

MAR 19640003: GORDONDALE

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19640003

ECONOMIC MINERALS

FILE REPORT No.

FE-AF-023(01)

IRON PROSPECTING

PERMIT NO. 23

GORDONDALE AREA

TECK CORPORATION LIMITED
P.O. BOX 694
CALGARY, ALBERTA

JANUARY 7th, 1964.

4495

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INTRODUCTION

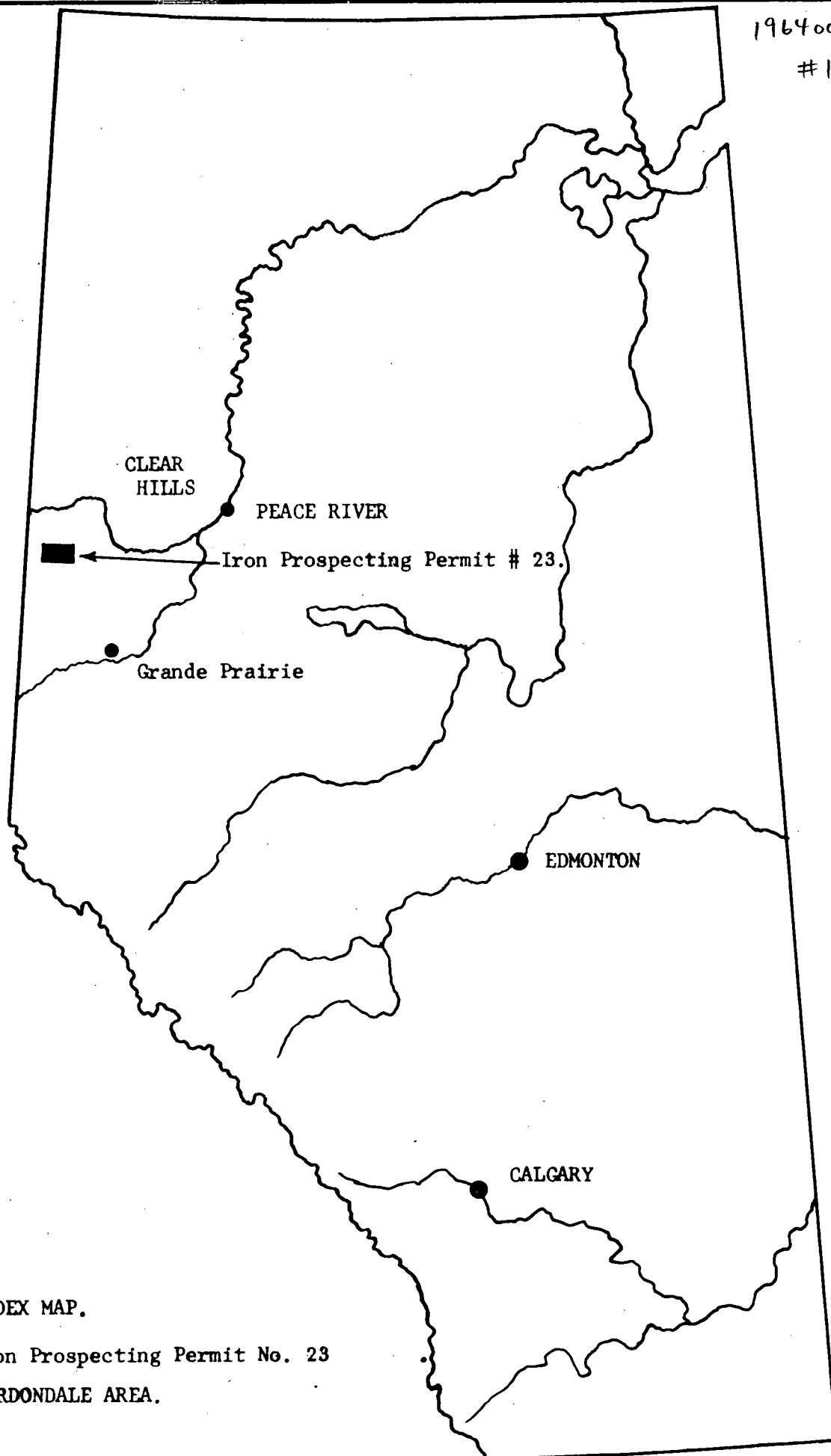
Iron Prospect Permit No. 23 was filed by Canadian Devonian Petroleums Limited, (now Teck Corporation Limited), on January 16, 1963, for the purpose of exploring for economic iron deposits in the Gordondale area of Alberta.

A reconnaissance of the area was conducted in October 1963, to examine all available outcrop relevant to the Permit area and to select locations that would be accessible to a truck-mounted auger drill. Twenty-six test holes were dug to examine the subsurface section on and near the Permit. The initial phase of the evaluation program involved the examination of outcrop and the digging of holes near iron deposits in Section 26 and 27, Township 79, Range 9, W6M. Subsequent holes were drilled on Permit No. 23 and were located as well as possible to prove the present or absence of iron over the Permit area. A third group of holes were drilled subsequent to the Permit area exploration in an attempt to determine regional distribution of the iron deposits based on impression of structure and stratigraphy gained by the early phases of the program. All samples from all of the auger holes were examined by microscope and described in detail. These descriptions, and summaries of same, are provided in this report and on the topographic map accompanying the report.

The reconnaissance project lasted a period of eight days and employed a geologist from the staff of Teck Corporation Limited plus a consultant engineer, plus one man who operated the truck-mounted auger drill. Three vehicles were utilized. The first was a standard automobile,

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#1



INDEX MAP.

Iron Prospecting Permit No. 23

GORDONDALE AREA.

for access to the area. The second vehicle, a four wheel drive landrover, was rented in Dawson Creek and was used for exploration of outcrops and access to areas along seismic lines and over rough or soggy roads. A three ton, single axle truck was the third vehicle; it carried the auger drill and was provided by Mobile Angers and Research of Edmonton, Alberta.

The auger drill was found to be a satisfactory method to recover samples at the surface of the soluble oolitic iron. In some instances it would be desirable to have a larger diameter auger with a hollow stem that would be unable to recovery of cores of the unconsolidated iron zone. This equipment is not available in Canada at this time. The auger drill used was effectively limited to a 50 foot depth because the penetration rates were drastically reduced below this point. The auger was used to drill a series of shallow holes on topographic slopes so that a continuous stratigraphic section of several hundred feet could be evaluated. On flat terrain it was found that the auger drill could penetrate to a depth of 90 to 100 feet dependent on the drillability of the section. If thin ironstone horizons were encountered below a depth of 40 feet, it was generally impossible to penetrate them.

In summary, the auger drill was found to be satisfactory for this type of exploration for a mineral that is soluble in water. The cost of a seismic rotary drill plus the fact that water is circulated in the drilling technique eliminated the consideration of this type of machine for this project. The dry sample aspect of the auger drill may make the machine applicable in the Gordondale area for exploration for water. It will be noted that there were several instances where water aquifer zones

were penetrated. On two instances the water entered the auger hole at a high pressure and could be seen and heard from the surface. The general impression gained from the inhabitants in the area was that water was very scarce and that drilling for water has not been successful in the past.

ACCESSIBILITY

Excellent Provincial Highways enable one to get to the Gordondale area from the larger settled areas of Alberta. Secondary municipal roads provide access to all four sides of Permit No. 23. Seismic lines through the Gordondale area allowed access to the major portion of the Permit. Two access routes, one north-south and east-west were particularly adequate for access. These seismic lines have been traveled during the past years by local inhabitants using vehicles to hunt for game and for commuting from one farm area to another.

