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Paul
Check with Duncan

They will contact Guerlcon

August 18, 1971

TO: H. Lanier

FROM: G. Jackson

SUBJECT: Stauffer Chemical Co.
Iron Mountain Mine (Formerly
Copper Mountain Mining Co. Ltd.)
Shasta County, California

A call was made to Mr. E.I. Lentz, Asst. to V.P. and the General Manager of the Fertilizer Div., Stauffer Chemical Co., San Francisco, Calif. (415-434-1800), to determine the present status of the Iron Mountain Mine near Redding, Shasta County, Calif. Mr. Lentz stated that they were negotiating with another company at present, but would contact us (I gave him your name, too) if no deal is made.

The mine was suggested as one with potential by Clyde Osborn who contacted a Mr. Nicholas A. Fittinghoff, Consultant, Henfield, Calif., in regard to it. Mr. Fittinghoff stated to me that the mine was on the market a year ago and was examined by him then for Martin-Marietta. He suggested calling Mr. Lentz.

There are a number of reports on the Redding-Shasta County area mines in the Wisser files. Briefly, they have mined off and on there since the 1860's with over 150,000 tons of copper produced. No mines are presently active as far as is known.

The ores were massive sulfides with mostly pyrite and some copper, zinc, Au, Ag, magnetite, and up to 50% sulfur. There have been several roasting/smelting operations there over the years with a roaster finally being built in the Bay area at Martinez, Calif. as the most recent venture. The Copper Mountain Mining Co., Ltd. produced Cu and Zn concentrates plus roasting the pyrite to produce sulfuric acid and fertilizers. Stauffer Chemical Co. bought out Copper Mountain several years ago and shut down operations about two years ago when the sulfur market broke.

At present (according to Fittinghoff) Stauffer is recovering some copper from the mine water by precipitation over tin cans. Fittinghoff states that present reserves (open pit) were about 10 million tons of unknown grade. Historically, most of the production

was from underground mines with access by adits. Mining conditions were appalling (according to reports) due to danger of fires, acid water, high temperatures, etc.

It is believed that the mine and surrounding area (Humble is a neighbor) have some but unknown potential as a future copper producer. The metallurgical problems may prove difficult of solution but the ore has been relatively high grade (1.5 to 4% Cu) and could be profitable.

Gordon
G. Jackson

GEJ:td

WISSER AND COX geologists - engineers

55 new montgomery san francisco, california YU 2-1436

POSSIBILITIES FOR ADDITIONAL MAGNETITE ORE AT THE IRON MOUNTAIN MINE

Shasta County, California

Prepared for Mountain Copper Company
May 21, 1962

WISSER AND COX geologists - engineers

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POSSIBILITIES FOR ADDITIONAL MAGNETITE ORE AT THE IRON MOUNTAIN MINE

INTRODUCTION

At the request of Mr. C. W. McClung, I visited the magnetite area on May 12, 1962, in company with Messrs. Don Winsor and R.J.J. Lampson. After inspection in the field, all available data, chiefly from drill holes, were collected in the mine office. The present report is based on a study of these data, together with general information on the Iron Mountain mine and West Shasta copper-zinc district, derived from the following publications:

A.R.Kinkel and J.P.Albers, 1951, Geology of the Massive Sulfide Deposits at Iron Mountain, Shasta County, California, Division of Mines Special Report #14.

A.R.Kinkel, Jr., W.E.Hall, J.P.Albers, 1956, Geology and Base-Metal Deposits of West Shasta Copper-Zinc District, Shasta County, California, U.S.Geol.Survey. Prof.Paper 285.

