

EXECUTIVE SUMMARY

The Department of Defense (DoD) has established the Military Munitions Response Program (MMRP) under the Defense Environmental Response Program to address DoD sites suspected of containing munitions and explosives of concern (MEC) or munitions constituents (MC). Under the MMRP, the U.S. Army Corps of Engineers (USACE) is conducting environmental response activities at Formerly Used Defense Sites (FUDS) for the Army, DoD's Executive Agent for the FUDS program. Shaw Environmental, Inc. (Shaw) is responsible for conducting Site Inspections (SIs) at FUDS in the northwest region managed by the Omaha District Military Munitions Design Center.

SI Objectives and Scope

The primary objective of the MMRP SI is to determine whether a FUDS project warrants further response action under the Comprehensive Environmental Response, Compensation, and Liability Act. The SI collects the minimum amount of information necessary to make this determination, as well as it (i) determines the potential need for a removal action; (ii) collects or develops additional data, as appropriate, for Hazard Ranking System scoring by the Environmental Protection Agency; and (iii) collects data, as appropriate, to characterize the release for effective and rapid initiation of the Remedial Investigation and Feasibility Study. An additional objective of the MMRP SI is to collect the additional data necessary to complete the Munitions Response Site Prioritization Protocol (MRSPP).

The scope of the SI reported herein is restricted to evaluation of the presence of MEC or MC related to historical use of the FUDS prior to transfer. Potential releases of hazardous, toxic, or radioactive wastes are not addressed within the current scope. The intent of the SI is to evaluate the presence or absence of MEC and/or associated MC contamination.

Camp Abbot

This report presents the results of an SI conducted at Camp Abbot, FUDS identification number F10OR0041, located approximately 15 miles south of Bend, Deschutes County, Oregon. Camp Abbot was commissioned in 1943 and was used primarily for training engineer soldiers. Camp Abbot was decommissioned in June 1944. In November 1947, the Army relinquished its permits for use of Forest Service land.

Technical Project Planning

The approach for the SI was developed by Shaw in consultation with site stakeholders. A Technical Project Planning (TPP) meeting conducted in April 2006 was attended by representatives from the USACE Omaha Design Center; USACE Hazardous, Toxic, and Radioactive Waste Center of Expertise; USACE Seattle District; Oregon Department of

Environmental Quality (ODEQ); Shaw; Sunriver Owners Association; and Sunriver Resort. The stakeholders agreed to the approach and identified seven areas of concern (AOCs) – Range Complex No. 1, Anti-Tank Range, Demolition Area, Mortar Range, Grenade Courts, Burial Pit, and Chemical Training Area – for further evaluation in the SI.

SI Field Activities

SI field activities, conducted in September 2006, included a site reconnaissance to look for evidence of MEC and to avoid MEC during sampling. Samples were collected from groundwater, surface water, sediment, and surface soil and analyzed for metals, explosives, and/or perchlorate depending on the media and AOC sampled.

No MEC or munitions debris was identified at Range Complex No. 1 or the Grenade Courts during the visual reconnaissance. Since MEC has been previously confirmed at the Anti-Tank Range, Demolition Area, and Mortar Range (Explosives Munitions Ranges), no further reconnaissance was performed. A visual reconnaissance for the site of the Burial Pit did not reveal its location. No visual reconnaissance was performed for the Chemical Training Area based on its close location to the former cantonment area, the current development that has occurred in the area, and the limited activities that occurred in the area.

SI Recommendations

Results of the SI provide the basis for conclusions and/or recommendations for further actions at each of the AOCs.

Range Complex No. 1 (Small Arms Ranges)

Based on historical evidence and results from the SI field activities, the MEC risks are low and Range Complex No. 1 is recommended for No Department of Defense Action Indicated (NDAI) with respect to MEC.

Ecological screening of lead results that also exceeded background indicate that adverse ecological impacts from barium, lead, mercury, and zinc concentrations in sediments and soil may occur. There are no human health impacts indicated. As agreed to during the TPP and documented in the data quality objectives (DQOs), “If sample results do not exceed human health screening values but do exceed both ecological screening values and background values, additional evaluation of the data will be conducted in conjunction with the stakeholders to determine if additional investigation is warranted.” Therefore, no recommendation for either NDAI or remedial investigation/feasibility study (RI/FS) with respect to MC is made until consultation with the stakeholders is completed.

Explosive Munitions Ranges (Anti-Tank Range, Demolition Area, and Mortar Range)

Based on historical evidence, and results of the SI field activities, there is evidence of MEC, munitions debris, and use of explosives occurring within the Anti-Tank Range, the Mortar Range, and the Demolition Area. Based on the historical occurrence of MEC, the Anti-Tank Range, the Mortar Range and the Demolition Area are recommended for RI/FS.

Iron detected at concentrations above the background and human health screening value in soil samples from the Demolition Area and the Mortar Range indicate that adverse human health effects may occur. However, iron is a common rock forming mineral. The bedrock at Camp Abbot is basaltic, which has high iron content. These elevated iron concentrations may reflect natural variation in the soils.

The ecological screening value was exceeded for barium, chromium, and lead in soil samples. The exceedances indicate that adverse ecological impacts may occur in sediments and soil. As agreed to during the TPP and documented in the DQOs, "If sample results do not exceed human health screening values but do exceed both ecological screening values and background values, additional evaluation of the data will be conducted in conjunction with the stakeholders to determine if additional investigation is warranted." No recommendation for either NDAI or RI/FS is made relative to MC until consultation with the stakeholders is completed.

Grenade Courts

Historically, no MEC or munitions debris, other than a grenade spoon and expended lead bullets, have been found at the Grenade Courts. Based on the types of MEC that may be present and the limited investigation that has been conducted, the overall MEC risk is considered to be moderate and the Grenade Courts area is recommended for RI/FS.

All analytical results for MC were below human health screening values. The ecological screening value was exceeded for nickel in a sediment sample, which may indicate adverse ecological impacts in sediments. However, the detected concentration may reflect the natural variation of nickel in sediment. As agreed to during the TPP and documented in the DQOs, "If sample results do not exceed human health screening values but do exceed both ecological screening values and background values, additional evaluation of the data will be conducted in conjunction with the stakeholders to determine if additional investigation is warranted." No recommendation for either NDAI or RI/FS is made relative to MC until consultation with the stakeholders is completed.

Burial Pit

The Burial Pit was identified in the *Archives Search Report* (USACE, 1995) as occurring near the landfill and appearing as a "horseshoe-shaped area, bermed and ringed with stone" potential ordnance disposal pit. An extensive search of the area was completed

during the SI and no evidence of the Burial Pit was found. There have been no reports of MEC or munitions debris from this pit. Because the pit could not be located, no MC samples were collected. Based on this, the Burial Pit is recommended for NDAI for both MEC and MC.

Chemical Training Area

No MEC or munitions debris has been reported at the Chemical Training Area. This AOC is currently located within a housing development. No MC samples were collected from this area because any chemical agents that may have been released would be in very small quantities associated with “sniff” sets, and if released the agents would not be expected to persist in the environment. Based on the above, the Chemical Training Area is recommended for NDAI for both MEC and MC.