(283) item 20

UNIVERSITY OF NEVADA
NEVADA BUREAU OF MINES AND GEOLOGY
RENO, NEVADA 89507

3100 0020

SECOND REPORT FOR FORD MOTOR COMPANY ON MAGNETOMETER SURVEYS FOR IRON ORE IN PERSHING COUNTY, NEVADA.
by E. L. Stephenson (August 1952)

3100.0020

283
Item 20

SECOND REPORT FOR FORD MOTOR COMPANY ON MAGNETOMETER SURVEYS FOR IRON ORE IN PERSHING COUNTY, NEVADA

By

E. L. Stephenson
Consulting Geophysicist

Reno, Nevada

August 1952

Contents

SECOND REPORT FOR FORD MOTOR COMPANY ON MAGNETOMETER SURVEYS FOR IRON ORE IN PERSHING COUNTY, NEVADA

By

E. L. Stephenson
Consulting Geophysicist

INTRODUCTION

This report presents and summarizes the results of two detailed magnetometer surveys for iron ore, made for the Ford Motor Company in southern Pershing County, Nevada. The purpose of the surveys was to obtain detailed magnetic and geologic information in two areas where earlier reconnaissance magnetometer work or recently discovered outcrops indicated the presence of possible commercial bodies of high grade iron ore. Both areas are located in T.25N., R.34E., M. D. M., Pershing County, Nevada.

In June 1951 the writer, in cooperation with Mr. Victor E. Kral, Mining Engineer, made a reconnaissance magnetometer survey for the Ford Motor Company covering 4½ sections in T.25N. and T.26N. On the basis of the magnetic findings certain parcels of land were recommended for possible additional prospecting. In particular, the writer's report and a supplemental letter by Mr. Kral recommended detailed magnetic work in the west half of section 27, particularly if the Company wished to develop ore reserves for future use.

The latter recommendation was adopted, and in April, 1952 the writer ran a detailed magnetometer grid on the main anomalous zone in the southwest quarter of section 27, T.25N., R.34E. The chief purpose was to determine locations for diamond drilling which had already been contracted for by the company.

While the magnetic work and drilling was in progress in section 27, prospectors from Lovelock located claims on newly discovered outcrops of high-grade iron ore in the northeast corner of section 6, T.25N., R.34E. The Ford Motor Company immediately obtained prospecting rights on this ground, and in May 1952 the writer ran a detailed magnetometer grid, again for the purpose of locating diamond drill holes.

When the magnetic work was begun the drilling company already was prepared to start operations, and the magnetometer results were used immediately in the field to determine the most favorable drill hole locations. As the chief purpose of this report merely is to summarize and record the magnetic findings, particularly in relation to the drill holes, the accompanying magnetic maps and profiles constitute the principle parts of the report. The drill findings, tonnage estimates, and recommendations for further development are embodied in a separate report by Mr. Kral.

The field work was done with a standard Askania magnetometer, having a sensitivity of approximately 30 gammas per scale division. Utilizing magnetic base No. 1, which was established in the southwest part of section 3 at the beginning of the 1951 survey, the magnetometer was adjusted to the same zero setting. The magnetic readings of the several surveys therefore may be compared directly.

GEOLOGY

The chief country rock in the Pershing County iron ore area is a coarse-grained diorite. The ore bodies, which are composed dominantly or entirely of magnetite, appear to be irregular replacement deposits occurring along well-defined structural breaks in the diorite. Although the deposits have some of the general features of veins, particularly in attitude and structural control, the individual bodies tend to be lenticular both horizontally and vertically. They vary in size from small pods to bodies containing many thousands of tons. Splits and horses of waste are very common features of the mineralized zones.

All of the diorite contains at least small amounts of accessory magnetite, and therefore it is somewhat magnetic, but the magnetite content varies widely. Along the chief mineralized zones in which the ore lenses occur, the diorite is heavily impregnated with grains, stringers, and small veins of magnetite. These large masses of noncommercial magnetic rock produce rather strong anomalies, and to a large extent they account for the positive anomalous zones. They also may produce much magnetite float, especially from small included lenses. They therefore tend to complicate both geologic and magnetic interpretations.

The zones of greatest magnetite concentration, and in particular the larger magnetite bodies, produce especially strong and well-defined positive anomalies. The magnetic readings alone,

however, will not determine the actual grade of a given body or zone, and the magnetic work must be followed by drilling to determine whether any given deposit contains mineable quantities of commercial ore.

MAGNETOMETER SURVEY

As noted above and in the earlier report, the magnetic readings do not give specific information as to grade of ore, and no specific magnetic value can be assigned as the dividing line between commercial and noncommercial material. The positive anomalies are indicators of magnetite concentrations, however, and they delineate the areas within which development work should be concentrated. In the earlier report, based mainly on findings in other areas, it was stated that positive anomalies exceeding 6,000 gammas might indicate ore of commercial grade. Later work in the Lovelock area, including the present surveys, now indicates that anomalies of 15,000 gammas and more may be produced by material that is not of commercial or mineable grade. On the other hand, some of the commercial bodies do not produce anomalies any stronger than this, depending on the nature of the ore, the depth of burial, and other factors. Therefore drilling is necessary to determine the commercial significance of any of the anomalies.