The dry climate that we experience in October of the year proved to be very helpful as the single axle, three ton truck was able to gain access to the critical locations within the Permit area. Deep gullies in some instances cut the access routes, but served only as an inconvenience as either end of the route could be serviced by returning and approaching from another direction. Low swampy areas on the Permit could not be evaluated, but coincidentally these areas were interpreted to be of no value in that they were believed to rest stratigraphically below the horizon of the iron deposit.

The remnant high country is quite thickly forested with a mixture of deciduous and coniferous trees and tends to have a fairly high percentage

of swampy ground. During wet seasons or wet years travel cross country would prove to be quite difficult, even with four-wheel drive vehicles. The better drained, low flatlands are generally clear, or are being cleared, for farm purposes.

VEGETATION AND TOPOGRAPHY

The entire Permit area is covered with vegetation which varies from heavy deciduous and coniferous growth on the higher areas to the north and west to willow and swamp type of Vegetation in the central eastern portion. The Permit generally follows the configuration of a high remnant plateau that stands 300 to 400 feet above the general level of the surrounding agricultural community. The sediments in the area are essentially flat-lying and the differential erosion of these sediments is believed to be the direct cause of the flat topped meza type topography. Presumably the more resistive Bad Heart sandstone formation or some other similarly resistive formation, has just recently been eroded from the remnant highlands. At the present time there are very small areas that still have this resistive capping and consequently the mezas will be eroded at a relatively rapid rate as the tributaries from the Peace River continue to erode into the uplifted terrain. Highway 49 that runs between Spirit River and Baytree is in a position roughly coincident with a hinge line wherein the sediments in the subsurface begin to dip to the southwest at a rate of 33 feet per mile. Whereas, to the north of the highway the sediments flatten and have a much gentler southwest dip of 15 feet per mile. As a

result of this structural environment, the area south of the highway is an irregularly dissected cuesta slope. The area to the north of the highway is flatter with the occurrence of isolated flat top remnant hills. The farming community is in the greater sense north of the highway on the flat terrain.

STRATIGRAPHY AND STRUCTURAL GEOLOGY

The following stratigraphic table is a summary of the general formations believed present in outcrops in the Baytree, Spirit River Area of this report.

MESOZOIC	CRETACEOUS
	-UPPER CRETACEOUS
	<u>Smoky River Group</u>
	-Wapiabi Shale (2000' \pm) (Eroded in map area)
	-Bad Heart (5-25') clear sub ang. qtz with chert pebbles, ironstone, withers dk red. Contains oolitic iron oxides.
	-Kaskapau (600-800') dk grey carb. shale Ironstone concretions throughout.
	(Contains Cardium sandstone and Baytree) (conglomerate in Upper 1/3 of formation) (where they are developed.)
	<u>Dunvegan Formation (500-600')</u>
	Marine and non marine l.t. grey-yellow buff massive crossbedded sandstone, also shale zones with s.s. and siltstone laminae.
	-LOWER CRETACEOUS
	<u>Fort St. John Formation</u> - not exposed.

The oolitic sandy iron deposits examined on the remnant plateau north and northeast of Gordondale are considered to be equivalent to the Bad Heart sandstone that outcrops at Spirit River, 21 miles to the east. The basis for this conclusion is the distinctly comparable characteristics of the oolitic zones of iron oxide found in drill holes at both localities.

The literature available indicates that Geologists in general consider the Bad Heart and Cardium formations also to be correlative. C. R. Stelck has presented evidence of 330 feet of separation between the Cardium and the Bad Heart in the Redwillow Creek well in British Columbia. The Cardium is the lower of the two formations.

A simple east-west cross-section drawn generally along Highway 49 from Baytree to Spirit River reveals an east dip component of approximately 25 feet to the mile of the oolitic iron - Bad-Heart outcrops. In addition, an east dip component of less than one degree was measured with a Brunton compass at the Baytree Cardium outcrop three miles south of the Baytree Post Office. The Bad-Heart and Cardium could be separated by approximately 100 - 200 feet in this area, as at Redwillow.

Observation made by J. B. Mellon in his paper on "Petrology of the Upper Cretaceous Oolitic Iron Rich Rocks from Northern Alberta", in 1962, are required to explain the stratigraphic conditions observed in the Gordondale area. Although the Iron deposits at Gordondale are markedly similar to the Bad-Heart outcrop at Spirit River and the correlation of the deposits seems obvious; it is noted that the Cardium formation was

not recognized to outcrop at any point north of Highway 49. The auger hole penetrated a considerable thickness of shale stratigraphically below the iron deposit on Permit No. 23. No indication of any type of resistive formation was noted there, or in the area between the Permit and outcrop of the Dunvegan sandstone, observed in the Pouce-Coupe River, west of the settlement of the Bonanza. The iron deposits must be correlative with the Cardium outcrop south of Baytree or alternatively, the Cardium deposit must not be present north of Highway 49.

J. B. Mellon sites the collection of *Inoceramous pontoni* and *Inoceramous coulthardi* near the base of the oolitic ironstone outcrop in the Clear Hills area, and he refers to the original description by McLearn of the same fossil as collected from the Bad-Heart sandstone south of the Peace River. Thus there is a verification of the correlation of the Gordondale oolitic iron deposits with the Bad-Heart outcrop at Spirit River. J. B. Mellon also remarks that there is paleontological evidence that indicates the lower part of Smokey River shale, beneath the oolitic iron deposits, is much thinner than equivalent strata to the south; a major unconformity may be contained within this shale section. A sharp break in lithology at the top of the oolite bed is presented as evidence of another major unconformity, and Mellon states - " the sharp break in lithology at the top of the oolite bed is similar to that observed at the top of the correlative Bad-Heart sandstone on the Smokey River, about 80 miles south of the Clear Hills"

In lieu of accurate geological and topographical control in the local Gordondale area, we would sight our general evaluation to be in support of the correlation between the oolitic iron deposits and the Bad Heart sandstone formation stated by Mellon. The anomalous relationship apparent between the iron outcrops and the Cardium distribution near Gordondale could be explained by the presence of a major unconformity. At Baytree and Gordondale this erosion surface would be post Cardium and would explain the abrupt termination of Cardium outcrop on the south side of Highway 49. Presumably erosion of the Kaskapau shale became deeper and deeper from south to north across the Gordondale area, truncating the Cardium formation roughly along the trend of Highway 49. The Bad Heart and oolitic iron and Wapiabi shales were deposited subsequent to the erosion period and lie on middle or lower Kaskapau shales north of the highway. South of the highway the Upper formations in the Smokey River group rest on Cardium or Upper Kaskapau shale in the more complete normal stratigraphic section.

In the subsurface, contours on the Peace River sandstone horizon display a considerable amount of structural character involving the general hinge line, noted previously, and involving also, anticlinal and synclinal structures that are reflected in the present Pouce-Coupe and Gordondale gas fields. Probably these structures are present to some extent in the formations that outcrop, or are near outcrop in the area and their exact relationship to one another will not be known until all of the data on logged shot holes, etc., are available

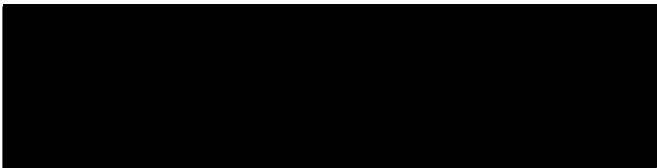
IRON ORE POSSIBILITIES AND CONCLUSIONS

The oolitic iron deposits in the Gordondale area, have proven to be very limited in size and quite variable in quality. Our Company has concluded that the limited size of the deposits in this local area do not provide adequate tonnages to allow consideration of economic mining for iron ore.

