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VIBRATION TEST (CABLE SHAKE) (Figure C-1)

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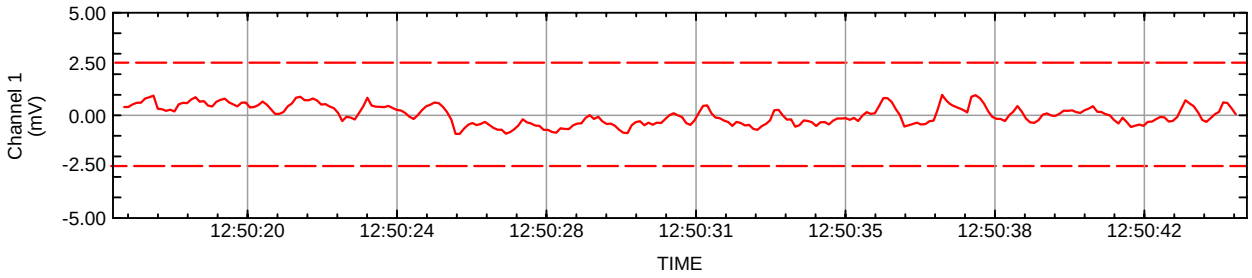
Cable Shake Test

Project: Iowa Army Ammunition Plant
Equipment: EM-61 (1.0x0.5m)
Grid/Location: GPO

Outside range
Acceptable limits

AM test
Operator: MB
Date: 2008/06/12



Database: C:\URS Projects\IAAAP\Field Data\EM61\061208b.gdb
Line Name: L1

Figure C-1

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STATIC BACKGROUND AND STATIC STANDARD RESPONSE (SPIKE) TEST RESULTS (Figures C-2 through C-13)

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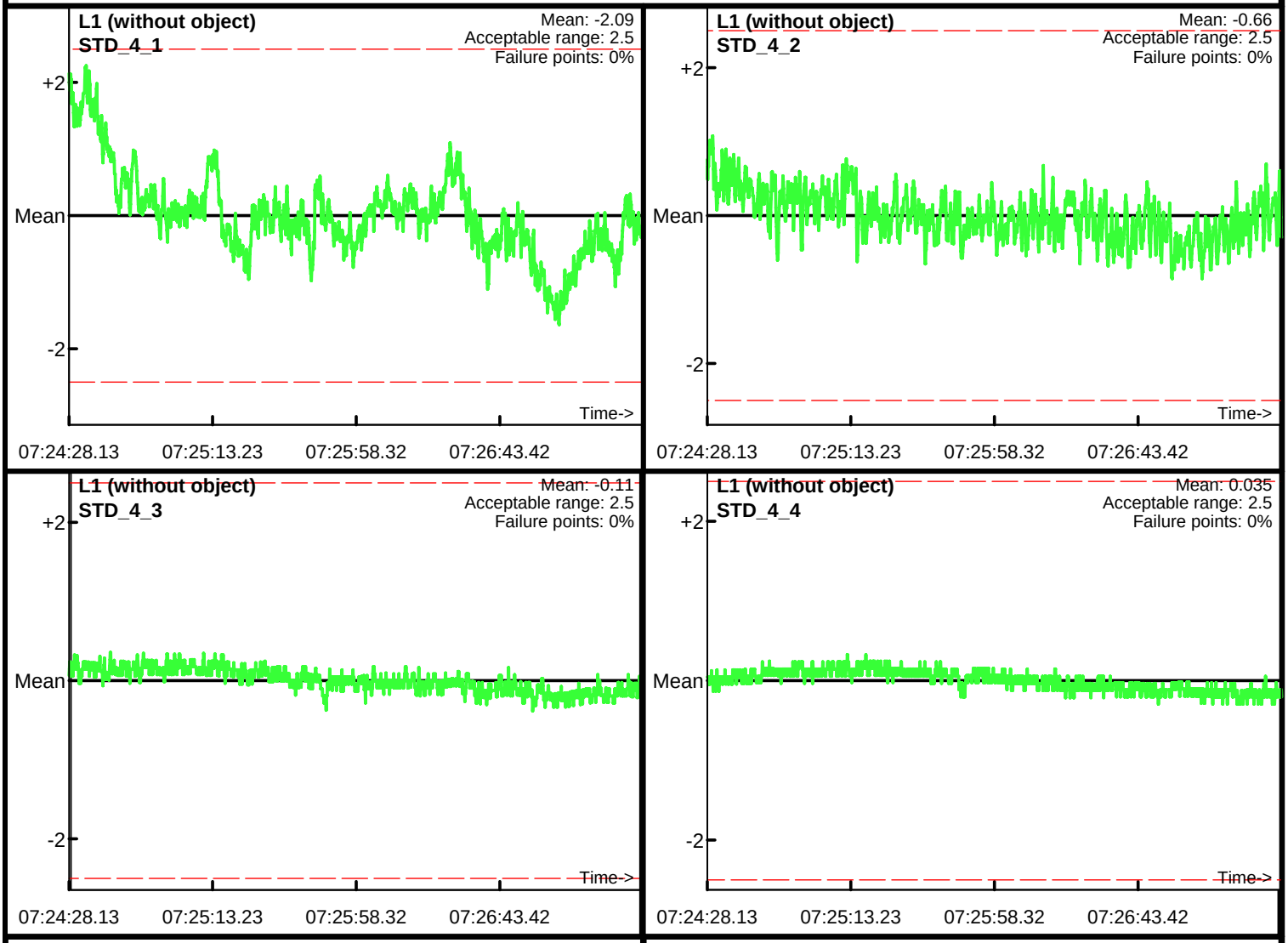
Static Calibration Test

Project: Iowa Army Ammunition Plant
Equipment: EM-61 (1.0x0.5m)
Grid/Location: GPO

Instrument Threshold: 20%
Outside range
Acceptable limits

AM test
Operator: MB
Date: 2008/06/13



Database: C:\URS Projects\IAAAP\Field Data\EM61\061308a_static.gdb

Line Name: L1

Figure C-2

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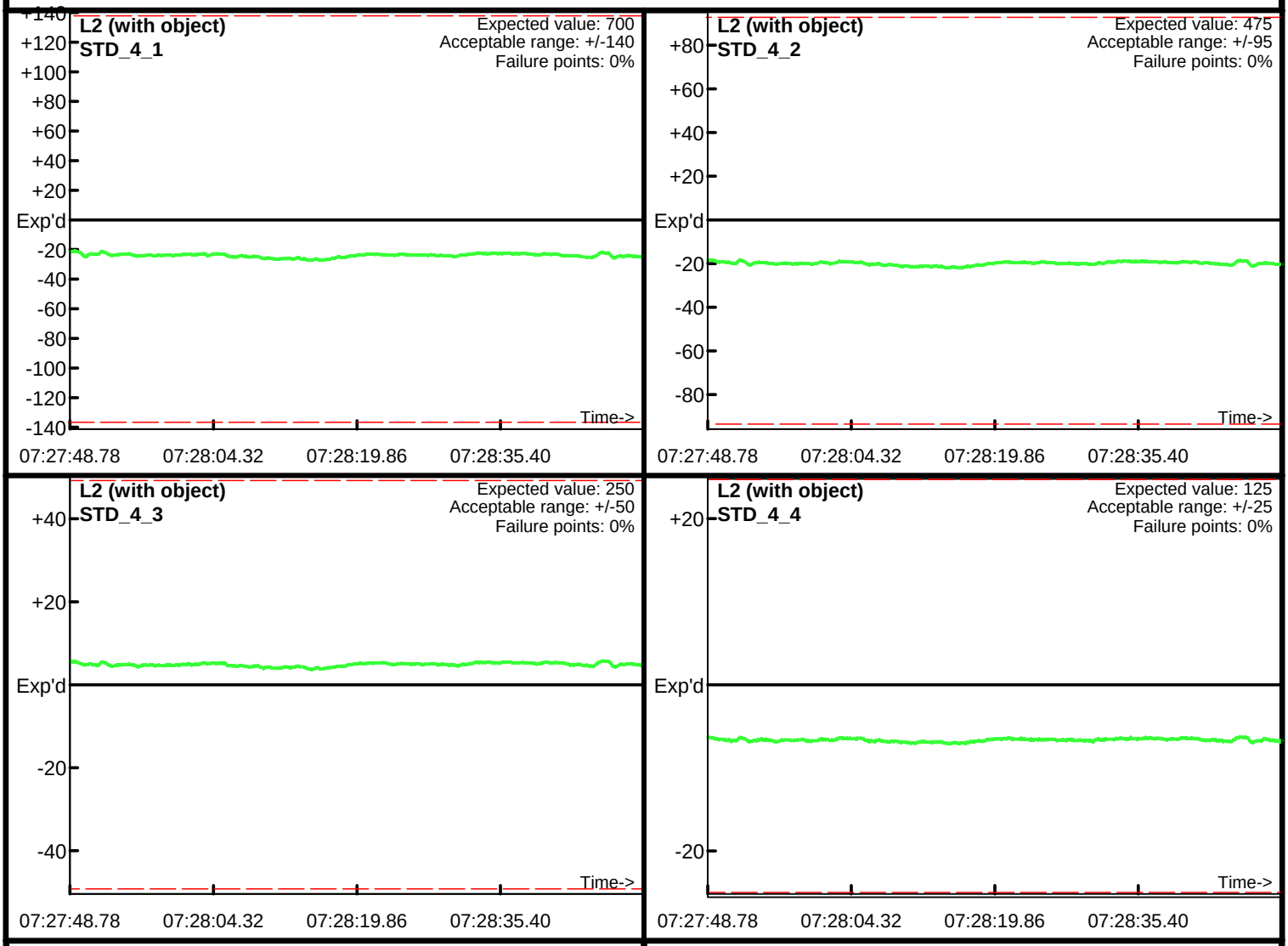
Static Calibration Test

Project: Iowa Army Ammunition Plant
Equipment: EM-61 (1.0x0.5m)
Grid/Location: GPO

Instrument Threshold: 20%
Outside range
Acceptable limits

AM test
Operator: MB
Date: 2008/06/13



Database: C:\URS Projects\IAAAP\Field Data\EM61\061308a_static.gdb
Line Name: L2

Figure C-3

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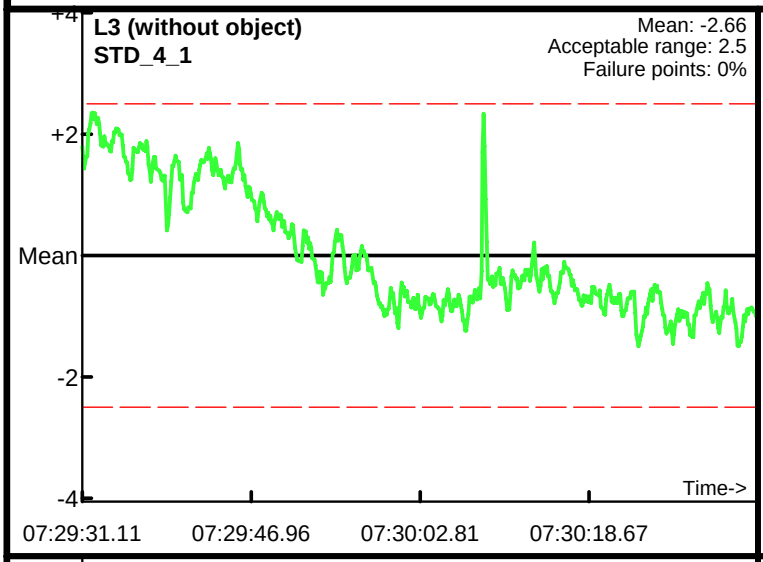
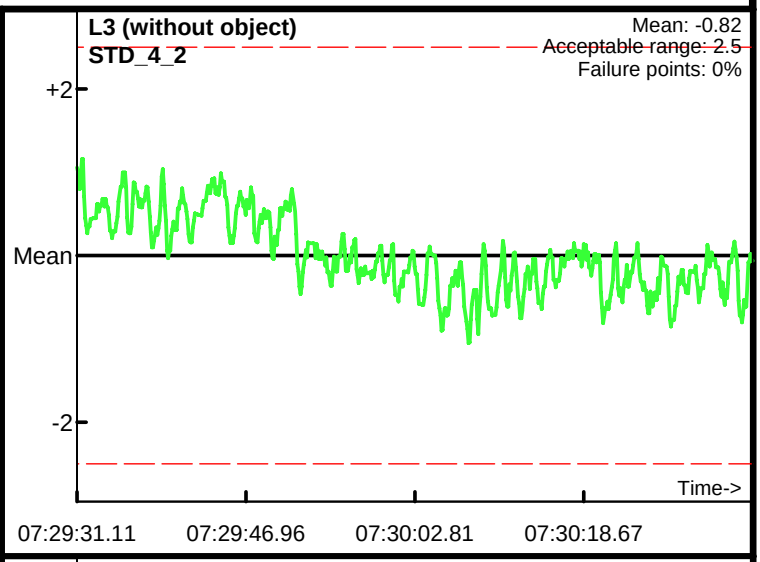
Static Calibration Test

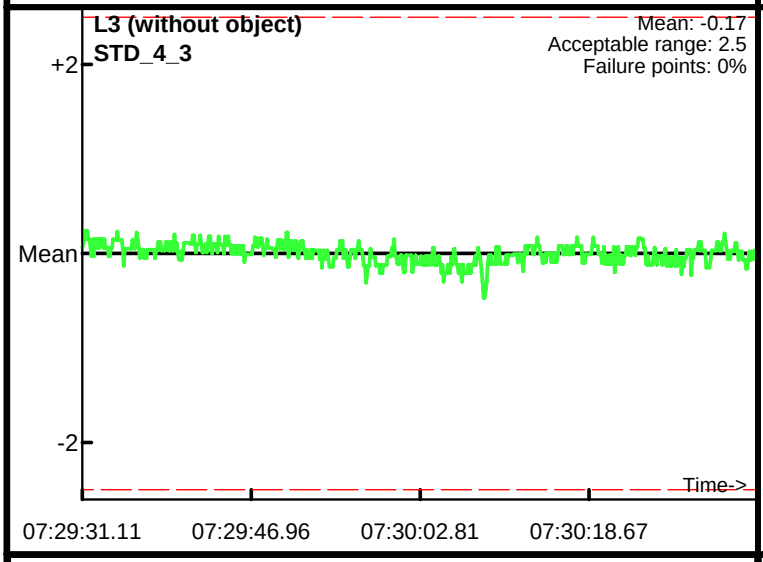
Project: Iowa Army Ammunition Plant
Equipment: EM-61 (1.0x0.5m)
Grid/Location: GPO

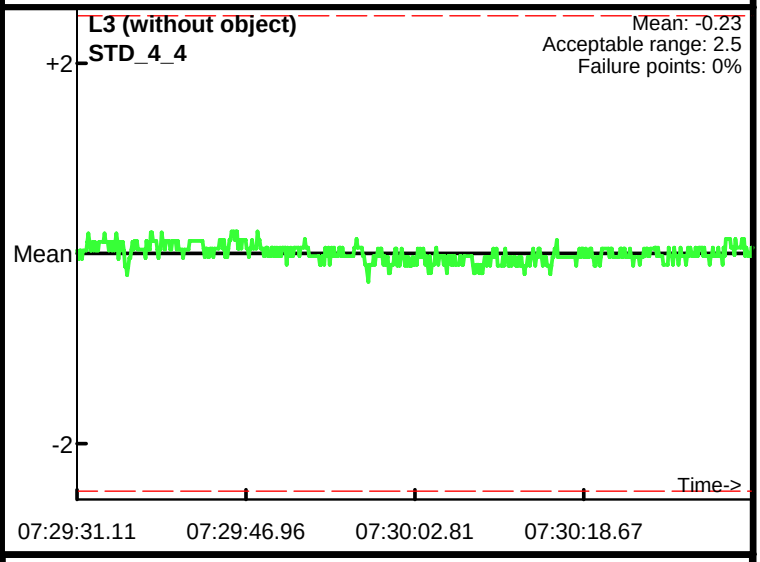
Instrument Threshold: 20%
Outside range
Acceptable limits

AM test
Operator: MB
Date: 2008/06/13









Database: C:\URS Projects\IAAAP\Field Data\EM61\061308a_static.gdb

Line Name: L3

Figure C-4

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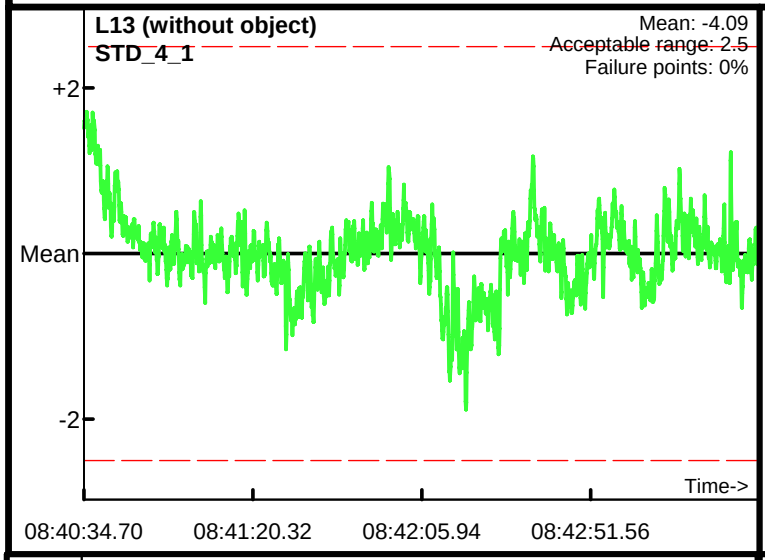
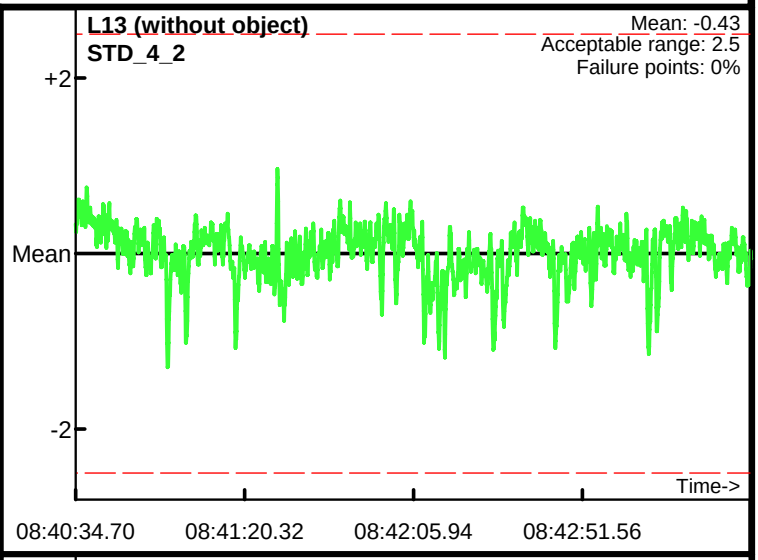
Static Calibration Test

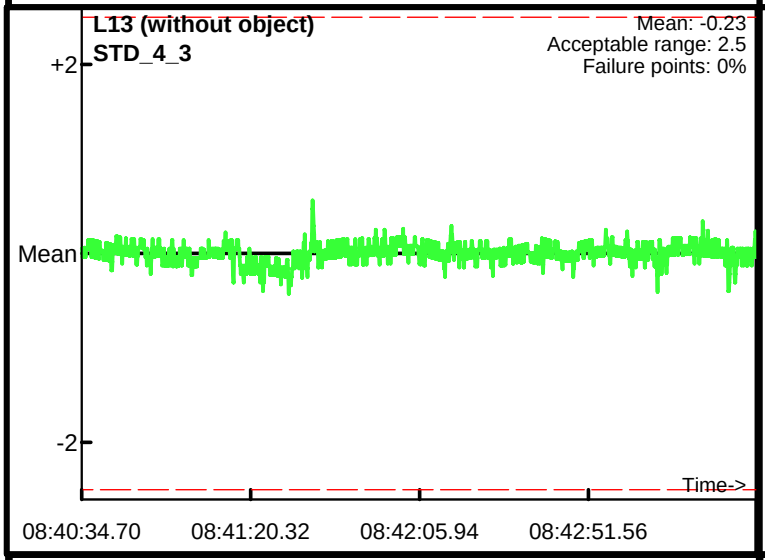
Project: Iowa Army Ammunition Plant
Equipment: EM-61 (1.0x0.5m)
Grid/Location: GPO