Railroad Lease in Section 27

Plan of the Survey. The west half of section 27 is railroad grant land owned by the Southern Pacific Railway Company, and the area is here designated as the Railroad Lease. The plan of the survey is shown on the accompanying magnetic map, which also contains a small scale index map showing the relation of the

grid to the land boundaries and to two of the traverses of the 1951 reconnaissance survey. The zero point of the grid is 500 ft. north of the 2000E point of traverse 58 (1951), which was run eastward from the southwest corner of section 27 along the south line. The grid was established to cover the anomalous zone discovered on this traverse and traverse 59 of the earlier survey. East-west magnetometer traverses were run at 100-foot intervals for 1600 feet north of the zero traverse and for 500 feet south, or a total north-south distance of 2100 feet. As the anomaly zone trends a little west of north, the in dividual traverse lines were offset accordingly, as shown on the map. On all of the traverses, magnetometer stations were occupied at 25-foot intervals within the anomaly zone and 50-foot intervals on the borders.

Results of the Survey. The results of the survey are shown on the magnetic map and the profile sheet, the latter showing the exact magnetic variations along each traverse. The mineralized zone, as outlined by the 5000-gamma contour on the magnetic map, extends in a direction a little west of north across the entire grid. Within this general zone there are three areas of higher magnetic intensity, each exceeding 10,000 gammas and showing local peaks of still higher intensity. As indicated by the profiles, the individual readings are somewhat erratic, but the main high anomalies are well defined. In places the profiles suggest rather abrupt offsets, as between the 0 line and the 100N line, and between the 700N and 800N lines, and it seems probable that the mineralized zone is cut by cross-faults. The magnetic map, however,

indicates a general continuity of strike for the zone as a whole, and the main concentrations of magnetite probably were deposited in an en echelon pattern.

The largest and strongest anomaly occurs between the 300N and 700N traverse lines, centering approximately on the base line of the grid and trending almost due north. The crest of the anomaly exceeds 15,000 gammas and local peaks reach still higher values.

The next largest anomaly lies between the 1200N and 1500N lines. It reaches maximum values of about 15,000 gammas. On the 1300N line the anomaly is broken by a negative reversal, which probably is due to reverse polarization associated with a structural break.

The third positive center lies between the 0 line and the 200S line. The peak is rather broad and reaches maximum values of about 12,000 gammas. This anomaly, like the others, shows a lack of sharp negative borders, indicating that the mineralized zone extends to depth.

The two larger anomalies were each tested by a single inclined diamond drill hole, as shown on the map. The drill results show a rather broad zone of strong magnetite mineralization, marked by veinlets, stringers and small masses of magnetite. The material is rather strongly magnetic but is not of commercial grade.

Simons Lease in Section 6

Plan of the Survey. The area of the newly discovered outcrops in section 6 is here designated the Simons Lease. The

plan of the survey is shown on the magnetic map, which also contains a small scale index map showing the relation of the grid to the land boundaries. An arbitrary zero point was chosen near the east end of the outcrop area, and a base line was projected on a bearing of approximately N.50° W. Magnetometer traverses at right angles to the base line were run at intervals of 100 feet for a distance of 1500 feet northwest of the zero traverse and 100 feet southeast. The lines were extended far enough to cover the main anomalous zones. On all of the lines magnetometer stations were occupied at intervals of 25 feet within the anomalies and 50 feet on the borders. In the northwest part of the grid two short intermediate traverses were run to determine the boundaries of a local anomaly.

Results of the Survey. The results of the survey are shown on the magnetic map and the profile sheet. The readings show two main, sub-parallel positive anomalies that strike slightly north of west, and a smaller and narrower positive anomaly of northwesterly strike. The positive anomalies are not accompanied by sharp negative borders, indicating that the bodies extend to depth. As indicated by the 5,000-gamma contour, particularly in the western part of the grid, the main ore bodies occur in a broad zone of fairly high magnetic intensity, indicating extensive impregnations of magnetite in the diorite.

The larger of the two main anomalies lies in the western part of the grid. As outlined by the 5,000-gamma contour, it extends from the 600W traverse to the 1200W traverse. At the

eastern end the anomaly shows relatively narrow peaks that exceed the range of the magnetometer, or above 26,000 gammas. The west part of the anomaly shows a broader high, which approaches 26,000 gammas on the 1000W line. This part of the anomaly occurs over alluvium west of the westernmost outcrops. A broad, strong peak on the north part of the 1300W line indicates a separate small body of probable commercial grade but of very short strike length. This anomaly also occurs over alluvium.

The second anomaly, which is associated with the eastern outcrops, is much smaller and narrower. It is best developed on the 200W and 400W lines, which show peak values above 20,000 gammas. In addition to much shorter strike length, the anomaly is much narrower than the western one.

