

**APPENDIX A: GSV LETTER REPORT
MILITARY MUNITIONS RESPONSE PROGRAM
REMEDIAL INVESTIGATION/FEASIBILITY STUDY**

**FORMER CAMP MAXEY
Paris, Texas**

June 10, 2013

Maxey-026

Commander, US Army Engineering & Support Center, Huntsville
Attn: USAESCH-OE-DC, John Cook
4820 University Square
Huntsville, Alabama 35816-1822

RE: Remedial Investigation / Feasibility Study, Former Camp Maxey, Texas IVS Letter Report Revision 2

Explosive Ordnance Technologies, Inc. (EOTI) is pleased to submit the revised Instrument Verification Strip (IVS) letter report for the Remedial Investigation / Feasibility Study (RI/FS) at the Former Camp Maxey in Texas. The revision incorporates changes resulting from the initial review by CEHNC. Responses to comments are addressed on the enclosed Form 7.

Please contact me at (865) 200-8081 if you have any questions or need any additional information.

Sincerely,

Explosive Ordnance Technologies, Inc.



James Y. Daffron, PE
Project Manager

June 10, 2013

GPR
MAGNETICS
ELECTROMAGNETICS
SEISMICS
RESISTIVITY
UTILITY LOCATION
UXO DETECTION
BOREHOLE CAMERA
STAFF SUPPORT

Mr. Jim Daffron
Project Manager
EOTI
Phone: 865-200-8081

Dear Mr. Daffron:

This letter is written to inform you of the results of the Instrument Verification Strip (IVS) that NAEVA Geophysics, Inc. performed at the start of the geophysical investigation at the Former Camp Maxey Artillery Ranges near Paris, Texas on May 20th and 21st, 2013. The purpose of the IVS is to demonstrate the effectiveness of all instrumentation, methods, and personnel prior to the initiation of fieldwork and document the site-specific capabilities of the system.

Equipment

The transect and meandering path surveys are to be completed by using industry-standard GPS-integrated Geonics EM61 MK2 metal detectors, which may cover up to 4.125 miles per day. This device is a four-channel time domain EM device that detects both ferrous and non-ferrous metal objects. This system is highly suitable for use in developed settings, where cultural features and environmental noise contribute to the data. The man-portable EM61 MK2 uses an air-cored 1.0-meter by 0.5-meter copper transceiver coil mounted on wheels at 40 centimeters above the ground. The wheels will be employed in open, smooth areas. A two-man stretcher (litter mode) will be employed on transects if vegetation clearance proves inadequate for wheel mode. Target response with the EM61 MK2 is a single sharply defined peak, facilitating quick and accurate location. Data are recorded at several intervals of time (time gates) over a single target, which provides a measurement of the response decay. Data acquisition is supported by a field computer, which includes real-time graphic display, high-capacity data storage, and input connections for simultaneous collection of EM and external GPS positioning data. To collect useful GPS data at Maxey's varied forest cover, the GPS will be a Trimble GeoXH 6000 receiver whose accuracy averages approximately two meters in varying wooded conditions.

IVS Design

One IVS was installed just north of transect E-3B-A-2 in the Eastern Range Area. The IVS was oriented roughly North-South and five small Industry Standard Objects (ISOs) items were installed vertical at a depth of 6 inches in a line.

DGM Survey Activities

NAEVA's first field crew (Geo A) collected the background (**Figure 1**) and seeded IVS (**Figure 2**) on May 20th. Except for a few low amplitude responses, The IVS was determined to be relatively free of anomalies and was seeded as described above. NAEVA's second field crew (Geo B) arrived on site on May 21st and collected the seeded IVS (**Figure 3**). For the background and seeded IVS survey, six lines were collected at 0, 0.375, 0.75 (seeded line), 1.125, and 1.5, with the background line at 3.75 meters. These six lines were collected on the first day as the initial IVS. All subsequent days' collections of the IVS were over just lines 0.75 and 3.75. All IVS data was collected in wheel mode, if it is determined that litter mode will be needed the six line seeded IVS will be collected in this method.

