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GEOHERMAL INVESTIGATION: PRINCE EDWARD ISLAND DRILLING

John A. Leslie & Associates Limited
Consultant Geologists
Bedford, Nova Scotia

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GEOHERMAL INVESTIGATION
PRINCE EDWARD ISLAND DRILLING

by

John A. Leslie & Associates Limited
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Bedford, Nova Scotia

February 1984

Abstract

A 484.8 m cored hole was drilled through sediments in October 1983 at Charlottetown, Prince Edward Island. The objective was to obtain temperature and rock property data to aid in assessing the low-grade geothermal potential on the University of Prince Edward Island campus. The measured thermal gradient of between 13 and 14 °C/km is disappointing in terms of geothermal energy potential. No further investigations are warranted at this locality unless different evaluation criteria become relevant.

Résumé

Un sondage de 484.8 m a été carotté dans les sédiments à Charlottetown, Ile du Prince Edouard, en octobre 1983. Le but de ce forage était d'obtenir des données sur la température et les propriétés des roches afin d'aider l'évaluation de l'utilisation de la géothermie basse énergie sur le campus de l'université de l'Ile du Prince Edouard. Le gradient géothermique, qui mesure entre 13 et 14 °C/km, est décevant en termes de potentiel géothermique. Des études supplémentaires à cet endroit seront justifiées seulement si différents critères d'évaluation deviennent pertinents.

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LIST OF ILLUSTRATIONS

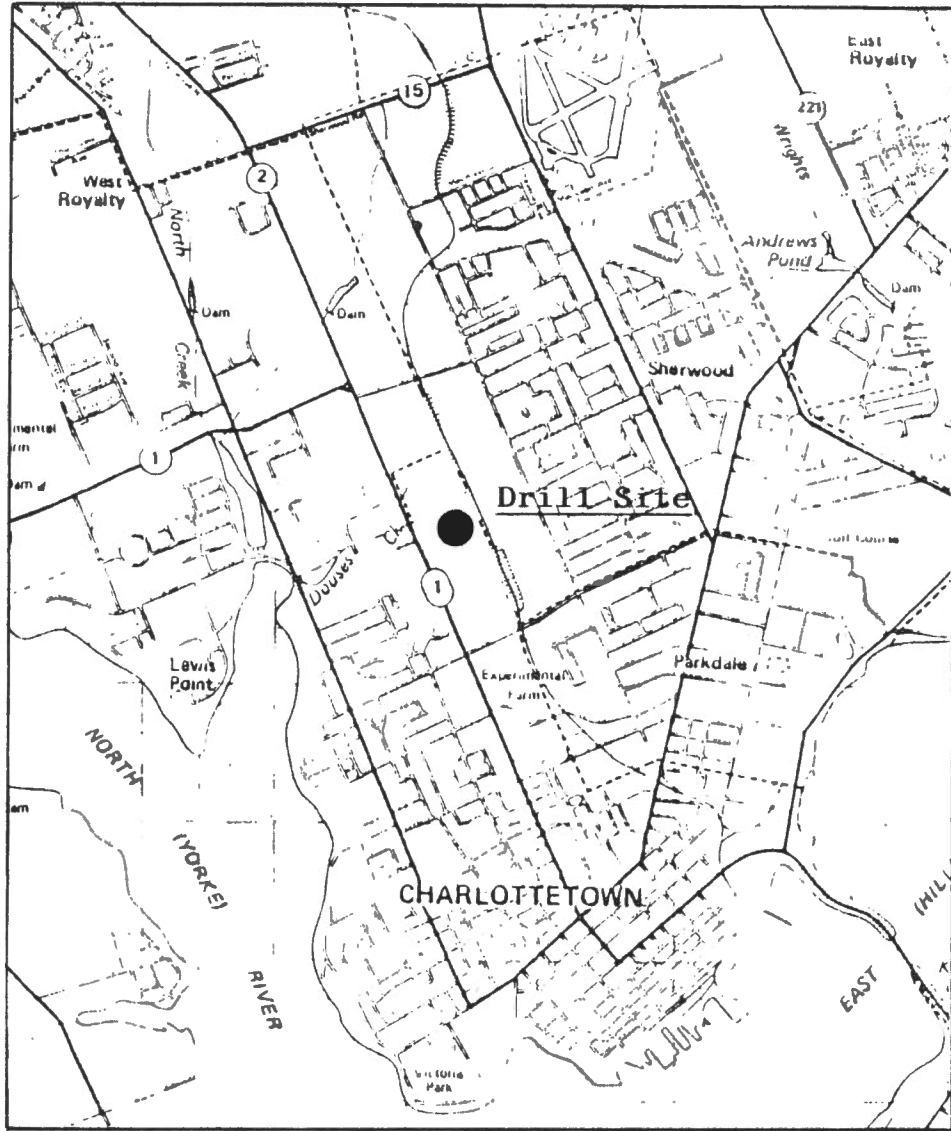
Figure 1 Location Map

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INTRODUCTION

A 484.8-metre diamond drill hole project was undertaken in October 1983 at Charlottetown, Prince Edward Island. The temperature and rock property data so obtained was to aid in assessing the low-grade geothermal potential on the University of Prince Edward Island campus, a possible site for future applications. The drill hole is located on the north side of the campus (Figure 1).

The project was undertaken for the Division of Gravity, Geothermics and Geodynamics, Earth Physics Branch, Energy, Mines and Resources Canada. Scientific management was provided by Dr. M. J. Drury, Division of Gravity, Geothermics and Geodynamics. Contract management was provided by Mr. P. J. Monnelly, Supply and Services Canada. Field management was performed by John A. Leslie & Associates Limited, geologists, Bedford, Nova Scotia, under contract number OSQ83-00073. Diamond drilling services were provided by Hop-Mun Drilling Incorporated, Salisbury, New Brunswick, under contract number OGR83-00383.



Scale: 1 cm = 500 m

Figure 1
Location Map

ACKNOWLEDGEMENTS

The cooperation and assistance provided by the administration of the University of Prince Edward Island and the personnel of the Prince Edward Island Department of Energy and Forestry are gratefully acknowledged.

GEOLOGY OF SITE

Igneous and metamorphic basement rocks are overlain by Mississippian Horton Group conglomerate, arkosic sandstone, shale and, locally, interbedded volcanic rocks. These are overlain by siltstone, anhydrite and salt of the Windsor Group. A major disconformity separates these strata from the overlying Pennsylvanian rocks. Canso-Riversdale sandstone and silty sandstone are overlain by Pictou Group conglomerate, sandstone, shale and traces of coal. The outcropping, flat-lying, red beds are of Permian-Carboniferous age. H. W. van de Poll (1981) has subdivided the red beds into four major cyclic sequences, Megacyclic Sequences I to IV. Each sequence is 275 to 365 metres thick. They consist of conglomerate at the base, thinning upwards through sandstone to siltstone.

The diamond drill hole was collared in Megacyclic Sequence III. It intersected thinly to thickly interbedded red sandstone, siltstone and shale with an increase in mud-pellet conglomerate towards the bottom. The sandstone, varying from fine to coarse grained, contains 80 per cent detrital and 20 per cent matrix and cement. The rock is comprised of 55 per cent quartz, 15 per cent feldspar and 5 per cent lithic fragments and 5 per cent muscovite. The matrix is of a silt-clay fraction. The cement is hematitic, locally calcareous. The siltstone has essentially the same constituents as the sandstone, differing mainly in grain size. The mineralogy of the shale is not discernible megascopically. The mud-pellet conglomerate consists of shaly clasts to a few centimetres in diameter in a sandstone matrix. All rocks locally possess grey to grey-green segregations and contacts produced by reduction processes. Both micaceous and calcareous sections are common.

THE DRILLING PROJECT

The Prince Edward Island drilling project comprised three phases: pre-drilling, drilling and

post-drilling. These phases are discussed in detail below.

Pre-Drilling Phase

The pre-drilling phase concerned site selection, obtaining all necessary permissions and a site visit with potential bidders for the drilling contract.

Site Selection

The University of Prince Edward Island campus site was selected because of possible future on-campus applications of the resource. The specific site chosen was one where surface damage and distraction to concurrent university functions would be minimal. However, it was thought to meet all the objectives of the project.

Permissions

The university administration granted permission to undertake the drilling on campus. Discussions with city officials revealed that work permits, noise by-laws, etc., were not applicable in this instance.

Site Visit

On August 18, 1983, three potential bidders for the drilling contract were shown the proposed site. The drilling contract was awarded in late September. Drill equipment was moved to the site on October 3, 1983, and drilling commenced on October 4, 1983.

Drilling Phase

General

A total of 484.8 metres of NQ wireline diamond drilling was accomplished using a Longyear Model 38 drill. The hole was drilled at an angle of minus 90 degrees. Overburden, consisting of red, sandy clay with scattered sandstone cobbles, is 8.5 metres thick. HW casing was drilled and cemented to 13.4 metres to be below the depth of severe weathering. NW casing was drilled to 18.3 metres to be below the depth of near-surface loss of water circulation. On completion of the drilling, a steel liner was inserted and grouted to total depth. All NW casing was removed except for 10 metres and an NW casing shoe, which were broken off in the hole. A lockable cap was placed on the liner to prevent articles from falling in the hole and causing blockage. All drill activities were completed and the drill equipment removed on October 25, 1983.

Appendix I contains the drill contractor's shift reports which indicate drilling rates, problems, etc. Drilling was carried out during a 12-hour daytime shift. Drilling conditions were generally quite good. Although loss of water circulation was experienced at two depths, cementing and later grouting

of the liner have prevented potential vertical water flow which would result in meaningless temperature data.

The project manager checked the daily drilling progress and performed various site tasks such as lithologic logging, sampling core and labelling core boxes.

Bottomhole Temperatures

Temperatures were recorded at the bottom of the hole as drilling progressed (Appendix II). Readings were taken with temperature bridge Model BGT-1 employing a single thermistor probe. Attempts were made to record these temperatures at the same time each day. Although considerable instability of the readings is evident, they would have provided useful data in the event the hole was completely lost at any time due to incompetent rock.

Post-Drilling Phase

The post-drilling activities included temperature logging, lithologic logging, core sampling, core storage and site inspection.

Temperature Logging

Four temperature logs were carried out. The time intervals of these logs were one hour after core drilling and 48 hours, 12 days and 3.5 months after

cessation of all drilling activities. Readings were taken utilizing temperature bridge Model BGT-1 employing a single thermistor probe. The station interval was five metres with the exception of the 1-hour log for which a 10-metre interval was used. The collected temperatures and supporting data are tabled in Appendix III.

Lithologic Logging

Brief lithologic logs describing major changes in rock type were undertaken by the project manager. These are contained in Appendix IV.

Core Sampling

Full and intact core samples, 15 centimetres long, were collected for thermal conductivity measurements. The sample interval, being somewhat dependent on the lithology, averaged between 10 and 12 metres. Although the thermal conductivity measurements were not available at the completion of the remaining phases of this investigation, pertinent data on the samples are listed in Appendix V.

Core Storage

All core boxes have been properly labelled and are stored in Charlottetown at a facility provided by the Prince Edward Island Department of Energy and Forestry.

Site Inspection

The drill site was inspected subsequent to the removal of the drill equipment. Little ground disturbance was evident. The site was left in as close to its pre-drilling condition as possible.

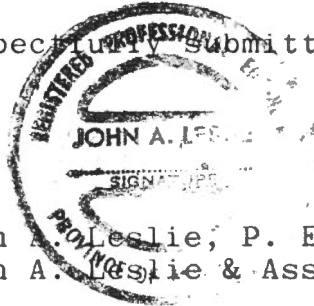
CONCLUSIONS AND RECOMMENDATIONS

The collected temperature data indicate a thermal gradient of between 13 and 14 degrees centigrade per kilometre for the investigation site. Successive temperature logs indicate slight decreases in temperature. The largest decrease, that of 0.8 to 1.0 degree, is apparent between the 1-hour and 48-hour logs. Temperature decreases between the remaining logs are generally less than 0.4 degrees. The successive logs also indicate a slight overall increase, of perhaps less than one °C/km, in the thermal gradient. This results, in part, from slightly greater temperature decreases in the upper portions of the hole. This phenomenon reflects the dissipation of the thermal effects of drilling which decrease in a downhole direction.