The iron outcrop in Sections 26 and 27, Township 79, Range 9, W6M, appear to be in a narrow, elongate deposit which phases out to iron colored shale and dark grey marine shale very rapidly. Apparently concentrated iron zones were deposited in oolite form in crowfoot type deltas where streams with iron rich water entered a marine basin. In places such as the outcrop in the north portion of Permit 23, the sand content in the delta was high. The reader is referred to J. B. Mellon's report for a very detailed investigation into the chemistry and mechanics of deposition of similar oolitic iron deposits in Clear Hills.

In addition to the variable depositional nature in the Bad Heart interval, the present distribution of the horizon is affected by structural and erosional conditions. The particular stage of erosion in the area is such that topographic highs appear to have recently been denuded of the resistive Bad Heart cap. The east dip of the formation results in the Bad Heart and iron deposits being remnant on the east sides of these highs. The outcrop on Permit No. 23 is a resistive cap on a small, (500 foot diameter), prominent knob that remains resistive 30 feet above the general level of a large plateau.

The quality of the iron deposit, as indicated by a preliminary assay in 1962, can be quite good with iron content ranging from 40% to 46%. The silica and calcium percentages are considered to be acceptable in regard to smelting of iron ore. Iron minerals present in the deposit, including goethite, siderite and limonite indicate that the deposit is a classic example of bog ore. Analyses of the mineralized zones encountered in our auger hole programme have been made by the Research Council of Alberta. They indicate that within the limited areas of the deposits, the quality varies considerably. The large depositional basin environment, resulting in continuity and homogeneity of deposit that is present in the Clear Hills area, does not seem to have extended as far south as the Gordondale area.



Clive D. McCord, P. Eng.

TECK CORPORATION LIMITED

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APPENDIX

(Note : The analyses of the mineralized)
(zones in 8 auger holes will be)
(forwarded at a later date and)
(should be added to this appendix)

STATUTORY DECLARATION OF EXPENDITURES
INCURRED ON IRON PROSPECTING PERMIT NO. 23 IN 1963
GORDONDALE AREA, ALBERTA

Reconnaissance Geology-

C.D. McCord, P. Geol. - Teck employee	\$	401.28
8 days - salary and employee benefits		178.35
Travel expenses and supplies		135.50
Vehicle rental - landrover		13.00
Telephone	\$	<u>728.13</u>

Drill Hole Program -

Mobile Augers & Research Ltd., drilling contractor		854.30
J.F.C. Maunder, P. Eng. supervisor of drilling program		1,161.92
Rotary Engineers - sample bags		<u>47.10</u>
	\$	<u>2,063.32</u>
Total Expenditures	\$	<u>2,791.45</u>

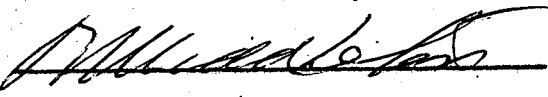
Canada)
Province of Alberta)

Do whit)

I James A. S. Gibson of the city of Calgary, make oath and say:

1. That I am the chief accountant for Teck Corporation Limited and as such have knowledge of the facts herein disposed to.
2. That the above is a true and correct statement of amounts expended by Teck Corporation Limited in actual reconnaissance geology and a drill hole program in iron are prospecting

Sworn before me in the City of
Calgary, Province of Alberta
this 14th day of January A. D.
1964


a commissioner for oaths in and
for the Province of Alberta.

Hole # 1.

Date: October 9, 1963.

Location:

NE corner, Lsd. 1, Sec. 27, Twp. 79, Rge. 9, W6 Mer.
(approximately 200' N of location of the original discovery of
iron mineralization in the SE corner of Sec. 27, Twp. 79, Rge. 9,
W6 Mer.).

Sample depth
or interval
(ft)

Sample description.

0' - 10'	Glacial till
10'6"	Oolitic iron mineralization, medium brown, fine grained, extremely friable, slightly limey, minor s.s. grains.
12'6"	As above.
13'6"	Oolitic iron mineralization, medium brown, fine grained.
16'0"	As above
17'0"	Oolitic iron sand, rust coloured, duller than above more s.s. content than above, slightly limey trace of glauconitic s.s.
24'0"	Oolitic iron, rust coloured with glauconitic s.s. much greater quantity than above.
24' - 26'	Sandstone, rust coloured.
26' - 28'	Shale, claylike, rust coloured soft, siliceous.
28' - 33'	Shale (clay), medium brown to tan, sl. siliceous, silty, wet, claylike.
33' - 35'	Shale (clay) as above.
35' - 43'	Shale (clay) dark blue grey, soft, plastic, trace of well polished chert pebbles, not as siliceous as above.
T.D. 43'	

Hole # 2.

Date: October 10, 1963.

Location: 300' W., 100' N. of the SE corner of Lsd. 9, Sec. 34, Twp. 79,
Rge. 9, W6 Mer.

Sample depth or
interval (ft)

Sample description

3'	Clay, brown grey, plastic
8'	Clay, brown grey, plastic, with very minor sand grains and rare chert pebbles, minor rust coloured staining.
13'	Clay, brown grey, plastic as above with very rare coal.
18'	Clay, brown grey, plastic, with minor quantity sand grains and rare chert pebbles and one piece rust coloured, hard, apparently fossilized material.
23'	Clay, brown grey, plastic, with minor sand grains and rare chert pebbles.
28'	Clay, brown grey, plastic with minor sand grains, iron rust coloured staining, rare coal, rare anhydrite (?) crystals.
33'	Clay, grey, plastic, less sand than above, rare chert pebbles, rare rust coloured staining.
At 37'	Hard streak, may be shale or large pebbles, drilled hard to 38'. No sample.
38'	Clay, grey, plastic, limey, with minor blue grey shale chips, minor chert pebbles, rare anhydrite (?) crystals. Replaced auger bit with finger bit at 38'.
43'	Clay, grey, plastic, minor chert pebbles and anhydrite crystals.
48'	Clay, grey, plastic, rare chert pebbles.
53'	As above.
63'	Clay, grey, plastic, limey with rare s.s. grains, anhydrite crystals, trace rust coloured staining.

Hole # 2.

Date: October 10, 1963.

Page - 2 -

73'

As above

At 79'

Drilling break.

79'

Clay, medium blue grey, powder like
sl. limey.

83'

As above.

T.D. 88

As above.

Hole # 3.

Date: October 10, 1963.

Location: SE corner, Lsd. 9, Sec. 27, Twp. 79, Rge. 9, W6 Mer.

Sample depth or
interval (ft)

Sample description.

3'

Clay, bright brown, powdery.

8'

Clay, medium brown, plastic, limey, rare
anhydrite crystals, rare chert pebbles, rust
coloured staining.

13'

Clay, medium brown (khaki) plastic, limey,
with rare anhydrite crystals and rare chert
pebbles.

14'

Clay, medium brown with iron concretions.

18'

Clay, khaki, plastic, with rare anhydrite
crystals, chert pebbles and silt stringers.

T.D. 28'

Clay, grey brown, plastic, fewer anhydrite
crystals than above.

Hole # 4.

Date: October 11, 1963.

Location: Approximately 600' N. of the SE corner - Lsd. 8, Sec. 27,
Twp. 79, Rge. 9, W6 Mer.

Sample depth or
interval (ft)

Sample description.

0 - 1'

Clay, light brown, powdery.

1'

Oolitic iron mineralization, clayey.

3'

Clay, brown grey (khaki) plastic, limey with
lighter brown yellow silt streaks, rare
anhydrite crystals, chert pebbles, rust coloured
staining and iron nodules.

8'

Clay, brown grey, plastic, limey rust staining,
iron nodules, rare chert pebbles and anhydrite
crystals. (Similar to sample at 3').

T.D. 13'

Clay, brown grey, plastic, limey, iron nodules,
rare chert pebbles.

Hole # 4A

Date: October 11, 1963.

