in a release of PFAS' in two ways.

- **Aqueous Film-forming Foam (AFFF)** – AFFF contains PFAS. The development of AFFF began in 1966, and the military has used AFFF extensively to extinguish hydrocarbon fuel fires since 1970 (USAF, 2012). PFAS could have been released to the environment if AFFF was used to extinguish fires during firefighting training activities at SWMU 68.
- **JP-7 Fuel** – JP-7 fuel contains a fluorocarbon lubricity additive, PWA-536 (USAF, 1998). JP-7 fuels are used in supersonic aircraft (for example, U-2, and scramjets) (ATSDR, 1995). PFAS could have been released to the environment if JP-7 fuel was burnt or used to ignite fires at SWMU 68.

The following documents were reviewed to obtain historical information about the activities conducted at SWMU 68:

- Phase I/II Environmental Condition of Property (ECP) Report (NAVFAC Atlantic, 2005)
- Phase I Resource Conservation and Recovery Act Facility Investigation (RFI) Report (CH2M/Baker, 2008)
- Corrective Measures Study Final Report (Rightway/Baker, 2009)
- Corrective Measures Implementation Closeout Report (Rightway, 2012)

3 Background

SWMU 68 is located at the southwest end of the former Ofstie Airfield within a flat-lying open area surrounded by secondary growth vegetation (**Figure 1**). The SWMU covers approximately 18 acres and includes portions of a freshwater wetland (**Figure 2**). SWMU 68 was originally identified in 2004 during the Aerial Photography Analysis portion of the ECP. Aerial photographs taken in 1961 and 1964 revealed a circular, graded area free of vegetation with an aircraft fuselage and two stained areas consistent with a fire training area. Interviews conducted with

facility staff confirmed former use as a fire training area. The physical site inspection conducted during the ECP observed a disturbed circular area consistent with that of a fire training area, but no stressed vegetation or stained soils were visible.

Subsequent to identification of the SWMU, several investigations were conducted to determine if a release resulting from firefighting activities occurred. The investigations included collection of groundwater, surface soil, and subsurface soil samples for analysis of volatile organic compounds, semivolatile organic compounds, metals, and total petroleum hydrocarbons (gasoline range organics and diesel range organics). Samples were not analyzed for PFAS because they were not commonly analyzed at the time and have recently been identified as emerging contaminants. The investigations concluded that metals in surface soil posed a potential unacceptable ecological risk. A Statement of Basis was prepared in 2010 that proposed excavation and offsite disposal of the contaminated surface soil as the final corrective measure with no long-term restrictions, controls, or monitoring thereafter. The corrective action was completed in 2011 and approximately 600 cubic yards of metals-impacted soil, to a depth of 2 feet below ground surface, were removed from SWMU 68 (Right Way Environmental Contractors, Inc., 2012). Additional details of the investigations and actions taken at the SWMU are provided in the documents listed in Section 2.

4 Per- and Polyfluoroalkyl Substances Assessment

Although there is no official documentation of the dates that SWMU 68 was used for firefighting training, facility staff indicated during interviews conducted for the ECP that they believed SWMU 68 was only operational in the 1950s and early 1960s. The Fire Training Pit at Crash Crew Area (SWMU 14) at NAPR became operational in 1963 (Greenleaf/Telesca, 1984) and it is likely that fire training activities at SWMU 68 ceased around this time. The aerial photographs taken in 1964 corroborate this scenario, as it was evident that vegetation had started to grow back at SWMU 68 when comparing the 1961 and 1964 aerial photographs. **Figure 2** includes a depiction of the extent of the cleared vegetation in 1961 and 1964 based on the 1961 aerial photograph and information obtained from the Phase 1 RFI. **Attachment 1** shows the 1961 aerial included in the Phase 1 RFI. The 1964 aerial could not be located. It is unlikely that AFFF was used to extinguish fires at SWMU 68 as operations ceased in approximately 1963, and the military did not implement widespread use of AFFF to extinguish fires until 1970.

According to facility personnel, supersonic aircraft were not stationed at NAPR. The fuels used at the facility consisted of JP-5, diesel fuel marine, motor gasoline, and Avgas (Naval Facilities Engineering Command Atlantic, 2005). Therefore, there is no evidence that releases of PFAS associated would be associated with use of JP-7 fuels at SWMU 68.