Results

The background noise levels at the both IVSs were calculated from the background IVS survey and the background line of data for all collections of the IVS on the 20th and 21st. Three and five times the standard deviation was used as the background noise values. This is an

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industry accepted determination for background noise. The IVS is flat and in a relatively low noise environment. Slightly elevated background noise levels have been observed in other parts of the site. The table below shows the background noise range for both systems.

| | Noise Range (3x Std Deviation) | | Noise Range (5x Std Deviation) | |
|--------------|---------------------------------------|----------------|---------------------------------------|----------------|
| | Minimum | Maximum | Minimum | Maximum |
| Geo A | 1.74 | 3.48 | 2.9 | 5.8 |
| Geo B | 2.28 | 3.45 | 3.8 | 5.75 |

The below table depicts the expected response values for the IVS. These values were calculated from the average of the targeted response on line 0.75 (seeded line) for tests 0520AIVS2 and 0520BIVS1. All subsequent runs of the IVS through May 27th (last day of collection prior to break) were within the stated quality control measures of greater than or equal to 75% of the expected value.

| IVS Seed ID | X UTM | Y UTM | Expected Responses for Channel 2 | Minimum Allowable Response |
|--------------------|--------------|--------------|---|-----------------------------------|
| ISO0 | 262683.87 | 3748966.74 | 66.36 | 49.77 |
| ISO1 | 262684.85 | 3748963.95 | 74.16 | 55.62 |
| ISO2 | 262685.84 | 3748961.12 | 66.04 | 49.53 |
| ISO3 | 262686.84 | 3748958.35 | 69.75 | 52.31 |
| ISO4 | 262687.84 | 3748955.45 | 72.33 | 54.25 |

The below table depicts the response values for both teams over the IVS at half a line spacing over from the seeded line. For Geo A, multiple six lines IVSs were collected over the seeded IVS on the 20th, so the recorded responses on the half a line spacing over for each ISO was averaged together to determine the Expected Response for Channel 2. For Geo B, only one pass of the seeded IVS was collected on the 21st, so the recorded responses for Channel 2 on the half a line spacing over for each ISO were used. To determine the expected response for both teams for the blind seed items that will be buried in the grids, the highest and lowest readings (31.22 and 19.02 respectively) were thrown out and the rest were averaged. The expected response for the blind seeds in the grids (if buried vertical at 6 inches) is 26.41mV with minimum allowable response of 19.81mV.

| Team ID | IVS Seed ID | X UTM | Y UTM | Minimum Allowable Response | Expected Responses for Channel 2 |
|----------------|--------------------|--------------|--------------|-----------------------------------|---|
| Geo A | ISO0 | 262683.87 | 3748966.74 | 22.80 | 30.40 |
| | ISO1 | 262684.85 | 3748963.95 | 18.71 | 24.95 |
| | ISO2 | 262685.84 | 3748961.12 | 19.00 | 25.34 |
| | ISO3 | 262686.84 | 3748958.35 | 20.55 | 27.41 |
| | ISO4 | 262687.84 | 3748955.45 | 23.17 | 30.90 |
| Geo B | ISO0 | 262683.87 | 3748966.74 | 14.26 | 19.02 |
| | ISO1 | 262684.85 | 3748963.95 | 16.76 | 22.35 |
| | ISO2 | 262685.84 | 3748961.12 | 23.41 | 31.22 |
| | ISO3 | 262686.84 | 3748958.35 | 17.20 | 22.94 |
| | ISO4 | 262687.84 | 3748955.45 | 20.26 | 27.01 |

Geo A detected all seeds within 1.5 meters of the seed item locations except for the IVS collected in the afternoon of May 24th which were detected within approximately 3.7 to 3.8 meters. Geo B detected all seeds within 2 meters of the seed locations (surveyed in with RTK GPS) except for the IVS collected in the afternoon of May 24th which were detected within approximately 3.1 meters. It was determined that on the afternoon

