TECHNICAL MEMORANDUM NO. 1

DRUM AREA 1 SOURCE DELINEATION MAGNETOMETER SURVEY

Metamora Landfill Site
Lapeer County, Michigan

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Metamora Landfill Site
Lapeer County, Michigan

DECEMBER 1992
REF. NO. 3298-17

CONESTOGA-ROVERS & ASSOCIATES

December 9, 1992 Reference No. 3298

Ms. Linda M. Nachowicz
Metamora Landfill Site - Remedial Project Manager
Office of Superfund (HSRW-6J)
United States Environmental Protection Agency
Region V
77 West Jackson Boulevard
Chicago, Illinois
U.S.A. 60604

Dear Ms. Nachowicz:

Re: Technical Memorandum No. 1 (TM1)
Drum Area 1 Source Delineation: Magnetometer Survey
Metamora Landfill Site (Site)
Lapeer County, Michigan

On behalf of the Metamora Landfill Settling PRP Group (MLSPG), CRA has prepared the following Technical Memorandum presenting the information generated during the Drum Area 1 Source Delineation Magnetometer Survey.

The information is discussed in the following titled paragraphs.

Introduction

The purpose of the magnetometer survey was to locate and delineate buried metallic objects in the vicinity of Drum Area 1.

Schedule

The magnetometer survey was conducted at the Metamora Landfill Site during the period from November 11 - 12, 1992.

Personnel

The magnetometer survey was conducted by Northern Environmental of Mequon, Wisconsin under direct supervision of Conestoga-Rovers & Associates (CRA). The following personnel were directly responsible for each party:

Northern Environmental

- Mr. John Jansen - Project Manager
- Mr. Patrick Jurcek - Field Geophysicist

CRA

- Mr. Glenn Turchan - Project Coordinator
- Mr. Jim McClellan - Project Technician

Methods

At commencement of the magnetometer survey, both a GEMS Proton Precession Memory Magnetometer and a Scintrex MF2-100 flux-gate magnetometer (Scintrex) were mobilized to the Site. The survey was completed using a GEMS GSM-19G Proton Precession Magnetometer/Gradiometer. All field activities were conducted in a manner consistent with the U.S. EPA-approved Drum Area 1 Source Delineation Work Plan (Work Plan).

Field Work

A base station was established south of the survey grid. Survey work was performed using a maximum 20 by 20 foot grid. Station locations were measured using a tape between 50 by 50 foot surveyed grid points established by Darrell D. Hughes and Associates, Land Surveyors.

Results

The results of the magnetometer survey are presented in Northern Environmental's report presented as Attachment A. The survey identified a relatively large magnetic anomaly (Anomaly A) in roughly the center of the surveyed area. Seven smaller magnetic anomalies were identified adjacent to Anomaly A, however it is thought that four of the smaller magnetic anomalies are due to interference from metallic debris (i.e. fences, wells, etc.)

Based upon the magnetometer survey results, test pit locations have been proposed and are shown as Figure 1. The layout of proposed test pits on Figure 1 identify the conceptualized scope of the test pit investigation. The actual number and location of test pits will be revised, as necessary, as the test pitting activities are conducted. All test pits will be excavated in accordance with the U.S. EPA-approved Work Plan.

Should you have any questions regarding the information presented in this technical memorandum, please do not hesitate to contact us.

Yours truly,

CONESTOGA-ROVERS & ASSOCIATES

Glenn Turchan, P.Eng.

GT/bjr/33

Encl.

cc U.S. EPA (3 additional copies)
Joe Swiniarski (U.S. ACE) (1 copy)
MLSPG Technical Committee
Jim Campbell (EMI)

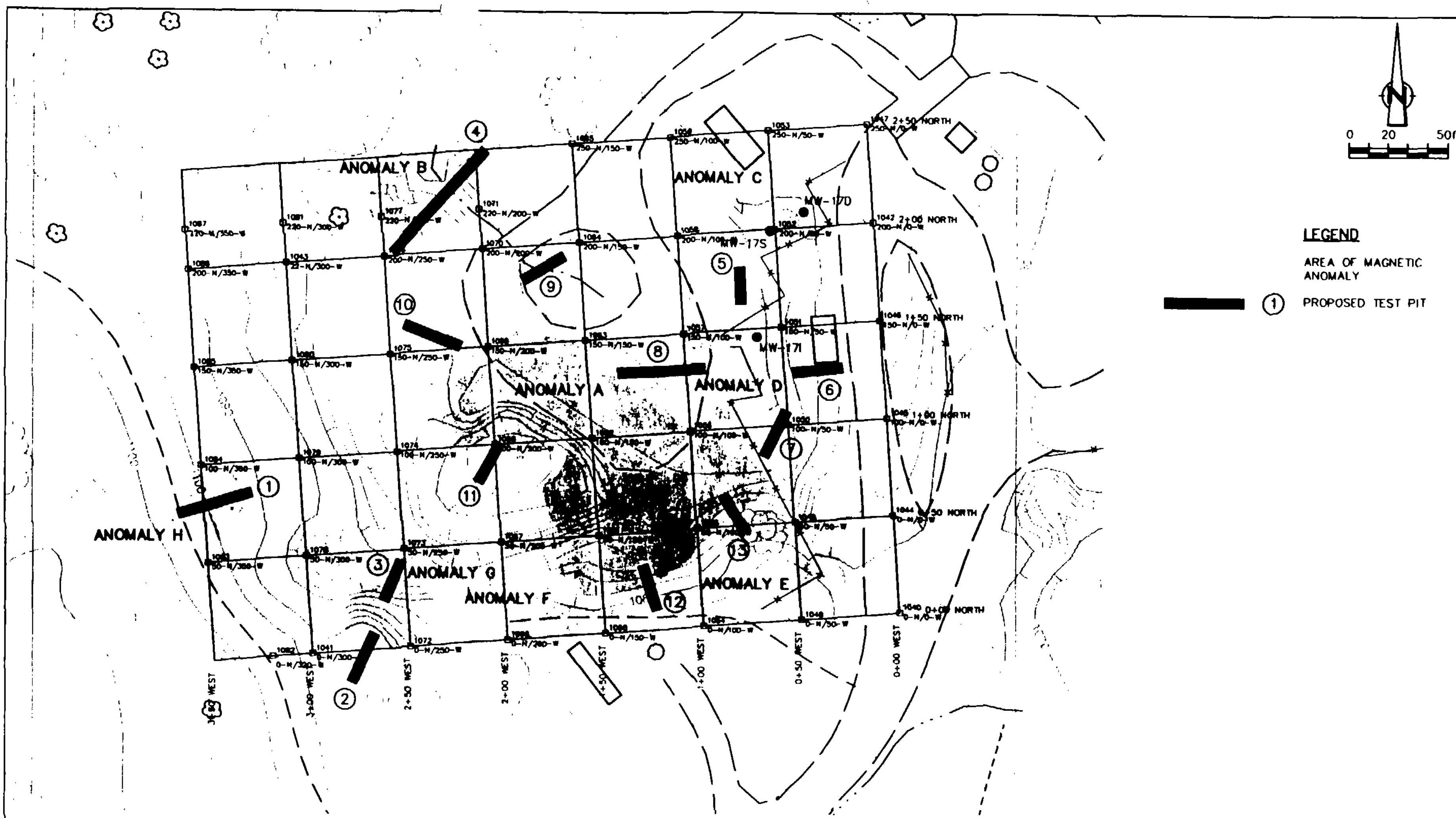


figure 1

PROPOSED TEST PIT LOCATIONS
METAMORA LANDFILL SITE
Lapeer County, Michigan

CRA

3298 (L) DEC 09/92 REV 0 (P-82)

