

Attachment to WCR.

Appendix 3 of WCR

Ingleby-1  
(W1038)

PETROLEUM DIVISION

DEPT. NAT. RES & ENV



PE906631

16 MAR 1993

# APPENDIX-3

## DRILLING FLUID RECAP

GAS AND FUEL EXPLORATION N.L.

DRILLING FLUIDS RECAP

INGLEBY NO. 1

PEP 100, OTWAY BASIN. VICTORIA

Prepared by: M Olejniczak

Dated : November 1990

BAROID AUSTRALIA PTY. LTD.

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GAS AND FUEL EXPLORATION N.L.  
 INGLEBY NO. 1  
 PEP 100, OTWAY BASIN, VICTORIA

WELL SUMMARY

Operator : Gas and Fuel Exploration N.L.  
 Well Name : Ingleby No. 1  
 Location : PEP 100, Otway Basin, Victoria  
 Contractor/Rig : Drillcorp / Rig 24  
 Rig on Location : 22 October, 1990  
 Spud Date : 23 October, 1990  
 RKB Elevation : 3.3m  
 Total Depth : 331.2m  
 Date Reached TD : 26 October, 1990  
 Total Days Drilling : 4 Days  
 Rig Off Location : 27 October, 1990  
 Total Days on Well : 6

<u>Drilling Fluid Type</u>	<u>Interval</u>	<u>Hole Size</u>	<u>Cost (A\$)</u>
Freshwater AQUAGEL Spud Mud	Surf - 69m	12 1/4"	\$ 379.25
KCL/AQUAGEL/Polymer	69m - 331.2m	8 1/2"	\$ 1,826.54

Mud Materials Charged to Drilling -----  
\$ 2,205.79

Engineer on Location from Oct 22 to Oct 26.  
 Drilling Fluid Engineering: 5 days @ \$410.00 \$ 2,050.00

Total Cost Drilling Materials & Engineering \$ 4,255.79

Mud materials not charged to drilling \$ -

Casing Programme : 18" Cond. at 13m  
 9 5/8" Csg. at 64.4m

Drilling Supervisor : Barry Beetson

Baroid Drilling Fluid Engineer: Manfred Olejniczak

GAS AND FUEL EXPLORATION N.L.  
INGLEBY NO. 1  
PEP 100, OTWAY BASIN, VICTORIA

#### INTRODUCTION

Ingleby No. 1 was spudded in on October 23rd, 1990 using Drillcorp's Rig 24.

The 12 1/4" hole was drilled to a depth of 69m using Freshwater AQUAGEL Spud Mud flocculated with Lime, with the 9 5/8" casing run and cemented to 64.4m.

The 8 1/2" hole was then drilled to the TD of 331.2m with a KCl/AQUAGEL/Polymer Mud. After successfully running wireline logs, the well was plugged and abandoned on October 26th, 1990.

GAS AND FUEL EXPLORATION N.L.  
INGLEBY NO. 1  
PEP 100, OTWAY BASIN, VICTORIA

DISCUSSION BY INTERVAL

12 1/4" Hole (Surface to 69m) - 1 day  
9 5/8" Casing Set at 64.4m

After completing rigging up, the kelly rathole was drilled out with mud late on the 22nd of October, using premixed prehydrated AQUAGEL.

It had been anticipated to spud in the early hours of the 23rd, but one of the two rig motors blew up. The spud in was delayed until 16.30 hours, while agreement was reached on drilling ahead with only one motor.

The 12 1/4" hole was then drilled through silty claystone, with the prehydrated AQUAGEL mud, flocculated with only a little additional Lime. The viscosity was controlled to around 40-45 seconds during drilling with water dilution. Just prior to casing point the viscosity was deliberately increased to 55 seconds to improve hole cleaning. At 69m, a wiper trip was run back to the surface with no fill on going back to bottom. After circulating the hole clean, the 9 5/8" casing was run in and cemented, with cement returns to surface.

The hole must have been close to gauge, as the casing was a little tight going in, and good cement returns were observed.

Despite running the desander and desilter constantly, the sand content was still at 2%, with an 8.9 ppg mud weight, after drilling to only 69m.

GAS AND FUEL EXPLORATION N.L.  
INGLEBY NO. 1  
PEP 100, OTWAY BASIN, VICTORIA

DISCUSSION BY INTERVAL (cont.)