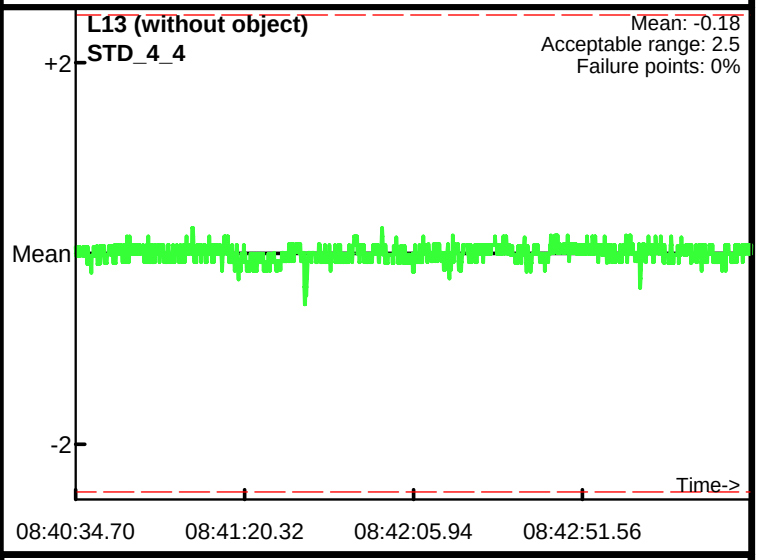
Instrument Threshold: 20%
Outside range
Acceptable limits

PM test
Operator: MB
Date: 2008/06/13









Database: C:\URS Projects\IAAAP\Field Data\EM61\061308a_static.gdb

Line Name: L13

Figure C-5

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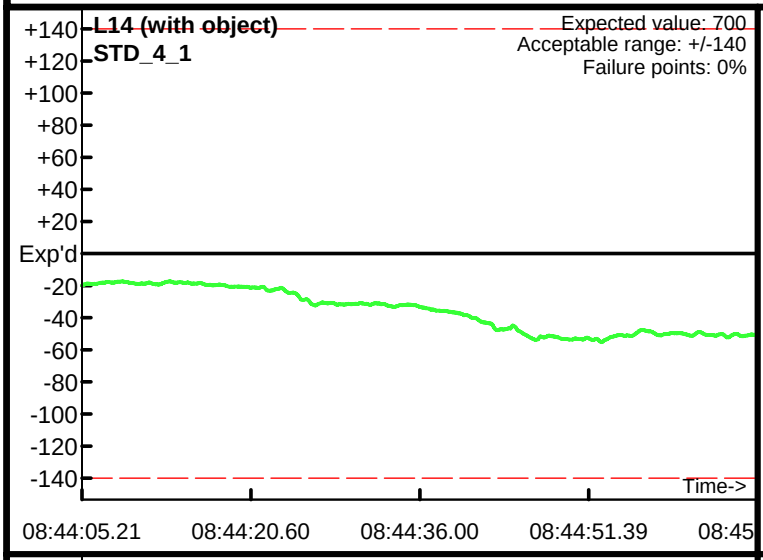
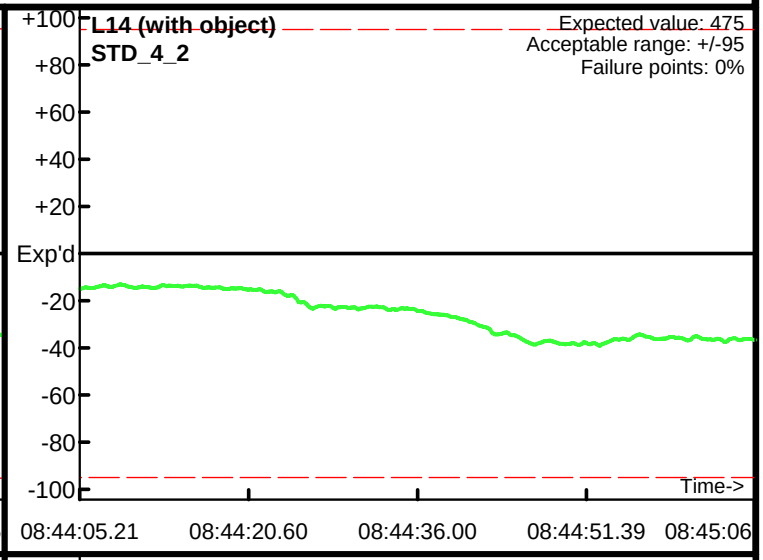
Static Calibration Test

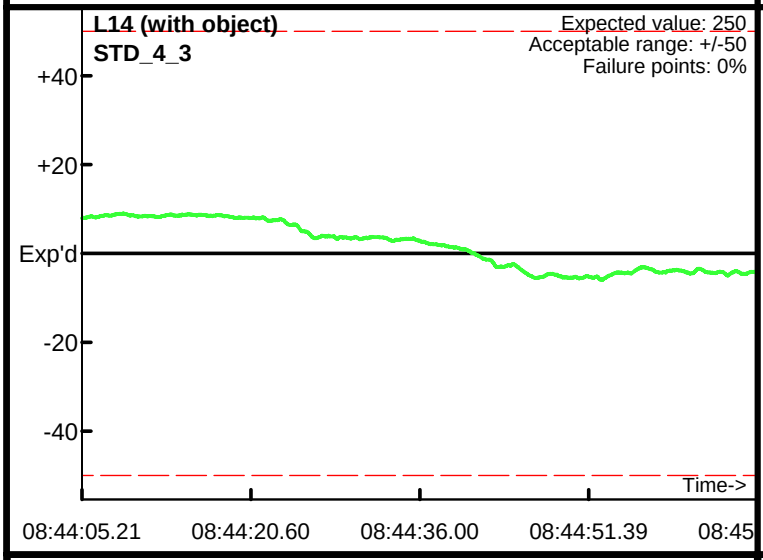
Project: Iowa Army Ammunition Plant
Equipment: EM-61 (1.0x0.5m)
Grid/Location: GPO

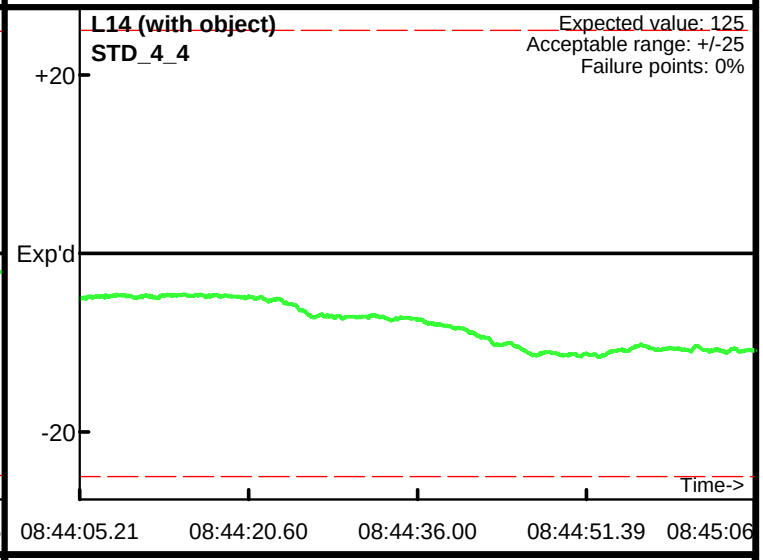
Instrument Threshold: 20%
Outside range
Acceptable limits

PM test
Operator: MB
Date: 2008/06/13









Database: C:\URS Projects\IAAAP\Field Data\EM61\061308a_static.gdb
Line Name: L14

Figure C-6

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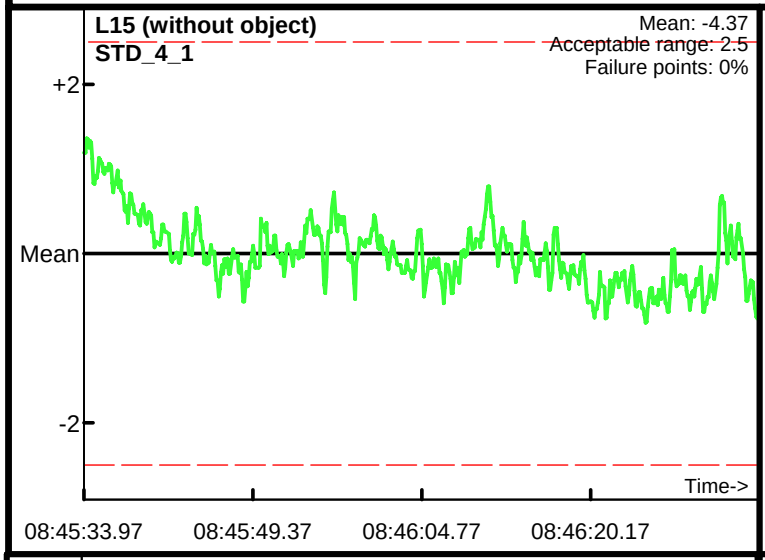
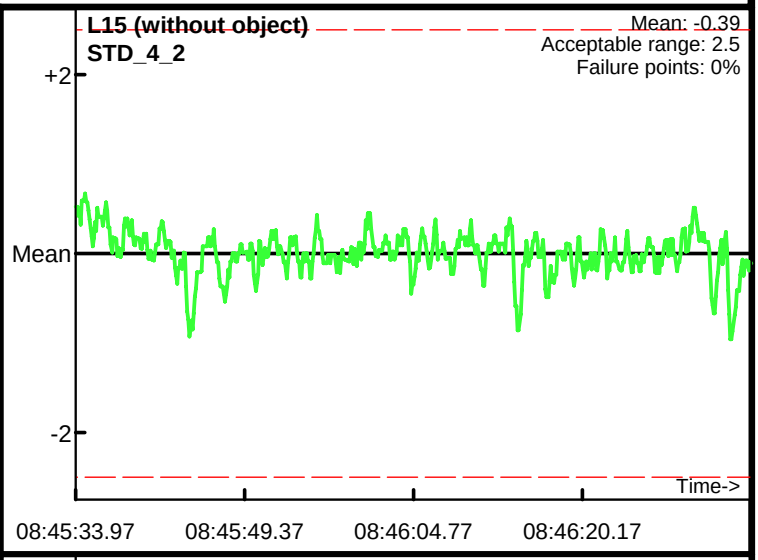
Static Calibration Test

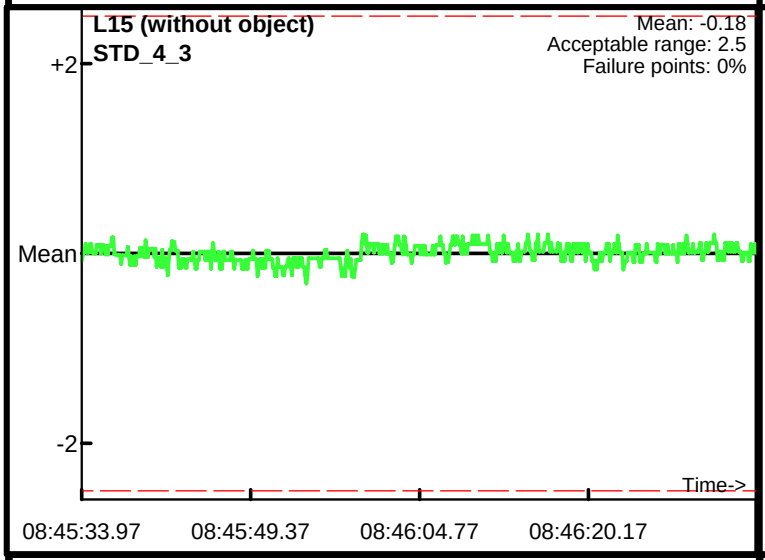
Project: Iowa Army Ammunition Plant
Equipment: EM-61 (1.0x0.5m)
Grid/Location: GPO

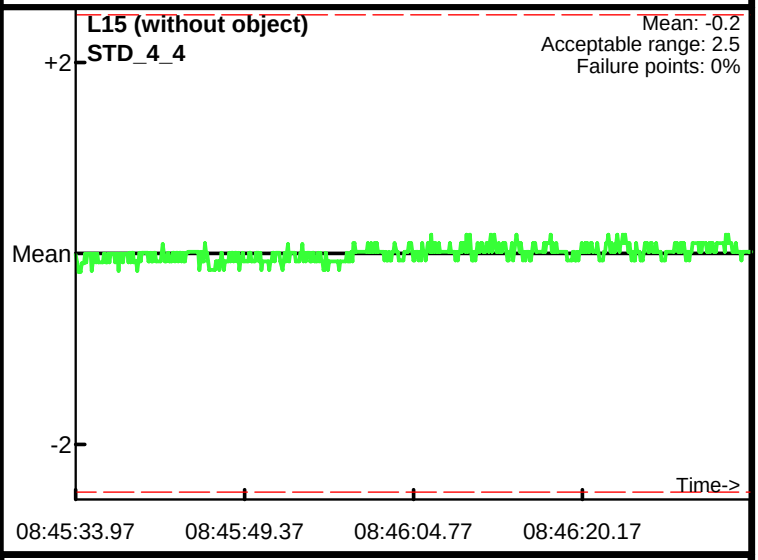
Instrument Threshold: 20%
Outside range
Acceptable limits

PM test
Operator: MB
Date: 2008/06/13









Database: C:\URS Projects\IAAAP\Field Data\EM61\061308a_static.gdb

Line Name: L15

Figure C-7

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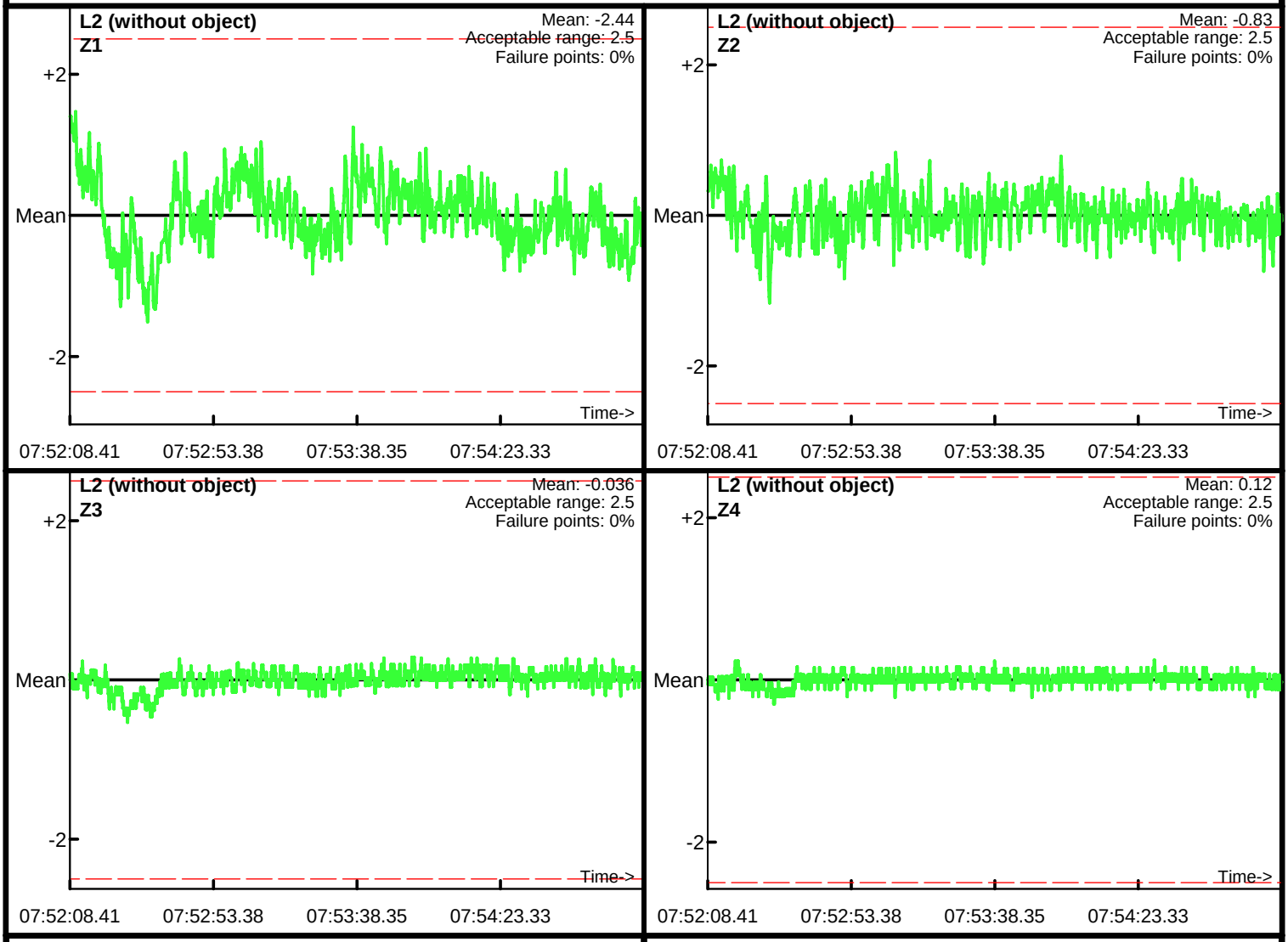
Static Calibration Test

Project: Iowa Army Ammunition Plant
Equipment: EM-61 (1.0x0.5m)
Grid/Location: GPO