Attachment A

**Northern Environmental
Magnetometer Report
(December 1992)**

▲ Northern Environmental™
Hydrologists • Engineers • Geologists

1214 West Venture Court
Mequon, WI 53092
Fax 1-414-241-8222
1-414-241-3133
1-800-776-7140

December 4, 1992
(CRA170926)

Mr. Tom Gutpell, C.E.T
Conestoga-Rovers & Associates Limited
651 Colby Drive
Waterloo, Ontario, Canada N2V 1C2

RE: Magnetometer Survey, Drum Area 1 Source Delineation, Metamora Landfill Site (site), Lapeer County, Michigan

Dear Mr. Gutpell:

Per your request, Northern Environmental Technologies Incorporated (Northern Environmental) has conducted a magnetometer survey at the Metamora Landfill, Lapeer County, Michigan under the direction of Conestoga-Rovers & Associates Limited (CRA). The objective of the survey was to determine the extent of buried metal objects in a former drum disposal area at the landfill. The field operations were performed on November 11 and 12, 1992. This report presents the results of the magnetometer survey.

DISCUSSION OF METHOD

Electrical currents in the liquid outer core of the Earth generate a dipolar magnetic field that surrounds the planet. The field is generally smooth, but the intensity, declination and inclination or dip of the field vary depending on the latitude and longitude of the observation point. Accumulations of ferrous metal objects cause localized distortions of the natural magnetic field that can be used to detect the presence of anomalous ferrous bodies. The magnetometry method involves making precise measurements of the intensity of the Earth's magnetic field at distinct stations on a grid to detect magnetic anomalies caused by local accumulations of ferrous metal.

The shape and intensity of the magnetic anomalies will vary depending on the size, shape, and depth of the metal target. Single metal targets with simple shapes produce distinctive anomaly patterns which can be analyzed to estimate the depth, shape, and ferrous metal content of the body. This is particularly useful when looking for a single steel storage tank or drum. Accumulations of multiple targets create complex anomaly patterns which cannot be reliably analyzed to determine the position and shape of the individual targets. In these cases, the location of the magnetic anomaly indicates the area over which the multiple targets are distributed, but the area must be excavated to identify the individual targets. The areal extent and the relative intensity of the anomaly can be used to qualitatively estimate the extent and significance of an anomaly.

When making magnetic field readings, the maximum absolute intensity of the field can be measured without regard to the direction of the field. This type of measurement is known as a total field measurement. The magnetic field intensity is usually recorded in units called nanoTeslas (nT). Proton precession instruments, such as the GEMS GSM-19 system used for this survey, are total field instruments. Close to the sides of ferrous targets, strong horizontal magnetic fields are created. Over the top of ferrous targets, the magnetic field is nearly vertical with essentially no horizontal component.

When making total field measurements, the horizontal fields encountered to the side of the target are not distinguished from the vertical field encountered over the top of the target. As a result, total field measurements tend to show anomalies from local targets as relatively broad features. This has an advantage in screening a site for targets between measurement points, but it has the disadvantage of not sharply delineating the limits of the target body and tends to blend separate anomalies from multiple targets into a single anomaly.

While proton precession instruments can only measure the total field intensity, the vertical gradient of the total field can be measured by making measurements at two sensors at different elevations. These type of measurements are known as gradiometer measurements and are a physical analog of a first derivative of the total field. Gradiometer measurements reduce the sensitivity of the proton precession instrument to horizontal fields and therefore make the anomalies sharper. Gradiometer measurements can often separate out individual anomalies from the broader anomalies seen in the total field data. Since gradiometer measurements can be made simultaneously with total field measurements, a site can be surveyed with the advantage of the screening ability of the total field measurements while still being able to improve the delineation of individual anomalies.

DISCUSSION OF FIELD PROCEDURES

Figure 1 shows the location of the magnetometer survey area with the reference grid superimposed over the area. The survey area is known as Drum Area 1 (see report "Drum Area 1 Source Delineation Work Plan," prepared by CRA, September 1992) The grid was surveyed with 50 foot centers by Darrell D. Hughes and Associates Land Surveyors, Fowlerville, Michigan, using a total station surveying instrument. Flags were set at 20 foot centers along the four boundaries of the survey area, and the 100 and 200 foot north lines, using a measuring tape. Utilizing this grid as a guide, the entire survey was performed taking readings on 20 foot centers.

The 20 foot station spacing was chosen as a compromise between the two mutually exclusive parameters of maximum sensitivity to isolated drums and practical limitations of field time. At this size grid spacing, the probability of detecting a single isolated drum is low, but the probability of detecting large groups of buried drums approaches 100%. Based on the Site history, it is believed that a majority of the drums are buried in close proximity to each other. Therefore, the 20 x 20 foot grid was determined to be adequate in determining the extent of the groups of buried drums.

A base station was located south of the survey grid, in an area free from any surface metal interference (see Fig. 1). Readings were taken at the base station approximately every 30 minutes to one hour during the surveying periods. The base station readings were used to determine the diurnal drift of the Earth's magnetic field during the duration of the survey. Figure 2 is a plot of the base station readings versus time for November 11, and 12, 1992. The plots indicate that the maximum drift for November 11 and 12, 1992, was 25 and 10 nT, respectively. This is a relatively low amount of drift in the magnetic field.

The magnetic response of a single drum buried at a depth of six feet, is approximately 200 nT. Groups of drums would produce anomalies with much larger magnitudes. The amount of diurnal drift experienced during the entire survey is approximately 5 to 13% of the estimated response from a single drum. The amount of drift is negligible compared to the expected anomalies from large groups of buried, metal drums. Due to the minimal significance of the measured drift, it was not necessary to remove the diurnal drift from the field data.

The entire survey was done using a GEMS GSM-19G Proton Precession Magnetometer/Gradiometer. Measurements were made at a total of 318 stations during the survey. Both total field and vertical gradient measurements were made at each station.

DISCUSSION OF RESULTS

Plots of the field data were made using different contour intervals to enhance anomalies of different magnitudes. The plots indicate the presence of several magnetic anomalies suspected of containing buried steel drums.

Figure 3 is a contour plot of the magnetic total field data of the survey area with a contour interval of 500 nT. Figure 4 is a contour plot of the vertical gradient data of the survey area with a contour interval of 500nT/m. Both plots indicate the presence of a single massive anomaly with a northwest trend centered at 120N, 160 W, and several smaller anomalies surrounding the large anomaly.

