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LETTER OF TRANSMITTAL AND PROPOSED GEOPHYSICAL SURVEY APPROACH FOR SITE 12 JERICHO ISLAND DISPOSAL AREA MCRD PARRIS ISLAND SC
2/3/1998
BROWN AND ROOT ENVIRONMENTAL

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Foster Plaza VII
661 Andersen Drive
Pittsburgh, PA 15220-2745

(412) 921-7090
FAX: (412) 921-4040

Brown & Root Environmental

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Project Number 7803

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Commanding Officer
Department of the Navy
SOUTHNAVFACENGCOM
ATTN: Art Sanford (Code 1862)
2155 Eagle Drive
North Charleston, South Carolina 29406

Reference: Clean III Contract No. N62467-94-D-0888
Contract Task Order No. 0053

Subject: Parris Island, Marine Corps Recruit Depot; South Carolina
Site 12/SWMU 10, Jericho Island Disposal Area
Boundary Investigation Approach & Schedule

Dear Mr. Sanford:

Please find enclosed as Attachment 1, the proposed geophysical survey approach for supporting investigation of Site 12/SWMU 10, Jericho Island Disposal Site, Marine Corps Recruit Depot, Parris Island, South Carolina.

Comments to the approach of the geophysical survey are requested by February 13, 1998. If you have any questions or require clarification, please contact myself at (412) 921-8916 or Jason Brown at (412) 921-8401.

Very truly yours,

Mark P. Speranza

Mark P. Speranza, P.E.
Task Order Manager

MPP/dt
Enclosure

c: D. Evans-Ripley, SOUTHDIV (w/o enclosure)
T. Harrington, MCRD Parris Island
K. Lapierre, U.S. EPA
D. Hargrove, SCDHEC
S. Peterson, SCDHEC
P. Went, SCDNR
T. Dillon, NOAA
D. Duncan, U.S. Fish and Wildlife
K. Atchley, Bechtel Environmental, Inc.
D. Wroblewski, B&R Environmental
M. Perry, B&R Environmental
J. Brown, B&R Environmental
T. Jordan, B&R Environmental
G. Wagner, B&R Environmental
File 7803

Attachment 1
Site 12/SWMU 10, Jericho Island Disposal Area
Proposed Geophysical Survey Approach

Brown and Root Environmental (B&R Environmental) is pleased to submit the proposed approach and schedule of field activities for supporting investigation of Site 12/SWMU 10, Jericho Island Disposal Site, Marine Corps Recruit Depot, Parris Island, South Carolina. Over the next month, an initial site visit followed by geophysical survey is planned for delineating the limits of the Site 12/SWMU 10 landfill. The purpose and proposed approach of the site visit and geophysical survey is detailed in the following paragraphs.

One-Day Site Visit

A one-day site visit will be conducted to determine the best approach for geophysical data collection. This visit has been coordinated with Tim Harrington of the MCRD and scheduled for Monday, February 9, 1998. A geophysicist, Thomas Jordan, and project engineer, Jason Brown, from the Pittsburgh office of B&R Environmental will attend the site visit.

During this site visit, B&R Environmental staff will become familiar with the site and test geophysical instrumentation. Specifically, B&R Environmental personnel will determine the effectiveness of a global positioning system (GPS) under site-specific conditions and assess the feasibility of mobilizing field equipment.

B&R Environmental has successfully used differential GPS techniques to provide station and location information for magnetometer, electromagnetic (EM) and ground penetrating radar (GPR) surveys. These GPS and geophysical investigations have been conducted in various types of forested and non-forested settings. B&R Environmental has determined that the use of GPS allows for the rapid and accurate collection of location data for geophysical surveys without the need for surveying and staking a conventional reference grid system.

B&R Environmental staff will visit the site with Magellan X-CP sub-meter resolution differential GPS receivers. A higher resolution Ashtech differential GPS may also be available at the time of this site visit. The Ashtech GPS, if available, will be mobilized to determine if it is more suitable for collecting position data under site-specific conditions.

