DRILLING RECORD

AREA: MERSEY FORTH POWER DEVELOPMENT

LOCATION: Lemon Thyme Tunnel Line

GEOLOGICAL PLAN: B6016 SURVEY PLAN: SA-414871

DATES (c) DRILLED: Sept. 1963. (b) WATER TABLE:

METHOD: D.D. DIAMETER:

SITE REMARKS: Basalt talus slope on Raw Plains above tunnel line.

POSITION

CO-ORDINATES:	E:	N:	HOLE No.
ON LINE: GF36 / GF37	BEARING: 0°00'	AT CH:	5831
AT STN: GF36	BEARING: 180°19'	DIST: 92'	FILE No.

LEVEL.

SURFACE	COLLAR	WATER TABLE
	2506	

INCL.

HOLE DRILLED	ANGLE FROM HORIZONTAL	DIRECTION
VERT. ~~HOR.~~ ~~INC.~~	90°	

SHEET 1 OF 14 SHEETS

DEPTH	CORE DRAWN	CORE LENGTH	CASING	RECOVERY %	GRAPHIC LOG	JOINTS No. Per Foot	FLUID RETURN	GROUND WATER	WATER PRESSURE TESTS LEAKAGE	REMARKS
0'			NX				Grey			1'2" – 25' Soft brown basalt clay. No core recovered.
5'							Brown			
10'										Basalt Clay
15'										
20'										
25'										
30'							Grey			25'-29'4" Pebbles of weathered vesicular basalt and occasionally quartzite. Clay matrix lost from core. Weathered Basalt.
35'		Up to 12"				½				29'4" – 43' Massive dark grey – black olivine basalt, often vesicular or amygdaloidal, in which a decomposed green mineral is common, usually as amygdales. Joints are few but movement is shown by rock flour along joint planes. 43'–43'8" odd patches of granular weathered basalt.
40'										
45'		Up to 9"	BX			1				
50'						3				43'8" – 64' Fresh, hard, dark grey – black fine grained olivine basalt in which occasional weathered amygdales occur. Rock well jointed with especially strong vertical jts. Histria joint surfaces seen.
55'						3				
60'						3				
65'		Up to 20" in length.				2				64' – 83' Fresh, hard, dark grey – black fine grained olivine basalt with fewer joints than above, histria joint surfaces and occasional amygdales. Tertiary Olivene Basalt.
70'						1				
75'						½				
80'										
85'										83' – 104'6" Fresh, hard, dark grey – black fine grained olivine basalt with amygdales of a green mineral. histria joint surfaces common.
90'						1				
95'										
100'										

DRILLING RECORD

AREA: MERSEY FORTH POWER DEVELOPMENT

LOCATION: Lemonthyme Tunnel Line.

GEOLOGICAL PLAN: B601C SURVEY PLAN: 54-A14874

DATES (a) DRILLED: Sept. 1963 (b) WATER TABLE:

METHOD: D.D DIAMETER:

SITE REMARKS: Basalt talus slope on Emu Plains above tunnel line.

POSITION	CO-ORDINATES:	E:	N:	HOLE No. 5831
	ON LINE:	BEARING:	AT CH.	
	AT STN:	BEARING:	DIST:	FILE No.
LEVEL.	SURFACE	COLLAR	WATER TABLE	
		2.5-0.6		
INCL.	HOLE DRILLED	ANGLE FROM HORIZONTAL	DIRECTION	SHEET 2 OF 14 SHEETS
	VERT/~~HOR/INC~~	90°		

DEPTH	CORE DRAWN	CORE LENGTH	CASING	RECOVERY % (20 40 60 80 100)	GRAPHIC LOG	JOINTS No. Per Foot.	FLUID RETURN	GROUND WATER	WATER PRESSURE TESTS LEAKAGE
100'			Bx			2	Grey		
105'		Lengths up to 18"				1			
110'						2			
115'									
120'									
125'						3			
130'		Lengths up to 7"				4			
135'									
140'		Lengths up to 7"				2			
145'									
150'						1			
155'									
160'						1			
165'									
170'		Lengths up to 17"							
175'						1			
180'									
185'									
190'		Average length 2"-3"					Grey-Black		
195'									
200'						6	Grey		

REMARKS

104'6" – 116' Hand dark grey-black vesicular basalt in which decomposed green mineral is common. Vesicles may contain bluey-grey weathered sand and may be lined with a hard glassy mineral. Joints, many near vertical, are common and many show rock flour.

116' – 124' Hand dark grey-black fine grained olivene basalt with occ. vesicles and v. strong vertical joints.

123' Gas pipe containing weathered green mineral (chlorite, serpentine)?

