DRILL LOG — HUMBLE OIL & REFINING CO. – EASTERN DISTRICT – Lake Superior Project

DRILL HOLE NO. R-2-1 | LOCATION: STATE Minnesota | COUNTY Koochiching | SW 1/4 of 1/4 SEC. 5 TWP. 68N RGE. 21W

PROSPECT Rainy River | BUDGET NO. E-1142 | DEPTH 601' | LATITUDE -45° S50°E | E-W LOCATION RR2 grid 339 & 582

DATE COLLARED July 25, 1969 | DATE COMPLETED August 18, 1969 | CORE RECOVERY 100%

CORE LOGGED BY P.G. Schmidt | DATE September 5, 1969

PROPERTY: MINERALS State of Minnesota | SURFACE

OVERBURDEN DRILLING — 0 to 63

CORED

NO	63	to 289
BQ	289	to 602
		to

CASING

N	0	to 65

PLUGGED BY (agent)

REMARKS: Collar elevation 1166. lost circulation in overburden

Except for a couple intervals and scarce small veinlets of pink stained metasediments, core recovered was unaltered

SUMMARY DRILL LOG 1" = 150'

DEPTH	UNIT
65	
88	Felsic volcaniclastic semi-massive Py
109	
	Greywacke massive Po 126 to 113
	Graphite & semi massive Po 113-178
187	
200	
	Diabase
247	
273	Granite
300	
	Greywacke
350	
363	volcaniclastic Greywacke minor Po 350-360
400	
	Greywacke
491	
500	
	Gabbro
537	
600	Greywacke

SUMMARY MINERALIZATION

DEPTH	ANALYSES
65' to 88'	Py - Po 5% to 20% Cu 40 to 70 ppm Zn 45 to 115 ppm
106' to 175'	Po-Py 2% to 50% Cu 75 to 300 ppm Zn 35 to 750 ppm
350' to 363'	Po 5% Cu 50 to 1200 ppm Zn 150 to 2200 ppm Ag 1 to 3 ppm

Po ——— Cu ——— Ag 1 to 3

Py ——— Zn ———

Graphite ▨ Pb ———

Ni ———

Co ———

SCALE 1" = 10 FT.

FEET	THICK	CODE	DESCRIPTION	% SULFIDES	SPG

Overburden

43.5 — clay -- free of boulders

43.5 — 48.5 — 5 — Granite boulder

48.5 — 145 — Packed boulders little or no clay

63

65 — 2 — Broken "breze" ∠ 30°-35° — Breccia: It grey, lt brn & lt grn, ang to sbrnd, hard, dense, silic & recrystd matrix, massive to v. thick bedded, irregular to v. irreg. fracs, some breccia zones have both matrix and breccia fragments. Py & some & sm. irreg. veinlets. Minor Cp & Sph.

65 — 7 — Felsic volcaniclastic

72 — 16.5 — Cherty felsic volcaniclastic — v. fine gr. siliceous breccia, broken thin cbs, lbn-buff, trace gr fragments in cherty matrix, fracs irreg, sometimes healed with chalcedony, sometimes open, irregular, locally much stained fine fractures. Py & some & veins, stringers & thin irregular zones to 2" to 3" in core & Cp & Sph.

88.5 — 17.5 — Greywacke — v. fine gr. mottled v. dk grey & lt grey, massive, hard, dense, irregular fracs, some healed, some open, some stained, some irregular zones to 1/2" wide of v. fine gr. dk grey, massive greywacke. No bedding. Rare pyritic veinlets. Py 3 sets, small cubes, & veinlets Py small cubes.

106 — 7.7 — Greywacke ∠ 35° — fine gr. grey, some hard, massive, (imp. gritty?) occas. Py replaced by massive po. Trace py.

113.7 — 3.0 — Greywacke ∠ 70°-90° — med-coarse gr. hard, massive, mottled light-dk grey, some Py replaced by massive Po, some Py. Trace Cp. Minor Sph. Contains graphite.

117.2 — 9.5 — greywacke ∠ 50° — fine gr. med-dk grey, massive & thinly laminated w/ chloritic & graphitic sections 1" to 9" w/ chloritic & graphitic. Py 3 sets & thin bands. Py thin veinlets, small cubes

126.7 — 3.3 — Greywacke — fine-med gr. dk grey, massive, hard, dense. Py 3 sets.