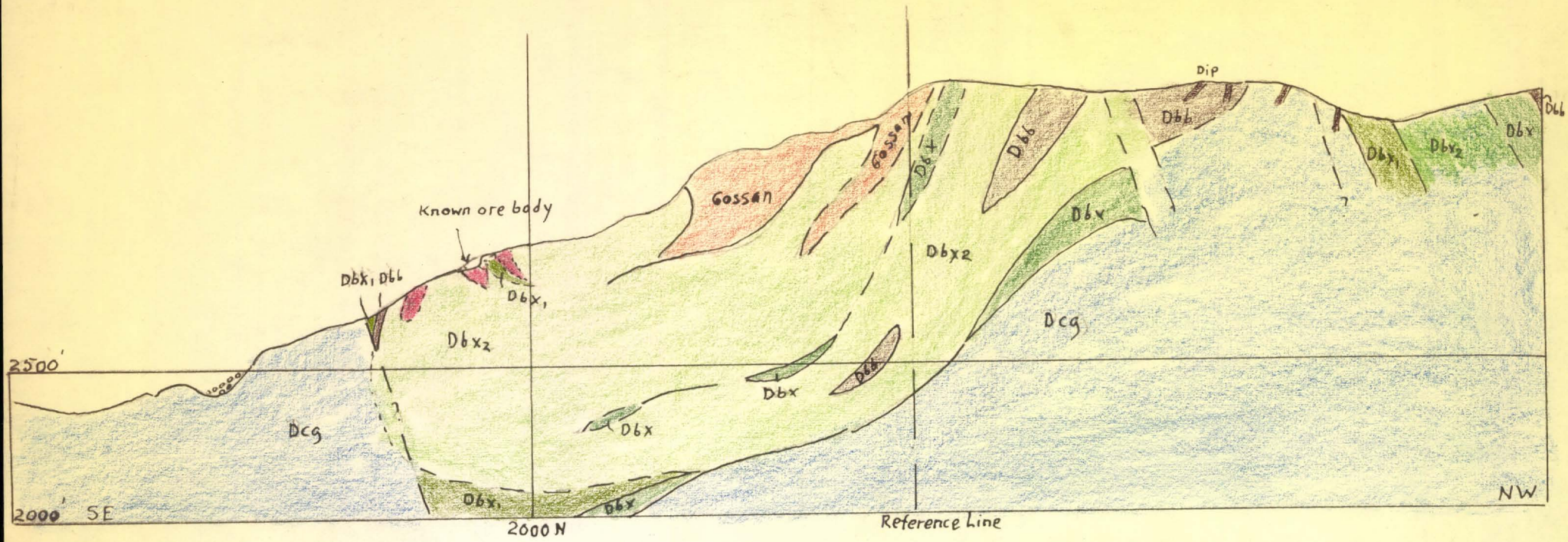
LOCATION

The area of known magnetite lies roughly 2000 feet east of south from the present open cut on the Brick Flat ore body, and just east of the great dumps resulting from mining the Old Mine ore body gossan by open cut. The area lies on the northern slope of Slickrock Creek canyon, which separates Iron Mountain from South Fork Mountain.

GEOLOGY OF THE AREA

No attempt is made to describe this in detail; the geology is better known to the mine staff than to myself. The accompanying Geologic Map of Magnetite Area shows the geology, based on maps in the publications cited. Rock formations consist of various members of the Balaklala rhyolite, and the underlying Copley greenstone.

Kinkel subdivided the Balaklala rhyolite, which he considers to be entirely surface flows and pyroclastics, on the basis of size of quartz phenocrysts (see Legend on map). Unit Dbx3, coarsely porphyritic, is the upper unit; Units Dbx 2 and Dbxl seem to correspond to the middle unit, while Unit Dbx, nonporphyritic rhyolite, is Kinkel's lower unit.



SECTION 22 (U.S.G.S. Prof. Paper 285)
Scale: 1" = 500'
For legend see Geologic Plan of Magnetite Area.

The above classification is stratigraphic, but unfortunately Kinkel's classification is lithologic as well, and the two do not always correspond. Referring to the accompanying Section 22 of Kinkel, note that Dbx lies in places directly on the Copley greenstone, but occurs also enclosed in Dbx2, 150 feet above the top of the greenstone. Deciphering the structure is therefore difficult.

Accepting Kinkel's notions of structure (with reservations), Section 22 and his Section 29 (not included in this report) show that the magnetite area lies on the southeast limb of a sharp syncline, which tends to be overturned to the northeast near the supposed fault shown on the left of Section 22, and near the south end of the map.