124' – 140' Strongly amygdaloidal and vesicular basalt occasionally weathering to a granular mass. Amygdales of clear, transparent-translucent mineral decomposing to chlorite.?

128'6" Breccia zone associated with joint. Rock flour associated with minerals in amygdales.

140' – 143'8" Rock becoming less vesicular, amygdales less weathered.

143'8" – 151' Core much broken up due to vertical jointing. Hence core loss.

151' – 185' Hard dark grey-black fine grained olivene basalt with occasional joints sometimes showing rock flour. Small amygdales may occasionally occur. } Tertiary Olivene Basalt

185' – 196' Hard dark grey-black fine grained vesicular and amygdaloidal basalt. Vesicles may contain crystals of a hard (6-7) clear mineral. Amygdales often weather to a sandy residue.

192' – 196' Vesicles becomes lined with carbonaceous material.

196' – 200' Badly weathered and jointed basalt both amygdaloidal and vesicular. Broken fibrous carbonaceous material formed with broken-up basalt indicative of lava engulfed vegetation. Vesicles contain lined. Texture often glassy.

DRILLING RECORD

AREA: MERSEY FORTH POWER DEVELOPMENT

LOCATION: Lemonthyme Tunnel Line.

GEOLOGICAL PLAN: B6016 SURVEY PLAN: S4-414874

DATES (a) DRILLED: Sept. 1963 (b) WATER TABLE:

METHOD: D.D. DIAMETER:

SITE REMARKS: Basalt talus slope on true Mains above tunnel line.

POSITION			
CO-ORDINATES:	E:	N:	HOLE No. 6831
ON LINE:	BEARING:	AT CH:	
AT STN:	BEARING:	DIST:	FILE No.
LEVEL: SURFACE	COLLAR	WATER TABLE	
	2506		
INCL.: HOLE DRILLED	ANGLE FROM HORIZONTAL	DIRECTION	SHEET 3 OF 14 SHEETS
VERT/~~HOR~~/~~INC~~	90°		

DEPTH	CORE DRAWN	CORE LENGTH	CASING	RECOVERY % (20 40 60 80 100)	GRAPHIC LOG	JOINTS No. Per Foot.	FLUID RETURN	GROUND WATER	WATER PRESSURE TESTS LEAKAGE	REMARKS
200			Bx				Grey			200'–204' Very badly weathered amygdaloidal basalt grading into highly vesicular basalt with weathered amygdales.
205										204'–213' Dark grey - black fine grained massive basalt with occasional amygdales. Sometimes strongly jointed (Sheared at 206'6") perhaps with recrystallization.
210										213'–215'6" Silty clays with angular quartz pebbles in lower part, probably derived from adjacent quartzite ridge.
215										215'6"–219' Unbroken basalt.
220										222' Strong cemented joints.
225										219'–232' Vesicular and/or amygdaloidal basalt, amygdales often weathered. Occasionally well jointed
230										Tertiary Olivine Basalt.
235										232' 2" Basalt Clay.
240										237–247' Hard black - dark grey basalt with occasional decomposed amygdales Well jointed in places.
245										247–257' Unbroken basalt grading into basalt clay. Well jointed vesicular - massive, sheared in part. Hard translucent amygdaloidal mineral in botryoidal habit may be seen.
250										
255										
260										263–290' Light brown unconsolidated micaceous silts recovered sporadically.
265										
270										
275										
280										Unconsolidated sediments – reworked weathered Pre-Cambrian Schists?
285										
290							Dark Grey.			290'–300' Light grey & light brown poorly consolidated micaceous siltstones with carbonaceous material and occasional bands of mudstone.
295										
300										

Up to 15' Unbroken vesicular basalt.

DRILLING RECORD

AREA: Mersey Forth Power Development

LOCATION: Lemonthyme Tunnel Line.

GEOLOGICAL PLAN: B6016 SURVEY PLAN: 54-414874

DATES (a) DRILLED: Sept. 1963 (b) WATER TABLE:

METHOD: D.D. DIAMETER:

SITE REMARKS: Basalt talus slope on true Plains above tunnel line.

POSITION

CO-ORDINATES:	E:	N:
ON LINE:	BEARING:	AT CH:
AT STN:	BEARING:	DIST:

LEVEL.

SURFACE	COLLAR	WATER TABLE
	2506	

INCL.

HOLE DRILLED	ANGLE FROM HORIZONTAL	DIRECTION
VERT/~~HOR~~/~~INC~~	90°	

HOLE No. 5831

FILE No.