130 — 21.4 — Greywacke — fine-med. gr. dk grey mottled, thinly bedded & "massive", chloritic zones - slumps, some graphitic. Py 3 sets & bands, small massive beds, to 1". Py small cubes to 1/2". tr. Cp & small veinlets, sm. blebs.

151.4 — 14.6 — Greywacke — v. fine - med. gr., dk. grey, hard, dense, massive to thinly laminated, chloritic zones, some cubes of pink color & feldspar? Contains graphitic zones thinly laminated & chloritic. ∠ 40° Py 3 sets & thin bands.

166.0 — 7 — Greywacke-argillite ∠ 40° — fine gr. to very v. fine gr. thin bedded to thin laminated, dark grey to dk. grey, siliceous, slightly graphitic argillite. Py 3 sets & thin bands. tr. Cp & small veinlets.

173 — ∠ 50° — Greywacke-argillite ∠ 40° — fine gr. v. thinly bedded, hard, dense, siliceous, dk. grey.

178 — 5 — Greywacke-argillite — fine gr. v. thinly bedded, hard, dense, siliceous, dk. grey. Massive pyritic zone, 1" thick.

187 — 9 — Greywacke — v. fine gr. grey-dk grey-dk brown, massive to irreg. bedded, massive to v. thinly laminated, locally contains small v. irreg. patches of v. fine gr. dk. grey chloritic material. Py 3 sets & thin veinlets & v. small cubes. Trace Cp. Minor Sph. Small clusters of Py?

Diabase Intrusive

numerous thin qtz-chlorite veinlets

70 — v. fine gr. med-dk. grey, massive blotchy, mottled, thin curved fractures w/ thin alteration zones to 1/2". Numerous fine plag. laths in fine blotchy chlorite-matrix?) Pillow basalt or imp. gritty? Qtz-chlorite veins & veinlets w/ sparse py, chlorite blebs w/ hematite stains, tr. Cp w/ po.

257 — Diorite Intrusive

16 — med-coarse gr., dk grey, massive, chloritic-plag. diorite. Trace Cp & Sph. in irregularly interbanded & fine gr. massive chloritic zones.

NX 269 BX 273 — Py to disem & thin 1-2" zones - blebs.

Greywacke

∠ 20°

v. fine - fine gr., grey to mottled grey, hard, dense, massive to mottled banded, some slump structures, but generally v. subtle banding. Massive sections v. hard, dense, siliceous.

∠ 65° — A few bands of coarser material - possible tuffaceous? biotite, chloritic.

Py disem & in v. fine bands, some nearly massive Py, but only 20-30% po.

122 — trace Cp - small amt w/ po

∠ 45°-55° — Thinly banded volcaniclastic, fine-med gr.

2° qtz — Py to disem & thin irreg. bands. Cp in thin veinlets, v. small amt.

3° qtz

Brec zone 5° qtz

∠ —

Greywacke

∠ 55° — fine-med gr., med grey, massive to thinly bedded, laminated, thinly bedded zones disrupted & brecciated. fine gr. dk grey to brownish, massive zones. Fine gr. dk-med. grey, well-mixed, some 1/4" to 1" clasts, possible gr. intermixed salt & pepper appearance.

Grey. banding, irreg. Strong (1 to 3° Grey. fracs, veins, veinlets & qtz

Py tr. disem

491 — Gabbro Intrusive

1° qtz

med-coarse gr., dk grey, massive altered gabbro - plag-hbl-calcite, finer gr. near basal contact. Lt feldspar phenocrysts? Brecciated zones & qtz veinlets throughout

3° qtz

Py tr. disem.

78 — rusty fracture 5° hard grain 45° to core

4° qtz

5° qtz

4° qtz

3° qtz

(Chloritic-silicified zones of?)

5° qtz

559 — Greywacke — v. fine gr., lt. grey, dk. grey, massive, mottled, no bedding, v. hard, dense, occ. finer gr. small rounded (clasts?)

31 — 4° qtz. 3° qtz. 1° qtz.

602 — TD