5 Conclusions and Recommendations

There is no evidence of activities that would have resulted in a PFAS release at SWMU 68. Therefore no further investigation or action is recommended to address potential PFAS impacts at this site. Documentation of this evaluation will be included in the Statement of Basis for SMWU 68 for public review and comment as part of the final corrective measures determination.

6 References

- Agency for Toxicological Substances and Disease Registry (ATSDR). 1995. *Toxicological Profile for Jet Fuels JP-4 and JP-7*. June.
- CH2M HILL, Inc. (CH2M) and Baker. 2008. *Revised Final Phase I Resource Conservation and Recovery Act Facility Investigation Report, SWMU 68, Former Southern Fire Training Area*. July 11.
- Greenleaf/Telesca. 1984. *Initial Assessment Study of Naval Station Roosevelt Roads, Puerto Rico*. September.
- Naval Facilities Engineering Command Atlantic (NAVFAC Atlantic). 2005. *Phase I/II Environmental Conditions of Property Report, Former U.S. Naval Station Roosevelt Roads, Ceiba, Puerto Rico*. July 15.
- Rightway Environmental Contractors, Inc. and Baker Environmental, Inc. (Rightway/Baker). 2009. *Corrective Measures Study Final Report, SWMU 68*. June 12.
- Rightway Environmental Contractors, Inc. (Rightway). 2012. *Corrective Measures Implementation Closeout Report SWMU 68 – Former Southern Fire Training Area*. May.
- United States Air Force (USAF). 1998. *Turbine Fuel, Low Volatility, JP-7 Specification. MIL-DTL-38219D (USAF)*. August 21.
- USAF. 2012. *Interim Guidance on Perfluorinated Compounds*. September 17.

Figures



LEGEND

- SWMU 68 Boundary
- Boundary Naval Activity Puerto Rico

Imagery:
 DigitalGlobe WorldView2
 May 3, 2013
 0.5m resolution.

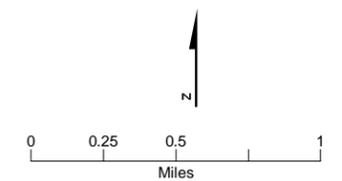


FIGURE 1
Naval Activity Puerto Rico and
SWMU 68 Location
Naval Activity Puerto Rico
(Former Roosevelt Roads Facility)
Ceiba, Puerto Rico



- LEGEND
- Freshwater Emergent Wetland
 - Freshwater Forested/Shrub Wetland
 - Area free from Vegetation (1961)
 - Area free from Vegetation (1964)
 - SWMU 68 Boundary
 - Boundary Naval Activity Puerto Rico

Note:
 Green and Purple boundaries are based on an evaluation of historical aerial photographs showing the portions of SWMU 68 that were clear of vegetation in the respective years

Imagery:
 DigitalGlobe WorldView2
 May 3, 2013
 0.5m resolution.

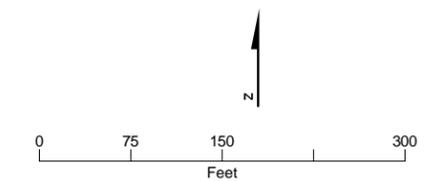
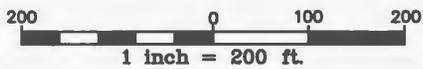


FIGURE 2
SWMU 68 Vicinity
Naval Activity Puerto Rico
(Former Roosevelt Roads Facility)
Ceiba, Puerto Rico

Attachment 1



LEGEND

- - 1961 POLYGON FEATURE
- - 1961 DRAINAGE
- - 1964 POLYGON FEATURE
- - EXISTING SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION (PHASE II ECP INVESTIGATION)
- ⊙ - PROPOSED SAMPLING LOCATIONS
- ◊ - ECP SITE BOUNDARY

SOURCE: GEO-MARINE, INC., SEPTEMBER 6, 2000.

FIGURE 2-4
1961 AERIAL PHOTOGRAPH
WITH SAMPLE LOCATIONS
FORMER SOUTHERN
FIRE TRAINING AREA
PHASE I RFI SWMU 68
NAVAL ACTIVITY PUERTO RICO