Location: 4' south of hole #4.

Sample depth or
interval (ft)

Sample description.

1½'

Oolitic iron mineralization, clayey, chert pebbles
(rare)

2½'

Same as sample at 3' hole # 4.

Hole # 5.

Date: October 11, 1963.

Location: Approximately 200' N. of the SE corner Lsd. 8, Sec. 27, Twp. 79,
Rge. 9, W6 Mer.

Sample depth or
interval (ft)

Sample description.

3'

Clay, brown grey, plastic, rust coloured
staining, limey, yellow brown silt streaks.

8'

Clay, brown grey, plastic, limey, iron stone
nodules, rust coloured staining, green chert
pebbles, anhydrite crystals.

13'

Clay, brown grey, plastic, limey, rust
coloured staining, ironstone nodules, chert
pebbles, anhydrite crystals.

18'

Oolitic iron mineralization in blue clay, red
rust brown coloured.

20'

Oolitic iron mineralization as above.

23'

Oolitic iron mineralization, clayey, limey,
sample is probably contaminated with hole
cavings.

Top of oolitic iron bed is believed to be at
18'. Base of bed is believed to be at 21'.
Samples are contaminated with clay from above
mineralized zone.

26'

Oolitic iron with minor shale laminae.

27'

As above.

28'

Oolitic iron mineralization, rust coloured
w/much s.s. grains and green shale, probably
contaminated sample.

28 $\frac{1}{2}$ '

Clay, brown, powdery with much green shale,
silty.

T.D. 33

Shale, blue grey, calcarious.

Hole # 6

Date: October 11, 1963.

Location: 550' N. of the SW corner of Lsd. 1, Sec. 27, Twp. 79, Rge. 9,
W6 Mer.

Sample depth or
interval (ft)

Sample description.

3'	Clay, sandy trace of rounded chert pebbles, minor rust coloured staining, non calcarious.
6'	Sandstone, with iron stone matrix, clayey.
8'	As above.
13'	Sandstone, blue grey, non calcarious.
T.D. 23'	Shale, blue grey, slightly limey, minor rust coloured staining.

Hole # 7

Date: October 11, 1963.

Location: NE corner Sec. 10, Twp. 80, Rge. 11, W6 Mer.

Sample depth or
interval (ft)

Sample description.

3'	Clay, green, silty, micromicaceous rare qtz. sand grains, non-calcareous, bentonitic.
18'	Clay, blue green, silty.
23'	As Above.
25½'	Shale, blue grey, hard, slightly limey, ironstone nodules. Harder drilling at this point.
28'	Clay, silty, blue grey.
35½'	Ironstone, brown. Harder drilling at 35½' indicates ironstone stringer to be 5" thick.
39'	Clay, med. blue grey, silty, one large chert pebble in bit.
41'	Hard streak, 3" thick, no sample.
42'	Hard streak, no sample.
T.D. 43'	Ironstone, brown, hard at this depth and unable to penetrate.

Hole # 8

Date: October 11 and 12, 1963.

Location: NE corner Sec. 15, Twp. 80, Rge. 11, W6 Mer. 50' lower than hole # 7 by barometer.

Sample depth or interval (ft)	Sample description
2'	Clay, grey, plastic, rust coloured staining.
9'	Shale (clay), med. grey, rust coloured staining, ironstone nodules, hard streak at 9' probably ironstone pebbles.
13' - 18'	Shale (clay) med. blue grey, with light brown silty streaks. Hard drilling at 18' believed to be ironstone pebbles.
25'	Hard drilling, no sample.
29 $\frac{1}{2}$ '	Hard drilling, ironstone.
32'	Hard drilling.
38'	Shale (clay) med. blue grey.
41 $\frac{1}{2}$ '	Hard drilling.
47'	Shale (clay) med. blue grey.
48'	Water intering hole at this depth.
58'	Shale (clay) blue grey, plastic, with siltstone inclusions very rare anhydrite crystals, non calcareous.
60 $\frac{1}{2}$ '	Hard drilling. Hard streak is 7" to 8" thick.
60 - 65 $\frac{1}{2}$ '	Shale (clay) med. blue grey, plastic, non-calcareous, with rare silt stringers, siliceous. Hard rilling at 65 $\frac{1}{2}$ ', unable to drill deeper.
T.D. 65 $\frac{1}{2}$ '	

Hole # 9

Date: October 12, 1963.

probable typo
should be W6
E. Alesi, Nov. 2004

Location:

0.3 mile of N. of the SE corner sec. 22, Twp. 80, Rge. 11, (W5) Mer.
50' lower than hole # 8 by barometer.

Sample depth or
interval (ft)

Sample description.

3'	Clay, brown grey, plastic, rare ironstone nodules, rust coloured staining, non-calcareous.
10 - 12'	Clay, med. brown, siliceous, chert pebbles, crypto-crystalline white limestone pebble, clay is non-calcareous.
18'	Clay med. brown.
20'	Clay, blue grey, non-calcarous, silty.
28'	As above.
30'	Hard drilling, chert pebbles.
33'	Clay, blue grey, slightly limey, silty, chert pebbles, qtz, sand grains.
36'	Hard drilling, limestone pebble.
46 - 48'	Wet. Water entering hole at this depth.
48'	Clay, blue grey, plastic, slightly limey, silty, chert pebbles, qtz. sand grains, ironstone nodules, rust coloured staining.
	Driller's comment. From 44' to 57' I couldn't feel any stones.
68'	No sample. Pulled to 38' and became stuck in hole. Necessary to reverse tool to come out of hole. Therefore, lost sample. Material recovered is very similar to sample at 48'.
T.D. 78'	Silstone, dark blue grey, plastic, slightly limey, silty, chert pebbles. Unable to drill deeper. Clay balling-up and preventing auger from turning.

Hole # 10.

Date: October 12, 1963.

Location: 0.5 miles N of the SE corner of Sec. 22, Twp. 80, Rge. 11, W6 Mer.
75' lower than Hole # 9 by barometer.

Sample depth or
interval (ft).

Sample description.

3'	Clay, med. brown, plastic, slightly siliceous, limey, chert pebbles, ironstone nodules, rust coloured staining.
8'	Clay, med. brown, plastic, siliceous limey, chert pebbles, ironstone nodules, rust coloured staining.
11'	As above.
18'	Clay, med. brown, plastic, slightly siliceous, limey, chert pebbles, ironstone nodules, rust coloured staining.
23'	Clay, blue grey, plastic, siliceous, limey with very rare limestone pebble, chert pebbles.
28'	Clay (siltstone), blue grey, moist, siliceous, slightly limey.
33'	Clay, blue grey, plastic, sl. siliceous, limey, rare chert pebbles.
38'	Clay, blue grey, plastic, very slightly siliceous, rare chert pebbles, very rare anhydrite (?) crystals.
43'	Clay, blue grey, plastic, very slightly siliceous, slightly limey.
48'	As above.
T.D. 53'	As above.

Hole # 11

Date: October 13, 1963

Location:

3/4 Mi. S. of the NE corner Sec. 33, Twp. 80, Rge. 10, W6 Mer.
Ground surface rises 8', 100' N. of hole. Falls about 20'
immediately south of hole.

Sample depth or
interval (ft)

Sample description.