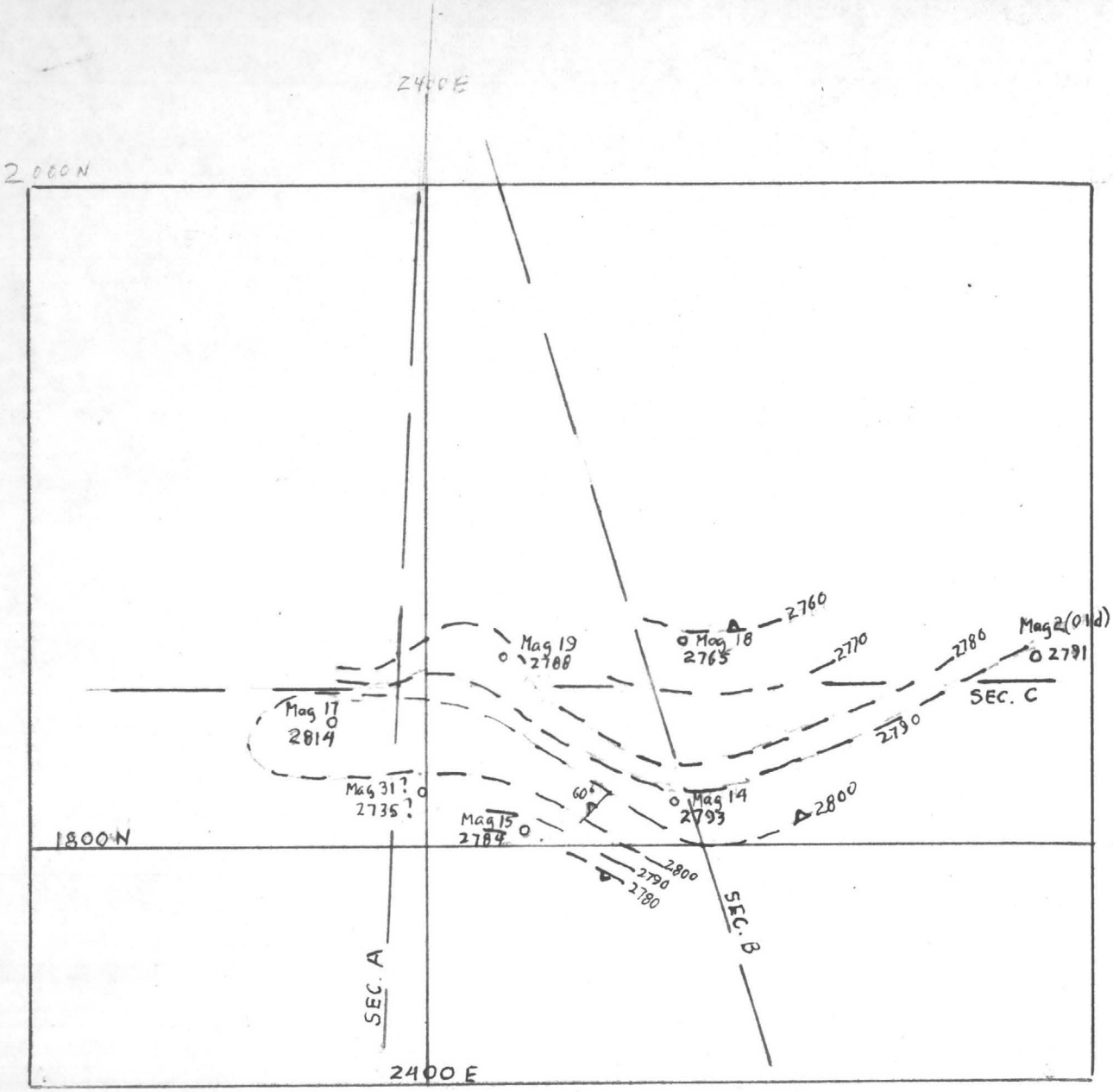
In the vicinity of the known ore body (see Geologic Map) the rhyolite formations, according to Kinkel, dip northwest into Iron Mountain; Kinkel shows his northernmost body of "magnetite-hematite" dipping in that direction (section 22).

According to Kinkel, the massive sulfide ore bodies of the West Shasta district show marked stratigraphic control, occurring in the upper portions of the middle unit (Dbx2). Section 22 shows the upper magnetite-hematite ore body lying at about the same stratigraphic horizon as the bottom of the Old Mine sulfide ore body, here completely altered to gossan.

