NORTHERN TERRITORY GEOLOGICAL SURVEY REPORT GS 79/30

AUGER AND DRILL HOLE SURVEY OF THE GEOLOSEC PHOSPHATE DEPOSIT, RUM JUNGLE

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Compiled by: C.J. Rivers

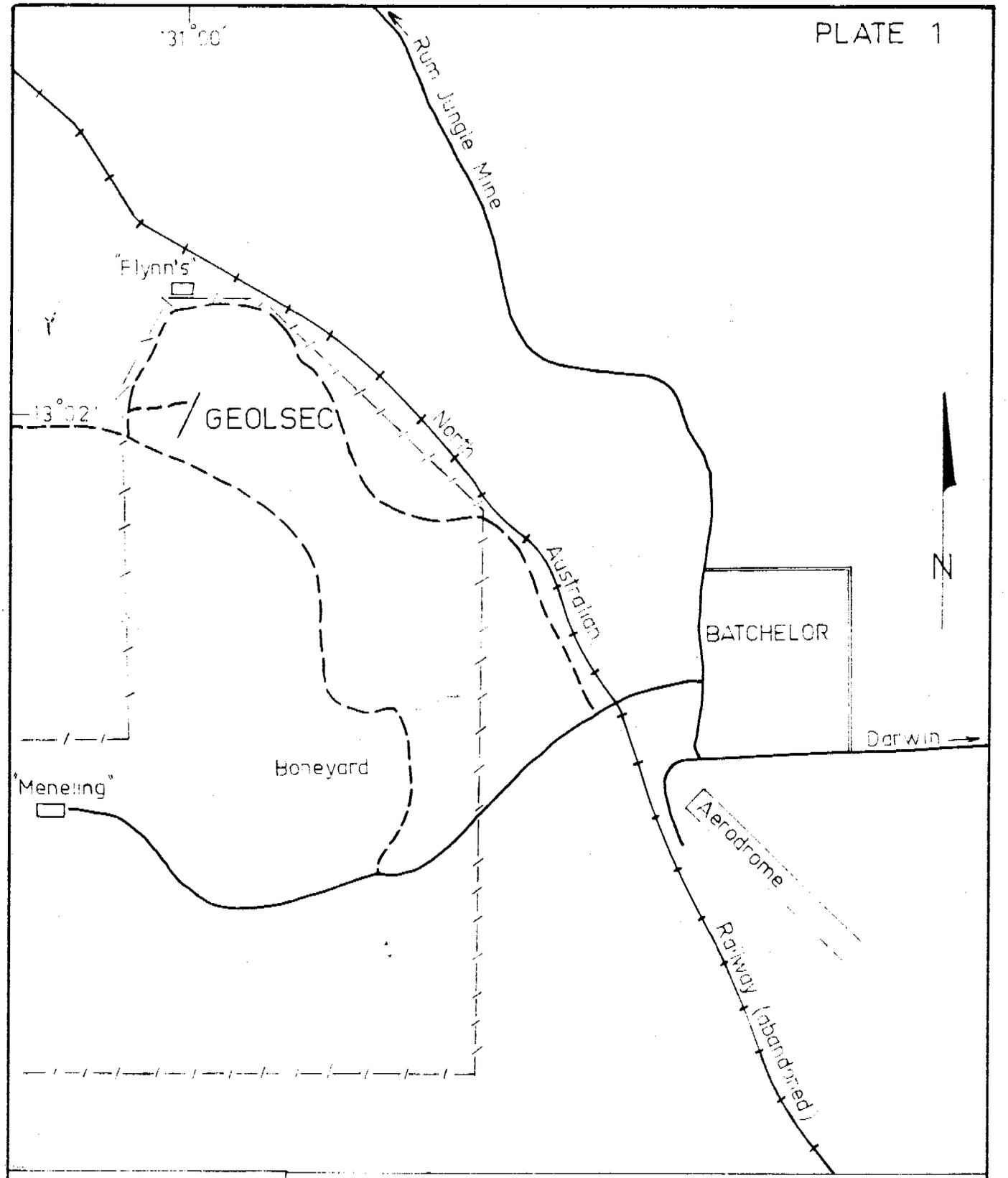
In 1977 the Northern Territory Geological Survey carried out a programme of diamond and auger drilling at Geolsec in response to a request by the Division of Primary Industry to find a suitable phosphate body for local manufacture of Biophosphate.

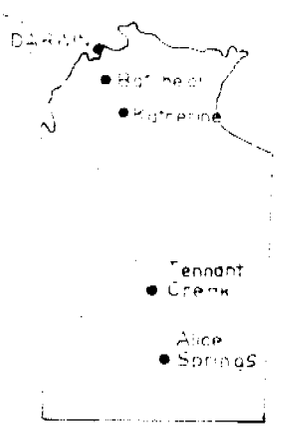
This report is a package of the data from this programme. The geology of the area and features of the deposit are described by Hickey (1979) in Geological Survey report GS 79/17. Reference should be made to this report.

Eight diamond drill holes were completed (DDH1-DDH8); two auger holes (ADH1-ADH2) were also drilled. In addition, Gamma Ray logs of the drill holes and P_2O_5 content of the core are also presented.

REFERENCE: Hickey, S H (1979) Investigation of Geolsec Phosphate Deposit, Rum Jungle, 1979. Northern Territory Geological Survey Report, GS 79/17

PLATE 1





RUM JUNGLE PHOSPHATE.