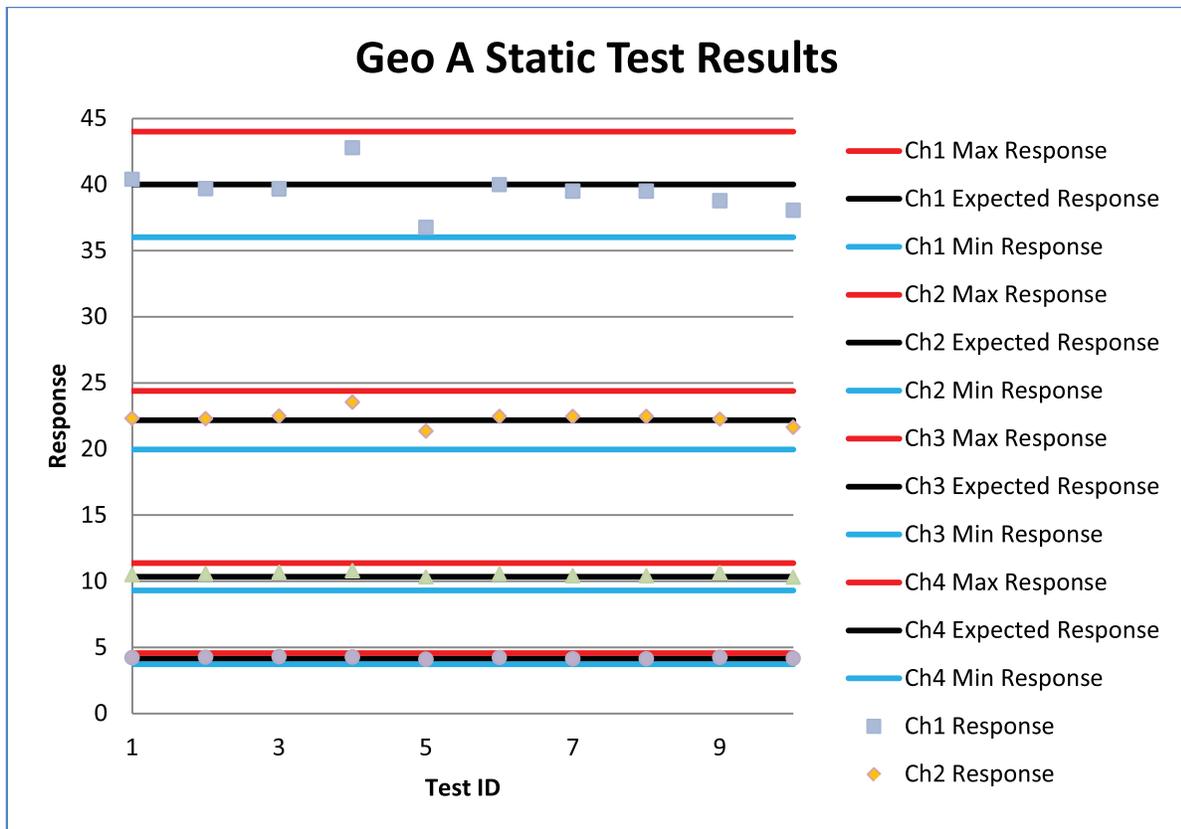
of May 24th the GeoXH GPS units lock onto a different solution therefore giving a lower accuracy. Since the data positioned with the GeoXH GPS units is only being used for target density and grid placement, the recorded offset are acceptable.

In addition to checking the amplitude and positional accuracy of the targeted locations in the IVS, the following tests were also evaluated to ensure the equipment was working correctly.