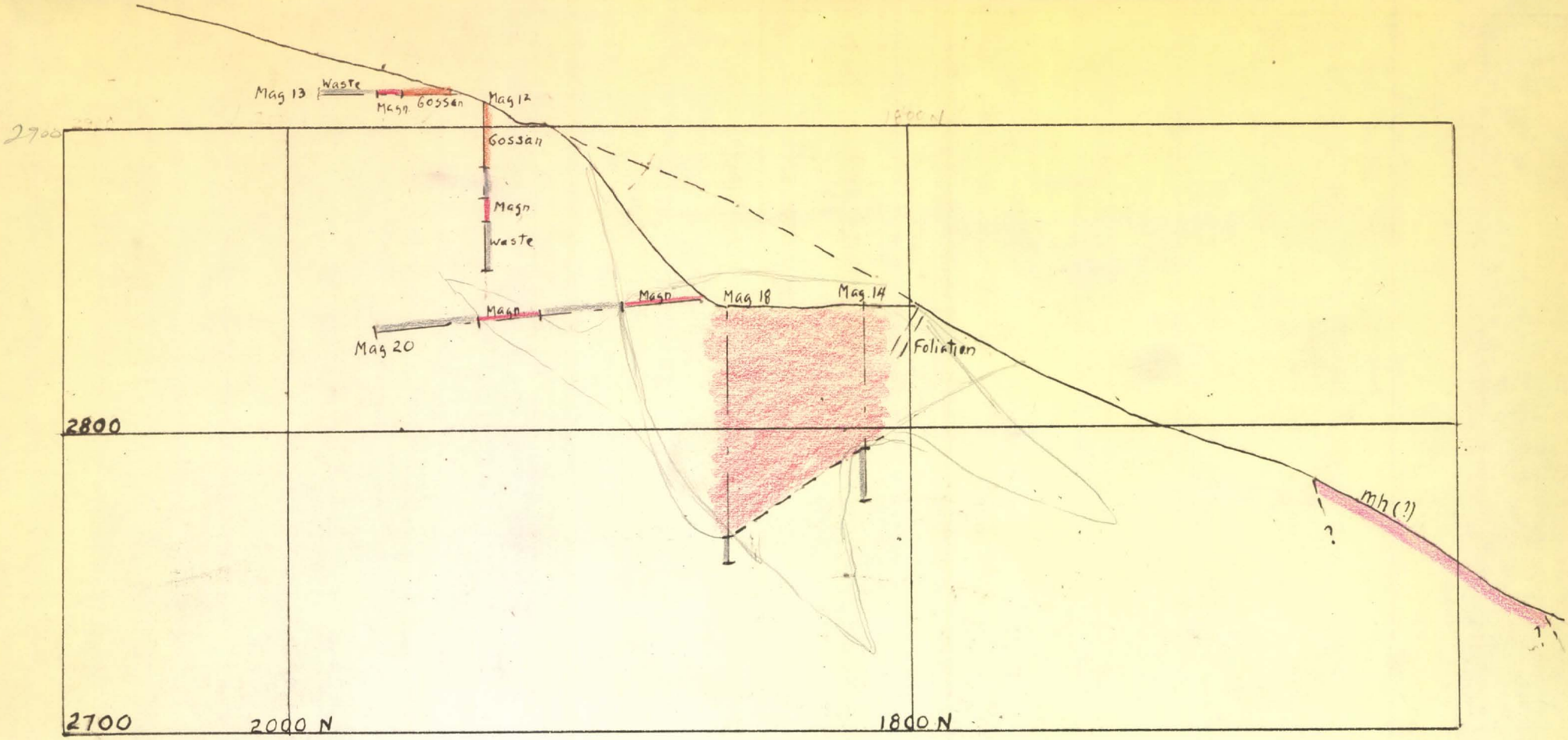
There is nothing anomalous in the occurrence of magnetite bodies, free of sulphides, in massive pyrite copper zinc districts. The assumption seems reasonable, therefore, that if the massive sulfide deposits were localized by stratigraphic control, magnetite deposits might be localized in the same manner. On this assumption, and accepting Kinkel's structural pattern, the known magnetite ore body might dip northwest, into the mountain slope.