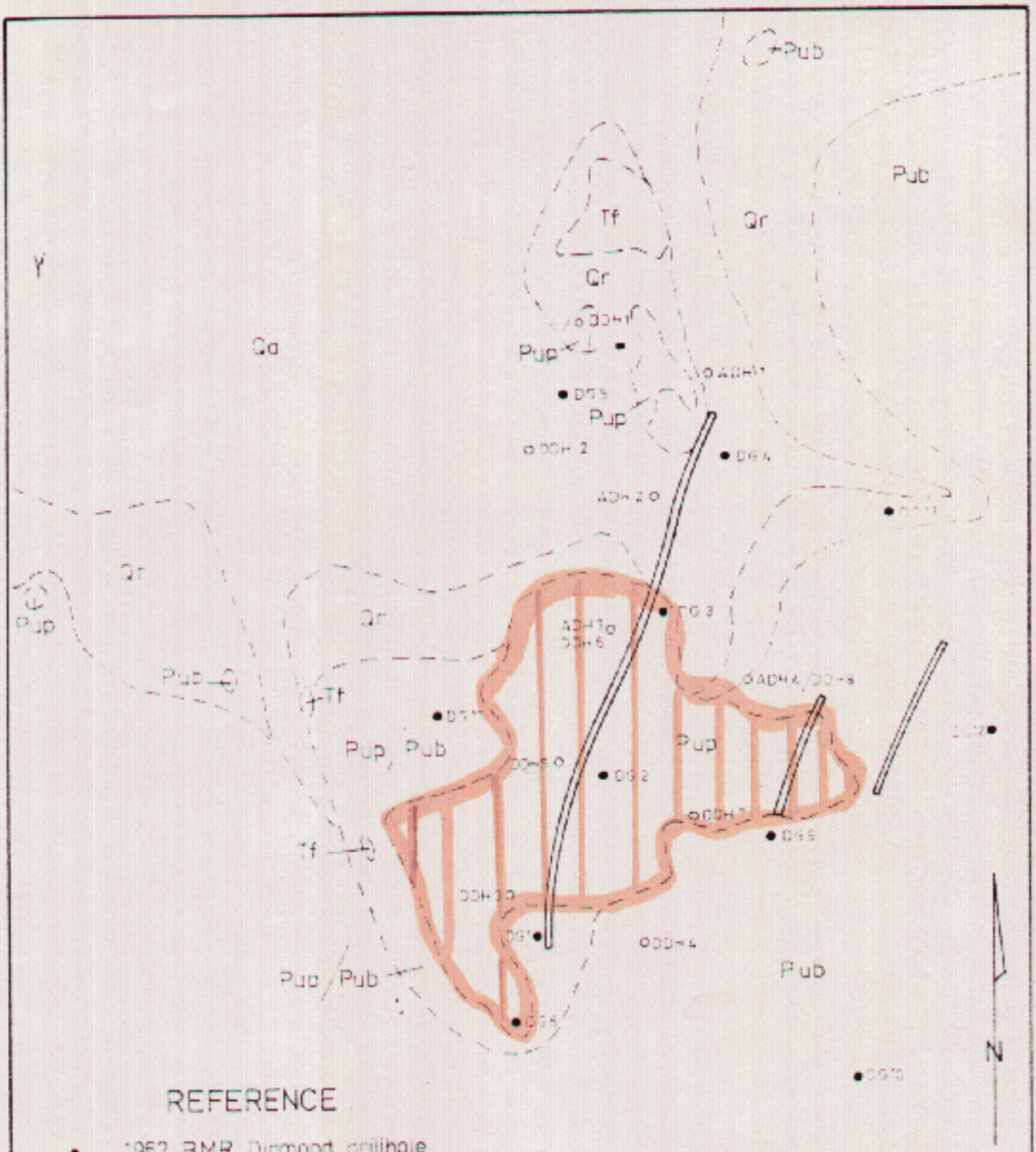
LOCATION OF GEOLSEC DEPOSIT.

Scale 1: 25000

500 0 500 1000 m.

Drawn by Dept. of Mines and Energy Drafting Section, Oct. 79.

G79/31E



REFERENCE

- 1962 BMR Diamond drillhole
- 1977 NTGS drill hole
- 1962 BMR Costean
- Geological boundary
- Qa Alluvium
- Qr Rubble
- Tf Ferruginous breccia (pisolitic)
- Pub Hematitic quartz breccia
- Pup Phosphatic rock

GEOLSEC PHOSPHATE DEPOSIT

1979 GEOLOGICAL SKETCH MAP

(after Pritchard and others, 1963)

Scale 1: 2000

20 0 20 40 60 80 100 m

Drawn by Dept. of Mines and Energy Drafting Section, Oct. 79.

G 79/32 E

GEOLOGICAL LOG OF DRILL HOLE

PROJECT RUM JUNGLE PHOSPHATE — REMARKS
HOLE No DDH 7 — CO-ORDINATES — R.L. GROUND
LOCATION — ANGLE FROM HORIZONTAL VERTICAL — DIRECTION

METRES	DESCRIPTION OF CORE	LOG	CORE RECOVERY %	P2O5 assay %	SAMPLES
0	0.0				
	Only pebbles of quartz, quartz breccia and of ironstained, porous, indurated mudstone were recovered		0	14.75	
2			5		
	2.80				
4			0		
	5.35				
6	Weathered QUARTZ BRECCIA: white to brown; containing approx 80% quartz fragments (1–30 mm size, angular) in a matrix of sandy mudstone	Δ Δ Δ Δ	85	1.21 / 1.51	
	7.60		65	1.44	
8	?BRECCIA: brown to dark brown fragments of limonitized mudstone (moderately indurated, some are porous) with minor specular hematite and minor quartz fragments set in a soft, pink clay matrix; slight reaction to phosphate test.	◇ ◇ ◇	55	20.60	
10		◇ ◇ ◇	40	20.60	
	c.10.80 ↓ Transitional change with decrease of limonitized mudstone ↓		55		
12	c.12.80				
	CLAY: white to pink; textureless, soft, wet		80	18.32	
14			70	6.60	
	Weathered QUARTZ BRECCIA c.14.30	Δ			
	14.60				
16	QUARTZ BRECCIA: similar to material from 5.35 – 7.60; but less weathered and stronger; slight to medium reaction to phosphate test.	Δ Δ Δ	25	21.76 / 21.91	
			100	1.12	
18		Δ Δ	25	2.02	
		Δ		15.89	
		Δ	90	13.60	
20	End of hole 20-low			11.75	

REFERENCES

LOGGED BY G.C. Low

SHEET — OF — DRAWING No

GEOLOGICAL LOG OF DRILL HOLE

PROJECT: RUM JUNGLE PHOSPHATE REMARKS:
HOLE No: DDH 2 CO-ORDINATES: R.L. GROUND:
LOCATION: ANGLE FROM HORIZONTAL: VERTICAL DIRECTION:

DESCRIPTION OF CORE (METRES)

0 — 0.0

1.60 ————————————————

2 Soft, brown SANDY CLAY core with white patches of angular quartz sand (possibly disaggregated quartz fragments), and some coarse crystalline quartz fragments; no reaction to phosphate test.

— Transitional change — — — — — — 3.60

4 Soft, pink to brown CLAY core; contains quartz sand and gravel fragments, and dark brown patches of iron oxide (earthy, often porous and with low density; in places shows soft black spots and streaks of ?limonite, or hard limonite/pyrite cubes and pyritohedrons); parts of the core disintegrate rapidly in water; core looks similar to DDH 8.

6 c.6.00

c.6.80

8

10 c.9.50

12

c.12.50

— Transitional boundary — — — — — — 13.60

14 FERRUGINOUS SANDSTONE: brown to dark brown; porous, permeable and friable; consists of very fine sand-size quartz locally cemented by ? iron oxide; also contains minor white to mauve quartz fragments and white sugary quartz veins; some vugs contain white, acicular unidentified mineral.

16

18

Below 19.0 the core is cut by thin to thick veins of red brown clay.

20 END OF HOLE 20.00m.

CORE RECOVERY %	P_2O_5 assay %
0	
100	2.07
100	1.67
35	1.09
100 / 100	1.23
100 / 50	1.16
100	
100	0.81
0 / 100	1.26
100	1.95
100	1.80
80	2.89
	1.92
100	2.06 / 2.03
	0.96
65	0.52
90	1.13
100	1.67
	2.23
100	2.09
60	1.56
25	0.27
90	0.70
75	1.08
90	0.76 / 0.74
75	0.87
50	0.76
80	0.61
100	0.99
90	1.16
95	0.99
	0.63
	1.09

LOG | SAMPLES

REFERENCES

LOGGED BY: G.C. [illegible]

SHEET __ OF __ DRAWING No

GEOLOGICAL LOG OF DRILL HOLE

PROJECT: RUM JUNGLE PHOSPHATE
HOLE No: DDH 3
LOCATION:
CO-ORDINATES:
REMARKS:
R.L. GROUND:
ANGLE FROM HORIZONTAL ~~VERTICAL~~
DIRECTION:

METRES	DESCRIPTION OF CORE	LOG	CORE RECOVERY %	P_2O_5 assay %	SAMPLES

0 – 0.40

0.40 – 1.25 (boxed section to approx. 3 m):

QUARTZ: white, fine to very coarse crystalline (0.1 – 5 mm) quartz with patches veined and discoloured by small amounts of intergranular phosphatic ironstained mud; contains some patches of specular hematite; probably a silica-rich breccia.