The results of the investigation are somewhat disappointing. It is questionable, based on the obtained thermal gradients alone, whether or not

direct applications of this resource at this particular locality could be economically feasible. Therefore, no further investigations are recommended for the Charlottetown area at least until such time as new and/or different evaluation criteria become available. This investigation does not, however, preclude the possibility of significant thermal gradients resulting from appropriate geologic processes elsewhere on Prince Edward Island.

Respectfully Submitted



John Leslie, P. Eng. for
John A. Leslie & Associates Limited

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2. Leslie, John A. & Assoc. Ltd. (1982) Investigation of geothermal energy resources - Atlantic Provinces: Energy, Mines and Resources Canada, Earth Physics Br. O.F.R. 82-8.
3. Van de Poll, H. W. (1981) Report on the geology of Prince Edward Island: unpub. rept., P.E.I. Dept. of Energy and Forestry.

APPENDIX I
DRILL SHIFT REPORTS



LOGAN DRILLING LIMITED

DAILY REPORT

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CONTRACT D.S.S. LOCATION Charlottetown DATE Oct. 3. 19 83
 HOLE SIZE NQ HOLE NO. C-1 DRILL TYPE 38 SHIFT Day

DIAMOND ARTICLES					FOOTAGE REPORT								
TYPE	NUMBER	OVERBURDEN	BEDROCK	LEFT IN HOLE	CASING				DRILLING				
					DEPTH END SHIFT								
					DEPTH START SHIFT								
					CASED OR DRILLED								
					CORE RECOVERED								
OTHER SUPPLIES USED					MATERIAL	FROM	TO	FEET					
TRICONE BITS		CHOPPING BITS			OVERBURDEN								
AUGER HEADS		AUGER TEETH			BEDROCK								
BENTONITE		ADDITIVES											
CEMENT					CASING - IN HOLE								
CORE BOXES					LENGTH	AW	BW	NQ	NW	HW	OTHER		
SHELBY TUBES					2 FT.								
SAMPLE JARS					5 FT.								
PENETRATION CONES					10 FT.								
OTHER (SPECIFY)													
ITEMS LEFT IN HOLE (SPECIFY)					LENGTH	AW	BW	NQ	NW	HW	OTHER		
					2 FT.								
TESTING AND LOGGING					5 FT.								
CLINOMETER					10 FT.								
TROPARI													
OTHER													

LABOUR				DESCRIPTION OF WORK									
RUNNERS	FROM	TO	TOT. HRS	HOURS				WORK DETAIL					
				SPVSR.	RUNNER	HELPER	OTHER						
<u>B. Miller</u>	<u>7</u>	<u>7</u>	<u>12</u>					DRILLING OVERBURDEN					
								DRILLING BEDROCK					
								CASING (DEPTH)					
								REAMING (FROM TO)					
								WATERLINE (LENGTH)					
								CEMENT (AT FT.)					
								SET UP OR TEAR DOWN					
								MOVING (DISTANCE)					
EQUIPMENT				WEDGING									
DRILL RIG (HOURS)				TESTING									
TRACTOR (HOURS)				AWAITING ORDERS									
5 TON TRUCK MILEAGE OR HOURS				DELAYS (SPECIFY)									
1/2 TON TRUCK				REPAIRS (SPECIFY)									
CAR				OTHER (SPECIFY)									
CHAIN SAW DAYS OR HOURS				MOBILIZATION									
BOAT													
MOTOR													
OTHER													

REMARKS: move from Shop to Charlottetown - unload gear.

[Signature] CLIENT'S REPRESENTATIVE B. Miller RUNNER/FOREMAN



LOGAN DRILLING LIMITED

DAILY REPORT

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CONTRACT D.S.S. LOCATION Charlottesville DATE Oct. 4 19 83
 HOLE SIZE N.O. HOLE NO. C-1 DRILL TYPE 38 SHIFT Day

DIAMOND ARTICLES					FOOTAGE REPORT						
TYPE	NUMBER	OVERBURDEN	BEDROCK	LEFT IN HOLE			CASING		DRILLING		
					DEPTH END SHIFT		44				
					DEPTH START SHIFT		0				
					CASED OR DRILLED		44				
					CORE RECOVERED						
OTHER SUPPLIES USED					MATERIAL		FROM	TO	FEET		
TRICONE BITS		CHOPPING BITS			OVERBURDEN		0	44	44		
AUGER HEADS		AUGER TEETH			BEDROCK						
BENTONITE		ADDITIVES									
CEMENT		5 sacks									
					CASING - IN HOLE						
CORE BOXES		SHELBY TUBES			LENGTH	AW	BW	NQ	NW	HW	OTHER
SAMPLE JARS		PENETRATION CONES			2 FT.					2	
OTHER (SPECIFY)					5 FT.						
					10 FT.					4	
					CASING - LEFT IN HOLE						
ITEMS LEFT IN HOLE (SPECIFY)					LENGTH	AW	BW	NQ	NW	HW	OTHER
					2 FT.						
					5 FT.						
					10 FT.						
TESTING AND LOGGING											
CLINOMETER		TROPARI		OTHER							

LABOUR				DESCRIPTION OF WORK				
RUNNERS	FROM	TO	TOT. HRS	HOURS				
				SPVSR.	RUNNER	HELPER	OTHER	
B Miller	8:30	6:30	10					
HELPERS				WORK DETAIL				
G Miller	8:30	6:30	10	DRILLING OVERBURDEN		2	2	
				DRILLING BEDROCK				
				CASING (DEPTH)		3	3	
				REAMING (FROM . TO)				
				WATERLINE (LENGTH)				
				CEMENT (AT 44-0 FT.)		1	1	
				SET UP OR TEAR DOWN		4	4	
				MOVING (DISTANCE)				
EQUIPMENT				WEDGING				
DRILL RIG (HOURS)				TESTING				
TRACTOR (HOURS)				AWAITING ORDERS				
5 TON TRUCK MILEAGE		OR HOURS		DELAYS (SPECIFY)				
1/2 TON TRUCK				REPAIRS (SPECIFY)				
CAR				OTHER (SPECIFY)				
CHAIN SAW DAYS		OR HOURS						
BOAT				MOBILIZATION				
MOTOR								
OTHER								

REMARKS:

M. Miller CLIENT'S REPRESENTATIVE *B. Miller* RUNNER/FOREMAN



LOGAN DRILLING LIMITED

¹⁵DAILY REPORT

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CONTRACT D.55. LOCATION Charlottesville DATE Oct. 5 19 83

HOLE SIZE N.9 HOLE NO. C-1 DRILL TYPE 38 SHIFT Day

DIAMOND ARTICLES					FOOTAGE REPORT								
TYPE	NUMBER	OVERBURDEN	BEDROCK	LEFT IN HOLE	CASING			DRILLING					
					DEPTH END SHIFT		60						90
					DEPTH START SHIFT		0						44
					CASED OR DRILLED		60						46
					CORE RECOVERED								46
OTHER SUPPLIES USED					MATERIAL	FROM	TO	FEET					
TRICONE BITS		CHOPPING BITS			OVERBURDEN								
AUGER HEADS		AUGER TEETH			BEDROCK		44		90				
BENTONITE		ADDITIVES											
CEMENT		<u>9 sacks</u>			CASING - IN HOLE								
CORE BOXES					LENGTH	AW	BW	NQ	NW	HW	OTHER		
SHELBY TUBES					2 FT.								
SAMPLE JARS					5 FT.				2				
PENETRATION CONES					10 FT.				5				
OTHER (SPECIFY)					CASING - LEFT IN HOLE								
ITEMS LEFT IN HOLE (SPECIFY)					LENGTH	AW	BW	NQ	NW	HW	OTHER		
					2 FT.								
					5 FT.								
					10 FT.								
TESTING AND LOGGING													
CLINOMETER	TROPARI		OTHER										

LABOUR				DESCRIPTION OF WORK					
RUNNERS	FROM	TO	TOT. HRS	HOURS					
				SPVSR.	RUNNER	HELPER	OTHER		
<u>B. Miller</u>	<u>7:30</u>	<u>6:30</u>	<u>11</u>	WORK DETAIL					
				DRILLING OVERBURDEN					
				DRILLING BEDROCK		3	3		
				CASING (DEPTH)		2	2		
				REAMING (FROM TO)					
				WATERLINE (LENGTH)					
				CEMENT (AT FT.)		1	1		
				SET UP OR TEAR DOWN					
				MOVING (DISTANCE)					
				WEDGING					
				TESTING					
				AWAITING ORDERS					
				DELAYS (SPECIFY)		3	3		
				REPAIRS (SPECIFY)					
				OTHER (SPECIFY)		2	2		
				MOBILIZATION					
EQUIPMENT									
DRILL RIG (HOURS)									
TRACTOR (HOURS)									
5 TON TRUCK MILEAGE		OR HOURS							
1/2 TON TRUCK									
CAR									
CHAIN SAW DAYS		OR HOURS							
BOAT									
MOTOR									
OTHER									

REMARKS: Pull casing remove shoe bit run back in
losing water - pull casing + rods
cement 35' of hole
logit has cement to set.

[Signature] CLIENT'S REPRESENTATIVE B. Miller RUNNER/FOREMAN



LOGAN DRILLING LIMITED

DAILY REPORT

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CONTRACT D. 55 LOCATION Charlottetown DATE Oct. 6, 19 83
 HOLE SIZE N.O. HOLE NO. C-1 DRILL TYPE 38 SHIFT Day

DIAMOND ARTICLES					FOOTAGE REPORT							
TYPE	NUMBER	OVERBURDEN	BEDROCK	LEFT IN HOLE	CASING				DRILLING			
					DEPTH END SHIFT				280			
					DEPTH START SHIFT				90			
					CASED OR DRILLED				190			
					CORE RECOVERED				190			
OTHER SUPPLIES USED					MATERIAL		FROM	TO	FEET			
TRICONE BITS		CHOPPING BITS			OVERBURDEN							
AUGER HEADS		AUGER TEETH			BEDROCK		90	280	190			
BENTONITE		ADDITIVES										
CEMENT		<u>3 sacks</u>										
CORE BOXES					CASING - IN HOLE							
SHELBY TUBES					LENGTH	AW	BW	NQ	NW	HW	OTHER	
SAMPLE JARS					2 FT.							
PENETRATION CONES					5 FT.							
OTHER (SPECIFY)					10 FT.							
ITEMS LEFT IN HOLE (SPECIFY)					CASING - LEFT IN HOLE							
					LENGTH	AW	BW	NQ	NW	HW	OTHER	
					2 FT.							
					5 FT.							
					10 FT.							
TESTING AND LOGGING												
CLINOMETER		TROPARI		OTHER								

LABOUR				DESCRIPTION OF WORK				
RUNNERS	FROM	TO	TOT. HRS	HOURS				
				SPVSR.	RUNNER	HELPER	OTHER	
<u>B. Miller</u>	<u>7:30</u>	<u>7:00</u>	<u>11 1/2</u>					
				WORK DETAIL				
HELPERS				DRILLING OVERBURDEN				
<u>B. Miller</u>	<u>7:30</u>	<u>7:00</u>	<u>11 1/2</u>	DRILLING BEDROCK				
				CASING (DEPTH)				
				REAMING (FROM TO)				
OTHER				WATERLINE (LENGTH)				
				CEMENT (AT FT.)				
				SET UP OR TEAR DOWN				
				MOVING (DISTANCE)				
EQUIPMENT				WEDGING				
DRILL RIG (HOURS)				TESTING				
TRACTOR (HOURS)				AWAITING ORDERS				
5 TON TRUCK MILEAGE		OR HOURS		DELAYS (SPECIFY)				
1/2 TON TRUCK				REPAIRS (SPECIFY)				
CAR				OTHER (SPECIFY)				
CHAIN SAW DAYS		OR HOURS						
BOAT				MOBILIZATION				
MOTOR								
OTHER								