RESULTS OF DRILLING AND MINING IN THE MAGNETITE AREA

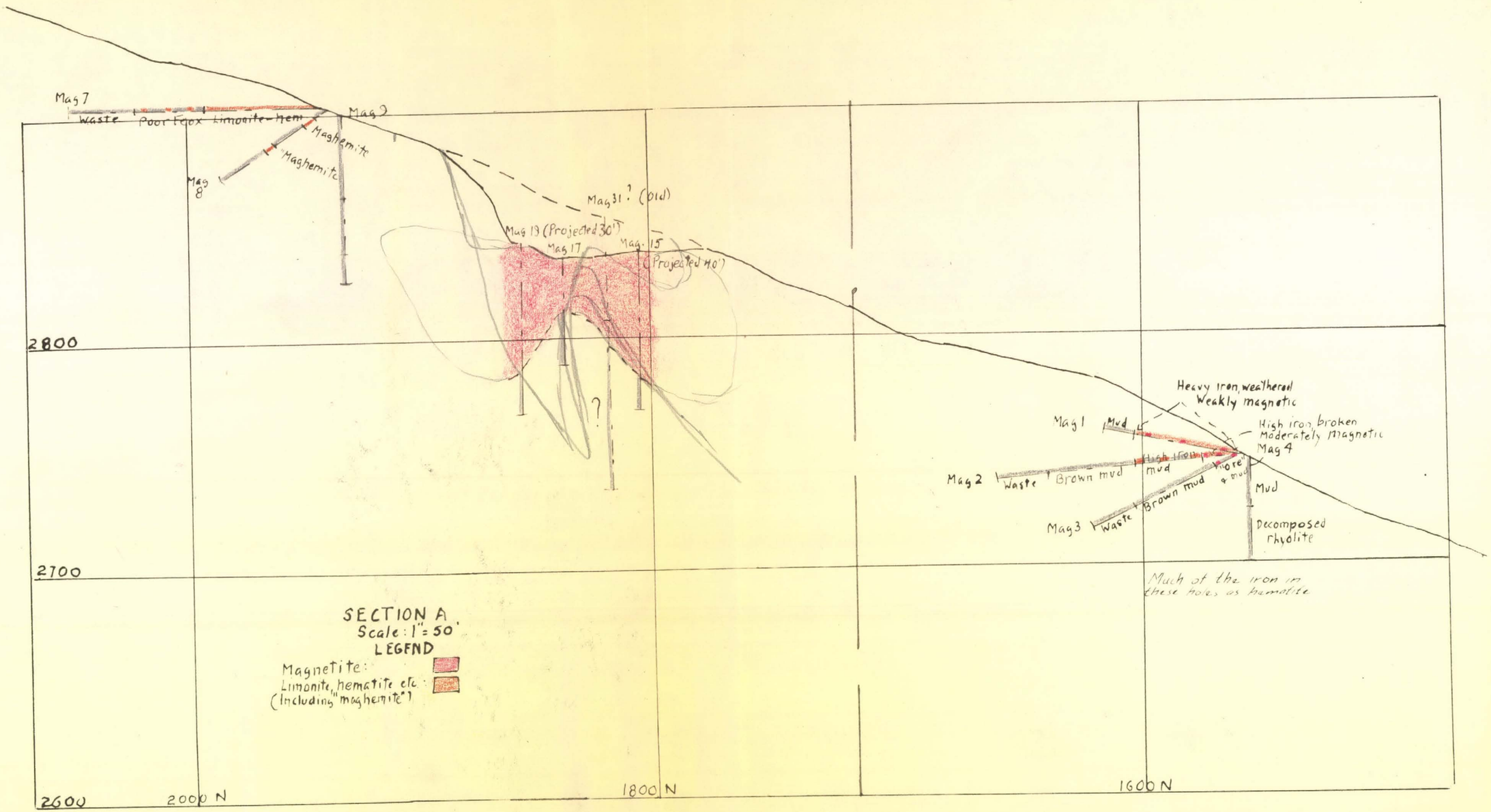
Drill holes are shown on the Geologic Plan and on Sections A, B, and C. Data from these holes, and obtained from mining 20,000 tons or so from the known ore body, do not accord well with Kinkel's surface mapping of "magnetite-hematite rock". Kinkel shows three lenses of magnetite which are reproduced on the Geologic Map. They are described as a maxture of magnetite and hematite, some of the latter being a surface oxidation product (Prof.Paper 285, p. 119). The hematite is described as the specular variety, making up about 10% of the magnetite bodies (ibid. p.86). This may refer to the hypogene hematite.



STRUCTURAL CONTOURS ON BASE OF
MAGNETITE OREBODY
Scale: 1" = 50'



SECTION B
Scale: 1" = 50'
For legend see Section A


Mag 7
Waste
Poor Fox
Limonite-hem
Mag 9
Maghemite
"Maghemite"
Mag 8
Mag 31? (Old)
Mag 13 (Projected 30')
Mag 17
Mag. 15
(Projected 40')
2800
?
Heavy iron, weathered
Weakly magnetic
Mag 1
Mud
High iron, broken
Moderately magnetic
Mag 4
Mag 2
Waste
Brown mud
High iron
mud
Iron
& mud
Mud
Mag 3
Waste
Brown mud
Decomposed
rhyolite
2700
Much of the iron in
these holes as hematite
SECTION A
Scale: 1" = 50'
LEGEND
Magnetite:
Limonite, hematite etc.:
(Including "maghemite")
2600
2000 N
1800 N
1600 N

Maghemite, the ferromagnetic ferric oxide (Fe_2O_3) has been described from the Iron Mountain sulfide gossan. Brown, rusty material associated with the magnetite bodies was analyzed on the supposition that it might be maghemite, formed as an oxidation product of magnetite. The brown, rusty material was found not to be maghemite, and the magnetite sample was composed of 70% magnetite, 10% hematite, and 20% limonite and gangue.

Substantial tonnages of magnetite recently mined and analyzed show extremely low or no sulfur. This would imply that much of the hematite reported in drill holes and seen on the surface was derived by oxidation of magnetite, and that all the limonitic material was formed by oxidation of magnetite and hematite.

Kinkel's northwesternmost exposure of magnetite-hematite was explored by drill holes 7 through 13 and by part of Hole 20 (see Geologic Map and Sections A and B). As the sections show, only small bodies of magnetite were cut except in Hole 9, which cut 25 feet of magnetite (Sec.A). This might possibly be an offshoot of the main ore body (Sec.A), and/or might hook up with the magnetite cut by Hole 20 directly under Hole 12 (Sec.B).

