

MAR 19620001: CLEAR HILLS

Received date: Dec 31, 1962

Public release date: Jan 01, 1964

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19620001

ECONOMIC MINERALS
FILE REPORT No.
EE-AF-D17(01)

Original

REPORT
ON
CLEAR HILLS IRON DEPOSIT
OF
ALBERTA

*This report, written in 1960,
was submitted as is,
as the assessment work
done on Permit 17, and
dated 1962. The report was
only indexed once for the
C160, and identified as 1962.*

APRIL 21, 1960

N. S. Edgar, P. Eng.

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SUMMARY AND CONCLUSIONS

Results from the drilling of 120 holes along a narrow strip of the south slopes of the CLEAR HILLS, Alberta, have established iron ore reserves as follows:

Positive Ore	25,749,836 tons
Probable Additional Ore	8,225,266 tons
Total Positive and Probable	33,975,102 tons

Average Analysis of the ore is:-

Iron	32.652
Phos.	0.691
Mang.	0.164
Silica	25.672
Alum.	5.534
Sulph.	0.108
CaO	3.247
MgO.	1.245
Ignition Loss	14.356

Additional drilling exploration in the area will undoubtedly provide for an increase in ore reserves, since the ore zone is known to extend beyond the area drilled.

REPORT ON
CLEAR HILLS IRON DEPOSIT

INTRODUCTION

During the spring and summer of 1959 an attempt was made to evaluate the occurrence of iron ore which outcrops in Townships 87 and 88, Ranges 6 and 7, West of the Sixth Meridian, Alberta. These outcrops were trenched and sampled and a few bore holes were put down for sampling purposes. This work was described in reports dated July 10 and October 16, 1959.

The lateral extent of the deposit and it's physical situation under overburden made it such that the only practical method of exploration was by drilling a large number of holes along a length of some 12 miles in order to establish tonnage and grade. The friable nature of the ore precluded the use of normal coring techniques, a number of which had previously been tried, unsuccessfully.

Experiments conducted during late 1959 resulted in the decision to resume drilling using a conventional truck mounted rotary drill and to use compressed air rather than a fluid medium for the transfer of cuttings out of the drill hole.

OBJECTIVE OF DRILLING PROGRAM

The objective of this drilling program was to prove the existence of from twenty to thirty million tons of iron ore in Townships 87 and 88, Ranges 6 and 7, West of the Sixth Meridian, Alberta. Since the deposit is nearly horizontal in attitude, and since the overburden cover increases in depth to the north with the rise in the general topography, it was decided to limit drilling exploration to those areas in which the overburden cover extended to a maximum depth of from 70 to 130 feet. This would give an average depth of from 35 to 65 feet of overburden that would have to be stripped in order to expose the ore for extraction.

DESCRIPTION OF SAMPLING EQUIPMENT

The equipment consisted of a Winter Weiss truck mounted Rotary drill. The compressor used was a Gardner Denver model RP 600 D-A Rotary Compressor, delivering 600 c.f.m. at 105 p.s.i. pressure. This was mounted on a heavy duty logging sleigh in order to keep the center of gravity as low as possible and was towed to successive drilling sites by a small International T.D. 9 crawler tractor.

The top of the drill hole was sealed with a dome-shaped apparatus manufactured from ten inch casing through which the Kelly drilling bar passed. The Kelly was sealed by a succession of washers made of metal, rubber and belting material, these being held in place

by a clamping device bolted to the top of the dome. A four inch outlet from the side permitted the attachment of a twenty foot length of four inch flexible rubber hose leading to the top of an air separator manufactured from a steel tank. The separator dimensions are as follows: Diameter - 24 inches, Length - 36 inches, Top Opening - 10 inches, Bottom Opening - 8 5/8 inches. Samples were collected in pails at the bottom of the separator. The operating arrangement is shown in the two photographs in Appendix "D".

FIELD OPERATION

(a) Survey:

A grid pattern of drill holes, in the center of each legal sub-division of 40 acres was first plotted. These were arranged so as to lie mostly between elevations of 2,600 feet and 2,700 feet, A.S.L. since the lowest outcrop elevation known was at 2,610 feet. The survey was started from the North East corner of Section 36, Township 87, Range 7, West of the Sixth Meridian, this being the closest survey point. The elevation at this corner was taken to be 2,479' A.S.L., this being the datum used by crews carrying out seismic surveys in the area.

Existing seismic survey lines were utilized where possible and branch lines were bulldozed from ~~these~~ to the desired locations. In some cases topography required the location to be shifted from the center of the legal sub-division, but the locations were held as close as possible to this center.

(b) Operation of Equipment:

At each location holes were spudded and drilled with 4 3/4 inch bit to within about five feet of the calculated depth of the ore. Drill stem was then removed, and the top of the hole sealed off with the "sampling head". The stem was then measured into the hole and the Kelly bar marked off in one foot intervals when the bit was on bottom. Drilling proceeded with the cuttings being examined closely. The top of the zone was identified by cuttings returned in the air blast, and was frequently signalled by a grinding noise in crusty, hard shaly material at the top of the zone.

The four inch hose connection to the separator was then made, the Kelly bar re-marked in one foot intervals, and drilling resumed, stopping after each foot of penetration to remove and bag the samples obtained.

It was necessary to pre heat the separator in sub-freezing temperatures to prevent the damp material from freezing and caking on the inside. This was usually done either with a propane torch or by simply building a wood fire underneath it.

Sampling continued foot by foot until the base of the zone was reached, and then the hole was deepened for a few feet to ensure the whole zone had been penetrated. During this penetration, samples were taken as outlined above, and in no case was there found any significant amount of ore material through which the drill had previously penetrated. This appeared conclusive evidence that there was little or no

contamination of samples due to the rubbing of the drill stem on the sides of the hole.

When water bearing strata were encountered, it was necessary to case the hole to seal it off since the air stream was insufficient to keep the hole clean and also since the wet, sticky walls would cause cuttings to build up and close the opening. Such cases were few, however, they deserve description. In such circumstances, the drill was moved a few feet from the original hole and a second hole drilled using a 6 1/2 inch bit. This was drilled into and through the water bearing zone. Casing was then put down in ten foot lengths and was driven through into dry material below the water zone. The casing used was 6 inch O.D., 9.7 lb. Insert Joint (Flush Joint). In addition to 10 ft. lengths, four 2 ft. lengths and two 1 ft. lengths were carried so that the top could always be kept within 6 inches of ground level and would not interfere with free passage of cuttings through the "sealing head".

Drilling then was resumed inside the casing using 4 3/4 inch bit. Fortunately, no more than one water bearing horizon was encountered in the holes drilled.

(c) Sampling Procedure:

1. Field:

During drilling of the ore zone, the rotation rate was slowed considerably and the air flow reduced to about 3/4 of full flow from the compressor. At the completion of each foot of penetration, the rotation was stopped and the full air flow turned on for a few seconds to clear the hole of all cuttings. Samples were then removed, bagged in 4 mil.

polyethelene plastic bags which were then wrapped in paper bags and marked. these were shipped to the laboratory for further processing.

2. Laboratory:

Field samples were handed in the laboratory in accordance with the procedure outlined diagrammatically on page 8. It was decided that from a practical mining viewpoint, the top foot should be sampled separately since some of this would undoubtedly be lost during stripping. The remainder of the zone was examined under a low power microscope, foot by foot, and samples were then combined in lithologically similar sections. Sample weights were therefore the same and it was assumed that each foot of sample was representative of that portion of the zone from which it originated.

Analyses were made by Steep Rock Range Laboratories, Atikokan, Ontario.

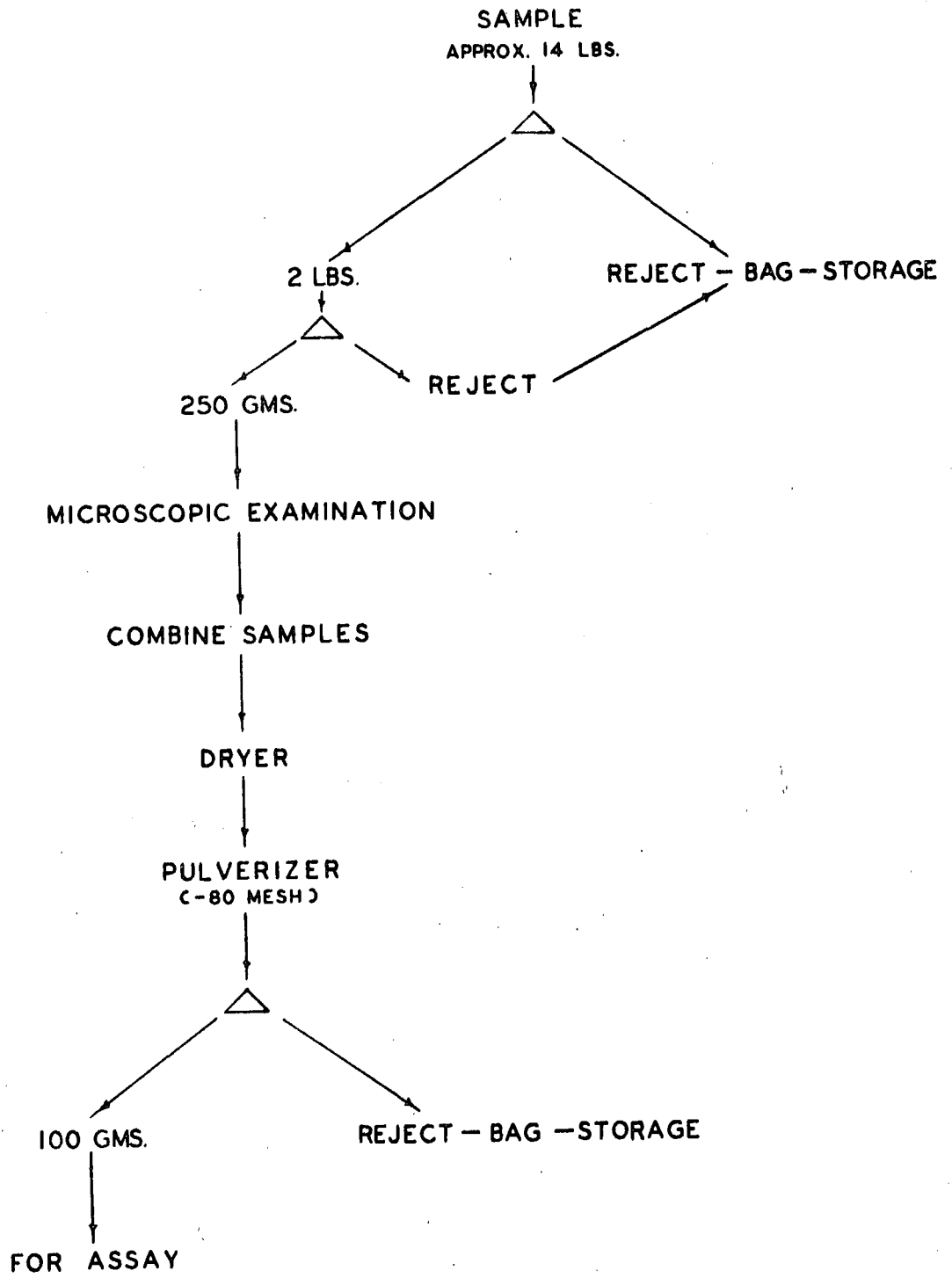
All sample rejects were retained and are held in storage for any future requirements.

AIR PHOTOGRAPH STUDY

In order to assist in correlation of data obtained from drill holes, a study of air photos of the area was obtained through the co-operation of the Research Council of Alberta. A copy of this report is attached as Appendix "A".

This study indicated "stable areas", separated by erosion features, such as drainage channels, and areas where "slumping" or faulting has occurred.

LABORATORY SAMPLING PROCEDURE



INTERPRETATION OF DRILLING RESULTS

Reference is made to location and Assay Maps attached as Appendix "B".

The air photo study and drill hole data have indicated three erosional features which have the effect of dividing the ore deposit into two major segments. The eastern segment in Township 88, Range 6, is de-limited by stream erosion and slumping in a broad valley extending north through Sections 2 and 11. Westward, stable conditions exist through Sections 3, 4 and 5 to a second broad erosional valley extending north through Sections 6 and 7. West of Sections 6 and 7 there exists a broad highland covering Sections 1, 2 and the east half of 3 and 10, in Township 88, Range 7. Stable conditions are found around the east, south and western flanks of this highland except for minor slumping or draping, and relatively narrow but deep areas of stream erosion.

West of Section 9, Township 88, Range 7, in Sections 5, 6, 7 and 8, photo interpretation indicates stable areas, possibly overrun by major "landslide" areas. Drilling results show that some slumping has certainly occurred but in addition, they indicate that the zone becomes thinner and may be only from 2 to 4 feet thick in this area.

DRILL LOGS AND ANALYSES .

Data on Drill Logs and Analyses are listed in Appendix "C" to this report.

Locations of holes are plotted on the maps, Appendix

"B". The following calculations are weighted averages of all analyses.

They are weighted as to ore thickness.

<u>Element</u>	<u>Analysis %</u>
Iron	32.652
Silica	25.672
Phosphorous	0.691
Manganese	0.164
Alumina	5.534
Sulphur	0.108
Calcium Oxide	3.247
Magnesium Oxide	1.245
Ignition Loss	14.536

It is of interest to compare the analyses of ore obtained in drill holes close to the four trenches which were channel sampled:

	<u>Channel</u>	<u>Drill Hole</u>
Trench 1.	$\frac{31.72}{9}$	$\frac{30.23}{10}$
2.	$\frac{30.75}{9}$ or $\frac{35.62}{6}$	$\frac{32.67}{7}$
3.	$\frac{34.41}{8}$	$\frac{32.01}{8}$
4.	$\frac{35.98}{9}$	$\frac{32.35}{10}$
5.	$\frac{32.11}{11}$ - Bulk Sample	

TONNAGE AND GRADE ESTIMATES

Calculations of Tonnage and Grade are presented in Tables 1 and 2 following. The various areas have been designated "A", "B", "C",

etc. and are shown on the maps in Appendix "B". It will be noted that the Eastern limit of reserve estimates is in Section 3, Township 88, Range 6, The area in Sections 10, 11, and 12 are extremely difficult to traverse; hence only a few holes were drilled, and these were not sufficient to show sufficient continuity of ore on which to base reserve calculations. Also, this area has had much slumping and stream erosion. Additional drilling would no doubt enlarge the reserve estimates.