REMARKS: 2 1/2 hrs. run in casing & rods - remove out 35' of cement
1/2 hrs. cement bottom of hole losing water

W. Helie CLIENT'S REPRESENTATIVE B. Miller RUNNER/FOREMAN



LOGAN DRILLING LIMITED

DAILY REPORT

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CONTRACT D.55 LOCATION Charlottetown DATE Oct 7 19 83

HOLE SIZE NQ HOLE NO. C-1 DRILL TYPE R SHIFT Day

DIAMOND ARTICLES					FOOTAGE REPORT			
TYPE	NUMBER	OVERBURDEN	BEDROCK	LEFT IN HOLE	CASING		DRILLING	
					DEPTH END SHIFT		285	
					DEPTH START SHIFT		280	
					CASED OR DRILLED		5	
					CORE RECOVERED		5	
OTHER SUPPLIES USED					MATERIAL	FROM	TO	FEET
TRICONE BITS		CHOPPING BITS			OVERBURDEN			
AUGER HEADS		AUGER TEETH			BEDROCK	280	285	5
BENTONITE		ADDITIVES						
CEMENT		3 sacks			CASING - IN HOLE			
CORE BOXES					LENGTH	AW	BW	NQ
SHELBY TUBES					2 FT.			
SAMPLE JARS					5 FT.			
PENETRATION CONES					10 FT.			
OTHER (SPECIFY)					CASING - LEFT IN HOLE			
ITEMS LEFT IN HOLE (SPECIFY)					LENGTH	AW	BW	NQ
					2 FT.			
					5 FT.			
					10 FT.			
TESTING AND LOGGING								
CLINOMETER		TROPARI		OTHER				

LABOUR				DESCRIPTION OF WORK				
RUNNERS	FROM	TO	TOT. HRS	HOURS				
				SPVSR.	RUNNER	HELPER	OTHER	
B. Miller	7:30	6:30	11	WORK DETAIL				
				DRILLING OVERBURDEN				
				DRILLING BEDROCK				
				CASING (DEPTH)				
				REAMING (FROM TO)				
				WATERLINE (LENGTH)				
				CEMENT (AT FT.)				
				SET UP OR TEAR DOWN				
				MOVING (DISTANCE)				
EQUIPMENT				WEDGING				
DRILL RIG (HOURS)				TESTING				
TRACTOR (HOURS)				AWAITING ORDERS				
5 TON TRUCK MILEAGE OR HOURS				DELAYS (SPECIFY)				
1/2 TON TRUCK				REPAIRS (SPECIFY)				
CAR				OTHER (SPECIFY)				
CHAIN SAW DAYS OR HOURS								
BOAT				MOBILIZATION				
MOTOR								
OTHER								

REMARKS: 2 hrs circulating cuttings out of hole
1 hr run in sand drill - last part cement
1 hr pull rods
1 hr cement to set

Hsieh CLIENT'S REPRESENTATIVE B. Miller RUNNER/FOREMAN



LOGAN DRILLING LIMITED

DAILY REPORT

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CONTRACT D. 55. LOCATION Charlottesville DATE Oct. 8 19 83
 HOLE SIZE NQ HOLE NO. C-1 DRILL TYPE 38 SHIFT Day

DIAMOND ARTICLES					FOOTAGE REPORT						
TYPE	NUMBER	OVERBURDEN	BEDROCK	LEFT IN HOLE	CASING		DRILLING				
					DEPTH END SHIFT		485				
					DEPTH START SHIFT		285				
					CASED OR DRILLED		200				
					CORE RECOVERED						
OTHER SUPPLIES USED					MATERIAL	FROM	TO	FEET			
TRICONE BITS		CHOPPING BITS			OVERBURDEN						
AUGER HEADS		AUGER TEETH			BEDROCK	285	485	200			
BENTONITE		ADDITIVES									
CEMENT					CASING - IN HOLE						
CORE BOXES					LENGTH	AW	BW	NQ	NW	HW	OTHER
SHELBY TUBES					2 FT.						
SAMPLE JARS					5 FT.						
PENETRATION CONES					10 FT.						
OTHER (SPECIFY)					CASING - LEFT IN HOLE						
ITEMS LEFT IN HOLE (SPECIFY)					LENGTH	AW	BW	NQ	NW	HW	OTHER
					2 FT.						
					5 FT.						
					10 FT.						
TESTING AND LOGGING											
CLINOMETER		TROPARI		OTHER							

LABOUR				DESCRIPTION OF WORK				
RUNNERS	FROM	TO	TOT. HRS	HOURS				
				SPVSR.	RUNNER	HELPER	OTHER	
B. Miller	7:30	6:30	11	WORK DETAIL				
				DRILLING OVERBURDEN				
				DRILLING BEDROCK		10	10	
				CASING (DEPTH)				
				REAMING (FROM TO)				
				WATERLINE (LENGTH)				
				CEMENT (AT FT.)				
				SET UP OR TEAR DOWN				
				MOVING (DISTANCE)				
				WEDGING				
				TESTING				
				AWAITING ORDERS				
				DELAYS (SPECIFY)				
				REPAIRS (SPECIFY)				
				OTHER (SPECIFY)		1	1	
				MOBILIZATION				
EQUIPMENT								
DRILL RIG (HOURS)								
TRACTOR (HOURS)								
5 TON TRUCK MILEAGE		OR HOURS						
1/2 TON TRUCK								
CAR								
CHAIN SAW DAYS		OR HOURS						
BOAT								
MOTOR								
OTHER								

REMARKS: Run in & drill out cement.

Edie CLIENT'S REPRESENTATIVE B. Miller RUNNER/FOREMAN



LOGAN DRILLING LIMITED

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DAILY REPORT

CONTRACT D. S.S. LOCATION Charalotte DATE Oct. 10 19 83
 HOLE SIZE NQ HOLE NO. C-1 DRILL TYPE 38 SHIFT Day

DIAMOND ARTICLES					FOOTAGE REPORT								
TYPE	NUMBER	OVERBURDEN	BEDROCK	LEFT IN HOLE					CASING	DRILLING			
					DEPTH END SHIFT					675			
					DEPTH START SHIFT					485			
					CASED OR DRILLED					190			
					CORE RECOVERED					190			
OTHER SUPPLIES USED					MATERIAL		FROM	TO	FEET				
TRICONE BITS		CHOPPING BITS			OVERBURDEN								
AUGER HEADS		AUGER TEETH			BEDROCK		485	675	190				
BENTONITE		ADDITIVES											
CEMENT					CASING - IN HOLE								
CORE BOXES					LENGTH	AW	BW	NQ	NW	HW	OTHER		
SHELBY TUBES					2 FT.								
SAMPLE JARS					5 FT.								
PENETRATION CONES					10 FT.								
OTHER (SPECIFY)					CASING - LEFT IN HOLE								
ITEMS LEFT IN HOLE (SPECIFY)					LENGTH	AW	BW	NQ	NW	HW	OTHER		
					2 FT.								
					5 FT.								
					10 FT.								
TESTING AND LOGGING													
CLINOMETER		TROPARI		OTHER									

LABOUR				DESCRIPTION OF WORK					
RUNNERS	FROM	TO	TOT. HRS	HOURS					
				SPVSR.	RUNNER	HELPER	OTHER		
<u>B. Miller</u>	<u>7:30</u>	<u>6:30</u>	<u>11</u>						
				WORK DETAIL					
HELPERS				DRILLING OVERBURDEN					
<u>B. Miller</u>	<u>7:30</u>	<u>6:30</u>	<u>11</u>	DRILLING BEDROCK					
				CASING (DEPTH)					
				REAMING (FROM TO)					
OTHER				WATERLINE (LENGTH)					
				CEMENT (AT FT.)					
				SET UP OR TEAR DOWN					
				MOVING (DISTANCE)					
				WEDGING					
				TESTING					
EQUIPMENT				AWAITING ORDERS					
DRILL RIG (HOURS)				DELAYS (SPECIFY)					
TRACTOR (HOURS)				REPAIRS (SPECIFY)					
5 TON TRUCK MILEAGE		OR HOURS		OTHER (SPECIFY)					
1/2 TON TRUCK									
CAR									
CHAIN SAW DAYS		OR HOURS							
BOAT				MOBILIZATION					
MOTOR									
OTHER									

REMARKS:

[Signature] CLIENT'S REPRESENTATIVE B. Miller RUNNER/FOREMAN

DESIGNATIONS: WHITE: LOGAN DRILLING LTD.; CANARY: CLIENT'S REPRESENTATIVE; PINK: RETAIN BY FOREMAN



LOGAN DRILLING LIMITED

DAILY REPORT

20

CONTRACT D.S.S. LOCATION Charlottetown DATE Oct 11 19 83
 HOLE SIZE N.O. HOLE NO. C-1 DRILL TYPE 38 SHIFT Day

DIAMOND ARTICLES					FOOTAGE REPORT							
TYPE	NUMBER	OVERBURDEN	BEDROCK	LEFT IN HOLE	CASING				DRILLING			
					DEPTH END SHIFT				805			
					DEPTH START SHIFT				675			
					CASED OR DRILLED				130			
					CORE RECOVERED				130			
OTHER SUPPLIES USED					MATERIAL	FROM	TO	FEET				
TRICONE BITS		CHOPPING BITS			OVERBURDEN							
AUGER HEADS		AUGER TEETH			BEDROCK	675	805	130				
BENTONITE		ADDITIVES										
CEMENT					CASING - IN HOLE							
CORE BOXES					LENGTH	AW	BW	NQ	NW	HW	OTHER	
SHELBY TUBES					2 FT.							
SAMPLE JARS					5 FT.							
PENETRATION CONES					10 FT.							
OTHER (SPECIFY)					CASING - LEFT IN HOLE							
ITEMS LEFT IN HOLE (SPECIFY)					LENGTH	AW	BW	NQ	NW	HW	OTHER	
					2 FT.							
					5 FT.							
					10 FT.							
TESTING AND LOGGING												
CLINOMETER		TROPARI		OTHER								

LABOUR				DESCRIPTION OF WORK					
RUNNERS	FROM	TO	TOT. HRS	HOURS					
				SPVSR.	RUNNER	HELPER	OTHER		
<u>B. Miller</u>	<u>7:30</u>	<u>6:30</u>	<u>11</u>	WORK DETAIL					
HELPERS				DRILLING OVERBURDEN					
<u>B. Miller</u>	<u>7:30</u>	<u>6:30</u>	<u>11</u>	DRILLING BEDROCK					
OTHER				CASING (DEPTH)					
				REAMING (FROM. TO)					
				WATERLINE (LENGTH)					
				CEMENT (AT FT.)					
				SET UP OR TEAR DOWN					
				MOVING (DISTANCE)					
EQUIPMENT				WEDGING					
DRILL RIG (HOURS)				TESTING					
TRACTOR (HOURS)				AWAITING ORDERS					
5 TON TRUCK MILEAGE OR HOURS				DELAYS (SPECIFY)					
1/2 TON TRUCK				REPAIRS (SPECIFY)					
CAR				OTHER (SPECIFY)					
CHAIN SAW DAYS OR HOURS									
BOAT				MOBILIZATION					
MOTOR									
OTHER									

REMARKS:

A. Leda CLIENT'S REPRESENTATIVE B. Miller RUNNER/FOREMAN



LOGAN DRILLING LIMITED

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DAILY REPORT

CONTRACT A.S.S. LOCATION Charlottetown DATE Oct. 12, 19 83

HOLE SIZE N.Q. HOLE NO. C-1 DRILL TYPE 38 SHIFT Day

DIAMOND ARTICLES					FOOTAGE REPORT						
TYPE	NUMBER	OVERBURDEN	BEDROCK	LEFT IN HOLE	CASING		DRILLING				
					DEPTH END SHIFT		950				
					DEPTH START SHIFT		805				
					CASED OR DRILLED		145				
					CORE RECOVERED		145				
OTHER SUPPLIES USED					MATERIAL	FROM	TO	FEET			
TRICONE BITS		CHOPPING BITS			OVERBURDEN						
AUGER HEADS		AUGER TEETH			BEDROCK	805	950	145			
BENTONITE		ADDITIVES									
CEMENT					CASING - IN HOLE						
CORE BOXES					LENGTH	AW	BW	NQ	NW	HW	OTHER
SHELBY TUBES					2 FT.						
SAMPLE JARS					5 FT.						
PENETRATION CONES					10 FT.						
OTHER (SPECIFY)					CASING - LEFT IN HOLE						
ITEMS LEFT IN HOLE (SPECIFY)					LENGTH	AW	BW	NQ	NW	HW	OTHER
					2 FT.						
					5 FT.						
					10 FT.						
TESTING AND LOGGING											
CLINOMETER		TROPARI		OTHER							

