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FINAL
OPERATIONAL RANGE ASSESSMENT PROGRAM REPORT
FORT HOOD, TEXAS

To meet Department of Defense (DOD) requirements and support the United States (U.S.) Army's Sustainable Range Program, the Army is conducting assessments to determine whether a release or substantial threat of release of munitions constituents of concern (MCOC) from an operational range to an off-range area creates a potentially unacceptable risk to human health or the environment. The initial assessment—Phase I—was a qualitative evaluation of whether (a) a MCOC source existed on the operational range footprint, (b) there is a potential migration mechanism and (c) human or sensitive ecological receptors are present. For the operational range footprints having a potentially complete source-receptor pathway, the Army conducted a Phase II, a quantitative assessment of potentially complete pathways of MCOC. This ORAP Phase II Report presents evaluation of source-receptor pathways at Fort Hood, Texas. EA Engineering, Science and Technology, Inc. (EA) conducted this evaluation under contract W912DR-05-D-0018 to the U.S. Army Corps of Engineers (USACE)-Baltimore District.

Initially, the ORAP Phase II establishes whether the source-receptor pathway identified during Phase I is complete or new information has been identified that would impact the Phase I's conclusions. To determine whether MCOC are potentially leaving an operational range footprint by an identified pathway (e.g., groundwater or surface water) and pose a potential risk to off-site receptors, the Phase II considers existing and any new sampling data. The ORAP team may accomplish Phase II through reevaluating existing literature (e.g., prior sampling and/or reports), modeling, and/or collecting additional samples. In Fort Hood's Phase II report, available information was used to establish a weight-of-evidence case that determines whether there has likely been release from the operational range footprint that may pose a potentially unacceptable risk to an off-range receptor.

Fort Hood is comprised of approximately 218,502 acres of land located in Bell and Coryell counties in central Texas, approximately 60 miles north of Austin and 50 miles southwest of Waco. The installation is bound on the north by the city of Gatesville, on the east by Belton Lake and the town of Temple, on the south by the city of Killeen, and on the west by the town of Copperas Cove.

The Phase I was conducted at Fort Hood by EA Engineering, Science, and Technology (EA) for 193 operational ranges covering 198,257 acres (EA 2008). The ranges were evaluated based on three components: 1) whether they contained sources of potential munitions constituents of concern (MCOC), 2) the presence of MCOC migration pathways (surface water and/or groundwater) from operational ranges to off-range areas, and 3) the presence of off-range human and/or ecological receptors. The ranges were grouped based on these components and categorized as either "Unlikely" (MCOC are unlikely to migrate to off-range receptors at concentrations that pose an unacceptable risk), or "Inconclusive" (a determination could not be made based on readily available information).

Based on the results of the Phase I, 18 operational ranges were classified as Inconclusive because existing information was insufficient to make a source-receptor interaction determination, and/or indicated the potential for such interaction to be occurring. Following a review of the Phase I, and using additional information obtained during the Phase II site reconnaissance, the CSM was refined to account for range boundary overlap. As a result, the Inconclusive range area was adjusted from 18 ranges totaling 15,718 acres to a portion of 20 ranges totaling 17,594 acres.

Based on the potential for source-receptor interactions via the surface water pathway, detailed conceptual site models were developed for four subwatersheds (Turnover Creek, Henson Creek, North Fort Hood, and Owl Creek), which encompass the Inconclusive range areas. EA conducted the Phase II multi-season field sampling events in the Inconclusive range complex from May to November 2010.

Four rounds of surface water and three rounds of sediment samples were collected from six locations across the four subwatersheds. Two rounds of benthic macroinvertebrate samples were collected from the three perennial stream locations, where appropriate flow and habitat were present. Reference surface water (two locations), sediment (two locations), and benthic macroinvertebrate (one location) samples were collected from locations upstream of the Inconclusive range areas.

Samples of surface water and sediment were analyzed for explosives, metals, and water quality parameters (pH, temperature, conductivity, oxidation reduction potential, and dissolved oxygen). Media-specific analytes included perchlorate and hardness in surface water and total organic carbon in sediment. Benthic macroinvertebrate populations were also sampled and habitats assessed.

No explosives were detected in any surface water or sediment samples. Low levels (orders of magnitude below standards) of perchlorate were observed at several downstream sampling locations.

No metals were detected above screening levels in any surface water or sediment samples. Additionally, in general, the average downstream concentrations of metals were not significantly higher than average reference concentrations for surface water or sediment.

Benthic macroinvertebrate surveys determined that the ecological habitat and overall health within upstream and downstream areas are similar (suboptimal). Although upstream and downstream conditions were classified as suboptimal, it was determined that they resulted from a lack of habitat and not MCOC contamination.

The results of Fort Hood's Phase II show that MCOC from the operational ranges are not migrating at levels that pose an unacceptable risk to off-range human and or ecological receptors. Therefore, the Inconclusive ranges should be re-categorized as Unlikely and the operational ranges at Fort Hood should be placed into a periodic review program under the ORAP (**Figure 1**).

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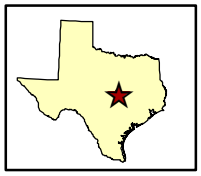
Operational Range Assessment Program
Phase II Quantitative Assessment
U.S. Army Garrison Fort Hood, Texas

Figure 1
Phase II Conclusions



Installation Data
- Installation Boundary
- Non-Operational Area

Range Data
- Inconclusive
- Unlikely

Hydrology
- Intermittent Stream
- Perennial Stream
- Water Body

Data Sources:
ARID-GEO, May 2006
ESRI, StreetMap, 2006

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