1'	Sandstone, unconsolidated, sub-angular qtz. grains, with ochre coloured clay-matrix, <u>iron oolites</u> , rare chert pebbles, ironstone nodules.
2'	Sandstone, unconsolidated, angular to rounded qtz. grains, in matrix of ochre coloured clay <u>iron, oolites</u> rare chert pebbles.
3'	Sandstone, unconsolidated pebbles, angular to rounded qtz. grains in matrix of ochre coloured clay, rare green shale chips, rare feldspar crystals, fewer <u>iron oolites</u> than above, rare chert pebbles, ironstone nodules.
4'	Clayey sandstone, unconsolidated more clayey than above, as above.
6'	Sandstone, unconsolidated, angular to rounded qtz. grains, in matrix of greenish ochre coloured clay green shale chips, angular and rounded feebly magnetic probably hematite grains; <u>iron oolites</u> , rare chert pebbles, ironstone nodules, micaceous in part.
7'	Sandstone, unconsolidated, med. to coarse grained, in matrix of brown clay, rare chert pebbles, <u>iron oolites</u> , slightly magnetic.
8'	Sandstone, loosely consolidated, brown coloured, with clay-matrix, <u>iron oolites</u> , angular to rounded qtz. grains, rare green shale chips, <u>slightly magnetic</u> .
9'	Clay, sandy, medium brown, angular to rounded qtz. grains, fewer <u>iron oolites</u> than above.
10'	As above, slightly limey.
11'	Clay, light med. brown, highly siliceous medium grained, rounded to sub angular qtz. crystals, minor <u>iron oolites</u> are <u>weakly magnetic</u> .

12'	Clay, light med. grey, brown, highly siliceous, medium grained rounded to sub angular qtz. crystals, minor <u>iron oolites</u> .
13'	Clay, med. grey brown, highly siliceous as above with one large pebble of seliceous hematite, pebble shows hematite and silicate laminae.
14'	Clay medium blue grey, slightly siliceous.
15'	Clay medium blue grey, slightly siliceous, chert pebbles, non calcareous.
16'	Clay siltstone, blue grey, trace pyrite mineralization.
17'	Clay, greenish blue grey, plastic, silty.
20'	Clay, siltstone, medium blue grey, slightly siliceous, chert pebbles, trace pyrite, rare anhydrite crystals, non calcareous.
24'	Siltstone, grey, slightly siliceous, trace pyrite, slightly siliceous.
30'	Clay, medium grey, plastic slightly siliceous, rare green shale chips, rare chert pebbles, non-calcareous.
35'	Clay, light grey, silty, dry, rare calcite crystals; bentonitic, sl. calcareous.
38'	Clay, medium light grey silty sl. plastic, sl. calcareous, bentonitic.
45'	Clay, medium light grey silty, non-calcareous.
T.D. 48'	Clay, medium grey, silty, non-calcareous.

Hole # 12

Date: October 13, 1963.

Location: 470' N. of hole # 11. Ground surface drops 20', 100' N. of hole.

Sample depth or
interval (ft)

Sample description.

1'	Sandstone, unconsolidated, rounded to sub angular qty. grains, ochre coloured, <u>iron oolites</u> , oolites are in <u>part magnetic</u> .
2'	Sandstone, unconsolidated, silty, grey brown, fewer <u>iron oolites</u> than above, more clayey, <u>oolites in part magnetic</u> , non calcareous.
3'	Clay sandstone, silty, grey brown as above.
4'	Clay, siliceous, tan brown, <u>rare oolites</u> , sl. bentonitic, very slight calcareous.
5'	Clay, light grey brown, silty sl. siliceous, sl. calcareous.
6'	Clay, light grey brown, silty, siliceous, non calcareous.
7'	Clay, light grey, with rusty brown admixture, siliceous with rounded qtz. grains, <u>rare iron oolites in part magnetic</u> , rare green shale chips.
8'	Clay, light brown grey, silty siliceous rare green shale chips, micaceous.
9'	Clay, green brown grey, silty, siliceous, rare pyrite, rare chert pebbles non calcareous.
10'	Clay, blueish brown grey, silty siliceous non calcareous.
11'	As above
12'	As above
13'	Clay, blueish brown grey, silty siliceous non calcareous.
18'	Clay, as above.
20'	Clay, blue grey, silty, non calcareous, rare green shale chips, rare anhydrite crystals, rare pyrite.
T.D. 23'	As above.

Hole # 13.

Date: October 13, 1963.

Location: 300' W. of the SE corner, Sec. 18, Twp. 79, Rge. 9, W6 Mer.

Sample depth or
interval (ft)

Sample description.

3'	Clay, brown, slightly silty.
8'	Clay, brown, slightly silty, slightly limey, rare anhydrite crystals.
13'	Clay, yellow brown, slightly silty, slightly limey, trace pyrite.
18'	Clay, blue grey, slightly silty, slightly limey.
23'	Clay, grey, with unconsolidated sand pebbles, rare grain dolomite, rare chert pebbles.
28'	Clay, grey, plastic, slightly silty, slightly limey.
33'	Clay, grey, plastic, slightly silty, rare chert pebbles.
38'	As above.
43'	Clay, grey, plastic, limey, rare limestone pebbles, rare chert pebbles.
T.D. 48'	As above.

Hole # 14

Date: October 13, 1963.

Location: 200' W., SE corner Sec. 13, Twp. 79, Rge. 10, W6 Mer.

Sample depth or
interval (ft)

Sample description.

3'	Clay, greenish brown, plastic, silty.
8'	Clay, greenish brown, plastic, silty.
13'	Clay, blue grey-greenish brown laminae, silty, slightly limey, sparse rounded pebbles.
18'	Clay, greenish brown, silty, with rounded quartz grains, chert pebbles, rust coloured staining.
23'	Clay, blue grey, slightly siliceous, chert pebbles.
28'	Clay, blue grey, slightly siliceous, rare chert pebbles, rare limestone pebbles.
33'	Clay, blue grey, slightly limey, plastic, rare chert pebbles.
38'	As above.
43'	Clay, brownish blue grey, plastic.
T.D. 48'	As above.

Hole # 15

Date: October 14, 1963.

Location:

2400' N, 475' E of the ~~SE~~ corner of Sec. 2, Twp. 80, Rge. 11,
W6 Mer.

typo, should be SW/C (E. Alesi, Nov. 2004)

Sample depth or
interval (ft)

Sample description.

4'	Clay, green brown, semi-plastic, anhydrite crystals abundant, sl. siliceous, rust coloured staining, ironstone nodules.
13'	Clay, blue grey, plastic, siliceous, chert pebbles, s.s. grains.
18'	Clay, brownish blue grey, plastic, siliceous, chert pebbles.
23'	Clay, brownish, blue grey, plastic, with yellow-brown silt stringers, non calcareous chert pebbles.
28'	Clay, blue grey, sl. limey, rare anhydrite crystals.
33'	Clay, brownish blue grey, sl. limey, sl. siliceous.
38'	Clay, brownish blue grey, plastic, sl. siliceous, silt streaks, chert pebbles.
41'	As above. Drillers comment: Drilling difference at 41'.
61'	Hard streak - no sample.
T.D. 68'	Clay, plastic, green blue grey, siliceous.

Hole # 16

Date: October 14, 1963.

Location: 0.3 mi. N. of the SE corner Sec. 10, Twp. 80, Rge. 11, W6 Mer.

Sample depth or
interval (ft)

Sample description.

3'	Clay, brownish green grey, trace rust coloured staining, trace anhydrite crystals.
8'	Clay, brownish grey, plastic, sl. siliceous chert pebbles, limistone pebbles, trace rust staining.
13'	Clay, blue grey, sl. siliceous, rare anhydrite crystals.
18'	Clay, blue grey, sl. siliceous, rare ironstone pebbles.
23'	Clay, blue grey, siliceous, rare anhydrite crystals, ironstone pebbles.
24'	Hard streak - no sample.
T.D. 28'	Same as 23'. Water entering hole at 28'.

Hole # 17

Date: October 14, 1963.

Location: 1650' N, 700' E of the SW corner Sec. 2, Twp. 80, Rge. 111, W6 Mer.
Approximately 60' lower than hole # 15.