QUARTZ BRECCIA: brown, spotted white and grey; contains approx. 30% quartz fragments (white to grey, 1-20 mm size but some coarser; some elongate and curved shapes indicate non-sedimentary breccia; some boundaries corroded or obscured by veining of matrix material) in 70% brown, indurated, ironstained sandy mudstone matrix; medium phosphate test. Weathered fractures or shears are white to pink, clayey; white acicular unidentified mineral (see DDH 4, 8.30m) in some vugs.

Hard, medium strong to strong rock, which could be difficult to mine and crush

Between 13.60 and 15.80, the core is vuggy, porous, and rich in specular hematite.

Medium phosphate test throughout.

Between 19.60 and 21.95, some breccia fragments are vuggy and rich in specular hematite.

Depth marks on scale: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20 m; boundaries at 0.40, 1.25, 13.60, 15.80, 19.00, 21.95.

Core recovery % (top to bottom): 55, 100, 100, 95, 75, 100, 100, 75, 80, 95, 100, 80, 100, 95, 100, 100, 100, 100, 80, 100, 100, 95, 100, 95, [illegible]

P_2O_5 assay % (top to bottom)
11.18
4.10
8.19
2.97
9.16
2.59
2.93
2.93
3.11 / 3.46
7.85
13.97
3.05
3.16
3.39
13.95
11.55
16.46
11.74
5.50
5.45
9.73
19.18
25.94
16.75
30.64
30.80
36.64
39.53
25.97
12.89
10.05
11.75
10.31
18.76
27.48 / 35.64
[illegible].76
[illegible].60
[illegible]
[illegible]

REFERENCES

END OF HOLE 21.95 m

G. LAW NTGS
June 1978

GEOLOGICAL LOG OF DRILL HOLE

PROJECT RUM JUNGLE PHOSPHATE — REMARKS
HOLE No DDH A — CO-ORDINATES — R.L. GROUND
LOCATION — ANGLE FROM HORIZONTAL VERTICAL — DIRECTION

METRES	DESCRIPTION OF CORE	LOG	CORE RECOVERY %	P_2O_5 assay %	SAMPLES
0	Only fubbles of quartz and quartz breccia recovered.		0	0.04	
	1.00				
	QUARTZ BRECCIA: as described below.		80	0.03	
	1.65				
2	GRAVELLY CLAY: brown, mottled white, lateritic; containing some quartz fragments and some rounded ? siliceous nodules.		80	0.08	
	2.95				
	QUARTZ BRECCIA: brown, spotted white; contains 10–40% quartz fragments (generally 1–30mm, some > core ø i.e. 60mm) in brown matrix of indurated sericitic mudstone; weathered whitish and clayey along some fractures; contains unidentified colourless, fine acicular mineral (straight extinction, n_α approx 1.526, n_γ approx 1.55) lining some vugs. Very slight phosphate reaction.		80	0.09	
4			100	0.10	
				0.15	
				0.12	
			100	0.18	
6				0.16	
				0.23	
			100	0.32	
	50mm thick bed of GREYWACKE: poorly sorted, subrounded quartz sand in brown muddy matrix; bed has fairly sharp contacts at 45° ten. 7.30 7.40			0.52	
8				0.25	
	8.30 8.35		100	0.35	
	Disrupted GREYWACKE bed has contacts at approx 60°–70° ten.			0.23	
				0.21	
10			100	0.21	
	Slight phosphate test below 10 m.			0.19	
				0.18	
	At 11.50, quartz fragments have elongate, curved shapes indicating ? intraformational breccia.		100	0.19	
12				0.16	
				0.19	
			100	0.17	
				0.15	
14				0.23	
			95	0.15	
	14.90			0.13	
	Between 14.90 – 16.80 specular haematite is common in the core.			0.39	
16			100	0.88	
				0.05	
	16.80			0.25	
				0.73	
18			100		
			100		
20	END OF HOLE 20.00m.				

REFERENCES

LOGGED BY G. LAU NTGS

SHEET — OF — DRAWING No

GEOLOGICAL LOG OF DRILL HOLE

PROJECT RUM JUNGLE PHOSPHATES — REMARKS
HOLE N° DDH 5 — CO-ORDINATES — R.L. GROUND
LOCATION — ANGLE FROM HORIZONTAL VERTICAL — DIRECTION

METRES	DESCRIPTION OF CORE	LOG	CORE RECOVERY %	P_2O_5 assay %	SAMPLES
0	0.00				
	Broken core and pebbles recovered; lithology is QUARTZ BRECCIA as below.		35	1.5	
2			50	<1.0	
	2.80		80		
	QUARTZ BRECCIA: brown, spotted white; consists of 20-30% quartz fragments (white, 1-20mm size, a few to 40 mm; angular shape; margins commonly corroded) in a matrix of ironstained, non-phosphatic sandy mudstone; some ? joints or shears are weathered, whitish and clayey.			<1.0	
4			95	<1.0	
				<1.0	
				<1.0	
6			95	<1.0	
				<1.0	
				<1.0	
			95	<1.0	
8				<1.0	
				<1.0	
			160	1.1	
	From 9.35 - 10.60 the quartz breccia is less well indurated; fractures are clay coated and show slickenside lineation.	9.35			
10			90	<1.0	
				<1.0	
	10.60			<1.0	
			100	<1.0	
12				1.6	
				<1.0	
			75	<1.0	
				<1.0	
14	Slight reaction to phosphate test below about 14 m depth.			<1.0	
			100	<1.0	
				<1.0	
				<1.0	
16	Medium reaction to phosphate test in matrix material below about 16 m.		100	<1.0	
				<1.0	
	Below 17.50, veins and fracture coatings are green, chloritic; some drusy quartz and specular hematite also occurs. The dark red brown fracture coating above this depth is possibly oxidised chlorite.	17.50			
18			100	<1.0	
				<1.0	
				<1.0	
			100	<1.0	
				<1.0	
20	END OF HOLE 20.00 m.			<1.0	

REFERENCES

LOGGED BY G. LAU NTGS

SHEET — OF — DRAWING N°

GEOLOGICAL LOG OF DRILL HOLE

PROJECT: RUM JUNGLE PHOSPHATE — REMARKS:
HOLE No: DDH 6 / ADH3 — CO-ORDINATES: — R.L. GROUND:
LOCATION: — ANGLE FROM HORIZONTAL: VERTICAL — DIRECTION:

