

**C L BREDIN HOLDINGS LTD
GEOLOGICAL CONSULTING**

Box 750
Breton Alta
TOC OPO
Ph 1-696-2366

**WELLSITE GEOLOGICAL REPORT
FOR
PARAMOUNT RESOURCES LTD.**

**Paramount et al Cameron
C-19**

WELL SUMMARY

Well Name: Paramount et al Camreron C-19

Location: 60° 10' N 117° 30' W

Elevation: Ground 782.8m KB 786.3m

Total Depth: Driller 1673m Logger 1642.0m [bridged]

Operator: Paramount resources Ltd.

Contractor: Sierra Drilling Rig #3

Geologist: Colin Bredin

Drilling Supervisor: Phillip Christie

Logs Run: IRTJ", CNL-FDC", ARRAY Sonic*, PHASOR-SFL+
+ ran retrievable casing to 564.5 then Phasor without standoffs
* bridged at 482m, Sonic from 482 to surface
" ran 139mm through bridges then ran slim hole tools

Drill Stem Tests:

#1 Lower Sulfur Point 1439.0 to 1457.0m BH Inflate

Core Cut: None

Surface Casing: 244.5mm landed @ 395m KB

Production Casing: 139.7mm landed @ 1668m KB

Spud Date: 91-02-11

Rig Release: 91-03-05

Status: Potential Sulfur Point Gas

COLIN BREDIN BSc PGeol

WELL NAME: Paramount et al Cameron C-19

GR 782.8m

LOCATION: 60° 10' N 117° 30' W

KB 786.3m

FORMATION	DEPTH	SUBSEA
Wabamun	555.0m	+231.3
Fort Simpson	750.0m	+ 36.3
Twin Falls	871.0m	- 84.7
Hay River	1022.0m	-235.7
Muskwa	1352.0m	-565.7
Slave Point	1377.0m	-590.7
Fort Vermillion	1407.5m	-621.2
Watt Mountain	1426.0m	-639.7
Sulfur Point	1431.0m	-644.7
Muskeg	1451.5m	-665.2
Keg River	1549.0m	-762.7
Chinchaga	1621.0m	-834.7
Granite Wash Sandstone	1650.0m samp	-863.7
Precambrian	1653.0m samp	-866.7
Total Depth	1673.0m tally	-886.7

DRILL STEM TEST REPORT

WELL NAME Paramount et al Cameron C-19DATE 91-02-24 TEST # One KB 786.3m TD 1457m
yr mo dayFORMATION Lower Sulfur Point INTERVAL 1439m TO 1457mTYPE Bottom Hole Inflate WTS - minGTS 3 minFLOWTIMES 10 / 60 / 18 / - OTS - min

BLOW DESCRIPTION

Prewlow WAB to SAB in 3 min, increasing throughout, NGTSValve Open SAB immediate, GTS 3 min

PRESSURES

RECOVERY

PF 1390 - 1228 Total 334mHP 16088 - 16004 65m gasified inhibitor + H₂OFP 1335 - 991 52m gasified mudSIP 9662 - 2159 165m gassy oil stained mud52m drilling mud

REMARKS

Lost packer seat 18 minutes into valve open, could notregain seat, 165m gassy oil stained mud was 45% mud,20% oil, 35% water 5000 ppm