LABOUR				DESCRIPTION OF WORK			
RUNNERS	FROM	TO	TOT. HRS	HOURS			
				SPVSR.	RUNNER	HELPER	OTHER
<u>B. Miller</u>	<u>7:30</u>	<u>6:30</u>	<u>11</u>				
HELPERS	FROM	TO	TOT. HRS	WORK DETAIL			
<u>S. Miller</u>	<u>7:30</u>	<u>6:30</u>	<u>11</u>	DRILLING OVERBURDEN			
				DRILLING BEDROCK		<u>11</u>	<u>11</u>
				CASING (DEPTH)			
				REAMING (FROM TO)			
				WATERLINE (LENGTH)			
				CEMENT (AT FT.)			
				SET UP OR TEAR DOWN			
				MOVING (DISTANCE)			
EQUIPMENT				WEDGING			
DRILL RIG (HOURS)				TESTING			
TRACTOR (HOURS)				AWAITING ORDERS			
5 TON TRUCK MILEAGE		OR HOURS		DELAYS (SPECIFY)			
1/2 TON TRUCK				REPAIRS (SPECIFY)			
CAR				OTHER (SPECIFY)			
CHAIN SAW DAYS		OR HOURS					
BOAT				MOBILIZATION			
MOTOR							
OTHER							

REMARKS:

<u>M. Helee</u> CLIENT'S REPRESENTATIVE	<u>B. Miller</u> RUNNER/FOREMAN
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DESIGNATIONS: WHITE: LOGAN DRILLING LTD.; CANARY: CLIENT'S REPRESENTATIVE; PINK: RETAIN BY FOREMAN



LOGAN DRILLING LIMITED

DAILY REPORT

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CONTRACT D.55 LOCATION Charlottetown DATE Oct 13 19 83
 HOLE SIZE NQ HOLE NO. C-1 DRILL TYPE 38 SHIFT Day

DIAMOND ARTICLES					FOOTAGE REPORT						
TYPE	NUMBER	OVERBURDEN	BEDROCK	LEFT IN HOLE	CASING		DRILLING				
					DEPTH END SHIFT		1065				
					DEPTH START SHIFT		950				
					CASED OR DRILLED		125				
					CORE RECOVERED		125				
OTHER SUPPLIES USED					MATERIAL	FROM	TO	FEET			
TRICONE BITS		CHOPPING BITS			OVERBURDEN						
AUGER HEADS		AUGER TEETH			BEDROCK	950	1065	125			
BENTONITE		ADDITIVES									
CEMENT					CASING - IN HOLE						
CORE BOXES					LENGTH	AW	BW	NQ	NW	HW	OTHER
SHELBY TUBES					2 FT.						
SAMPLE JARS					5 FT.						
PENETRATION CONES					10 FT.						
OTHER (SPECIFY)											
ITEMS LEFT IN HOLE (SPECIFY)					LENGTH	AW	BW	NQ	NW	HW	OTHER
					2 FT.						
					5 FT.						
					10 FT.						
TESTING AND LOGGING											
CLINOMETER					TROPARI	OTHER					
					10 FT.						

LABOUR				DESCRIPTION OF WORK					
RUNNERS	FROM	TO	TOT. HRS	HOURS					
				SPVSR.	RUNNER	HELPER	OTHER		
B. Miller	7:30	6:30	11	WORK DETAIL					
				DRILLING OVERBURDEN					
				DRILLING BEDROCK					
				CASING (DEPTH)					
				REAMING (FROM TO)					
				WATERLINE (LENGTH)					
				CEMENT (AT FT.)					
				SET UP OR TEAR DOWN					
				MOVING (DISTANCE)					
EQUIPMENT				WEDGING					
DRILL RIG (HOURS)				TESTING					
TRACTOR (HOURS)				AWAITING ORDERS					
5 TON TRUCK MILEAGE OR HOURS				DELAYS (SPECIFY)					
1/2 TON TRUCK				REPAIRS (SPECIFY)					
CAR				OTHER (SPECIFY)					
CHAIN SAW DAYS OR HOURS									
BOAT				MOBILIZATION					
MOTOR									
OTHER									

REMARKS:

[Signature] CLIENT'S REPRESENTATIVE *B. Miller* RUNNER/FOREMAN



LOGAN DRILLING LIMITED

DAILY REPORT

CONTRACT D.S.S. LOCATION Charlottesville DATE Oct. 14, ²³ 19 83
 HOLE SIZE NQ HOLE NO. C-1 DRILL TYPE 38 SHIFT Day

DIAMOND ARTICLES					FOOTAGE REPORT							
TYPE	NUMBER	OVERBURDEN	BEDROCK	LEFT IN HOLE	CASING				DRILLING			
					DEPTH END SHIFT				1170			
					DEPTH START SHIFT				1065			
					CASED OR DRILLED				105			
					CORE RECOVERED				105			
OTHER SUPPLIES USED					MATERIAL	FROM	TO	FEET				
TRICONE BITS		CHOPPING BITS			OVERBURDEN							
AUGER HEADS		AUGER TEETH			BEDROCK	1065	1170	105				
BENTONITE		ADDITIVES										
CEMENT					CASING - IN HOLE							
CORE BOXES					LENGTH	AW	BW	NQ	NW	HW	OTHER	
SHELBY TUBES					2 FT.							
SAMPLE JARS					5 FT.							
PENETRATION CONES					10 FT.							
OTHER (SPECIFY)					CASING - LEFT IN HOLE							
ITEMS LEFT IN HOLE (SPECIFY)					LENGTH	AW	BW	NQ	NW	HW	OTHER	
					2 FT.							
					5 FT.							
					10 FT.							
TESTING AND LOGGING												
CLINOMETER		TROPARI		OTHER								

LABOUR				DESCRIPTION OF WORK				
RUNNERS	FROM	TO	TOT. HRS	HOURS				
				SPVSR.	RUNNER	HELPER	OTHER	
B. Miller	7:30	3:30	8					
				WORK DETAIL				
HELPERS				DRILLING OVERBURDEN				
G. Miller	7:30	3:30	8	DRILLING BEDROCK				
				CASING (DEPTH)				
				REAMING (FROM . TO)				
OTHER				WATERLINE (LENGTH)				
				CEMENT (AT FT.)				
				SET UP OR TEAR DOWN				
				MOVING (DISTANCE)				
				WEDGING				
EQUIPMENT				TESTING				
DRILL RIG (HOURS)				AWAITING ORDERS				
TRACTOR (HOURS)				DELAYS (SPECIFY)				
5 TON TRUCK MILEAGE OR HOURS				REPAIRS (SPECIFY)				
1/2 TON TRUCK				OTHER (SPECIFY)				
CAR								
CHAIN SAW DAYS OR HOURS								
BOAT				MOBILIZATION				
MOTOR								
OTHER								

REMARKS:

CLIENT'S REPRESENTATIVE: _____ RUNNER/FOREMAN: B. Miller



LOGAN DRILLING LIMITED

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DAILY REPORT

CONTRACT D.55, LOCATION Charlottesville, DATE Oct. 17, 19 83
 HOLE SIZE N.O. HOLE NO. C-1 DRILL TYPE J8 SHIFT Day

DIAMOND ARTICLES					FOOTAGE REPORT						
TYPE	NUMBER	OVERBURDEN	BEDROCK	LEFT IN HOLE	CASING			DRILLING			
					DEPTH END SHIFT			1270			
					DEPTH START SHIFT			1170			
					CASED OR DRILLED			100			
					CORE RECOVERED			100			
OTHER SUPPLIES USED					MATERIAL	FROM	TO	FEET			
TRICONE BITS		CHOPPING BITS			OVERBURDEN						
AUGER HEADS		AUGER TEETH			BEDROCK	1170	1270	100			
BENTONITE		ADDITIVES									
CEMENT					CASING - IN HOLE						
CORE BOXES					LENGTH	AW	BW	NQ	NW	HW	OTHER
SHELBY TUBES					2 FT.						
SAMPLE JARS					5 FT.						
PENETRATION CONES					10 FT.						
OTHER (SPECIFY)					CASING - LEFT IN HOLE						
ITEMS LEFT IN HOLE (SPECIFY)					LENGTH	AW	BW	NQ	NW	HW	OTHER
					2 FT.						
					5 FT.						
					10 FT.						
TESTING AND LOGGING											
CLINOMETER		TROPARI		OTHER							

LABOUR				DESCRIPTION OF WORK				
RUNNERS	FROM	TO	TOT. HRS	HOURS				
				SPVSR.	RUNNER	HELPER	OTHER	
B. Miller	9:00	6:30	9 1/2					
HELPERS				WORK DETAIL				
J. Miller	9:00	6:30	9 1/2	DRILLING OVERBURDEN				
				DRILLING BEDROCK		9 1/2	9 1/2	
				CASING (DEPTH)				
				REAMING (FROM TO)				
OTHER				WATERLINE (LENGTH)				
				CEMENT (AT FT.)				
				SET UP OR TEAR DOWN				
				MOVING (DISTANCE)				
EQUIPMENT				WEDGING				
DRILL RIG (HOURS)				TESTING				
TRACTOR (HOURS)				AWAITING ORDERS				
5 TON TRUCK MILEAGE OR HOURS				DELAYS (SPECIFY)				
1/2 TON TRUCK				REPAIRS (SPECIFY)				
CAR				OTHER (SPECIFY)				
CHAIN SAW DAYS OR HOURS								
BOAT				MOBILIZATION				
MOTOR								
OTHER								

REMARKS:

CLIENT'S REPRESENTATIVE: [Signature] RUNNER/FOREMAN: B. Miller



LOGAN DRILLING LIMITED

DAILY REPORT

25

CONTRACT D. 55 LOCATION Charlottesville DATE Oct, 18 19 83

HOLE SIZE NQ HOLE NO. C-1 DRILL TYPE 38 SHIFT Day

DIAMOND ARTICLES					FOOTAGE REPORT						
TYPE	NUMBER	OVERBURDEN	BEDROCK	LEFT IN HOLE	CASING		DRILLING				
					DEPTH END SHIFT		1410				
					DEPTH START SHIFT		1270				
					CASED OR DRILLED		140				
					CORE RECOVERED		140				
OTHER SUPPLIES USED					MATERIAL	FROM	TO	FEET			
TRICONE BITS		CHOPPING BITS			OVERBURDEN						
AUGER HEADS		AUGER TEETH			BEDROCK	1270	1410	140			
BENTONITE		ADDITIVES									
CEMENT					CASING - IN HOLE						
CORE BOXES					LENGTH	AW	BW	NQ	NW	HW	OTHER
SHELBY TUBES					2 FT.						
SAMPLE JARS					5 FT.						
PENETRATION CONES					10 FT.						
OTHER (SPECIFY)					CASING - LEFT IN HOLE						
ITEMS LEFT IN HOLE (SPECIFY)					LENGTH	AW	BW	NQ	NW	HW	OTHER
					2 FT.						
TESTING AND LOGGING					5 FT.						
CLINOMETER		TROPARI			OTHER	10 FT.					