8 1/2" Hole (69m to 331.2m) - 3 days

After nipping up and pressure testing the BOP stack, the cement and casing shoe were drilled out using old mud from the previous interval, diluted with water. With 4m of new hole drilled, a leak-off test was run at 73m giving a 17.8 ppg equivalent.

Drilling then continued immediately through silty marl of the Hetesbury Group. Treatment of the mud system for water loss and increasing KCl percentage began immediately. Some of the old mud was dumped and replaced with new AQUAGEL with CMC HV and small amounts of KCl.

After drilling into the top of the Wangerrip Group at 159m, the hole immediately began to have problems, with the sticky plastic brown claystone blocking up the flowline with large lumps. The flowline had to be cleared several times with drilling stopping, and mud losses occurring over the top of the bell nipple, and some apparent downhole mud losses due to mud rings downhole.

The KCl content was gradually increased to 4% to help alleviate the problem, and the second mud pump was run on the flowline to help keep it clear. These measures helped, but the problem did not completely disappear until the lithology changed, with the volcanics formation reached at 222m.

Drilling then continued through the Basalt and into the Eumeralla Formation to TD at 331.2m without further drilling problems.

Additional CMC HV and DEXTRID was added during this period to bring the water loss to under 10 cc for logging. The KCl content was allowed to drop back a little to 3% as hole conditions and cuttings appeared to be good. Typical mud properties near and at TD were:

Weight	9.4 ppg
Viscosity	37 seconds
Yield Point	8 - 9 lb/100ft <sup>2</sup>
Filtrate	9.2 cc
Chlorides	16,000 mg/l
KCl	3 %

After circulating the hole clean, a wiper trip was run to the casing shoe, with 3m of fill on running back to bottom. The hole was then circulated clean once again prior to running B.P.B. wireline logs.



GAS AND FUEL EXPLORATION N.L.  
INGLEBY NO. 1  
PEP 100, OTWAY BASIN, VICTORIA

DISCUSSION BY INTERVAL (cont.)

8 1/2" Hole (cont.)

Logging proceeded without any downhole problems, with the loggers reaching 326m. The 5m of apparent fill, most likely due to some sticky pieces from the Wangerrip Group pushed to bottom. The caliper log showed the hole to be very close to gauge, being between 8.5 and 9 inches all the way.

The well was then plugged and abandoned on October 26th, 1990.

GAS AND FUEL EXPLORATION N.L.  
INGLEBY NO. 1  
PEP 100, OTWAY BASIN, VICTORIA

#### CONCLUSIONS AND RECOMMENDATIONS

There were several mud problems which were mostly directly related to shortcomings in the rig for the drilling of exploration wells.

- 1) Despite the short length of hole drilled, mud weight rapidly became a problem in both the 12 1/4" and 8 1/2" holes, with 9.4 ppg at TD, and 2% sand recorded at casing depth. The desander and desilter were both obviously operating poorly on low pressure; most likely due to inadequately sized feed pipes. Also, there was no functional sandtrap at all, and no good way to dump excess mud other than shutting off one shaker and allowing mud to run off the screen.
- 2) It was difficult to mix mud quickly, particularly when trying to increase the KCl content, as all the mud had to be carried across the length of the mud tanks, across the flowline and up a set of stairs; sack by sack. This was because there was no forklift access around the back of the rig at all, as there was no gravel on that part of the site, so all the mud had to be placed at the front of the rig. In addition, the mud tanks on this rig had no mud materials platform, or stair access at the back of the pits anyway.
- 3) The flowline on this rig gave problems on this hole, as it had done on the previous hole, only worse. The flowline was of a small diameter, with a "T" junction splitting the flow to the two shakers. Combined with a low angle, this arrangement tended to continually block up, and required regular shovelling out of the shaker boxes. The problems experienced with flowline blockage, mud losses and apparent downhole mud rings were most likely largely due to the flowline arrangement, resulting in the hole not being cleaned properly. It should be noted that this formation has never before given these kinds of problems on another rig.
- 4) Although the rig had a premixing tank, it had been found totally inadequate for prehydrating bentonite on the previous well. On this well it was used as an anchor for one of the rig guy wire cables. This meant that the mud bentonite content could not be increased by additions of Bentonite, and the viscosity at TD was consequently a little lower than desired.