Sample depth or
interval (ft)

Sample description.

3'	Clay, med. brown, plastic, siliceous, limey, chert pebbles.
8'	Clay, as above with anhydrite crystals.
13'	Clay, med. brown, plastic, chert pebbles, rust coloured staining.
18'	Clay, med. brown plastic, with blue grey clay laminae, chert pebbles, anhydrite crystals, sl. limey.
23'	Clay, blue grey, plastic, sl. siliceous, sl. limey, chert pebbles.
33'	As above.
38'	As above.
43'	As above.
T.D. 48'	As above.

Hole # 18

Date: October 14, 1963.

Location: 1000' N, 500' E, of the SW corner of Sec. 2, Twp. 80, Rge. 11,
W6 Mer. Approximately 50' lower than Hole # 17.

Sample depth or
interval (ft)

Sample description.

3'	Clay, green brown, plastic, chert pebbles, non-calcareous, rare ironstone nodules.
8'	Clay, green brown, plastic, chert pebbles, limestone chips, anhydrite crystals, sl. limey, ironstone nodules, rust coloured staining, sl. siliceous.
13'	Clay, brown grey, plastic, chert pebbles, anhydrite crystals, rust coloured staining, sl. siliceous.
18'	Clay, brownish blue grey, plastic, rust staining, <u>rare oolites</u> , anhydrite crystals.
23'	Clay, blue grey, plastic, with silty laminae, very slight limey.
28'	Clay, blue grey, plastic, with silty laminae, rare ironstone pebbles.
33'	Clay, blue grey, plastic, rare chert pebbles.
38'	Clay, as above, sl. siliceous, sl. limey.
43'	As Above.
48'	As above.
T.D. 53'	As above.

Hole # 19

Date: October 14, 1963.

Location:

200' S of the NW corner Sec. 35, Twp. 79, Rge. 11, W6 Mer.
Approximately 50' lower than Hole # 18.

Sample depth or
interval (ft)

Sample description.

3'	Clay, green brown, plastic, non-calcareous, with siliceous silt laminae.
8'	Clay, green brown, plastic, siliceous, rare chert pebbles.
13'	Clay, green brown, plastic, with blue grey clay laminae, siliceous, chert pebbles, rust coloured staining, ironstone nodules, rare anhydrite crystals.
18'	Clay, partly green brown, partly blue grey, plastic, siliceous, chert pebbles, <u>rare oolites</u> , rust coloured staining.
23'	Clay, blue grey, plastic, siliceous, rare chert pebbles.
28'	Clay, dark blue grey, plastic, sl. siliceous, sl. limey, rare chert pebbles.
33'	Clay, as above.
38'	Clay, as above.
43'	Clay, as above with rare anhydrite crystals.
T.D. 48'	As above.

Hole # 20

Date: October 15, 1963.

Location: 1000' W. of the SE corner Sec. 33, Twp. 78, Rge. 10, W6 Mer.

Sample depth
or interval (ft)

Sample description.

3'	Clay, brown, plastic, with silty laminae, sl. calcareous, sl. siliceous, rust coloured staining, ironstone nodules, chert pebbles.
8'	As above.
13'	As above with blue grey clay.
18'	As above, with anhydrite crystals and rare coal.
23'	As above.
28'	Clay, blue grey, plastic, rare chert pebbles, sl. siliceous, sl. calcareous.
33'	As above, with limestone chips.
38'	As above, less calcareous.
43'	As above.
48'	Clay, blue grey, plastic, chert pebbles calcareous, rust coloured staining which may be contamination.
T.D. 63'	Clay, greenish blue grey, plastic, chert pebbles, calcareous, siliceous.

Hole # 21

Date: October 15, 1963.

Location: 0.5 mi. E. of the SW corner of Sec. (4) Twp. 79, Rge. 10, W6 Mer.

Lot type, should be sec 14 (E. Alesi, Nov. 2)

Sample depth or
interval (ft)

Sample description.

3'	Clay, green brown, plastic, non calcareous.
8'	Clay, green brown, plastic, sl. siliceous, sl. calcareous, rare chert pebbles.
13'	Clay, partly green brown, partly blue grey, plastic, sl. siliceous with ironstone nodules, rust coloured staining, chert pebbles, sl. calcareous.
18'	Clay, green brown, plastic, sl. siliceous, sl. calcareous, with pebbles, ironstone nodules, rust coloured staining.
23'	Clay, blue grey, plastic, sl. calcareous, sl. siliceous, with chert pebbles.
28'	Clay, blue grey, plastic, calcareous, sl. siliceous, chert pebbles.
33'	As above.
38'	Clay as above with limestone pebbles.
43'	As above.
T.D. 48'	As above.

Hole # 22

Date: October 15, 1963.

Location: 0.4 mi. S of the NE corner of Sec. 19, Twp. 79, Rge. 9, W6 Mer.

Sample depth or
interval (ft)

Sample description.

3'	Clay, brown, plastic, with blue clay laminae, chert pebbles, rust coloured staining, sl. siliceous, sl. calcareous.
8'	Clay, brown, plastic, as above with ironstone nodules.
13'	As above.
18'	Clay, blue grey, plastic, calcareous, siliceous, with chert pebbles.
20'	Clay, ochre rust colour, with iron oolites and rare s.s. grains, non magnetic.
22'	As above.
23'	As above.
24'	As above with more oolites.
25'	Clay, rust coloured, siliceous, with rare oolites.
26'	As above, becoming more siliceous.
27'	Sandstone, dark grey, with clay-matrix sl. calcareous.
28'	Sandstone, brown grey, with clay-matrix, rare oolites.
29'	Hard drilling - no sample.
30'	Hard drilling - sandstone, med. grey quartz. Sample is wet and contaminated. Sandstone layer is approximately one foot thick by drilling time.
T.D. 33'	Sandstone blue grey, probably contaminated.

Hole # 23

Date: October 15, 1963.

Location: NW corner Sec. 29, Twp. 79, Rge. 9, W6 Mer.

Sample depth or
interval (ft)

Sample description.

3'	Clay, greenish brown with blue grey clay laminae, limey chert pebbles.
8'	As above.
13'	As above.
18'	Clay, greenish brown and blue grey 50/50, plastic, sl. calcareous.
20'	Clay, blue grey, plastic, sl. calcareous, with chert pebbles, rare anhydrite crystals.
23'	Clay, dark blue grey, plastic, sl. calcareous, with chert pebbles.
28'	As above.
33'	As above.
38'	As above.
43'	As above.
T.D. 48'	As above.

Hole # 24

Date: October 15, 1963.

Location: 0.25 N of the SE Corner of Sec. 19, Twp. 79, Rge. 9, W6 Mer.

Sample depth or
interval (ft)

Sample description.

3'	Clay, green brown, plastic, with blue grey, clay laminae, rust coloured staining, rare chert pebbles.
8'	As above.
11'	Clay, green brown, plastic, with rust coloured staining more abundant than above, ironstone nodules, rare chert pebbles.
13'	Clay, green brown, plastic.
16'	Clay, rust brown, non-plastic, siliceous.
17'	Sandy clay, dark rust brown, non-plastic with <u>rare iron oolites</u> .
18'	Clay, dark blue grey, sl. plastic, with much rust coloured staining.
19'	Clay, dark blue grey, siliceous.
23'	Sandstone, dark rust colour with <u>rare oolites</u> .
27'	Clay, dark green grey, siliceous.
T.D. 30'	Clay, blue grey, plastic. Unable to drill deeper.

Hole # 25

Date: October 16, 1963.

Location: 0.4 mi. N of the SE corner of Sec. 22, Twp. 78, Rge. 7, W6 Mer.

Sample depth or
interval (ft)

Sample description.

