Appendix G

Geophysical Survey Memo

Shaw Environmental & Infrastructure, Inc.

Shaw The Shaw Group Inc.

5301 Central Avenue Suite 700
Albuquerque, New Mexico 87108-1513
505-262-8800
Fax: 505-262-8855

Memorandum

Date: November 29, 2005

To: Tom Mathison

CC: Tony Sheeran

From: Cory Gilbert, Chuck Nycum

RE: Shaw Geophysics performed at Former Schenectady Army Depot

Geophysical surveys were performed at the Former Schenectady Army Depot on November 18th and 19th, 2005. The objective for these geophysical surveys was to delineate the lateral extents of potential buried drums associated with two drum nests. The approach for this investigation was to conduct two different types of surveys covering all areas where the brush was cleared. Magnetometer and frequency-domain electromagnetic surveys were originally planned. However due to time and weather constraints, only magnetometer data was collected. The decision to collect magnetometer data was based on the judgment of field personnel, and it is anticipated that the omission of the frequency-domain electromagnetic data will not hinder the detection off potential buried drums.

Instrumentation

The gradiometric magnetometer utilized for this survey is the Geometrics G-858G magnetometer. The G-858G, which is an optically pumped cesium vapor instrument, measures the intensity of the earth's magnetic field in nano-Tesla (nT, 1 nT = 1gamma).

Anomalies in the earth's background magnetic field are caused by remnant and induced magnetic fields associated with buried targets. Remnant magnetism refers to the initial magnetic field developed in an object when it was formed (e.g., when steel is cooled to create a metal pipe). Induced magnetic anomalies, which are the case in this survey, result from the induction of a secondary magnetic field in a ferromagnetic material (such as pipelines, drums, tanks, or well casings). Induced magnetism can be caused by long-term exposure to the earth's magnetic field or other magnetic objects, or by the sudden impact of an object.

Magnetic survey data are typically presented as plan-view contour maps. Due to the dipolar nature of magnetic signal, an analytic signal filtering method is applied to the data. The analytic signal is the square root of the sum of the squares of the derivatives in the x, y, and z directions. This method converts the dipolar nature of the data to monopolar and thus

Shaw The Shaw Group Inc.

Memorandum

enhances the final map product and presents anomalous areas in a manner that is visually easier to explain and interpret. The maps are color-enhanced to aid in interpretation of subtle anomalies. Figure 1, shown in the attached *Figures* section, presents the results of the magnetometer data collected at the Former Schenectady Army Depot.

Field Survey

The survey area consisted of three haul roads, each trending roughly northwest-southeast with thick brush and vegetation between them. The northern portion of the site was considerably lower in elevation than the southern half. Due to recent rains the ground was quite muddy, especially after it began to thaw throughout the morning.

Data were collected over each of the haul roads, as well as along each transect that had been cut between them. Additionally data were collected in the northern half of the upper pit and around the spoils pile on the southern edge of the site.

Due to problems encountered with the rental GPS unit, the data were collected fiducially. Therefore, the site was gridded and marked with paint at specific intervals measured with a measuring tape. In this instance, data were collected along lines spaced five feet apart. Within each line, data were collected continuously at 10 hertz (Hz) with markers collected within the dataset at 10 foot intervals to ensure ground locations were consistent and accurate. A spray paint can was placed at (0,10) of each survey grid to make sure data map is oriented correctly after processing.

In order to collect data more efficiently, the survey area was broken down into smaller sub-areas that were relatively square. To ease the re-acquisition of Areas of Interest (AOI) after field work is complete, a stake was placed at the origin of each sub-area. Distances can be measured from the origin stakes to each AOI. There were 16 sub-areas where data were collected, all of which are labeled on the map. Table 1, on the next page, describes the location of each.

Shaw The Shaw Group Inc.

Memorandum

Site	Location	Description
1	Northern Road	Uphill (southern) Section
2	Southernmost Transect	Between Northern & Center Roads
3	Northern Road	Downhill (northern) Section
4	Northernmost Transect	Between Northern & Center Roads
5	Bottom of Northern Road	Between Northern Road & Lower Pit
6	East Side of Lower Pit	East of Lower Pit & North of Site 5
7	Southern Road	Entire Portion of Southern Road
8	Northernmost Transect	Connects to North Edge of Site 7
9	Southernmost Transect	Connects to Site 11
10	Southern Edge of Lower Pit	Directly East of Site 11
11	Center Road	Downhill (northern) Section
12	Mound	From Site 11 to the Top of the Mound
13	Upper Pit	Northern Half of the Upper Pit
14	Center Road	Uphill (southern) Section
15	North Side of Spoils Pile	North of the Spoils Pile
16	East Side of Spoils Pile	East of the Spoils Pile

Table 1. Description of each of the data collection sites.

Results

In general, most of the sites contained a small amount of metallic anomalies that could not be explained by surface features. The following list describes the location of three AOI's representing potential drums that were selected based on the review of the MAG data:

- AOI 1 – This is the area surrounding the lower pit. There are magnetic anomalies representing potential drums in a radius approximately 25 feet from the edge of the pit towards the south and east. It is possible that there are drums on the north and west sides as well, however due to ground conditions, data collection was not possible here;
- AOI 2 – There is a large, single anomaly centered at approximately (30,15) with respect to the origin stake in Site 5. This anomaly is large enough that it could potentially represent a buried drum;
- AOI 3 – There is a large, single anomaly about 70 feet south of the origin stake for Site 3 along a line extending through the origin stake for Site 1. This anomaly is large enough that it could potentially represent a buried drum;

Shaw The Shaw Group Inc.