SHEET 4 OF 14 SHEETS

DEPTH	CORE DRAWN	CORE LENGTH	CASING	RECOVERY %	GRAPHIC LOG	JOINTS No Per Foot	FLUID RETURN	GROUND WATER	WATER PRESSURE TESTS LEAKAGE	REMARKS
300'			Bx							300-314' Unconsolidated light grey to light brown micaceous silts grading into a heterogeneous deposit of angular to rounded schists and sand grains set in a fine grained matrix.
305'										
310'										
315'										314-319' Brecciated weathered schist with occasional carbonaceous material and small quartzes, occasionally sheared.
320'										319-324' Decomposed schist with occ. quartzes.
325'										324-329' Unconsolidated grit composed of angular mica + quartz grains and fines. Small fragments of schist may be present. Passes into weathered schist.
330'										329-334' Decomposed schist with distinctive red weathered schist at top. Angular quartzes present.
335'										334-339' Red weathered schist Foliation 50-55°
340'										339-349' Schist well broken up and occasionally decomposed. Joints may be seen.
345'										
350'							Mud			349-364' Weathered light brown jointed schist. Unconsolidated sediments grading into Pre-Cambrian chlorite mica-schists.
355'										
360'										
365'							Drilling			364-374' Light brown weathered schists showing jointing and steep foliation.
370'										
375'										374-384' Small fragments weathered broken schist.
380'										
385'										384-394' Small fragments of weathered broken schist showing near vertical foliation.
390'										
395'										394-395' Decomposed chlorite mica-schist with boulder.
400'										395-400' Small fragments of decomposed chlorite mica-schist.

DRILLING RECORD

AREA: MERSEY FORTH POWER DEVELOPMENT.

LOCATION: Lemonthyme Tunnel Line

GEOLOGICAL PLAN: P6016 SURVEY PLAN: SA-41987A

DATES (a) DRILLED: Sept. 1963 (b) WATER TABLE:

METHOD: D.D. DIAMETER:

SITE REMARKS: Basalt talus slope on Knau Plains above tunnel line.

POSITION

CO-ORDINATES:	E:	N:
ON LINE:	BEARING:	AT CH:
AT STN:	BEARING:	DIST:

LEVEL.

SURFACE	COLLAR	WATER TABLE
	2506	

INCL.

HOLE DRILLED	ANGLE FROM HORIZONTAL	DIRECTION
VERT/~~HOR~~/~~INC~~	90°	

HOLE No. 5831

FILE No.

SHEET 5 OF 14 SHEETS

DEPTH	CORE DRAWN	CORE LENGTH	CASING	RECOVERY % (20 40 60 80 100)	GRAPHIC LOG	JOINTS No. Per Foot.	FLUID RETURN	GROUND WATER	WATER PRESSURE TESTS LEAKAGE	REMARKS
400'		Mostly fragmented. Up to 8" Small lengths up to 4" often fragmented. Fragmented Up to 4" Usually massive Up to 15"								400–403' Weathered chlorite mica schist decomposed in part.
405'										403–415' Fragmented decomposed chlorite mica schist.
410'										
415'										415'–419' Weathered chlorite mica schists often stained red. Steep joints foliation 50°
420'										419–435' Fragmented weathered schist, decomposed in part. Joints seen to be vertical in places
425'										
430'										
435'										435–438' Fresh – slightly weathered chlorite mica schist showing near vertical jointing and foliation at about 70°
440'						2	Mud.			438'–440' Weathered schists breaking into small fragments.
445'										440' Steep foliation, vertical jointing.
450'										454' Foliation 65° Vertical jointing.
455'						3	Drilling			
460'										459'–460' Schist decomposed or badly weathered. Vertical foliation.
465'						2				464' Weathered schist. Foliation near vertical
470'						2				464'–469' Schist much weathered and broken up. Foliation vertical
475'										470' Foliation 70°
480'						2				472'–500' Dark grey, fresh, quartz chlorite schist strongly foliated with prominent joints and very occasional quartz/chlorite bandings.
485'						3				
490'						3				487'–488' decomposed schist.
495'						4				493' Suggestion of garnets.
500'						3				

Decomposed Chlorite Mica-Schist grading down into fresh rock occasionally weathered.

DRILLING RECORD

AREA: MERSEY FORTH POWER DEVELOPMENT

LOCATION: Lemon Thyme Tunnel Line.

GEOLOGICAL PLAN: B6016 SURVEY PLAN: SA-A14874

DATES (a) DRILLED: Sept 1963 (b) WATER TABLE:

METHOD: D.D. DIAMETER:

SITE REMARKS: Basalt talus slope on Emu Plains above tunnel line.

POSITION

CO-ORDINATES:	E:	N:
ON LINE:	BEARING:	AT CH:
AT STN:	BEARING:	DIST:

HOLE No. 5831

FILE No.