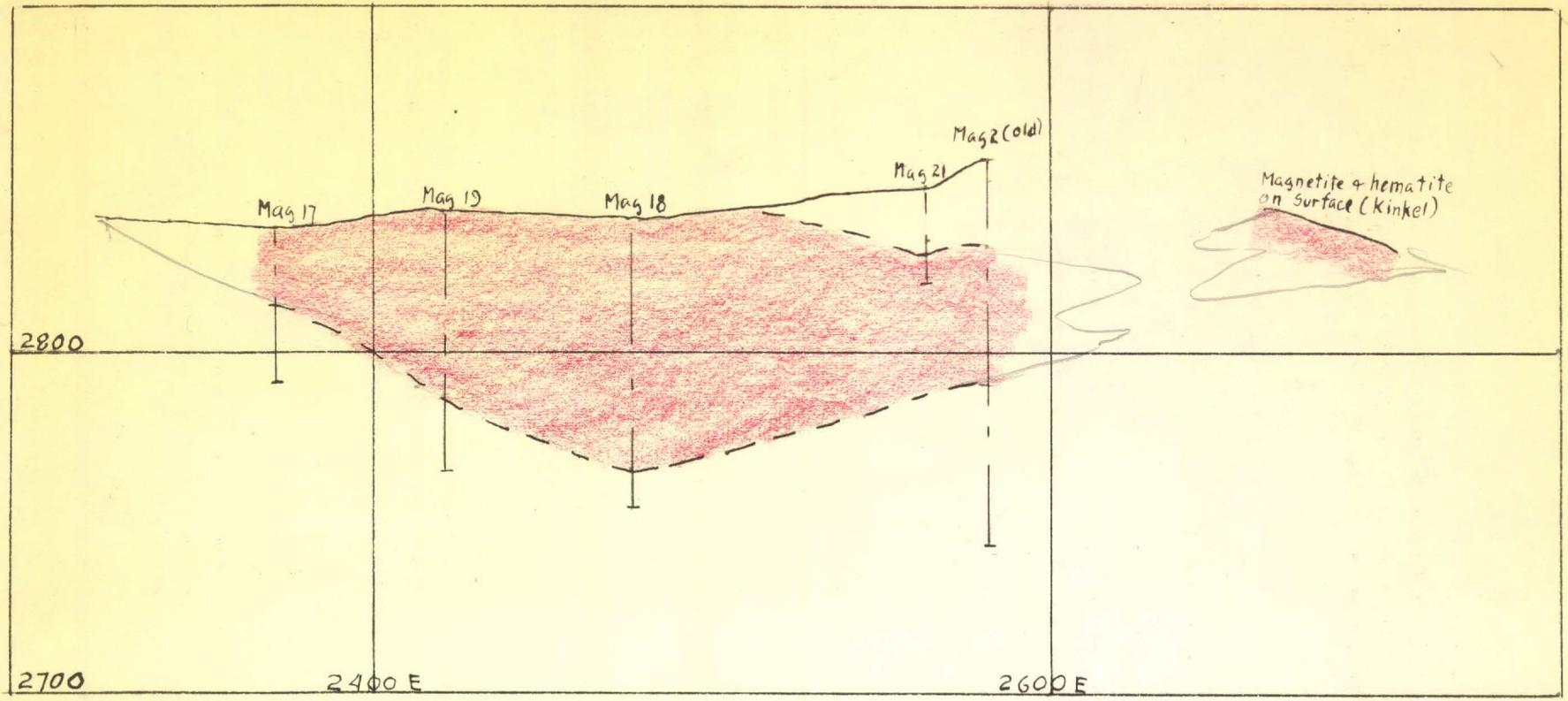
The shallow holes 7, 8, 12 and 13 cut considerable gossan and some magnetite. This might possibly represent the oxidized portion of a magnetite body, but the lower half of Hole 8 is against this notion (Sec.A).

The known ore body envelopes the very small, central surface exposure of magnetite-hematite shown by Kinkel. I was able to see only the north fringe of this ore body, owing to current conditions of mining. The road cut shows irregular bodies of magnetite, some tabular, some pipelike, following no discernible structures in dark greenish rhyolite, which contrasts markedly in appearance with the light gray or pinkish normal rhyolite, and which may lie as an alteration halo around the ore body.

As shown by the ore collected by bulldozer, the magnetite breaks in very large chunks up to 3 feet across. Seen in place I am told these chunks were not jumbled, as would occur in a slide; the chunks were probably blocks between joints of various systems.

Mr. Lampson has gathered the impression from mining operations that the ore body dips not into the hill slope, as suggested above, but southerly with the slope; also, that the ore body is step-faulted, with minor down through downslope, to the south.

SectionB suggests that the bottom of the ore body dips to the north, into the hill, while Section A shows a "hump" in the bottom surface (if dubious Hole 31 is rejected), with north and south dips off the crest of the hump. The structural contour map shows the configuration of the bottom surface of magnetite in more detail.