# Baroid Australia Pty. Ltd.

# MATERIAL RECAP

COMPANY Gas and Fuel Exploration N.L. HOLE SIZE 12 1/4"  
 WELL Ingleby No. 1 CONTRACTOR/RIG Drillcorp / Rig 24  
 LOCATION PEP 100, Otway Basin, Victoria MUD TYPE Freshwater AQUAGEL Spud Mud

INTERVAL TO (m)	69	DRILLING DAYS	1	COST/DAY	\$379.25
FROM (m)		ROTATING HRS.	4	COST/M	\$5.50
DRILLED (m)	69			COST/BBL	\$1.50
DATE	Oct 23, 1990	MUD CONSUMPTION FACTOR (bbl/m)			3.65

MATERIAL	UNIT	UNIT COST	QUANTITY		CONC (ppb)		TOTAL COST (A\$)	
			EST	ACT	EST	ACT	ESTIMATE	ACTUAL

Barite								
AQUAGEL GOLD SEAL	100lb	18.64	15	17	11.6	6.7	279.60	316.88
Caustic Soda	25kg	27.93	1	2	0.4	0.4	27.93	55.86
Lime	25kg	6.51	1	1	0.4	0.2	6.51	6.51

DIESEL	Bbls							
CHEMICAL VOLUME	Bbls			2				
FRESH WATER	Bbls		129	250				
SEA WATER	Bbls							
TOTAL MUD MADE	Bbls		129	252				
COST LESS BARYTES							\$314.04	\$379.25
COST WITH BARYTES							\$314.04	\$379.25

## COMMENTS

# Baroid Australia Pty. Ltd.

# MATERIAL RECAP

COMPANY Gas and Fuel Exploration N.L.  
 WELL Ingleby No. 1  
 LOCATION PEP 100, Otway Basin, Victoria

HOLE SIZE 8 1/2"  
 CONTRACTOR/RIG Drillcorp / Rig 24  
 MUD TYPE KCL/AQUAGEL/Polymer

INTERVAL TO (m)	331.2	DRILLING DAYS	3	COST/DAY	\$608.85
FROM (m)	69	ROTATING HRS.	16	COST/M	\$6.97
DRILLED (m)	262.2			COST/BBL	\$4.29
DATE	Oct 26, 1990	MUD CONSUMPTION FACTOR (bbl/m)			1.62

MATERIAL	UNIT	UNIT COST	QUANTITY		CONC (ppb)		TOTAL COST (A\$)	
			EST	ACT	EST	ACT	ESTIMATE	ACTUAL
Barite								
AQUAGEL GOLD SEAL	100lb	18.64	47	8	10.0	1.9	876.08	149.12
Caustic Soda	25kg	27.93	4		0.5		111.72	
Lime	25kg	6.51		1		0.1		6.51
Sodium Bicarbonate	40kg	26.69		2				53.38
CMC HV	25kg	67.17	5	6	0.6	0.8	335.85	403.02
DEXTRID	50lb	37.96	8	16	0.9	1.9	303.68	607.36
Pot Chloride (Ag)	50kg	18.39		5		1.3		91.95
Pot Chloride (Te)	25kg	9.20		56		7.3		515.20
Soda Ash	25kg	14.06	2		0.2		28.12	
DIESEL	Bbls							
CHEMICAL VOLUME	Bbls			6				
FRESH WATER	Bbls		470	420				
SEA WATER	Bbls							
TOTAL MUD MADE	Bbls		470	426				
COST LESS BARYTES							\$1,655.45	\$1,826.54
COST WITH BARYTES							\$1,655.45	\$1,826.54

COMMENTS



# Baroid Australia Pty. Ltd.

# PROPERTY RECAP

COMPANY Gas and Fuel Exploration N.L.  
 WELL Ingleby No. 1  
 LOCATION PEP 100, Otway Basin, Victoria

CONTRACTOR/RIG Drillcorp / Rig 24

DATE	DEPTH m	HOLE SIZE in	F'LINE TEMP C	MUD WT ppg	VIS sec	PV	VP	GELS		FILTRATION		pH	Pf	Mf	Cl mg/l x1000	Ca mg/l	K+ xWT %	SAND %	REPORT			MBC	REMARKS/TREATMENT/FORMATION		
								10 sec	10 min	API ml	HTHP ml								CAKE 32nd	TEMP C	SOL %			H2O %	OIL %
1990																									
Oct.																									
23	69	12 1/4		8.90	55	7	60	18	20	nc		11.0	0.25	0.30	0.7	40		2.00				8	Drill, wiper trip; Clyst.		
24	73	8 1/2		8.75	37	5	16	8	18	nc		12.0	0.30	0.40	0.9	40		0.10				8	Cmt 9 5/8" Csg, Drill Cmt.		
25	331.2	8 1/2		9.40	37	7	9	4	10	9.2	2	9.0	0.05	0.10	16.0	320		3	0.25	5	95	8	Drill, wiper trip; Clyst.		
26	331.2	8 1/2		9.40	37	7	9	4	10	9.2	2	9.0	0.05	0.10	16.0	320		3	0.25	5	95	8	Log, P & A		