LEVEL.

SURFACE	COLLAR	WATER TABLE
	2506	

INCL.

HOLE DRILLED	ANGLE FROM HORIZONTAL	DIRECTION
VERT/~~HOR~~/INC.	90°	

SHEET 6 OF 14 SHEETS

DEPTH	CORE DRAWN	CORE LENGTH	CASING	RECOVERY % (20 40 60 80 100)	GRAPHIC LOG	JOINTS No. Per Foot.	FLUID RETURN	GROUND WATER	WATER PRESSURE TESTS LEAKAGE	REMARKS
500'	Max. length 5" often much fragmented						Grey.			500–517' Dark grey – black chloride mica schist with prominent foliation, jointing and quartz / chloride boudins. Rock may be locally weathered or decomposed.
505'										506' Foliation 50°. Large quartz boudin.
510'						2				511' Iron pyrites present.
515'										514' Small quartz/Chloride boudin.
										517' Pyrites along joint planes.
520'						1/2				517'–600' Fresh, solid, dark grey – black chloride mica schists, well foliated and jointed. Quartz chloride boudins and pyrites occasionally seen.
525'						1/4				
530'						2				527' Filled joints. Foliation 50°.
						1/2				
535'										537' Foliation 70°
540'	Schists up to 2½"	2½"								538'–40' Large quartz/chloride boudin.
										541' Foliation 65°
545'						2				Weathered Chloride Mica-schists grading into fresh solid rock.
550'										550' Foliation 65°
										552–6' Small quartz chloride boudins.
555'										
560'						2				
565'	Schists up to 1½" generally 5–6"	5–6"				1				
						2				568' Foliation 50°. Core breaks easily in that direction.
570'						3				
575'										
580'										578' Fe pyrites along joint plane.
										582' Foliation 65°
585'										
590'	Broken up									586' Foliation 75–80°
						2				588–591' Core much broken up along foliation (55°–60°) and steep joints.
595'	Up to 25"									
						3				596–598 Prominent joints dipping at 40°. Movement along some joints.
600'										

DRILLING RECORD

AREA: MERSEY FORTH POWER DEVELOPMENT
LOCATION: Lemarkyne tunnel line
GEOLOGICAL PLAN: B6016 SURVEY PLAN: SA-A14 871
DATES (c) DRILLED: Sept. 1963 (b) WATER TABLE:
METHOD: D.D. DIAMETER:
SITE REMARKS: Basalt talus slope on Finn Plains above tunnel line.

POSITION: CO-ORDINATES: E: N: | ON LINE: BEARING: AT CH: | AT STN: BEARING: DIST:
LEVEL: SURFACE COLLAR WATER TABLE: 2506
INCL.: HOLE DRILLED ANGLE FROM HORIZONTAL DIRECTION | VERT./~~HOR.~~ 90°

HOLE No. 6831
FILE
SHEET 7 OF 14 SHEETS

DEPTH	CORE DRAWN	CORE LENGTH	CASING	RECOVERY % (20 40 60 80 100)	GRAPHIC LOG	JOINTS No. Per Foot	FLUID RETURN	GROUND WATER	WATER PRESSURE TESTS LEAKAGE	REMARKS
600'							Grey			600'–700' Fresh, solid dark grey-green/black chlorite mica-schists. Rock well foliated and jointed but quartz bonding nearly absent. Joints regular and often filled.
605'						2				
610'						2				612' Prominent filled joints dipping at 40°.
615'						3				
620'						4				620' Near vertical foliation.
625'						3½				625' Fe pyrites along joints.
630'		25'				3				630' Suggestion of small garnets.
635'						5				634'–640' Well jointed schist occasionally much broken up.
640'						3				
645'						4				644' Vertical foliation producing broken core.
650'										648'–656' Foliation 50–55° steepening to 70–75°; less jointed, more foliated and darker than above. Pre-Cambrian Chlorite Mica-Schists
655'										
660'						2				659' Fe pyrites.
665'						3				664' Thin quartz bonding. Foliation 60°
670'						2				
675'						2				
680'						1				682' Small garnets present.
685'										684' Foliation 55°. Fe pyrites present.
690'										
695'						1				693'–694' Large quartz/chlorite bonding.
700'										697' Vertical foliation (Jointing?) Fe pyrites present.

Good core lengths

DRILLING RECORD

AREA: Mersey Forth Power Development

LOCATION: Lemon Kyme Tunnel Line

GEOLOGICAL PLAN: B6016 SURVEY PLAN: SA-414874

DATES (a) DRILLED: Sept. 1963 (b) WATER TABLE:

METHOD: D.D. DIAMETER:

SITE REMARKS: Basalt talus slope on Fenn Plains above Tunnel line.