SECTION C
Scale: 1" = 50'
For legend see Section A

The known ore body seems delimited to the west (Geologic Map) but is open to the east, as shown in Section C, which suggests that ore might extend as far east as Kinkel's largest surface exposure of magnetite-hematite.

The known ore body does not seem to me to be delimited to the south downslope, because the southernmost drill hole, No. 15, shows 45 feet of ore; however, mining may have shown that the southern limit is quite close to this hole.

Kinkel's southernmost and largest magnetite hematite outcrop has been partly explored, with poor results, by two sets of drill holes. Toward the southwest end Holes 1 through 4 (see Geologic Map and Section A) show considerable iron oxide, said to be mainly hematite, with much "mud". This could be highly weathered slide material.

Farther northeast, old hole 1 cut 37 feet of hematite, while recent Holes 5 and 6 cut 10 to 12 feet of magnetite just below their collars, but then passed into waste. In spite of these poor showings, this, the largest magnetite-hematite exposure cannot be dismissed as yet.

There are other indications of magnetite in the area. The Geologic Map shows the approximate location of small masses of magnetite exposed in the road passing near the known ore body; east of that ore body is an area of magnetite float; just south of the float is a supposed exposure of magnetite appearing on a map by Oscar Hershey, and southeast of this is a similar area. I understand that neither of these exposures has been confirmed, but exposures in general are very poor here.

On his last visit, I believe, Mr. Kinkel designated on the geologic map of the Iron Mountain area a series of magnetic traverses along roads. Mr. Lampson wrote on the map, at Kinkel's dictation: "Plus magnetic traverses by C.H.Sandberg. Yellow indicates areas of irregularity in magnetic profiles." A traverse showing such irregularities which crosses the area of my Geologic Map is shown on thas map. It suggests the possibility of magnetite ore bodies north of any drill holes.

I am informed that the company would be interested in pods of magnetite containing as little as 100,000 tons. Assuming a thickness of 50 feet, such a pod would have dimensions shown below:

Comparing this sketch with the Geologic Map, it is evident that areas of magnetite as small as that could easily be concealed by talus, soil and mine dumps. Note that the known ore body was nearly missed by Kinkel, who shows only a very small magnetite-hematite outcrop here. Further, magnetite ore bodies, large or small, that did not extend upwards to the bedrock beneath the cover would not be disclosed even though the cover were removed by bulldozing.

CONCLUSIONS

Chances seem reasonably good to me for discovering substantial additional magnetite ore in bodies minable at a profit, in the area of the Geologic Map, and possibly elsewhere. I recommend a magnetic survey of most of this area, to wit: from coordinate 2200E to 3200E inclusive, and from coordinate 2400N to 1400N inclusive.

Traverses should be 200 feet apart. Ideally these should be normal to the longer axes of expected ore bodies. The known ore body trends easterly; on this basis the traverses should run northerly. However, the structural grain of the area, which possible ore bodies might follow, trends northeasterly; on that basis the traverse lines would be run northwesterly. Which direction is selected is not of critical importance; possibly a direction about N25W would be a workable compromise. Observation points on each traverse would be 100 feet apart, giving 55 observation points in all.

Time Estimate for Magnetic Survey:

Obtaining basic magnetic data	3 days
Maps and report	4 "
Travel	2 "
	9 days

A magnetometer survey will disclose magnetic anomalies which, if present, will make attractive targets for drilling, but it will tell little about depth of the bodies

causing the anomalies. For that reason, a resistivity survey is recommended as a supplement to the magnetic survey. The two methods together should give a very fair notion of the depth at which any magnetic bodies found would lie.

Time Estimate for Resistivity Survey:
(the same 55 points would be used)