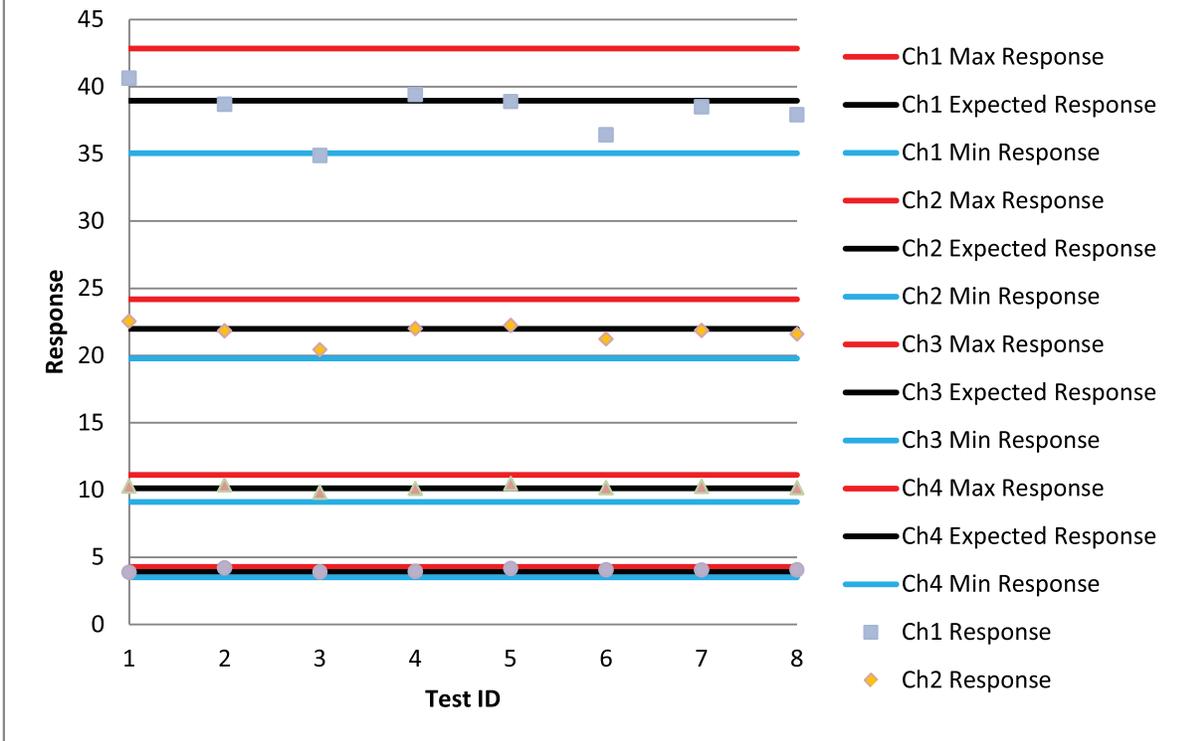
- Personnel Tests – All readings were within +/- 2mV.
- Cable Shake Test – Data profile did not exhibit any spikes
- Static Background and Static Standard Response Test - All background data was within +/- 2mV and the response did not exceed +/- 10% after background correction. This test is preformed with an ISO placed in a jig mounted over the coil. The expected value was obtained by taking the average of the first day's readings. Below table displays the expected responses and the minimum and maximum values for each team.

| | Channel 2 | | |
|-------|--------------|----------------|--------------|
| | Min Response | Expected Value | Max Response |
| Geo A | 19.9575 | 22.175 | 24.3925 |
| Geo B | 19.782 | 21.98 | 24.178 |

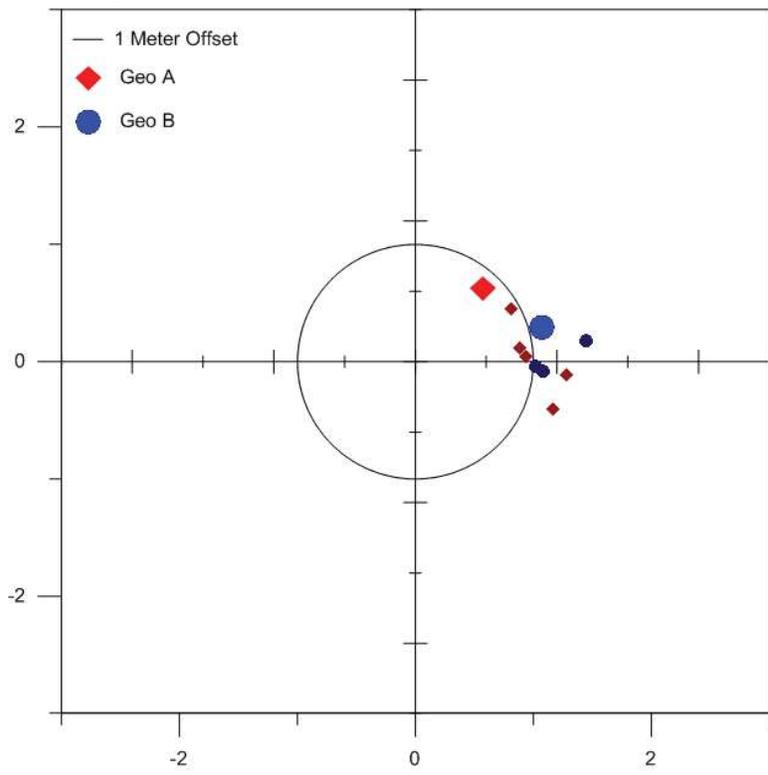
The below charts display the static spike test results for both teams for all channels through May 27th. The pass/fail criterion is only based on channel 2.