To the West, in Township 88, Range 7, the Western limit for reserve estimates is a line through the East boundaries of Sections 5 and 8. West of this, inconclusive drill hole results were found. It is probable that landslide conditions have churned up the underlying strata, or possibly filled in old erosion channels, or possibly depositional factors resulted in thinning of the deposit in this area.

Moisture content of the ore has been measured at from 12 to 15% indicating an apparent density of 14.5 cubic feet to the ton. This has been used in tonnage calculations.

Using the map scale of 1 inch equals 400 ft., one square inch of map area provides for 11,035 tons of ore per vertical foot of ore thickness.

The area factor provides for the interval between the average top of the ore elevation and the top contour elevation, in the area measured. A uniform topographical gradient is assumed for this calculation.

Tonnage estimates are arrived at by the following:

$\text{Tonnage} = \text{Map Area} \times 11,035 \times \text{Average Thickness} \times \text{Area Factor}.$

Estimates are divided into two classes, Positive and Probable. The distance between some drill holes may be regarded as rather more than is desirable when considering ore reserves. However, the persistence of the zone is such that the writer regards the drilling results as being adequate for the present purpose of outlining positively the large tonnage required.

The Probable reserves are obtained by increasing the strip width along the upper contour, assuming a uniform topographical gradient. This would require removal of more overburden, but the maximum average figure used has been limited to 65 feet.

Total Positive Reserves are calculated at	25,749,836 tons
Addition Probable Reserves are calculated at	8,225,226 tons
Average grade	32.65% Fe.

Respectfully submitted,


N. S. Edgar, P. Eng.

Edmonton, Alberta,

April 21st, 1960.

TABLE I

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TONNAGE AND IRON GRADE ESTIMATES-POSITIVE RESERVES

<u>Location</u> <u>Area Description</u>	<u>Map Area</u> <u>Sq. Inches</u>	<u>Contour</u> <u>Interval</u>	<u>Average</u> <u>Thickness</u>	<u>Average Top</u> <u>Elevation</u>	<u>Area</u> <u>Factor</u>	<u>Average</u> <u>Overburden</u>	<u>Tonnage</u>	<u>Average</u> <u>Grade Iron</u>
<u>Twp. 88-Rge. 7-W. 6 M.</u>								
"A" SW 9, SE 8, NE 5, NW 4,	24.9	2629-2750	8.0'	2629	1.0	60.5'	2,198,172	30.91
"B" SE 9, NE 4, SW 9,	41.9	2624-2750	8.2'	2624	1.0	63'	3,791,405	32.72
"C" SW 10, SE 10,	18.0	2655-2750	6.6'	2655	1.0	47.5'	1,310,958	35.44
"D" SW 10,	4.4	2649-2750	8.0'	2649	1.0	37.5'	388,432	35.24
"E" SW 10, NE 4, NW 3, SE 9,	6.2	2650-2665	8.0'	2648.5	1.0	50.75'	547,336	33.55
"F" SW 3, SE 4, NW 3,	8.3	2640-2667	6.0'	2640	1.0	13.5'	549,543	31.07
"G" SE 3, NE of SW 3,	26.3	2640-2750	10.25'	2640	1.0	55'	2,974,704	33.25
"H" NE 3, SE of NW 3, NE of NW 3,	25.4	2640-2750	8.6'	2640	1.0	55'	2,410,485	33.25
"L" SW 1,	9.1	2600-2700	8.0'	2635	0.65	32.5'	461,263	31.16
"M" SE 1, SW 6,	28.4	2600-2700	8.6'	2627	0.73	36.5'	1,964,892	31.16
"N" NE 1, SW 7,	5.3	2650-2700	8.0'	2627	1.0	36.5'	467,884	31.16
Sub-total							<u>17,065,074</u>	

TABLE I (continued)

<u>Location</u> <u>Area Description</u>	<u>Map Area</u> <u>Sq. Inches</u>	<u>Contour</u> <u>Interval</u>	<u>Average</u> <u>Thickness</u>	<u>Average Top</u> <u>Elevation</u>	<u>Area</u> <u>Factor</u>	<u>Average</u> <u>Overburden</u>	<u>Tonnage</u>	<u>Average</u> <u>Grade Iron</u>
<u>Twp. 87-Rge. 7 - W.6 M.</u>								
"I" NW 35, NE 34,	20.6	2600-2750	9.5'	2623	0.84	63.5'	1,813,933	33.11
"J" NE 35,	14.3	2600-2750	8.0'	2627.5	0.81	61.25'	1,022,503	33.11
"K" NW 35,	4.8	2600-2750	8.0'	2626	0.82	62'	<u>347,381</u>	33.11
Sub-total							<u>3,183,817</u>	
<u>Twp. 88-Rge 6- W.6M.</u>								
"Q" NW 5,	18.7	2600-2700	8'	2630	.70	35.0'	1,155,585	31.07
"R" SW 5, SE 5,	42.1	2600-2700	6'	2615	.85	42.5'	2,369,324	31.07
"S" SW 4,	11.4	2600-2700	5.5'	2615	.85	42.5'	588,055	31.33
"T" SE 4,	16.2	2600-2700	6'	2616	.84	42.0'	900,897	31.33
"U" SW 3,	12.4	2600-2700	4'	2611	.89	44.5'	<u>487,084</u>	33.5
Sub-total							5,500,945	

TOTAL POSITIVE RESERVES - 25,749,836 TONS

TABLE 2

15

TONNAGE AND GRADE ESTIMATES - PROBABLE ADDITIONAL RESERVES

<u>Location</u> <u>Area Description</u>	<u>Map Area</u> <u>Sq. Inches</u>	<u>Contour</u> <u>Interval</u>	<u>Average</u> <u>Thickness</u>	<u>Average Top</u> <u>Elevation</u>	<u>Area</u> <u>Factor</u>	<u>Average</u> <u>Overburden</u>	<u>Tonnage</u>
<u>Twp. 88-Rge. 6 W. 6 M.</u>							
"O" SW 7,	9.2	2678-2756	7'	2658	1.0	46'	710,654
"P" SE 7,	24.05	2631-2761	6'	2631	1.0	65'	1,592,350
"Q" NW 5,	24.31	2630-2760	8'	2630	1.0	65'	2,146,086
"R" SW 5, SE 5,	54.73	2615-2745	6'	2615	1.0	65'	3,623,673
"S" SW 4,	14.82	2615-2745	5.5'	2615	1.0	65'	899,462
"T" SE 4,	21.06	2616-2746	6'	2616	1.0	65'	1,394,382
"U" SW 3,	16.12	2611-2741	4'	2611	1.0	65'	711,536
Total							11,078,143
Less Positive Reserves							5,500,945
Probable Additional Reserves							5,577,198
<u>Twp. 88-Rge. 7 - W. 6 M.</u>							
"L" SW 1.	21.1	2600-2750	8'	2635	0.76	57.5	1,415,569
"M" SE 1, SW 6,	30.4	2600-2740	8.6'	2627	0.80	56.5	2,307,970
"N" NE 1, SW 7,	20.6	2650-2750	8.0'	2627	1.0	61.5	1,818,568
Total							5,542,107
Less Positive Reserves							2,894,039
Probable Additional Reserves							2,648,068

TOTAL PROBABLE ADDITIONAL RESERVES - 8,225,266 TONS

APPENDIX "A"

Geomorphology of the Southern Slopes of Clear Hills, Alberta

by L. A. Bayrock

Research Council of Alberta

The Clear Hills are made up of Upper Cretaceous mon-tmorillonitic, marine and brackish water deposits capped by glacial deposits comprised mainly of till. The till averages from about 10 to 20 feet in thickness. Glacio-lacustrine and recent lacustrine sediments mantle the lowlands to the south of the Clear Hills. The thickness of the lacustrine deposits is not expected to exceed ten feet. Glacial deposits are generally thin and do not obscure the underlying bedrock topography.

The bedrock topography of the southern part of the Clear Hills can be described as hilly bearing signs of a pre-last glaciation bad-land type of erosion. Figure 1 shows a hypothetical type of bedrock topography of the southern flanks of the Clear Hills. The valleys between the hills are wide and flat. The slopes of the hills are steep and terminate abruptly at the bottom and the top. The hilltops are generally level.

Glaciation did not alter the slopes and shapes of the hills to any significant degree except for deposition of till and glacio-lacustrine sediments.

After glaciation a warm semi-arid type of climate produced some rejuvenation of badland type of erosion in places on a minor scale

and mainly was limited to gully formation. Extensive alluvial fans at heads of gullies were produced at this time. Alluvial fans are present throughout the area at the bottom of now stable slopes. It is expected to find as much as forty feet of alluvial fan material in places, but on the average alluvial fans should average from 10 to 15 feet in thickness. It was also noted that alluvial fans usually do not extend more than 300 feet beyond the base of the hills. Figure II shows a hypothetical relationship of alluvial fans to hills in the area. The post-glacial period of alluvial fan formation and badland type of erosion was followed by a period of extensive slumping which in some places approached land sliding. Slumping is a common phenomenon in Alberta and it usually occurs on steep slopes developed on montmorillonitic bedrock of shale or sandy shale mechanical composition.

Slumping of the southern part of the Clear Hills can be subdivided into two groups: (a) "landslide" - like slumping, and (b) local slumping. The "landslide" - like slumping covers most of the area from the high crest of the Clear Hills to the southern limit of the Hills. This "landslide" slumping probably took place all at one time when the whole of the southern slope of the Hills failed mechanically and the debris moved downslope as a semi-liquid mass overrunning and covering smaller hills in its wake. The movement of the debris was between landsliding and slumping, as large discrete slump blocks can be easily recognized, but at the very front of the moving mass there was considerable mixing of the debris to qualify for the term "landsliding". This "landslide" moved down in large lobes with an easily recognizable front. The front of it has been outlined on photographs. Figure 3 shows a hypothetical relation of the "landslide"

to the underlying deposits. This "landslide" is up to 2 miles in width in places.

Local landsliding took place on small hills not overrun by the large "landslides". It occurs on most of the hill slopes and can be easily recognized on aerial photography by a semi-concentric step-like appearance of the hill slopes. This local landsliding is characterized by only a little churning of the rock mass involved and considerable displacement on the average was from about 100 to 400 feet and vertical from 10 to 40 feet. Some backward rotation of the individual slump blocks can be observed on aerial photographs. Some sections through such slumps may show undisturbed strata usually with more than average dips.

Undermining, even on a small scale, of either of the mass-movement materials ("landslide" or local slump) should invariably lead to further landsliding or slumping and if slide would be avoided great care and modern practices of landsliding and slumping prevention should be employed.

Solifluction, cryofluction, and soil creep materials are expected to cap all of the slopes of the area. The maximum depth of these materials on steep slopes is not expected to exceed 15 feet and should average about 5 feet in thickness.

February 15th, 1960

APPENDIX "A"

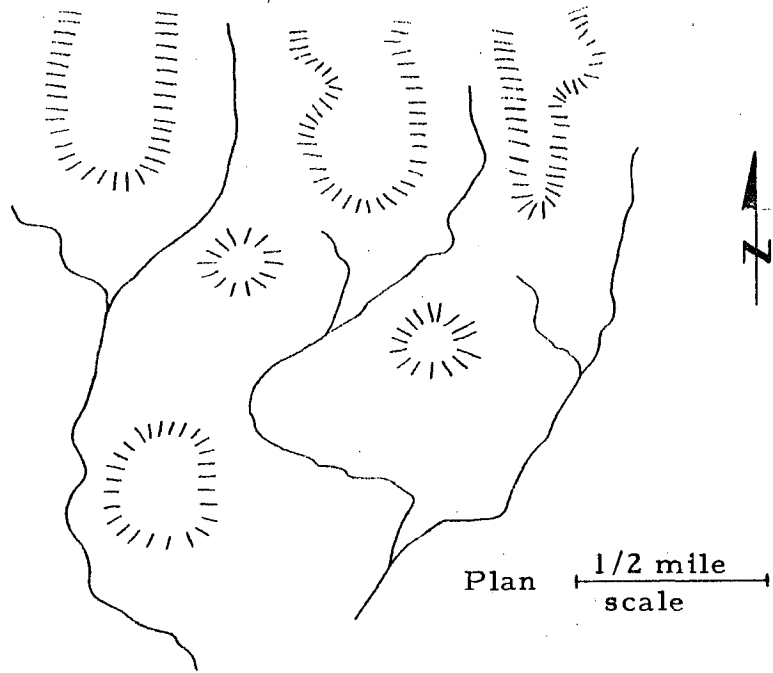


Fig. I Hypothetical land forms of southern Clear Hills before last glaciation.

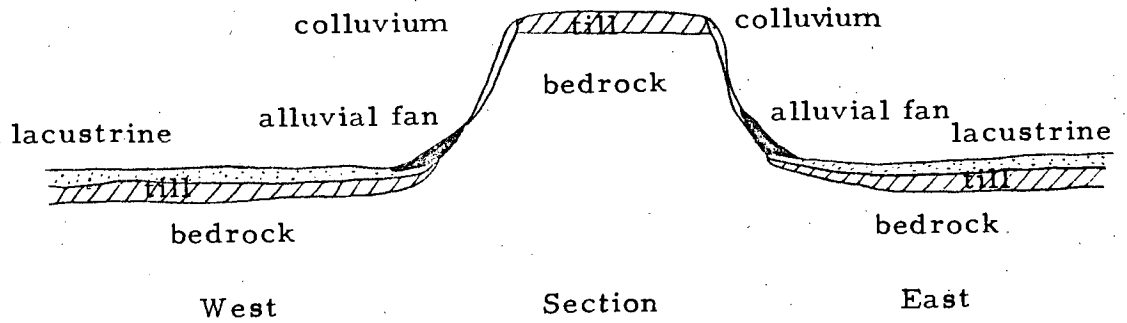


Fig. II Hypothetical relation of surface deposits (vertical scale greatly exaggerated)

APPENDIX "A"

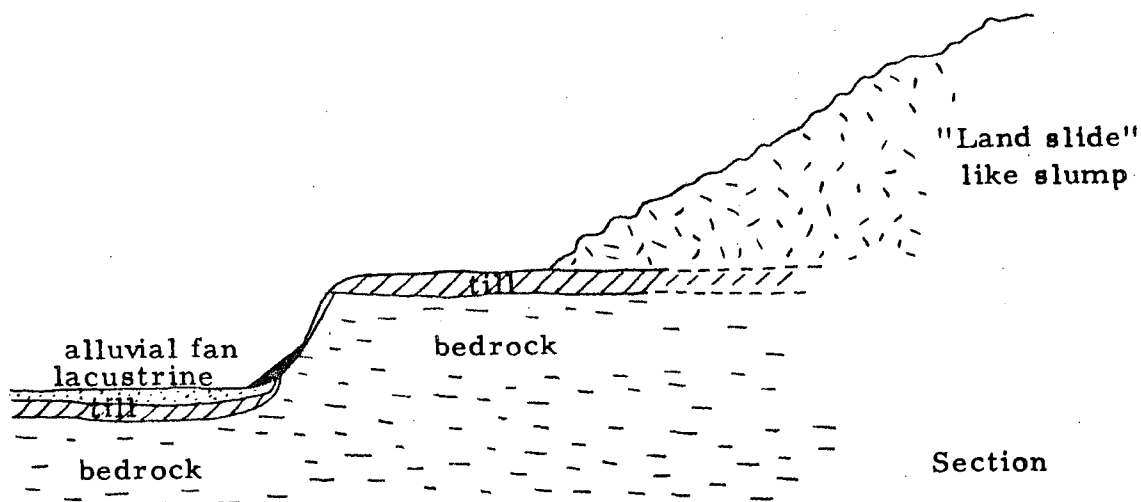


Fig. III Hypothetical relation of "Land Slide" like slump to other deposits.

