GEOPHYSICAL SURVEY NAS FORT WORTH TX

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ECOLOGY AND ENVIRONMENT

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NAVAL AIR STATION FORT WORTH JRB CARSWELL FIELD TEXAS

ADMINISTRATIVE RECORD COVER SHEET

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Geophysical Survey
Carswell A.F.B.
Fort Worth, Texas

February 1991

Prepared for

U.S. Army Corps of Engineers
Fort Worth District

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INTRODUCTION

Pursuant to a request from the U.S. Army Corps of Engineers, Fort Worth Division, Ecology and Environment, Inc. (E&E) performed a geophysical survey at site 10, a suspected waste burial site at Carswell Air Force Base, Fort Worth, Texas. The nature of the survey was to identify the existence and approximate location of subsurface anomalies, which would indicate the location of suspected buried drums that are thought to contain trichloroethene (TCE).

This report summarizes the field activities, including a description of the geophysical survey and a site map showing the locations of the subsurface anomalies.

SITE DESCRIPTION

The area described as site 10 waste burial site is located in the southern part of Carswell AFB, at the northeast corner of the intersection of White Settlement Road and Cody Drive. It is triangular in shape with dimensions of 200 ft. x 150 ft. x 250 ft., as illustrated in Figure 1.

FIELD INVESTIGATION

E & E technical staff performed the ground-penetrating-radar (GPR) survey on February 11 and the EM-31 conductivity meter survey on February 12, 1991.

The GPR survey was performed with a Geophysical Survey Systems, Inc. Model SIR-3. It provides a continuous profile of the subsurface using high-frequency radio waves to obtain subsurface information. The high-frequency signals are emitted from a transmitter which is pulled along the ground surface. The signals are reflected from various interfaces in the subsurface and are detected by a radar receiver, which is enclosed in the same unit as the transmitter. The information is then passed to a controller and graphic recorder which prints a hard copy of the profile. This allows precision definition of any edges of excavations or metal objects such as tanks, drums or metal utility conduits. However, the actual depth of signal penetration is controlled by various factors, such as the conductivity of the subsurface material and the frequency of the transmitted signal. Consequently, the amount of clay or other highly conductive material may render the subsurface opaque to radar signals, and therefore produce limited results.

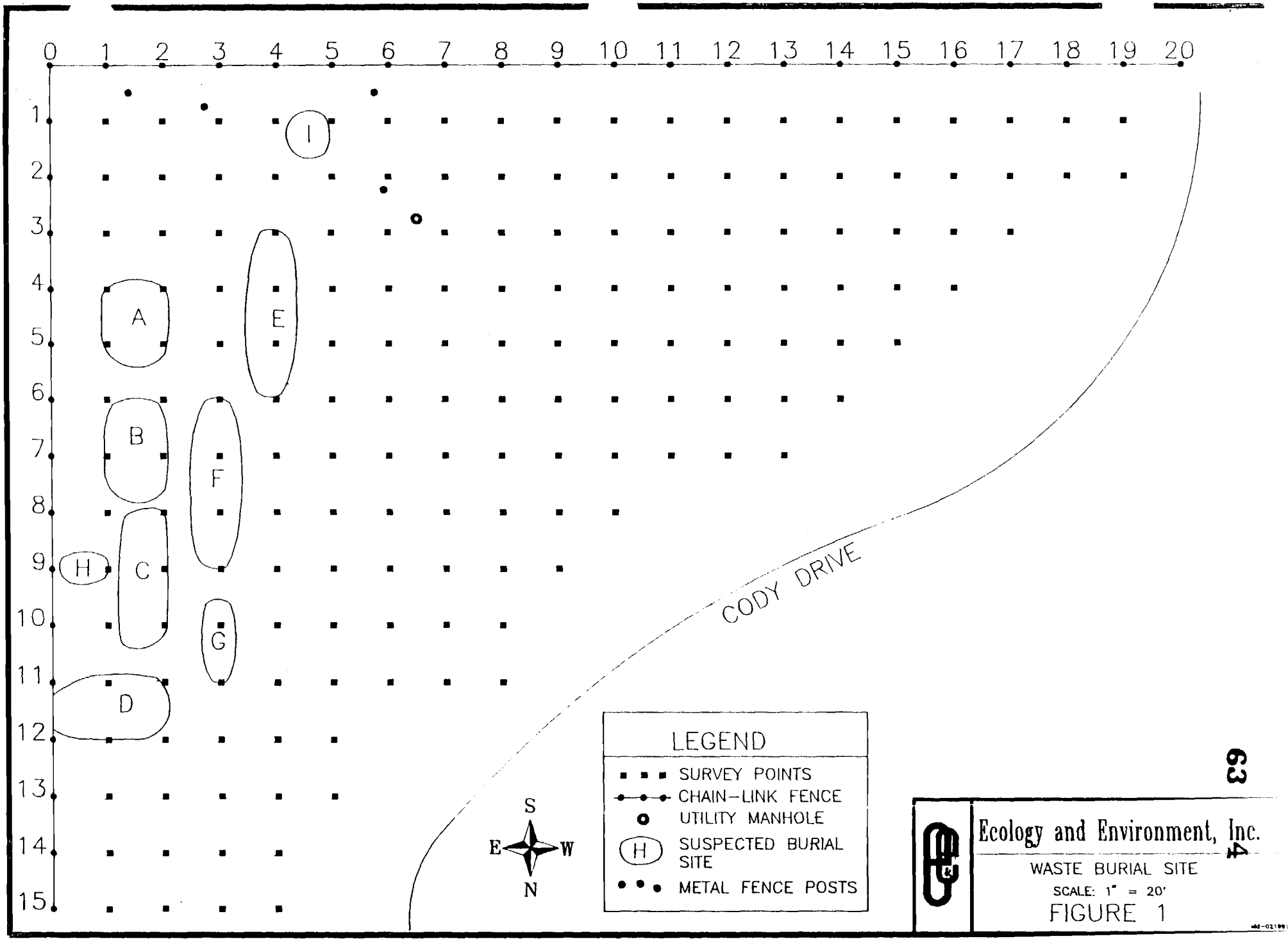
The Geonics EM-31 conductivity meter directly measures the average conductivity of the hemisphere below it. The strength of the signal is affected by material at depths of up to 18 feet, but the greatest part of the signal is generated by material in the uppermost 6 to 9 feet. The