Geo B Static Test Results



- GeoXH GPS QC Test - All readings were within 2 meters. A field change request will be submitted to have the acceptance criteria for data positioned with the GeoXH (density transects) should be within 5 meters and for data positioned with fiducials should be within 1 meter.



Threshold recommendation

After careful analysis, NAEVA recommends a targeting threshold of 5 mV in Channel 2 for the transect survey. This response level has been shown to allow the consistent detection a 37mm to depths of approximately 31cm. Observed noise levels on the eastern area transects are generally low with more noise in the north. This threshold should minimize the selection of targets that are not associated with a metallic source object. In addition, Channel 2 field data to date exhibit few consistent response features with amplitudes less than 5 mV. In areas where the background noise levels are reduced, anomalies with a good decay across all channels and exhibiting a response consistent with a metallic source are selected below 5mV. These targets are identified with comments. Once grid locations have been selected and data has been collected, the targeting threshold could be lowered to 2.7mV, depending on noise levels, to allow detection of 37mm to a depth of 40.7cm (11x the diameter). If this threshold was used for the transects, significant number of noise targets would be selected and could potentially skew the location of the grids.

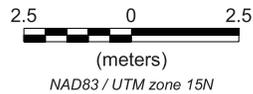
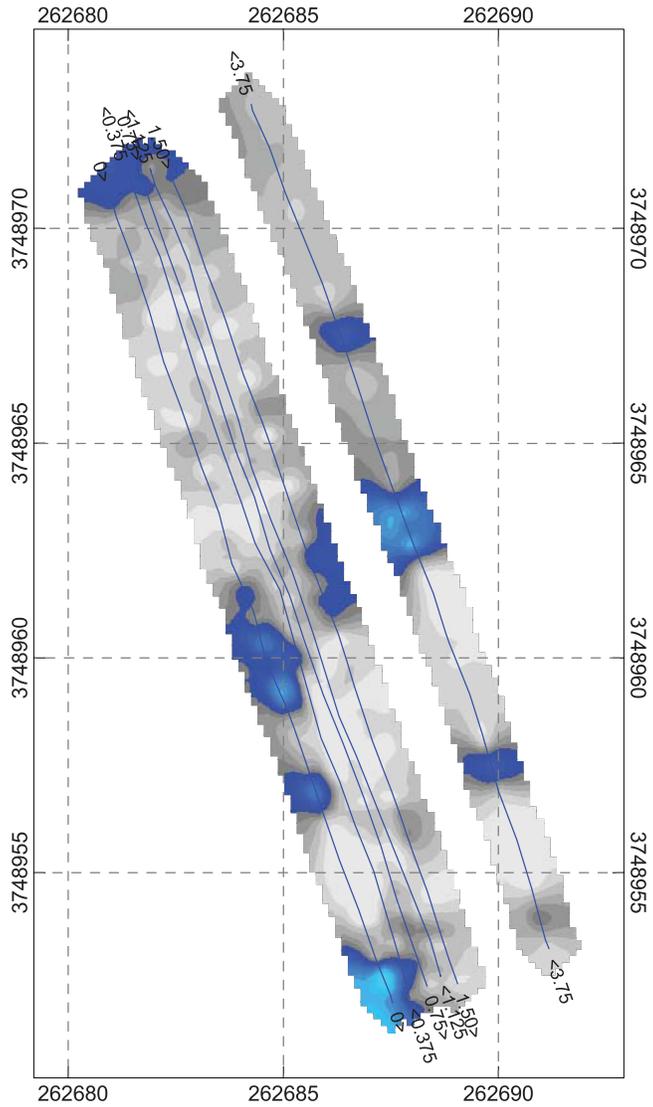
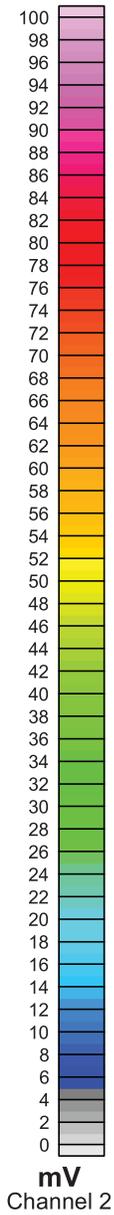
Deliverables