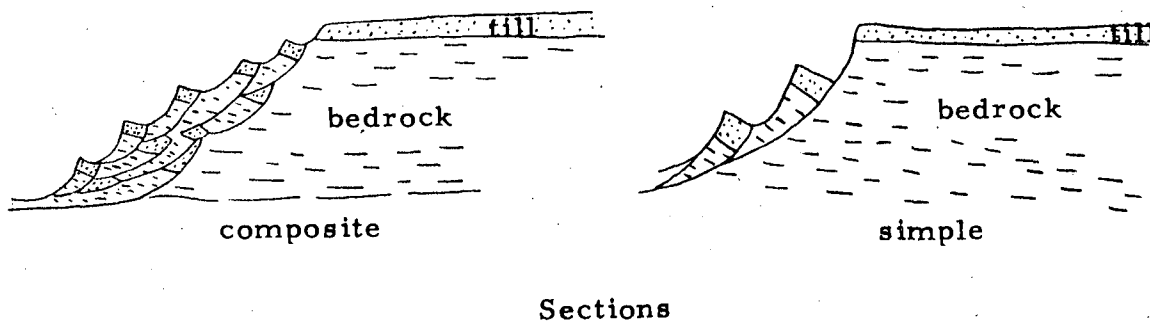
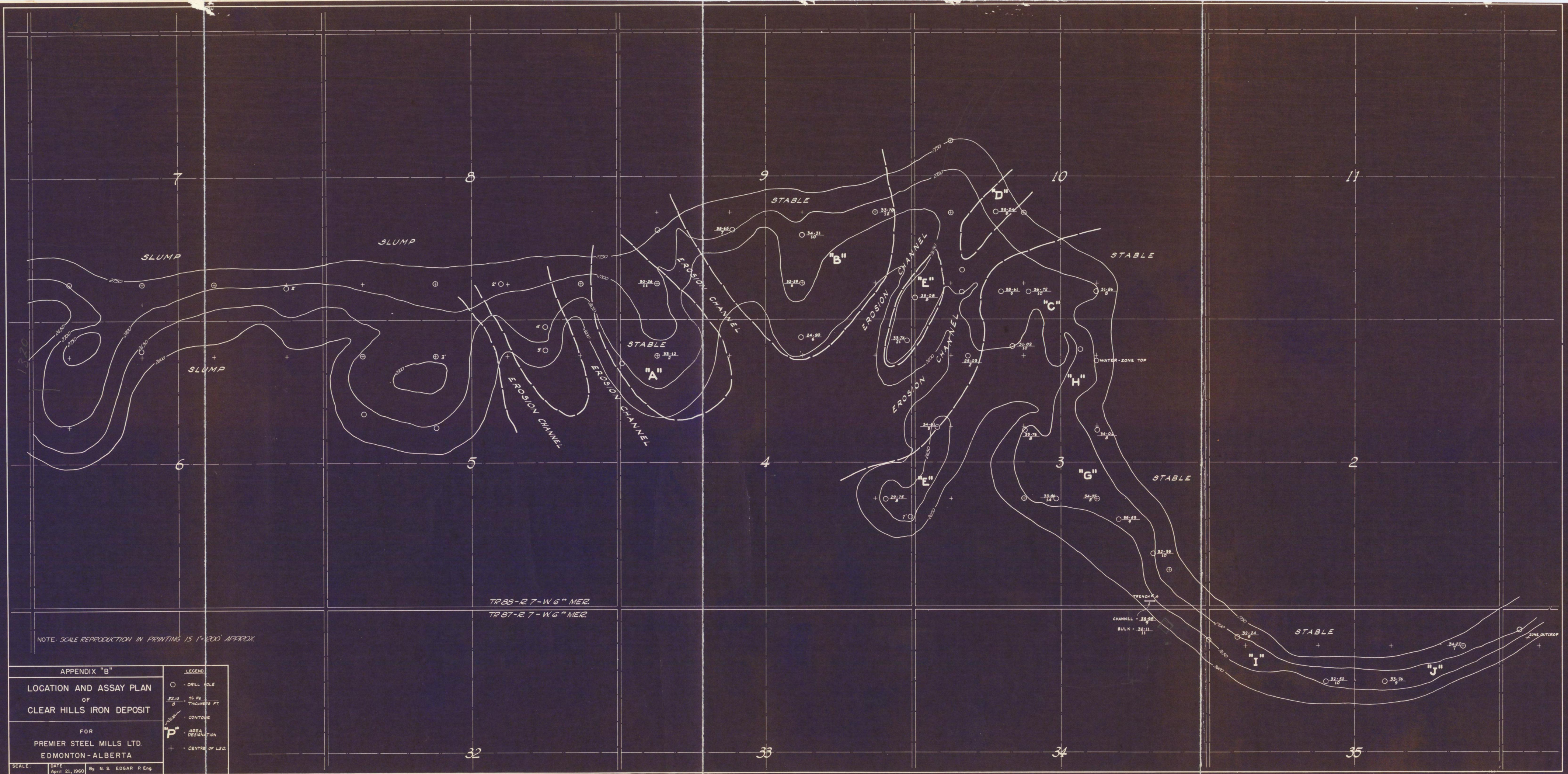


Fig. IV Composite and simple local slumps.

1220
2440



TP 88-R 7-W 6" MEER
TP 87-R 7-W 6" MEER

APPENDIX "B"
LOCATION AND ASSAY PLAN
OF
CLEAR HILLS IRON DEPOSIT
FOR
PREMIER STEEL MILLS LTD.
EDMONTON - ALBERTA

LEGEND
○ DRILL HOLE
32.10 36.78
THICKNESS FT.
--- CONTOUR
"P" AREA
RESERVATION
+ CENTRE OF L.S.

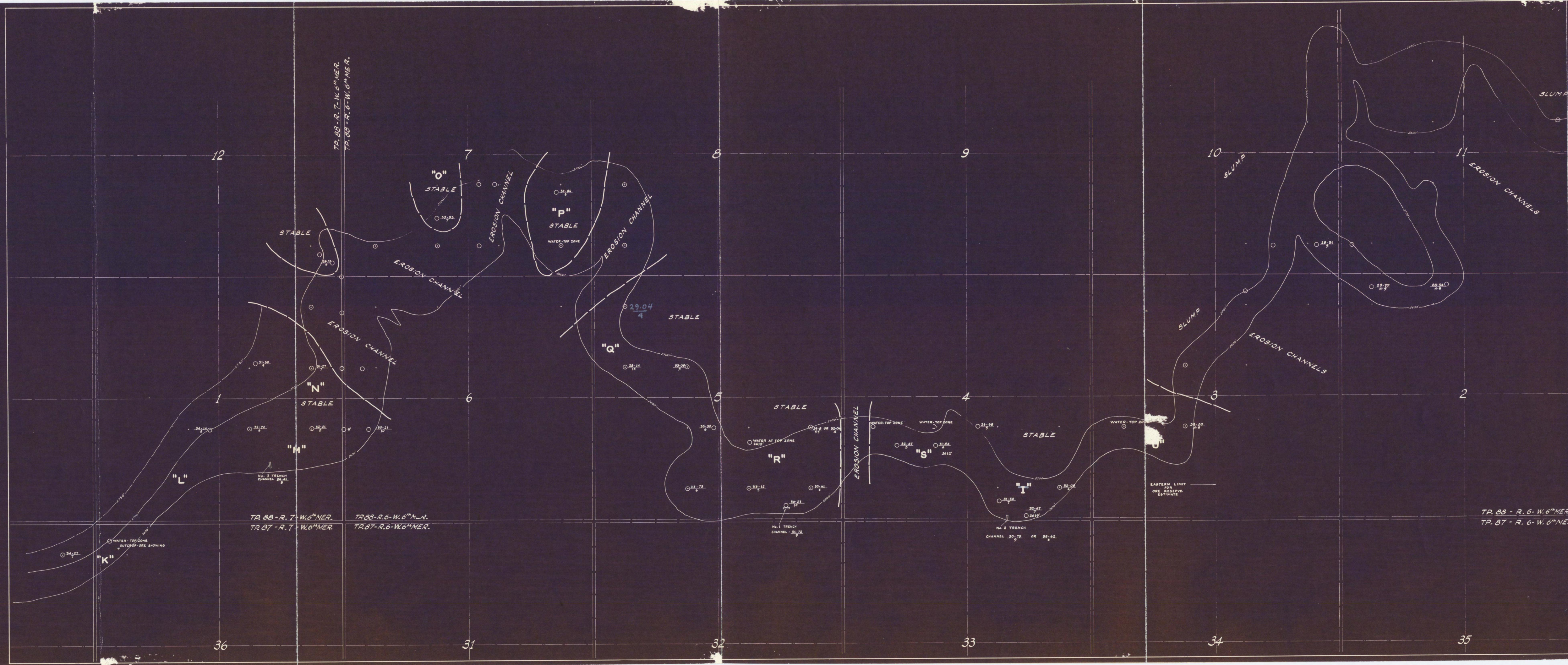
SCALE: DATE: April 21, 1960 By: N. S. EDGAR P. Eng.

32

33

34

35



TP 88-R.7-W.6"MER.
TP 87-R.7-W.6"MER.

TP 88-R.7-W.6"MER.
TP 88-R.6-W.6"MER.

TP 88-R.6-W.6"MER.
TP 87-R.6-W.6"MER.

NOTE: SCALE REPRODUCTION IN PRINTING IS 1"=100' APPROX.

LEGEND		APPENDIX "B"	
○	DRILL HOLE	LOCATION AND ASSAY PLAN	
—	CONTOUR	OF	
—	EROSION CHANNEL	CLEAR HILLS IRON DEPOSIT	
—	WATER-TOP ZONE	FOR	
—	SLUMP	PREMIER STEEL MILLS LTD.	
—	STABLE	EDMONTON - ALBERTA	
+	CENTRE OF L.S.D.	SCALE: DATE: April 23, 1960 By N.S. EDGAR P.Eng.	

APPENDIX "C"

DRILL LOGS

APPENDIX "C"

UNSUCCESSFUL DRILL HOLE LOCATIONS

Township 88, Range 7, W. 6 M.

<u>LOCATION</u>		<u>ELEVATION</u>	<u>DEPTH</u>	<u>REMARKS</u>	
<u>Lsd.</u>	<u>Sec.</u>				
✓	9	1	2705	58'	Abandoned due to water
✓	10	1	2726	9'	Abandoned due to water
✓	6	3	2649	21'	Abandoned due to water
✓	6A	3	2652	21'	Abandoned due to water and gravel
✓	6B	3	2652	25'	Abandoned due to water
}	15A	3	2656.3	31'	Abandoned due to water
	15B	3	2708	66'	Abandoned due to water
✓	15	3	2707	68'	Abandoned due to water
✓	11	5	2642	30'	No intersection of ore zone
+	12	5	2643	40'	No intersection of ore zone
+	13	5	2654	50'	No intersection of ore zone
✓	14	6	2640	40'	No intersection of ore zone
✓	2	7	2708	90'	No intersection of ore zone
✓	3	7	2742	70'	Abandoned-water bearing sand
✓	3A	7	2695	90'	No intersection of ore zone
✓	4	7	2705	86'	Abandoned-caving gravel
✓	1	8	2682	81'	No intersection of ore zone
✓	3	8	2732	97'	No intersection of ore zone
✓	4	8	2706	77'	No intersection of ore zone
✓	5	9	2750	123'	No intersection of ore zone
✓	4	10	2657	22'	Ore from 17-22' no sample returns due to water
	4A	10	2673	35'	Green, shaly, oolitic material 27 - 28'
✓	5	10	2673	26'	Abandoned due to water
✓	5	10	2678	27'	Abandoned because of caving
✓	6	10	2673	69'	Abandoned due to water
}	12	10	2704	13'	Abandoned-gravel with water
	12	10	2721	18'	Abandoned-caving
	12	10	2751	25'	Abandoned-caving
S. E. Cor.					
		1	2665	44'	Abandoned due to gravel
✓	1	12	2660	70'	No intersection of ore zone
✓	13	36	2701	18'	Abandoned-caving
✓	13B	36	2729	97'	Abandoned due to water

APPENDIX "C"UNSUCCESSFUL DRILL HOLE LOCATIONSTownship 88, Range 6 W. 6 M.

<u>LOCATION</u>		<u>ELEVATION</u>	<u>DEPTH</u>	<u>REMARKS</u>
<u>Lsd.</u>	<u>Sec.</u>			
✓ 5	3	2666	60'	No sample returns due to water
✓ 11	3	2667	74'	No intersection of ore zone
✓ 15	3	2703	108'	No intersection of ore zone
✓ 5	4	2675	63'	Abandoned due to wet, sticky clay
✓ 6	4	2721	112'	No sample returns due to water
+ 7	5	2705	94'	Top of zone at 90'-abandoned due to water
✓ 12	6	2626	25'	No intersection of ore zone
✓ 12A	6	2655	60'	No intersection of ore zone
✓ 1	7	2647	16'	Top of ore zone at 16'-abandoned due to water
✓ 2	7	2650	60'	No intersection of ore zone
✓ 3	7	2659	74'	No intersection of ore zone
✓ 4	7	2696	35'	Abandoned due to water
✓ 7	7	2674	20'	No intersection of ore zone
✓ 4	8	2652	50'	No intersection of ore zone
✓ 5	8	2666	12'	Abandoned-due to water and fine gravel
✓ 4	11	2706		Abandoned-caving sand - 3 locations
✓ 9	11	2695	100'	No intersection of ore zone
- 12	12	2658	31'	Abandoned due to caving of wet sand and clay.