To enhance the smaller anomalies that surround the larger anomaly, the plots were re-contoured with a smaller contour interval, and the range of values to be contoured was restricted to remove the large anomaly. Figure 5 is a contour plot of the total field data with a contour interval of 100 nT. Figure 6 is a plot of the vertical gradient data with a contour interval of 10 nT/m. The plots indicate that there are seven smaller anomalies of significance in the survey area. The large anomaly and the additional seven anomalies are labelled A through H. A description of the labelled anomalies are listed as follows:

ANOMALY A: The anomaly encompasses an estimated area of 11,550 square feet, with a peak magnetic field response of over 11,000 nT above average base station level of 56,930 nT. The anomaly displays characteristic dipole response, with the lower field readings to the north of the anomaly. Figure 3 indicates that the large anomaly is actually composed of four distinct bodies centered at 80N and 80W, 80N and 140W, 140N and 160W, 120N and 200W.

These anomalies appear to be caused by separate concentrations of multiple ferrous bodies in close proximity within the limits of the area of the overall large anomaly. Based on Site history, it is assumed that four concentrations of barrels will be found at the location of separate anomalies seen on Figure 3.

ANOMALY B: The anomaly is centered at approximately 220N and 220W on Figures 5 and 6, with a peak magnetic response of over 1,100 nT above average base station level. The areal extent of the anomaly is small compared to Anomaly A, but the size and magnitude of the anomaly indicate that it is a result of shallow buried metal objects, presumably steel drums, concentrated in the area of peak magnetic response.

ANOMALY C: The anomaly is centered at 200N and 60W with a peak magnetic response of approximately 700 nT above average base station level. Monitoring wells MW-17S and MW-17D, which have metal flush mount caps, are located near Anomaly C. In addition, a snow fence with metal poles is present. The shape and magnitude of the anomaly suggests that it is likely to be the result of interference associated with the monitoring wells and the snow fence, and does not appear to be related to any significant subsurface metallic target.

ANOMALY D: The anomaly is centered at approximately 130N and 70W, with a peak magnetic response of over 4,800 nT above background base station level. Monitoring well MW-17I and a snow fence with metal poles are located in the vicinity of the anomaly. The magnitude of the anomaly is approximately 6 times greater than anomaly C. The size and magnitude of this anomaly suggests that it is a result of buried metallic objects, in addition to interference from surface metal objects.

ANOMALY E: The anomaly is centered at 20N and 40W, and is composed of a single station peak magnetic response of over 500 nT above background base station level. The peak magnetic response of the anomaly is located four feet south of a metal fence pole. The anomaly is most likely due to the metal pole and not buried metal targets.

ANOMALY F: The anomaly is located between stations 0N, 140W to 200W, and has a peak magnetic response of over 800 nT above background base station level. The anomaly is also directly adjacent to a snow fence with metal poles. The anomaly is most likely due to interference from the fence, and not buried metal targets.

ANOMALY G: The anomaly is centered at station 20N, 260W, and is composed of several stations with a peak response of 616 nT above background. The anomaly has a characteristic dipolar shape and is not associated with any obvious surface feature. It is likely that this feature represents a small accumulation of buried metal objects, possibly several steel drums.

ANOMALY H: The anomaly is centered at station 80N, 340W and consists of peak response of 237 nT above background. The anomaly is probably the result of small, shallow buried metal objects, possibly one or more steel drums.

The descriptions and inferred interpretations of the above anomalies are based on indirect measurements, which are subject to interference and multiple interpretations. Based on the Site history, it is probable that anomalies A,B,D, and G are most likely to be caused by buried steel drums. Anomaly A represents an area that most likely contains a large number of drums, whereas anomalies B, D, and G, are areas that contain significantly smaller amounts of drums. Using a 2.5 foot diameter for a typical 55 gallon steel drum, it is possible that roughly 2000 barrels could be stacked in a single layer that could fit within Anomaly A. This estimate is based on the surface area, and not the magnetic response of Anomaly A. The anomaly is too complex with many unknown parameters, such as magnetic susceptibility, depth, and orientation of the subsurface targets, and thus it is impossible to obtain a unique estimate of the number of drums from the magnetic response of Anomaly A.

We trust this information meets your needs. Please feel free to contact us if you have any questions or comments.

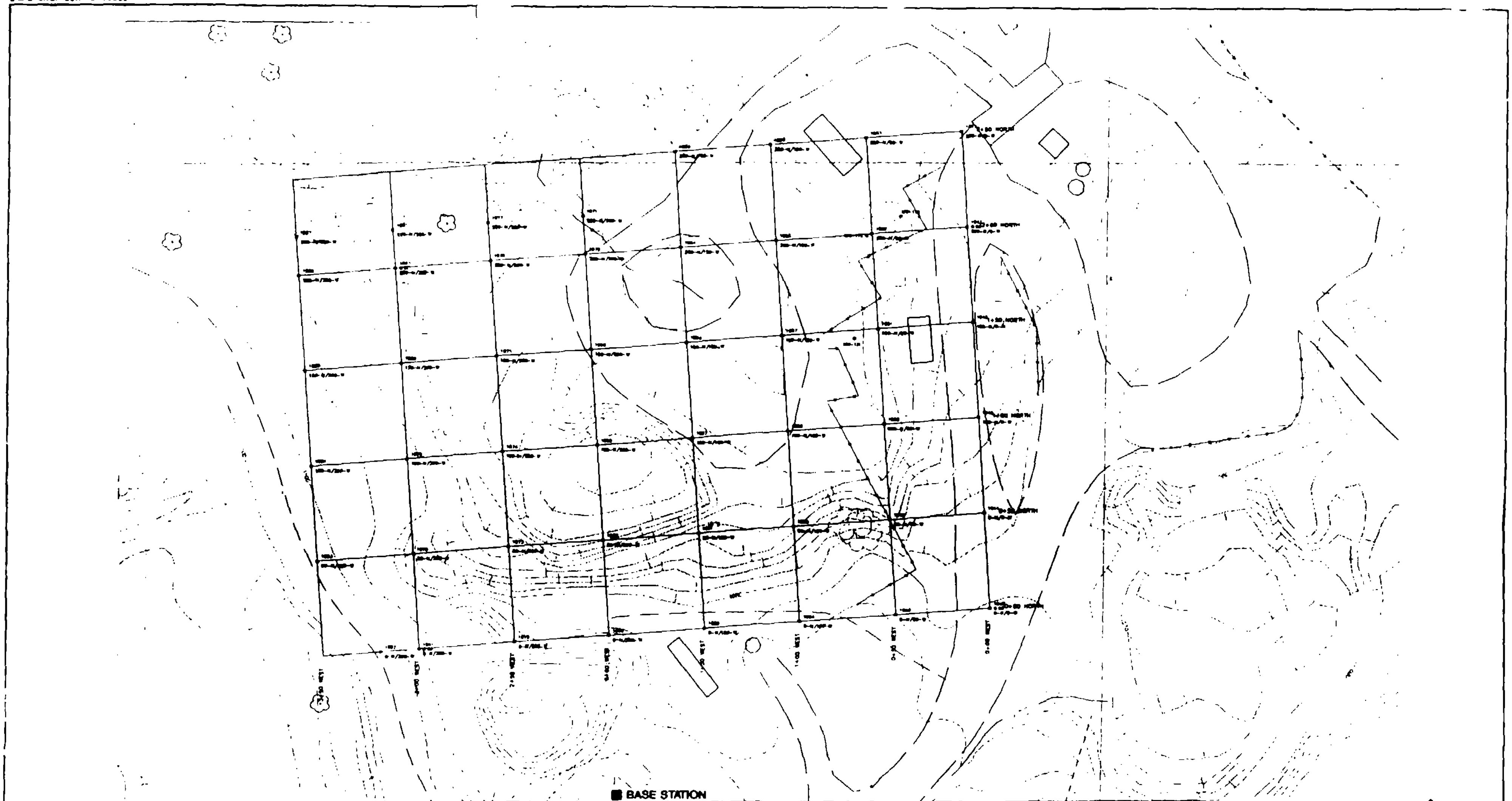
Sincerely,
Northern Environmental Technologies, Incorporated

