Radford Army Ammunition Plant

FACT SHEET
SWMU 54

Introduction

This fact sheet describes the selected action for contaminated soil and groundwater at Solid Waste Management Unit (SWMU) 54 – the Propellant Burning Ash Disposal Area at Radford Army Ammunition Plant (RFAAP). This alternative was selected in accordance with Part II(D)(11-21) Interim Measures (IM) of the *RFAAP Corrective Action Permit* (USEPA, 2000a). This removal action work is being performed in accordance with Contract No. W912QR-04-D-0027-DA04.

Background

SWMU 54 consists of two non-contiguous disposal areas; Area A is an approximately 0.58-acre triangular shaped area in the southern portion of SWMU 54, and Area B is an approximately 1.09-acre area in the northern portion of SWMU54.

The RFAAP Resource Conservation and Recovery Act (RCRA) Corrective Action Permit identified SWMU 54 as an area of concern that had the potential to pose a threat or potential threat to human health and the environment. The Resource Conservation and Recovery Act (RCRA) Facility Assessment (USEPA, 1987) indicated that, according to plant personnel, propellant ash disposal occurred on the surface, with no routine disposal in pits or trenches. Four previous investigations have been conducted at this site prior to completion of an interim removal measure in 1999 by Parallax, Inc that consisted of the excavation of "hot spot" areas of lead and explosives in soil.

RCRA Facility Investigation (RFI)/Corrective Measures Study (CMS)

The RCRA facility investigation (RFI) field efforts were conducted at the site in 2008 by URS. The assessment indicated that the main concern at the site is the fill material and grossly-contaminated soil directly below the material. The main parameters of concern in Area A soil are lead, 2,4,6-TNT, DNT, RDX, amino DNTs, NG, heptachlor epoxide, and dioxins/furans. Parameters of concern in Area B soils include lead, DNT, amino DNT, NG, RDX, dieldrin, Aroclor 1254, heptachlor epoxide, and dioxins/furans.

Based on the results from the Human Health and Risk Assessment (HHRA), it was concluded that based on the levels detected in the soil hot spot areas, Contaminants of Interest (COIs) could potentially leach from soil to groundwater at levels of concern, although groundwater impacts at levels of concern have not yet been identified at Area B. Because the RFI demonstrated that COI contamination is present at concentrations associated with unacceptable human health concerns, a Corrective Measures Study (CMS) was performed to address the propellant ash material and grossly-contaminated soil under the ash material at SWMU 54. The alternatives evaluated were as follows:

- Alternative One: No Further Action;
- Alternative Two: Excavation of Soil at Area A and Area B, Off-site Disposal, and Monitored Natural Attenuation (MNA) of Groundwater; and,
- Alternative Three: Excavation of Soil at Area A and Area B, Off-site Disposal, and Enhanced *In Situ* Bioremediation of Groundwater.

Alternative Two, which entails excavation and off-site disposal as the primary remediation process, was found to achieve the corrective measures objective. Therefore, Alternative Two was selected as the final alternative for SWMU 54 because it is implementable and provides a greater level of protection to human health and the environment not provided by other alternatives. In addition, Alternative Two is the sole alternative that facilitates remedial goals without potential adverse effects to groundwater (i.e., degradation

of secondary water quality parameters) from remedial implementation activities, which would occur with implementation of Alternative Three.

Implementation of the Selected Corrective Measures

The selected alternative has the main goal of mitigating the further leaching of explosives constituents from soil to groundwater at levels that would potentially increase concentrations and adversely impact future beneficial use of groundwater. Remedial goals (RGs) were developed and used to confirm that all Contaminants of Interest (COIs) were removed to levels that are safe for human health and the environment. The RGs were used to compare results from confirmation samples collected after removal of the propellant ash fill and grossly-contaminated soil immediately below the fill. Confirmation samples were collected from the side walls and bottom of the excavation after visual signs of the propellant ash were removed, and concentrations were compared to the RGs to confirm that the propellant ash and grossly-contaminated soils were removed. Excavation efforts continued until confirmation sample concentrations were below the RGs. The site was then restored and vegetated. Shaw removed approximately 12,678.65 tons of contaminated soil from SWMU 54: 5,857.47 tons from Area A and 6,821.18 tons from Area B. The corrective measures soil site work was completed in October 2010.

Shaw submitted an Interim Measures Completion Report for the removal action of contaminated soil from SWMU 54 to the Environmental Protection Agency (EPA) and Virginia Department of Environmental Quality (VDEQ) in April 2011, which was approved in August 2011.

MNA of the groundwater is currently being performed per an approved work plan. Four additional wells were installed downgradient of Area A and Area B to aid in gathering long term groundwater data. Twelve quarters of groundwater sampling have been completed. After Quarter 9, the monitoring program was reduced to three down gradient wells (54MW10, 54MW12, and 54MW13) which have had COI concentrations above RGs and an upgradient well (54MW1). Samples collected in the first twelve quarters were analyzed for explosives, perchlorate, and MNA indicators. During Quarters 10 through 12, samples were also analyzed for RDX breakdown products.

Based on COI concentrations and biological indicator parameters measured in groundwater during Quarters 1 through 12, MNA processes including biodegradation (for 2,4,6-TNT and RDX), sorption, dilution, dispersion, and chemical stabilization are occurring at SWMU 54. Perchlorate has been detected in the SWMU 54 monitoring well network from non-detect to 22.8µg/L. The Maximum Contaminant Level (MCL) for perchlorate at RFAAP is 15µg/L. The MCL for perchlorate was exceeded in two of the eight quarters of sampling, in the same monitoring well at SWMU 54. Perchlorate was not detected in the pore water samples collected at SWMU 54. All perchlorate concentrations in the third year of sampling were below the RG and showed a steady decline in concentrations during that period.

Groundwater monitoring will continue at SWMU 54 on a quarterly bases at three down gradient wells (54MW10, 54MW12, and 54MW12). In addition, one upgradient well (54MW1) will continue to be monitored.