LABOUR				DESCRIPTION OF WORK					
RUNNERS	FROM	TO	TOT. HRS	HOURS					
				SPVSR.	RUNNER	HELPER	OTHER		
B. Miller	7:30	6:30	11	WORK DETAIL					
				DRILLING OVERBURDEN					
				DRILLING BEDROCK		11	11		
				CASING (DEPTH)					
				REAMING (FROM TO)					
				WATERLINE (LENGTH)					
				CEMENT (AT FT.)					
				SET UP OR TEAR DOWN					
				MOVING (DISTANCE)					
				WEDGING					
				TESTING					
				AWAITING ORDERS					
				DELAYS (SPECIFY)					
				REPAIRS (SPECIFY)					
				OTHER (SPECIFY)					
				MOBILIZATION					
EQUIPMENT									
DRILL RIG (HOURS)									
TRACTOR (HOURS)									
5 TON TRUCK MILEAGE	OR HOURS								
1/2 TON TRUCK									
CAR									
CHAIN SAW DAYS	OR HOURS								
BOAT									
MOTOR									
OTHER									

REMARKS:

<i>[Signature]</i>	<i>B. Miller</i>
CLIENT'S REPRESENTATIVE	RUNNER/FOREMAN

DESIGNATIONS: WHITE: LOGAN DRILLING LTD.; CANARY: CLIENT'S REPRESENTATIVE; PINK: RETAIN BY FOREMAN



LOGAN DRILLING LIMITED

DAILY REPORT

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CONTRACT D.S.S. LOCATION Charlottetown DATE Oct. 19. 19 83

HOLE SIZE NQ HOLE NO. C-1 DRILL TYPE 38 SHIFT Day

DIAMOND ARTICLES					FOOTAGE REPORT						
TYPE	NUMBER	OVERBURDEN	BEDROCK	LEFT IN HOLE	CASING		DRILLING				
					DEPTH END SHIFT		1530				
					DEPTH START SHIFT		1410				
					CASED OR DRILLED		120				
					CORE RECOVERED		120				
OTHER SUPPLIES USED					MATERIAL	FROM	TO	FEET			
TRICONE BITS		CHOPPING BITS			OVERBURDEN						
AUGER HEADS		AUGER TEETH			BEDROCK	1410	1530	120			
BENTONITE		ADDITIVES									
CEMENT					CASING - IN HOLE						
CORE BOXES					LENGTH	AW	BW	NQ	NW	HW	OTHER
SHELBY TUBES					2 FT.						
SAMPLE JARS					5 FT.						
PENETRATION CONES					10 FT.						
OTHER (SPECIFY)											
ITEMS LEFT IN HOLE (SPECIFY)					LENGTH	AW	BW	NQ	NW	HW	OTHER
					2 FT.						
TESTING AND LOGGING					5 FT.						
CLINOMETER					10 FT.						
TROPARI		OTHER									

LABOUR				DESCRIPTION OF WORK			
RUNNERS	FROM	TO	TOT. HRS	HOURS			
				SPVSR.	RUNNER	HELPER	OTHER
<u>B. Miller</u>	<u>7:30</u>	<u>6:30</u>	<u>11</u>				
HELPERS	FROM	TO	TOT. HRS	WORK DETAIL			
<u>G. Miller</u>	<u>7:30</u>	<u>6:30</u>	<u>11</u>	DRILLING OVERBURDEN			
				DRILLING BEDROCK		<u>11</u>	<u>11</u>
				CASING (DEPTH)			
				REAMING (FROM TO)			
				WATERLINE (LENGTH)			
				CEMENT (AT FT.)			
				SET UP OR TEAR DOWN			
				MOVING (DISTANCE)			
EQUIPMENT				WEDGING			
DRILL RIG (HOURS)				TESTING			
TRACTOR (HOURS)				AWAITING ORDERS			
5 TON TRUCK MILEAGE				DELAYS (SPECIFY)			
1/2 TON TRUCK				REPAIRS (SPECIFY)			
CAR				OTHER (SPECIFY)			
CHAIN SAW DAYS							
BOAT				MOBILIZATION			
MOTOR							
OTHER							

REMARKS:

<u>Alodie</u>	<u>B. Miller</u>
CLIENT'S REPRESENTATIVE	RUNNER/FOREMAN

DESIGNATIONS: WHITE: LOGAN DRILLING LTD.; CANARY: CLIENT'S REPRESENTATIVE; PINK: RETAIN BY FOREMAN



LOGAN DRILLING LIMITED

DAILY REPORT

27

CONTRACT D.55. LOCATION Charlottesville DATE Oct. 20, 19 83
 HOLE SIZE NQ HOLE NO. C-1 DRILL TYPE 38 SHIFT Day

DIAMOND ARTICLES					FOOTAGE REPORT							
TYPE	NUMBER	OVERBURDEN	BEDROCK	LEFT IN HOLE	CASING				DRILLING			
					DEPTH END SHIFT				1590			
					DEPTH START SHIFT				1530			
					CASED OR DRILLED				60			
					CORE RECOVERED				60			
OTHER SUPPLIES USED					MATERIAL	FROM	TO	FEET				
TRICONE BITS		CHOPPING BITS			OVERBURDEN							
AUGER HEADS		AUGER TEETH			BEDROCK	1530	1590	60				
BENTONITE		ADDITIVES										
CEMENT					CASING - IN HOLE							
CORE BOXES					LENGTH	AW	BW	NQ	NW	HW	OTHER	
SHELBY TUBES					2 FT.							
SAMPLE JARS					5 FT.							
PENETRATION CONES					10 FT.							
OTHER (SPECIFY)												
ITEMS LEFT IN HOLE (SPECIFY)					LENGTH	AW	BW	NQ	NW	HW	OTHER	
					2 FT.							
TESTING AND LOGGING					5 FT.							
CLINOMETER	TROPARI	OTHER			10 FT.							

LABOUR				DESCRIPTION OF WORK						
RUNNERS	FROM	TO	TOT. HRS	HOURS						
				SPVSR.	RUNNER	HELPER	OTHER			
B. Miller	7:30	4:30	9	WORK DETAIL						
				DRILLING OVERBURDEN						
				DRILLING BEDROCK						
				CASING (DEPTH)						
				REAMING (FROM TO)						
				WATERLINE (LENGTH)						
				CEMENT (AT FT.)						
				SET UP OR TEAR DOWN						
				MOVING (DISTANCE)						
				WEDGING						
				TESTING Client						
				AWAITING ORDERS						
				DELAYS (SPECIFY)						
				REPAIRS (SPECIFY)						
				OTHER (SPECIFY)						
				MOBILIZATION						
				Testing						
EQUIPMENT										
DRILL RIG (HOURS)										
TRACTOR (HOURS)										
5 TON TRUCK MILEAGE		OR HOURS								
1/2 TON TRUCK										
CAR										
CHAIN SAW DAYS		OR HOURS								
BOAT										
MOTOR										
OTHER										

REMARKS: Draw up & make rod for bottom of hole
Client testing hole & as

[Signature] CLIENT'S REPRESENTATIVE B. Miller RUNNER/FOREMAN

DESIGNATIONS: WHITE: LOGAN DRILLING LTD.; CANARY: CLIENT'S REPRESENTATIVE; PINK: RETAIN BY FOREMAN



LOGAN DRILLING LIMITED

DAILY REPORT

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CONTRACT D. S. S. LOCATION Charlottesville DATE Oct. 21 19 83

HOLE SIZE NQ HOLE NO. C-1 DRILL TYPE 38 SHIFT day

DIAMOND ARTICLES					FOOTAGE REPORT								
TYPE	NUMBER	OVERBURDEN	BEDROCK	LEFT IN HOLE	CASING				DRILLING				
					DEPTH END SHIFT								
					DEPTH START SHIFT								
					CASED OR DRILLED								
					CORE RECOVERED								
OTHER SUPPLIES USED					MATERIAL	FROM	TO	FEET					
TRICONE BITS		CHOPPING BITS			OVERBURDEN								
AUGER HEADS		AUGER TEETH			BEDROCK								
BENTONITE		ADDITIVES											
CEMENT					CASING - IN HOLE								
CORE BOXES					LENGTH	AW	BW	NQ	NW	HW	OTHER		
SHELBY TUBES					2 FT.								
SAMPLE JARS					5 FT.								
PENETRATION CONES					10 FT.								
OTHER (SPECIFY)													
ITEMS LEFT IN HOLE (SPECIFY)					LENGTH	AW	BW	NQ	NW	HW	OTHER		
					2 FT.								
TESTING AND LOGGING					5 FT.								
CLINOMETER		TROPARI		OTHER	10 FT.								

LABOUR				DESCRIPTION OF WORK				
RUNNERS	FROM	TO	TOT. HRS	HOURS				
				SPVSR.	RUNNER	HELPER	OTHER	
<u>Elwyn Woodin</u>	<u>7.30</u>	<u>6.30</u>	<u>11</u>					
HELPERS				WORK DETAIL				
<u>Earl Miller</u>	<u>7.30</u>	<u>6.30</u>	<u>11</u>	DRILLING OVERBURDEN				
<u>Demetrius</u>	<u>7.30</u>	<u>6.30</u>	<u>11</u>	DRILLING BEDROCK				
				CASING (DEPTH)				
				REAMING (FROM TO)				
				WATERLINE (LENGTH)				
				CEMENT (AT FT.)				
				SET UP QR TEAR DOWN				
				MOVING (DISTANCE)				
				WEDGING				
EQUIPMENT				TESTING				
DRILL RIG (HOURS)				AWAITING ORDERS				
TRACTOR (HOURS)				DELAYS (SPECIFY)				
5 TON TRUCK MILEAGE	OR HOURS			REPAIRS (SPECIFY)	<u>Attachig shop</u>	<u>3 1/2</u>	<u>7</u>	
1/2 TON TRUCK	OR HOURS			OTHER (SPECIFY)	<u>Pull Rods (hole 5' from)</u>	<u>1 1/2</u>	<u>7</u>	
CAR	OR HOURS			MOBILIZATION	<u>17 stall liner</u>	<u>4</u>	<u>8</u>	
CHAIN SAW DAYS	OR HOURS							
BOAT	OR HOURS							
MOTOR	OR HOURS							
OTHER	OR HOURS							

REMARKS: all sent to machine shop to have adapter made.
Broke hoisting cable at end of shift.
installing NQ rods for liner.

Walter CLIENT'S REPRESENTATIVE Elwyn Woodin RUNNER/FOREMAN



LOGAN DRILLING LIMITED

DAILY REPORT

29

CONTRACT D.S.S. LOCATION Charlottesville DATE Oct 22 19 83
 HOLE SIZE NG HOLE NO. C1 DRILL TYPE 38 SHIFT day

DIAMOND ARTICLES					FOOTAGE REPORT							
TYPE	NUMBER	OVERBURDEN	BEDROCK	LEFT IN HOLE	CASING				DRILLING			
					DEPTH END SHIFT							
					DEPTH START SHIFT							
					CASED OR DRILLED							
					CORE RECOVERED							
OTHER SUPPLIES USED					MATERIAL	FROM	TO	FEET				
TRICONE BITS		CHOPPING BITS			OVERBURDEN							
AUGER HEADS		AUGER TEETH			BEDROCK							
BENTONITE		ADDITIVES										
CEMENT		<u>24 bags</u>			CASING - IN HOLE							
CORE BOXES					LENGTH	AW	BW	NQ	NW	HW	OTHER	
SHELBY TUBES					2 FT.							
SAMPLE JARS					5 FT.							
PENETRATION CONES					10 FT.							
OTHER(SPECIFY)					CASING - LEFT IN HOLE							
ITEMS LEFT IN HOLE (SPECIFY)		<u>Liner - 157 NG rods:</u>			LENGTH	AW	BW	NQ	NW	HW	OTHER	
		<u>414' of HW casing mounted in at beginning of job.</u>			2 FT.					2		
TESTING AND LOGGING					5 FT.							
CLINOMETER	TROPARI	OTHER			10 FT.			15'		4		

LABOUR				DESCRIPTION OF WORK									
RUNNERS	FROM	TO	TOT. HRS	HOURS									
				SPVSR.				RUNNER		HELPER		OTHER	
<u>E Woodia</u>	<u>9.30</u>	<u>8.30</u>	<u>11</u>	WORK DETAIL									
HELPERS				DRILLING OVERBURDEN									
<u>G. Miller</u>	<u>9.30</u>	<u>8.30</u>	<u>11</u>	DRILLING BEDROCK									
<u>D Young</u>	<u>9.30</u>	<u>8.30</u>	<u>11</u>	CASING (DEPTH)									
OTHER				REAMING (FROM TO)									
				WATERLINE (LENGTH)									
				CEMENT (AT FT.)				6		12			
				SET UP OR TEAR DOWN									
				MOVING (DISTANCE)									
EQUIPMENT				WEDGING									
DRILL RIG (HOURS)				<u>TESTING</u> <u>Running water</u>				2		2			
TRACTOR (HOURS)				AWAITING ORDERS									
5 TON TRUCK MILEAGE		OR HOURS		DELAYS (SPECIFY)									
1/2 TON TRUCK				REPAIRS (SPECIFY)									
CAR				OTHER (SPECIFY)									
CHAIN SAW DAYS		OR HOURS		<u>TRIP IN RR car</u>				2		4			
BOAT				MOBILIZATION									
MOTOR				<u>195 Fall liner</u>				1		2			
OTHER													

REMARKS: Finished installing liner. Counting liner through
11' to void at 275'. Piped rubber seal down 11' to
to prevent cement from coming down. RG side being up at 275'
when going in to tag rubber plug.