METRES	DESCRIPTION OF CORE	LOG	CORE RECOVERY %	P_2O_5 assay %	SAMPLES
0	Brown silty sand containing pebbles of quartz breccia, quartz and indurated sandy mudstone; some quartz is fine crystalline, cusery.			4.1	
				3.0	
				4.1	
				4.6	
				4.1	
2	Transitional change. — — — — 2.00			12.4	
	Brown clayey sand with lumps of quartz, quartz breccia and white clay. No visible reaction to phosphate test.			9.2	11.0%
				9.2	
				7.3	
				4.1	
4	Transitional change. — — — — —			3.2	
	Brown clay with lumps of white clay and clay-coated quartz and moderately indurated mudstone. One lump of bleached apatitic mudstone was noted.			5.5	
				7.6	
				12.8	
6				18.8	
				15.1	
				21.1	
				27.3	
				32.1	
	END OF ADH3 at 7.00m.			32.1	
				27.3	
	START OF DDH6 at 7.10m.				
			100	24.6	
8	SILICA ROCK, brecciated in part: brown, indurated, phosphatic; looks like silicified mudstone; contains 2-5% vugs and fine fores, the latter often containing bleck? limonite/pyrite grains; cut by white clayey? shears at 60° to c.n. Below about 9.3,			30.2	
			100	28.9	
				30.0	
			100	21.6	
10	the rock is brecciated by numerous white clay veins.			31.1	
			100	35.3	
				30.2	
				26.6	
			95	21.8	
12	— Transitional boundary. — — — — 11.60			27.5	
	CLAY: brown; soft, broken, core with medium reaction to phosphate test; looks like highly weathered sericitic mudstone; contains scattered patches of specular hematite.				
			35	25.2	
14				9.5	
			85	17.3	
				9.7	
16			100	5.1	
				10.2	
			75	3.1	
				18.4	
18	Around 18.00 the core contains a few angular grains of quartz.			2.5	
			100	3.2	
				7.3	
			100	3.8	
20	END OF HOLE 20.00m.			2.9	

REFERENCES

LOGGED BY: G. LAW NTGS

SHEET — OF — DRAWING No

GEOLOGICAL LOG OF DRILL HOLE

PROJECT: RUM JUNGLE PHOSPHATE
REMARKS:
HOLE No: 0047
CO-ORDINATES:
R.L. GROUND:
LOCATION:
ANGLE FROM HORIZONTAL: VERTICAL
DIRECTION:

METRES	DESCRIPTION OF CORE
0 – 3.20	Broken core; dominantly brown, highly weathered QUARTZ BRECCIA similar to the material below.
3.20	QUARTZ BRECCIA: brown to pink brown, spotted white and grey; contains 10–40% quartz fragments (white to grey, generally 1–20 mm size but some > 60 mm core ϕ; shapes are angular with some irregular corroded margins); fragments are set in a phosphatic matrix of ironstained sandy mudstone; the core is cut by whitish, weathered zones possibly representing shears.
9.15	Transitional change with decrease of quartz and appearance of chlorite in the rock mass. CHLORITIC MUDSTONE BRECCIA: dark brown, mottled green; contains clasts and stringers of chlorite and clasts of brown mudstone in a dominant matrix of phosphatic, sericitic mudstone.
10.90	QUARTZ BRECCIA, similar to 3.20 – 9.15 above.
15.40	MUDSTONE: pink brown, sericitic, phosphatic, brecciated in part.
16.40	QUARTZ BRECCIA as above.
18.00	From 18.00, many fracture faces in the quartz breccia are coated with slickensided chlorite.
20	END OF HOLE 20.05 m

LOG: Δ (quartz breccia), HW (highly weathered), CHL (chlorite), mudstone symbols 15.40–16.40.

CORE RECOVERY % (top to bottom): 40, 60, 90, 100, 80, 100, 100, 100, 100

P_2O_5 assay % (top to bottom): 4.9, 3.4, 4.4, 5.3, 3.2, 4.4, 19.2, 13.3, 11.3, 9.3, 14.7, 14.1, 16.7, 8.4, 23.7, 22.9, 16.7, 7.6, 4.6, 9.1, 13.0, 12.6, 8.5, 3.9, 7.5, 6.2, 2.6, 14.8, 2.9, 1.8, 6.6, 8.9, 16.1, 14.1

SAMPLES:

REFERENCES:

LOGGED BY: G. LAU NTGS

SHEET __ OF __ DRAWING No

GEOLOGICAL LOG OF DRILL HOLE

PROJECT RUM JUNGLE PHOSPHATE — REMARKS
HOLE No DDH 8 — CO-ORDINATES — R.L. GROUND
LOCATION — ANGLE FROM HORIZONTAL VERTICAL — DIRECTION

METRES	DESCRIPTION OF CORE	LOG	CORE RECOVERY %	P_2O_5 assay %	SAMPLES
0	Only loose pebbles recovered; mostly quartz with some quartz breccia.		0	<1.0	
			0	<1.0	
2			0	<1.0	
	Highly weathered QUARTZ BRECCIA: pink to brown, spotted white; containing 20-30% quartz fragments (1-20mm size, angular) in an ironstained, sandy mudstone matrix.	2.40	15	<1.0	
			40	<1.0	
4			35	<1.0	
			45	<1.0	
		4.75			
	CLAY: soft core containing variable amounts of crystalline quartz (5-10mm, subhedral crystals) and dark brown iron oxide (earthy, porous, low density; sometimes containing aggregates of fine specular hematite) in white or pink to brown, ironstained clay (in places this has a rhombohedral crystalline form ? pseudomorphing carbonate); iron rich in the sections 5.60 - 9.40, and 11.30 - c.15.20		100	1.5	
		5.60	90	1.4	
6			85	1.3	
				1.2	
8			55	1.2	At 7.85, a Sample assayed: Fe as Fe_2O_3 92.5% Mn as MnO_2 10.8%.
			90	1.5	
			75	1.6	
		9.40	55	1.4	
10			65	1.8	
			85	1.7	
			100	1.5	
		11.30	100	1.6	
12	At 11.80, a faint foliation trends at 45°tcn.	11.80	100	1.7	
				1.1	
14			65	6.0	
	QUARTZ BRECCIA: hard, moderately strong core; lithology similar to that below.	c.15.20	65		
		15.50			
16	CLAY: brown, slightly sericitic, with minor greenish ?talc; shows small slickensided ?shear planes.		65	<1.0	
		16.70			
	DOLOMITE: dark brown, coarse crystalline dolomite with minor yellow-green ?talc	16.80	85	<1.0	
18	QUARTZ BRECCIA: brown, spotted white; containing 30-40% quartz fragments (clear to white, angular, 1-40mm size; some have elongate, wispy shapes and/or corroded margins) set in a matrix of ironstained sandy mudstone; fractures commonly coated with dark brown chlorite.			<1.0	
				<1.0	
			70	<1.0	
20			90	<1.0	

REFERENCES

END OF HOLE at 19.85m

LOGGED BY C. LAU NTGS

SHEET — OF — DRAWING No

GEOLOGICAL LOG OF DRILL HOLE

PROJECT RUM JUNGLE PHOSPHATE REMARKS

HOLE No ADH1 CO-ORDINATES R.L. GROUND

LOCATION ANGLE FROM HORIZONTAL VERTICAL DIRECTION

METRES	DESCRIPTION OF CORE	LOG	CORE RECOVERY %	P_2O_5 assay %	SAMPLES
0–2	Brown silty sand with pebbles of quartz breccia and of sugary, fine crystalline quartz, and brown flakes of specular hematite.			27	
				1.4	
2–4	Soft, dark brown lumps of homogenized clay; in places has fine white sprinkling, pale green? talcose patches, relict pink and yellow banding, black limonite staining, minor specular hematite flakes and minor quartz sand; slight phosphate reaction.			<1.0	
				1.4	
				1.4	
4–6				1.4	
				4.6	
6–8				2.7	
				1.8	
8–10				1.4	
				1.0	
10–12				1.4	
				1.4	
12–14				1.6	
				2.1	
14–16				1.8	
				2.7	
16–18				2.7	
				3.0	
18–20				3.0	
20	END OF HOLE 20.00 m.				