POSITION

CO-ORDINATES:	E:	N:
ON LINE:	BEARING:	AT CH:
AT STN:	BEARING:	DIST:

HOLE No. 5831

FILE No.

LEVEL.

SURFACE	COLLAR	WATER TABLE
	2506'	

INCL.

HOLE DRILLED	ANGLE FROM HORIZONTAL	DIRECTION
VERT/~~HOR~~/~~INC~~	90°	

SHEET 8 OF 14 SHEETS

DEPTH	CORE DRAWN	CORE LENGTH	CASING	RECOVERY % (20 40 60 80 100)	GRAPHIC LOG	JOINTS No. Per Foot.	FLUID RETURN	GROUND WATER	WATER PRESSURE TESTS LEAKAGE	REMARKS
700'							Grey.			700'-800' Fresh, dark grey-black chlorite mica-schists. Well foliated, strong filled joints common and quartz/chlorite boudins becoming more prevalent.
705'		4ft 6 & 12" broken strata jointed.				4				705-707' Irregular foliation becoming vertical.
710'										712'-714' Core broken up and slightly weathered due to vertical jointing.
715'										
720'						2				
725'										
730'										729' Foliation 60°
735'										734-737' large quartz/chlorite boudin with irregular foliation often vertical.
740'										
745'										747'-749' Folded foliation with associated quartz/chlorite boudins
750'		22"				1				750' Foliation 60°
755'		6								755' Fe pyrites
760'										
765'						2				765'-779' Quartz/Chlorite boudin development much stronger than previously.
770'										
775'		Lengths				1				
780'										779'-800' Quartz/chlorite boudins absent, jointing very regular, strong and filled.
785'						4				
790'						5				
795'						3				
800'						2				

Age - Cambrian Chlorite mica-schists (Dove Group)

DRILLING RECORD

AREA: Mersey Forth Power Development

LOCATION: Lemon Kyme Tunnel

GEOLOGICAL PLAN: 86016 SURVEY PLAN: S4-A14 874

DATES (a) DRILLED: Sept. 1963 (b) WATER TABLE:

METHOD: D.D. DIAMETER:

SITE REMARKS: Basalt relics crops on Kinu Plains above tunnel line.

POSITION

CO-ORDINATES:	E:	N:
ON LINE:	BEARING:	AT CH:
AT STN:	BEARING:	DIST:

LEVEL.

SURFACE	COLLAR	WATER TABLE
	2506	

INCL.

HOLE DRILLED	ANGLE FROM HORIZONTAL	DIRECTION
VERT/~~HOR~~/~~INC~~	90°	

HOLE No. 5831

FILE No.

SHEET 9 OF 11 SHEETS

DEPTH	CORE DRAWN	CORE LENGTH	CASING	RECOVERY % (20 40 60 80 100)	GRAPHIC LOG	JOINTS No. Per Foot.	FLUID RETURN	GROUND WATER	WATER PRESSURE TESTS LEAKAGE	REMARKS
800'							Grey.			
805'						3				800'–900' Dark grey–black well foliated chlorite mica–schists. Rock fresh and hard showing closed joints, quartz veins and boudins. Foliation variable but usually steep. Jointing often strong.
810'						3				
815'		Lengths up to 18"				2				809'–811' Small qtz. boudins with occ. pyrites along joint planes.
820'						1				812' Foliation 50–60°
825'						3				818' Foliation 65–70°
830'						2				821'–823' Small qtz/chlorite boudins. Foliation 70°
835'		Lengths up to 26" (Broken only when fol.) on joints vertical				1				825' Schists become more micaceous and chloritic.
840'										826' Foliation near vertical.
845'										828'–830' Vertical jointing, broken core.
850'						1				830' Chlorite along joint plane.
855'										838' Quartz/chlorite boudins.
860'						2				836' Foliation 75°
865'		Minimum length 5"								839' Foliation 75°–vertical.
870'						5				863' Pyrites along joint plane. Foliation 75–80°
875'						5				863'6"–865' Irregular foliation. Small qtz boudins with much chlorite
880'		Lengths up to 18" but often shorter.				2				866' Foliation 75°
885'										868'–871' Foliation 55–75°. Smooth joints. Core breaks along both foliation and joints
890'						1				873' Quartz/chlorite boudins, pyrites found sporadically.
895'										874' Schists become less micaceous
900'										877' Pyrites along joint lines. Small boudins.
										883' Foliation near vertical.
										895' Foliation near vertical
										899' Foliation 65–70°

Pre-Cambrian Mica-schists. (Dove Group).