# Baroid Australia Pty. Ltd.

# BIT RECORD

COMPANY Gas and Fuel Exploration N.L.  
 WELL Ingleby No. 1  
 LOCATION PEP 100, Otway Basin, Victoria

CONTRACTOR/RIG Drillcorp / Rig 24

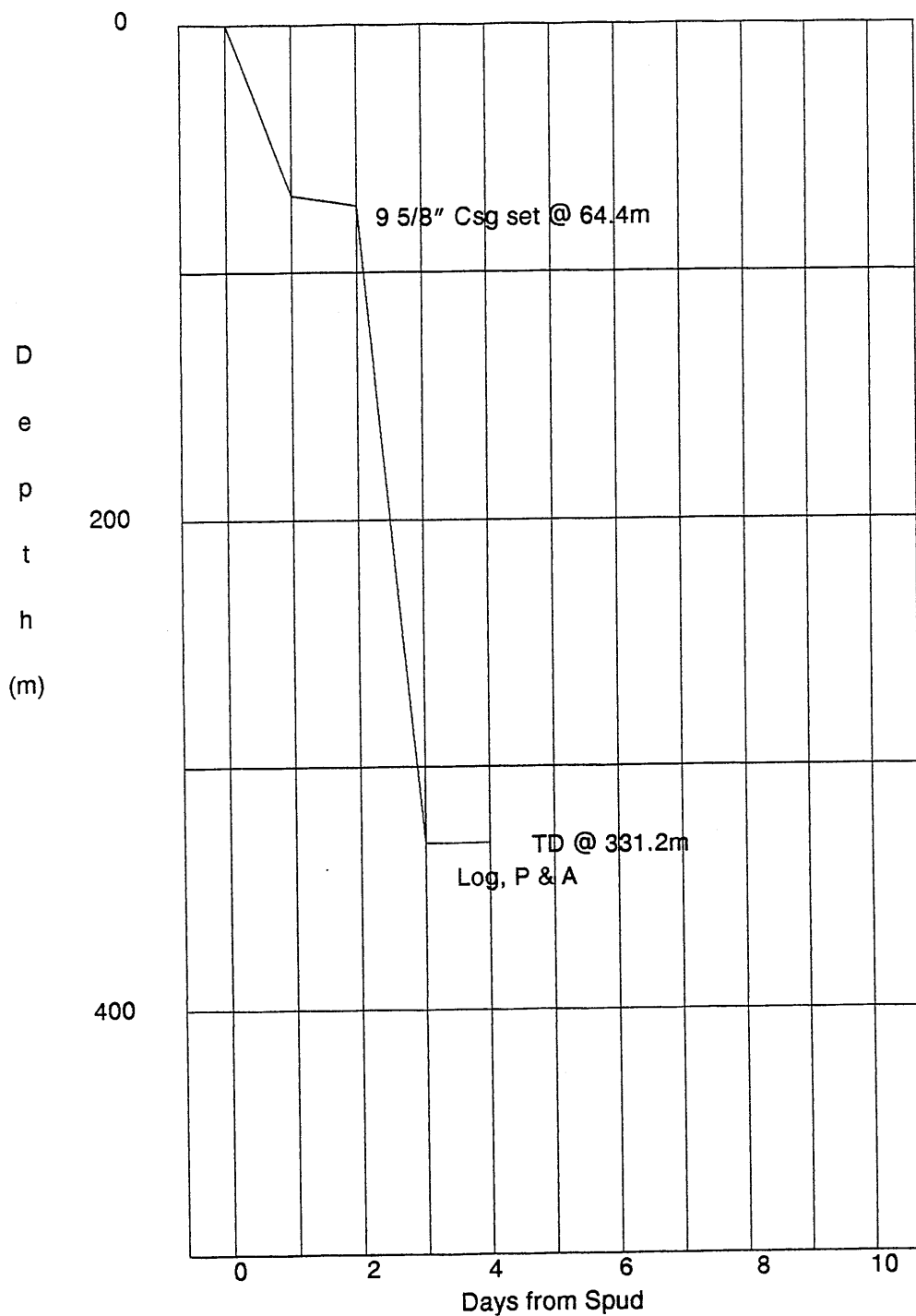
DATE	BIT NO.	BIT SIZE	MAKE	TYPE	JETS	DEPTH OUT	METRES DRILLED	HOURS	RATE	ACCUM DRLG	BIT WT.	RPM	VERT DEV'N	PUMP PRESS	PUMP RATE	MUD WT	MUD VIS	CONDITION			FORMATION
																		T	B	G	
1990		in			32nd"	m			m/hr	HOURS	tonnes		deg.	psi	gpm	ppg	sec				
Oct																					
23	1	12 1/4	Varex	L114	3 x 16	69	69	4	17.3	4				600	466	8.90	55	3	3	1	Claystone
26	2	8 1/2	Varex	L114	11,12,12	331.2	262.2	16	16.4	20				700	265	9.40	37	3	2	1	Claystone/Volc./Sst.