CLIENT'S REPRESENTATIVE: _____ RUNNER/FOREMAN: Bill Wood



LOGAN DRILLING LIMITED

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DAILY REPORT

CONTRACT D.S.S LOCATION Charlotteville DATE Oct 23 19 83
 HOLE SIZE 1 1/2 HOLE NO. C1 DRILL TYPE 38 SHIFT day

DIAMOND ARTICLES					FOOTAGE REPORT									
TYPE	NUMBER	OVERBURDEN	BEDROCK	LEFT IN HOLE					CASING	DRILLING				
					DEPTH END SHIFT									
					DEPTH START SHIFT									
					CASED OR DRILLED									
					CORE RECOVERED									
OTHER SUPPLIES USED					MATERIAL	FROM	TO	FEET						
TRICONE BITS		CHOPPING BITS			OVERBURDEN									
AUGER HEADS		AUGER TEETH			BEDROCK									
BENTONITE		ADDITIVES												
CEMENT		<u>1.3 bags</u>			CASING - IN HOLE									
CORE BOXES					LENGTH	AW	BW	NQ	NW	HW	OTHER			
SHELBY TUBES					2 FT.									
SAMPLE JARS					5 FT.									
PENETRATION CONES					10 FT.									
OTHER (SPECIFY)					CASING LEFT IN HOLE									
ITEMS LEFT IN HOLE (SPECIFY) <u>1 NW shoe bit.</u>					LENGTH	AW	BW	NQ	NW	HW	OTHER			
					2 FT.									
TESTING AND LOGGING					5 FT.									
CLINOMETER	TROPARI			OTHER	10 FT.									

LABOUR				DESCRIPTION OF WORK			
RUNNERS	FROM	TO	TOT. HRS	HOURS			
				SPVSR.	RUNNER	HELPER	OTHER
<u>E. Woodin</u>	<u>3</u>	<u>4</u>	<u>8</u>				
HELPERS				WORK DETAIL			
<u>G. Miller</u>	<u>3</u>	<u>4</u>	<u>8</u>	DRILLING OVERBURDEN			
<u>D. Young</u>	<u>3</u>	<u>4</u>	<u>8</u>	DRILLING BEDROCK			
OTHER				CASING (DEPTH)			
				REAMING (FROM TO)			
				WATERLINE (LENGTH)			
				CEMENT (AT FT.)		<u>4</u>	<u>8</u>
				SET UP OR TEAR DOWN			
				MOVING (DISTANCE)			
EQUIPMENT				WEDGING			
DRILL RIG (HOURS)				TESTING			
TRACTOR (HOURS)				AWAITING ORDERS			
5 TON TRUCK MILEAGE	OR HOURS			DELAYS (SPECIFY)			
1/2 TON TRUCK				REPAIRS (SPECIFY)			
CAR				OTHER (SPECIFY)			
CHAIN SAW DAYS	OR HOURS			<u>BQ rods</u>		<u>4</u>	<u>8</u>
BOAT				MOBILIZATION			
MOTOR							
OTHER							

REMARKS: Continued from top of hole to void at 275 through NW casing. Pulled NW casing. 10' left in hole with shoe bit. Purchased BQ rods to 1210. Cannot send logs at 1210 ft. will have to drill count-out.

Whishu CLIENT'S REPRESENTATIVE Mike Jones RUNNER/FOREMAN



LOGAN DRILLING LIMITED

DAILY REPORT

31

CONTRACT D. 55 LOCATION Charlton DATE Oct. 24 19 83
 HOLE SIZE 1 1/2 HOLE NO. C1 DRILL TYPE 38 SHIFT day

DIAMOND ARTICLES					FOOTAGE REPORT							
TYPE	NUMBER	OVERBURDEN	BEDROCK	LEFT IN HOLE	CASING				DRILLING			
					DEPTH END SHIFT				1585			
					DEPTH START SHIFT				1210			
					CASED OR DRILLED				375			
					CORE RECOVERED							
OTHER SUPPLIES USED					MATERIAL	FROM	TO	FEET				
TRICONE BITS		CHOPPING BITS			OVERBURDEN							
AUGER HEADS		AUGER TEETH			BEDROCK							
BENTONITE		ADDITIVES										
CEMENT					CASING - IN HOLE							
CORE BOXES					LENGTH	AW	BW	NQ	NW	HW	OTHER	
SHELBY TUBES					2 FT.							
SAMPLE JARS					5 FT.							
PENETRATION CONES					10 FT.							
OTHER (SPECIFY)					CASING - LEFT IN HOLE							
ITEMS LEFT IN HOLE (SPECIFY)					LENGTH	AW	BW	NQ	NW	HW	OTHER	
					2 FT.							
TESTING AND LOGGING					5 FT.							
CLINOMETER		TROPARI		OTHER	10 FT.							

LABOUR				DESCRIPTION OF WORK				
RUNNERS	FROM	TO	TOT. HRS	HOURS				
				SPVSR.	RUNNER	HELPER	OTHER	
F. Woodin	8	6	10	WORK DETAIL				
HELPERS				DRILLING OVERBURDEN				
G. Miller	8	6	10	DRILLING BEDROCK	Cement	10	10	
D. Young	8	6	10	CASING (DEPTH)				
OTHER				REAMING (FROM TO)				
				WATERLINE (LENGTH)				
				CEMENT (AT FT.)				
				SET UP OR TEAR DOWN				
				MOVING (DISTANCE)				
EQUIPMENT				WEDGING				
DRILL RIG (HOURS)				TESTING				
TRACTOR (HOURS)				AWAITING ORDERS				
5 TON TRUCK MILEAGE		OR HOURS		DELAYS (SPECIFY)				
1/2 TON TRUCK				REPAIRS (SPECIFY)				
CAR				OTHER (SPECIFY)				
CHAIN SAW DAYS		OR HOURS		MOBILIZATION				
BOAT								
MOTOR								
OTHER								

REMARKS: Drilled cement out of HQ rods. Cleaned hole to 1585. Left 5' cement plug in bottom of hole. Pulled BQ rods.

[Signature] CLIENT'S REPRESENTATIVE *[Signature]* RUNNER/FOREMAN

DESIGNATIONS: WHITE: LOGAN DRILLING LTD.; CANARY: CLIENT'S REPRESENTATIVE; PINK: RETAIN BY FOREMAN



LOGAN DRILLING LIMITED

DAILY REPORT

32

CONTRACT DSS LOCATION Charleston DATE Oct 25 19 83

HOLE SIZE _____ HOLE NO. C1 DRILL TYPE 38 SHIFT day

DIAMOND ARTICLES					FOOTAGE REPORT						
TYPE	NUMBER	OVERBURDEN	BEDROCK	LEFT IN HOLE			CASING	DRILLING			
					DEPTH END SHIFT						
					DEPTH START SHIFT						
					CASED OR DRILLED						
					CORE RECOVERED						
OTHER SUPPLIES USED					MATERIAL	FROM	TO	FEET			
TRICONE BITS		CHOPPING BITS			OVERBURDEN						
AUGER HEADS		AUGER TEETH			BEDROCK						
BENTONITE		ADDITIVES									
CEMENT <u>1 bag for cement top of hole</u>					CASING - IN HOLE						
CORE BOXES					LENGTH	AW	BW	NQ	NW	HW	OTHER
SHELBY TUBES					2 FT.						
SAMPLE JARS					5 FT.						
PENETRATION CONES					10 FT.						
OTHER (SPECIFY) <u>Alcomar - 2 Pails used for intire job.</u>					CASING - LEFT IN HOLE						
ITEMS LEFT IN HOLE (SPECIFY) <u>hooking cap for NQ rods</u>					LENGTH	AW	BW	NQ	NW	HW	OTHER
					2 FT.						
TESTING AND LOGGING					5 FT.						
CLINOMETER					10 FT.						
TROPARI		OTHER									

LABOUR				DESCRIPTION OF WORK			
RUNNERS	FROM	TO	TOT. HRS	HOURS			
				SPVSR.	RUNNER	HELPER	OTHER
<u>F. Woodin</u>	<u>4</u>	<u>6</u>	<u>10</u>				
HELPERS				WORK DETAIL			
<u>G. Miller</u>	<u>8</u>	<u>6</u>	<u>10</u>	DRILLING OVERBURDEN			
<u>D. Young</u>	<u>4</u>	<u>6</u>	<u>10</u>	DRILLING BEDROCK			
				CASING (DEPTH)			
				REAMING (FROM TO)			
				WATERLINE (LENGTH)			
				CEMENT (AT FT.)			
				SET UP OR TEAR DOWN			
				MOVING (DISTANCE)			
EQUIPMENT				WEDGING			
DRILL RIG (HOURS)				TESTING			
TRACTOR (HOURS)				AWAITING ORDERS			
5 TON TRUCK MILEAGE OR HOURS				DELAYS (SPECIFY)			
1/2 TON TRUCK				REPAIRS (SPECIFY)			
CAR				OTHER (SPECIFY)			
CHAIN SAW DAYS OR HOURS							
BOAT				MOBILIZATION			
MOTOR							
OTHER							

REMARKS: Loaded equipment on truck - ready to move to shop.
Hired septic service to pump out sumps.
Hired back hoe to fill in sumps and back dig site.
Went back to shop.

M. Blie CLIENT'S REPRESENTATIVE J. Miller RUNNER/FOREMAN

APPENDIX II

Bottomhole Temperatures
(End of Drill Shift)

<u>Date</u>	<u>Time</u>	<u>Depth (m)</u>	<u>Temp.</u> <u>°C</u>	<u>Remarks</u>
October 8, 1983	1655	139.0	11.708	
October 10, 1983	1830	200.0	12.827	
October 11, 1983	1815	245.0	12.451	
October 12, 1983	1815	290.0	12.786	
October 13, 1983	1815	326.0	13.618	
October 14, 1983	1505	356.0	11.830	
October 14, 1983	1536	365.0	11.502	30 minutes after drilling.
October 17, 1983	1810	387.0	12.188	
October 19, 1983	1815	466.0	16.384	
October 20, 1983	1745	484.0	13.894	3 hours after drilling.

APPENDIX III
COLLECTED TEMPERATURE DATA

COLLECTED TEMPERATURE DATA

Hole: E.P.B. No. 341

Location: Charlottetown, P.E.I.