HOLE No. 13-2-88-6-6

DRILL LOG

HOLE No. 13-2-88-6-6 PAGE No. 1

LOCATION 350.9' North of Center of Lsd. ELEVATION 2634 DEPTH 32 ELEV. TOP ORE 2612

SAMPLES		DESCRIPTION	ANALYSIS											REMARKS	
From	To		From	To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O	Mg O		Average Iron
0	21	Brown gravelly clay													
21	22	Hard shale													
22	23	Rusty ferrug. matl.-few oolites & frag. shale	22	23	26.54										
23	24	Same	23	26.5	30.61	0.772	0.16	30.94	4.75	0.395	15.66	7.33	1.83	29.70	
24	24.5	Greenish oolitic zone with qtz. grains & rust						22.72						4.5	
24.5	25	" " " " " "													
25	25.5	" " " " rust matl.													
25.5	26	" " " " " "													
26	26.5	Same as above but fewer oolites, more qtz.													
26.5	27	Rusty sandy clay - grey color													
27	27.5	" " " " " "													
27.5	32	Hard shale - water at 32'													

HOLE No. 14-2-88-6-6

DRILL LOG

HOLE No. 14-2-88-6-6 PAGE No. 2

LOCATION 300' East & 393.3' North of Center ELEVATION 2653 DEPTH 50 ELEV. TOP ORE 2617

SAMPLES		DESCRIPTION	ANALYSIS of Lsd.											REMARKS	
From	To		From	To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O	Mg O		Average Iron
0	35	Brown gravelly clay													
35	36	Shale													
36	37	Rusty ferrug. matl. few oolites & qtz. frags.	36	37	25.74										
37	38	Highly oolitic Brown ore zone	37	40.5	29.09	0.693	0.13	25.40	5.12	0.159	14.56	4.51	1.65	28.34	
38	39	" " " " " "						28.49						4.5	
39	40	" " " " " "													
40	40.5	" " " " " "													
40.5	41	Rusty sandy shale or clay													
41	41.5	" " " " " "													
41.5	50	Grey clay, some sand & gravel													

DRILL LOG

 HOLE No. 6-3-88-6-6

 HOLE No. 6-3-88-6-6 PAGE No. 3

 LOCATION Center of Lsd.

 ELEVATION 2634 DEPTH 31 ELEV. TOP ORE 2615

SAMPLES		DESCRIPTION	ANALYSIS											REMARKS		
From	To		From	To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O	Mg O		Average Iron	
0	12	Hard dry grey clay. Rust zone at 12'														
12	19	Brown Clay														
19	20	Greenish brown solitic zone with bits of qtz. & clay	19	20	29.30			22.71								
20	21	Same	20	23	34.90	0.805	0.17	19.53	5.27	0.088	16.60	3.24	1.61	<u>33.50</u> 4		
21	22	Same														
22	23	Same														
23	24	Rusty Sandy mixture - 20% oolites, consid. qtz. & clay	23	25	21.29			44.04								
24	24.5	Similar and non-oolitic														
24.5	25.0	" " " "														
25.0	28.0	Rusty sandy clay-non oolitic														
28	31	Blue green clay														

DRILL LOG

 HOLE No. Comparison Trench 2

 HOLE No. Comparison Trench PAGE No. 4

 LOCATION 400' East of Trench 2

 ELEVATION 2639 DEPTH 29' ELEV. TOP ORE 2619

SAMPLES		DESCRIPTION	ANALYSIS											REMARKS		
From	To		From	To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O	Mg O		Average Iron	
0	20	Brown clay - a little gravelly														
20	21	Brown ferrug. oolitic matl.-some shale	20	21	26.79			31.46								
21	22	Brown oolitic ore zone - white calc. specks	21	27	33.65	0.681	0.23	22.70	6.05	0.275	15.63	3.91	1.37	<u>32.67</u> 71	Comparison with channel samples in Trench No. 2	
22	23	Highly oolitic Brown ore zone														
23	24	" " " " "														
24	25	" " " " "														
25	26	" " " " " green oolites														
26	27	" " " " " some clay														
27	29	Green - grey clay or shale												<u>30.75</u> 91	<u>32.67</u> 71	Channel Drill Hole

HOLE No. 1-4-88-6-6

DRILL LOG

HOLE No. 1-4-88-6-6 PAGE No. 5

LOCATION Center of Lsd.

ELEVATION 2653 DEPTH 46 ELEV. TOP ORE 2611

SAMPLES		DESCRIPTION	ANALYSIS											REMARKS	
From	To		From	To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O	Mg O		Average Iron
0	10	Brown clay & gravel													
10	40	Damp blue-grey clay-gypsum xtls. @ 16'													
40	40.5	Grey shale													
40.5	41.5	Rusty limonitic, oolitic, frag's grey shale & qtz.	40.5	41.5	28.01			25.05							
41.5	42.5	Greenish oolitic ore zone "	41.5	46.0	32.90	0.786	0.12	19.17	4.95	0.165	18.40	3.80	1.62	<u>32.08</u> 6	
42.5	43.5	Same - more oolitic													
43.5	44.5	Same - highly oolitic													
44.5	45.5	Same -													
45.5	46	Same - plus bits green clay characteristic of base zone. Water encountered at 46' and hole abandoned.													

HOLE No. 2-4-88-6-6

DRILL LOG

HOLE No. 2-4-88-6-6 PAGE No. 6

LOCATION 300' South of Center Lsd.

ELEVATION 2630 DEPTH 21 ELEV. TOP ORE 2621

SAMPLES		DESCRIPTION	ANALYSIS											REMARKS	
From	To		From	To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O	Mg O		Average Iron
0	3	Brown clay & coarse gravel													
3	9	Brown hard clay													
9	10	Rusty-few oolites - bits grey shale & qtz.	9	10	28.41			33.17							
10	11	Brown oolitic ore zone - qtz. grains & white calc. matl.	10	16	32.02	0.763	0.13	26.24	4.79	0.071	14.34	4.30	0.91	<u>31.50</u> 7	
11	12	Highly oolitic Brown ore zone	16	18.5	15.05			58.89							
12	13	"													
13	14	"													
14	15	"													
15	16	"													
16	16.5	Rusty sand with grey clay													
16.5	17.0	Similar but more clay, est. 40%													
17.0	17.5	Rusty sand and clay													
17.5	18.0	" " "													
18.0	18.5	" " "													
18.5	21	Green-grey shale or clay													

HOLE No. 5A-4-88-6-6

DRILL LOG

HOLE No. 5A-4-88-6-6 PAGE No. 7

LOCATION 450' East and 410' South of Center ELEVATION 2648 DEPTH 38' ELEV. TOP ORE 2618

SAMPLES		ANALYSIS of Lsd.													REMARKS
From	To	DESCRIPTION	From	To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O	Mg O	Average Iron	
0	14	Brown clay - damp													
14	28	Grey clay													
28	30	Hard grey shale													
30	31	Rusty greenish oolitic matl. with bits shale	30	31	32.09										
31	32	Highly oolitic greenish brown ore zone	31	35	32.57	0.618	0.19	22.29	5.64	0.285	15.50	4.10	1.52	<u>32.47</u>	
32	33	" " " "						22.74						5	
33	34	" " " "													
34	35	" " " "													
35	36	- Green sandy clay - non oolitic													
36	38	Shale													

HOLE No. 6A-4-88-6-6

DRILL LOG

HOLE No. 6A-4-88-6-6 PAGE No. 8

LOCATION 30' West and 420' South of Center ELEVATION 2646 DEPTH 42 ELEV. TOP ORE 2612

SAMPLES		ANALYSIS of Lsd.													REMARKS
From	To	DESCRIPTION	From	To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O	Mg O	Average Iron	
0	14	Brown clay													
14	29	Grey silty clay - few gypsum xtls.													
29	34	Brown clay													
34	35	Rusty, oolitic, ferrug. matl. with bits shale	34	35	29.54			24.68							
35	36	Green-brown oolitic ore zone with bits grey clay	35	40	32.30	0.702	0.14	22.09	5.43	0.170	16.80	3.64	1.39	<u>31.84</u>	
36	37	" " " "	40	41	17.77									6	
37	38	" " " "													
38	39	" " " "													
39	40	" " " "													
40	41	Greenish sandy clay with few oolites													
41	42	Grey green shale													

HOLE No. 7-4-88-6-6

DRILL LOG

HOLE No. 7-4-88-6-6 PAGE No. 3

LOCATION 450' West of Center of Lsd.

ELEVATION 2712 DEPTH 98.5 ELEV. TOP ORE 2620

SAMPLES		ANALYSIS											REMARKS		
From	To	DESCRIPTION	From	To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O		Mg O	Average Iron
0	15	Brown clay and gravel													
15	19	Coarse gravel													
19	43	Brown clay, gravelly													
43	48	Coarse gravel & clay													
48	66	Silty grey clay, some gravel													
66	71	Gravel													
71	88	Grey silty clay													
88	93	Brown silty clay													
93	94	Green-grey-brown slightly oolitic material	93	94	29.38			31.21							
94	95	Green-brown highly oolitic with consid. qtz.	94	98	25.89	0.729	0.14	43.44	4.03	0.502	12.39	2.31	1.15	26.58	
95	96	" " " " " "													
96	97	" " " " " "													
97	98	Similar but about 30% green clay													
98	98.5	Rusty green clay.													

HOLE No. Comparison - No. 1 Trench

DRILL LOG

HOLE No. Comparison - No. 1 PAGE No. 10

LOCATION 10' North of No. 1 Trench

ELEVATION 2625 DEPTH 23 Trench ELEV. TOP ORE 2615

SAMPLES		ANALYSIS											REMARKS		
From	To	DESCRIPTION	From	To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O		Mg O	Average Iron
0	1	Rusty sand													
1	10	Brown clay, few pebbles													
10	11	Rusty, ferrug. material-few oolites	10	11	28.93			28.04							
11	12	Similar-more oolitic													
12	13	Rusty-brown, highly oolitic ore zone	11	21	30.38	0.624	0.16	29.43	5.08	0.062	13.80	3.48	0.99	30.23	Comparison with channel samples in Trench No. 1.
13	14	" " " " " "	21	23	18.65			48.01						10'	
14	15	" " " " " "													
15	16	" " " " " "													
16	17	Brown ferruginous but less oolitic													
17	18	" " " " " "													
18	19	Relatively few oolites, lt. buff limonite													
19	20	" " " " " "													
20	21	Rusty ferrug. - few oolites, bits green clay													
21	22	Green clay increasing - Base of zone													
22	23	Green clay with bits rust													

HOLE No. 1-5-88-6-6

DRILL LOG

HOLE No. 1-5-88-6-6 PAGE No. 11

LOCATION Center of Lsd.

ELEVATION 2656 DEPTH 49' ELEV. TOP ORE 2616

SAMPLES		DESCRIPTION	ANALYSIS											REMARKS		
From	To		From	To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O	Mg O		Average Iron	
0	21	Brown clay - gypsum xtls. at 20'														
21	37	Grey silty clay becoming gravelly 26-29 with few gypsum xtls.														
37	39	Brown slightly rusty clay														
39	40	Hard grey shale														
40	41	Rusty slightly oolitic with consid. clay	40	41	24.11											
41	42	Brown oolitic ore zone	41	46	31.91	0.678	0.15	37.67	4.34	0.106	15.03	3.16	1.29	<u>30.61</u>		
42	43	" " " " & white calcareous mat'l.						26.26								
43	44	" " " " & bits green clay														
44	45	" " " " & green clay & sand														
45	46	Out of zone - rusty sand & green clay														
46	47	Hard shale														
47	49															

HOLE No. 2-5-88-6-6

DRILL LOG

HOLE No. 2-5-88-6-6 PAGE No. 12

LOCATION Center of Lsd.

ELEVATION 2652 DEPTH 46' ELEV. TOP ORE 2617

SAMPLES		DESCRIPTION	ANALYSIS											REMARKS		
From	To		From	To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O	Mg O		Average Iron	
0	34	Brown sandy clay with fine gravel becoming heavier at 14'.														
34	35	Hard blue shale														
35	36	Highly oolitic-green oolites, bits clay, pebbles	35	36	34.54											
36	37	" " " " " "	36	40	32.77	0.607	0.15	20.28	5.94	0.077	16.71	3.38	1.49	<u>33.12</u>		
37	38	" " " " " "	40	42	25.02			23.73								
38	39	" " " " " "						33.27								
39	40	" " " " " "														
40	41	Greenish-grey sandy material & few oolites														
41	42	" " " " " "														
42	43	Mostly greenish-grey clay-few oolites														
43	46	Greenish-grey clay														

HOLE No. 3-5-88-6-6

DRILL LOG

HOLE No. 3-5-88-6-6 PAGE No. 13

LOCATION 60' East of Center of Lsd.

ELEVATION 2656 DEPTH 50' ELEV. TOP ORE 2619

SAMPLES		ANALYSIS											REMARKS		
From	To	DESCRIPTION	From	To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O		Mg O	Average Iron
0	12	Brown-grey clay with small amt gravel at 12' - Rusty zone 4"													
12	20	Hard Blue-grey clay, some gravel													
20	24	Brown clay													
24	37	Grey clay with gypsum xtls.													
37	38	Brown ferruginous material - non oolitic	37	39	25.34			29.22							
38	39	Similar but oolitic plus bits clay and sand	39	44	35.41	0.661	0.09	20.73	5.46	0.063	15.98	4.01	1.86	<u>33.73</u> 6'	
39	40	Brown oolitic ore zone	44	46	22.92			31.28							
40	41	" " " " " "													
41	42	Brownish-green oolitic ore zone													
42	43	" " " " " "													
43	44	Greenish clay with few oolites base zone													
44	45	" " " " " "													
45	46	" " " " " "													
46	50	Green clay													

HOLE No. 6-5-88-6-6

DRILL LOG

HOLE No. 6-5-88-6-6 PAGE No. 14

LOCATION 60' East of Center of Lsd.