Instrument Threshold: 20%
Outside range
Acceptable limits

AM test
Operator: MB
Date: 2008/06/19



Database: C:\URS Projects\IAAAP\Field Data\EM61\061908a.gdb

Line Name: L2

Figure C-8

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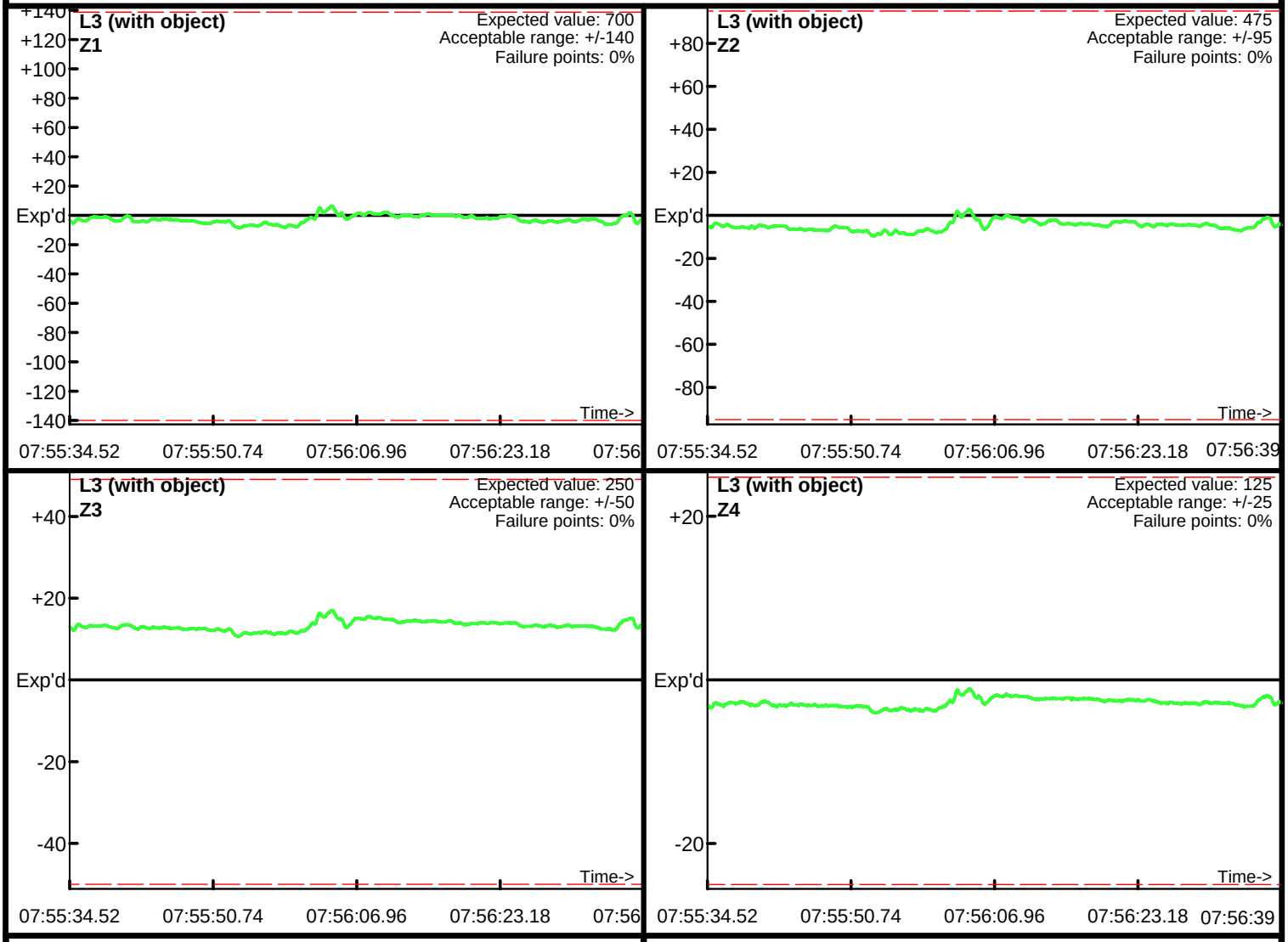
Static Calibration Test

Project: Iowa Army Ammunition Plant
Equipment: EM-61 (1.0x0.5m)
Grid/Location: GPO

Instrument Threshold: 20%
Outside range
Acceptable limits

AM test
Operator: MB
Date: 2008/06/19



Database: C:\URS Projects\IAAAP\Field Data\EM61\061908a.gdb

Line Name: L3

Figure C-9

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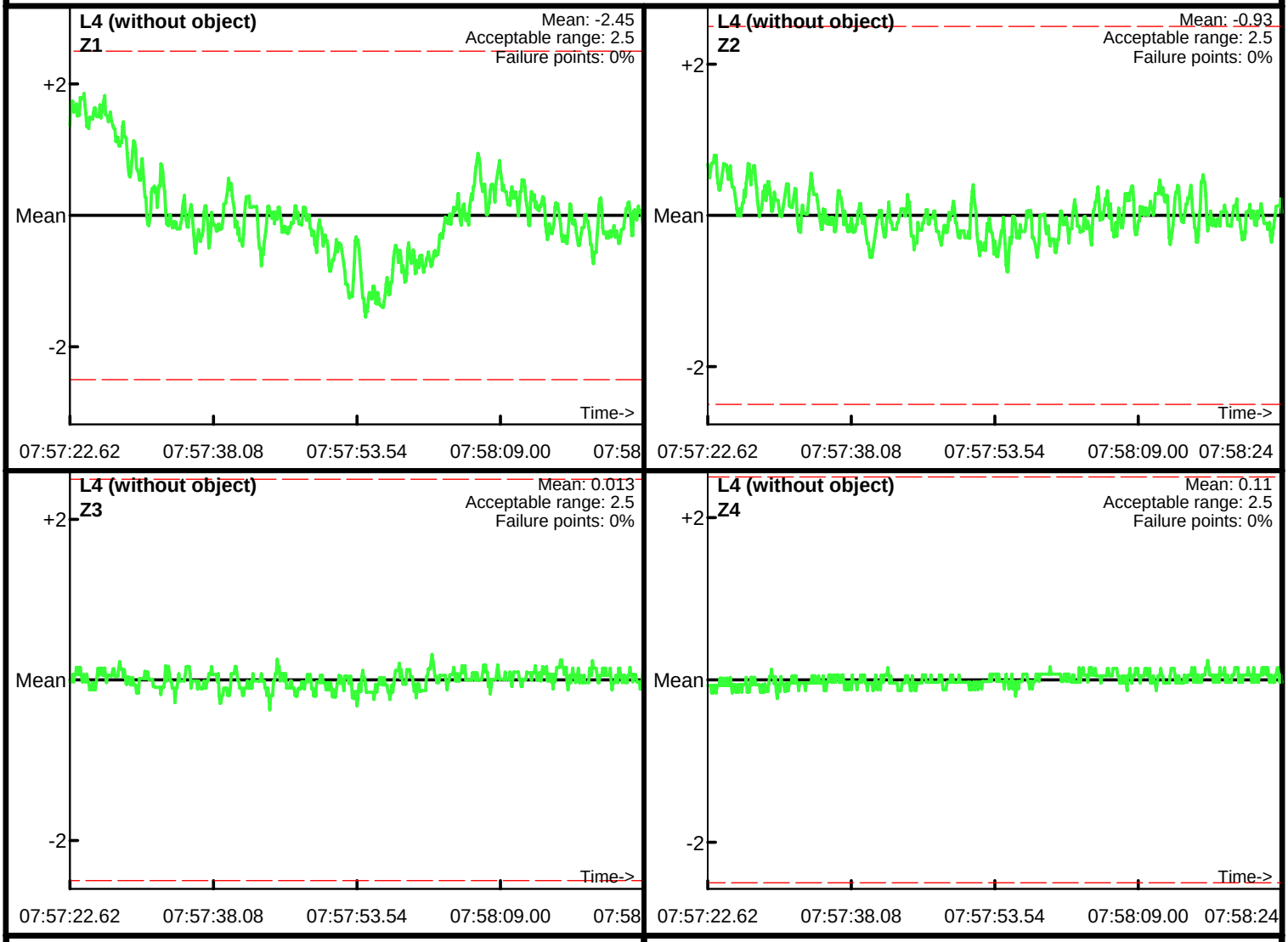
Static Calibration Test

Project: Iowa Army Ammunition Plant
Equipment: EM-61 (1.0x0.5m)
Grid/Location: GPO

Instrument Threshold: 20%
Outside range
Acceptable limits

AM test
Operator: MB
Date: 2008/06/19



Database: C:\URS Projects\IAAAP\Field Data\EM61\061908a.gdb
Line Name: L4

Figure C-10

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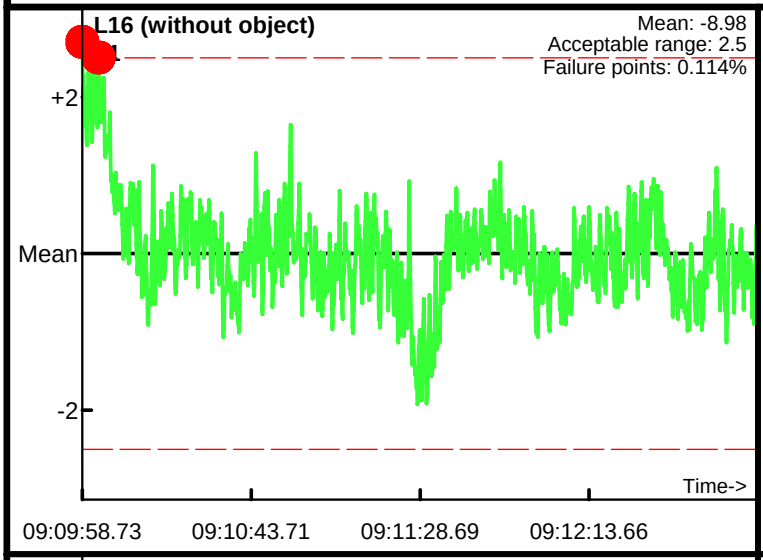
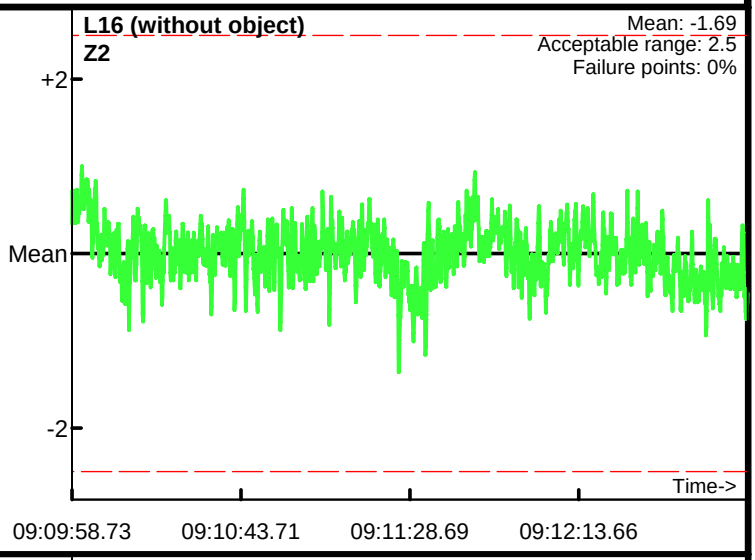
Static Calibration Test

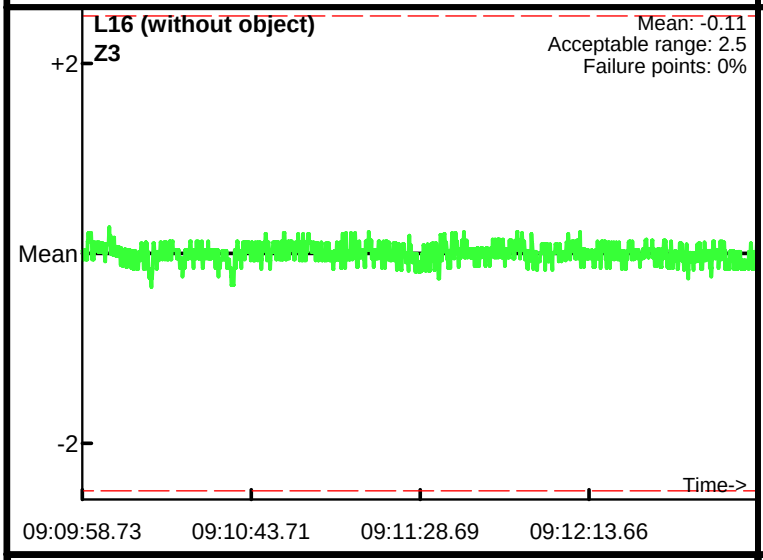
Project: Iowa Army Ammunition Plant
Equipment: EM-61 (1.0x0.5m)
Grid/Location: GPO

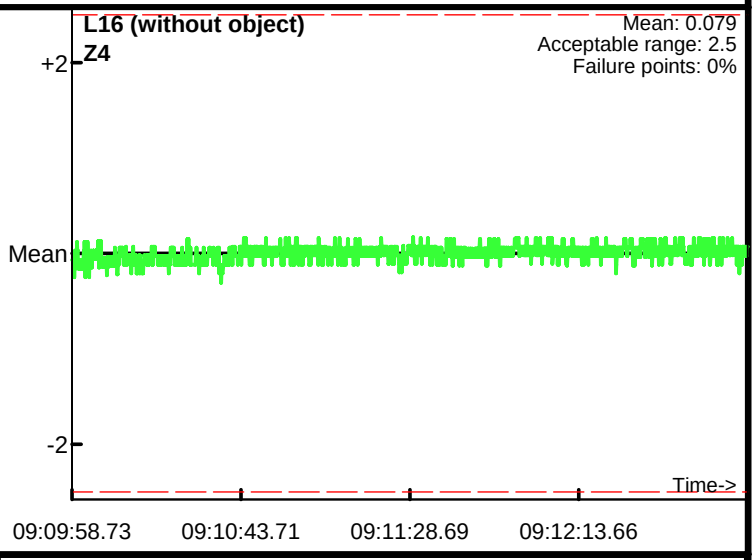
Instrument Threshold: 20%
Outside range
Acceptable limits

PM test
Operator: MB
Date: 2008/06/19









Database: C:\URS Projects\IAAAP\Field Data\EM61\061908a.gdb
Line Name: L16

Figure C-11

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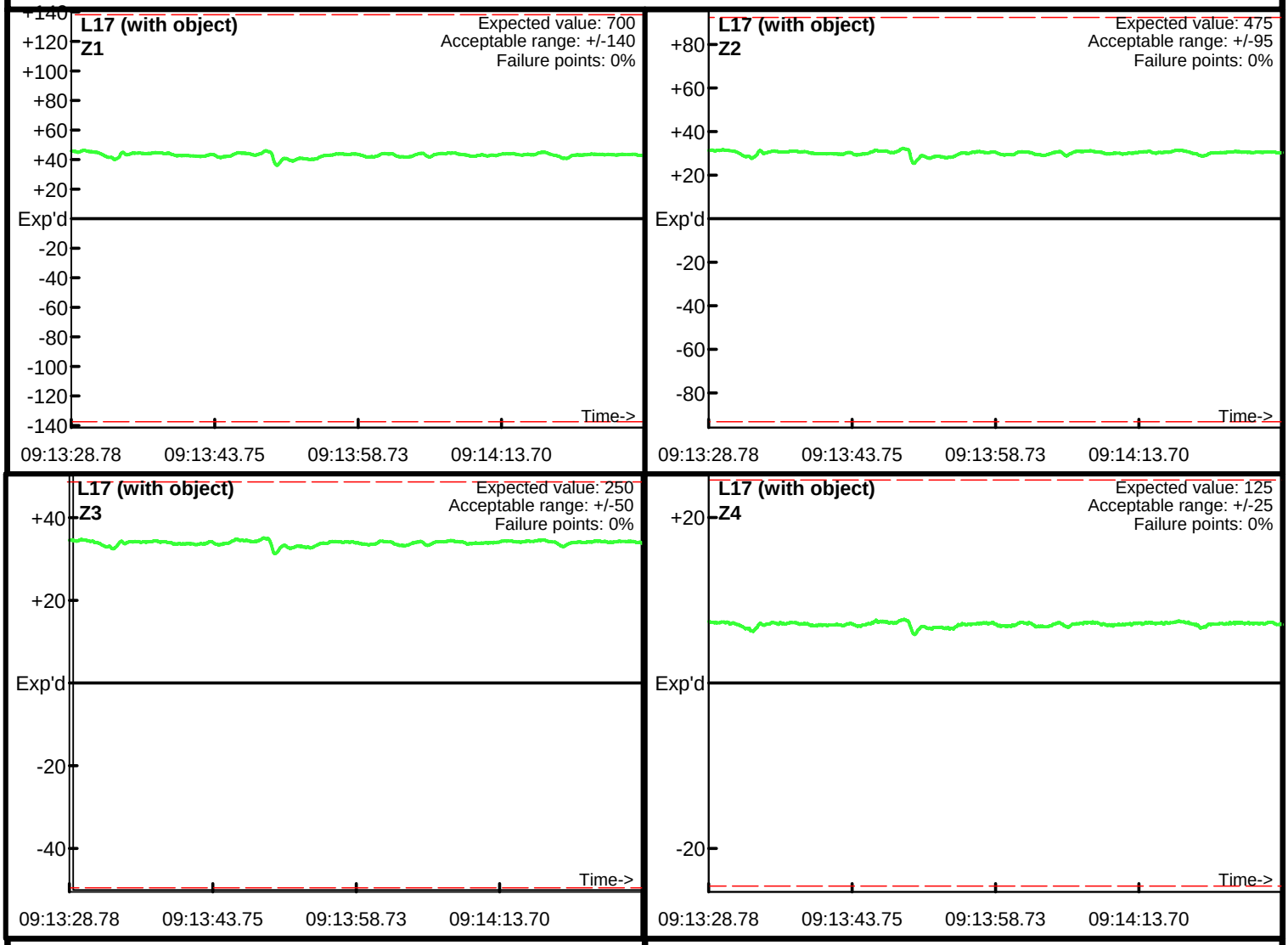
Static Calibration Test

Project: Iowa Army Ammunition Plant
Equipment: EM-61 (1.0x0.5m)
Grid/Location: GPO

Instrument Threshold: 20%
Outside range
Acceptable limits

PM test
Operator: MB
Date: 2008/06/19



Database: C:\URS Projects\IAAAP\Field Data\EM61\061908a.gdb
Line Name: L17

Figure C-12

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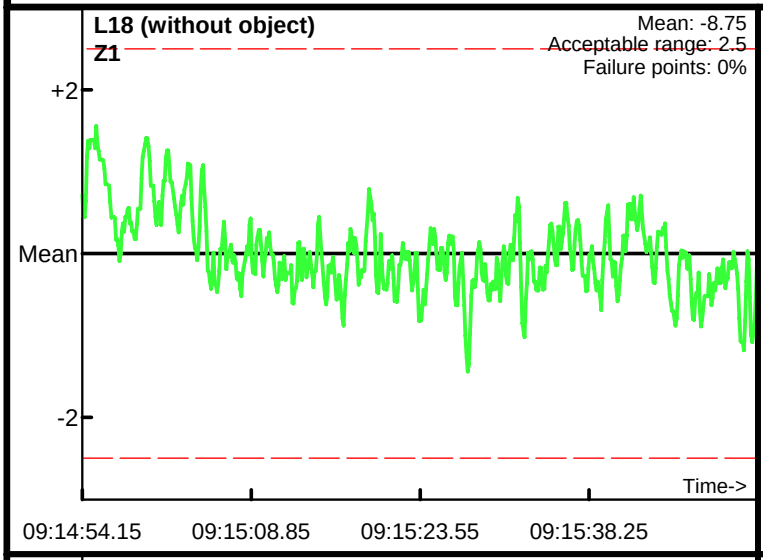
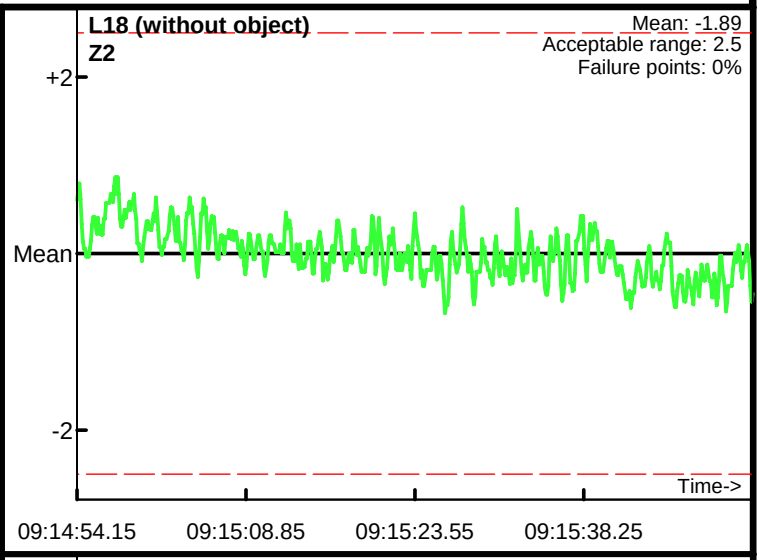
Static Calibration Test