REFERENCES

LOGGED BY G. LAW NTGS.

SHEET OF DRAWING No

GEOLOGICAL LOG OF DRILL HOLE

PROJECT RUM JUNGLE PHOSPHATE — REMARKS
HOLE No ADH 2 — CO-ORDINATES — R.L. GROUND
LOCATION — ANGLE FROM HORIZONTAL VERTICAL — DIRECTION

METRES	DESCRIPTION OF CORE	LOG	CORE RECOVERY %	P_2O_5 assay %	SAMPLES
0–2	Brown silty sand with pebbles of quartz, and quartz breccia; sand is non-sorted, very fine to very coarse; shape is subrounded above medium size and angular below medium size.			<1·0	
	↓ Becoming clayey			<1·0	
2–4	Brown clayey sand with pebbles of quartz (both coarse crystalline, and fine crystalline, sugary) quartz breccia, and soft lumps of sandy and gravelly mudstone; no visible P_2O_5 mineral.			<1·0	
				<1·0	
4–6				1·4	
				1·4	
6–8	↓ Sand decreasing to absent.			1·4	
	Light brown lumps of generally homogenised clay with angular quartz sand and gravel and chips of white clay.			2·1	
8–10				7·8	
				5·5	
10–12				6·0	
				1·9	
12–14				9·6	
				13·6	
14–16				5·5	
				7·8	
16–18				25·6	
				11·5	
18–20	Clay contains some large lumps of dark brown limonitised sericitic clay, and some brown, finely spotted white lumps of clay.			8·2	
				4·6	
20	END OF HOLE 20·00 m.				