Pat J. Jurcek
Geophysicist/Hydrogeologist II

John R. Jansen, R.G., R.Gp.
Director of Geosciences

PJJ/gjw

G M B ENGINEERING 552354



BASE MAP SOURCE: CONESTOGA-ROVERS & ASSOCIATES

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	Northern Environmental Hydrologists • Engineers • Geologists		

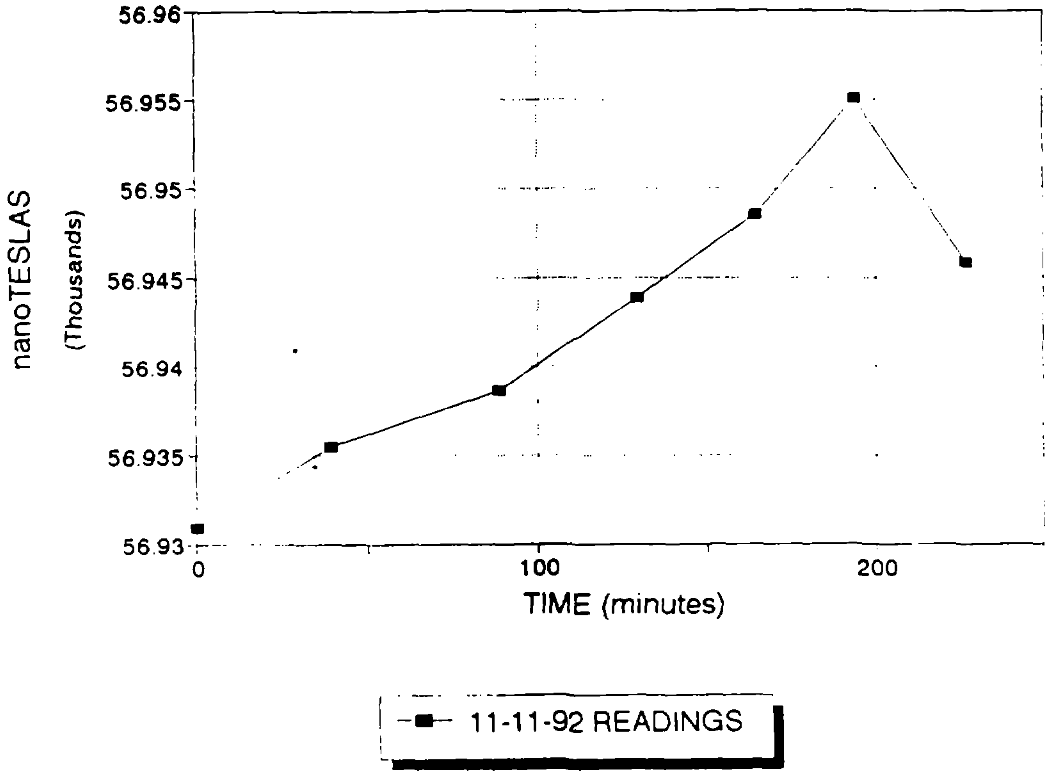
SCALE

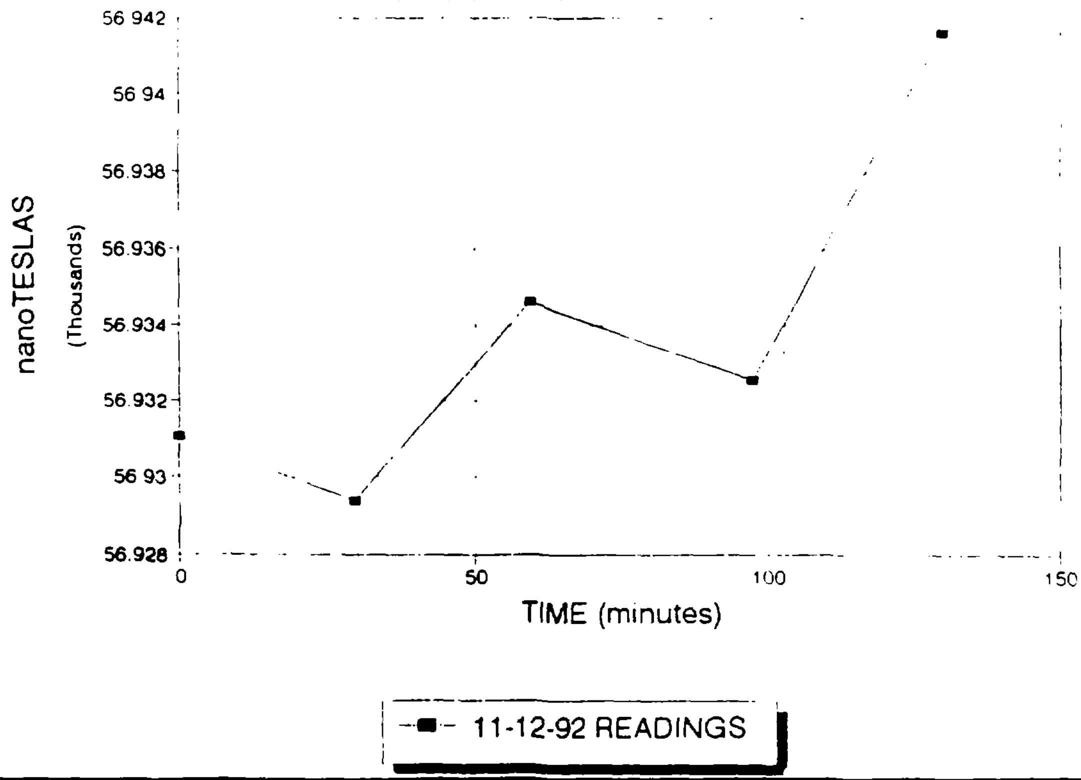
0 25' 50'