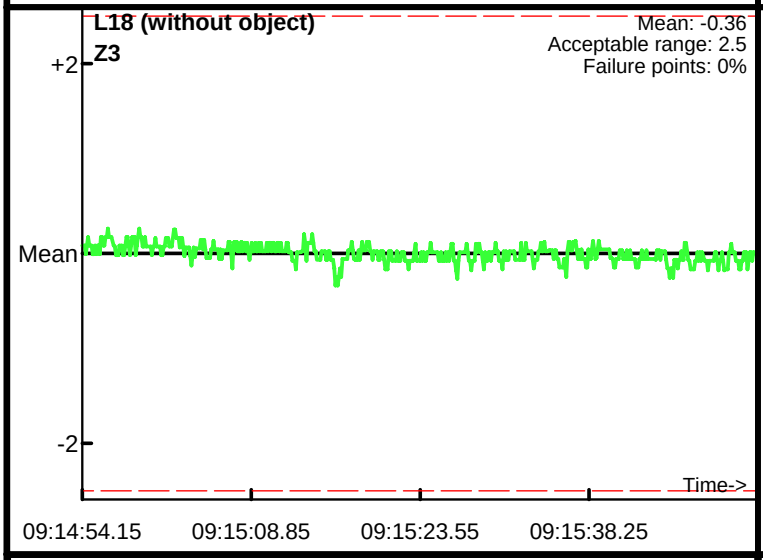
Project: Iowa Army Ammunition Plant
Equipment: EM-61 (1.0x0.5m)
Grid/Location: GPO

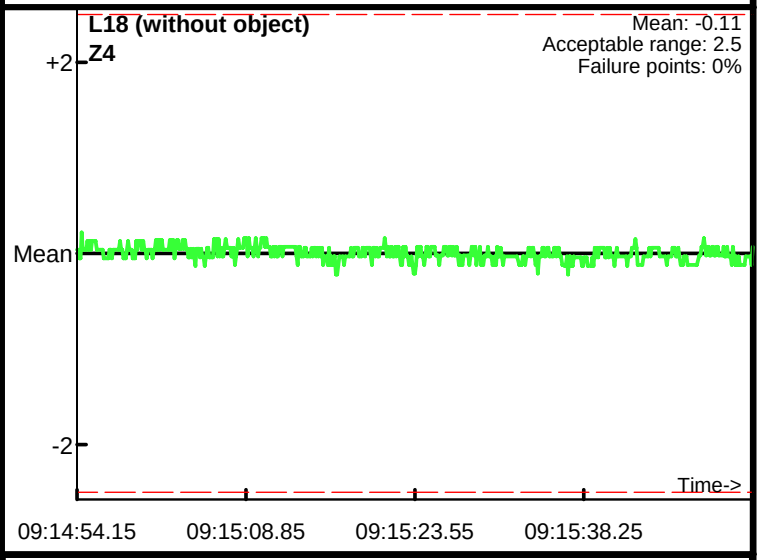
Instrument Threshold: 20%
Outside range
Acceptable limits

PM test
Operator: MB
Date: 2008/06/19









Database: C:\URS Projects\IAAAP\Field Data\EM61\061908a.gdb

Line Name: L18

Figure C-13

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SIX LINE TEST RESULTS (Figure C-14)

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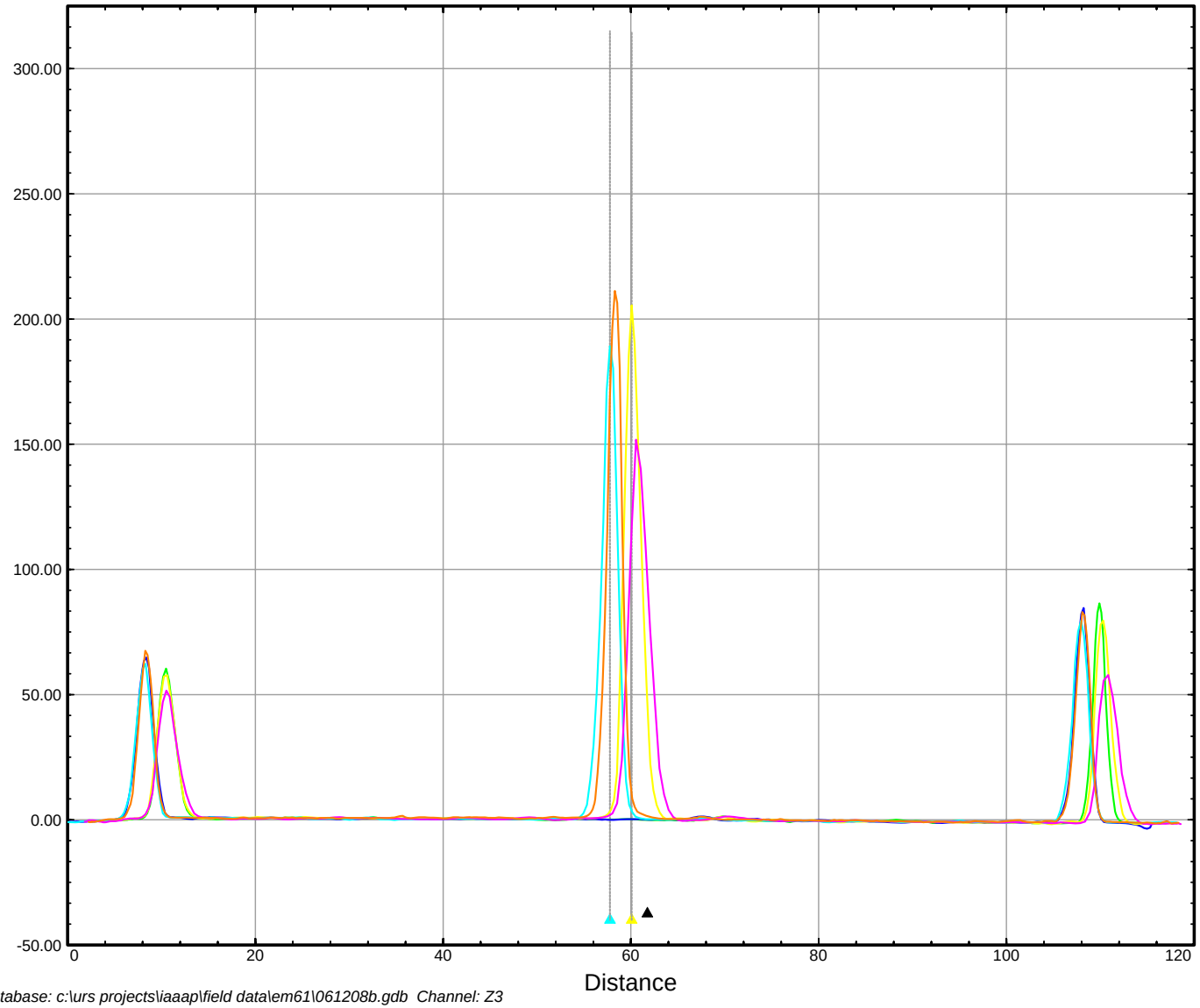
Geophysical Prove-Out
6 Line Test

Background Data Set



database: c:\urs projects\iaaap\field data\em61\061208b.gdb Channel: Z3

Geophysical Prove-Out

6 Line Test

Data File: 061208b

LEGEND

- Normal Pace
- Normal Pace
- Normal Pace with object
- Normal Pace with object
- Fast Pace with object
- Slow Pace with object
- Target position
- Lateral tol. exc.

Proposed distance lag = 1.168

Proposed fiducial lag = 3.451 fid

Client: U.S. Army Corps of Engineers, Omaha District	
Project: Iowa Army Ammunition Plant	
Contractor: URS Group, Inc.	
Created by:	**Verified by:**
Date: July 31, 2008	**File: 061208b_6LineTest**
Figure C-14	**Approved:**

URS

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DATA REPEATABILITY RESULTS (Figure C-15)

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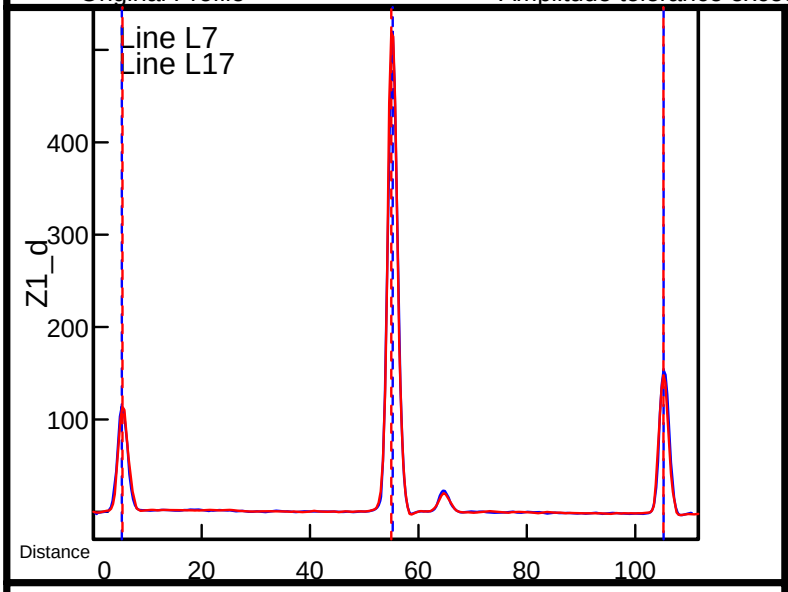
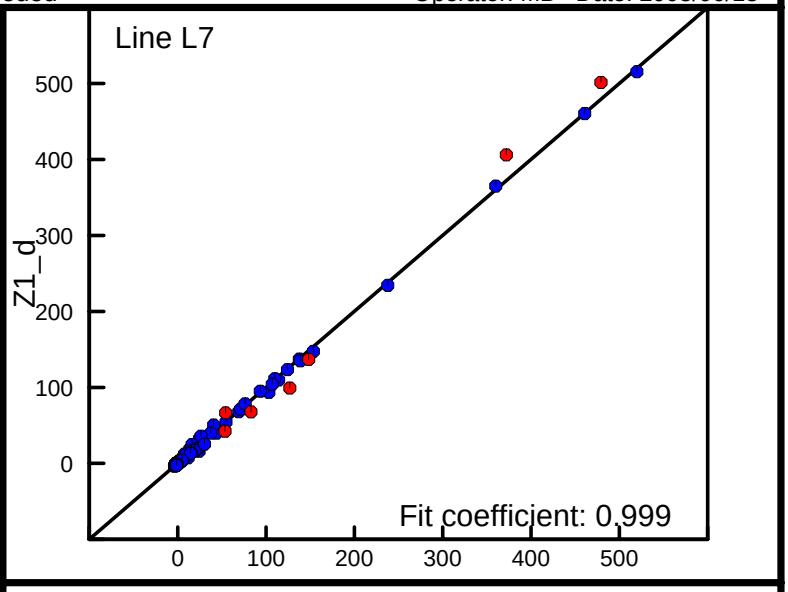
Repeatability Test

Project: Iowa Army Ammunition Plant
Instrument: EM-61 Mark II
Tolerance (% Amplidute) :10.00
Grid name: GPO
Location: GPO
Operator: MB Date: 2008/06/13

Repeated Profile
Original Profile
Lateral tolerance exceeded
Amplitude tolerance exceeded





Database: c:\urs projects\IAAAP\field data\EM61\061308a_edit.gdb

Figure C-15

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SAMPLE SEPARATION (Figures C-16 and C-17)

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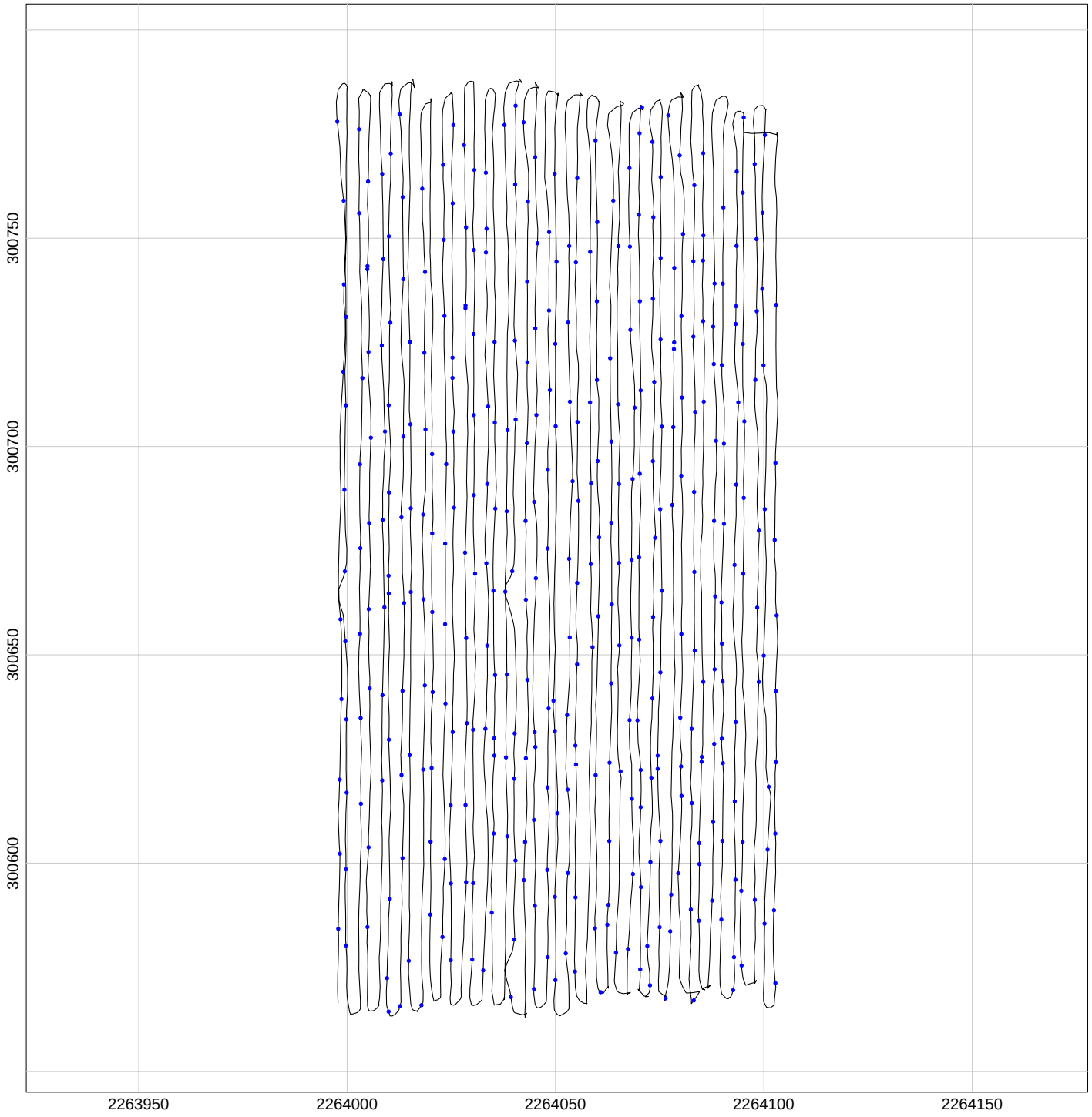

Geophysical Prove-Out
Sample Separation

Background Results
Data File: 061308a

LEGEND

Line path

Flag_Separation

Maximum point seperation set at 0.6 feet

Tolerance limit for data exceeding maximum spacing of 0.6 feet is 20% of data set

Data exceeding max. data spacing: 1.5%

Map Scale: 0 — 50

US survey foot

NAD83 / Iowa CS83 South zone

N

Grid North: 0°0'0"
Mag North: 0°0'0"

Client: U.S. Army Corps of Engineers, Omaha District

Project: Iowa Army Ammunition Plant

Contractor: URS Group, Inc.

Created by:	**Verified by:**
Date: September 4, 2008	**File: 061308a_DATASEP**
Figure C-16	**Approved:**

URS

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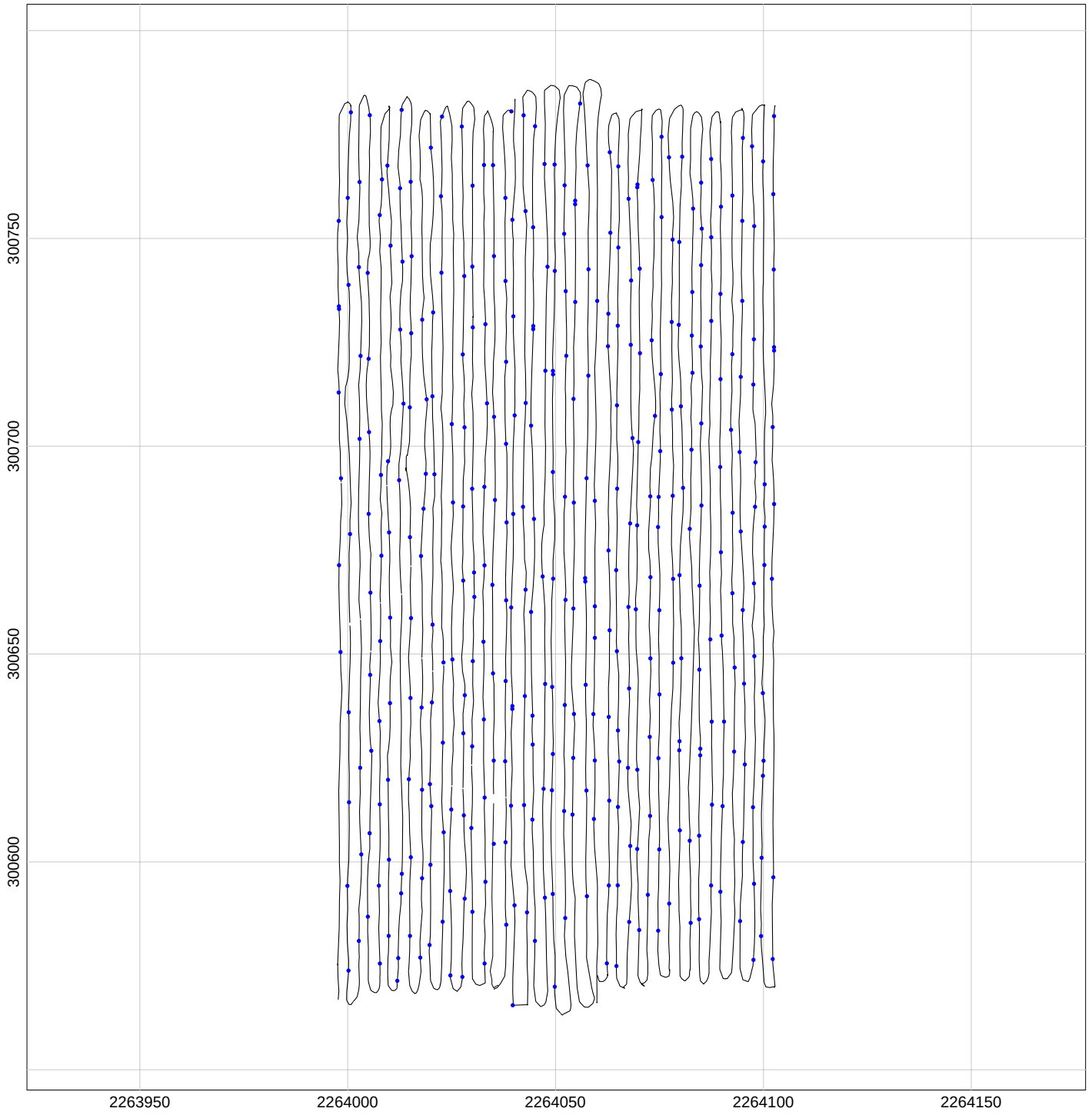

Geophysical Prove-Out

Sample Separation

Test Plot Results
Data File: 061908a_062508a_combined_test_0718

LEGEND

Line path

Flag_Separation

Maximum point seperation set at 0.6 feet

Tolerance limit for data exceeding maximum spacing of 0.6 feet is 20% of data set

Data exceeding max. data spacing: 1.5%

Map Scale: 0 — 50

US survey foot

NAD83 / Iowa CS83 South zone

N

Grid North: 0°0'0"
Mag North: 0°0'0"

Client: U.S. Army Corps of Engineers, Omaha District

Project: Iowa Army Ammunition Plant

Contractor: URS Group, Inc.