The location of potential GPS base station sites will be evaluated for their suitability for this investigation. The GPS base station will be setup over a known point such as a surveyed monitoring well, a site benchmark, etc. The base station GPS will be configured to collect data at 1-second intervals and will collect data throughout the day. The mobile GPS will also be configured to collect data at 1-second intervals. GPS data will be collected along known landmarks (e.g., benchmarks and roads) and in the wooded areas of the site. Collected GPS data will be downloaded and processed in the office to determine its accuracy and the ease of data collection in the wooded areas.

The Site/SWMU will also be photographed for the purpose of evaluating the level of effort required to obtain GPS and magnetometer data. This evaluation will be used to determine whether clearing will be required prior to the mobilization of the geophysical equipment and professional staff. A suitable location for the base station magnetometer will also be determined during the one-day site visit.

Geophysical Survey

Based on the information gathered during the one-day site visit, a geophysical survey will be conducted for the determining the Site 12/SWMU 10 landfill boundary. At this date, the duration of the geophysical survey is anticipated to last seven days. B&R Environmental proposes March 2 - 8, 1998 as the dates of this geophysical survey

The geophysical survey will require a geophysicist and a field technician to be present on site. A cesium vapor gradiometer, a base station proton precession magnetometer, and a GPS device will be mobilized to delineate the presence of landfill materials at this site. Areas that may require clearing for mobilizing equipment and personnel will be identified during the one-day site visit. Heavily vegetated areas of the site where data collection is critical will be cleared prior to the mobilization.

A Geometrics G-858 cesium vapor magnetometer and gradiometer will be used for the geophysical survey. The G-858 is a digital magnetometer equipped with a magnetic field sensor located on the end of an aluminum pole that is positioned approximately 6-feet ahead of the operator. The magnetic field sensor is referred to as Sensor 1. Total field data are susceptible to diurnal drift and are collected in units of nanoTeslas (nT). Total field data are used to identify the presence of large buried metallic features and to map the presence of geologic features.

A second magnetic field sensor (Sensor 2) will be attached 1-meter above the first sensor and is oriented vertically. The total field magnetic data obtained from Sensor 2 is subtracted from the total field magnetic data obtained from Sensor 1 and the difference is divided by the separation distance (3-feet). The results represent a measurement of the vertical magnetic gradient in units of nT/meters. Vertical gradient data are often used to map the presence of near surface features such as buried anthropogenic features or shallow geologic features such as alluvial fans.

The G-858 will be configured to collect data at 1-second intervals during this geophysical survey. Data will be collected in areas that are accessible with the gradiometer and GPS instruments. All data will be stored in the device's internal digital data logger. The instrument's sensors will be allowed to warm-up following methods outlined in the manufacturers operations manual. The data logger will be time synchronized to the GPS such that the data files can be correlated upon completion of each days field work.

The Space Environmental Agency will be contacted prior to the initiation of the magnetic survey. The Space Environmental Agency provides magnetic forecast data for military and civilian purposes and indicate the presence or projects the potential for magnetic storms. Magnetic storms can result in rapid and significant localized changes in the earth's magnetic field that can equal or exceed several hundred

nTs. The existence of a magnetic storm during data collection often results in the data being uninterpretable.

Diurnal drift data will be collected in the field using a Geometrics 856AX proton precession magnetometer. The Geometrics 856AX will be set up in an area believed to be free of anthropogenic features such as buried utilities, metallic debris or other features. The proton precession magnetometer device will be designated the base station magnetometer and will be programmed to collect a data value every 30-seconds during the field operations. The use of a proton precession magnetometer is acceptable as a base station because the dynamic range of the readings is anticipated to be small.

Data will be initially processed in the field using the manufacturers software MAGMAP96. The purpose of the preliminary processing will be to ensure that the data is complete and of high quality. Final processing will be performed in the office using the software OASIS. These data will be gridded using an random data gridding algorythm. Any digital planimetric data showing roads, buildings or other site features will be overlain onto the magnetometer and gradiometer results. These results will be presented in the South Carolina State Plain Coordinate System referenced to either the NAD83 or NAD27 datum.