N

FIGURE 1

METAMORA LANDFILL MAGNETOMETER SURVEY
BASE STATION READINGS





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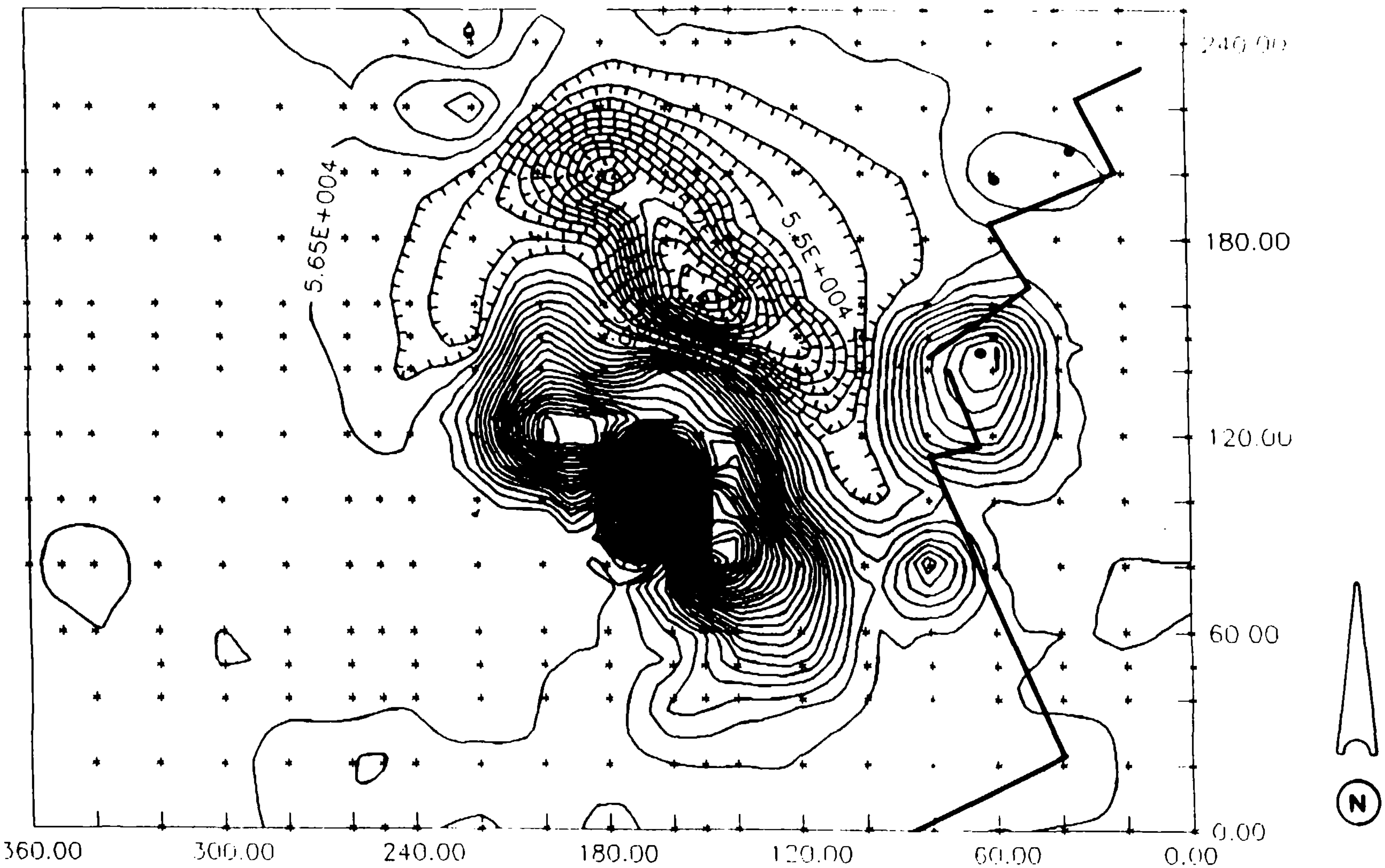
Northern Environmental *Hydrologists • Engineers • Geologists*			**BASE STATION READINGS**

FIGURE 2



CONTOUR INTERVAL 500 nT

SCALE 1:50

● = MONITORING WELL

= FENCE

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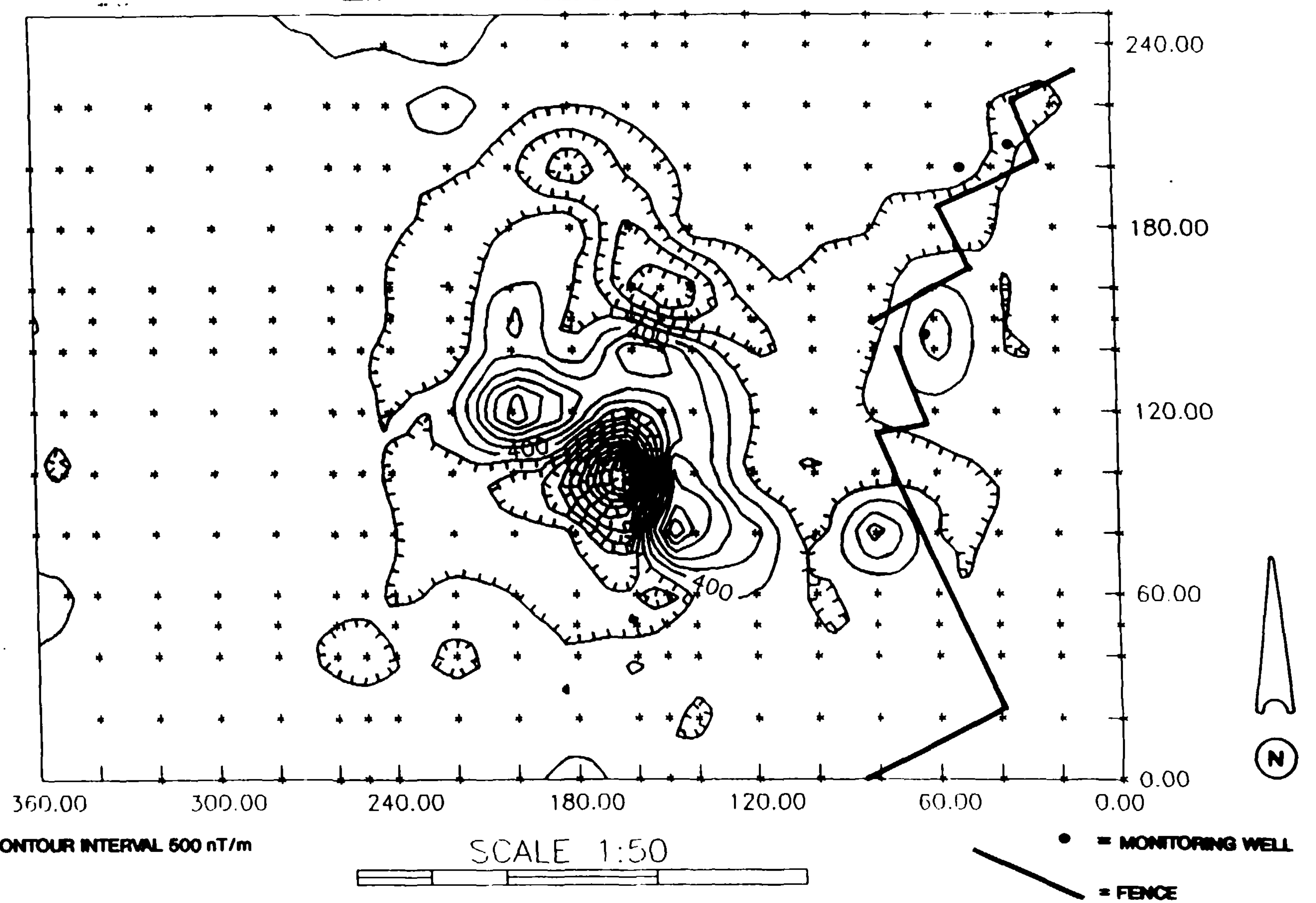
Northern Environmental Hydrologists • Engineers • Geologists			MAGNETIC TOTAL FIELD MAP