# Baroid Australia Pty. Ltd.

# GRAPH

COMPANY Gas and Fuel Exploration N.L.  
WELL Ingleby No. 1  
LOCATION PEP 100, Otway Basin, Victoria

DEPTH vs DAYS



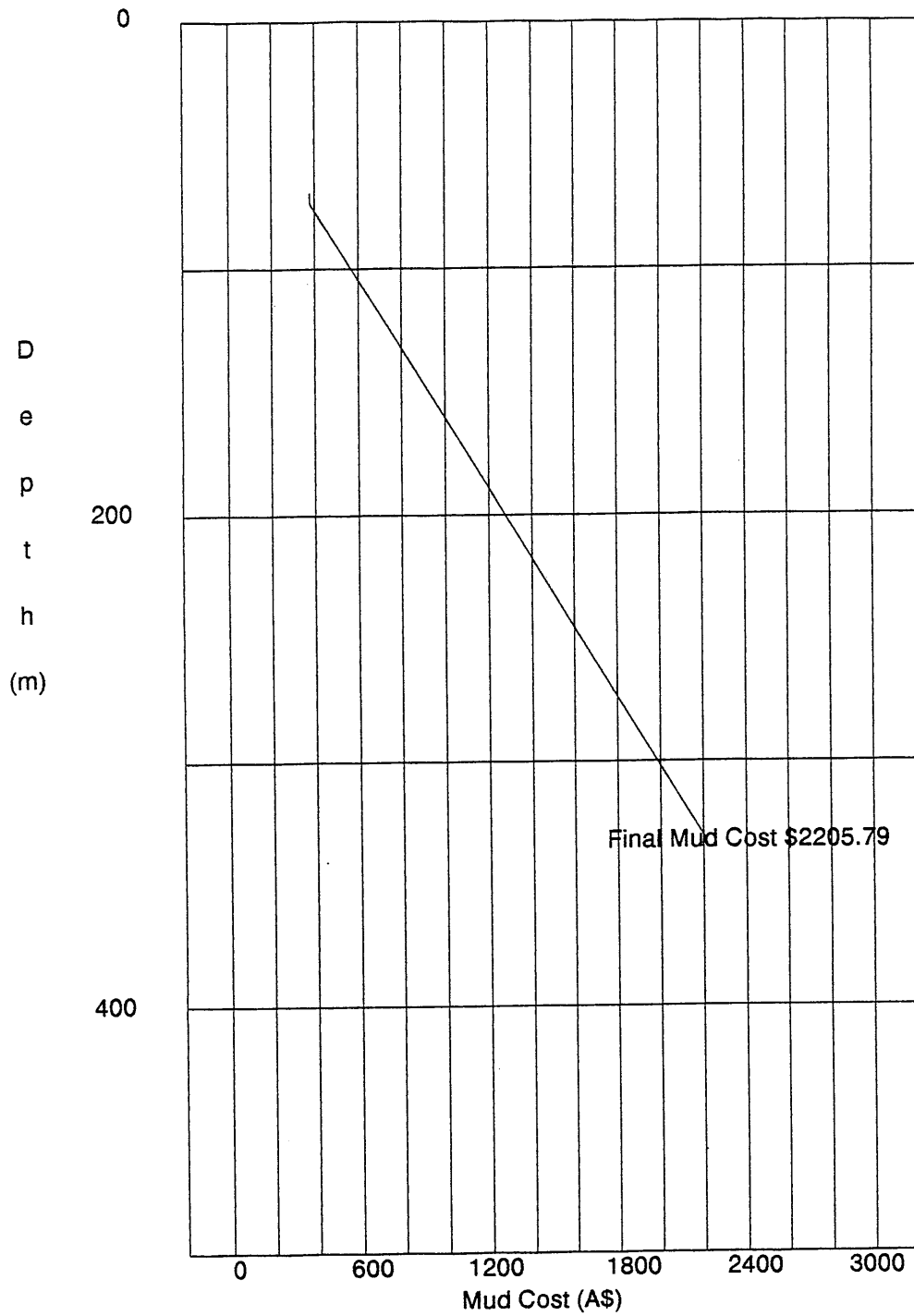


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# GRAPH

COMPANY Gas and Fuel Exploration N.L.  
WELL Ingleby No. 1  
LOCATION PEP 100, Otway Basin, Victoria