Latitude: 46°08.3'

(1-hour log, October 20/83)

Longitude: 63°08.3'

Thermistor No. 5326

Total Depth: 484.8 m

Logged Depth: 483.0 m

<u>Vertical Depth(m)</u>	<u>Cable Resist.(ohms)</u>	<u>Corrected Resist.(ohms)</u>	<u>Temp.(°C)</u>	<u>Lithology/Remarks</u>	
10	251	9,973	10.996	Logged at 10-metre intervals through NQ rods one hour after cessation of drilling activities.	
20		10,769	9.205		
30		10,807	9.124		
40		10,925	8.871		
50	250	10,879	8.969		
60		10,839	9.055		
70		10,858	9.014		0 - 8.5m: overburden.
80		10,844	9.044		8.5 - 484.8m: Permo-Carboniferous red beds consisting of sandstone, siltstone and shale with an increase in mud-pellet conglomerate towards end of hole.
90		10,834	9.065		
100	250	10,842	9.049		
110		10,760	9.225		
120		10,800	9.139		
130		10,736	9.276		
140		10,714	9.324		
150	249	10,670	9.420		
160		10,625	9.518		
170		10,545	9.694		
180		10,539	9.707		
190		10,478	9.842		
200	249	10,436	9.936		
210		10,337	10.158		
220		10,346	10.138		
230		10,268	10.315		
240		10,186	10.502		
250	249	10,088	10.728		
260		10,062	10.788		
270		10,018	10.892		
280		9,976	10.989		
290		9,893	11.284		
300	248	9,803	11.399		
310		9,814	11.368		
320		9,730	11.575		
330		9,693	11.664		
340		9,643	11.786		
350	248	9,615	11.854		

COLLECTED TEMPERATURE DATA

36

Hole: E.P.B. No. 341
(1-hour log)

Location:

Latitude:

Longitude:

Thermistor No.

Total Depth:

Logged Depth:

<u>Vertical</u> <u>Depth(m)</u>	<u>Cable</u> <u>Resist.(ohms)</u>	<u>Corrected</u> <u>Resist.(ohms)</u>	<u>Temp.(°C)</u>	<u>Lithology/Remarks</u>
360		9,551	12.012	
370		9,480	12.188	
380		9,376	12.448	
390		9,333	12.557	
400	248	9,266	12.727	
410		9,174	12.964	
420		9,074	13.224	
430		9,007	13.400	
440		8,932	13.599	
450	250	8,816	13.910	
460		8,803	13.946	
470		8,658	14.343	
480		8,805	13.940	
483		8,822	13.894	End of log.

COLLECTED TEMPERATURE DATA

37

Hole: E.P.B. No. 341

Location: Charlottetown, P.E.I.

Latitude: 46°15.7'

(48-hour log, October 26/83)

Longitude: 63°08.3'

Thermistor No. 5326

Total Depth: 484.8 m

Logged Depth: 480.0 m

<u>Vertical Depth(m)</u>	<u>Cable Resist.(ohms)</u>	<u>Corrected Resist.(ohms)</u>	<u>Temp.(°C)</u>	<u>Lithology/Remarks</u>
0	244	10,872	8.985	Logged through liner- 6 days after core drilling. 3 days after cementing liner. 2 days after drilling cement.
5		10,869	8.991	
10		11,124	8.454	
15		11,580	7.528	
20		11,599	7.490	
25		11,499	7.689	
30		11,449	7.790	
35		11,437	7.815	
40		11,502	7.683	0 - 8.5m: overburden
45		11,543	7.601	
50	245	11,529	7.629	8.5 - 484.8m: Permo- Carboniferous red beds
55		11,515	7.657	consisting of sandstone,
60		11,525	7.637	siltstone and shale with
65		11,562	7.564	increase in mud-pellet
70		11,474	7.740	conglomerate towards
75		11,434	7.820	end of hole.
80		11,466	7.756	
85		11,326	8.038	
90		11,451	7.786	
95		11,424	7.840	
100	245	11,392	7.907	
105		11,336	8.018	
110		11,236	8.222	
115		11,334	8.022	
120		11,298	8.094	
125		11,248	8.198	
130		11,216	8.264	
135		11,199	8.299	
140		11,204	8.289	
145		11,131	8.440	
150	245	11,102	8.500	
155		11,061	8.585	
160		11,060	8.587	
165		11,011	8.690	
170		11,006	8.700	
175		10,969	8.779	
180		10,921	8.880	

COLLECTED TEMPERATURE DATA

Hole: E.P.B. No. 341
(48-hour log)

Location:

Latitude:

Longitude:

Thermistor No.

Total Depth:

Logged Depth:

<u>Vertical Depth(m)</u>	<u>Cable Resist.(ohms)</u>	<u>Corrected Resist.(ohms)</u>	<u>Temp.(°C)</u>	<u>Lithology/Remarks</u>
185		10,893	8.940	
190		10,892	8.942	
195		10,865	9.000	
200	245	10,853	9.025	
205		10,816	9.100	
210		10,753	9.240	
215		10,729	9.291	
220		10,700	9.355	
225		10,651	9.461	
230		10,628	9.511	
235		10,623	9.523	
240		10,564	9.652	
245		10,534	9.728	
250	245	10,499	9.795	
255		10,466	9.869	
260		10,438	9.931	
265		10,401	10.014	
270		10,380	10.061	
275		10,356	10.115	
280		10,317	10.204	
285		10,302	10.238	
290		10,204	10.461	
295		10,195	10.482	
300	245	10,190	10.493	
305		10,173	10.532	
310		10,146	10.594	
315		10,115	10.665	
320		10,083	10.740	
325		10,068	10.775	
330		10,028	10.868	
335		10,003	10.926	
340		9,978	10.981	
345		9,952	11.045	
350	246	9,922	11.116	

COLLECTED TEMPERATURE DATA

39

Hole: E.P.B. No. 341
(48-hour log)

Location:

Latitude:

Longitude:

Thermistor No.

Total Depth:

Logged Depth:

<u>Vertical</u> <u>Depth(m)</u>	<u>Cable</u> <u>Resist.(ohms)</u>	<u>Corrected</u> <u>Resist.(ohms)</u>	<u>Temp.(°C)</u>	<u>Lithology/Remarks</u>
355		9,888	11.195	
360		9,861	11.261	
365		9,846	11.296	
370		9,818	11.363	
375		9,783	11.447	
380		9,750	11.526	
385		9,748	11.531	
390		9,732	11.570	
395		9,710	11.623	
400	246	9,663	11.737	
405		9,637	11.800	
410		9,613	11.859	
415		9,580	11.940	
420		9,554	12.004	
425		9,526	12.074	
430		9,499	12.140	
435		9,478	12.193	
440		9,445	12.275	
445		9,417	12.345	
450	246	9,380	12.433	
455		9,350	12.514	
460		9,366	12.575	
465		9,294	12.655	
470		9,260	12.743	
475		9,235	12.807	
480		9,207	12.879	End of log.

COLLECTED TEMPERATURE DATA

40

Hole: E.P.B. No. 341

Location: Charlottetown, P.E.I.

Latitude: 46°15.7'

(12-day log, November 5/83)

Longitude: 63°08.3'

Thermistor No. 5326

Total Depth: 484.8 m

Logged Depth: 483.0 m

<u>Vertical Depth(m)</u>	<u>Cable Resist.(ohms)</u>	<u>Corrected Resist.(ohms)</u>	<u>Temp.(°C)</u>	<u>Lithology/Remarks</u>
0	251	10,405	10.005	Logged through liner-
5		10,350	10.129	16 days after core
10		11,834	7.030	drilling.
15		11,680	7.330	13 days after cementing
20		11,679	7.332	liner.
25		11,704	7.283	12 days after drilling
30		11,694	7.303	cement.
35		11,684	7.324	
40		11,679	7.332	0 - 8.5m: overburden
45		11,691	7.309	
50	249	11,701	7.289	8.5 - 484.8m: Permo-
				Carboniferous red beds
55		11,665	7.360	consisting of sandstone,
60		11,656	7.378	siltstone and shale with
65		11,650	7.389	increase in mud-pellet
70		11,607	7.474	conglomerate towards
75		11,586	7.516	end of hole.
80		11,574	7.540	
85		11,479	7.729	
90		11,514	7.659	
95		11,527	7.633	
100	248	11,496	7.695	
105		11,292	8.108	
110		11,360	7.969	
115		11,416	7.852	
120		11,404	7.880	
125		11,364	7.961	
130		11,327	8.036	
135		11,299	8.094	
140		11,285	8.142	
145		11,237	8.220	
150	247	11,206	8.284	
155		11,169	8.361	
160		11,153	8.394	
165		11,109	8.485	
170		11,091	8.523	
175		11,052	8.604	

COLLECTED TEMPERATURE DATA

Hole: E.P.B. No. 341
(12-day log)

Location:

Latitude:

Longitude:

Thermistor No.

Total Depth:

Logged Depth:

<u>Vertical Depth(m)</u>	<u>Cable Resist.(ohms)</u>	<u>Corrected Resist.(ohms)</u>	<u>Temp.(°C)</u>	<u>Lithology/Remarks</u>
180		11,010	8.692	
185		11,000	8.713	
190		10,977	8.762	
195		10,949	8.821	
200	247	10,929	8.863	
205		10,882	8.965	
210		10,841	9.051	
215		10,811	9.115	
220		10,785	9.171	
225		10,743	9.261	
230		10,707	9.340	
235		10,688	9.380	
240		10,645	9.474	
245		10,612	9.547	
250	247	10,578	9.621	
255		10,541	9.703	
260		10,512	9.767	
265		10,480	9.838	
270		10,453	9.898	
275		10,429	9.951	
280		10,398	10.021	
285		10,370	10.084	
290		10,324	10.188	
295		10,298	10.247	
300	246	10,621	10.331	
305		10,233	10.394	
310		10,207	10.454	
315		10,176	10.525	
320		10,146	10.594	
325		10,118	10.659	
330		10,089	10.725	
335		10,058	10.798	
340		10,032	10.858	
345		10,010	10.910	
350	246	9,980	10.979	

COLLECTED TEMPERATURE DATA

42

Hole: E.P.B. No. 341
(12-day log)

Location:

Latitude:

Longitude:

Thermistor No.

Total Depth:

Logged Depth:

<u>Vertical</u> <u>Depth(m)</u>	<u>Cable</u> <u>Resist.(ohms)</u>	<u>Corrected</u> <u>Resist.(ohms)</u>	<u>Temp.(°C)</u>	<u>Lithology/Remarks</u>
355		9,949	11.052	
360		9,922	11.115	
365		9,892	11.186	
370		9,868	11.244	
375		9,830	11.334	
380		9,803	11.399	
385		9,782	11.449	
390		9,756	11.512	
395		9,723	11.592	
400	246	9,701	11.645	
405		9,668	11.725	
410		9,646	11.779	
415		9,617	11.849	
420		9,587	11.923	
425		9,557	12.997	
430		9,531	12.062	
435		9,504	12.128	
440		9,477	12.195	
445		9,450	12.263	
450	246	9,416	12.348	
455		9,379	12.440	
460		9,356	12.499	
465		9,322	12.585	
470		9,287	12.674	
475		9,258	12.748	
480		9,230	12.820	
483		9,218	12.850	End of log.

COLLECTED TEMPERATURE DATA

Hole: E.P.B. No. 341

Location: Charlottetown, P.E.I.

Latitude: 46°15.7'

(3.5 month log, Feb.5/84)

Longitude: 63°08.3'

Thermistor No. 5326

Total Depth: 484.8 m

Logged Depth: 483.0 m

<u>Vertical Depth(m)</u>	<u>Cable Resist.(ohms)</u>	<u>Corrected Resist.(ohms)</u>	<u>Temp.(°C)</u>	<u>Lithology/Remarks</u>
5	250	12,383	6.030	Logged through liner-
10		11,738	7.217	107 days after core
15		11,680	7.330	drilling.
20		11,772	7.150	104 days after cementing
25		11,780	7.135	liner.
30		11,782	7.131	103 days after drilling
35		11,773	7.148	cement.
40		11,776	7.143	
45		11,771	7.152	0 - 8.5m: overburden
50	249	11,759	7.176	
55		11,749	7.195	8.5 - 484.8m: Permo-
60		11,728	7.236	Carboniferous red beds
65		11,715	7.261	consisting of sandstone,
70		11,694	7.303	siltstone and shale with
75		11,669	7.352	increase in mud-pellet
80		11,640	7.409	conglomerate towards
85		11,614	7.460	end of hole.
90		11,588	7.512	
95		11,578	7.532	
100	248	11,542	7.603	
105		11,485	7.717	
110		11,465	7.758	
115		11,468	7.752	
120		11,459	7.770	
125		11,436	7.816	
130		11,398	7.892	
135		11,370	7.949	
140		11,346	7.998	
145		11,309	8.073	
150	248	11,279	8.134	
155		11,251	8.192	
160		11,222	8.252	
165		11,180	8.338	
170		11,158	8.383	
175		11,131	8.440	

COLLECTED TEMPERATURE DATA

44

Hole: E.P.B. No. 341
(3.5 month log)

Location:

Latitude:

Longitude:

Thermistor No.