ELEVATION 2654 DEPTH 42 ELEV. TOP ORE 2624

SAMPLES		ANALYSIS											REMARKS		
From	To	DESCRIPTION	From	To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O		Mg O	Average Iron
0	7	Brown Clay													
7	8	Rusty brown clay (Bog Iron?)													
8	13	Grey-green clay													
13	22	Brown-grey clay													
22	28	Dark greenish blue clay, few pebbles													
28	29	Brown clay													
29	30	Grey shale													
30	31	Brown rusty oolitic, few clay fragments	30	31	31.27			24.03							
31	32	Highly oolitic brown, rusty ore zone	31	36	36.11	0.68	0.11	22.80	4.50	0.06	13.72	3.15	0.99	<u>35.30</u> 6'	
32	33	" " " " " "	36	38	23.21			37.16							
33	34	" " " " " "													
34	35	" " " " " "													
35	36	" " " " " "													
36	37	Brown ferruginous, few oolites, some clay. green clay.													
37	38	" " " " " "													
38	42	Green clay													

HOLE No. 7-5-88-6-6

DRILL LOG

HOLE No. 7-5-88-6-6 PAGE No. 15

LOCATION 320'south of Center of Lsd.

ELEVATION 2705 DEPTH 94' ELEV. TOP ORE 2615

SAMPLES		DESCRIPTION	ANALYSIS											REMARKS		
From	To		From	To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O	Mg O		Average Iron	
0	4	Brown clay - 3" Rust @ 4'.														
4	10	Brown clay														
10	88	Dark grey silty clay with shell fragments and occasional pebble.														
88	90	Hard blue-grey shale.														
90	91	Greenish oolitic material - top of ore zone - not sampled														
91	92	At 92' encountered water, drilled to 94' and abandoned - no cuttings returned past 92'.														

HOLE No. 8-5-88-6-6

DRILL LOG

HOLE No. 8-5-88-6-6 PAGE No. 15

LOCATION Center of Lsd.

ELEVATION 2702 DEPTH 90 ELEV. TOP ORE 2621

SAMPLES		DESCRIPTION	ANALYSIS											REMARKS		
From	To		From	To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O	Mg O		Average Iron	
0	11	Brown clay with coarse gravel-damp at 11' water seam in yellow clay														
11	16	Brown clay with fine gravel - wet														
16	26	Dark grey clay, shell frag's. gypsum xtls.														
26	30	Brown gravelly clay - damp														
30	80	Blue-grey silty clay - becoming hard and dry at 45'														
80	81	Hard shale - water zone at top of iron bed	81	82	29.98											
81	82	Greenish-brown oolitic mat'l. cons. clay	82	85	33.76	0.666	0.16	27.10	4.88	0.101	16.75	3.17	1.91	29.3		Samples contaminated due to water at top of zone and resulting wall sloughing.
82	83	" " " " " "	85	86.5	23.79			22.09						5.5		
83	84	" " " " " "						45.90								
84	85	" " " " " "														
85	86	Oolitic sandy clay														
86	86.5	" " " " " "														
86.5	90	Shale														

HOLE No. 11-5-88-6-6

DRILL LOG

HOLE No. 11-5-88-6-6 PAGE No. 17

LOCATION 60' East of Center of Lsd. ELEVATION 2681 DEPTH 65 ELEV. TOP ORE 2625

SAMPLES		DESCRIPTION	ANALYSIS											REMARKS		
From	To		From	To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O	Mg O		Average Iron	
0	14	Brown clay occasional pebble														
14	20	" " with gravel														
20	55	Grey-Blue clay, gravel 48-50'														
55	56	Hard blue shale														
56	57	Brownish green oolitic zone	56	57	32.56			20.63								
57	58	" " highly oolitic, some clay	57	61	33.21	0.579	0.14	22.76	5.08	0.119	16.65	3.07	1.41	<u>33.08</u>		
58	59	" " " " " "												<u>57</u>		
59	60	" " " " " "														
60	61	" " " " " "														
61	63	Greenish rusty sandy zone														
63	65	" " " " & green clay														

HOLE No. 12-5-88-6-6

DRILL LOG

HOLE No. 12-5-88-6-6 PAGE No. 18

LOCATION Center of Lsd. ELEVATION 2650 DEPTH 34' ELEV. TOP ORE 2639

SAMPLES		DESCRIPTION	ANALYSIS											REMARKS		
From	To		From	To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O	Mg O		Average Iron	
0	7	Brown clay - gravelly from 5-7'														
7	11	Brown silty clay - 3" rust at 7'														
11	12	Brown ferrug. matl. - few oolites	11	12	27.89			36.67								
12	13	Same - Fragments gypsum and sand	12	20	23.53	0.602	0.16	36.00	6.10	0.146	13.97	4.29	1.37	<u>28.14</u>		
13	14	Oolitic ferrug. mat. & some grey clay	20	26	34.33	0.686	0.15	23.03	5.62	0.072	13.65	2.97	0.97	<u>15'</u>		
14	15	Rusty, oolitic, ferrug. zone	26	28.5	24.42			34.28								
15	16	" " " " " "														
16	17	" " " " " "														
17	18	" " " " " "														
18	19	" " " " " "														
19	20	" " " " " "														
20	21	Highly oolitic Brown ore zone														
21	22	" " " " " "														
22	23	" " " " " "														
23	24	" " " " " "														
24	25	" " " " " "														
25	26	" " " " " "														
26	26.5	Rusty oolitic material, 30% clay or shale														
26.5	27	same														
27	27.5	Similar material, 5-10% clay														
27.5	28	" " " " " "														
28	28.5	" " " " " "														
28.5	29	Greenish grey clay & ferrug. matl. few oolites														
29	29.5	Same														
29.5	30	Same														
30	30.5	Mostly clay - 80%														
30.5	31	" " " " - 90%														
31	34	Blue - green clay or shale														

HOLE No. 13-5-88-6-6

DRILL LOG

HOLE No. 13-5-88-6-6 PAGE No. 19

LOCATION Center of Lsd.

ELEVATION 2704 DEPTH 88' ELEV. TOP ORE 2625

SAMPLES		DESCRIPTION	ANALYSIS											REMARKS		
From	To		From	To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O	Mg O		Average Iron	
0	17	Brown gravelly clay - 1" rusty mat'l. at 10'														
17	29	Blue-grey silty clay, slightly plastic														
29	30	Shale														
30	44	Soft silty blue clay-few shell frag's														
44	78	Grey silty clay - hard and dry														
78	79	Hard shale														
79	80	Rusty clay - few oolites	80	84	29.09	0.702	0.15	29.34	4.38	0.267	15.12	3.12	1.79	29.09	All samples appear contaminated with wall material	
80	81	Green-brown oolitic mat'l. with clay	84	85	21.46			45.74						4		
81	82	" " " "														
82	83	Highly oolitic green-brown ore														
83	84	" " " "														
84	85	Greenish rusty sandy mat'l.														
85	86	Green clay, few bits rust														
86	88	Green shale or clay														

HOLE No. 5-6-88-6-6

DRILL LOG

HOLE No. 5-6-88-6-6 PAGE No. 20

LOCATION 317' West of center

ELEVATION 2640.5 DEPTH 27' ELEV. TOP ORE 2627

SAMPLES		DESCRIPTION	ANALYSIS											REMARKS		
From	To		From	To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O	Mg O		Average Iron	
0	14	Brown Clay														
14	15	Brown oolitic ore zone, few pebbles clay	14	15	26.84			37.73	5.15	0.11	12.94	3.67	0.83	30.21		
15	17	" " " "	15	23	30.63	0.595	0.18	31.58						10'		
17	19	Highly oolitic ore zone	23	24	30.22			28.69								
19	21	" " " "														
21	23	" " " " few grains qtz. & clay														
23	24	Brown oolitic ore with green clay typical base of zone														
24	27	Green clay or shale														

HOLE No. 6-7-88-6-6

DRILL LOG

HOLE No. 6-7-88-6-6 PAGE No. 21

LOCATION 740' South of Center of Lsd.

ELEVATION 2685 DEPTH 60' ELEV. TOP ORE 2658

From		To	DESCRIPTION	From		To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O	Mg O	Average Iron	REMARKS
From	To	From		To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O	Mg O	Average Iron			
0	26		Brown gravelly clay - wet														
26	27		Hard shale														
27	28		Rusty ferrug. oolitic zone - bits shale or clay	27	28	35.19			22.01	4.48	0.223	15.56	3.51	1.65	33.93		
28	29		Similar - more oolitic plus calc. matl.	28	34	33.73	0.624	0.21	23.25								
29	30		Greenish brown oolitic zone-few shale frags.														
30	31		" " " "														
31	32		Highly oolitic greenish ore zone.														
32	33		" " " "														
33	34		" " " "														
34	35		Green clay slightly rusty														
35	59		Grey to green shale or clay														
59	60		Hard shale.														
<p>Note - At 60' encountered water-cuttings returned were green with some oolitic material. Abandoned due to water</p>																	
<p>Possibly repetition of zone at this location due to faulting or slumping. Upper zone could represent "landslide" section. If this is the case, the elevation of lower zone would be 2625'.</p>																	

HOLE No. 8-7-88-6-6

DRILL LOG

HOLE No. 8-7-88-6-6 PAGE No. 22

LOCATION 210' South and 30' West of Center

ELEVATION 2683 DEPTH 49 ELEV. TOP ORE 2644

From		To	DESCRIPTION	From		To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O	Mg O	Average Iron	REMARKS
From	To	From		To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O	Mg O	Average Iron			
0	12		Brown gravelly clay - wet														
12	30		Grey clay - some gravel - wet														
			Water at 15' - required casing.														
30	38		Grey silty clay - dry														
38	39		Hard shale														
39	40		Rusty Shaly oolitic material	39	40	27.76			24.51								
40	41		Greenish brown oolite ore zone	40	45	31.48	0.639	0.18	24.24	4.09	0.19	16.27	4.50	2.09	30.86		
41	42		" " " " " "														
42	43		" " " " " " highly oolitic														
43	44		" " " " " "														
44	45		" " " " " "														
45	46		Greenish rusty sandy clay - out of zone														
46	49		Green-grey shale														

HOLE No. 1-10-88-6-6

DRILL LOG

HOLE No. 1-10-88-6-6 PAGE No. 23

LOCATION 50' South & 200' East of Center of Lsd. ELEVATION 2638 DEPTH 40' ELEV. TOP ORE 2614

SAMPLES		DESCRIPTION	ANALYSIS											REMARKS		
From	To		From	To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O	Mg O		Average Iron	
0	23	Grey - blue clay														
23	24	Grey shale														
24	25	Rusty ferrug. matl., bits grey shale	24	25	20.54											
25	26	" " " becoming oolitic	25	28	31.89	0.756	0.15	39.44	4.92	0.243	16.05	7.14	2.01	28.31		
26	27	Highly oolitic-green-brown-small amt. qtz.	28	29	25.34			21.23						5'		
27	28	Same						39.76								
28	28.5	Rusty sand-few oolites, much grey shale												or		
28.5	29	Same, with consid. qtz. frag's.														
29	29.5	Grey-green sandy matl. much clay												31.89		
29.5	30	Rusty sand with much grey clay												3'		
30	31	Same														
31	32	Mostly green clay at base of zone and qtz. grains														
32	40	Grey shale or clay														

HOLE No. 2-10-88-6-6

DRILL LOG

HOLE No. 2-10-88-6-6 PAGE No. 24

LOCATION 50' South and 600' East of Center of Lsd. ELEVATION 2688 DEPTH 78' ELEV. TOP ORE 2614

SAMPLES		DESCRIPTION	ANALYSIS											REMARKS		
From	To		From	To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O	Mg O		Average Iron	
0	38	Brown gravelly clay														
38	39	Gravel														
39	54	Clay with small boulders & pebbles														
54	62	Blue silty clay														
62	73	Brown sticky clay														
73	74	Grey shale														
74	75	Sandy ferrug. matl.-few oolites, much qtz.														
75	76	Similar - more qtz.														
76	77	Sandy clay - non oolitic														
77	78	Same - more clay														

HOLE No. 16-35-87-7-6

DRILL LOG

HOLE No. 16-35-87-7-6 PAGE No. 25

LOCATION Center of Lsd.

ELEVATION 2721 DEPTH 108 ELEV. TOP ORE 2620

SAMPLES		DESCRIPTION	ANALYSIS											REMARKS		
From	To		From	To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O	Mg O		Average Iron	
0	19	Brown clay - some gravel & sand														
19	45	Grey silty clay - wet from 26' - 29'														
45	47	Brown sand														
47	100	Grey silty clay, very dry														
100	101	Shale														
101	102	Greenish brown oolitic ore zone with some clay	101	102	35.06			17.80								
102	103	" " " " " " "	102	107	34.17	0.696	0.16	22.65	5.90	0.083	15.62	2.26	1.24	<u>34.27</u>		
103	104	" " " " " " "	107	108	30.03											
104	105	" " " " " " "														
105	106	" " " " some qtz.														
106	107	" " " " " " "														
107	108	" " " " and green clay														
		<p>Note: Water seam at 108' stopped recovery while still in ore.</p>														

HOLE No. 13-35-87-7-6

DRILL LOG

HOLE No. 13-35-87-7-6 PAGE No. 26

LOCATION 235' North West of Center of Lsd

ELEVATION 2683 DEPTH 70 ELEV. TOP ORE 2622

SAMPLES		DESCRIPTION	ANALYSIS											REMARKS		
From	To		From	To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O	Mg O		Average Iron	
0	17	Brown clay														
17	59	Grey silty clay														
59	61	Brown clay														
61	62	Brown, rusty ferrug. matl. 25% clay and sand	61	62	24.35			34.60								
62	63	Oolitic zone with clay and sand	62	66	30.84	0.607	0.15	27.26	5.77	0.103	15.36	2.69	1.22	<u>32.24</u>		
63	64	Greenish brown oolitic zone-small amt. clay and sand	66	70	35.63	0.812	0.23	23.10	5.40	0.085	14.05	2.43	0.98			
64	65	Same														
65	66	Same														
66	67	Rusty sand - few oolites														
67	68	Highly oolitic green-brown ore zone														
68	69	" " " " " " "														
69	70	" " " " " " "														
		<p>Note: Still in ore at 70' and water flow stopped returns</p>														

HOLE No. 14-35-87-7-6

DRILL LOG

HOLE No. 14-35-87-7-6 PAGE No. 27

LOCATION 660' South 150 East of Center of Lsd. ELEVATION 2667 DEPTH 54' ELEV. TOP ORE 2624