Created by:	**Verified by:**
Date: September 4, 2008	**File: 061908a_062508a_DATASEP**
Figure C-17	**Approved:**

URS

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NOISE THRESHOLD (Figures C-18 and C-19)

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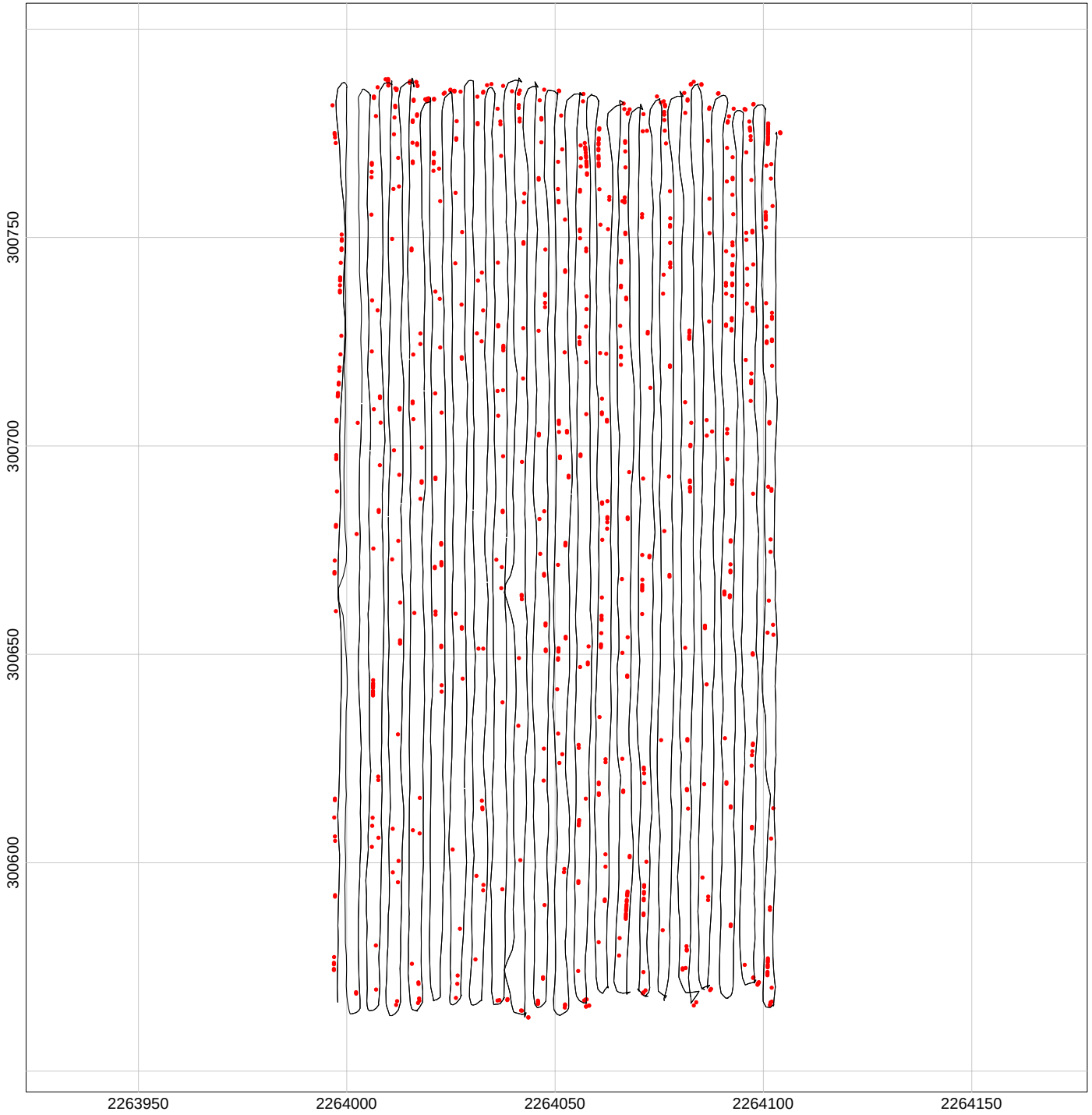

Geophysical Prove-Out
Noise Threshold

Background Results
Data File: 061308a
Channel 1 Data

LEGEND

Noise Threshold

Line path

Flag_Noise

4th difference

Tolerance: 1.5 (4th difference)

Acceptable tolerance for exceeding Noise Threshold is 20% of data set

3.17 % points out of tolerance for data set

Map Scale: 0 — 50

US survey foot

NAD83 / Iowa CS83 South zone

N

Grid North: 0°0'0"
Mag North: 0°0'0"

Client: U.S. Army Corps of Engineers, Omaha District

Project: Iowa Army Ammunition Plant

Contractor: URS Group, Inc.

Created by:	**Verified by:**
Date: September 4, 2008	**File: 061308a_Noise**
Figure C-18	**Approved:**

URS

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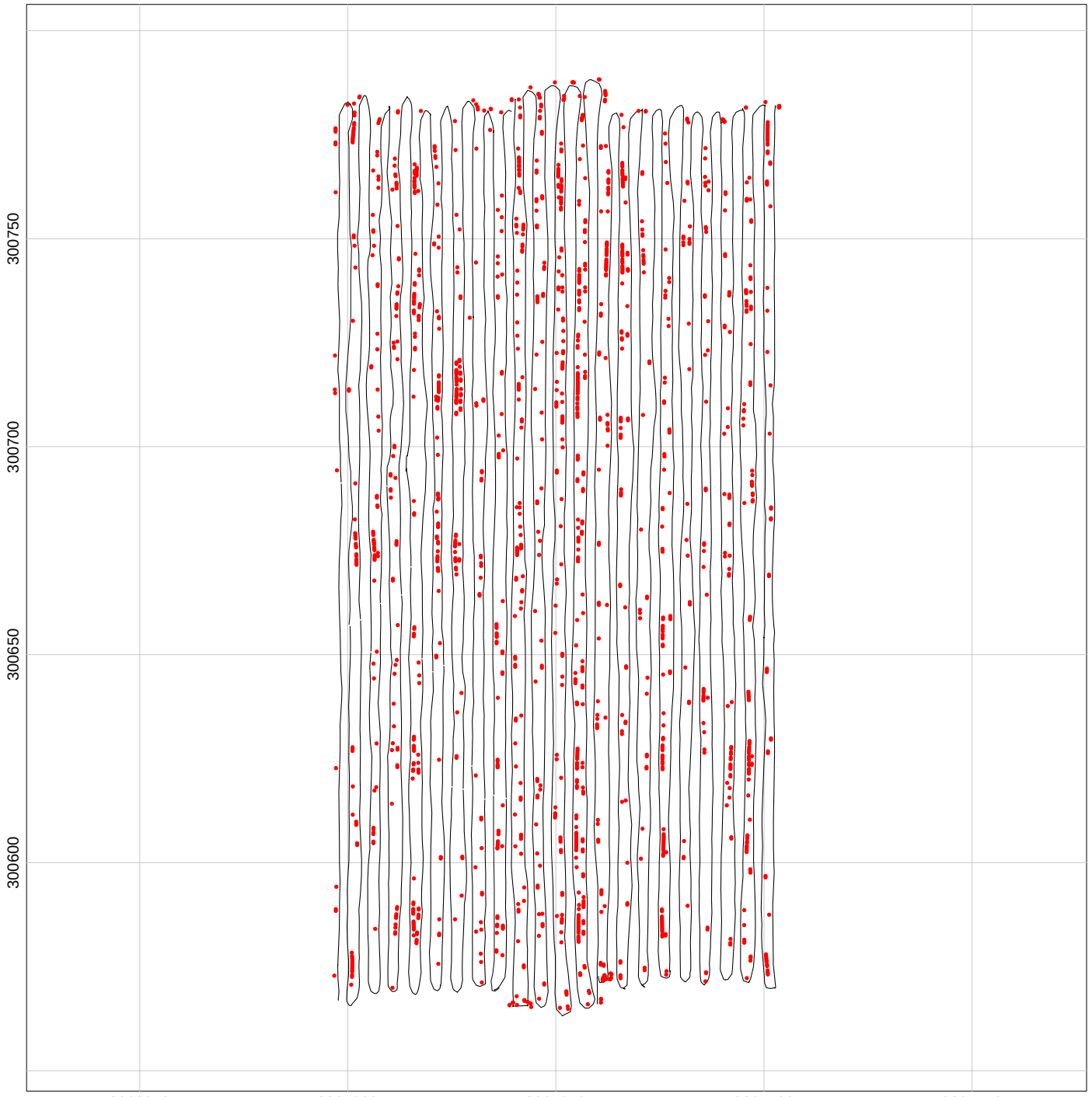

Geophysical Prove-Out
Noise Threshold

Test Plot Results
Data File: 061908a_062508a
Channel 1 Data

LEGEND

Noise Threshold

Line path

Flag_Noise

4th difference

Tolerance: 1.5 (4th difference)

Acceptable tolerance for exceeding Noise Threshold is 20% of data set

6.19 % points out of tolerance for data set

Map Scale: 0 — 50

US survey foot

NAD83 / Iowa CS83 South zone

N

Grid North: 0°0'0"
Mag North: 0°0'0"

Client: U.S. Army Corps of Engineers, Omaha District	
Project: Iowa Army Ammunition Plant	
Contractor: URS Group, Inc.	
Created by:	**Verified by:**
Date: September 4, 2008	**File: 061908a_Noise**
Figure C-19	**Approved:**

URS

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VELOCITY DATA (Figures C-20 and C-21)

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Geophysical Prove-Out Velocity Data

Background Results
Data File: 061308a

LEGEND

Original path colour: Black

Maximum Acceptable Velocity is 3.0 mph

Tolerance limit for data exceeding Maximum Velocity is 20% of data set

Acceptable velocity range (green symbols)

Velocity above acceptable range: 0.61 % (blue symbols)

Map Scale: 0 — 50

US survey foot

NAD83 / Iowa CS83 South zone

N

Grid North: 0°0'0"
Mag North: 0°0'0"

Client: U.S. Army Corps of Engineers, Omaha District	
Project: Iowa Army Ammunition Plant	
Contractor: URS Group, Inc.	
Created by:	**Verified by:**
Date: September 4, 2008	**File: 061308a_VelocityMap**
Figure C-20	**Approved:**

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Geophysical Prove-Out Velocity Data

Data File: 061908a_062508a_combined_test_0718

LEGEND

Original path colour: Black

Maximum Acceptable Velocity is 3.0 mph

Tolerance limit for data exceeding Maximum Velocity is 20% of data set

Acceptable velocity range (green symbols)

Velocity above acceptable range: 14.68 % (blue symbols)

Map Scale: 0 — 50

US survey foot

NAD83 / Iowa CS83 South zone

N

Grid North: 0°0'0"

Mag North: 0°0'0"

Client: U.S. Army Corps of Engineers, Omaha District	
Project: Iowa Army Ammunition Plant	
Contractor: URS Group, Inc.	
Created by:	**Verified by:**
Date: September 4, 2008	**File: 061908a_062508a_comb_test_0718**
Figure C-21	**Approved:**

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TABLE D-1
DIG SHEET THRESHOLD VALUE: 5.5 mV
IOWA ARMY AMMUNITION PLANT
MIDDLETOWN, IOWA

Project Name: Iowa Army Ammunition Plant
Project Location: Geophysical Prove-Out
Date: 06/09/08 through 06/26/08
Coordinate System: State Plane-Iowa South NAD83 Survey Feet
Survey Area ID:
Sector:
Field Book ID:

Geophysical Contractor: URS Corporation
Project Geophysicist: Corby Schmalz
Site Geophysicist: Matt Barner
Field Team: Matt Barner, Corby Schmalz
COE Design Center POC: Terry Samson
COE Project Engineer:
COE Geophysicist: Rick Grabowski

Seed Item ID	GPO Survey Results									Reacquisition Survey		
	Easting Coord. (ft)	Northing Coord. (ft)	Channel ID	Amplitude Response (mV)	Date	Description	Surveyed Depth (ft)	Target Status	Target ID	Amplitude Response (mV)	Azimuth	Polar Distance (ft)
1	2264004.28	300606.12	CH 1	17.99	25-Jun-08	Grenade, MK II	1.31	Found within middle radius	11	17.0	62.18	0.81
2	2264005.68	300606.57	CH 1	17.99	25-Jun-08	PD T Bar Fuze, M48#117	0.83	Found within middle radius	11	17.0	84.12	0.68
3	2264003.63	300607.10	CH 1	17.99	25-Jun-08	Grenade, MK II	1.72	Found within middle radius	11	17.0	66.35	1.5
4	2264004.84	300635.12	CH 1	9.46	25-Jun-08	81mm, M57, Mortar	2.46	Found within middle radius	17	4.4	79.7	0.67
5	2264004.13	300675.39	CH 1	47.98	25-Jun-08	81mm, M57, Mortar	1.67	Found within middle radius	26	55.0	82.79	0.88
6	2264005.54	300716.09	CH 1	1.94	25-Jun-08	81mm, M57, Mortar	3.53	Not Included	N/A	0.0	N/A	N/A
7	2264004.81	300749.86	CH 1	3.56	25-Jun-08	81mm, M57, Mortar	3.8	Not Included	N/A	0.0	N/A	N/A
8	2264014.81	300585.42	CH 1	63.10	25-Jun-08	81mm, M57, Mortar	1.72	Found within middle radius	6	67.0	18.14	0.61
9	2264015.06	300587.28	CH 1	63.10	25-Jun-08	Fuze Adaptor Body	1.1	Found within middle radius	6	67.0	2.68	1.28
10	2264014.96	300624.97	CH 1	36.91	25-Jun-08	75mm, MK1 Projectile	1.69	Found within inner radius	12	30.0	53.13	0.05
11	2264017.45	300626.59	CH 1	36.91	25-Jun-08	Fuze IOP-27-10, M215	0.4	Found within tolerance	12	30.0	57.02	2.92
12	2264015.00	300627.49	CH 1	36.91	25-Jun-08	MIC Time Fuze, M84	1.28	Found within tolerance	12	30.0	0	2.49
13	2264014.37	300654.55	CH 1	1.77	25-Jun-08	75mm, MK1 Projectile	3.8	Not Included	N/A	8.0	N/A	N/A
14	2264014.70	300692.69	CH 1	3.05	25-Jun-08	75mm, MK1 Projectile	4.06	Not Included	N/A	0.0	N/A	N/A
15	2264014.44	300735.15	CH 1	33.54	25-Jun-08	75mm, MK1 Projectile	1.56	Found within inner radius	41	29.0	21.8	0.16
16	2264014.80	300764.03	CH 1	54.66	25-Jun-08	75mm, MK1 Projectile	1.76	Found within inner radius	47	51.0	81.47	0.2
17	2264024.11	300638.80	CH 1	4.49	25-Jun-08	Landmine, M1A1	2.86	Not Found	N/P	3.0	*	*
18	2264024.47	300674.27	CH 1	32.89	25-Jun-08	Landmine, M1A1	2.88	Found within inner radius	24	33.0	7.43	0.23
19	2264024.88	300713.68	CH 1	125.61	25-Jun-08	Landmine, M1A1	1.68	Found within middle radius	34	125.0	62.7	0.7
20	2264024.65	300749.81	CH 1	4.68	25-Jun-08	Landmine, M1A1	1.98	Not Found	N/P	0.0	*	*
21	2264034.98	300585.29	CH 1	15.56	25-Jun-08	PD T Bar Fuze, M48#117	0.5	Found within middle radius	4	9.0	68.01	0.56
22	2264034.72	300605.51	CH 1	22.71	25-Jun-08	PD T Bar Fuze, M48#117	0.59	Found within middle radius	10	13.0	57.86	0.92
23	2264035.19	300625.17	CH 1	6.83	25-Jun-08	PD T Bar Fuze, M48#117	0.96	Found within inner radius	13	6.0	61.26	0.35
24	2264035.14	300655.27	CH 1	9.61	25-Jun-08	PD T Bar Fuze, M48#117	0.9	Found within inner radius	21	7.0	31.33	0.27
25	2264034.90	300694.86	CH 1	3.26	25-Jun-08	PD T Bar Fuze, M48#117	1.52	Not Found	N/P	3.0	*	*
26	2264035.23	300735.26	CH 1	4.18	25-Jun-08	PD T Bar Fuze, M48#117	1.31	Not Found	N/P	4.0	*	*
27	2264044.82	300664.89	CH 1	2.70	25-Jun-08	Fuze IOP-27-10, M215	0	Not Included	N/A	2.0	N/A	N/A
28	2264044.65	300685.30	CH 1	2.15	25-Jun-08	Fuze IOP-27-10, M215	0.25	Not Included	N/A	2.0	N/A	N/A
29	2264044.56	300704.95	CH 1	2.32	25-Jun-08	Fuze IOP-27-10, M215	0	Not Included	N/A	3.0	N/A	N/A
30	2264045.00	300725.01	CH 1	1.32	25-Jun-08	Fuze IOP-27-10, M215	0.25	Not Included	N/A	1.5	N/A	N/A
31	2264044.45	300744.81	CH 1	1.82	25-Jun-08	Fuze IOP-27-10, M215	0.25	Not Included	N/A	3.0	N/A	N/A
32	2264044.76	300765.04	CH 1	0.00	25-Jun-08	Fuze IOP-27-10, M215	0.25	Not Included	N/A	2.5	N/A	N/A
33	2264054.85	300585.04	CH 1	67.55	25-Jun-08	Fuze Adaptor Body	0.69	Found within middle radius	5	63.0	37.27	0.58
34	2264054.88	300604.91	CH 1	94.82	25-Jun-08	Fuze Adaptor Body	0.59	Found within inner radius	7	121.0	76.68	0.39
35	2264055.09	300625.23	CH 1	29.33	25-Jun-08	Fuze Adaptor Body	0.99	Found within middle radius	16	23.0	65.41	0.65
36	2264055.05	300645.03	CH 1	11.82	25-Jun-08	Fuze Adaptor Body	0.87	Found within middle radius	19	7.0	65.89	1.15
37	2264054.92	300675.05	CH 1	21.58	25-Jun-08	Fuze Adaptor Body	1.26	Found within middle radius	27	25.0	43.03	0.62