SAMPLE DESCRIPTION

- 1350 SHALE medium grey, dark brown calcareous
- 1355 SHALE medium grey, medium grey calcareous, dark brown calcareous, trace of LIMESTONE light grey-white argillaceous, tight
- 1360 SHALE medium grey calcareous, dark brown calcareous, black carbonaceous, minor LIMESTONE light grey, light grey-white argillaceous, tight
- 1365 as above
- 1370 as above
- 1375 SHALE medium grey, medium grey calcareous, LIMESTONE white-light grey, argillaceous, tight
- 1380 LIMESTONE light brown, medium brown, crypto to microcrystalline, mudstone to wackstone, no stain, no fluorescence, no Ø
- 1385 as above, **slight petroliferous odor.**
- 1390 LIMESTONE light brown, medium brown, cryptocrystalline, mudstone, no stain, no fluorescence, no Ø, **slight petroliferous odor.**
- 1395 LIMESTONE light brown, medium brown, cryptocrystalline, mudstone, no stain, **trace of yellow wet cut fluorescence, fair petroliferous odor, no apparent Ø**
- 1400 as above
- 1405 as above, trace of ANHYDRITE
- 1410 LIMESTONE as above, trace of ANHYDRITE white, light grey, abundant cavings
- 1415 LIMESTONE light grey, light brown, medium brown, crypto-crystalline, mudstone to wackstone, tight
- 1420 LIMESTONE light, medium brown, crypto to microcrystalline, mudstone to wackstone, no stain, no fluorescence, no Ø trace of ANHYDRITE white, light grey, abundant cavings
- 1425

- 1425 ANHYDRITE white, light grey, LIMESTONE medium, medium-dark brown, cryptocrystalline, mudstone, no stain, no fluorescence, no Ø
- 1430 LIMESTONE light, medium brown, cryptocrystalline, mudstone, no stain, no fluorescence, no Ø, minor LIMESTONE medium brown, crypto to microcrystalline, wackstone, no stain, no fluorescence, no Ø
- 1435 as above
- 1440 LIMESTONE as above, DOLOMITE light brown, crypto to microcrystalline, microcrystalline, wackstone to packstone, **light oil stain, fair dry, strong wet cut fluorescence, trace of pinpoint Ø, fair petroliferous odor, trace of intercrystalline Ø**, DOLOMITE light to medium brown, microcrystalline, wackstone, no stain, **spotty dry, streaming yellow wet cut fluorescence, minor vuggy Ø, fair petroliferous odor**
- 1445 DOLOMITE light, medium brown, cryptocrystalline, microcrystalline, wackstone, packstone, **trace of light oil stain, fair streaming yellow wet cut fluorescence, pinpoint and intercrystalline Ø, trace of small vugs, fair to strong petroliferous odor,**
- 1450 DOLOMITE medium brown, microcrystalline, wackstone to packstone, **trace of light oilstain, fair dry, fair wet cut fluorescence, minor pinpoint, intercrystalline and small vuggy Ø, strong petroliferous odor.**
- 1455 DOLOMITE as above, minor ANHYDRITE white, light grey
- 1460 DOLOMITE light, medium brown, cryptocrystalline, mudstone, no stain, no fluorescence, no Ø, ANHYDRITE white, light brown, light grey-white
- 1465 ANHYDRITE white, light brown, light grey-white, minor DOLOMITE as above
- 1470 as above
- 1475 as above
- 1480 DOLOMITE medium brown, cryptocrystalline, mudstone to wackstone, no stain, no fluorescence, no Ø, minor ANHYDRITE white, light brown,
- 1485

- 1485 ANHYDRITE white, light grey, light brown, trace of DOLOMITE
- 1490 as above
- 1495 ANHYDRITE white, light grey, light brown, trace of DOLOMITE medium brown, crypto to microcrystalline, mudstone to wackstone, no stain, no fluorescence, no Ø, abundant cavings
- 1500 ANHYDRITE white, light brown, light grey, trace of DOLOMITE as above, abundant cavings
- 1505 as above
- 1510 as above
- 1515 as above
- 1520 as above, trace of DOLOMITE medium brown, cryptocrystalline, mudstone, no stain, trace of **yellow wet cut fluorescence**,, no apparent Ø, abundant cavings
- 1525 Cavings
- 1530 ANHYDRITE white, light grey, light brown, trace of DOLOMITE medium brown, crypto to microcrystalline, mudstone to wackstone, no stain, no fluorescence, no Ø
- 1535 ANHYDRITE light brown, abundant cavings
- 1540 as above
- 1545 as above
- 1550 as above, trace of DOLOMITE light brown, crypto to microcrystalline, mudstone to wackstone, trace packstone, no stain, **faint wet cut fluorescence**, no visual Ø
- 1555 DOLOMITE light brown, medium brown, microcrystalline, wackstone to packstone, no stain, no fluorescence, **trace of pinpoint Ø**, minor ANHYDRITE and cavings
- 1560 DOLOMITE light brown, medium brown, cryptocrystalline, microcrystalline, mudstone to wackstone, minor packstone, no stain, **faint yellow wet cut fluorescence**, **trace of small vugs**.
- 1565 DOLOMITE light, medium brown, crypto to microcrystalline, mudstone to wackstone, no stain, no fluorescence, no Ø trace carbonaceous
- 1570