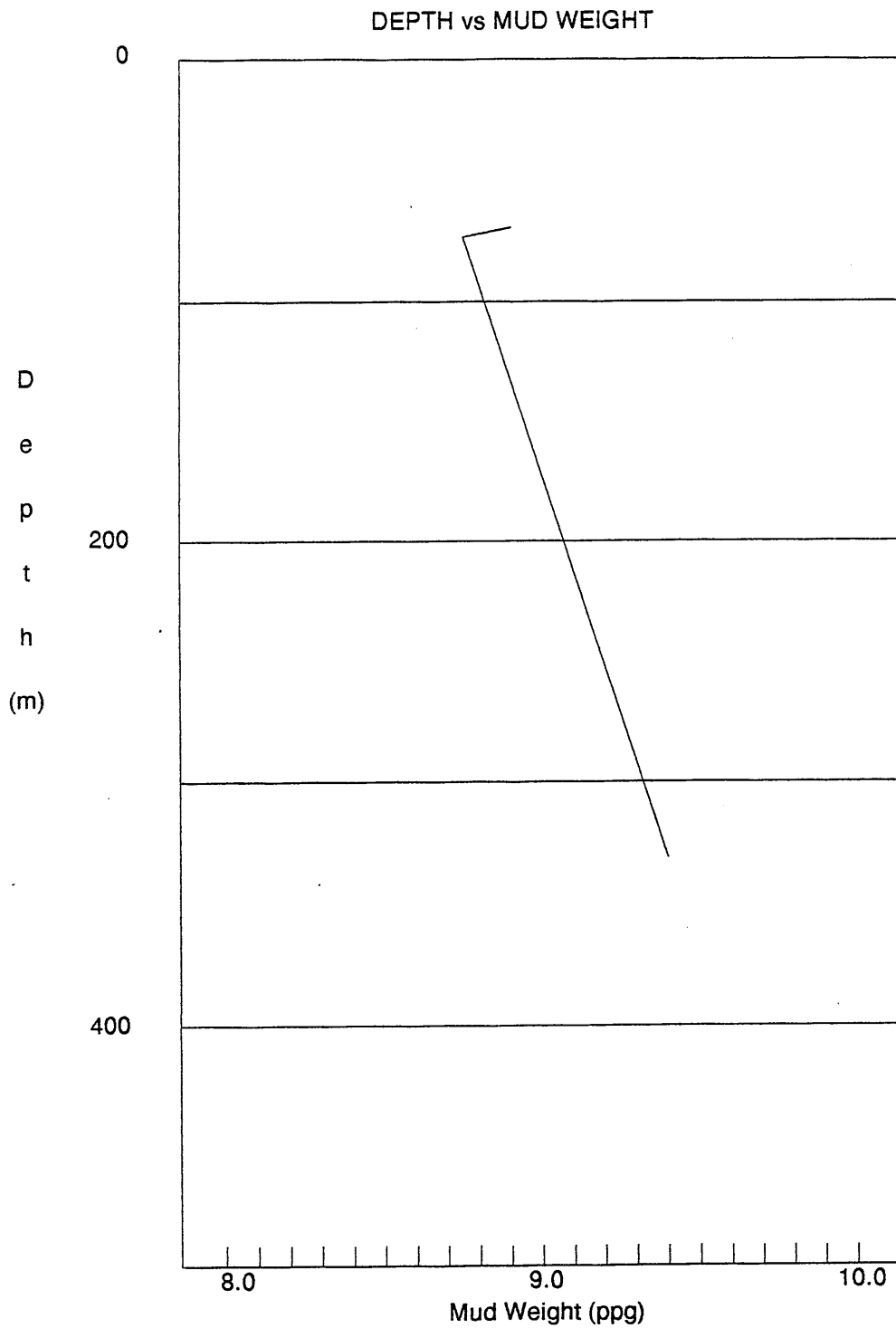
DEPTH vs COST



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# GRAPH

COMPANY Gas and Fuel Exploration N.L.  
WELL Ingleby No. 1  
LOCATION PEP 100, Otway Basin, Victoria

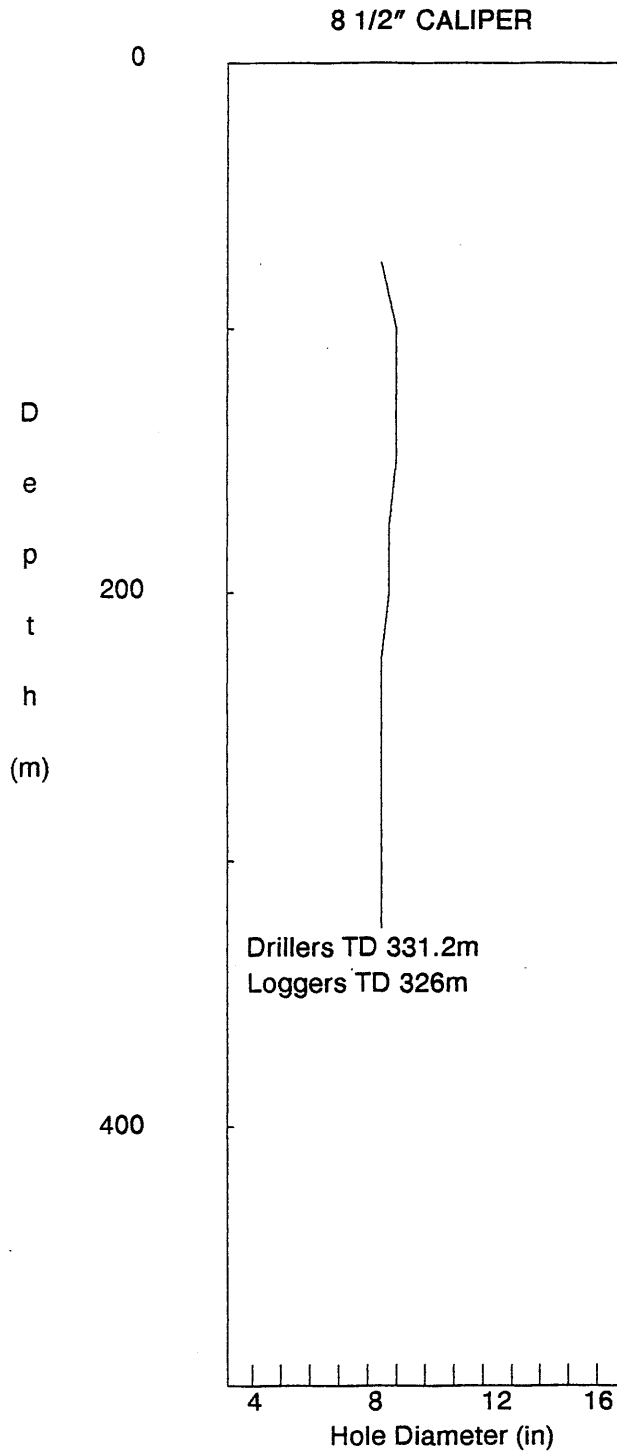


# Baroid Australia Pty. Ltd.

# CALIPER

COMPANY Gas and Fuel Exploration N.L.  
 WELL Ingleby No. 1  
 LOCATION PEP 100, Otway Basin, Victoria

APPENDIX A



FORMATION	TOP (RKB)
Heytesbury Group	Surface
Wangerrip Group	159m
Older Volcanics	222m
Pebble Point Formation	240m
Eumeralla Formation	247m