SAMPLES		DESCRIPTION	ANALYSIS											REMARKS	
From	To		From	To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O	Mg O		Average Iron
0	26	Brown Clay													
26	43	Grey silty clay-damp & sticky													
43	44	Rusty, brown oolitic with 10% shale	43	44	31.36			26.58							
44	45	Similar but more oolitic & few white specs.	44	47	31.86	0.795	0.18	26.10	6.19	0.07	13.24	3.23	0.93	<u>32.50</u>	
45	46	Oolitic brown ore zone with lt. buff limonite	47	51	34.10	0.709	0.15	27.15	5.55	0.05	12.09	1.90	0.67	<u>10'</u>	
46	47	Same	51	53	30.71			25.57							
47	48	Highly oolitic greenish brown ore zone													
48	49	Same with bits of sand and shale													
49	50	Highly oolitic greenish brown ore zone													
50	51	Same with buff limonite pebbles													
51	52	Grey, brown, oolitic and shaley													
52	53	Similar with increasing green shale													
53	54	Green shale													

HOLE No. 15-35-87-7-6

DRILL LOG

HOLE No. 15-35-87-7-6 PAGE No. 28

LOCATION 660' South and 100' West of ELEVATION 2677 DEPTH 55 ELEV. TOP ORE 2640

SAMPLES		DESCRIPTION	ANALYSIS											REMARKS	
From	To		From	To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O	Mg O		Average Iron
0	23	Brown clay													
23	37	Grey silty, damp clay													
37	38	Brown, ferrug. sandy clay, slightly oolitic													
38	39	" " " " " "	37	42	20.94			48.45							
39	40	" " " " " "	42	47	33.84	0.577	0.14	27.08	5.91	0.07	13.00	2.87	1.07	<u>33.76</u>	
40	41	" " " " " "	47	51	33.68	0.739	0.20	25.65	5.78	0.126	13.56	3.31	0.96	<u>9'</u>	
41	42	" " " " " "	51	55	25.72			30.80							
42	43	Highly oolitic ore zone, slightly sandy													
43	44	" " " " " "													
44	45	" " " " " "													
45	46	" " " " " "													
46	47	" " " " " "													
47	48	" " " " " "													
48	49	" " " " " "													
49	50	" " " " " with gypsum xtls.													
50	51	" " " " " "													
51	52	Brown ferrug. slightly oolitic sandy mat'l.													
52	53	" " " " " "													
53	54	" " " " " "													
54	55	" greenish clay or shale													

HOLE No. 6-1-88-7-6

DRILL LOG

HOLE No. 6-1-88-7-6 PAGE No. 23

LOCATION 440' East of Center

ELEVATION 2700 DEPTH 70' ELEV. TOP ORE 2644

SAMPLES		DESCRIPTION	ANALYSIS											REMARKS		
From	To		From	To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O	Mg O		Average Iron	
0	18	Brown sandy clay														
18	27	Blue silty clay, damp														
27	44	" " " dry 34-42 contains shell fragments, probably clams														
44	56	Soft grey shale														
56	57	Brown, oolitic ore, some clay-limonite	56	57	33.69			25.30								
57	59	Highly oolitic Brown ore with bits shale or clay	57	63	34.66	0.672	0.19	23.48	5.78	0.091	15.10	3.09	1.29	<u>34.14</u> 91		
			63	64	30.95			25.25								
59	61	Green oolitic ore														
61	63	" " "														
63	64	Mostly greenish clay with some oolites														
64	65	" " " Base of zone														
65	70	Grey Shale														

DRILL LOG

HOLE No. 7-1-88-7-6

HOLE No. 7-1-88-7-6 PAGE No. 30

LOCATION Center of Lsd.

ELEVATION 2698 DEPTH 80' ELEV. TOP ORE 2649

SAMPLES		DESCRIPTION	ANALYSIS											REMARKS		
From	To		From	To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O	Mg O		Average Iron	
0	16	Brown sandy clay														
16	28	Blue, silty clay, damp														
28	48.3	Blue-green clay, dry														
48.3	50.3	Green-black oolitic zone, small amt. clay	48.3	54.3	32.72	0.516	0.19	21.82	5.60	0.90	17.00	3.26	1.97	<u>32.72</u> 61		
50.3	52.3	" " " "														
52.3	54.3	" " " "														
54.3	56.3	" " " " increasing amt. clay	54.3	56.3	25.95			21.60								
56.3	60	Greenish Clay														
60	80	Grey Shale or clay												<u>30.75</u> 71		2" water seam at 69.5'

HOLE No. 8-1-88-7-6

DRILL LOG

HOLE No. 8-1-88-7-6 PAGE No. 31

LOCATION Center of Lsd. ELEVATION 2701 DEPTH 90' ELEV. TOP ORE 2646

SAMPLES		DESCRIPTION	ANALYSIS											REMARKS		
From	To		From	To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O	Mg O		Average Iron	
0	10	Brown Clay														
10	55	Alternate bands brown to grey clay														
55	56	Brown oolitic ore zone, consid. clay.	55	56	21.36			43.47								
56	58	Highly oolitic Brown ore zone, few bits shale	56	63	33.53	0.653	0.14	22.84	5.02	0.81	16.76	3.54	2.20	<u>32.01</u> 8'		
58	60	" " " " " "														
60	62	" " " " " some green oolitic														
62	63	Highly oolitic greenish brown ore, shaley														
63	68	Green clay or shale														
68	90	Black shale														

HOLE No. 9-1-88-7-6

DRILL LOG

HOLE No. 9-1-88-7-6 PAGE No. 32

LOCATION Center of Lsd. ELEVATION 2705 DEPTH 66' ELEV. TOP ORE 2648

SAMPLES		DESCRIPTION	ANALYSIS											REMARKS		
From	To		From	To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O	Mg O		Average Iron	
0	31	Brown sandy clay, wet & sticky at 8'														
31	57	Blue clay - damp. Thin shale cap at 57														
57	58	Highly oolitic greenish brown ore zone	57	62	32.41	0.623	0.17	22.58	5.11	0.081	16.55	3.45	1.80	<u>31.72</u> 7'	Possible top of zone mused in sampling. May be 6" to 1' thicker than indicated.	
58	59	" " " " " "	62	64	30.01			22.83								
59	60	" " " " " "														
60	61	" " " " " "														
61	62	" " " " " "														
62	63	Base of zone - mixture green clay & oolites														
63	64	Same														
64	66	Green Shale or clay														

HOLE No. 10-1-88-7-6

DRILL LOG

HOLE No. 10-1-88-7-6 PAGE No. 33

LOCATION 120' East and 100' North of
Center of Lsd.

ELEVATION 2740 DEPTH 100' ELEV. TOP ORE 2649

SAMPLES		DESCRIPTION	ANALYSIS											REMARKS		
From	To		From	To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O	Mg O		Average Iron	
0	7	Brown gravelly clay														
7	17	Gravel														
17	90	Grey silty clay														
90	91	Hard Shale														
91	92	Greenish Brown oolitic shaly zone	91	92	30.35											
92	93	Highly oolitic green-brown ore zone	92	98	32.93	0.63	0.19	25.66	5.23	0.088	16.30	3.22	1.66	31.39		
93	94	" " " " " "	98	100	27.30			22.81						9'		
94	95	" " " " " "						24.29								
95	96	" " " " " "														
96	97	Similar with increase in shale														
97	98	" " " " " " 10-15%														
98	99	Green clay or shale - few oolites														
99	100	" " " " " "														

HOLE No. IA-3-88-7-6

DRILL LOG

HOLE No. IA-3-88-7-6 PAGE No. 34

LOCATION 443' North West of Center of Lsd.

ELEVATION 2689 DEPTH 70.5 ELEV. TOP ORE 2631.5

SAMPLES		DESCRIPTION	ANALYSIS											REMARKS		
From	To		From	To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O	Mg O		Average Iron	
0	25	Brown Clay														
25	46	Blue-grey clay														
46	51	Shaly Brown clay and gravel														
51	54	Gravel and sand														
54	58.5	Grey silty shale														
58.5	59.5	Brown silty, shaly-very few oolites	58.5	59.5	25.02											
59.5	60.5	Similar but more oolites	59.5	67.5	32.61	0.644	0.16	36.05	4.91	0.112	13.86	2.64	1.24	32.35		
60.5	61.5	Brown to green highly oolitic ore zone						27.07						10'		
		bits clay	67.5	68.5	37.61			19.95								
61.5	62.5	" " " " " "														
62.5	63.5	" " " " " "														
63.5	64.5	" " " " " "														
64.5	65.5	" " " " " "														
65.5	66.5	" " " " " "														
66.5	67.5	" " " " " " & green clay														
67.5	68.5	" " " " " " more clay														
68.5	69.5	Base of zone-mixture green clay & oolites														
69.5	70.5	Grey-Black shale														
		<u>Note</u>														
		Hole 1-3-88-7-6 drilled at center of Lsd. encountered water at 87' depth and had to be abandoned.														
		Collar Elev. 2720'														
0	29	Brown clay														
29	37	Blue-grey silty clay or shale														
37	48	Brown Clay														
48	85	Blue-grey silty clay-some damp sections														
85	87	Coarse sand and gravel - water.														

HOLE No. 6C-3-88-7-6

DRILL LOG

HOLE No. 6C-88-7-6 PAGE No. 35LOCATION 559' East of Center of Lsd.ELEVATION 2657 DEPTH 28 ELEV. TOP ORE 2645

SAMPLES		DESCRIPTION	ANALYSIS											REMARKS	
From	To		From	To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O	Mg O		Average Iron
0	10	Sand and clay													
10	12	Brown clay													
12	13	Brown, highly oolitic ore zone	12	13	31.80			24.04							
13	14	" " " "	13	18	31.64	0.683	0.16	27.42	6.84	0.027	13.25	3.30	0.94	32.86	
14	15	" " " "	18	24	35.35	0.595	0.15	23.90	5.68	0.025	13.48	3.08	1.04	14.1	
15	16	" " " "	24	26	29.01			25.64							
16	17	" " " "													
17	18	Less oolitic-brown sandy mat'l.													
18	19	Highly oolitic brown ore zone													
19	20	" " " "													
20	21	" " " "													
21	22	" " " "													
22	23	" " " "													
23	24	" " " "													
24	25	Less oolitic and shaly mat'l.													
25	26	" " " "													
26	28	Shale													

HOLE No. 7-3-88-7-6

DRILL LOG

HOLE No. 7-3-88-7-6 PAGE No. 36LOCATION Center of Lsd.ELEVATION 2669 DEPTH 42' ELEV. TOP ORE 2638

SAMPLES		DESCRIPTION	ANALYSIS											REMARKS
From	To		From	To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O	Mg O	
0	11	Brown clay, wet below 3'												
11	28	Grey clay with sand & gravel												
28	31	Shale	31	32	32.00			25.38						
31	32	Highly oolitic greenish brown ore zone												
32	33	Same - less shale	32	38	34.43	0.654	0.16	24.70	5.72	0.068	14.32	2.57	0.92	34.07
33	34	Oolitic, slightly sandy zone-bits shale												8'
34	35	Brown oolitic zone-considerable shale	38	39	34.02			18.44						
35	36	Highly oolitic brown ore zone												
36	37	Same												
37	38	Greenish brown oolitic zone, bits green shale												
38	39	Green, sandy shale with few oolites												
39	40	Mostly green shale with few bits rusty mat'l.												

HOLE No. 7A-3-88-7-6

DRILL LOG

HOLE No. 7A-3-88-7-6 PAGE No. 37

LOCATION 535' South East of Lsd. 7

ELEVATION 2669 DEPTH 46 ELEV. TOP ORE 2636

SAMPLES		DESCRIPTION	ANALYSIS											REMARKS	
From	To		From	To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O	Mg O		Average Iron
0	11	Brown clay - some gravel													
11	13	Grey clay - damp													
13	31	" " some gravel													
31	34	Brown clay													
34	35	Shale													
35	36	Brown, highly oolitic ore zone, sandy	35	36	31.97			26.49							
36	37	" " " " " "	36	40	31.30	0.714	0.17	29.08	6.05	0.064	12.94	3.41	1.56	<u>35.53</u>	
37	38	" " " " " "	40	44	40.65	0.781	0.18	16.59	5.27	0.036	14.49	2.14	1.43	<u>91</u>	
38	39	" " " " " " clay and sand													
39	40	" " " " " "													
40	41	Greenish brown ore zone													
41	42	" " " " " "													
42	43	" " " " " "													
43	44	" " " " " " becoming shaly													
44	45	Shale													

HOLE No. 10-3-88-7-6

DRILL LOG

HOLE No. 10-3-88-7-6 PAGE No. 38

LOCATION 50' South of Center of Lsd.

ELEVATION 2719 DEPTH 91 ELEV. TOP ORE 2638

SAMPLES		DESCRIPTION	ANALYSIS											REMARKS	
From	To		From	To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O	Mg O		Average Iron
0	79	Grey clay, damp to 18', dry below													
79	81	Shale	81	84	28.45			29.38							
81	82	Shaley, green oolitic matl.-bits qtz. and gypsum	84	88	38.63	0.765	0.18	19.55	5.48	0.066	15.56	2.24	1.32	<u>34.02</u>	
			88	89	32.33			20.96						<u>81</u>	
82	83	Same, less shale													
83	84	Similar, more shale & qtz.													
84	85	Greenish, brown highly oolitic ore zone													
85	86	" " " " " "													
86	87	" " " " " "													
87	88	" " " " " "													
88	89	" " " " " " oolitic, shaley													
89	90	Green shale with few bits ferrug. matl. and sand													
90	91	Blue shale													

HOLE No. 11-3-88-7-6

DRILL LOG

HOLE No. 11-3-88-7-6 PAGE No. 39

LOCATION 50' South of Center of Lsd.

ELEVATION 2650 DEPTH 22' ELEV. TOP ORE 2641

SAMPLES		DESCRIPTION	ANALYSIS											REMARKS		
From	To		From	To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O	Mg O		Average Iron	
0	9	Brown & Grey clay with rust at 7'														
9	10	Brown ferrug. oolitic, few white specs.	9	10	23.47			39.85								
10	11	Greenish brown highly oolitic ore zone	10	15	37.36	0.722	0.24	21.62	6.11	0.025	14.14	2.80	0.77	32.76		
11	12	" " " " "	15	17	29.91			24.50						8'		
12	13	" " " " "												or		
13	14	Same, few bits qtz. & fine dusty green shale	17	20	25.68			29.40								
14	15	" " " " "												31.55		
15	16	Brown, oolitic, much silty matl. & sand & shale												11'		
16	17	Sandy, brown oolitic matl.														
17	18	Brown, sandy shale, slightly oolitic														
18	19	" " " " "														
19	20	" " " " "														
20	21	Brown, rusty, shaley sand														
21	22	Brown clay														

HOLE No. 12-3-88-7-6

DRILL LOG

HOLE No. 12-3-88-7-6 PAGE No. 40

LOCATION 250' West of Center of Lsd.