DRILLING RECORD

AREA: MERSEY FORTH POWER DEVELOPMENT

LOCATION: Lemonthyme Tunnel

GEOLOGICAL PLAN: B6016 SURVEY PLAN: SH-414 874

DATES (a) DRILLED: Sept. 1963 (b) WATER TABLE:

METHOD: D.D. DIAMETER:

SITE REMARKS: Basalt talus slope on Emu Plains above tunnel line.

POSITION	CO-ORDINATES:	E:	N:
	ON LINE:	BEARING:	AT CH:
	AT STN:	BEARING:	DIST:

LEVEL.	SURFACE	COLLAR	WATER TABLE
		2506	

INCL.	HOLE DRILLED	ANGLE FROM HORIZONTAL	DIRECTION
	VERT./~~HOR./INC.~~	90°	

HOLE No. 5831

FILE No.

SHEET 10 OF 14 SHEETS

DEPTH	CORE DRAWN	CORE LENGTH	CASING	RECOVERY % (20 40 60 80 100)	GRAPHIC LOG	JOINTS No. Per Foot.	FLUID RETURN	GROUND WATER	WATER PRESSURE TESTS LEAKAGE	REMARKS
900'							Grey			900'–1000' Fresh, dark grey – black, well foliated, chlorite mica-schists often well jointed and with pyrites and carbonates along the joint planes. Foliation variable but usually steep. Joints closed or sealed. Quartz boudins present.
905'						4				911' Foliation 70°
910'						2				914' Filled joints, foliation 80–85°, small quartz boudins.
915'						2				915'–916' Irregular foliation associated with much chlorite and quartz boudins.
920'						1				917'–917'10" Broken core due to steeply dipping joints and foliation.
925'										925' Foliation nearly vertical.
930'						3				929'–931' Foliation 75°–85° occ. small boudins.
935'						2				935' Jointing and near vertical foliation gives broken core.
940'						1				
945'										947'–948' Foliation 50–60°
950'						3				
955'						3				954' Irregular quartz boudin with chlorite.
960'										956'–958'6" Strong joints filled by carbonate ?
965'						2				
970'						2				964' Large quartz/chlorite boudin with pyrites.
975'										969'–970' Well jointed rock. Joints often irregular and associated with boudins.
980'						3				
985'										979'–987' Core well broken up due to large resistant boudin, strong joints and foliation. Pyrites common. Movement shown by sheared easy shale. Foliation 50° similar to joints.
990'						1				988' Foliation 65°
995'						2				990' Foliation 75° – vertical.
1000'										

Lengths up to 25" except where dark joints and foliation are near vertical.

Mostly lengths of 2–4" dip 0/30 up to 70°

Lengths up to 20"

Pre-Cambrian Mica-Schists (Dove Group)

DRILLING RECORD

AREA: Mersey Forth Power Development

LOCATION: Lemonthyme Tunnel

GEOLOGICAL PLAN: 86016 SURVEY PLAN: SA-414874

DATES (a) DRILLED: Sept. 1963 (b) WATER TABLE:

METHOD: D.D. DIAMETER:

SITE REMARKS: Basalt talus slope on Raw Plains above tunnel line.

POSITION

CO-ORDINATES:	E:	N:
ON LINE:	BEARING:	AT CH.
AT STN:	BEARING:	DIST:

LEVEL

SURFACE	COLLAR	WATER TABLE
	2506	

INCL.

HOLE DRILLED	ANGLE FROM HORIZONTAL	DIRECTION
VERT./~~HOR./INC.~~	90°	

HOLE No. 583

FILE No.

SHEET 11 OF 14 SHEETS

DEPTH	CORE DRAWN	CORE LENGTH	CASING	RECOVERY % (20 40 60 80 100)	GRAPHIC LOG	JOINTS No. Per Foot.	FLUID RETURN	GROUND WATER	WATER PRESSURE TESTS LEAKAGE	REMARKS
1000'							Grey			1000'–1100' Fresh, dark grey–black, chlorite mica-schists, well jointed with occasional boudins. Foliation variable but usually steep. Pyrites often present, occasionally to a marked degree. Garnet developed locally.
1005'										
1010'						2				1012' Quartz/chlorite boudin, foliation 55–60°.
1015'						2				
1020'										1019'–1020'6" Small boudins 1020'6"–1022' Broken core due to vertical foliation. Joints difficult to determine.
1025'						1				
1030'										
1035'										1035' Foliation 65–70° 1037'–1038' Vertical foliation, irregular core break.
1040'										1040' Foliation very changable, folding. 1042'–1043' Much pyrites present.
1045'		18" to 4' Lengths								1046'–1053' Vertical or irregular foliation, small boudins and much pyrites.
1050'										
1055'										1056'–1063' Quartz/chlorite boudins irregular foliation, little pyrites, & occasional joints. (1060'–1063' may represent a fault-zone.)
1060'										
1065'										1067'–1068' Small quartz boudins.
1070'						1				1069' Quartz filled joint, foliation 70° rock breaks readily along foliation. 1070' Appearance of garnet. 1073' Thin quartz boudin or vein.
1075'										1076' Foliation 50°
1080'						2				1083' Development of garnets reaches greater degree. 1084' Foliation 70°. Much pyrites
1085'										1087'6" Foliation 75°–80° Quartz/chlorite boudins. 1088'–1090' Core very broken due to vertical joints and/or foliation.
1090'		Lengths mostly 3–4", occasionally longer				3				1090'–1097' Strong joints, small quartz chlorite boudins, pyrites present.
1095'										1098' Pyrites fills joint cavities.
1100'										1100' Foliation horizontal.