The third positive anomaly, which occurs in the northeast corner of the grid, is much shorter and narrower. It shows sharp narrow peaks on the 0 line and the 100W line, and it probably marks a short, narrow vein of magnetite.

Considered in conjunction with the outcrops, the two main anomalies were interpreted to indicate commercial ore, and the drill findings confirm this interpretation. Four inclined diamond drill holes were drilled in the larger western anomaly, and one inclined hole was drilled in the eastern anomaly. The locations were made entirely on the basis of the magnetic findings. As certain of the magnetic curves seemed to indicate a very steep south dip, the first two holes were drilled from the south. These holes, in relation to

the outcrops, indicated a vertical or very steep north dip, and the last three holes were drilled from the north.

Drill hole No. 1, the only test of the eastern anomaly, was drilled at -45° from the south side of the anomaly, the collar being at 100S-200W of the magnetometer grid. The hole cut two bands of high-grade ore, at depths of 140-150 feet and 167-182 feet. The total depth was 197 feet.

Drill hole No. 2, the first test of the western anomaly, was collared at 125S-950W of the grid and was drilled northward at -35° to a depth of 151 feet. The hole cut two bands of ore, at depths of 79-107 feet and 121-142 feet.

Drill hole No. 3, collared at 37N-851W, was drilled at -45° from the north side of the narrowest part of the anomaly to a depth of 105 feet. It showed a single band of ore at 57-67 feet.

Drill hole No. 4 was collared at 78N-713W, on the north side of the anomaly, and was drilled at -45° to a depth of 79 feet. It cut iron ore at 33-49 feet.

Drill hole No. 5, collared at 90S-1115W, was drilled in the west end of the anomaly at -45° to a depth of 153 feet. This hole cut three bands of ore at depths of 68.5-82 feet, 94-107 feet, and 114-141 feet.

SUMMARY

Section 27

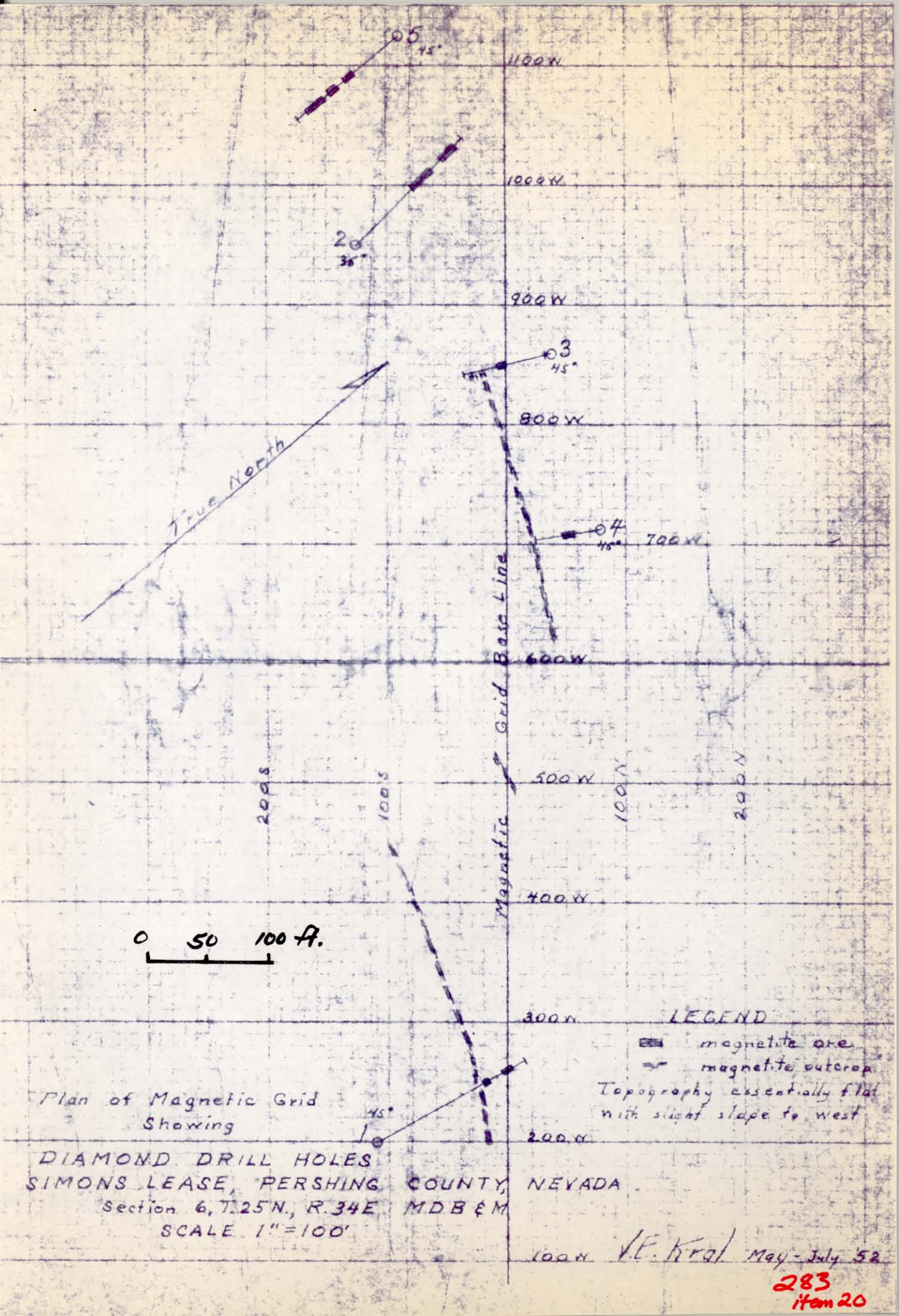
The detailed magnetometer survey in the southwest quarter of section 27 tested the southern part of the mineralized zone of high magnetic intensity that was discovered in the 1951 reconnaissance survey. It showed three anomalies of fairly high magnetic intensity within the general zone. The two best anomalies were tested by one diamond drill each, which showed strong magnetite mineralization in the diorite but no ore bodies of mineable grade and size. Further geologic scouting north of the magnetometer grid also indicated that the magnetite float comes from small veins or lenses in the diorite, and that probably all of the magnetic material in the west half of section 27 is similar to that found in the drill holes. No further work seems justified in this area.