Obtaining basic resistivity data	3 days
Maps and report	1 "
	4 days

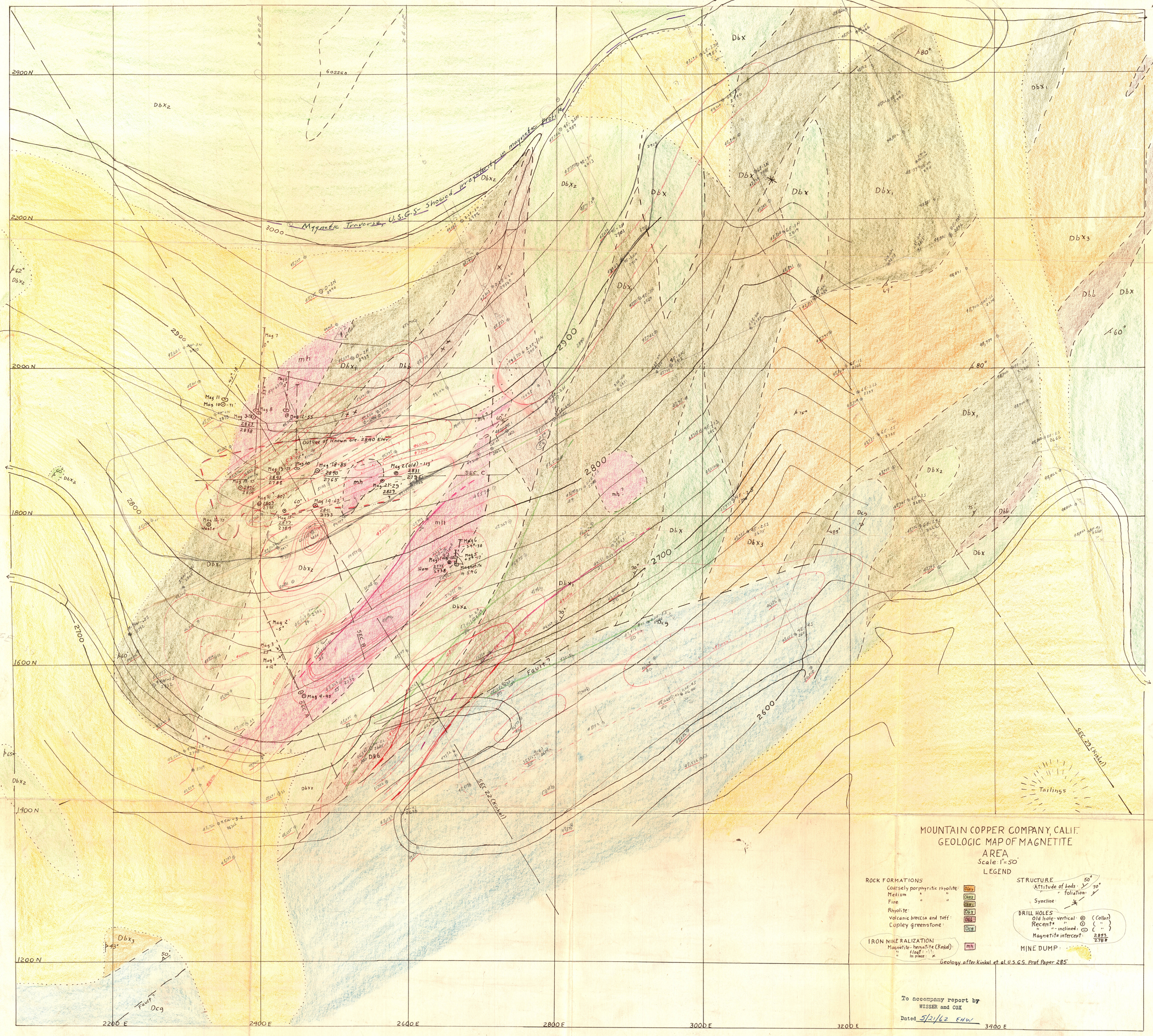
Total Magnetic & Resistivity Survey time 13 days

Both the magnetic and the resistivity surveys would be done by our associate, Eugene Lindsey. Mr. Lampson stated that his staff would lay out the grid, place observation stakes, etc. In addition, Lindsey would need one trained assistant and one laborer in the field. We have our own resistivity equipment but would have to rent a magnetometer.

We estimate that the total cost of the work, excluding services performed by your company, would be about $1500.

Edward Wisser

San Francisco
May 21, 1962


MOUNTAIN COPPER COMPANY, CALIF.
GEOLOGIC MAP OF MAGNETITE AREA
Scale: 1" = 50'
LEGEND
ROCK FORMATIONS
Coarsely porphyritic rhyolite: Dbx3
Medium " " Dbx2
Fine " " Dbx1
Rhyolite: Dbx
Volcanic breccia and tuff: Dbb
Copley greenstone: Dcg
IRON MINERALIZATION
Magnetite-hematite (Kinkel): mh
" float:
" in place:
STRUCTURE
Attitude of beds: 50°
" foliation: 70°
Syncline:
DRILL HOLES
Old hole-vertical: (Collar)
Recent " " (")
" " -inclined: (")
Magnetite intercept: 2873/2788
MINE DUMP:
Geology after Kinkel et al. U.S.G.S. Prof Paper 285
To accompany report by WISSER and COX
Dated 5/21/62 EHW
Magnetic Traverse U.S.C.S. Showed irregularity in magnetic field
Outline of known ore - 2840 Elev.
SEC. A
SEC. B
SEC. C
SEC. 22 (Kinkel)
SEC. 29 (Kinkel)
Fault ?
Tailings
2900 N
2200 N
2000 N
1800 N
1600 N
1400 N
1200 N
2200 E
2400 E
2600 E
2800 E
3000 E
3200 E
3400 E