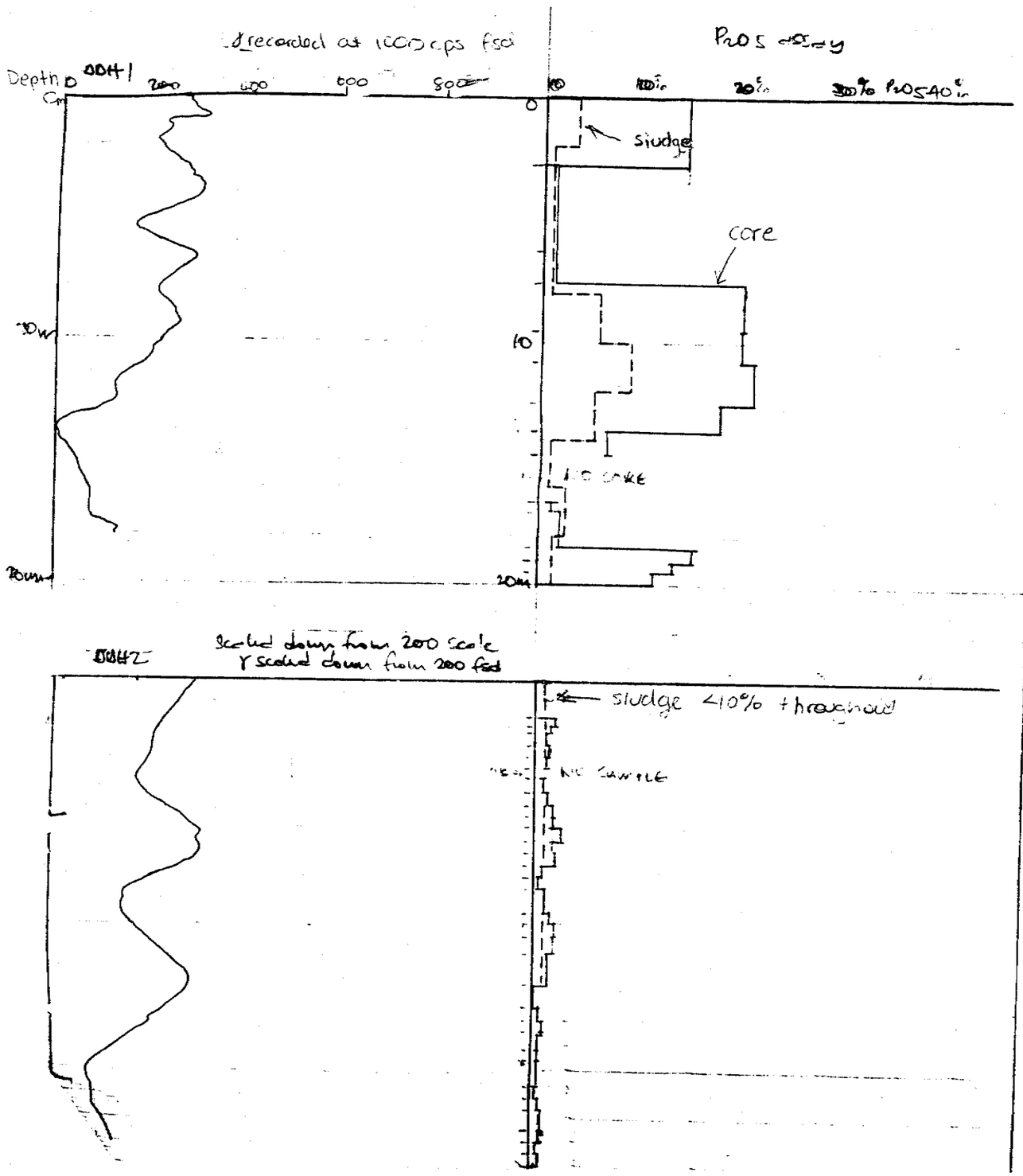
REFERENCES

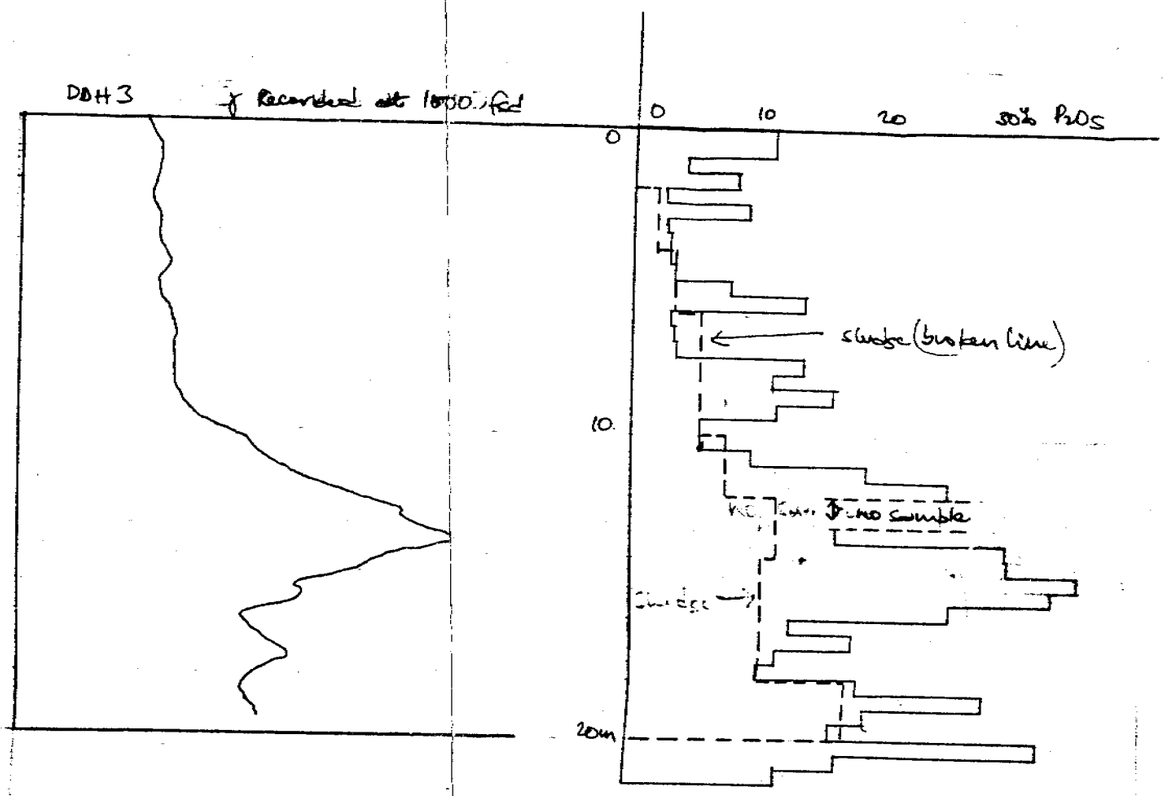
LOGGED BY G. LAU NTGS

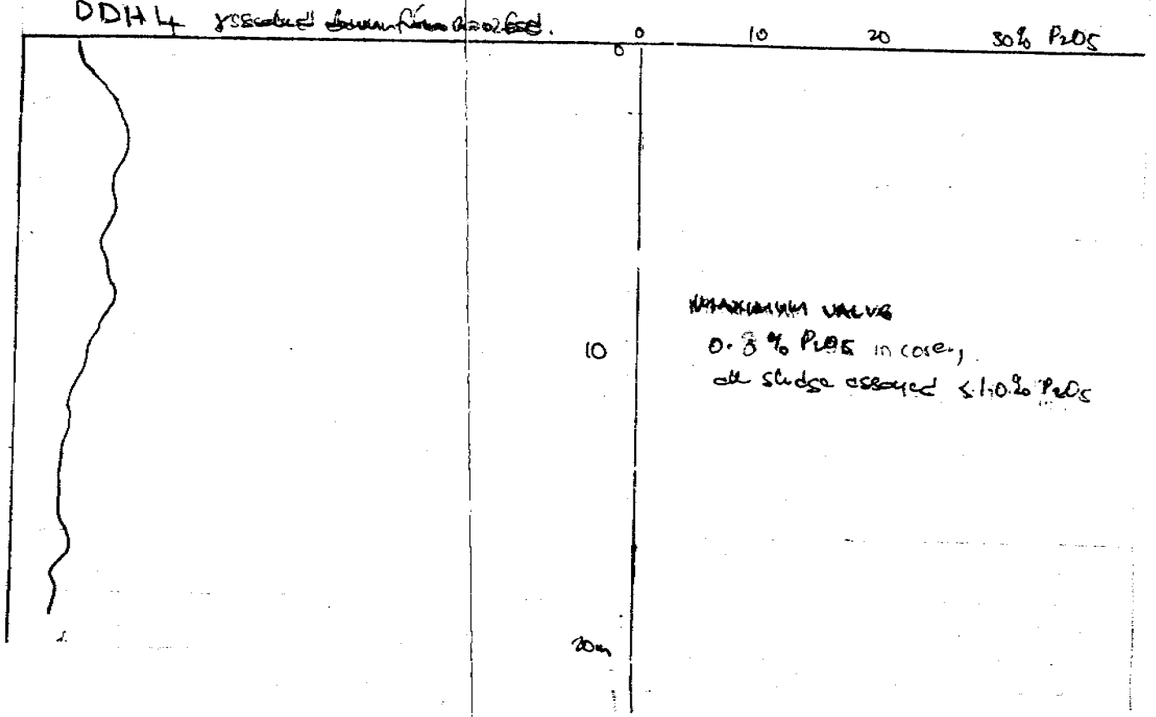
SHEET — OF — DRAWING No

Rum Jungle Phosphate

Comparison of gamma logs with Phosphate Assays



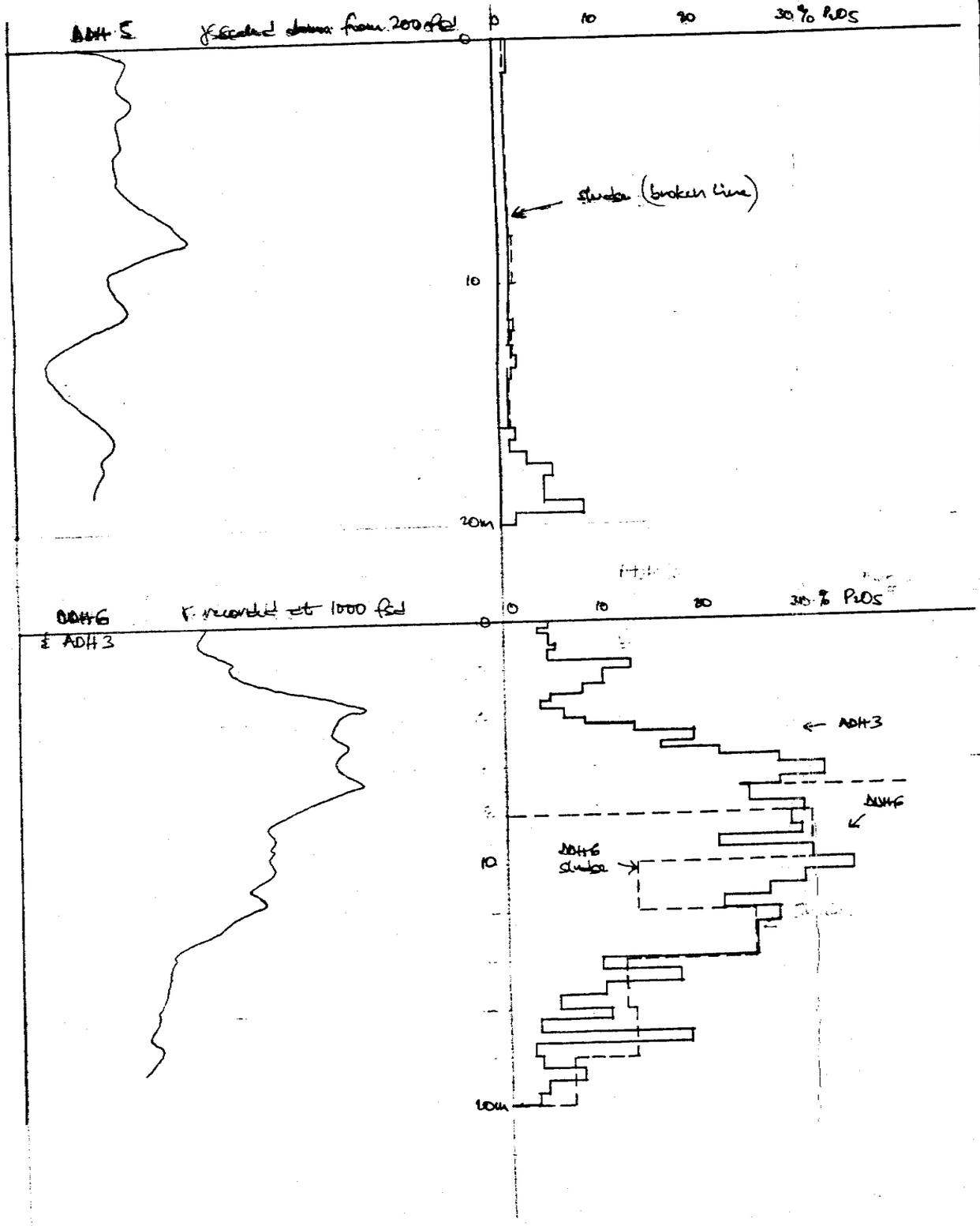


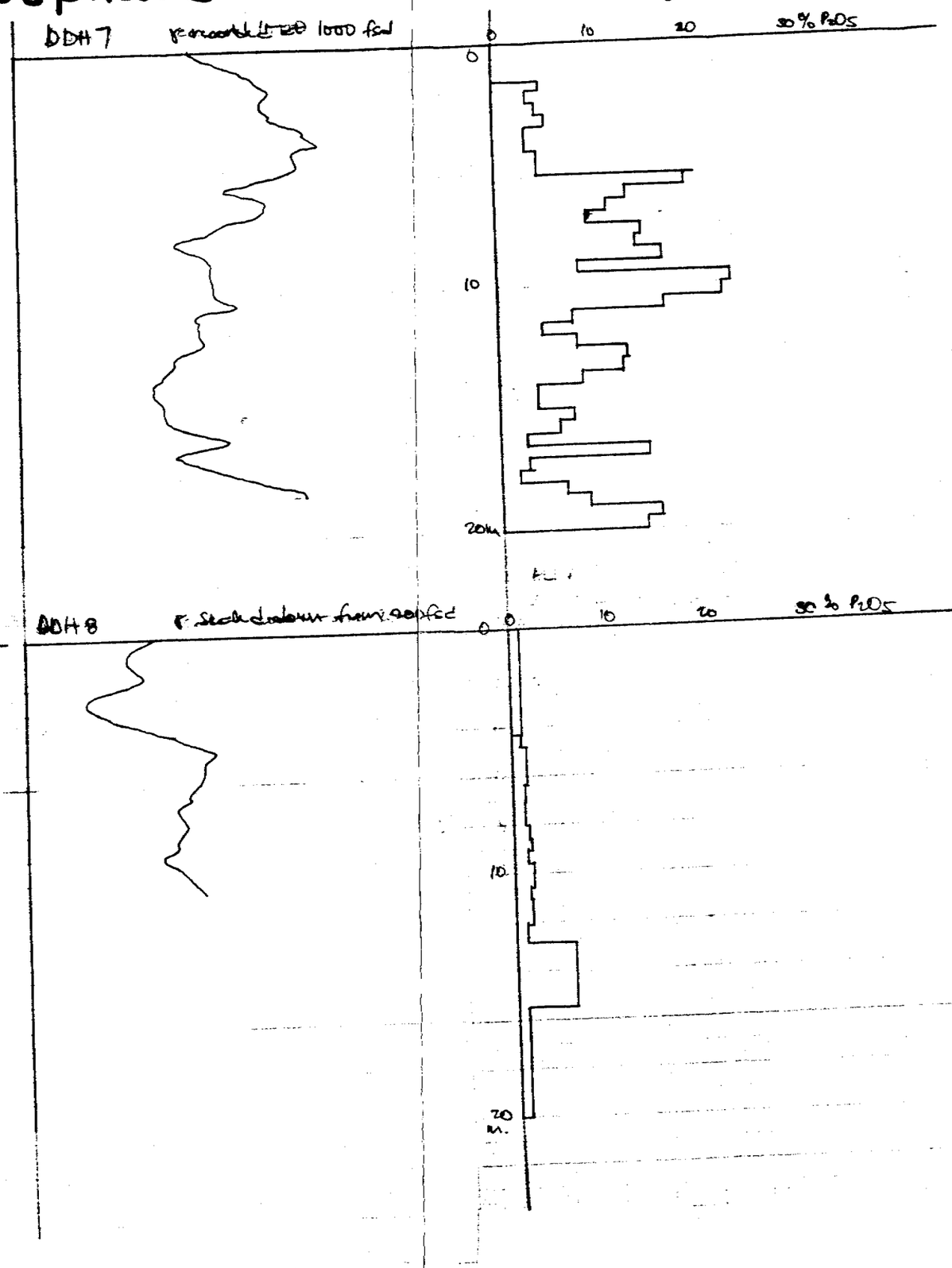


MAXIMUM VALUE