Section 6

The detailed magnetometer survey in the northern part of section 6 shows two main anomalies occurring within a broad mineralized zone. In part the anomalies are associated with recently discovered outcrops of high-grade iron ore. One diamond drill hole in the eastern anomaly and four diamond drill holes in the western anomaly all show high-grade ore at depth. These ore bodies are of mineable size and grade, and the property should be retained for future development. The companion report by Mr. Kral gives detailed drilling results, tonnage estimates, and other pertinent data.

Reno, Nevada
August 1952

E. L. Stephenson
Consulting Geophysicist



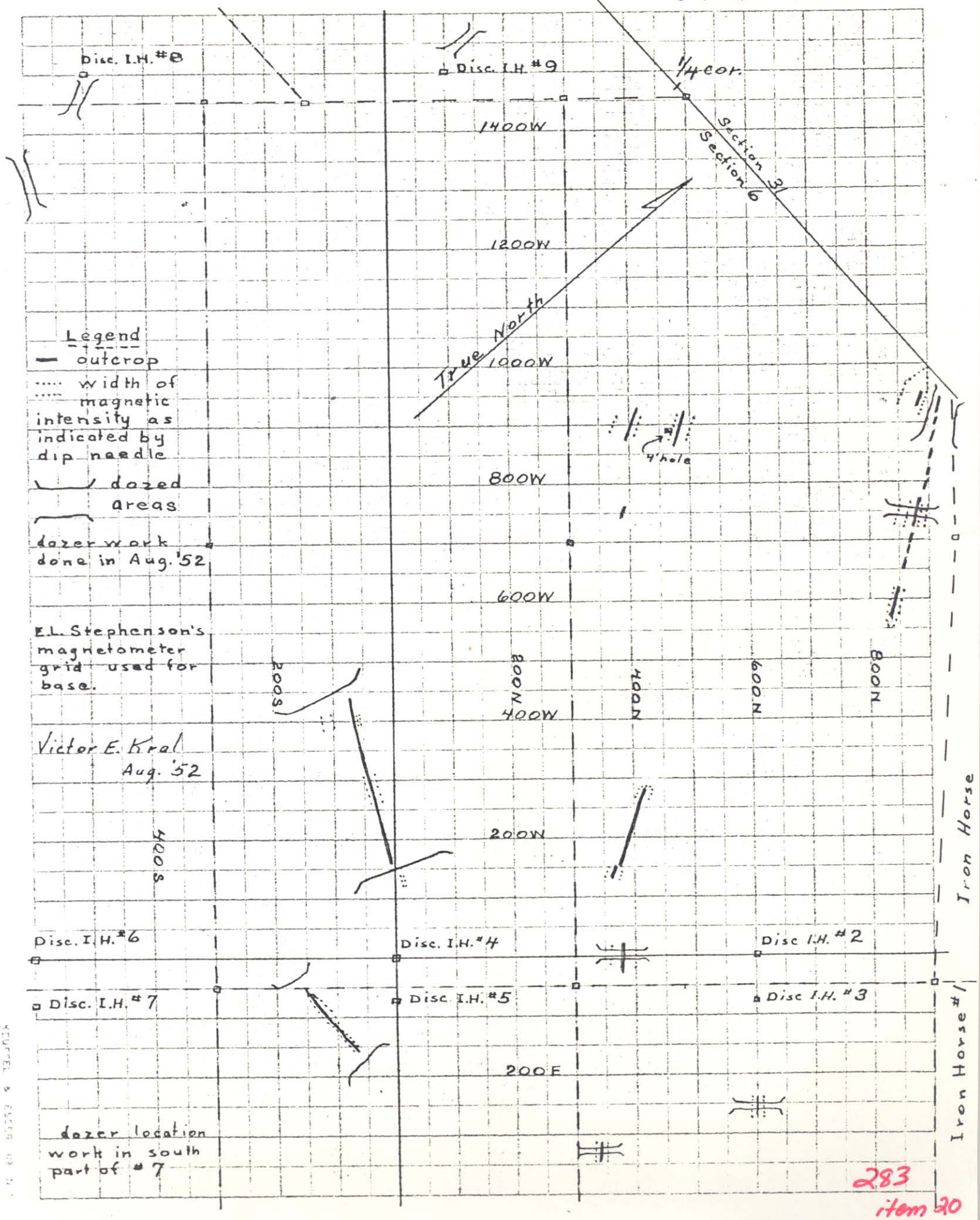
Plan of Magnetic Grid
Showing
DIAMOND DRILL HOLES
SIMONS LEASE, PERSHING COUNTY, NEVADA
Section 6, T.25N., R.34E. MDB&M
SCALE 1" = 100'