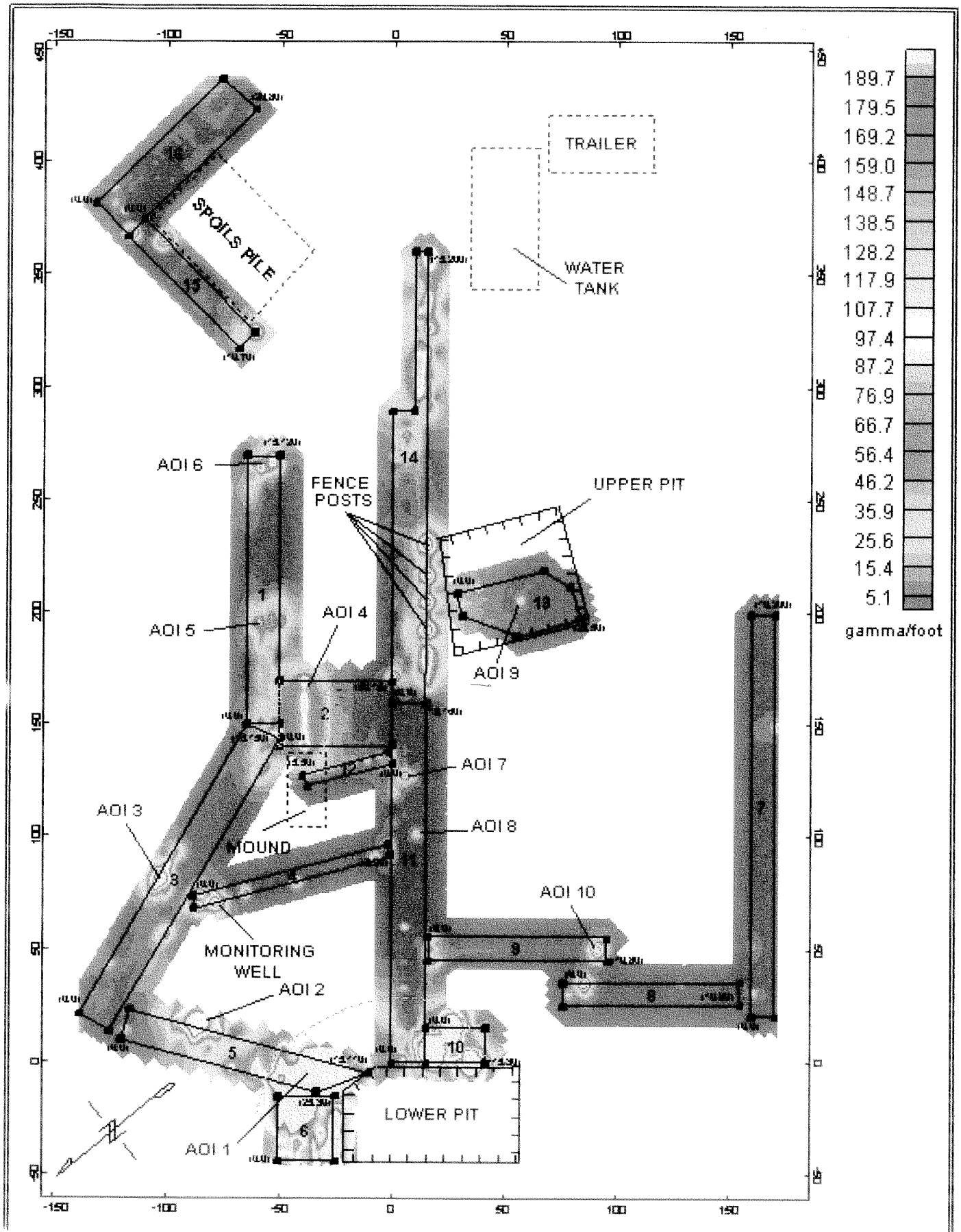
Memorandum

- AOI 4 – The eastern 20 feet of Site 2 contains a large, broad anomalous area, however it doesn't necessarily represent a single potential drum. This feature could possibly represent a trench containing pill bottles;
- AOI 5 – There is a large, broad anomaly that stretches across the entire road that is centered approximately 45 feet uphill from the origin stake in Site 2. This feature may indicate a trench of pill bottles as well;
- AOI 6 – This anomaly spans about ten feet and stretches across the entire road approximately 110 feet uphill from the origin stake in Site 2. This feature may indicate a trench of pill bottles as well;
- AOI 7 – There is an anomaly centered about (5,125) with respect to the origin stake in Site 11. Due to its location, it was selected as an AOI;
- AOI 8 – There is an anomaly centered approximately (10,100) with respect to the origin stake in Site 11. Due to its location, it could potentially represent a buried drum;
- AOI 9 – There is an anomaly in the center of the upper pit. It is centered at about (10,25) with respect to the origin stake in Site 13; and
- AOI 10 – There is a large, single anomaly centered at approximately (5,75) with respect to the origin stake in Site 9. This anomaly is large enough that it could potentially represent a buried drum.

Conclusions & Recommendations

There are metallic anomalies present on the map that were not selected as potential buried drums. These anomalies are smaller targets and occupied positions where drums had not been found previously. Some of the anomalies that were selected as Areas of Interest do not necessarily represent a potential buried drum, but due to their size and/or location they were selected regardless.

All metallic features within the survey area were mapped to a high degree of certainty, however magnetic data collection has some limitations. Firstly, the magnetometer cannot detect non-ferrous metals. The data can also be affected by surface metal and cultural features such as vehicles and equipment or power lines. Surface metal and cultural features were minimized as much as possible during data collection. Where the removal of surface metal/cultural features was not feasible, the locations were noted and plotted on the map with the magnetometer data.



Total Field Analytic Signal

Former Schenectady Army Depot