FIGURE 3

G.M.B. ENGINEERING 555929



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	Northern Environmental *Hydrologists • Engineers • Geologists*		**VERTICAL GRADIENT MAP**

FIGURE 4

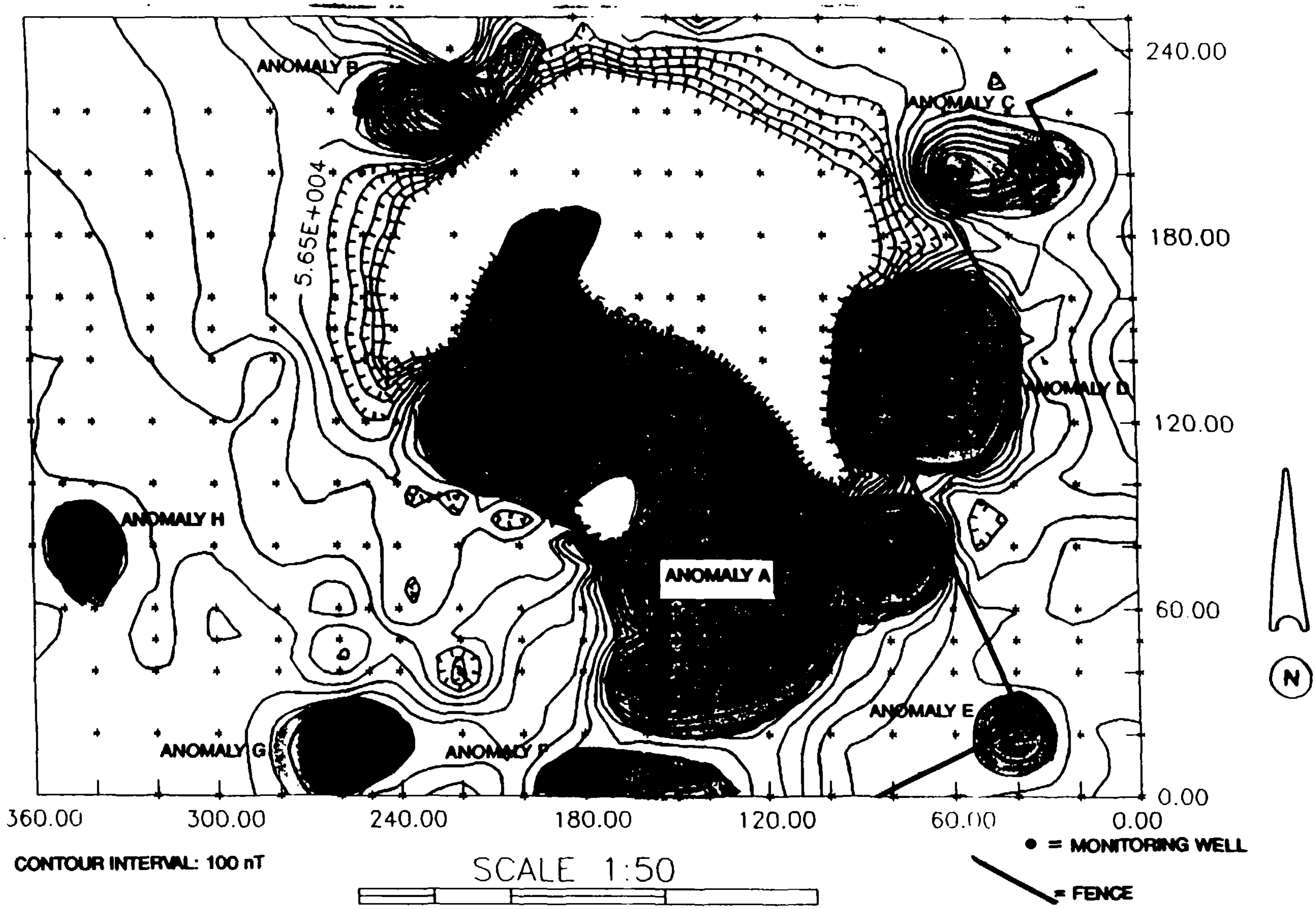

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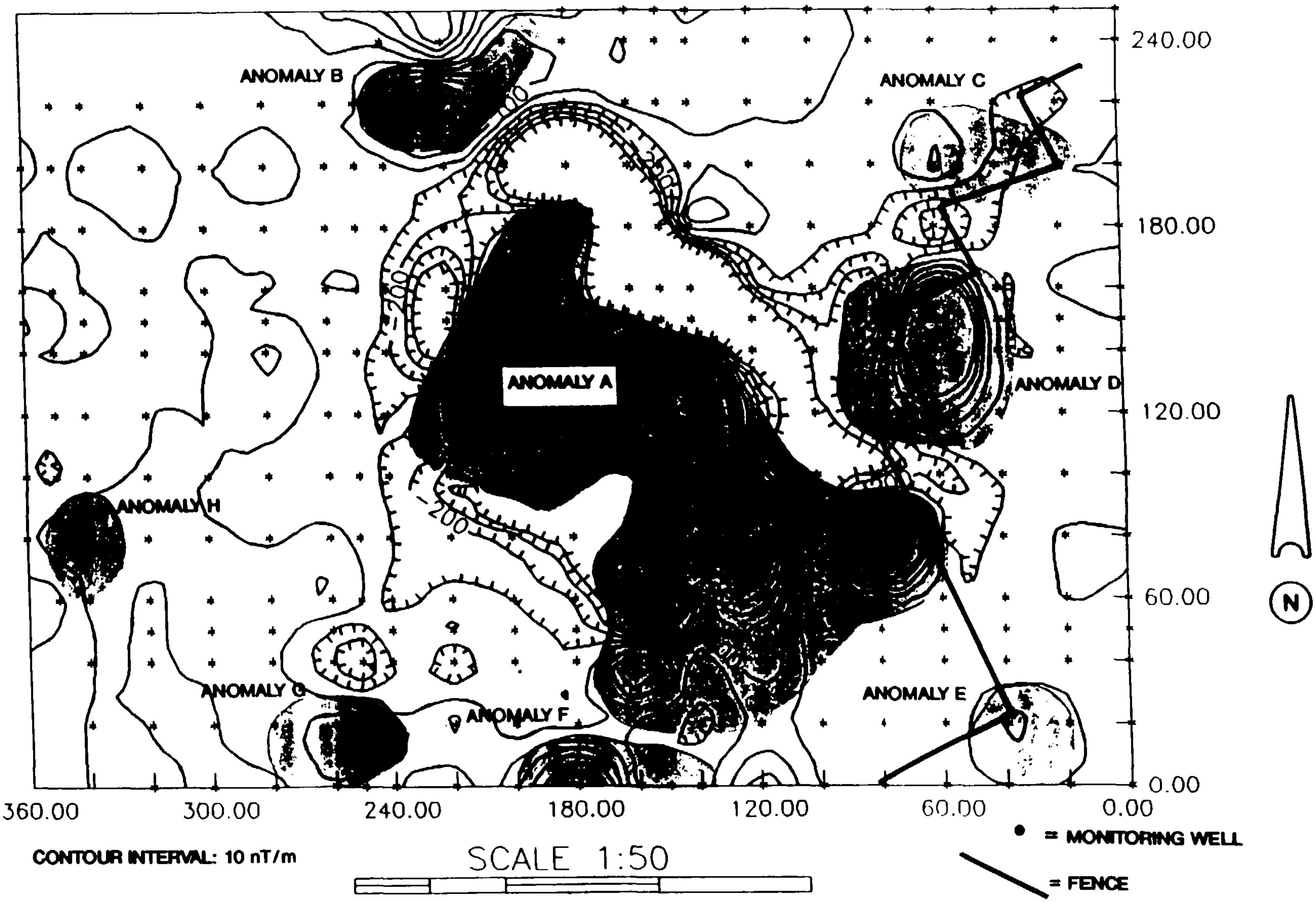
FIGURE 5