All raw and processed data including target lists have been submitted to the FTP site.

Sincerely,



Karen Lemley
Project Manager/Senior Geophysicist

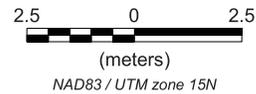
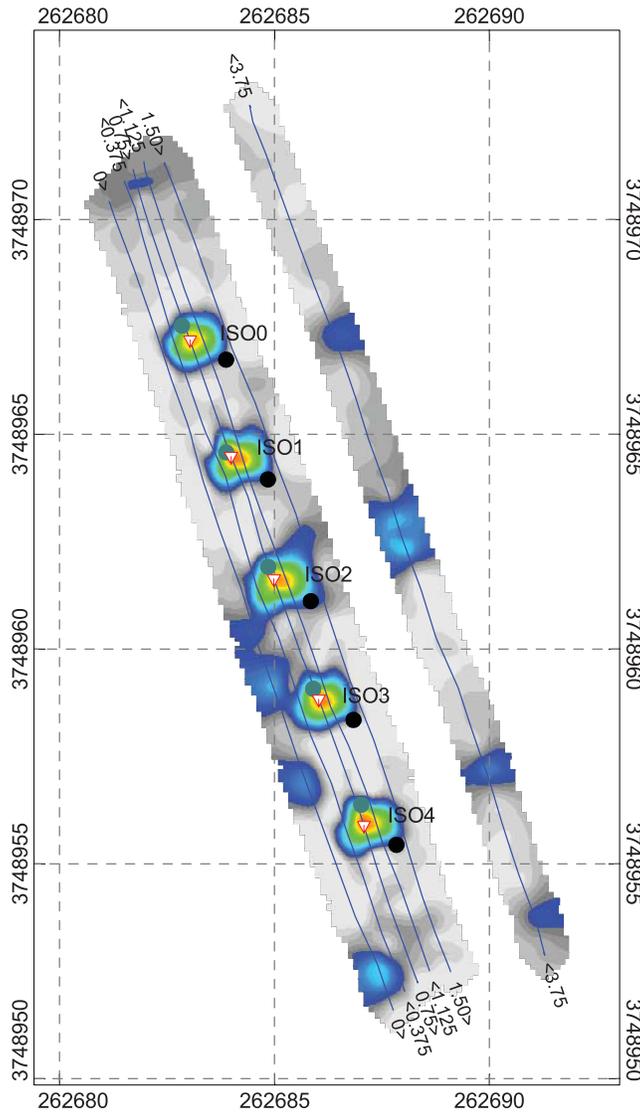
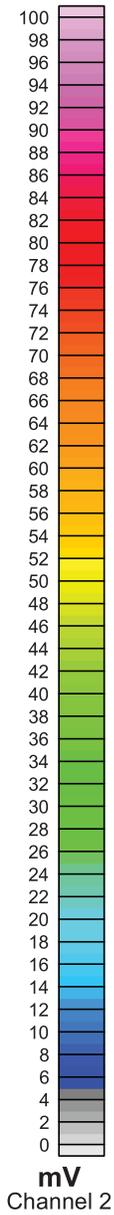


Legend

- ▼ Peak Response Location
- Seeded ISO (RTK GPS)
- Seeded ISO (GeoXH GPS)