Pre-Cambrian Mica-Schists (Dove Group)

DRILLING RECORD

AREA: Mersey Forth Power Development	POSITION: CO-ORDINATES:	E:	N:	HOLE No. 5831
LOCATION: Lemonthyme Tunnel	ON LINE:	BEARING:	AT CH:	
GEOLOGICAL PLAN B6016 SURVEY PLAN: 54-41-874	AT STN:	BEARING:	DIST:	FILE No.
DATES (a) DRILLED: Sept. 1963 (b) WATER TABLE:	LEVEL: SURFACE	COLLAR	WATER TABLE	
METHOD: D.D. DIAMETER:		2506		
SITE REMARKS: Basalt talus slope on Ram Plains above tunnel line.	INCL. HOLE DRILLED	ANGLE FROM HORIZONTAL	DIRECTION	SHEET 12 OF 14 SHEETS
	VERT/~~HOR/INC~~	90°		

DEPTH	CORE DRAWN	CORE LENGTH	CASING	RECOVERY %	GRAPHIC LOG	JOINTS No. Per Foot.	FLUID RETURN	GROUND WATER	WATER PRESSURE TESTS LEAKAGE	REMARKS
1100'							Grey			1100'–1200' Fresh, dark grey–black uniform chloritic, mica schist with variable foliation but strong right joints reasonably constant in direction and often unaffected by drilling pressures. Bonding and pyrites occasionally formed. Garnet well developed at some horizons. (especially 1184'–1200')
1105'		Lengths up to 11"				2				1108'6" Foliation near vertical
1110'						3				
1115'						3				
1120'										1121' Foliation folded and very variable.
1125'						3				
1130'		Lengths up to 22"								1126'. Foliation 50°
1135'										1129' Foliation vertical.
1140'										1133' Foliation 80–90°
1145'										1140' Strong joints at about 55° produce broken core, occasional joints parallel to foliation. Joints maybe quartz sealed.
1150'		Core mostly in 4–5" lengths but some sticks up to 10"								1147' Quartz vein. Pre-Cambrian Mica-Schist (Dove Group)
1155'						2				1150' Foliation 80°.
1160'						2				1151' Plane of movement shown by interruption of foliation planes.
1165'						½				1153' Foliation 75°
1170'						½				1154' Foliation vertical, small amount quartz/chloritic veining.
1175'		Lengths up to 17"				2				1162'–1168' Foliation 50°. Core breaks easily along this direction.
1180'						3				1168' Small quartz/chloritic bonding apparent.
1185'										1181' Foliation vertical, small quartz/chloritic bonding.
1190'		Lengths up to 12"				2				1184'7" Strong development of garnet
1195'						3				1187'–1192' Foliation vertical or sub-vertical, core breaks up along this plane Garnets common.
1200'										1192'–1200' Vertical foliation along which core easily breaks.

DRILLING RECORD

AREA: MERSEY FORTH POWER DEVELOPMENT

LOCATION: Lemonthyme Tunnel

GEOLOGICAL PLAN: B6016 SURVEY PLAN: SA-414879

DATES (a) DRILLED: Sept. 1963 (b) WATER TABLE:

METHOD: DD. DIAMETER:

SITE REMARKS: Basalt talus slope on Emu Plains above tunnel line.

POSITION

CO-ORDINATES:	E:	N:
ON LINE:	BEARING:	AT CH:
AT STN:	BEARING:	DIST:

HOLE No. 5831

FILE No.

LEVEL.

SURFACE	COLLAR	WATER TABLE
	2506	

INCL.