0.3 % P2O5 in core,
all sludge assayed <1.0% P2O5

Rum Jungle Phosphate

Comparison of gamma logs with phosphate assay





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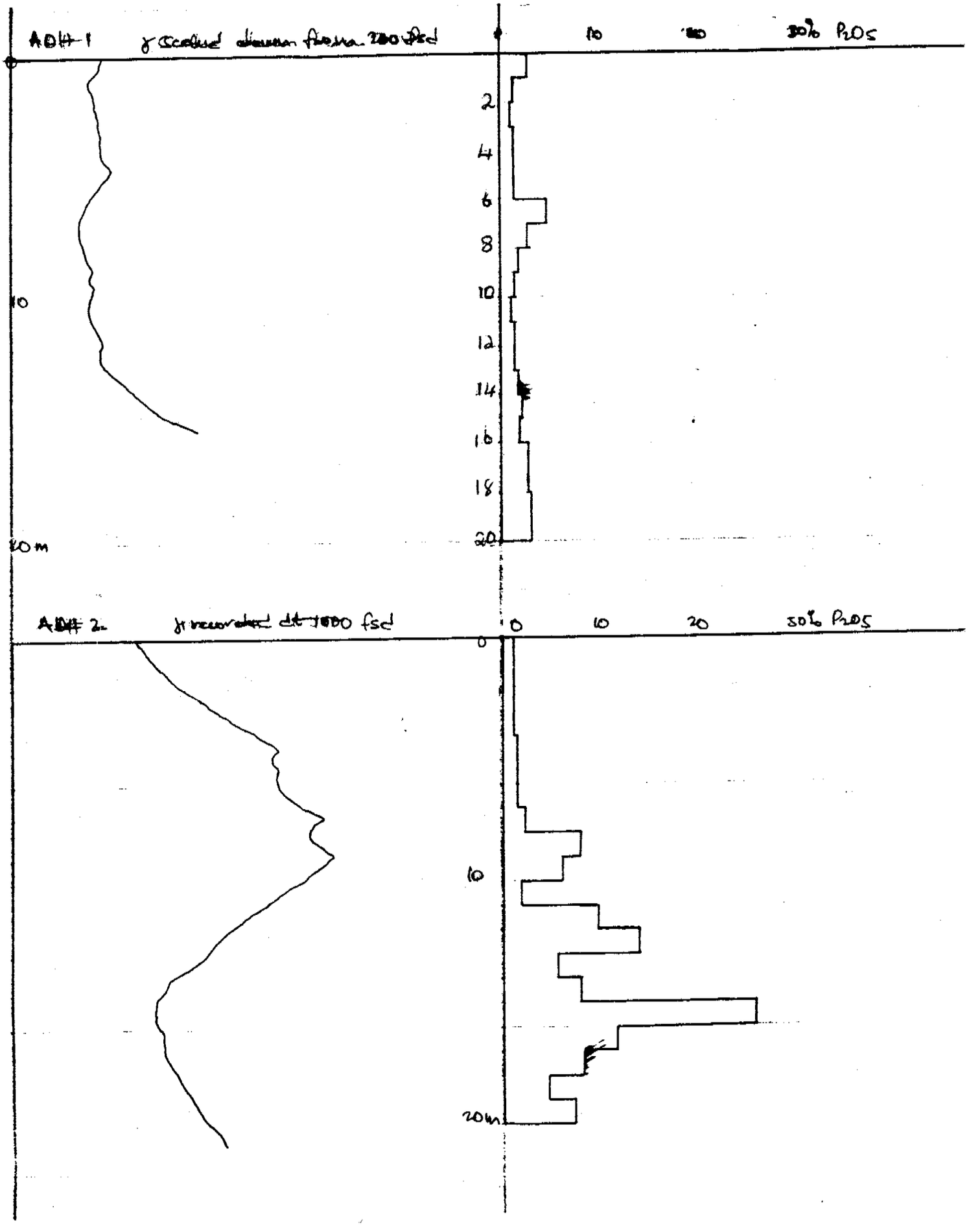

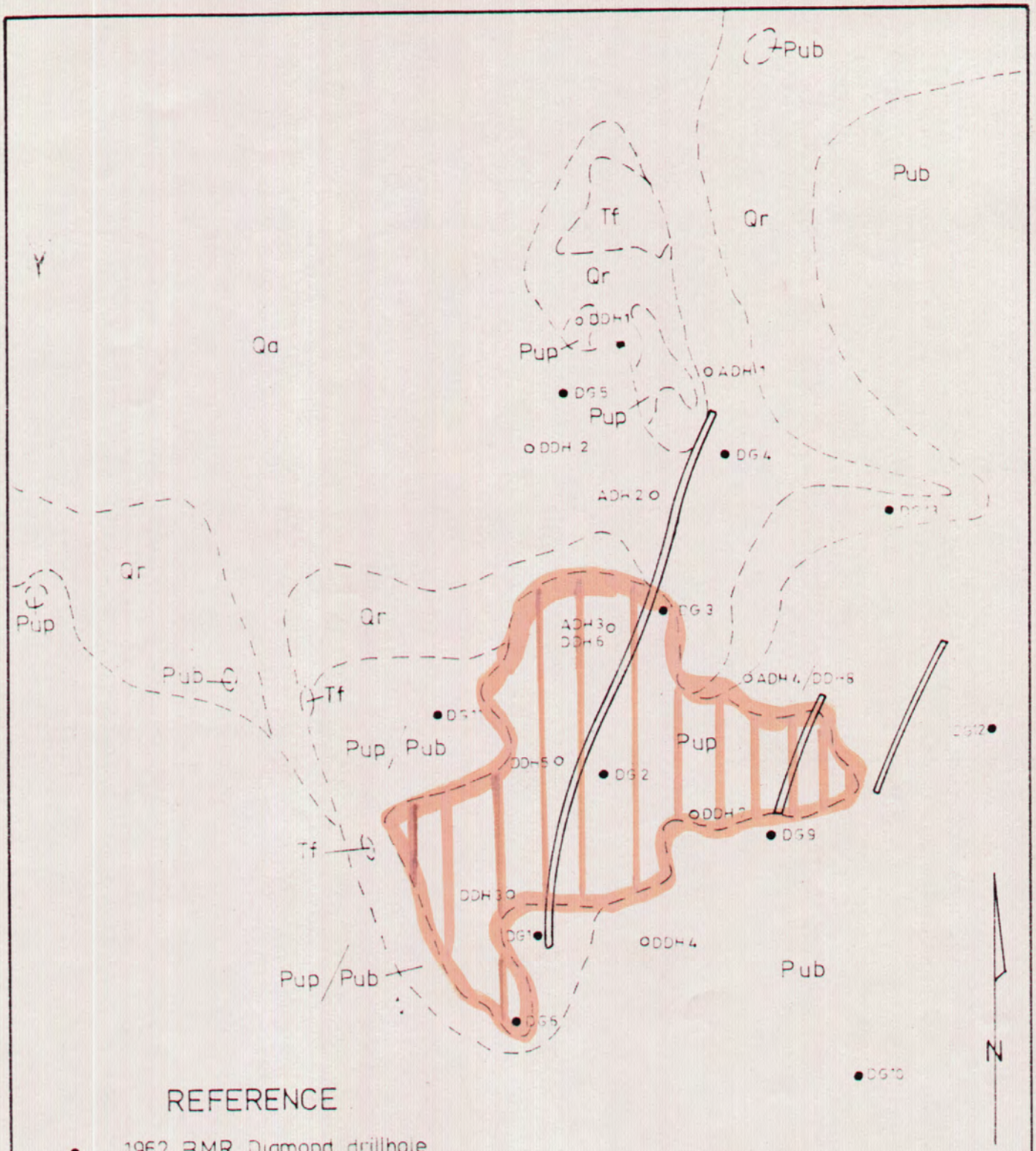

REFERENCE

- 1962 BMR Diamond drillhole
- 1977 NTGS drillhole
- 1962 BMR Costean
- Geological boundary

Qa	Alluvium
Qr	Rubble
Tf	Ferruginous breccia (pisolitic)
Pub	Hematitic quartz breccia
Pup	Phosphatic rock

GEOLSEC PHOSPHATE DEPOSIT

1979 GEOLOGICAL SKETCH MAP

(after Pritchard and others, 1963)

Scale 1: 2000

20 0 20 40 60 80 100 m

Drawn by Dept of Mines and Energy Drafting Section, Oct. 79.

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