- 1570 DOLOMITE light to medium brown, crypto to microcrystalline, mudstone to wackstone, no stain, no fluorescence, trace of vuggy $\emptyset$, slight petroliferous odor,
- 1575 as above
- 1580 DOLOMITE light, medium, dark brown, crypto to microcrystalline, mudstone to wackstone, no stain, no fluorescence, no visual $\emptyset$
- 1585 DOLOMITE light, medium brown, crypto to microcrystalline, mudstone to wackstone, no stain, no fluorescence, no $\emptyset$
- 1590 as above
- 1595 DOLOMITE light, medium, dark brown, crypto to microcrystalline, wackstone, no stain, no fluorescence, no $\emptyset$
- 1600 DOLOMITE dark brown, black, medium brown, crypto to microcrystalline, wackstone, no stain, no fluorescence, no visual $\emptyset$, trace of SHALE black carbonaceous
- 1605 DOLOMITE dark brown to black, cryptocrystalline, mudstone, argillaceous, no stain, no fluorescence, no $\emptyset$
- 1610 DOLOMITE light to medium brown, cryptocrystalline, mudstone, DOLOMITE dark brown, argillaceous, tight
- 1615 DOLOMITE light, medium, dark brown, crypto to microcrystalline, mudstone to wackstone, no stain, no fluorescence, no $\emptyset$, trace of ANHYDRITE light grey, light brown
- 1620 DOLOMITE buff to light brown, cryptocrystalline, mudstone, trace of ANHYDRITE
- 1625 as above, minor ANHYDRITE white to light brown, light grey
- 1630 ANHYDRITE white, light brown, DOLOMITE as above
- 1635 ANHYDRITE white, light grey, lt brown, minor DOLOMITE as above
- 1640 ANHYDRITE light brown, light grey-white, minor DOLOMITE buff to light brown, cryptocrystalline, mudstone, tight
- 1645 as above, trace of free quartz
- 1650 SANDSTONE clear to frosted quartz, fine to very coarse grained, angular to well rounded, poorly sorted, no stain, no fluorescence, intergranular $\emptyset$ 6-8%, trace of feldspars
- 1655 GRANITE quartz and feldspars
- 1673 TD

**C.L. BREDIN HOLDINGS LTD.
GEOLOGICAL CONSULTING**

Well Name: Paramount et al Cameron C-19 Ground Elev. 782.8
 Location: 60° 10' N 117° 30' W K.B. Elev. 786.3
 Spud Date: 91-02-11

Rig Release: 91-03-05 Finish Drilling 91-03-01
 Total Depth: 1673m Logger 1643.0 [br]

Status: Potential Sulfur Point Gas
 Casing: Surface 244.5mm landed at 395m KB
 Production 139.7mm landed @ 1668.0m KB

Operator: Paramount Resources Ltd.