HOLE DRILLED	ANGLE FROM HORIZONTAL	DIRECTION
VERT./~~HOR./INC.~~	90°	

SHEET 13 OF 14 SHEETS

DEPTH	CORE DRAWN	CORE LENGTH	CASING	RECOVERY % (20 40 60 80 100)	GRAPHIC LOG	JOINTS No. Per Foot.	FLUID RETURN	GROUND WATER	WATER PRESSURE TESTS LEAKAGE	REMARKS
1200'						4	Grey			1200'–1300' Fresh dark grey–black garnet chlorite mica-schists with occasional quartz/chlorite boudins. Tight or cemented joints common, foliation variable but generally steep. Pyrites rare, becoming more common lower down.
1205'										
1210'						2				
						2				
1215'		6" to 12"								1215' Large quartz/chlorite boudin
1220'										1222' Large quartz boudin. 1223' Foliation vertical 1225' Quartz and chlorite along joints. 1225'6"–1229' Rock well jointed, foliation vertical.
1225'		Lengths up								
1230'						4				1230'–1246' Rock very uniform few boudins, no pyrites or garnet, regular joints.
1235'						2				
1240'										
1245'						1				Pre-Cambrian mica-schists (Dove Group).
1250'										1248' Quartz/Chorite boudin. 1249' Foliation 70° Rock splits easily along foliation, chlorite occasionally along joints
1255'		30" to Lengths up				1				
1260'										1259' Foliation vertical 1261' Pyrite and carbonate along joint. 1262' Foliation vertical. 1263' Garnets reappear, quartz/chlorite boudin. 1267' Pyrite along joints.
1265'						2				
1270'						2				1273'–1274' Irregular vertical foliation with large quartz/chorite boudin. 1275–1276'6" Vertical joints, core breaks up easily. Foliation 65°–70°
1275'										
1280'						3				1280'6" Garnets. 1281'–1282' Foliation folded but 65° on limbs.
1285'		15" to Lengths up				1				1285' Garnets. Small boudins Foliation 65°–70° 1290'–1291' Foliation 60°. Quartz chlorite boudin with pyrites. 1294'–1295' Vertical foliation
1290'										
1295'										
1300'										

DRILLING RECORD

AREA: MERSEY FORTH POWER DEVELOPMENT	POSITION	CO-ORDINATES:	E:	N:	HOLE No. 5831
LOCATION: Lemonthyme Tunnel		ON LINE:	BEARING:	AT CH:	
GEOLOGICAL PLAN: B6016 SURVEY PLAN: 54-414874		AT STN:	BEARING:	DIST:	FILE No.
DATES (a) DRILLED: Sept. 1963 (b) WATER TABLE:	LEVEL	SURFACE	COLLAR	WATER TABLE	
METHOD: D.D. DIAMETER:			2506		SHEET 14 OF 14 SHEETS
SITE REMARKS: Basalt talus slope on Emu Plains above tunnel line.	INCL.	HOLE DRILLED	ANGLE FROM HORIZONTAL	DIRECTION	
		VERT./~~HOR./INC.~~	90°		

DEPTH	CORE DRAWN	CORE LENGTH	CASING	RECOVERY % (20 40 60 80 100)	GRAPHIC LOG	JOINTS No. Per Foot.	FLUID RETURN	GROUND WATER	WATER PRESSURE TESTS LEAKAGE	REMARKS
1300		4"-6"					Grey			1300'-1360' Fresh dark grey-black chlorite mica-schists with occasional quartz/chlorite boudins. Foliation variable, strong, tight joints common. Pyrites occasionally present.
1305		Up to 6"; broken where joints and/or fol. vertical				2				1302'-1304' Several joint directions often filled with quartz and showing pyrites, chlorite and carbonates along planes. Core broken, listric surfaces.
1310										1305' Foliation 65° Qtz./Chlorite boudins.
1315										1312' Near vertical jointing causing broken core. Quartz and chlorite on plane
1320						3				1314'-1316'7" Near vertical foliation and steep jointing.
1325		Lengths up to 26"								1328' Foliation 55-65° Many small quartz/chlorite boudins
1330						2				1329' Very regular foliation, boudins develop into alternating quartz/chlorite layers gradually dying out.
1335										
1340										1338' Foliation 65°
1345										1341' Foliation 75-80°
1350										1345' Small quartz/chlorite boudins, -1347' foliation 75° 1347'1" Foliation vertical, large quartz/chlorite boudin.
1355										1350'6"-1353'10" Foliation variable but steep, large quartz/chlorite boudins.
1360										1358' Foliation 65-70° 1360' Quartz/chlorite boudin with quartz filled joints.
1365										Hole Completed 1360'
1370										Logged by G. E. Rawlings Jan. 1964.
1375										
1380										
1385										
1390										
1395										
1400										

(1300'-1360', right margin:) Pre-Cambrian Mica-Schists (Dove Group).