Figure 1

| |
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| EOTI |
| EM61 MK2 Person Portable IVS Line IVS - 0520AIVS1 (Background Survey) Former Camp Maxey Artillery Ranges Paris, Texas |
| Date of Survey: 05/20/2013 |

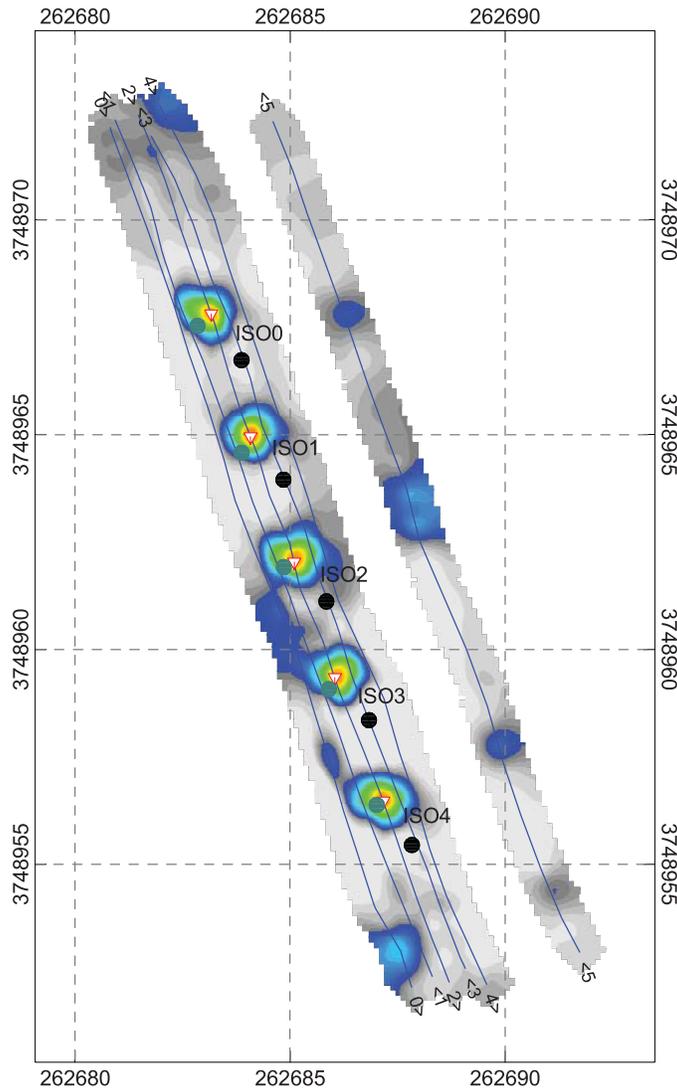
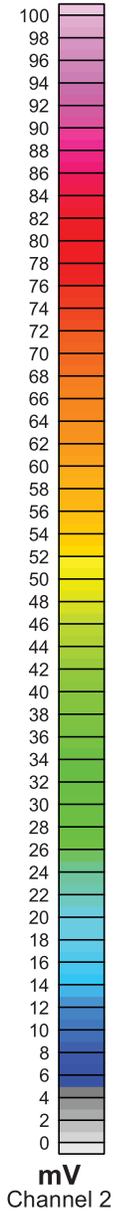


Legend

- Peak Response Location
- Seeded ISO (RTK GPS)
- Seeded ISO (GeoXH GPS)

Figure 2

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| EOTI |
| EM61 MK2 Person Portable IVS Line Instrument Verification Strip - 0520AIVS2 Former Camp Maxey Artillery Ranges Paris, Texas |
| Date of Survey: 05/20/2013 |



Legend

- ▼ Peak Response Location
- Seeded ISO (RTK GPS)
- Seeded ISO (GeoXH GPS)

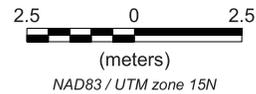


Figure 3

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| EOTI |
| EM61 MK2 Person Portable IVS Line Instrument Verification Strip - 0521BIVS1 Former Camp Maxey Artillery Ranges Paris, Texas |
| Date of Survey: 05/21/2013 |