V.E. Kral May - July 52

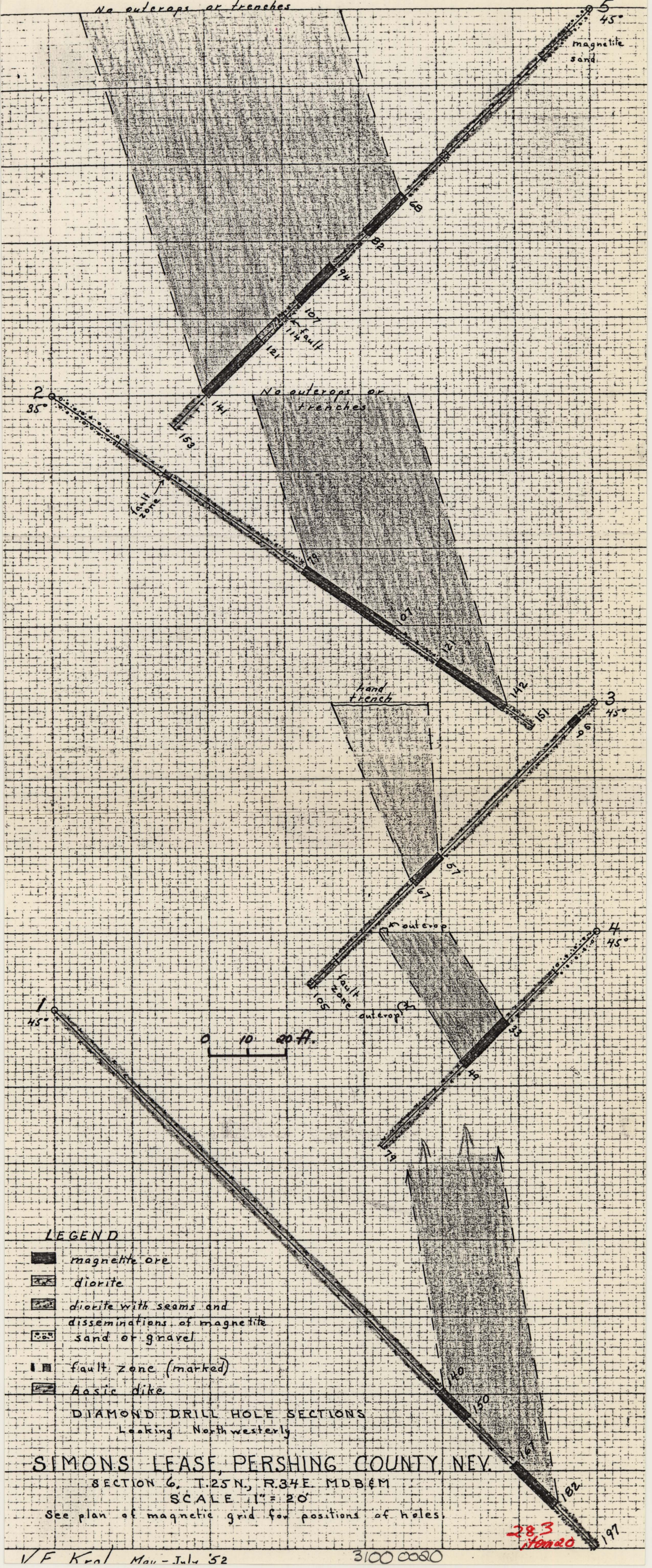
283
item 20

IRON HORSE GROUP
(Simons Lease)
Sec. 6, T.25 N., R.34E M.D.B.&M.