ELEVATION 2655 DEPTH 23' ELEV. TOP ORE 2638

SAMPLES		DESCRIPTION	ANALYSIS											REMARKS		
From	To		From	To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O	Mg O		Average Iron	
0	7	Grey clay														
7	9	Yellow-brown sand														
9	12	Brown clay														
12	17	Sandy clay														
17	18	Brown, oolitic sandy, shaly mat'l.	17	18	19.80			52.25								
18	19	Brown oolitic sandy ore zone	18	21	34.61	0.708	0.17	26.47	5.72	0.23	13.13	1.50	0.76	34.61		
19	20	" " " " "												3'		
20	21	" " " " "														
21	22	Brown Ferrug. Mat'l. with green clay														
22	23	Green clay or shale.														

HOLE No. 13-3-88-7-6

DRILL LOG

HOLE No. 13-3-88-7-6 PAGE No. 41

LOCATION 300' East of Center of Lsd. ELEVATION 2654 DEPTH 28 ELEV. TOP ORE 2639

SAMPLES		ANALYSIS													
From	To	DESCRIPTION	From	To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O	Mg O	Average Iron	REMARKS
0	15	Brown sandy clay													
15	16	Brown rusty, slightly oolitic mat'l. bits green clay						36.69						<u>25.03</u>	
16	17	" " " " " "	15	17	25.03									<u>21</u>	
17	18	Brown rusty sandy clay.													
18	19	" " " " " "													
19	28	Grey shale													

HOLE No. 14-3-88-7-6

DRILL LOG

HOLE No. 14-3-88-7-6 PAGE No. 42

LOCATION 200' West & 179' North of Center of Lsd. ELEVATION 2653 DEPTH 21 ELEV. TOP ORE 2642

SAMPLES		ANALYSIS													
From	To	DESCRIPTION	From	To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O	Mg O	Average Iron	REMARKS
0	11	Brown clay - few pebbles, damp													
11	12	Brown oolitic ore zone with shale & sand	11	12	26.50			28.81							
12	13	" " " " " "	12	15	27.06			26.97							
13	14	" " " " " "	15	21	33.76	0.787	0.19	22.90	6.50	0.08	13.55	2.74	0.61	<u>31.02</u>	
14	15	Rusty brown highly oolitic ore zone												<u>10'</u>	
15	16	" " " " " "													
16	17	" " " " " "													
17	18	" " " " " "													
18	19	" " " " " "													
19	20	" " " " " "													
20	21	" " " " " "													
		Water at 21' no further return of cuttings													

HOLE No. 8-4-88-7-6

DRILL LOG

HOLE No. 8-4-88-7-6 PAGE No. 43

LOCATION 200' East of Center of Lsd. ELEVATION 2666 DEPTH 39 ELEV. TOP ORE 2640

SAMPLES		DESCRIPTION	ANALYSIS											REMARKS		
From	To		From	To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O	Mg O		Average Iron	
0	4	Sandy clay, gravel														
4	9	Sand														
9	26	Sandy clay, damp														
26	27	Brown oolitic ferrug. mat'l. with shale and sand	26	27	23.90	0.571	0.14	42.53	6.25	0.252	12.85	2.92	1.45	26.44		
27	28	Brown highly oolitic ore zone	27	35	29.75			33.06						10		
28	29	" " " " " "	35	37	26.49			33.28								
29	30	" " " " " "														
30	31	" " " " " "														
31	32	" " " " " "														
32	33	" " " " " "														
33	34	" " " " " "														
34	35	Less oolitic, more clay														
35	36	" " " " " "														
36	37	" " " " " "														
37	39	Green shale or clay														

HOLE No. 13-4-88-7-6

DRILL LOG

HOLE No. 13-4-88-7-6 PAGE No. 44

LOCATION Center of Lsd. ELEVATION 2688 DEPTH 50 ELEV. TOP ORE 2648

SAMPLES		DESCRIPTION	ANALYSIS											REMARKS		
From	To		From	To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O	Mg O		Average Iron	
0	20	Brown clay														
20	38	Grey silty clay														
38	39.5	shale														
39.5	40	Grey clay	40	41	24.54			36.32						32.12		
40	41	Greenish brown sandy mat'l., oolitic	44	46	32.12			22.83						2		
41	42	Sand and shale														
42	44	Shale														
44	45	Greenish sandy mat'l., slightly oolitic														
45	46	" " " " oolitic														
46	47	Green shaly mat'l., some rust														
47	50	Shale														

HOLE No. 15-4-88-7-6

DRILL LOG

HOLE No. 15-4-88-7-6 PAGE No. 45

LOCATION 350' North of Center of Lsd.

ELEVATION 2638 DEPTH 22 ELEV. TOP ORE 2624

SAMPLES		DESCRIPTION	ANALYSIS											REMARKS			
From	To		From	To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O	Mg O		Average Iron		
0	8	Grey gravelly clay															
8	14	Grey silty clay - wet															
14	15	Brown ferrug., oolitic mat'l. with bits shale and white calc mat'l.	14	15	25.24	0.559	0.14	37.00	7.02	0.074	13.10	4.78	1.14	24.90 6'			
15	16	Sandy, clay with few oolites and rust	15	19	25.00												
16	17	Ferrug. slightly oolitic mat'l.	19	20	24.18												
17	18	" " " "															
18	19	" " " "															
19	20	Only slightly oolitic and shaly															
20	21	Sandy ferrug. clay-much gypsum															
21	22	Grey clay with much gypsum															

HOLE No. 16-4-88-7-6

DRILL LOG

HOLE No. 16-4-88-7-6 PAGE No. 46

LOCATION 590' East and 260' North of Center of Lsd.

ELEVATION 2657 DEPTH 30' ELEV. TOP ORE 2650

SAMPLES		DESCRIPTION	ANALYSIS											REMARKS			
From	To		From	To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O	Mg O		Average Iron		
0	7	Brown clay															
7	8	Highly oolitic brown ore - some sand & clay	7	8	29.85			30.31						33.74 21'			
8	9	" " " "	8	13	29.50	0.604	0.15	31.68	5.75	0.058	12.44	3.20	0.75				
9	10	" " " "	13	18	39.11	0.835	0.21	17.54	5.96	0.062	14.66	2.37	1.38				
10	11	" " " "	18	23	36.25	0.732	0.14	20.90	5.60	0.051	14.82	1.70	1.00				
11	12	" " " "	23	28	30.88	0.690	0.13	24.37	5.93	0.081	16.10	4.88	0.71				
12	13	" " " "															
13	14	" " " "															
14	15	" " " "															
15	16	" " " "															
16	17	" " " "															
17	18	" " " "															
18	19	" " " "															
19	20	" " " "															
20	21	" " " "															
21	22	" " " "															
22	23	" " " "															
23	24	" " " " with shale & rusty mat'l.															
24	25	" " " "															
25	26	" " " "															
26	27	" " " "															
27	28	" " " "															
28	30	Blue clay or shale															

Zone remarkably uniform throughout section

HOLE No. 14-5-88-7-6

DRILL LOG

HOLE No. 14-5-88-7-6 PAGE No. 47

LOCATION Center of Lsd.

ELEVATION 2688 DEPTH 50' ELEV. TOP ORE 2654

SAMPLES		DESCRIPTION	ANALYSIS											REMARKS	
From	To		From	To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O	Mg O		Average Iron
0	12	Brown gravelly clay													
12	33	Grey silty clay													
33	34	Shale													
34	35	Greenish oolitic sandy mat'l. with grey clay	34	37	27.43			26.96						27.43	
35	36	" " " " "												31	
36	37	" " " " "													
37	50	Blue shale													

HOLE No. 16-5-88-7-6

DRILL LOG

HOLE No. 16-5-88-7-6 PAGE No. 48

LOCATION 100' North & 660' West of Center

ELEVATION 2642 DEPTH 37 ELEV. TOP ORE 2627

SAMPLES		DESCRIPTION	ANALYSIS											REMARKS	
From	To		From	To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O	Mg O		Average Iron
0	3	Brown clay with sand and gravel													
3	9	Gravel, some sand													
9	15	Brown sandy clay													
15	16	Sandy ferrug. mat'l. - few oolites	15	18	11.85			65.07							
16	17	" " " " "													
17	18	" " " " "													
18	22	Sand & clay													
22	37	Blue green shale													

HOLE No. 16A-5-88-7-6

DRILL LOG

HOLE No. 16A-5-88-7-6 PAGE No. 49

LOCATION 660' West and 532' North of Center ELEVATION 2671 DEPTH 41 ELEV. TOP ORE 2645

SAMPLES		DESCRIPTION	ANALYSIS of Lsd.											REMARKS		
From	To		From	To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O	Mg O		Average Iron	
0	12	Gravelly brown clay														
12	23	Sand and gravel														
23	26	Sandy clay - damp														
26	27	Brown ferrug. sandy mat'l. slightly oolitic	26	30	14.28			58.27								
27	28	" " " " " "														
28	29	" " " " " "														
29	30	" " " " " "														
30	41	Blue green shale														

HOLE No. 2-8-88-7-6

DRILL LOG

HOLE No. 2-8-88-7-6 PAGE No. 50

LOCATION 150' West of Center of Lsd. ELEVATION 2718 DEPTH 70' ELEV. TOP ORE 2654

SAMPLES		DESCRIPTION	ANALYSIS											REMARKS		
From	To		From	To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O	Mg O		Average Iron	
0	4	Gravel with clay														
4	64	Grey silty clay, damp and sticky														
64	65	Brown, sandy clayish mat'l. slightly oolitic	64	66	28.08			30.05								
65	66	Green oolitic mat'l. with sand & clay														
66	67	Grey sandy shale														
67	70	Greenish grey shale														

HOLE No. 2-9-88-7-6

DRILL LOG

HOLE No. 2-9-88-7-6 PAGE No. 51

LOCATION Center of Lsd.

ELEVATION 2662 DEPTH 25 ELEV. TOP ORE 2647

SAMPLES		DESCRIPTION	ANALYSIS											REMARKS	
From	To		From	To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O	Mg O		Average Iron
0	15	Brown clay													
15	16	Brown oolitic zone with qtz. grains and white calc. mat'l.	15	16	30.84			32.54	6.04	0.079	14.97	4.85	0.98	<u>32.59</u> 6'	
16	17	Brown rusty highly oolitic ore zone	16	21	32.95	0.642	0.15	22.78							
17	18	" " " " " "	21	23	22.07			43.30							
18	19	" " " " " "	23	24	13.96			59.68							
19	20	" " " " " "											or		
20	21	Ferrug. mat'l. not very oolitic													
21	22	" " " " " shaly													
22	23	Brown ferrug. mat'l, with green clay											<u>29.96</u> 8'		
23	24	" " " " " "													
24	25	Blue green clay or shale													

HOLE No. 4-9-88-7-6

DRILL LOG

HOLE No. 4-9-88-7-6 PAGE No. 52

LOCATION Center of Lsd.

ELEVATION 2711 DEPTH 72 ELEV. TOP ORE 2652

SAMPLES		DESCRIPTION	ANALYSIS											REMARKS
From	To		From	To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O	Mg O	
0	16	Brown gravelly clay, gypsum xtls at 10'												
16	56	Grey silty clay or shale												
56	59	Brown sandy clay												
59	60	Brown ferrug. mat'l., slightly oolitic shaly	59	60	24.51			37.33						
60	61	" " " " " "	60	63	31.00	0.620	0.14	28.91	6.30	0.128	12.95	2.28	1.66	
61	62	Brown oolitic ore zone	63	65	16.72			55.98					<u>29.78</u> 12'	
62	63	" " " " " "	65	71	34.41	0.663	0.16	21.57	5.81	0.12	15.55	3.13	1.68	
63	64	Brown, sandy; only few oolites & white calc. mat.											or	
64	65	Rusty brown sandy shale - few oolites												
65	66	Greenish brown, highly oolitic ore zone											<u>30.26</u> 11'	
66	67	" " " " " "												
67	68	" " " " " "												
68	69	" " " " " "												
69	70	" " " " " "												
70	71	Brown ferrug. slightly oolitic												
71	72	Shale												

HOLE No. 6-9-88-7-6

DRILL LOG

HOLE No. 6-9-88-7-6 PAGE No. 53

LOCATION 50' East of Center of Lsd.

ELEVATION 2704 DEPTH 61 ELEV. TOP ORE 2655

SAMPLES		DESCRIPTION	ANALYSIS											REMARKS	
From	To		From	To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O	Mg O		Average Iron
0	30	Brown sandy clay - few pebbles													
30	47	Grey clay, damp & sticky													
47	48	Plastic yellow clay													
48	49	Shale													
49	50	Rusty brown sandy shaly mat'l.	50	52	14.45			58.53							
50	51	" " " " " slightly oolitic	52	57	37.72	0.942	0.18	21.68	5.53	0.054	12.90	2.43	0.72	35.65	
51	52	" " " " " "	57	59	30.48			28.58						7%	
52	53	Brown highly oolitic ore zone													
53	54	" " " " " "													
54	55	" " " " " "													
55	56	" " " " " "													
56	57	" " " " " "													
57	58	" " " " " & green clay													
58	59	" " " " " "													
59	60	Brown ferrug. mat'l. with green clay													
60	61	Shale													

HOLE No. 7-9-88-7-6

DRILL LOG

HOLE No. 7-9-88-7-6 PAGE No. 54

LOCATION 427' South of Center of Lsd.

ELEVATION 2672 DEPTH 26 ELEV. TOP ORE 2659

SAMPLES		DESCRIPTION	ANALYSIS											REMARKS	
From	To		From	To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O	Mg O		Average Iron
0	12	Brown clay, few pebbles, rust at 11'													
12	13	Shale													
13	14	Brown oolitic ferrug. mat'l.	13	14	34.69			25.43							
14	15	" " " " " "	14	17	28.24	0.896	0.14	32.48	5.95	0.035	10.82	4.39	0.57		
15	16	" " " " " , shaly	17	21	40.58	0.990	0.17	17.86	5.24	0.012	12.83	1.75	0.60	34.31	
16	17	" " " " " "	21	23	30.73			26.39						10'	
17	18	Highly oolitic, brown ore zone													
18	19	" " " " " "													
19	20	" " " " " "													
20	21	" " " " " "													
21	22	Ferrug. Mat'l., shaly, slightly oolitic													
22	23	" " " " " "													
23	26	Greenish blue clay or shale													

HOLE No. 8-9-88-7-6

DRILL LOG

HOLE No. 8-9-88-7-6 PAGE No. 55

LOCATION 40' South East of Center of Lsd.