Contractor: Sierra Drilling Rig #3

Supervision: Geologist Colin Bredin
 Engineer Phillip Christie

Logs Run: IRTJ, CNL-FDC, ARRAY Sonic, PHASOR-SFL

FORMATION TOPS		
Formation	Top	Subsea
Wabamun	555.0	+231.3
Ft Simpson	750.0	+ 36.3
Twin Falls	871.0	- 84.7
Hay River	1022.0	-235.7
Muskwa	1352.0	-565.7
Slave Pt	1377.0	-590.7
Ft Verm	1407.5	-621.2
Watt Mtn	1426.0	-639.7
Sulfur Pt	1431.0	-644.7
Muskeg	1451.5	-665.2
Keg River	1549.0	-762.7
Chinchaga	1621.0	-834.7
GW sand	1650.0	-863.7
PreCambrian	1653.0	-866.7
TD	1673.0	-886.7

CORE AND DRILL STEM TEST SUMMARY

NO	INTERVAL	RECOVERY	FORMATION
#1	1439.0-1457.0	334m gasified, oil st, mud	Sulfur Point

SHOWS

Excellent
 Good
 Fair
 Poor

SORTING

Well
 Medium
 Poor

POROSITY

Intergranular
 Inter crystalline
 Small Vuggy
 Large Vuggy
 Earthy
 Fracture
 Pinpoint

ROUNDING

Angular
 Sub-angular
 Sub-round
 Round

LIMESTONE

Crystalline

DOLOMITE

Crystalline

EVAPORITES

Anhydrite

Salt/Potash

CLASTICS

Shale

Siltstone

Sandstone

Conglomerate

Coal

Arkose

IGNEOUS-METAMORPHIC

Granite

Metamorphic

Volcanic

Peloidal

Bioclastic-Fragmental

Oolitic

Reefal

Crinoidal

Cherty

Anhydritic

Calcite Crystal

Dolomite Crystal

Bentonite

Earthy

Sandy

Silty

Argillaceous

Bituminous

Chert-Siliceous

Glauconitic

Calcareous

Dolomitic

Sideritic

Pyritic

Fracture

Fossil

Trachypod

Bryozoan

Coral

Gastropod

Ostracod

Location : Paramount et al Cameron C-19

LITHOLOGY

Rock Description Procedure

[illegible]

Depth, Tops Eng. Data	Penetration Rate min / m	Fluorescence	Por Type	Porosity ^ 20% 15-20% 10-15% 5-10% < 5%	Lithology	V.F. F M CS	Sorting	Rounding	Gross Rock Type	Cementation
									Color	Porosity
									Composition	Permeability
									Grain Size	Staining, Fluorescence, Cu
									Rounding, Sorting, Induration	Structures
FORT VERM									aa tr ANH	
1410									LS aa tr ANH wh, lt gy, abt cvngs	
1415									LS lt gy, lt bn, med bn, crypto mud-wack, tight	
1420									LS lt, med bn, crypto-micro, mud-wack, no st, no flour, no Ø, tr ANH wh, lt gy, abt cvngs	
1425									ANH wh, lt gy, LS med, med-dk bn, crypto, mud, no st, no flour, no Ø	
SULFUR POINT									LS lt, med bn, crypto, mud, no st, no flour, no Ø, mnr LS, med bn, crypto-micro, wack, no st, no flour, no Ø	
1435									aa	
1440									LS aa, DOL lt bn, crypto-micro suc, wack-pack, lt oil st, fair dry, strong wet cut flour, pp, intxstal, vug Ø petro odor	
1445									DOL lt, med bn, crypto, micro, wack, pack, lt oil st, fair st yw wet cut flour, pp, intxstal, small vug Ø fair petro odor	
MUSKEG									DOL med bn, micro, wack-pack, lt oil st, fair dry, fair wet cut flour, pp, intxstal, small vug Ø, strong petro odor	
1455									DOL aa, mnr ANH wh, lt gy	

Location : Paramount et al Cameron C-19

LITHOLOGY

Rock Description Procedure

[illegible]