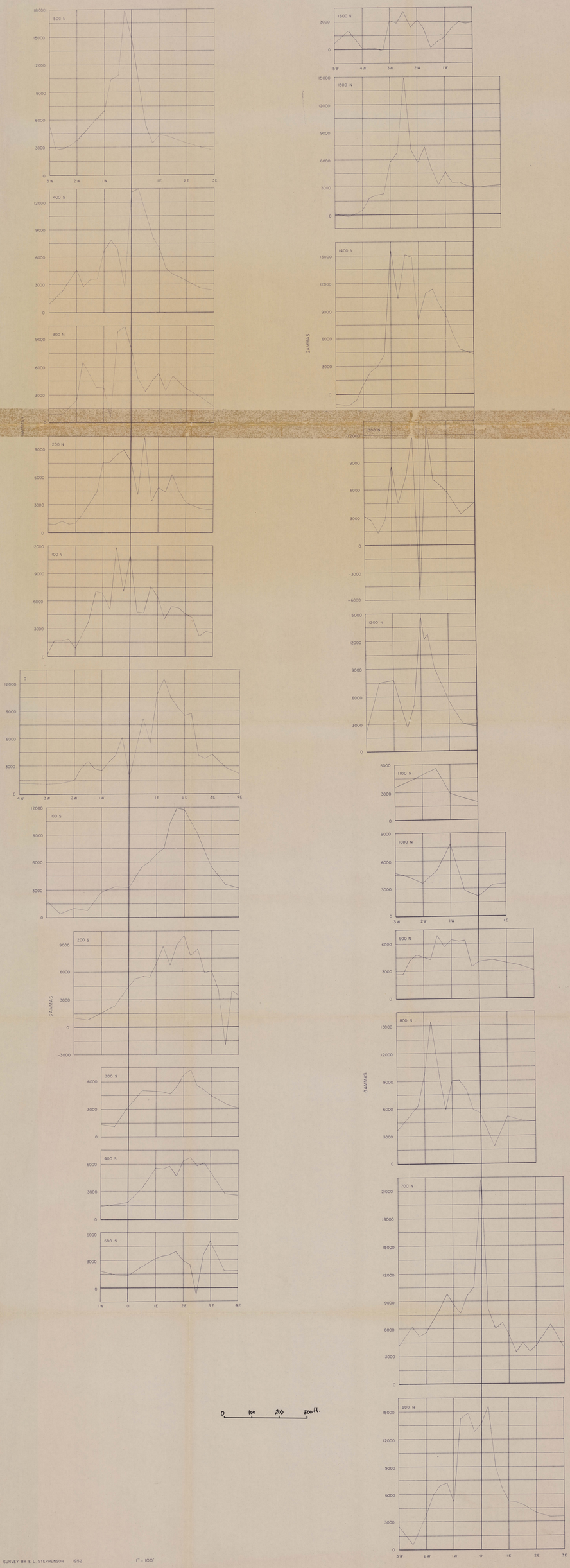
SCALE 1" = 200'



283
item 20


No outcrops or trenches
5
45°
magnetite sand
68
82
94
107
114
fault
121
141
153
No outcrops or trenches
2
35°
fault zone
64
67
72
142
151
hand trench
3
45°
96
57
67
outcrop
4
45°
fault zone
105
outcrop
33
49
79
1
45°
0 10 20 ft.
140
150
161
182
197
LEGEND
magnetite ore
diorite
diorite with seams and disseminations of magnetite
sand or gravel
fault zone (marked)
basic dike
DIAMOND DRILL HOLE SECTIONS
Looking Northwesterly
SIMONS LEASE, PERSHING COUNTY, NEV.
SECTION 6, T.25N., R.34E. MDB&M
SCALE 1" = 20'
See plan of magnetic grid for positions of holes.
283
item 20
V F Kral May - July '52
3100 0080

FORD MOTOR COMPANY



SURVEY BY E. L. STEPHENSON 1952

1" = 100'