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	Northern Environmental *Hydrologists • Engineers • Geologists*		

FIGURE 6

Northern Environmental℠
Hydrologists • Engineers • Geologists

APPENDIX A: MAGNETIC FIELD DATA

METAMORA LANDFILL, METAMORA, MICHIGAN

TIME	NORTH	WEST	TOTAL FLD	GRAD
130903	1000	1000	56930.93	-7.35
131600	0	0	56893.36	-7
131615	0	20	56904.79	-4.87
131636	0	40	56950.1	-8.16
131657	0	60	56998.09	-25.08
131718	0	80	57038.64	-26.58
131742	0	100	57145.78	-32.35
131909	0	120	57494.31	299.53
131936	0	140	57156.77	-59.39
132012	0	160	57175.57	-52.41
132036	0	180	57772.03	798.71
132118	0	200	57197.89	180.35
132257	0	220	56908.44	-83.23
132315	0	240	57045.1	11.21
132336	0	260	57317.32	105.42
132445	0	280	57067.54	-29.73
132500	0	300	56915.48	-4.83
132600	0	320	56982.91	8.85
132900	20	340	56948.43	8.58
133024	20	320	56939.49	-0.89
133054	20	300	56911.33	-8.6
133136	20	280	57153.29	78.28
133227	20	260	57546.4	160.78
133348	20	240	57223.32	-3.5
133427	20	220	57272.29	160.32
133512	20	200	57033.15	-81.46
133915	20	180	57251.46	-95.51
133942	20	160	57415.91	-46.83
134012	20	140	57484.14	-143.07
134145	20	120	57470.7	14.42
134230	20	100	57133.42	-86.51
134315	20	80	57066.82	-28.19
134339	20	60	56985.33	-91.67
134424	20	40	57463.56	166.05
134533	20	20	56914.26	-1.37
134545	20	0	56901.62	-5.21
134821	1001	1001	56935.44	-5.83
143751	1003	1003	56938.63	-5.1
144054	40	0	56909.23	-12.8
144124	40	20	56925.38	-10.12
144154	40	40	56884.53	-101.66
144324	40	60	57023.21	-30.01
144424	40	80	57203.12	-34.35
144548	40	100	57501.82	-58.66
144642	40	120	58057.13	211.83
144736	40	140	58366.18	-106.91
144803	40	160	58910.95	635.96
144933	40	180	57095.17	-108.32
144951	40	200	57082.72	31.89
145033	40	220	56380.76	-241.75
145118	40	240	56946.67	-57.55
145151	40	260	56688.29	-204.46
145239	40	280	56924.17	18.82
145254	40	300	56927.02	6.08
145348	40	320	56907.18	-6.71
145451	40	340	56942.07	1.78
145824	60	340	57008.12	75.28
145903	60	320	56867.12	-29.28
145957	60	300	57014.56	102.75
150057	60	280	56869.77	21.62
150124	60	260	57021.02	163.58
150157	60	240	56508.99	-164.85
150224	60	220	56747.66	-86.01
150236	60	200	56884.42	-95.96
150303	60	180	57033.74	-208.28
150339	60	160	58067.15	-485.94
150442	60	140	61353.85	87.14

150609	60	120	61215.58	377.05
150636	60	100	57616.46	-170.73
150745	60	80	57425.74	-55.17
150924	60	60	57085.72	-81.83
151042	60	40	57004.13	-26.82
151418	60	20	57046.62	4.41
151433	60	0	56975.77	-8.5
151812	1004	1004	56943.87	-5.53
152957	80	0	57019.52	3.48
153030	80	20	57050.1	20.8
153115	80	40	56820.34	-88.39
153224	80	60	56955.84	-119.41
153339	80	80	60730.6	1841.91
153403	80	100	57137.49	-448.89
153439	80	120	63255.95	1186.78
153509	80	140	68382.56	2143.87
153539	80	160	59981.59	-2019.58
153603	80	180	56798.26	-515.42
153618	80	200	56722.55	-236.08
153645	80	220	56699.45	-107.92
153703	80	240	56630.22	-102.92
153824	80	260	56730.79	9.69
153842	80	280	56740.49	-13.3
153933	80	300	56889.8	3.46
154003	80	320	56877.24	4.51
154030	80	340	57167.78	24.33
154054	80	360	56923.25	-38.48
154233	100	360	56916.86	-83.57
154339	100	340	56891.94	-8.46
154403	100	320	56871.94	3.55
154433	100	300	56843.9	1.53
154512	100	280	56708.74	-23.6
154530	100	260	56669.88	-32.33
154548	100	240	56558.07	-145.16
154600	100	220	56628.04	-392.85
154612	100	200	57004.19	-949.92
154624	100	180	58377.07	-2093.01
154645	100	160	28159.49	-7039.98
154824	100	140	65845.47	1250.26
154839	100	120	58100.24	-463
154854	100	100	55584.38	-624
154912	100	80	56276.24	-586.57
154936	100	60	56816.43	-270.33
155000	100	40	56898.78	-80.35
155018	100	20	56750.84	-75.19
155033	100	0	56742.35	-44.44
155330	1005	1005	56948.55	-5
155742	0	150	57196.15	-47.17
155854	20	150	57507.25	-73.94
155921	40	150	58729.15	92.82
160321	60	150	58399.96	-1142.32
160342	80	150	70595.59	3933.26
160403	100	150	69401.46	2555.12
160421	120	150	63138.63	501.57
160439	140	150	60724.09	1730.17
160457	160	150	49190.72	-1900.82
160530	180	150	51135.4	-706.62
160545	200	150	53783.94	-179.67
160600	220	150	55652.17	55.78
160615	240	150	56405.79	39.26
160703	250	150	56525.93	-24.98
160809	150	150	53045.56	-1384.19
160918	50	150	59153.78	50.53
162303	1006	1006	56955.09	-6.1
162709	120	0	56628.01	-36.76
162736	120	20	56881.9	-32.28
162806	120	40	57209.51	-64.28
162845	120	60	60015.6	256.71
163006	120	80	59455.4	-11.05
163112	120	100	55528.49	-492.42
163136	120	120	56499.29	-156.62