EM-31 can also be used in a metal detection mode to further define the results of the conductivity survey.

Upon arrival, the E&E team measured the site as a basis for the site map and to establish a 10 ft. x 10 ft. grid system to facilitate the geophysical survey, data interpretation and anomaly identification. The grid system was established using the existing chainlink fence posts, which are appproximately 10 ft apart, as reference points, with the southeast corner post being designated line 0, station 0. The lines, 0-19, run south to north, originating at the fence posts along the east-west fenceline, and the stations, 0-15,run east to west originating at the fence posts along the south-north fence line. The grid system is provided in Figure 1.

The GPR unit was assembled using the 100 Hz antenna, then employed across the site. After several unsuccessful attempts at obtaining conclusive data with the 100 Hz antenna, a smaller 30 Hz antenna was employed across the same area. Due to the high clay content of the site soils, which inhibited deep radar penetration, the GPR was not useful for determining the location of the suspected buried drums.

On the following day the E&E team returned to the site with an EM-31 conductivity meter to continue the geophysical survey. Initially, the EM-31 was employed in the conductivity mode across the site and data was recorded using the data logger. After the survey results were analyzed by E&E team members, a background level of 50-65 mS/m was established, and any value below background was identified as an anomaly. The results of the survey (Table 1) indicated anomalies along the east border of the site and along the south border parallel to the fenceline. The latter was subsequently determined to be a utility conduit leading to manhole near line 7, station 3. After completing the conductivity survey, the EM-31 was switched to an inphase mode which allows it to be used as a metal detector. This, along with a Fisher TW-6 Mscope pipe and cable locator were used to detect and identify, more specifically, the subsurface anomalies which would indicate buried metal drums. Once the location was identified, survey pin flags were placed around the perimeter of anomalies. Nine locations were identified and marked as areas A through I as illustrated by Figure 1. The anomalies not detected by metal detection could indicate: A TCE contamination plume migrating downgradient, north; or drums buried deeper than the penetration capabilities of the metal detectors.



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WASTE BURIAL SITE

SCALE: 1" = 20'

FIGURE 1

TABLE 1

EM-31 CONDUCTIVITY SURVEY RESULTS

Station	Line 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1	76.6	78.0	66.2	61.8	65.0	100.6	69.0	79.6	64.2	62.2	62.2	64.0	62.0	61.0	61.6	63.8	64.4	68.6	69.6
2	64.4	59.6	51.2	48.8	56.8	82.4	66.4	68.0	63.2	62.2	61.2	60.1	59.6	59.6	59.2	59.4	59.4	54.0	64.0
3	57.4	51.8	46.6	39.6	46.0	58.2	24.2	35.2	34.8	36.0	34.0	34.0	35.0	35.6	37.0	38.4	39.2		
4	58.0	41.0	42.6	41.4	45.6	53.6	56.8	58.2	57.8	56.4	53.4	59.2	57.8	60.2	62.2				
5	59.0	47.8	43.2	44.4	43.8	53.2	48.6	53.8	52.4	53.2	53.8	58.0	59.4	62.2	62.0				
6	58.0	47.6	36.2	42.0	41.2	48.4	29.4	53.4	47.6	47.8	51.0	55.0	54.6	60.2					
7	60.8	52.0	27.4	44.8	42.0	49.4	32.8	63.8	51.8	51.6	49.8	53.2	59.4						
8	64.6	49.8	35.2	43.8	40.0	46.8	75.2	79.8	52.8	45.8									
9	61.0	48.2	34.6	40.2	38.4	43.2	74.2	60.8	49.8										
10	45.8	47.2	35.6	36.8	35.2	41.4	55.0												
11	49.6	38.0	35.2	37.8	35.4	38.4	44.6												
12	56.6	49.2	41.0	38.2	39.8														
13	60.8	46.2	40.6	40.0	39.8														
14	59.6	47.8	44.0	43.2															
15	60.8	49.8	47.2	46.0															

* CONDUCTIVITY UNITS: mS/m

REFERENCES

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FINAL PAGE

ADMINISTRATIVE RECORD

FINAL PAGE

FINAL PAGE

ADMINISTRATIVE RECORD

FINAL PAGE