LITHOLOGY

Rock Description Procedure

Depth, Tops Eng. Data	Penetration Rate min / m	Fluorescence	Por Type	Porosity > 20% 15-20% 10-15% 5-10% < 5%	Lithology	V.F.	F	M.	C.S.	Sorting	Rounding	Rock Description Procedure	
												Gross Rock Type	Cementation
												Color	Porosity
												Composition	Permeability
												Grain Size	Staining, Fluorescence, Co
												Rounding, Sorting, Induration	Structures
1520												aa	
1525												aa tr DOL med bn crypto, mud, no st, tr yw wet cut flour, no app $\emptyset$, abt cvngs	
1530												cvngs	
1535												ANH wh, lt gy, lt bn, tr DOL med bn, crypto-micro, mud- wack, no st, no flour, no $\emptyset$	
1540												ANH lt bn, abt cvngs	
1545												aa	
1550												aa	
1555												aa tr DOL lt bn, crypto-micro, mud-wack, tr pack, no st, faint wet cut flour, no vis $\emptyset$	
1560												DOL lt, med bn, micro, wack- pack, no st, no flour, tr pp $\emptyset$, mnr ANH and cvngs	
1565												DOL lt, med bn, crypto-micro, mud-wack, mnr pack, no st, faint yw wet cut flour, tr small vug $\emptyset$	
												DOL lt, med bn, crypto-micro, mud-wack, no st, no flour, no $\emptyset$, tr carb	

LITHOLOGY

Rock Description Procedure

Depth, Tops Eng. Data	Penetration Rate min / m	Fluorescence	Por Type	Porosity > 20% 15-20% 10-15% 5-10% < 5%	Lithology	V.E. F M CS	Sorting	Rounding	Rock Description Procedure	
									Gross Rock Type	Cementation
									Color	Porosity
									Composition	Permeability
									Grain Size	Staining, Fluorescence, Co
									Rounding, Sorting, Induration	Structures
1575					DOL lt-med bn, crypto-micro, mud-wack, no st, no flour, tr vuggy Ø, slig petro odor					
1580					aa					
1585					DOL lt, med, dk bn, crypto- micro, mud-wack, no st, no flour, no vis Ø					
1590					DOL lt, med bn, crypto-micro, mud-wack, no st, no flour, no Ø					
1595					aa					
1600					DOL lt, med, dk bn, crypto- micro, wack, no st, no flour, no Ø					
1605					DOL dk bn, blk, med bn, crypto to micro, wack, no st, no flour, no vis Ø, tr SH blk, carb					
1610					DOL dk bn-blk, crypto, mud, arg, no st, no flour, no Ø					
1615					DOL lt-med bn, crypto, mud, DOL dk bn, arg, tight					
1620					DOL lt, med, dk bn, crypto- micro, mud-wack, no st, no flour, no Ø, tr ANH lt gy, lt bn					
					DOL buff-lt bn, crypto, mud, tr ANH					

Rock Description Procedure

Depth, Tops Eng. Data	Penetration Rate min / m	Fluorescence	Por Type	Porosity ^ 20% 15-20% 10-15% 5-10% ^ 5%	Lithology	V.F. F M CS	Sorting	Rounding	Rock Description Procedure	
									Gross Rock Type	Cementation
									Color	Porosity
									Composition	Permeability
									Grain Size	Staining, Fluorescence, Co
									Rounding, Sorting, Induration	Structures
									aa, mnr ANH wh-lt bn, lt gy	
1630									ANH wh, lt bn, DOL aa	
1635									ANH wh, lt gy, lt bn, mnr DOL aa	
1640									ANH lt bn, lt gy-wh, mnr DOL buff-lt bn, crypto, mud, tight	
1645									aa tr free qtz	
1650									P AW SS clr-fros qtz, fine to vcrs gn, ang-wrnd, psrtd, no st, no flour, intgran Ø 6-8%, tr feld	
1655									GRANITE qtz and feldspars	
1660									GRANITE qtz and feldspars	
1665									GRANITE qtz and feldspars	
1670									GRANITE qtz and feldspars	
1675					TD 1673					

CANADA OIL AND GAS LANDS
ADMINISTRATION
ADMINISTRATION DU PÉTROLE ET DU
GAZ DES TERRES DU CANADA
MAR 18 1991
ENGINEERING AND CONTROL
BRANCH
TECHNIQUE ET DU CONTRÔLE