163200	120	140	63081 68	1338 85
163230	120	160	62148.84	-356 58
163251	120	180	67259.26	2072 25
163400	120	200	67991.85	3893 46
163433	120	220	58128.06	214 76
163500	120	240	56419 42	-121 05
163527	120	260	56518.3	-47 53
163545	120	280	56764.39	38 48
163645	120	300	56808.67	0 07
163730	120	320	56853.59	2 82
163757	120	340	56794.33	-89 01
163848	120	360	56935.98	-1 28
164021	140	360	56942.83	-5 1
164103	140	340	56898.85	5 05
164139	140	320	56801.46	-20 3
164239	140	300	56698.65	-15 91
164306	140	280	56891.33	154 91
164342	140	260	56400.72	-24 01
164406	140	240	55772.58	-193 94
164433	140	220	56882.03	-542 21
164451	140	200	61779.9	598 76
164545	140	180	59824.07	-253 1
164609	140	160	62315.16	2133.83
164715	140	140	57216.98	534 19
164745	140	120	52934.34	-691 07
164806	140	100	55240.23	-380 48
164854	140	80	59968.95	-154 21
165042	140	60	61734.87	1133.26
165227	140	40	57134.51	-65 58
165242	140	20	56792.78	-37 46
165257	140	0	56501.11	-10 33
165554	1007	1007	56945.81	-5.78
125745	1008	1008	56931.07	-0.14
130148	150	0	56535.8	-5 58
130206	150	20	56770.72	-55.25
130224	150	40	57260.15	-68.23
130254	150	60	61711.31	1222.39
130406	150	80	59711.96	-486.44
130515	150	100	55261.35	-283.82
130533	150	120	52329.47	-780.62
130548	150	140	51798.04	-1318.5
130603	150	160	55689.58	-203.82
130636	150	180	57976.24	-288 42
130648	150	200	60632.6	1364.01
130724	150	220	55039.36	-587.8
130742	150	240	55952.49	-93.26
130803	150	260	56336.55	-43.26
130824	150	280	56586.44	-16.91
130839	150	300	56674.66	-4.69
131121	150	320	56725.42	-31.35
131157	150	340	56901	33.08
131224	150	360	56747.41	-170.53
131421	160	360	56878.31	2
131448	160	340	56851.87	-6.07
131539	160	320	56736.64	-27.41
131633	160	300	56691.57	13.85
131654	160	280	56589.43	6.94
131712	160	260	56387.08	-2.48
131736	160	240	55649.58	-119.64
131803	160	220	55162.62	-663.96
131821	160	200	58042.18	406.42
131854	160	180	56670.29	15.05
131912	160	160	50829.92	-1725.8
131939	160	140	49254.73	-1838.28
132036	160	120	54294.18	-181.58
132103	160	100	55402.1	-135.96
132145	160	80	56381.88	-430.28
132224	160	60	57795.09	461
132424	160	40	56869.32	-107.42
132439	160	20	56915.76	35.41
132451	160	0	56677.73	46.76

132742	1009	1009	56929 37	-7 76
133151	180	0	56550 12	-25 46
133215	180	20	56713 56	-51 64
133245	180	40	56787.3	-69.67
133409	180	60	56331.58	-478.25
133506	180	80	56078.91	-53.53
133521	180	100	55559 12	-66.28
133539	180	120	54918.13	32.07
133603	180	140	53747.02	248.75
133624	180	160	49812.54	-1372 35
133712	180	180	55377.42	481.58
133727	180	200	55516.69	-99.71
133754	180	220	55059.64	-208.67
133830	180	240	56049.52	-28.78
133851	180	260	56379.4	-12.75
133909	180	280	56604.65	-13.17
133924	180	300	56673.59	-10.67
134015	180	320	56765.37	6 48
134051	180	340	56805.15	-10.37
134145	180	360	56844.63	-14.19
134333	200	360	56826.8	9.57
134354	200	340	56772.77	9.33
134415	200	320	56730.13	10.01
134436	200	300	56674.57	-2.37
134451	200	280	56629.35	22.23
134506	200	260	56452.75	-13 35
134521	200	240	56266.25	-52 33
134536	200	220	55867.18	-44 05
134609	200	200	53649.36	-489.07
134648	200	180	49997.91	-1679.23
134712	200	160	52479.92	-479.58
134751	200	140	54625.53	-31.87
134806	200	120	55349.55	-74 08
134818	200	100	55870.97	-33 07
134830	200	80	56107.81	-85.12
134903	200	60	57619.55	185.32
135015	200	40	57300.07	-151.14
135148	200	20	56959.37	7.17
135236	200	0	56643.17	12.44
135709	1010	1010	56934.65	-1.78
140157	220	0	56674.51	-8.8
140224	220	20	56631.75	-135.62
140315	220	40	56641.91	-106.87
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140518	220	100	56318.41	19.6
140536	220	120	56121.21	28 92
140551	220	140	55814.84	43.46
140609	220	160	55404.25	64.17
140630	220	180	54723.32	-42.89
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141057	220	220	58044.88	801.85
141136	220	240	57277.56	306.07
141154	220	260	56521.97	-22.48
141221	220	280	56611.64	-8.39
141303	220	300	56656.4	-29.32
141327	220	320	56729.23	-4.33
141354	220	340	56722.02	-12.82
141815	240	0	56708.31	-20.6
141833	240	20	56605.16	-45.33
141848	240	40	56617.31	-14.64
141906	240	60	56582.44	-24.8
141921	240	80	56559.58	-13.16
141945	240	100	56552.41	62.87
142000	240	120	56453.01	34.1
142018	240	140	56340.6	0.67
142039	240	160	56516	131.75
142057	240	180	56385.73	59.1
142118	240	200	56798.88	197.55
142142	240	220	55309.95	-570.37
142306	240	240	56328.32	-121.06

142630	250	0	5679267	-18 55
142651	250	20	56674 47	-11 12
142706	250	40	56655 39	-6
142730	250	60	56635.02	-5 92
142748	250	80	56597.38	-9 25
142821	250	100	565706	1 32
142842	250	120	56537.22	1 94
142857	250	140	56870.92	186.85
142945	250	160	56520 87	25 46
143003	250	180	56363.55	-37 51
143506	1011	1011	56932.56	-4 83
143845	50	0	56916.49	-17 12
143900	50	20	56952.24	-14.23
143924	50	40	56966	-34 89
144057	50	60	57073.96	-39.32
144136	50	80	57262.35	-51 41
144242	50	100	57568.08	-109 05
144306	50	120	60044.44	161 35
144327	50	140	59702.17	104 75
144354	50	160	57464.21	-717 44
144454	50	180	57104.75	-125 07
144518	50	200	56950.4	-81.1
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144633	50	240	56861.76	-18.89
144700	50	260	56596.64	-138.32
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144745	50	300	57019.54	67.08
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145233	160	250	56263.58	18.92
145248	140	250	56234.56	-44 91
145303	120	250	56404 47	-73 62
145324	100	250	567474	-6.62
145339	80	250	56773.1	-9.23
145357	60	250	56858.88	10.35
145418	40	250	56897.84	-384.78
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145506	0	250	57092.31	22.58
145939	60	350	56889.33	-181.94
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150027	100	350	56905.64	-144.08
150048	120	350	56793.48	-96.66
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150124	160	350	56897.2	18 39
150146	180	350	56842.88	1 17
150209	200	350	56794.1	-8.46
150245	220	350	56743.42	-10 14
150748	1012	1012	56941.64	-4.25