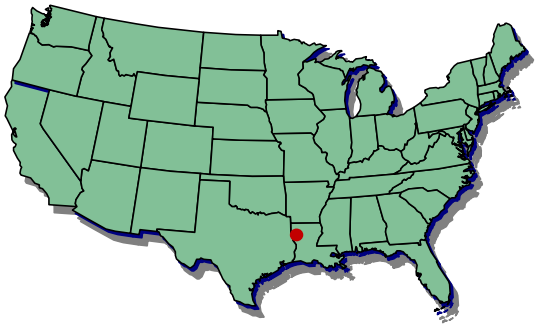
High-Resolution UXO Geophysical Site Investigations at Five East Reservation Bomb Ranges, Barksdale AFB



Client Name:

Air Force Center for Environmental Excellence (AFCEE)
Barksdale AFB Environmental Restoration Program

Project Description

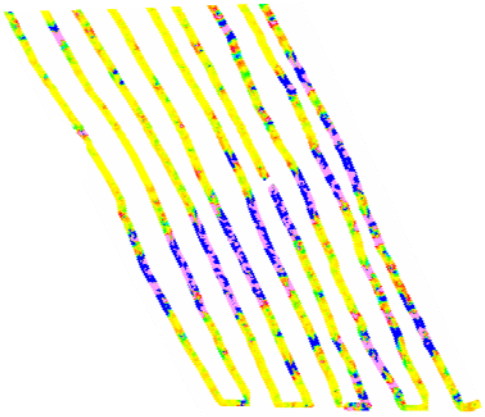
High-resolution UXO geophysical site investigations (SI) were conducted at five historical bombing ranges, totaling 1,900 acres. Before the SI was designed and conducted, a geophysical prove-out (GPO) was performed to determine the preferred geophysical instrument configurations and survey techniques for production SI work. For the SI, a work plan was developed and included an interim conceptual site model (ICSM), data quality objectives (DQO), health and safety plan (HASP), UXO support plan, geophysical investigation plan, sampling and analysis plan (SAP), as well as geographic information system (GIS) plan. The project objectives were to estimate the general quantity and distribution of medium and large WW II ERA UXO items (25-lb to 100-lb bombs, respectively) within the upper 10 to 15 feet of subsurface. As well, an explosives safety submission (ESS) was developed and submitted to Barksdale AFB in support of planned UXO remediation.

Geometrics G-858 Magnetic Gradiometer System w/ DGPS

100-lb Bomb

Work Performed

A Geometrics G-858G cesium vapor magnetic gradiometer was used to collect total magnetic field semicontinuously (10 readings/second) along meandering and linear transects and within grid-based survey areas. The meandering and linear transects were utilized to locate large features such as impact areas, open burn/open detonation sites and landfills, and to determine the lateral extents of MEC contamination. The grid-based surveys provided 100% geophysical data coverage and were conducted to locate possible UXO items as well as provide statistical information about target density and anomaly characteristics. The magnetic instruments were coupled to DGPS, RTK-GPS and robotic total station (RTS) to provide real-time data positioning.



Total Magnetic Field Survey along Linear Transects Spaced 100-ft apart in Open Areas

Analysis and Results

A total of 538,353 linear feet of magnetic data were collected including 244,577 linear feet of meandering and linear transect survey data and 293,776 linear feet of grid-based (100% coverage) survey data. The magnetic data were analyzed using the total magnetic field and analytic signal data employing Geosoft's Oasis Montaj® and UXO-Detect® programs. A statistical analysis was conducted to help quantify munitions response site (MRS) size, target densities, probability of detection, and update the CSM for each site. The geophysical

as well as soil sampling data were integrated with the GIS program ArcGIS geographic database (geodatabase) environment developed by Environmental System Research Institute (ESRI) and conformed to the Spatial Data Standards for Facilities, Infrastructure and Environment (SDSFIE). This integration allowed for spatial analyses of the various attribute and spatial data that included qualitative and quantitative sample information such as source type, quantity, prioritization, contamination, etc. The SI design and field work was successful in meeting the project DQOs including in confirming the boundaries of the five area of concerns (AOC), identify MRSs, interpolate MRS boundaries, estimated quantity and distribution of possible UXO, and interpret ed the munitions range type for the MRSs.

Total Magnetic Field Survey along Meandering Paths in areas of Thick Undergrowth. 100% QC grid-based data collected in select areas to improve target characterization.