TABLE D-1
DIG SHEET THRESHOLD VALUE: 5.5 mV
IOWA ARMY AMMUNITION PLANT
MIDDLETOWN, IOWA

Seed Item ID	GPO Survey Results									Reacquisition Survey		
	Easting Coord. (ft)	Northing Coord. (ft)	Channel ID	Amplitude Response (mV)	Date	Description	Surveyed Depth (ft)	Target Status	Target ID	Amplitude Response (mV)	Azimuth	Polar Distance (ft)
38	2264054.59	300694.89	CH 1	9.39	25-Jun-08	Fuze Adaptor Body	1.42	Found within middle radius	29	7.0	8.39	0.62
39	2264065.36	300665.10	CH 1	5.52	25-Jun-08	Adaptor Booster	1.29	Found within inner radius	23	5.0	74.48	0.37
40	2264065.17	300685.06	CH 1	4.95	25-Jun-08	Adaptor Booster	1.29	Not Found	N/P	5.0	*	*
41	2264065.19	300704.49	CH 1	21.74	25-Jun-08	Adaptor Booster	0.86	Found within inner radius	31	12.0	86.99	0.19
42	2264064.86	300725.23	CH 1	9.48	25-Jun-08	Adaptor Booster	0.87	Found within inner radius	38	10.0	27.41	0.3
43	2264064.92	300744.56	CH 1	173.07	25-Jun-08	Adaptor Booster	0.32	Found within inner radius	45	220.0	53.13	0.1
44	2264065.00	300764.66	CH 1	52.00	25-Jun-08	Adaptor Booster	0.44	Found within inner radius	48	59.0	0	0.34
45	2264075.14	300584.97	CH 1	63.15	25-Jun-08	MIC Time Fuze, M84	0.75	Found within middle radius	3	72.0	87.32	0.64
46	2264074.96	300604.77	CH 1	48.13	25-Jun-08	MIC Time Fuze, M84	0.53	Found within inner radius	8	40.0	9.87	0.23
47	2264075.06	300624.97	CH 1	42.17	25-Jun-08	MIC Time Fuze, M84	0.83	Found within inner radius	14	43.0	63.43	0.07
48	2264074.94	300654.85	CH 1	26.00	25-Jun-08	MIC Time Fuze, M84	0.97	Found within inner radius	20	15.0	21.8	0.16
49	2264074.92	300695.21	CH 1	7.20	25-Jun-08	MIC Time Fuze, M84	1.45	Found within middle radius	28	7.0	70.1	0.62
50	2264075.12	300734.82	CH 1	10.95	25-Jun-08	MIC Time Fuze, M84	1.51	Found within inner radius	42	8.0	64.65	0.42
51	2264084.98	300639.95	CH 1	23.80	25-Jun-08	Grenade, MK II	0.95	Found within inner radius	18	14.0	21.8	0.05
52	2264084.95	300675.04	CH 1	14.20	25-Jun-08	Grenade, MK II	1.42	Found within inner radius	25	11.0	84.92	0.45
53	2264084.82	300714.91	CH 1	6.57	25-Jun-08	Grenade, MK II	1.16	Found within inner radius	36	5.0	63.43	0.2
54	2264085.15	300749.98	CH 1	5.10	25-Jun-08	Grenade, MK II	1.79	Not Found	N/P	4.0	*	*
55	2264084.96	300765.06	CH 1	3.45	25-Jun-08	Grenade, MK II	1.85	Not Found	N/P	0.0	*	*
56	2264094.88	300604.95	CH 1	23.99	25-Jun-08	MIC Time Fuze, M84	1.42	Found within inner radius	9	14.0	67.38	0.13
57	2264093.80	300606.04	CH 1	23.99	25-Jun-08	Fuze IOP-27-10, M215	0.38	Found within tolerance	9	14.0	49.09	1.59
58	2264096.13	300605.94	CH 1	23.99	25-Jun-08	Fuze IOP-27-10, M215	0.73	Found within middle radius	9	14.0	50.24	1.47
59	2264095.04	300625.08	CH 1	346.82	25-Jun-08	Frag (multiple pieces)	0.86	Found within inner radius	15	382.0	80.13	0.47
60	2264095.45	300656.02	CH 1	7.49	25-Jun-08	FASCAM Mine	2.78	Found within middle radius	22	4.0	40.87	0.69
61	2264094.40	300686.39	CH 1	3.60	25-Jun-08	FASCAM Mine	2.54	Not Found	N/P	4.0	*	*
62	2264094.52	300706.50	CH 1	9.57	25-Jun-08	FASCAM Mine	2.21	Found within middle radius	32	7.0	46.12	0.72
63	2264094.75	300734.92	CH 1	22.38	25-Jun-08	FASCAM Mine	2.17	Found within middle radius	43	12.0	23.32	0.63
64	2264052.50	300704.25	CH 1	6.81	25-Jun-08	Munitions Component Sim (1/2" x 3" bolt)	0	Found within tolerance	30	25.0	79.32	2.32
65	2264054.50	300709.25	CH 1	15.40	25-Jun-08	Munitions Component Sim (1/2" x 3" bolt)	0	Found within inner radius	33	20.0	32.15	0.41
66	2264054.50	300715.25	CH 1	47.41	25-Jun-08	Munitions Component Sim (1/2" x 3" bolt)	0	Found within inner radius	35	75.0	53.97	0.27
67	2264052.50	300719.50	CH 1	9.26	25-Jun-08	Munitions Component Sim (1/2" x 3" bolt)	0.25	Found within tolerance	37	7.0	79.88	2.28
68	2264054.50	300726.25	CH 1	13.90	25-Jun-08	Munitions Component Sim (1/2" x 3" bolt)	0.25	Found within middle radius	39	12.0	33.69	0.72
69	2264052.75	300729.50	CH 1	4.35	25-Jun-08	Munitions Component Sim (1/2" x 3" bolt)	0.5	Not Found	N/P	10.0	*	*
70	2264054.75	300734.00	CH 1	6.65	25-Jun-08	Munitions Component Sim (1/2" x 3" bolt)	0.5	Found within inner radius	40	7.0	31.26	0.33
71	2264054.75	300740.00	CH 1	22.02	25-Jun-08	Munitions Component Sim (1/2" x 3" bolt)	0.5	Found within inner radius	44	28.0	17.53	0.2
62508	2264051.22	300762.72	CH 1	19.16	25-Jun-08	Blind Seed	0.5	Found within middle radius	46	N/R	32.57	1.45

Notes:
Found within inner radius - Found within inner radius (0.0 - 0.50 feet)
Found within middle radius - Found within middle radius (0.50 - 1.5 feet)
Found within tolerance - Found within tolerance (1.5 feet - 3.0 feet)
Not found - not located in the Picked Target Database within one of the three radii.
Not Included - Item not included in calculation
N/A = Not Applicable
N/P = Not Picked
N/R = Not Reacquired
* = Value not calculated

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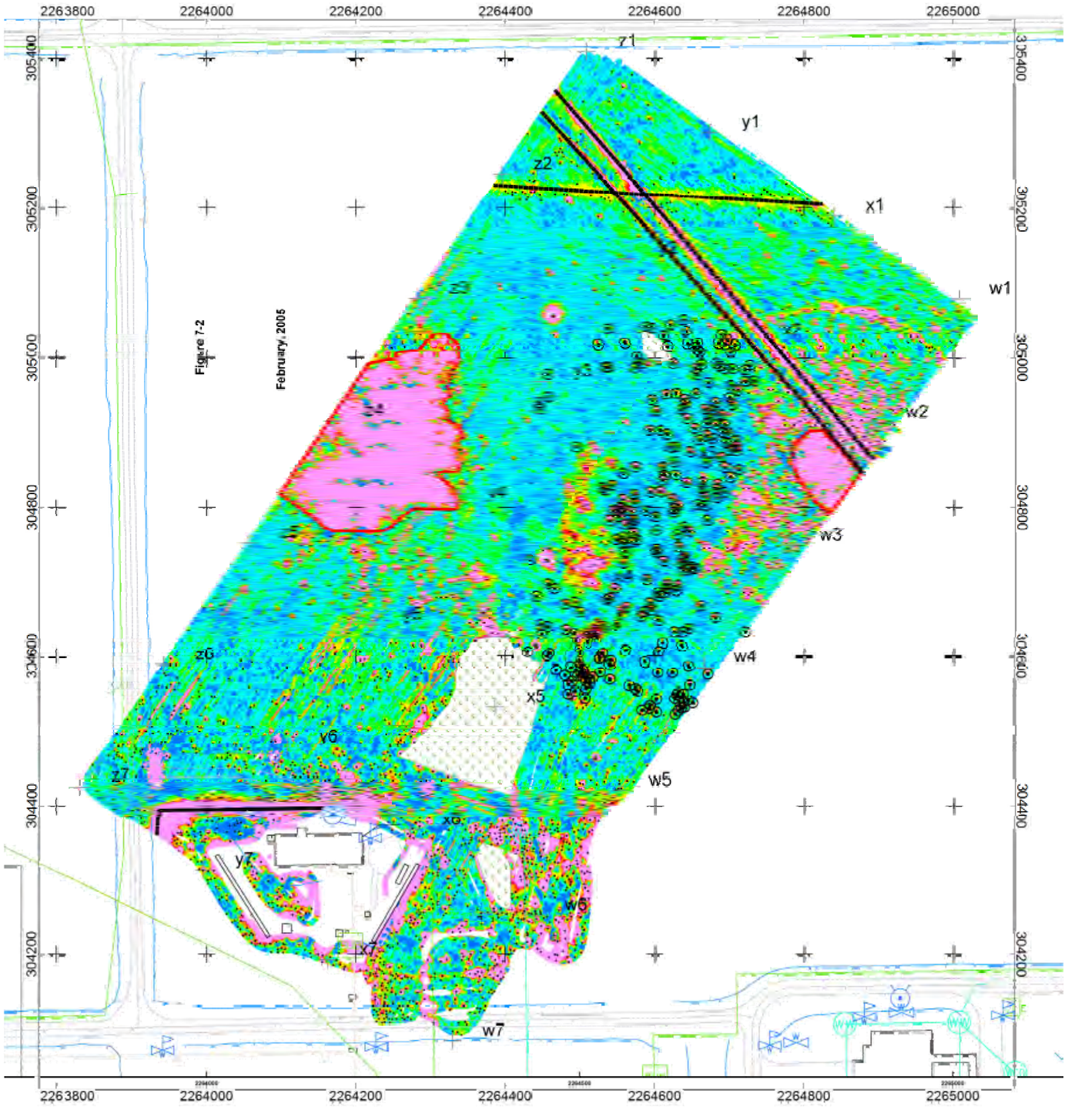


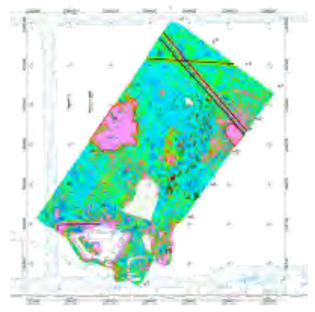
Reacquisition of MKM Data

Central Test Area MRS (IAAP-001-R-01)

Iowa Army Ammunition Plant
Middletown, Iowa

LEGEND

⊙ Reacquired Data Point



Client: U.S. Army Corps of Engineers, Omaha District	
Project: Iowa Army Ammunition Plant	
Contractor: URS Group, Inc.	
Created by:	Verified by:
Date: July 31, 2008	File: CTA_reacquisition_final_map
Figure E-1	Approved:

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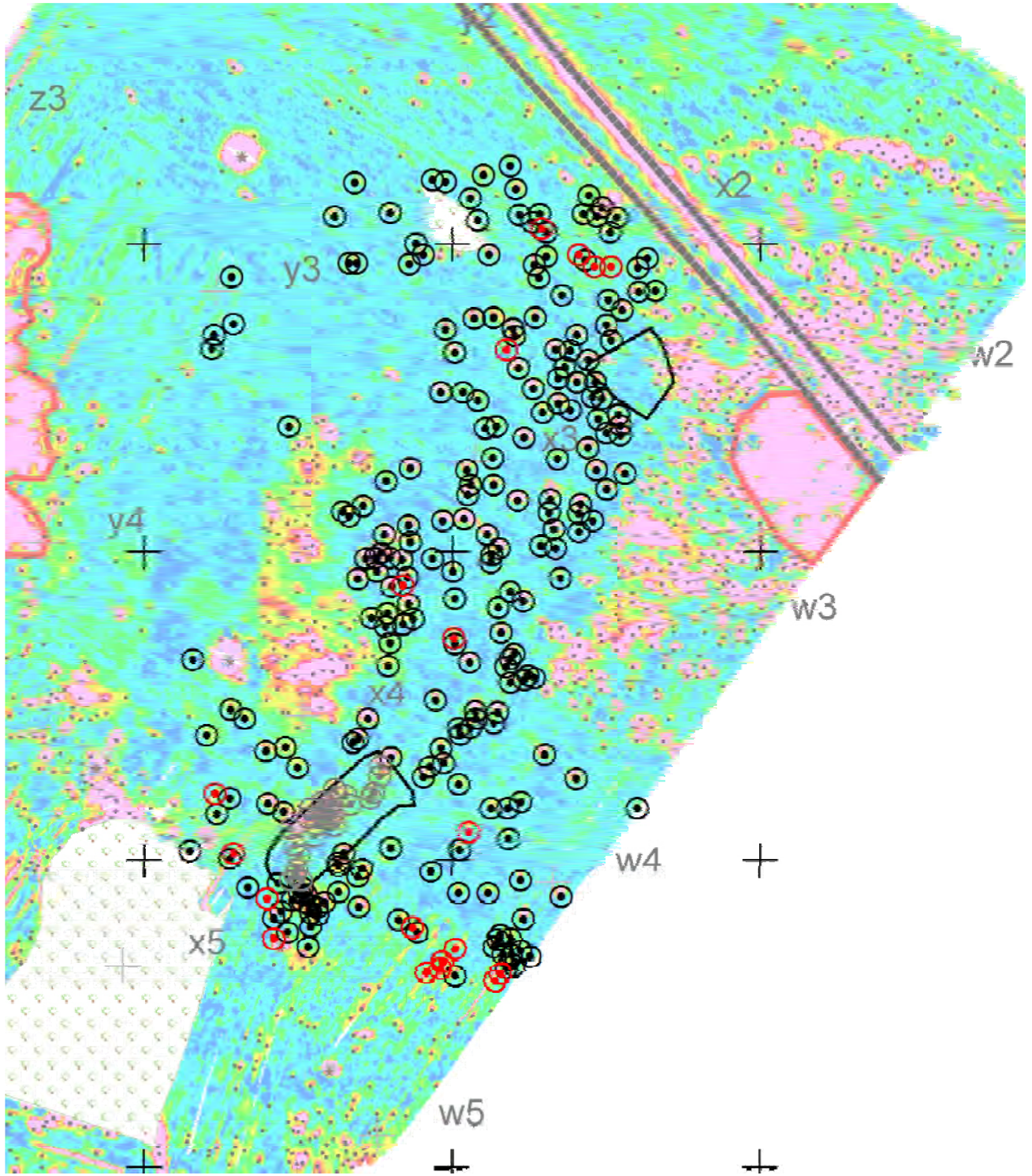


Reacquisition of MKM Data

Central Test Area MRS (IAAP-001-R-01)

Iowa Army Ammunition Plant
Middletown, Iowa

LEGEND

- Disturbed Area
- Reacquired Data Point
- Data Point Located WIthin Disturbed Area
- Reacquired Data Point Not Located During Reacquisition Process

REACQUISITION RESULTS

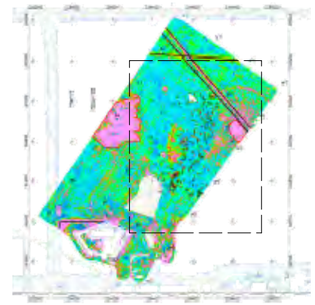
Total Number of Targets Reacquired = 276

Total Number of Targets Located within Disturbed Area = 30

Total Number of Targets Used in Caluculation = 246

Total Number of Targets Not Located = 20

Percentage of Targets Not Located = 8%



Map Scale: 0 100 US survey foot

NAD83 / Iowa CS83 South zone

N

Grid North: 0°0'0"
Mag North: 0°0'0"

Client: U.S. Army Corps of Engineers, Omaha District	
Project: Iowa Army Ammunition Plant	
Contractor: URS Group, Inc.	
Created by:	Verified by:
Date: July 31, 2008	File: CTA_reacquisition_final_map_results
Figure E-2	Approved:

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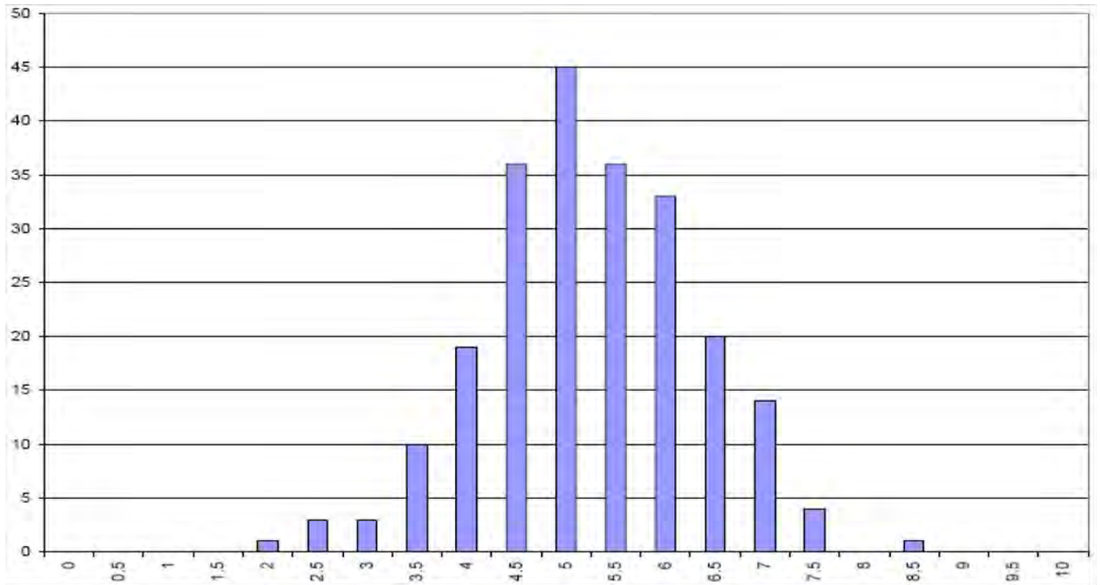
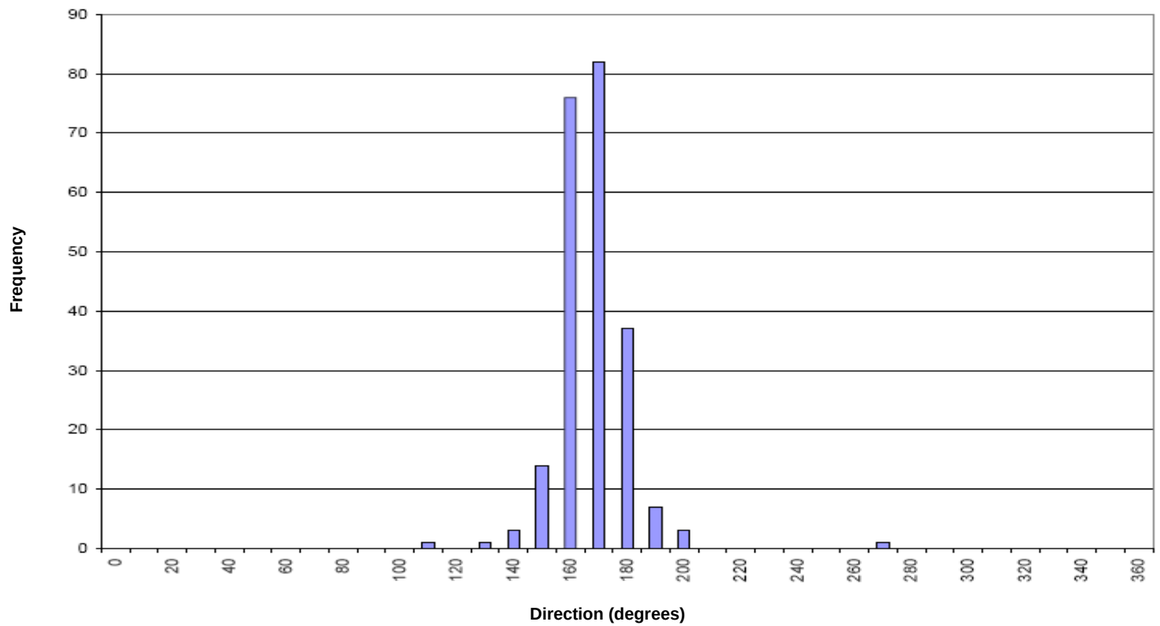
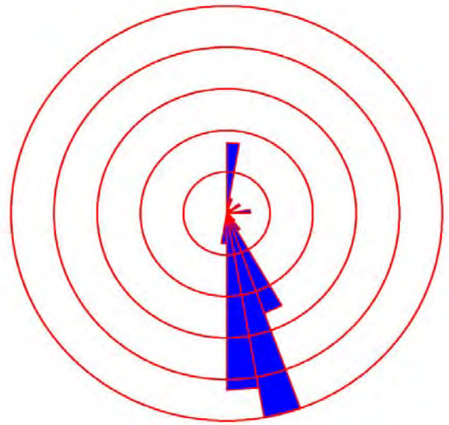
Reacquisition of MKM Data
Central Test Area MRS

Total Number of Targets Reacquired = 276
Total Number of Targets Used in Calculation: 276 - (30 within disturbed area) = 246
Total Number of Targets Not Located = 20 (8%)







ROSE DIAGRAM

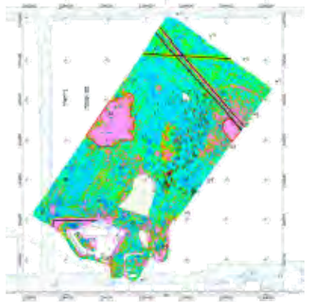
The above Rose Diagram image represents both distance and direction into a single plot.