Total Depth:

Logged Depth:

<u>Vertical</u> <u>Depth(m)</u>	<u>Cable</u> <u>Resist.(ohms)</u>	<u>Corrected</u> <u>Resist.(ohms)</u>	<u>Temp.(°C)</u>	<u>Lithology/Remarks</u>
180		11,090	8.525	
185		11,063	8.581	
190		11,036	8.637	
195		11,012	8.688	
200	248	10,981	8.753	
205		10,946	8.827	
210		10,903	8.919	
215		10,873	8.982	
220		10,839	9.055	
225		10,798	9.143	
230		10,773	9.197	
235		10,741	9.266	
240		10,702	9.351	
245		10,666	9.428	
250	247	10,625	9.518	
255		10,598	9.577	
260		10,569	9.641	
265		10,540	9.705	
270		10,509	9.773	
275		10,482	9.834	
280		10,447	9.912	
285		10,424	9.963	
290		10,388	10.043	
295		10,350	10.129	
300	247	10,308	10.224	
305		10,279	10.289	
310		10,249	10.358	
315		10,221	10.422	
320		10,182	10.511	
325		10,147	10.592	
330		10,120	10.654	
335		10,096	10.709	
340		10,069	10.772	
345		10,037	10.847	
350	247	10,015	10.897	

COLLECTED TEMPERATURE DATA

Hole: E.P.B. No.341
(3,5 month log)

Location:

Latitude:

Longitude:

Thermistor No.

Total Depth:

Logged Depth:

<u>Vertical Depth(m)</u>	<u>Cable Resist.(ohms)</u>	<u>Corrected Resist.(ohms)</u>	<u>Temp.(°C)</u>	<u>Lithology/Remarks</u>
355		9,988	10.960	
360		9,957	11.034	
365		9,922	11.116	
370		9,892	11.187	
375		9,872	11.234	
380		9,839	11.312	
385		9,810	11.382	
390		9,783	11.447	
395		9,759	11.504	
400	246	9,729	11.577	
405		9,701	11.645	
410		9,673	11.713	
415		9,646	11.779	
420		9,617	11.849	
425		9,584	11.930	
430		9,558	11.994	
435		9,529	12.066	
440		9,500	12.138	
445		9,476	12.198	
450	246	9,445	12.275	
455		9,403	12.380	
460		9,372	12.458	
465		9,349	12.517	
470		9,303	12.633	
475		9,276	12.702	
480		9,245	12.781	
483		9,231	12.817	End of log.

LITHOLOGIC LOG (Cont'd.)

32.8 - 35.6: INTERBEDDED SHALE AND SILTSTONE

Interbedded, massive, red to grey shale and medium to coarse grained siltstone. Individual beds to 14 cm. Siltstone has essentially the same constituents as the sandstone, differing mainly in grain size. The mineralogy of the shale is not discernible megascopically.

35.6 - 57.8: SANDSTONE

37.8 - 41.2: interbedded siltstone and shale.

41.2 - 46.8: scattered grey segregations.

41.7 - 41.9: shale, grey laminae.

41.9 - 54.9: interbedded siltstone and shale.

57.8 - 62.0: INTERBEDDED SHALE AND SILTSTONE62.0 - 91.5: SANDSTONE

66.7 - 68.9: shale, grey segregations.

73.4 - 74.8: shale.

74.8 - 91.5: abundant muscovite on bedding planes.

91.5 - 97.2: SHALE

91.8 - 95.2: strongly calcareous.

97.2 - 115.5: SANDSTONE

100.9 - 102.1: lost core.

102.1 - 104.3: shale.

105.2 - 115.5: silty.

115.5 - 130.5: SHALE

Locally silty. Grey sections to 15 cm wide.

130.5 - 139.1: SANDSTONE

Locally silty. Abundant muscovite.

LITHOLOGIC LOG (Cont'd.)

139.1 - 144.8: SHALE

Strongly calcareous.

144.8 - 157.0: SANDSTONE149.9 - 150.6: increase in matrix.
Segregations of hem-
atitic clay.

150.6 - 154.0: arkosic, altered.

154.0 - 157.0: increase in matrix.
Segregations of hem-
atitic clay.157.0 - 164.6: SHALEInterbedded grey beds. Locally
strongly calcareous.164.6 - 196.3: SANDSTONE

Locally silty.

173.8 - 176.0: shale.

192.5 - 193.1: shale.

196.3 - 210.8: SHALEScattered grey beds and segregations.
Narrow calcareous beds.210.8 - 235.1: SANDSTONE

214.6 - 214.9: silty.

217.5 - 218.6: siltstone.

221.3 - 222.9: shale.

227.4 - 230.0: shale.

235.1 - 241.3: SHALEMicaceous and calcareous. Scattered
grey sections.241.3 - 242.8: SANDSTONE242.8 - 245.4: SILTSTONE

LITHOLOGIC LOG (Cont'd.)

245.4 - 246.7: SANDSTONE

245.8 - 246.0: silty.

246.7 - 250.0: SHALE250.0 - 251.9: SILTSTONE251.9 - 271.7: SANDSTONE

255.7 - 256.0: shale, grey contacts.

260.1 - 260.2: shale.

268.7 - 271.7: greyish, arkosic,
altered.268.7 - 269.0: mud-pellet conglom-
erate. Shaly clasts
in sandstone matrix.271.7 - 272.3: SHALE272.3 - 275.3: SANDSTONE275.3 - 276.6: SHALE276.6 - 277.9: SILTSTONE277.9 - 283.1: SANDSTONE

278.8 - 279.3: shale.

282.9 - 283.1: silty.

283.1 - 285.2: MUD-PELLET CONGLOMERATEGreyish, arkosic, scattered shaly
clasts.285.2 - 286.1: SILTSTONE286.1 - 288.7: SANDSTONE288.7 - 302.3: SHALE

Scattered narrow calcareous beds.

LITHOLOGIC LOG (Cont'd.)

302.3 - 315.1: SANDSTONE

303.4 - 304.6: poorly laminated.
306.4 - 305.7: silty.
307.6 - 309.9: interbedded siltstone.
309.9 - 310.2: laminated. Cross-bedding.
313.7 - 314.6: mud-pellet conglomerate. Grey, arkosic, shaly clasts.

315.1 - 319.3: SHALE

318.0 - 318.7: scattered narrow, grey sandstone beds.
318.7 - 319.3: laminated.

319.3 - 339.2: SANDSTONE

326.5 - 327.4: laminated, silty.
328.7 - 334.8: increase in clayey matrix.
328.8 - 329.0: mud-pellet conglomerate.
330.2 - 330.8: mud-pellet conglomerate.
331.0 - 331.6: shale.
337.3 - 337.5: mud-pellet conglomerate.

339.2 - 342.2: SHALE

341.5 - 342.2: silty.

342.2 - 359.4: SANDSTONE

Locally laminated. Scattered mud-pellet conglomerate sections.

351.6 - 352.6: siltstone.
354.0 - 354.9: shale.
354.9 - 359.4: calcareous.
359.3 - 359.4: mud-pellet conglomerate.

LITHOLOGIC LOG (Cont'd.)

359.4 - 363.9: SHALE

Calcareous.

351.6 - 352.6: sandstone.

363.9 - 397.1: SANDSTONE

Locally laminated and strongly calcareous.

378.1 - 378.8: silty.

381.5 - 382.5: shale.

391.5 - 391.7: shale.

397.1 - 399.4: MUD - PELLETT CONGLOMERATE

Greyish, calcareous, shaly clasts.

399.4 - 407.8: SANDSTONE

399.4 - 400.0: silty.

402.7 - 403.7: mud-pellet conglomerate.

404.3 - 404.4: shaly.

404.6 - 407.8: shaly.

407.8 - 410.7: MUD - PELLETT CONGLOMERATE410.7 - 422.6: SANDSTONE

414.9 - 415.4: shale.

415.4 - 420.8: silty.

420.8 - 422.6: shale.

422.6 - 428.7: MUD - PELLETT CONGLOMERATE428.7 - 429.4: SANDSTONE429.4 - 430.5: SHALE430.5 - 434.1: SILTSTONE

Locally sandy.

432.9 - 433.1: shale.

LITHOLOGIC LOG (Cont'd.)

434.1 - 449.4: SANDSTONE

Locally interbedded mud-pellet conglomerate.

439.1 - 442.2: interbeds of shale.

442.2 - 444.7: shale.

444.7 - 447.3: shale laminae.

449.4 - 454.4: SHALE454.4 - 463.4: SILTSTONE

Locally laminated and calcareous.

459.1 - 459.3: mud-pellet conglomerate.

461.3 - 462.2: mud-pellet conglomerate.

463.4 - 477.6: SHALE

469.1 - 470.5: sandstone.

471.3 - 472.7: sandstone.

476.4 - 477.0: mud-pellet conglomerate.

477.6 - 478.4: SILTSTONE478.4 - 484.0: SANDSTONE

482.0 - 482.3: laminated, calcareous.

483.0 - 483.3: mud-pellet conglomerate.

484.0 - 484.8: SHALE

484.6 - 484.7: grey-green.

484.8: END OF HOLECORE RECOVERY - 98.7 per cent.

LITHOLOGIC LOG (Cont'd.)

CORE ANGLES

<u>Degrees</u>	<u>Depth (m)</u>	<u>Degrees</u>	<u>Depth (m)</u>
75	20.7	80	268.9
95	38.1	70	284.5
80	41.8	70	313.7
75	47.7	80	326.8
75	60.8	75	369.2
80	94.5	80	381.1
80	154.0	85	428.4
85	204.3	75	438.4
85	218.0	75	456.7
70	232.6	70	480.0

APPENDIX V

SAMPLES FOR THERMAL CONDUCTIVITY DETERMINATIONS

<u>Sample No.</u>	<u>Depth (m)</u>	<u>Rock Type</u>
C-1	14.0	sandstone
C-2	22.6	sandstone
C-3	33.5	shale
C-4	37.5	sandstone
C-5	43.9	sandstone
C-6	48.2	siltstone
C-7	54.0	shale
C-8	64.3	sandstone
C-9	68.6	shale
C-10	77.1	sandstone
C-11	83.2	sandstone
C-12	93.9	shale
C-13	99.7	sandstone
C-14	106.4	siltstone
C-15	118.9	shale
C-16	132.0	siltstone
C-17	141.8	shale
C-18	154.6	sandstone
C-19	164.0	shale
C-20	175.6	shale
C-21	186.6	sandstone
C-22	199.7	shale
C-23	212.5	sandstone
C-24	218.0	siltstone
C-25	225.9	sandstone
C-26	240.2	shale
C-27	250.6	siltstone
C-28	261.6	sandstone
C-29	272.3	shale
C-30	283.8	sandstone
C-31	295.4	shale
C-32	308.2	sandstone
C-33	320.1	sandstone
C-34	335.1	sandstone
C-35	347.6	sandstone
C-36	361.9	shale
C-37	372.6	sandstone
C-38	385.7	sandstone
C-39	398.5	sandstone
C-40	409.1	siltstone

APPENDIX V (Cont'd.)

SAMPLES FOR THERMAL CONDUCTIVITY DETERMINATIONS

<u>Sample No.</u>	<u>Depth (m)</u>	<u>Rock Type</u>
C-41	418.0	siltstone
C-42	431.9	siltstone
C-43	440.1	shale
C-44	448.2	sandstone
C-45	460.1	siltstone
C-46	474.7	shale
C-47	482.0	sandstone