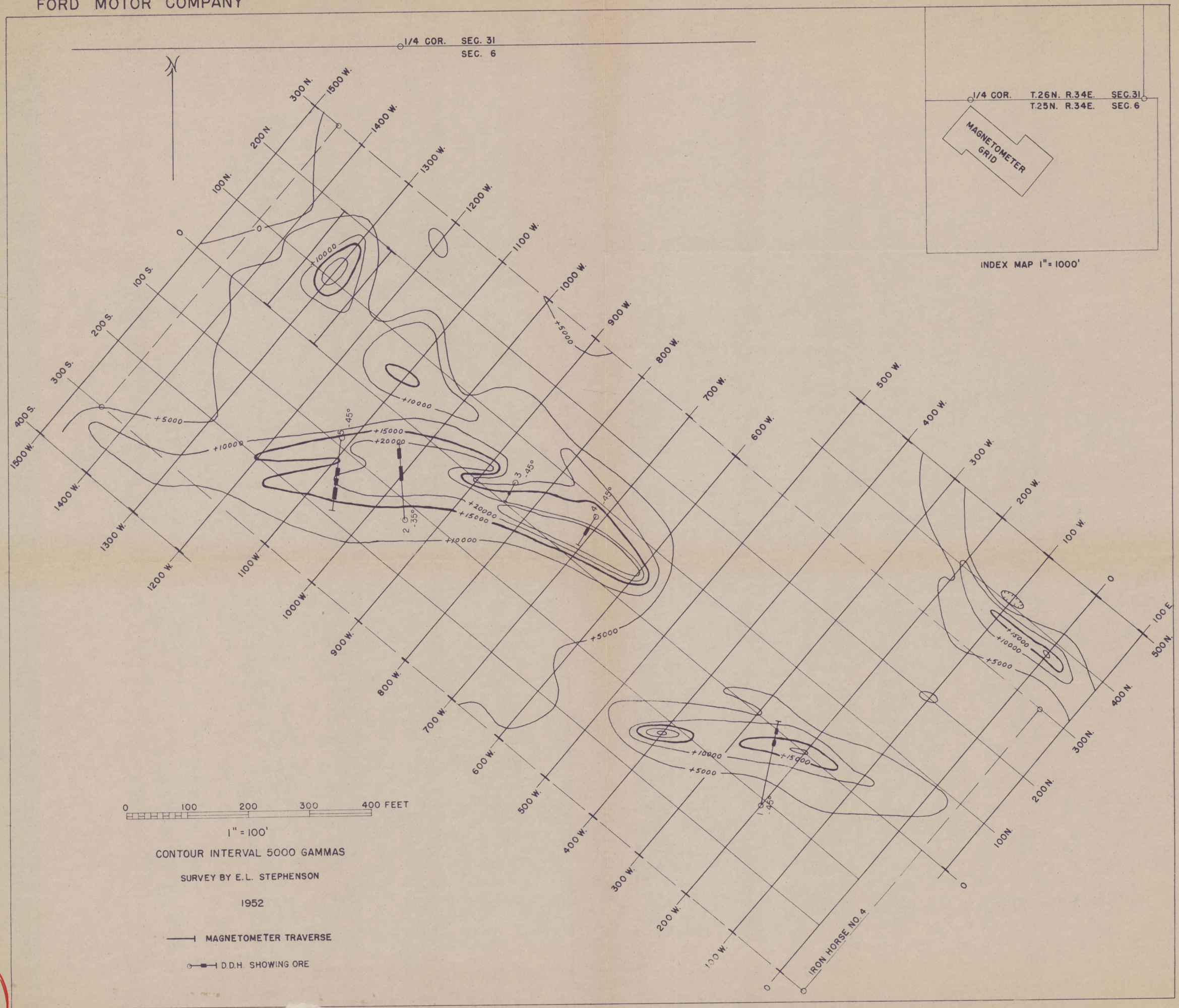
RAILROAD LEASE, SEC. 27, T. 25 N., R. 34 E., PERSHING COUNTY, NEVADA