Reacquisition of MKM Data

Central Test Area MRS (IAAP-001-R-01)

Iowa Army Ammunition Plant Middletown, Iowa

LEGEND



Client: U.S. Army Corps of Engineers, Omaha District	
Project: Iowa Army Ammunition Plant	
Contractor: URS Group, Inc.	
Created by:	**Verified by:**
Date: July 31, 2008	**File: CTA MKM Reacquisition**
Figure E-3	**Approved:**

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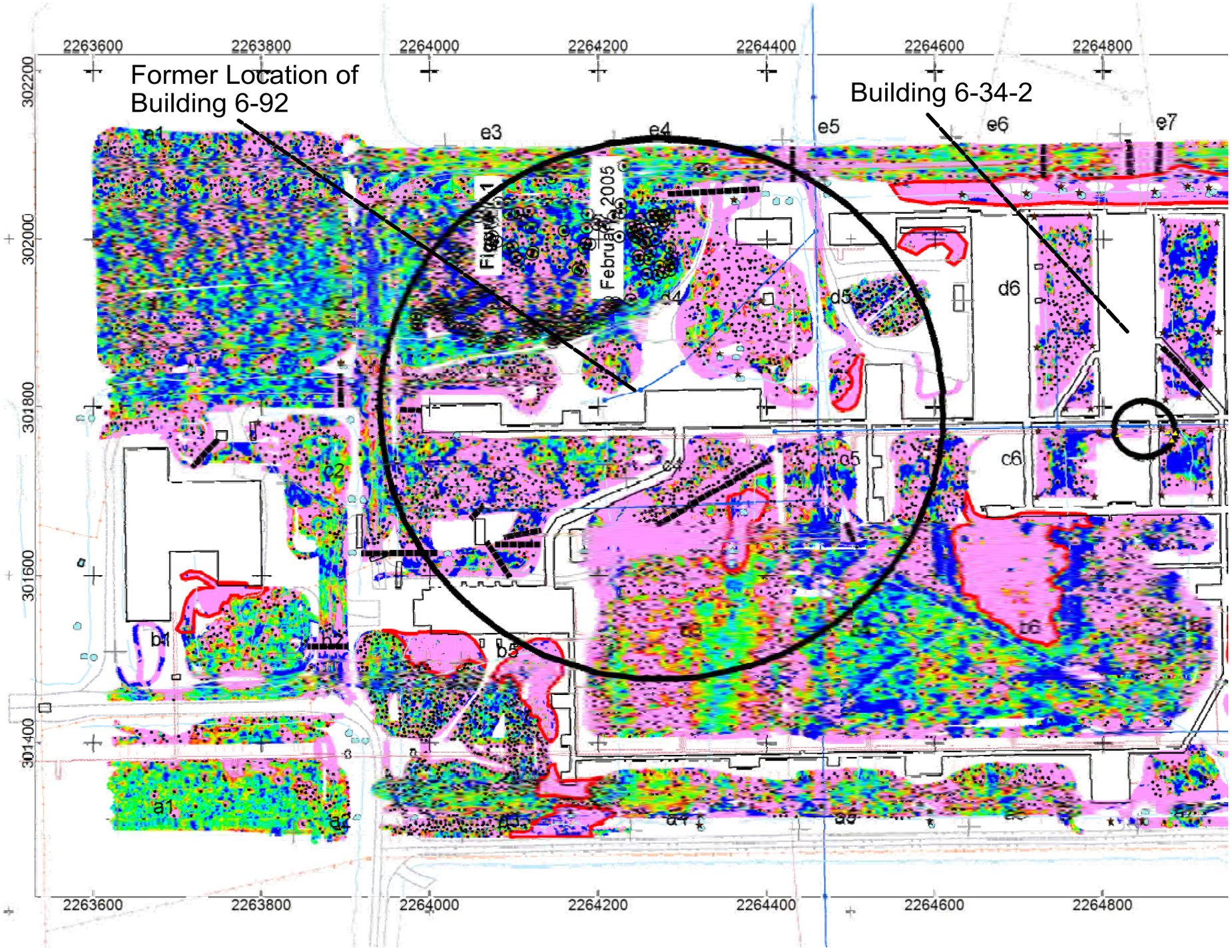


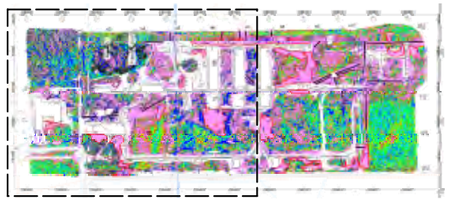
Reacquisition of MKM Data

Line 6 Ammo Production MRS (IAAP-002-R-01)

Iowa Army Ammunition Plant
Middletown, Iowa

LEGEND

- Radius for Explosive Items Recovered After Each Respective Explosion
- Reacquired Data Point



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Map Scale: 0 200
US survey foot
NAD83 / Iowa CS83 South zone

Grid North: 0°0'0"
Mag North: 0°0'0"

Client: U.S. Army Corps of Engineers, Omaha District	
Project: Iowa Army Ammunition Plant	
Contractor: URS Group, Inc.	
Created by:	**Verified by:**
Date: July 31, 2008	**File: LL6_reacquisition_final_map**
Figure E-4	**Approved:**

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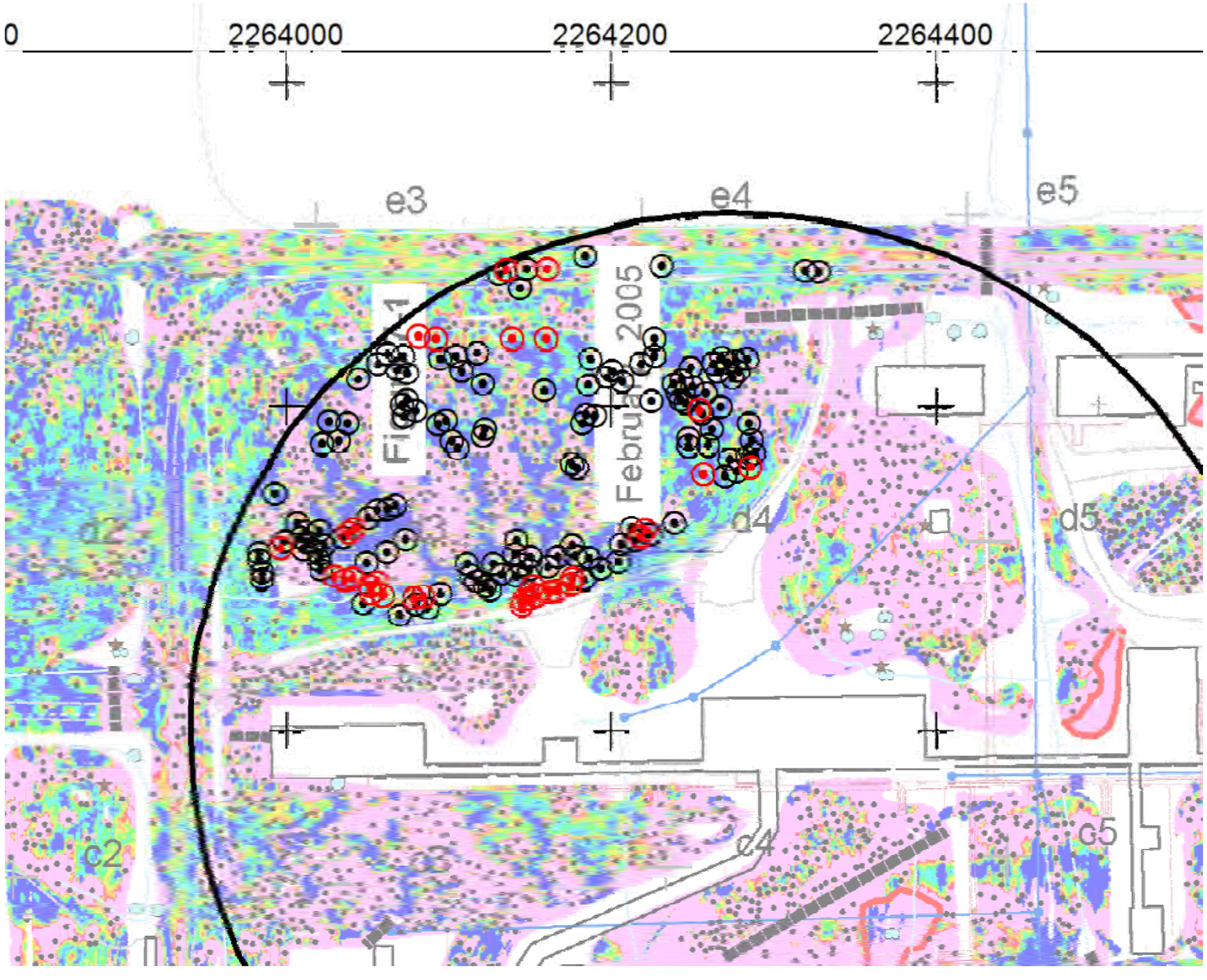
Reacquisition of MKM Data

Line 6 Ammo Production MRS (IAAP-002-R-01)

Iowa Army Ammunition Plant
Middletown, Iowa



LEGEND

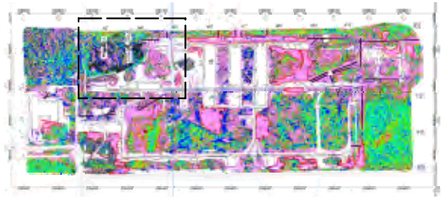
- Radius for Explosive Items Recovered After Each Respective Explosion
- Reacquired Data Point
- Reacquired Data Point Not Located During Reacquisition Process

REACQUISITION RESULTS

Total Number of Targets Reacquired = 163

Total Number of Targets Not Located = 32

Percentage of Targets Not Located = 20%



Map Scale: 0 100 US survey foot
NAD83 / Iowa CS83 South zone

N
Grid North: 0°0'0"
Mag North: 0°0'0"

Client: U.S. Army Corps of Engineers, Omaha District

Project: Iowa Army Ammunition Plant

Contractor: URS Group, Inc.

Created by:	Verified by:
Date: July 31, 2008	File: LL6_reacquisition_final_map_results
Figure E-5	Approved:

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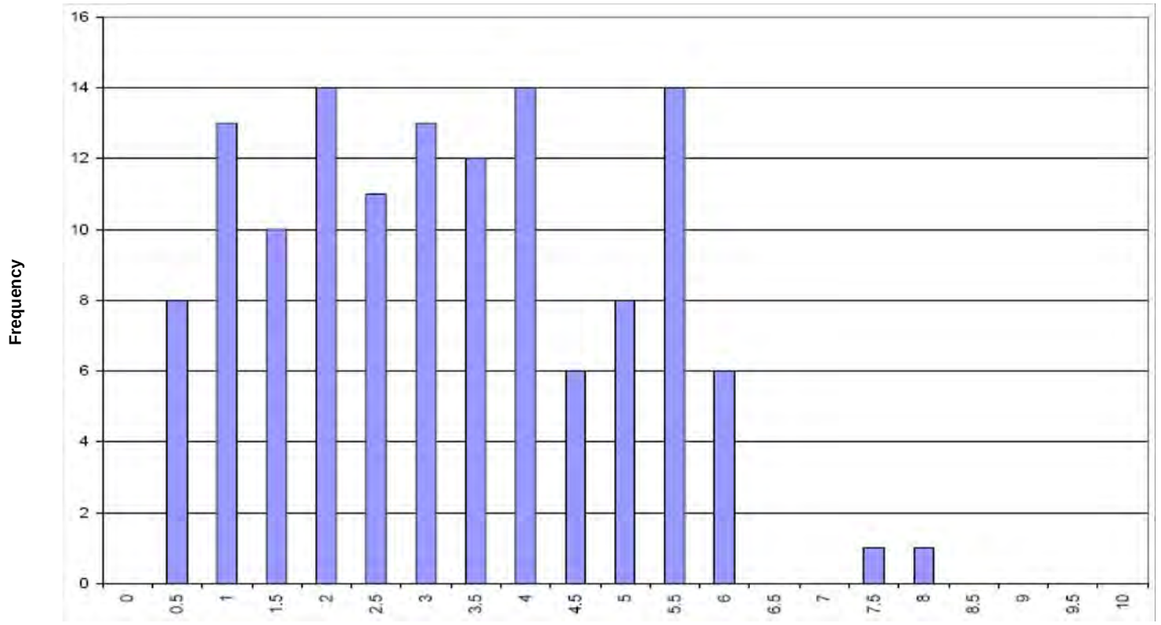
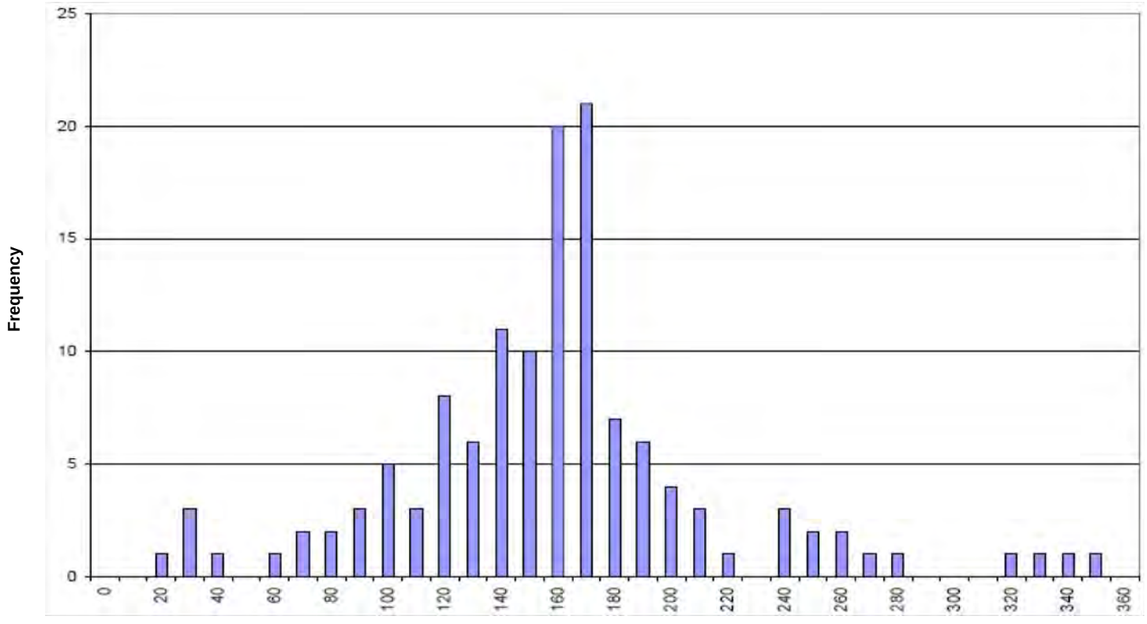
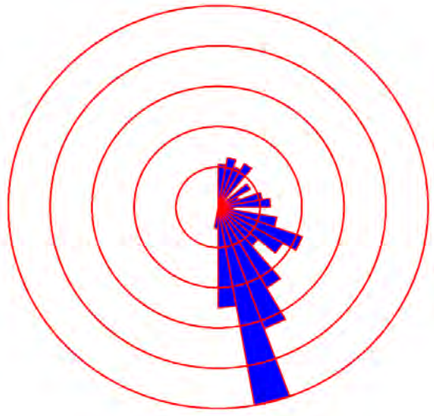
Reacquisition of MKM Data
Line 6 Ammo Production MRS

Total Number of Targets Reacquired = 163
Total Number of Targets Not Located = 32 (20%)







ROSE DIAGRAM

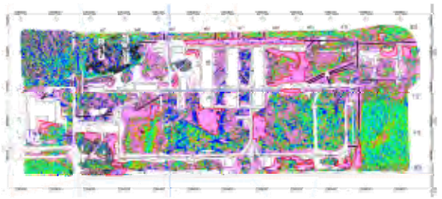
The above Rose Diagram image represents both distance and direction into a single plot.

Reacquisition of MKM Data

Line 6 Ammo Production MRS (IAAP-002-R-01)

Iowa Army Ammunition Plant
Middletown, Iowa

LEGEND



Client: U.S. Army Corps of Engineers, Omaha District	
Project: Iowa Army Ammunition Plant	
Contractor: URS Group, Inc.	
Created by:	**Verified by:**
Date: July 31, 2008	**File: Line 6 MKM Reacquisition**
Figure E-6	**Approved:**

URS

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RESPONSE TO USEPA AND US ARMY COMMENTS

URS RESPONSE TO USEPA AND US ARMY COMMENTS

DRAFT GPO TECHNICAL MEMORANDUM MILITARY MUNITIONS RESPONSE PROGRAM AT IOWA ARMY AMMUNITION PLANT

Comments by Scott Marquess, USEPA, Federal Facilities and Special Emphasis Branch, Superfund Division, August 25, 2008

GENERAL COMMENTS

Comment 1. The Technical Memorandum is well-written, and shows that the team was successful in detecting potential MEC of reasonable size and depth buried in the test plot. The major concerns with the document are in regard to: 1) the DQO's are not explicitly defined for some aspects of the data, which could be remedied by stating the DQO's, and how they can be monitored; and 2) the re-acquisiton of data collected by MKM appears to be only marginally successful in one of the two areas (Line 6 Ammo Production MRS), with a large number of "no finds" and a high percentage of re-acquired targets lying outside a 1-meter radius (after "correcting" the positions by 5 feet). Although the re-acquisition was more successful in the Central Test Area, there were still a significant number of no finds, and the positions require a 5 feet adjustment to meet the 1-meter radius requirement. Minor concerns include problems with the presented static test data (some of which can be corrected easily), and errors visible in the fiducialed data presented as a color contour map. The need to re-survey the Central Test Area and Line 6 remains in question based on the information presented in the report.

Response: Agree. 1) As discussed in the PM meeting, although the GPO performance criteria are currently listed in Section 4.10.2 of this document, it may be better to state the GPO performance criteria separately in Section 4.10.1. Section 4.10.1 will also include performance criteria for down line spacing, the confidence level, and a cross track evaluation. Section 4.10.3 will be revised to compare the GPO results to the performance criteria.

Response: Agree. 2) The CTA reacquisition results met the project reacquisition performance criteria (92% were located which was greater than the 85% criteria). The positional shift in land survey coordinates was effective in adjusting the previous MKM survey data to the current land survey data. The Line 6 reacquisition results were problematic (80% were located) due to the greater anomaly density and low amplitude signatures from small cultural debris items. It appears that the aerial extent of potential anomalies has been defined at Line 6 within the blast radii, therefore, instead of completing another DGM survey at Line 6, we recommend moving forward to "dig and verify" activities to investigate the nature of the anomalies in the Line 6 area.

Comment 2. In general, the report references data presented in various appendices, but provides little discussion or evaluation of the data to support conclusions that are made. Analysis of the data should be included in the text to support conclusions that are being made.

Response: Agree. The text in Sections 4, 5, and 6 will be revised to include more discussion of data evaluation, referencing tables and data analysis figures presented in the Appendices. Section 4 will be revised to present the GPO Performance Criteria at the beginning of the section as Section 4.10.1.

Comment 3. As we have discussed, MEC may be found at some areas at depths greater than 2 feet. Any remedial actions that may be found necessary will need to address all potential MEC at the site, which may include MEC at intervals deeper than 2 feet below grade at some sites.