3'	Clay, med. green brown, siliceous with trace of pyrite, sl. calcareous, rare rust coloured staining.
8'	Clay, dark green grey with clear sub-rounded quartz pebbles, trace quartz crystals, sl. calcareous (clay).
13'	Clay, green brown, plastic, sl. calcareous, with rust coloured staining rounded chert pebbles, rare quartz crystals.
18'	As above.
28'	Clay, green brown, plastic, sl. calcareous, sl. siliceous with chert pebbles and anhydrite crystals.
29 - 31'	Sandstone, varicoloured, fine grained, angular, in clay matrix.
31 - 33'	Clay, blue grey, plastic, sl. calcareous, sl. siliceous, with rare chert pebbles.
36 - 38'	Clay, med. olive green brown, plastic, siliceous, very calcareous, with rounded chert pebbles.
T.D. 43'	Limey pebble conglomerate with grey ironstone, unable to drill deeper.

Hole # 26

Date: October 16, 1963.

Location: 0.6 mi. N of the SE corner of Sec. 22, Twp. 78, Rge. 7, W6 Mer.

Sample depth or
interval (ft)

Sample description.

3'	Shale (clay), sandy, green grey micaceous.
6'	Oolitic sandstone, ochre rust colour, limey, with iron oolites.
7'	As above.
8'	As above.
10'	Sandstone, rusty grey, fine grained, sl. calcareous.
12'	Sandstone, hard streak at 12½'.
13'	Sandstone, rusty grey, fine grained.
16'	Ironstone, hard sandy.
17'	As above.
18'	Clay, blue grey, sl. silty, sl. calcareous.
T.D. 23'	Clay, blue grey, sl. silty, sl. siliceous.

TECK CORPORATION
LIMITED

Royalite Building, P.O. Box 694, Calgary, Alberta, Canada, Telephone (403) AM 2-3921

CANADIAN DEVONIAN PETROLEUM DIVISION

March 17, 1964.

Dr. J. W. Patrick
Director of Minerals
Department of Mines and Minerals
Natural Resources Building,
Edmonton, Alberta.

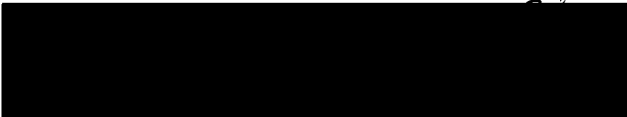
Dear Sir:

Re: AIPP-1 Iron Prospecting Permit No 23
Gordondale Area,
Province of Alberta.

The analyses of mineralized zones encountered in auger holes described in our report of January 14, 1964, are enclosed herein. Eight samples were referred to in previous correspondence in error. One sample was contained in two bags, so that in fact only seven mineralized zones are represented by the analysis. The analyses can be referred directly to the sample descriptions in the appendix of our report.

Yours very truly,

TECK CORPORATION LIMITED



Clive D. McCord, P. Eng.

CDM/gt

Encl.

Dr. T. Rigg

H. Wagenbauer
February 26th, 1964.

Analytical Report 64111

Samples oven dried at 40°C.

Sample	Tech Corp. 1-10.6-24	Tech Corp. 5-16-28	Tech Corp. 11-1,2,3,4,5, 6,7,8,9	Tech Corp. 12-1,2,3,4.
SiO ₂	19.61%	22.31%	39.45%	66.53%
Al ₂ O ₃	8.90	9.28	5.86	8.67
Total Iron as Fe ₂ O ₃	54.66	51.06	39.06	14.96
TiO ₂	0.10	0.12	0.10	0.17
P ₂ O ₅	1.78	1.46	2.06	0.56
MnO	0.07	0.07	0.09	0.04
CaO	2.09	1.92	2.15	0.56
MgO	1.00	1.24	1.07	1.08
Na ₂ O	0.12	0.14	0.15	0.27
K ₂ O	0.54	0.71	0.71	1.32
L.O.I.	12.78	12.91	10.09	6.59
TOTAL	101.65	101.22	100.79	100.75

V ₂ O ₅ *	0.25	0.24	0.13	0.06 %
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* Subtract this from Al₂O₃.

JR.

Dr. T. Rigg

H. Wagenbauer

February 26th, 1964.

Sample	Tech. Corp. 22-20-25	Tech. Corp. 24-17	Tech. Corp. 24-23	Tech. Corp. 26-6,7,8,10
SiO ₂	20.24%	11.40%	12.22%	23.40%
Al ₂ O ₃	7.24	6.80	5.68	7.35
Total Iron as Fe ₂ O ₃	54.66	58.00	57.10	44.95
TiO ₂	0.09	0.07	0.07	0.11
P ₂ O ₅	1.65	1.75	1.57	1.43
MnO	0.08	0.07	0.08	0.07
CaO	1.74	2.73	2.59	5.24
MgO	1.22	1.95	2.08	1.49
Na ₂ O	0.18	0.15	0.11	0.12
K ₂ O	0.52	0.32	0.33	0.65
L.O.I.	13.21	17.71	18.63	15.34
Total	100.83	100.95	100.46	100.15

V₂O₅*

0.23

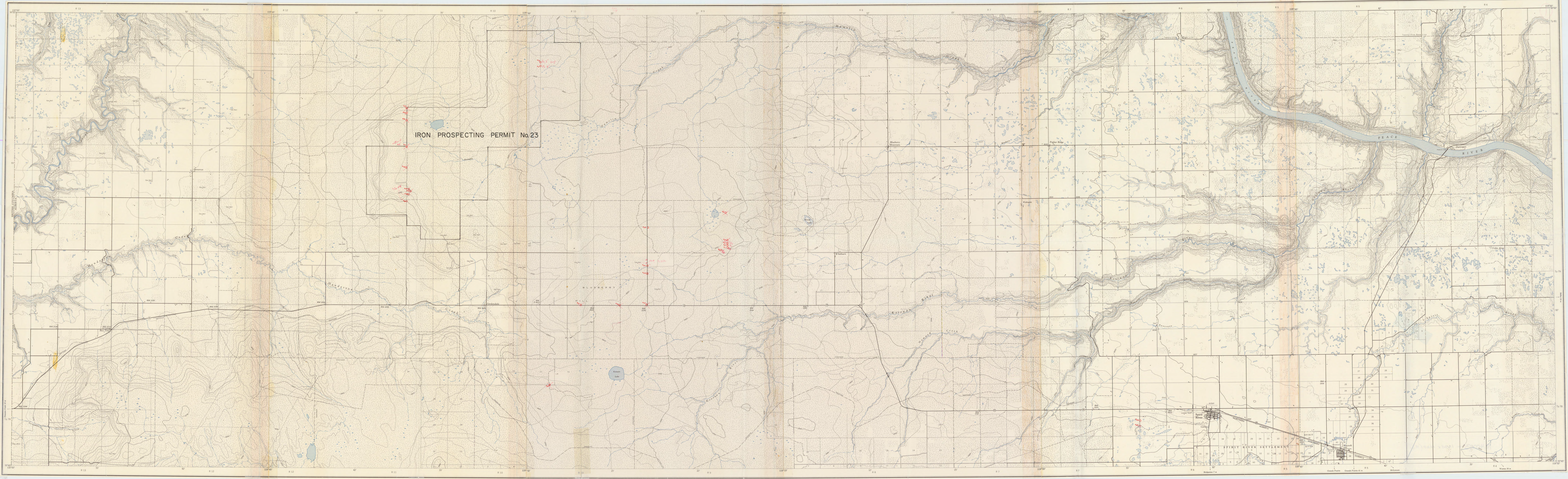
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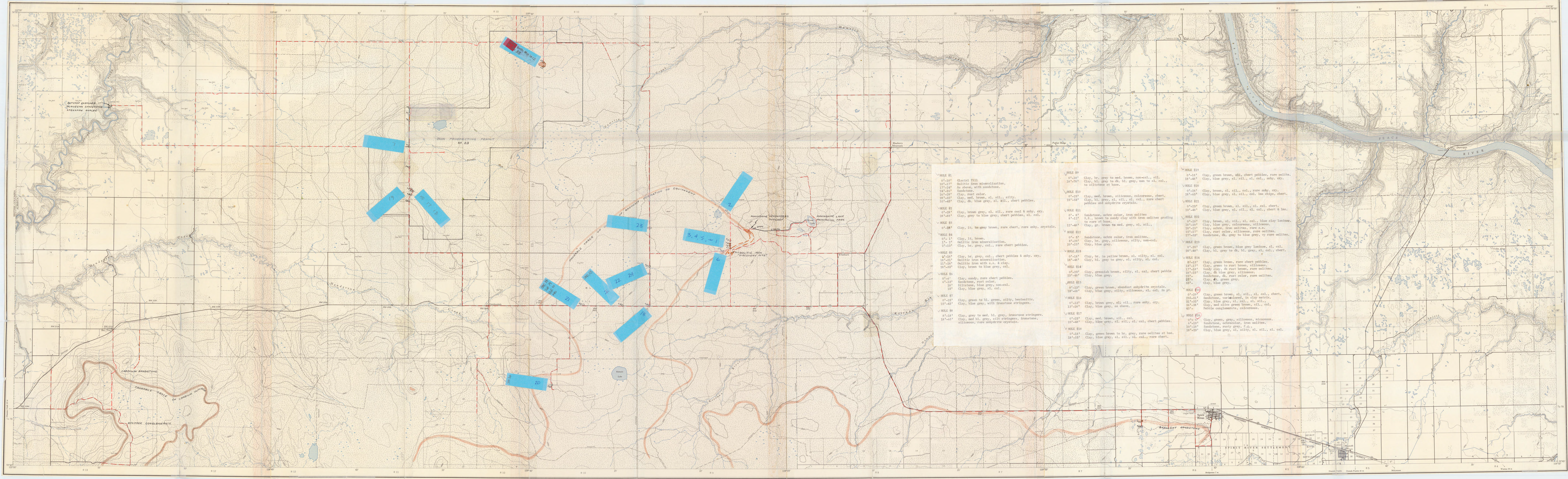
0.23