ELEVATION 2668 DEPTH 27 ELEV. TOP ORE 2655

SAMPLES		DESCRIPTION	ANALYSIS											REMARKS		
From	To		From	To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O	Mg O		Average Iron	
0	13	Yellowish wet clay														
13	14	Brown oolitic mat'l., bits shale or clay	13	14	28.44	0.598	0.20	34.16	5.87	0.06	13.00	2.39	0.76			
14	15	Brown oolitic ore zone	14	17	30.96	0.791	0.18	26.60	6.22	0.084	12.72	3.30	1.16	33.78		
15	16	Highly " " " "	17	22	38.68	0.672	0.16	18.71	5.24	0.067	14.73	4.31	1.32	12'		
16	17	" " " "	22	25	30.23			23.35								
17	18	" " " "														
18	19	" " " "														
19	20	" " " "														
20	21	" " " "														
21	22	" " " "														
22	23	Brown ferrug. mat'l. - few oolites														
23	24	" " " " " " green shale														
24	25	" " " " " " plus green shale														
25	26	" " " " " "														

HOLE No. 2-10-88-7-6

DRILL LOG

HOLE No. 2-10-88-7-6 PAGE No. 56

LOCATION 150' South, 50' West of Center of Lsd.

ELEVATION 2692 DEPTH 55 ELEV. TOP ORE 2648

SAMPLES		DESCRIPTION	ANALYSIS											REMARKS		
From	To		From	To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O	Mg O		Average Iron	
0	43	Brown clay - very wet & sticky water horizon at 28'														
43	44	Shale														
44	45	Rusty clay, slightly oolitic														
45	46	Similar - more oolitic & sandy	45	48	27.14			29.88								
46	47	" " " "	48	52	35.60	0.693	0.13	19.49	5.31	0.076	15.42	2.47	1.48	31.86		
47	48	" " " "	52	53	31.13			20.90						8'		
48	49	Green-brown highly oolitic ore zone														
49	50	" " " "														
50	51	" " " "														
51	52	" " " "														
52	53	" " " "														
53	54	Green clay - base of zone														
54	55	" " " "														

HOLE No. 3-10-88-7-6

DRILL LOG

HOLE No. 3-10-88-7-6 PAGE No. 57

LOCATION 150' South and 100' East of Center ELEVATION 2676 DEPTH 37 ELEV. TOP ORE 2650

SAMPLES		ANALYSIS of Lsd.											REMARKS		
From	To	DESCRIPTION	From	To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O		Mg O	Average Iron
0	26	Brown clay - rusty at 7'													
26	27	Top of zone - wet - no sample return													
27	28	Highly oolitic brown ore zone-some qtz.	27	33	37.20	0.659	0.17	20.85	5.68	0.132	14.15	1.59	0.65	<u>36.72</u>	Zone probably 8' thick.
28	29	" " " " "	33	34	33.84			21.71							
29	30	" " " " "													
30	31	" " " " "													
31	32	" " " " " greenish brown color													
32	33	" " " " " (green clay present													
33	34	" " " " " Slightly oolitic green shale or clay													
34	35	" " " " " Green-blue clay or shale													
35	37														

HOLE No. 3A-10-88-7-6

DRILL LOG

HOLE No. 3A-10-88-7-6 PAGE No. 58

LOCATION 150' South & 399' West of Center ELEVATION 2664 DEPTH 25 ELEV. TOP ORE 2648

SAMPLES		ANALYSIS of Lsd.											REMARKS		
From	To	DESCRIPTION	From	To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O		Mg O	Average Iron
0	16	Brown clay													
16	17	Highly oolitic ore zone-Brownish green	16	21	38.61	0.738	0.22	17.97	6.15	0.033	13.49	2.11	0.68	<u>38.61</u>	Water at 21'-no sample 21-22 zone-probably 7' thick.
17	18	" " " " "													
18	19	" " " " "													
19	20	" " " " "													
20	21	" " " " "													
21	22	" " " " "													
22	23	" " " " "													
23	24	Green shale													
24	25	" " " " "													

HOLE No. 4W-10-88-7-6

DRILL LOG

HOLE No. 4W-10-88-7-6 PAGE No. 53

LOCATION 250' South and 660' West of Center ELEVATION 2662 DEPTH 27 ELEV. TOP ORE 2646

SAMPLES		ANALYSIS of Lsd. 10												REMARKS	
From	To	DESCRIPTION	From	To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O	Mg O		Average Iron
0	16	Gravel with small amounts clay													
16	17	Highly oolitic ore zone with shale, gypsum, sand	16	17	30.93										
17	18	Brown highly oolitic ore zone	17	21	35.55	0.725	0.18	22.91	5.49	0.011	14.22	3.05	1.02	$\frac{33.08}{8}$	
18	19	" " " " " "	21	24	30.51	0.692	0.15	25.58	6.96	0.053	16.16	4.38	1.71		
19	20	" " " " " "													
20	21	" " " " " "													
21	22	Brown ferrug. mat'l. less oolitic													
22	23	" " " " " "													
23	24	" " " " " "													
24	25	Base of zone - green shale and rust													
25	27	Shale													

HOLE No. 6A-10-88-7-6

DRILL LOG

HOLE No. 6A-10-88-7-6 PAGE No. 54

LOCATION 515' West of Center of Lsd. ELEVATION 2708 DEPTH 70' ELEV. TOP ORE 2649

SAMPLES		ANALYSIS												REMARKS
From	To	DESCRIPTION	From	To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O	Mg O	
0	11	Brown gravelly clay												
11	45	Brown silty clay, damp and sticky												
46	58	Grey silty clay, dry												
58	59	Shale												
59	60	Green-brown sandy oolitic mat'l., qtz. grains & white calc. mat'l.	59	60	31.61			22.87						
60	61	Same	60	67	35.76	0.70	0.17	18.21	6.06	0.115	16.06	2.75	0.79	$\frac{35.24}{8}$
61	62	" more oolitic												
62	63	Highly oolitic greenish ore zone												
63	64	" " " " " "												
64	65	" " " " " "												
65	66	" " " " " "												
66	67	" " " " " shaly												
67	68	Greenish clay or shale, few oolites												
68	69	" " " " " "												
69	70	Green shale or clay												

HOLE No. 1-12-88-7-6

DRILL LOG

HOLE No. 1-12-88-7-6 PAGE No. 81

LOCATION 460' East and 360' South of Center ELEVATION 2671 DEPTH 20' ELEV. TOP ORE 2661(?)

SAMPLES

ANALYSIS of Lsd.

From	To	DESCRIPTION	From	To	Iron	Phos.	Mang.	Silica	Alum.	Sulph.	Ignition Loss	Ca O	Mg O	Average Iron	REMARKS
0	10	Brown gravelly clay													
10	11	Bright orange - red matl. highly oolitic	10	12	29.21	0.662	0.24	34.14	5.45	0.037	12.20	1.76	0.86		
11	12	Same	12	14	28.26	0.640	0.21	33.30	5.98	0.114	12.89	2.09	1.10	<u>28.73</u>	
12	13	Brown Ferrug. matl. - few oolites												<u>4</u>	
13	14	Same - plus bits grey shale													
14	20	Damp brown clay - encountered water zone at 20' and abandoned													

APPENDIX "D"



Air Separator and Compressor at left.
Operator collecting cuttings with screen.



View showing orifice at top of
"sealing head". Samples collected
in buckets shown beside separator.

PEACE RIVER MINING & SMELTING LTD.

ECONOMIC MINERALS

FILE REPORT No.

FE-AE-C17(02)

P.O. Box 8000
EDMONTON, ALBERTA

304 Imperial Bank Bldg.,
Edmonton, Alberta,
August 13, 1962.

Director of Mineral Rights,
Department of Mines and Minerals,
Natural Resources Building,
Edmonton, Alberta.

Dear Sir:

Re: Iron Prospecting Permit No. 17

Reference is made to our request for the issuance of a lease on certain lands contained in the above named permit. Enclosed herewith are the following documents:

1. Statutory Declaration respecting expenditures made in the exploration of the permit area and in metallurgical investigations of the iron ore.
2. A Report on Iron Prospecting Permit No. 17, (Clear Hills Iron Deposit of Alberta) dated April 21, 1962 by N. S. Edgar, which deals with the permit area.
3. Plan showing lands contained in Iron Prospecting Permit No. 17, and location of the drill holes thereon.

These reports present the details of the drilling exploration work in the permit area and outlined ore reserves proven and probable, together with the logs of the holes drilled and the analyses of the ore sections.

In brief, the iron ore deposit consists of a flat lying oolitic sandstone bed of cretaceous age. The ore is principally composed of the minerals Goethite and limonite which are both hydrated oxides of iron.

The drilling of 130 cored holes has established ore reserves as follows:

DESCRIPTION

IN TOWNSHIP EIGHTY-EIGHT (88), RANGE SIX (6), WEST OF
THE SIXTH (6) MERIDIAN:

Sections Three (3) to Ten (10) inclusive
and Sections Fifteen (15) to Twenty-two
(22) inclusive;

AND

IN TOWNSHIP EIGHTY-SEVEN (87), RANGE SEVEN (7), WEST
OF THE SIXTH (6) MERIDIAN:

Sections Thirty-one (31) to Thirty-six
(36) inclusive;

AND

IN TOWNSHIP EIGHTY-EIGHT (88), RANGE SEVEN (7), WEST
OF THE SIXTH (6) MERIDIAN:

Sections One (1) to Eighteen (18)
inclusive;

AND

IN TOWNSHIP EIGHTY-SEVEN (87), RANGE EIGHT (8), WEST
OF THE SIXTH (6) MERIDIAN:

Sections Thirty-one (31) to Thirty-six
(36) inclusive;

AND

IN TOWNSHIP EIGHTY-EIGHT (88), RANGE EIGHT (8), WEST
OF THE SIXTH (6) MERIDIAN:

Sections One (1) to Twelve (12) inclusive;

AND

IN TOWNSHIP EIGHTY-SEVEN (87), RANGE NINE (9), WEST OF
THE SIXTH (6) MERIDIAN:

Sections Twenty-five (25) to Thirty-six
(36) inclusive;

AND

IN TOWNSHIP EIGHTY-EIGHT (88), RANGE NINE (9), WEST
OF THE SIXTH (6) MERIDIAN:

Sections One (1) to Six (6) inclusive;

AND

IN TOWNSHIP EIGHTY-SEVEN (87), RANGE TEN (10), WEST
OF THE SIXTH (6) MERIDIAN:

Sections Twenty-five (25) and Twenty-six
(26), the South half and North West quarter
of Section Twenty-seven (27) and Sections
Twenty-eight (28) to Thirty-six (36) inclusive;

AND

IN TOWNSHIP EIGHTY-EIGHT (88), RANGE TEN (10), WEST OF
THE SIXTH (6) MERIDIAN:

Sections One (1) to Eighteen (18) inclusive;

AND

IN TOWNSHIP EIGHTY-SEVEN (87), RANGE ELEVEN (11), WEST
OF THE SIXTH (6) MERIDIAN:

Section Nineteen (19) and Sections Thirty
(30) to Thirty-six (36) inclusive;

AND

IN TOWNSHIP EIGHTY-EIGHT (88), RANGE ELEVEN (11), WEST
OF THE SIXTH (6) MERIDIAN:

Sections One (1) to Twenty-four (24)
inclusive;

AND

IN TOWNSHIP EIGHTY-SEVEN (87), RANGE TWELVE (12), WEST
OF THE SIXTH (6) MERIDIAN:

Sections Twenty-three (23) to Twenty-six
(26) inclusive and Sections Thirty-five
(35) and Thirty-six (36);

AND

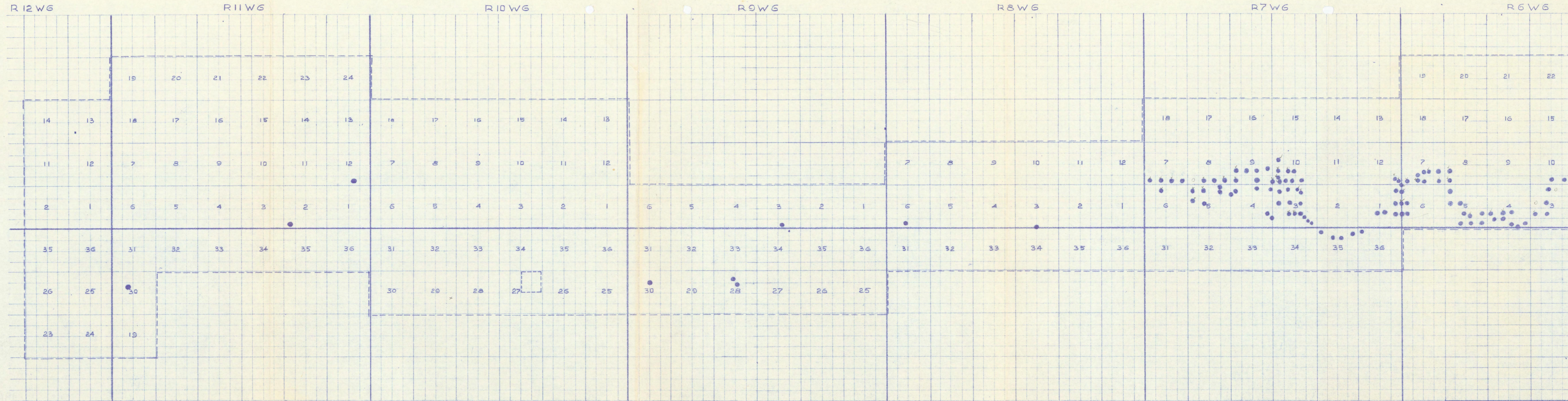
IN TOWNSHIP EIGHTY-EIGHT (88), RANGE TWELVE (12), WEST
OF THE SIXTH (6) MERIDIAN:

Sections One (1) and Two (2) and Sections
Eleven (11) to Fourteen (14) inclusive;

AND

All statutory road allowances and what would
be statutory road allowances if the lands were
surveyed pursuant to The Alberta Surveys Act,
lying within the outer limits of the above
described lands;

containing an area of Ninety-seven Thousand, Four Hundred
and Thirty (97,430) acres, more or less.



Scale 1"=1 mile

Legend:
 ----- Outline of Permit
 • Drill Hole

N.S. Edgar B.Sc. P.Eng. Edmonton - Alberta
 Outline of Iron Prospecting Permit No. 17.
 Drill Hole Locations.