MAGNETIC PROFILES

Map 20

283

FORD MOTOR COMPANY

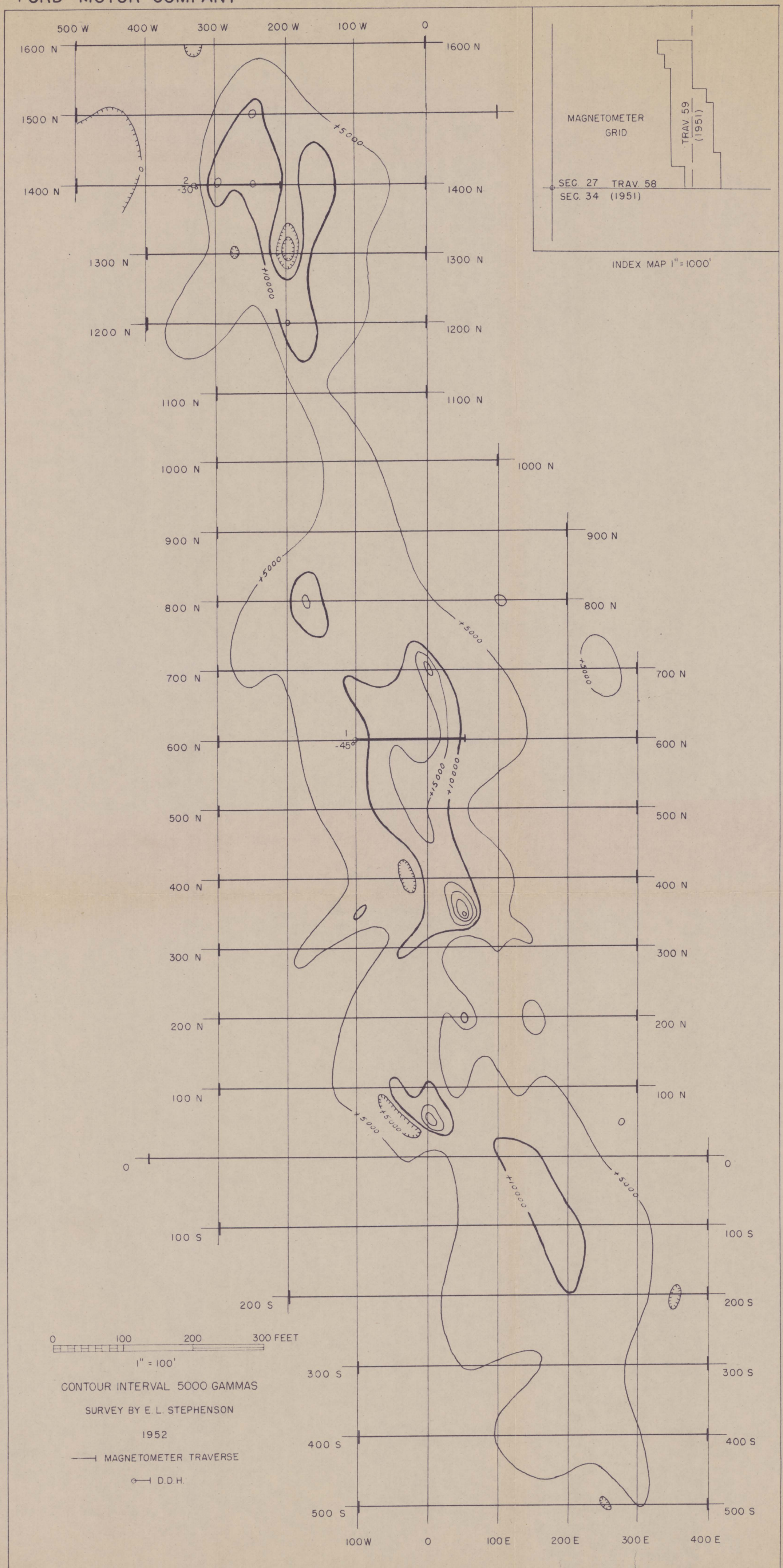


MAGNETIC MAP OF SIMONS LEASE, SECTION 6, T.25N. R.34E., PERSHING COUNTY, NEVADA

283

Item 20

FORD MOTOR COMPANY

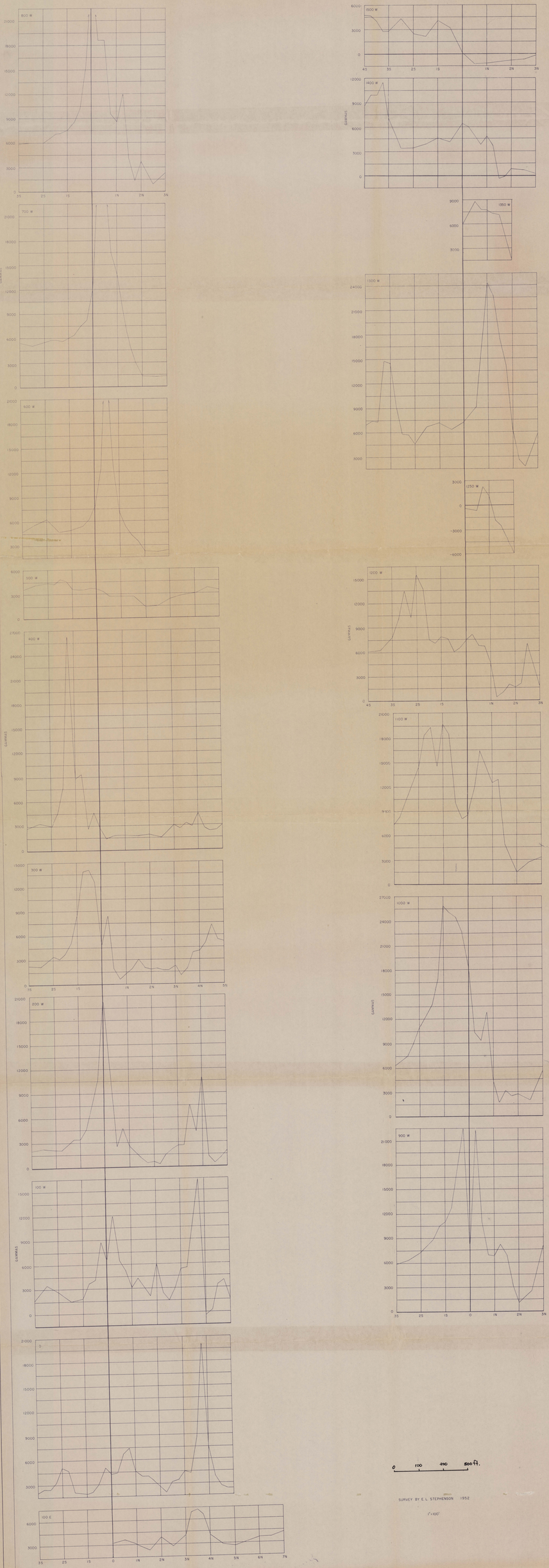


MAGNETIC MAP OF RAILROAD LEASE, SEC. 27, T.25N., R.34E., PERSHING COUNTY, NEVADA

283

Item 20

FORD MOTOR COMPANY



SURVEY BY E. L. STEPHENSON 1952

1"=100'

SIMONS LEASE, SECTION 6, T.25N., R.34E., PERSHING COUNTY, NEVADA

MAGNETIC PROFILES

3100 0091

2833

Jtem 20