0.25 %

* Subtract from al₂o₃.

J.R.





HOLE #1
0'-10' Glacial Till
10'-17' Oolitic iron mineralization.
17'-24' Sandstone.
24'-26' Clay, rust color.
26'-28' Clay, med. brown, sl. sil., silty.
28'-35' Clay, dk. blue grey, sl. sil., chert pebbles.

HOLE #2
0'-23' Clay, brown grey, sl. sil., rare coal & anhy. cry.
23'-28' Clay, grey to blue grey, chert pebbles, sl. cal.

HOLE #3
0'-28' Clay, lt. to grey brown, rare chert, rare anhy. crystals.

HOLE #4
0'-1' Clay, lt. brown.
1'-2' Oolitic iron mineralization.
2'-13' Clay, br. grey, cal., rare chert pebbles.

HOLE #5
0'-10' Clay, br. grey, cal., chert pebbles & anhy. cry.
10'-21' Oolitic iron mineralization.
21'-28' Oolitic iron with s.s. & clay.
28'-33' Clay, brown to blue grey, cal.

HOLE #6
0'-4' Clay, sandy, rare chert pebbles.
4'-13' Sandstone, rust color.
13'-18' Siltstone, blue grey, non-cal.
18'-23' Clay, blue grey, sl. cal.

HOLE #7
0'-23' Clay, green to bl. green, silty, bentonitic.
23'-43' Clay, blue grey, with ironstone stringers.

HOLE #8
8'-18' Clay, grey to med. bl. grey, ironstone stringers.
18'-65' Clay, med bl. grey, silt stringers, ironstone, siliceous, rare anhydrite crystals.

HOLE #9
0'-18' Clay, br. grey to med. brown, non-cal., sl.
18'-78' Clay, bl. grey to dk. bl. grey, non to sl. cal., to siltstone at base.

HOLE #10
0'-23' Clay, med. brown, siliceous, calcareous, chert.
23'-53' Clay, bl. grey, sl. sil., sl. cal., rare chert pebbles and anhydrite crystals.

HOLE #11
0'-8' Sandstone, ochre color, iron oolites
8'-12' S.S., brown to sandy clay with iron oolites grading to rare at base.
12'-48' Clay, gr. brown to med. grey, sl. sil.

HOLE #12
0'-3' Sandstone, ochre color, iron oolites.
3'-20' Clay, br. grey, siliceous, silty, non-cal.
20'-23' Clay, blue grey.

HOLE #13
0'-10' Clay, br. to yellow brown, sl. silty, sl. cal.
10'-48' Clay, bl. grey to grey, sl. silty, sl. cal.

HOLE #14
0'-23' Clay, greenish brown, silty, sl. cal. chert pebble
23'-48' Clay, blue grey.

HOLE #15
0'-13' Clay, green brown, abundant anhydrite crystals.
13'-65' Clay, blue grey, silty, siliceous, sl. cal. in pt.

HOLE #16
0'-13' Clay, brown grey, sl. sil., rare anhy. cry.
13'-25' Clay, blue grey, as above.

HOLE #17
0'-23' Clay, med. brown, sl. cal.
23'-48' Clay, blue grey, sl. sil., sl. cal. chert pebbles.

HOLE #18
0'-18' Clay, green brown to br. grey, rare oolites at base.
18'-53' Clay, blue grey, sl. sil., sl. cal., rare chert.

HOLE #19
0'-18' Clay, green brown, sl. chert pebbles, rare oolite.
18'-48' Clay, blue grey, sl. sil., sl. cal., anhy. cry.

HOLE #20
0'-28' Clay, brown, sl. sil., cal., rare anhy. cry.
28'-63' Clay, blue grey, sl. sil., cal. lms chips, chert.

HOLE #21
0'-23' Clay, green brown, sl. sil., sl. cal. chert.
23'-48' Clay, blue grey, sl. sil., sl. cal., chert & lms.

HOLE #22
0'-18' Clay, brown, sl. sil., sl. cal., blue clay laminae.
18'-20' S.S., brown to sandy clay with iron oolites.
20'-23' Clay, ochre, iron oolites, rare s.s.
23'-27' Clay, rust color, siliceous, rare oolites.
27'-33' Sandstone, dk. grey to blue grey, v. rare oolites.

HOLE #23
0'-20' Clay, green brown, blue grey laminae, sl. cal.
20'-48' Clay, bl. grey to dk. bl. grey, sl. cal., chert.

HOLE #24
0'-13' Clay, green brown, rare chert pebbles.
13'-17' Clay, green to rust brown, siliceous.
17'-18' Sandy clay, dk. rust brown, rare oolites.
18'-23' Clay, dk. blue grey, siliceous.
23'-28' Sandstone, dk. rust color, rare oolites.
28'-33' Clay, dk. green grey.
33'-48' Clay, blue grey.

HOLE #25
0'-4' Clay, green brown, sl. sil., sl. cal., chert.
4'-20' Sandstone, varicolored, in clay matrix.
20'-31' Clay, blue grey, sl. cal., sl. sil.
31'-53' Clay, med olive green brown, sl. cal. pebble conglomerate, calcareous.

HOLE #26
0'-4' Clay, green, grey, siliceous, micaceous.
4'-10' Sandstone, ochre color, iron oolites.
10'-18' Sandstone, rusty grey, f.g.
18'-23' Clay, blue grey, sl. silty, sl. sil., sl. cal.