Response: Agree. Each MRA is described in the IAAAP RI Work Plan and the depth of individual item MEC investigations have been agreed upon. If there are burial pits at PDS, InDA, and WBP South, the metallic signatures will be strong enough to be detected in the upcoming geophysical surveys. If burial pits are identified, future removal actions will address munitions-related debris to depth. No text changes are recommended.

SPECIFIC COMMENTS

Comment 1. Section 1.1, paragraph 2 – The dispute resolution also requires that the IAAP perform a Remedial Investigation for OU5, and that the RI must propose a schedule for a Feasibility Study, Proposed Plan, ROD, Remedial Design, Remedial Action Work Plan, and Remedial Action Completion Report for OU5. Please revise.

Response: Agree. The Draft MMRP RI Report will propose a schedule for the Feasibility Study, Proposed Plan, ROD, Remedial Design, Remedial Action Work Plan, and Remedial Action Completion Report. No text changes are recommended.

Comment 2. Section 1.2 – One of the important bullets from the GPO Prove Out Plan is missing –"Establish survey or data collection methodologies to meet performance criteria established in the GPO Plan". Please revise.

Response: Agree. The text will be revised as suggested.

Comment 3. Section 1, Page 1-5, paragraph 3 - The DQO's are not specific for certain parameters. There are no tolerances listed for down-line station spacing, between line spacing, positioning accuracy, reacquisition parameters, etc. The RI Work Plan

appears to indicate that some of the parameters will be defined during the GPO process, but these are not addressed in the Tech Memo. Please include this information in the revised Tech Memo.

The report indicates that after adjusting the reported re-acquired locations 5 feet (170 degrees E of N), then the re-acquired locations fall within a 1-meter radius of the originally reported locations. This is not a generally accepted method of re-locating targets. If this is applied universally, those locations that were within 1-meter to start with are no longer. If an explanation were offered for the offset (original GPS base station coordinate used was 5 feet off from actual location), this adjustment process may be easier to understand and accept. Another issue is that the amplitude of the re-acquired anomaly should always be equal to or greater than that of the original. During re-acquisition, the position is refined compared to the detection survey, and as a result a higher response is often observed. A number of the re-acquired targets in this list have a lower amplitude. This suggests something other than the original target may have been "re-acquired". This issue must be thoroughly addressed.

Response: Comment noted. See response to General Comment number 1.

Response: Agree. The MKM Draft Final MEC Density Report for Line 6 and the Central Test Area (May 2005) noted (page 2-3) that "...because no benchmarks were successfully located at the facility, a base station point named IAAP23 was created by MKM personnel." " ...small positional errors (up to a few feet) are likely..." "If present, these errors would exist as a baseline shift, and would not affect the relative positions of the EM readings. The MKM GPO reference points were removed and could not be relocated. A thorough radial search of each target indicated that the anomaly associated with the Target ID was generally 5' (170 degrees E of N). The positional shift in land survey coordinates was effective in adjusting the previous MKM survey data to the current land survey. The difference in target amplitude during reacquire may be attributed to where MKM nulled the EM61 electronics. URS nulled the EM61 electronics at each site. It may be possible that the MKM EM61 response characteristics were different than the EM61-MK2Aused during the reacquire. The text will be revised to indicate that the previous base station reference point could not be relocated and a new base station reference point was installed, and a baseline positional shift was effectively applied to the previous MKM survey data to assist in relocating target anomalies.

Comment 4. Section 1, Page 1-6, Anticipated MEC Types – The munition components listed are probably significantly smaller than the grenades, and are listed as

potential munitions categories. Please list the dimensions of these items as well, if they are going to be sought as targets.

Response: Comment noted. The minimum diameter munition for the CTA is the MKII grenade, components will not be targeted during geophysical mapping. Munitions specifications are presented in Appendix J of the Draft Final RI Work Plan (URS 2008). No text changes are recommended.

Comment 5. Section 1, Page 1-7, paragraph 4 - Please clarify how you are assessing whether the Line 6 data actually meets the project DQOs.

Response: Comment noted. See response to General Comment Number 1. Text in Section 5 will be revised to indicate that the reacquisition of targets at Line 6 Ammo Production MRS did not meet the performance criteria and that the MRS should move forward to the intrusive phase (dig and verify).

Comment 6. Section 1, Page 1-21, Figure 1-1 – The map is confusing - water features are blue in most of this map, but the river is white, and the land surface is blue on the eastern side. Please revise/clarify.

Response: Agree. Figure 1-1 will be revised as suggested.

Comment 7. Section 2.2 – Greater numbers of "simulants", rather than munition items as described in the Prove Out Plan, were emplaced in the test plot. The report should document that the simulants used are representative of the possible munitions that may be found at the site. It appears that you have concluded that for the smaller items, the simulants were not representative. The performance of the system in detecting smaller items was therefore not evaluated, leaving an apparent data gap.

Response: Agree. Performance of the system for small diameter munitions was evaluated using ½ inch diameter simulants. They are shown on Table 2-2. In general, the simulants had lower amplitude than the inert munitions items they were simulating. A table will be included in the GPO Technical Memorandum that compares the amplitude of the simulant and inert seed items.

Comment 8. Section 2.4 – Please clarify where areas of potential MEC-contamination were located. Were these areas at Line 6 not previously identified in the MKM survey?

Response: Agree. The first sentence in Section 2.4 will be revised to read: "UXO-qualified personnel used a White's XLT and Schonstedt GA-52-52Cx ~~to perform a clearance survey prior to~~ *for MEC anomaly*

avoidance while personnel were completing field activities at ~~entering areas~~ *the Central Test MRS and Line 6 Ammo Production MRS* ~~potentially contaminated with MEC~~."

Comment 9. Section 2.9 – Appendix B includes no discussion or interpretation of the results of the background survey. Such information should be presented.

Response: Comment noted. See the response to General Comment Number 2.

Comment 10. Section 3, paragraph 1 - Two of the figures in Appendix C (QC Results) show apparent failed tests (Figures C-3, C-9). The "failures" in Figure C-3 may not be true failures, but an error in the Acceptance Criteria. Another figure (C-6) doesn't show failures, but should, due to the same error. Please clarify.

Response: Agree. The figures will be revised to include the correct Acceptance Criteria range/values.

Comment 11. Section 3.5 – Please indicate whether the reference item was detected and whether system performance was evaluated at a lower height per the GPO Plan.

Response: Agree. Yes, the reference item was detected. Evaluation of the EM61 system performance at a lower height was not feasible.

Comment 12. Section 3, Page 3-3, paragraph 4 - The referenced figure (C-9) shows apparent problems with amplitude and lateral tolerance, however the data may well be within specifications, as the Geosoft program used to generate this figure has some issues. Please evaluate and clarify.

Response: Agree. Figure C-9 and the Geosoft program used to generate the figures will be evaluated as suggested.

Comment 13. Section 4, Page 4-1, paragraph 3 - Data are streamed real time into the Allegro via a serial port and recorded along with the current EM readings, but there is really no "synchronizing" performed. Please revise/clarify.

Response: Agree. The term "synchronizing" will be removed.

Comment 14. Section 4, Page 4-2, paragraph 3 – Please specify in what channel a 6 mV increase was noted.

Elevated response is visible in the southwest corner in the color contour map for the fiducial data set (only). Was this effect removed from the other data sets by leveling, or was it only present in this one?

Response: Agree. The text will be revised to indicate a 6mV increase was observed in Channel 1. The elevated response in the Southwest corner of the GPO was removed by leveling the data. The fiducial data will be leveled.

Comment 15. Section 4.2, last paragraph – Please clarify the discussion regarding the background survey at the Possible Demolition Site (PDS). The Report should establish whether a unique test plot is necessary at the PDS, and appears to defer this decision until later.

Response: Agree. A new background reference line will be required at the PDS. A new location will be selected and completed at the beginning of the PDS geophysical investigation.

Comment 16. Section 4, Page 4-2, Data Analysis and Interpretation, bullet 1 – This bullet is confusing as written. Please clarify what survey results were compared.

Response: Agree. The bullet will be revised to indicate that the background reference line survey results for the MRSs were compared to the GPO background reference line survey results to determine if individual test plots would be required at the MRSs.

Comment 17. Section 4, Page 4-2, bullet 3 – Please specify the tolerance limits for the signal-to-noise ratio.

Response: Agree. The bullet will be revised to indicate the performance criteria for allowable signal to noise variance was $\pm$ 5 mV.

Comment 18. Section 4.3, last bullet – The Probability of Detection and Confidence Level should be evaluated for munitions of different sizes. Please include this information in the report.

Response: Agree. The percent detection for the overall seed population was calculated to be 85.5 percent (which met the GPO performance criteria) and is presented in Section 4.10.1. To achieve a confidence level of 90%, over 100 seed items would have been required for each munition type. As discussed, the text will be revised to present the percent detection for various munition types and how the results achieved the overall objectives of the GPO project.

Comment 19. Section 4, Page 4-4, Data Reacquisition – The report states that URS reacquired all seed items placed within the GPO test plot. Please revise, as not all seed items were detected.

Response: Agree. The sentence will be modified to indicate that not all items were detected.

Comment 20. Section 4.7 – The M215 simulant used was apparently inappropriate. Please clarify how you have assessed the performance of the system relative to detection of the minimum diameter munitions/components.

Response: Comment noted. See response to Comment number 7.

Comment 21. Section 4.8 – An assessment of the system performance using 2 foot spacing should be presented.

Response: Agree. Section 4.8 indicates that results from the 2.0 and 2.5 foot spacing were similar, and that the 2.0 foot spacing did not increase target resolution. The text will be revised to add discussion on how it was determined that the target resolution was similar (e.g., 14 of 15 targets were detected and the amplitudes were similar).

Comment 22. Section 4.10.1 – The confidence level established in the GPO Plan was 90%, and 86% was achieved. Please clarify how this meets the overall objective of the GPO.

Response: Comment noted. See response to Specific Comment Number 18.

Comment 23. Section 4, Page 4-6, bullet 2 - It should be stated more clearly that this is for testing the RTK GPS, and not a requirement for positioning of anomalies. A 1 foot positioning requirement is not particularly rigorous for RTK. Many similar projects have a requirement of 4" for RTK accuracy in daily GPC checks. There is a 2-point positioning test described in Section 3, p. 3-27 of the RI Work Plan, which uses a tighter requirement for the positioning of anomalies (8").

Response: Agree. The Geophysical Prove-Out Plan indicates the tolerance will be +/- 20 centimeters. The text will be revised to indicate +/- 20 centimeter tolerance (about 8 inches).

Comment 24. Section 4, Page 4-6, bullet 6 - This statement is unclear. Is this a reference to signal-to-noise ratio (a unitless number), or to a variation in background noise? Please clarify.

Response: Agree. Bullet reads "signal to noise variance not to exceed +/- 5 mV."

Comment 25. Section 4, Page 4-9, Figure 4-1 - It appears there is a slight heading error (or leveling issue) in the data, as there are N-S lineations coinciding with the alternating line directions. Please clarify.

Response: Agree. The data will be reviewed and releveled in those areas with lineations.

Comment 26. Section 5, Reacquisition Field Activities, Line 6 - A field QC check was performed in the Central Test area and the Line 6 Ammo Production site "to determine if the data met the DQOs of the MMRP RI Work Plan (URS 2008a)". Results are listed in the following tables, but the question is not answered. Given the high number of no finds, and the number of targets reacquired outside the 1-meter radius, this question must be addressed.

Response: Comment noted. See response for General Comment #1.

Comment 27. Section 5, Page 5-1, Reacquisition Results, paragraph 2 - The area selected for re-acquisition appears to have high cultural influence, and a high chance for overlapping signatures. This may explain why there is such a large percentage of no finds, and perhaps why so many of the targets that were located fall outside of the 1-meter radius.

This is a significant number of no finds. What percentage of targets as no finds exceeds the DQO's? It is unclear how you have determined that previously collected data by MKM meets the project DQOs. Please explain.

Response: Comment Noted. See the response for General Comment Number 1. A portion (TBD) of the reacquired target exhibited a 0 mV response. It cannot be determined if the targets have moved or were simply not relocated. The potential for a surface/near surface target to move (due to rain, snow, and mechanical means [mowing]) is significant. Another portion (TBD) of the "no finds" appeared to be caused by the local terrain. Many of the "no find" targets are located within a drainage ditch. It is possible that as the data was collected by a towed array the array had difficulties navigating/negotiating the ditch. This may have caused the "no finds" or shifted the position beyond what was expected. The text in Section 5 will be revised to include a plausible explanation for the "no finds."

Comment 28. Section 5, Page 5-1, Reacquisition Results, paragraph 3 - The positional shift looks like it would work well at the Central Test Area, where a normal distribution can be seen in Figure E-3, but Figure E-6 shows a different story for the Line 6 Ammo Production MRS. Assuming Figure E-6 shows locations that have not been adjusted 5 feet, 53% would still lie outside of the 1-meter radius if adjusted by 5 feet. Please discuss.

It may be helpful to offer some reasons why this shift is necessary. If the GPS base station used during the MKM survey was setup with the wrong coordinates, this could explain why there is a constant offset.

Response: Agree. See response to Comment number 3. If one assumes that the MKM base station remained at the same location for the duration of data acquisition, the offset distance and direction should be similar for Line 6 and the CTA. It is possible that the density of anomalies located within Line 6 may have attributed to locating a target not associated with the selected/intended target

Comment 29. Section 6, Page 6-1, Recommendations, bullet 4 – Please specify the Channel for data to be used (Channel 1).

Response: Agree. Text will be revised to indicate Channel 1.

Comment 30. Appendix B, Page B-1, Figure B-1 - The GPS track shows a common problem in the path of the operator, with two lines too close together, then two lines separated too far apart. This doesn't seem to adversely affect detection in this GPO, but there should be defined limits for how much of a deviation is permissible. If the geophysicist holds the handle slightly off-center while pulling the cart, it will bias the position slightly off-center, with the result seen on some of these lines.

Response: Agree. Agree on what may affect the line spacing. Field was extremely wet due to heavy rains in area and after brush crew moved the vegetation, the area was deeply rutted by the tractor. The ruts may have affected data collection because the ruts are linear and roughly parallel to the N/S direction of data collection. Limits will be determined for permissible deviation and presented with the GPO Performance Criteria. Data will be reviewed to ensure that the line spacing was within criteria.

Comment 31. Appendix B, Page B-3, Figure B-2 - These data do not appear to have been leveled. The plotted response looks very much like an instrument warm-up period. Please clarify.

Response: Comment Noted. See response to Comment 15. Please note the comment provided to the right of the figure. "Variation in background may be caused by underground utility or other local interference not observed during data collection." Recommend moving the reference line to more suitable location. Although it may appear as an "equipment warm-up" the equipment was maintained in the "on" position during collection of all background area. The equipment was not turned off at any time.

Comment 32. Appendix B, Page B-7, Figure B-4 - What is the origin of the one line that traverses at an angle across the others? It does not appear to loop at the end like all of the other lines. The same line arrangement can be seen in the background survey.

Response: Agree. The line is an artifact from combining two data files. The end point from one data set has been connected to the start point of the next data set. The line will be removed.

Comment 33. Appendix B, Page B-9, Figure B-5 - The elevated response depicted in this image is unique. None of the other GPO maps show this feature. The noise is mentioned in the text, but was it not removed only from this run? Was it present in the other data sets, and removed in processing?

Response: Comment Noted. See response to Comment Number 12.

Comment 34. Appendix B, Page B-11, Figure B-6 - There are several instances on this map that show the fiducial correction was applied incorrectly. Looking at the data density, there are 11 portions of lines with data points either too close together or too far apart. None of these errors effect positioning near seed items, but this would be an issue in the production survey.

Response: Agree. This will be addressed during collection of production data if fiducial method is employed.

Comment 35. Appendix B, Page B-11, Figure B-6 - Were fiducial data collected using the odometer (10cm or 20cm?) or using auto mode (10 Hz?)?

Response: Agree. Data was collected using the odometer. The text will be revised to indicate that the odometer was used to collect data 20cm interval.

Comment 36. Appendix C, Page C-1, Figure C-1 - This chart would benefit from the addition of red dashed lines indicating the boundaries of the "Acceptable Range".

Response: Agree. The figure will be revised as suggested.

Comment 37. Appendix C, Pages C-3 to C-14, Figures C-2 to C-7 - The software used to generate these charts allows for the insertion of text identifying if the test was conducted with or without the spike. These should be labeled.

Response: Agree. The figures will be revised as suggested.

Comment 38. Appendix C, Page C-5, Figure C-3 - The "Acceptable Range" defined here is 2 standard deviations, but it should be 2.5 mV (a fixed number) as stated in the RI

Work Plan. The numbers listed on the panels for the acceptable range are very small, and unachievable.

Response: Agree. The acceptable range will be revised to 2.5 mV for tests without the reference item in place. The acceptable range will be revised to ± 20% the original reference response value for tests with the reference item in place.

Comment 39. Appendix C, Page C-11, Figure C-6 - There is a problem with this test, which shows a large amount of variation in response. The acceptable range is listed as 2 standard deviations, but it should be 2.5 mV (a fixed number) as listed in the RI Work Plan. Using a 2.5 mV acceptable range, this test fails in all channels.

Response: Agree. The incorrect data set in presented in the appendix. The appropriate series of tests will replace the current data set.

Comment 40. Appendix C, Page C-17, Figure C-9 - Tolerances were apparently exceeded for positioning and amplitude. The Geosoft program actually has a problem generating these test results, flagging tolerance exceeded spots, where no tolerances were exceeded. At any rate, the tolerances should be defined on this page, for positioning and amplitude. MR-005-05 uses 20% for the amplitude, and +/- 20cm for positioning.

Response: Agree. The figure will be revised as suggested.

Comment 41. Appendix C, Page C-19, Figure C-10 - There should be a tolerance listed here for the maximum permitted separation. What percentage of data exceeding the maximum spacing is acceptable?

Are these data gaps a result of overly wide line separation, or does this reflect down-line spacing problems?

Response: Agree. Based on the GPO results, the maximum permitted separation tolerance limit for line separation for the production geophysical survey will be 1.0 foot with 20% allowable percentage of data exceeding the maximum spacing.

Response: Comment Noted. It appears that this is related to down line spacing most likely attributed to terrain.

Comment 42. Appendix C, Page C-21, Figure C-11 - Is the tolerance here 1.5 mV? In what Channel?

What percentage of out-of-tolerance data is acceptable?

Response: Agree. Channel 1 data is displayed. Based on the GPO results, the noise threshold tolerance is 1.5 mV. For the production geophysical survey, with an acceptable out of tolerance of 20% of the data. This information will be added to the figure for clarification.

Comment 43. Appendix C, Page C-23, Figure C-12 - The implication for data collected at a velocity below an acceptable number is that an incorrect latency will be applied, negatively affecting the positioning of the target. What are the upper and lower limits of acceptable velocity? What percentage of out-of-tolerance data is acceptable?

Response: Agree. The text will be revised to indicate that based on the GPO results, the upper limit of acceptable velocity for the production geophysical survey will be 3.0 Mi/h with an acceptable out of tolerance of 20% of the data.

Comment 44. Appendix D, Page D-2, Table D-1 – Please add "feet" to the Polar Distance column header.

Response: Agree. The Table will be revised as suggested.

Comments by Rodger Allison, US Army, Installation Restoration Manager, August 25, 2008

Comment 1. Section 1.1, Page 1-1, 2ND paragraph – MRS's are designated with IAAP-001-R-xx (e.g. IAAP-001-R-01 for CTA) vice MRS-OU5x series (e.g. MRS-OU5C for CTA).

Response: Agree. The text will be revised to include the AEDB- R numbers.

Comment 2. Table 2-1, page 2-7 – "Inceindiary" should be changed to "Incendiary".

Response: Agree. The table will be revised as suggested.