COMMONWEALTH OF AUSTRALIA.

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DEPARTMENT OF SUPPLY AND SHIPPING.

BUREAU OF MINERAL RESOURCES GEOLOGY AND GEOPHYSICS.

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BEACH SANDS INVESTIGATION.

REPORT ON THE AREA BETWEEN THE ALLOTMENT FRONTAGES AND D.C.22 FROM PEERLESS AVENUE TO SEASHELL AVENUE, NORTH BURLEIGH, QUEENSLAND.

by

D. E. GARDNER

Geologist.

SOUTHPORT, QUEENSLAND. AUGUST, 1948.

COMMONWEALTH OF AUSTRALIA.

DEPARTMENT OF SUPPLY AND ~~SHIPPING~~ DEVELOPMENT.

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31st August, 1948.

THE CHIEF GEOLOGIST.

BEACH SANDS INVESTIGATION

Report on the Area Between the Allottment Frontages and D.C.22 from Peerless Avenue to Seashell Avenue, North Burleigh.

1. A plan and sections of the area dealt with in this report are included herewith.

The eastern boundary of the area (the western boundary of D.C.22) from Peerless Avenue to Ocean Street, was bored in August, 1947. The remainder of the area was bored in April, 1948.

2. Bore-holes were put down to water level, using a post-hole digger. When the sand brought up from the bore-hole appeared to contain appreciable quantities of heavy mineral, it was sampled by quartering.

Samples were dried and weighed and their volumes determined. The samples were then concentrated by panning, and the weights and volumes of the concentrates were determined. The percentage composition of a composite sample of concentrates from each bore line was determined by grain counting.

3. Estimates of the quantities and grades of heavy mineral concentrates, the quantities of overburden and the quantities of each of the heavy minerals are tabulated as follows:-

Table 1. Tonnage of Heavy Mineral Concentrate, Volumes and Average Thicknesses of Mineral-Bearing Sands and of Overburden, and Average Grades of Mineral-Bearing Sands.

Table 2. Tonnages of Heavy Mineral Concentrate, Volumes and Average Thicknesses of Mineral-Bearing Sands and of Overburden, and Average Grade of Mineral-Bearing Sands in a Strip 1 Yard Wide along Each Bore Line.

Table 3. Tonnages of Each of the Heavy Minerals.

The figures of Tables 1, 2 and 3 were derived from data tabulated in the Appendices as follows:-

Appendix

Table A. Quantities of Heavy Minerals Intersected in Bores.

Table B. Weight of Mineral in 1 Yard Strip along Bore Line.

Table C. Volume and Average Thickness of Mineral-Bearing Sand along Bore Line.

Table D. Volume and Average Thickness of Overburden along Bore Line.

Table E. Average Weight of Heavy Mineral Concentrate per 1 Yard Strip between Bore Lines, and Average Area of Longitudinal Section of Mineral-Bearing Sands and of Overburden between Bore Lines.

/Table F.

Table F. Total Weight of Heavy Mineral Concentrate, Total Volume of Mineral-Bearing Sands, and Total Volume of Overburden between Bore Lines.

Table G. Average Thicknesses of Mineral-Bearing Sands and of Overburden.

Table H. Percentage Compositions of Concentrates.

4. Reference to the cross-sections shows that the area could be mined without any danger of flooding of the land further west during stormy weather. The land further west is higher than the berm which fronts the beach. During storms, the sea does not encroach on the berm.

D. E. GARDNER
Geologist in Charge.

Encls.

TABLE 1.

TONNAGES OF HEAVY MINERAL CONCENTRATE, VOLUMES AND AVERAGE THICKNESSES OF MINERAL-BEARING SANDS AND OF OVERBURDEN, AND AVERAGE GRADES OF MINERAL-BEARING SANDS.

AREA BETWEEN BORE LINES.	WEIGHT OF HEAVY MINERAL CONCENTRATE. (TABLE F.) TONS	VOLUME MINERAL-BEARING SANDS (TABLE F.) CUBIC YDS.	VOLUME OVERBURDEN (TABLE F.) CUBIC YDS.	AVERAGE THICKNESS MINERAL-BEARING SANDS (TABLE G.) FEET	AVERAGE THICKNESS MINERAL-BEARING SANDS (TABLE G.) INCHES	AVERAGE THICKNESS OVERBURDEN (TABLE G.) FEET	AVERAGE THICKNESS OVERBURDEN (TABLE G.) INCHES	AVERAGE GRADE OF MINERAL-BEARING SANDS. LBS. OF HEAVY MINERAL CONCENTRATE PER CUB YD
240N to 960S	4,183	18,880	20,156	6	5	6	10	496.2
960S to 1400S	2,145	5,880	9,107	5	6	8	6	817.1
1400S to 1800S	1,710	6,252	7,790	6	5	8	0	612.7
1800S to 2200S	929	5,275	7,424	5	5	7	7	394.5
2200S to 3000S	517	5,184	17,110	2	9	8	9	223.4
3000S to 3800S	1,452	3,533	18,822	1	8	9	7	920.6
3800S to 4600S	1,523	2,419	21,814	1	3	11	2	1410.3
4600S to 5400S	298	4,317	20,592	2	2	10	6	154.6
240N to 5400S	12,757	51,740	122,815	3	9	8	11	552.2

TABLE 2.

TONNAGES OF HEAVY MINERAL CONCENTRATE, VOLUMES AND AVERAGE THICKNESSES OF MINERAL-BEARING SANDS AND OF OVERBURDEN, AND AVERAGE GRADE OF MINERAL-BEARING SANDS, IN STRIP 1 YARD WIDE ALONG BORE LINES.

LINE	WEIGHT OF HEAVY MINERAL CONCENTRATE. (TABLE B.)		VOLUME		AVERAGE THICKNESS				AVERAGE GRADE OF MINERAL-BEARING SANDS.
			MINERAL-BEARING SANDS (TABLE C.)	OVER-BURDEN (TABLE D.)	MINERAL-BEARING SANDS (TABLE C.)		OVER-BURDEN (TABLE D.)		
	LBS.	TONS	CUBIC YDS.	CUBIC YDS.	FEET	INCHES	FEET	INCHES	LBS. OF HEAVY MINERAL CONCENTRATE PER CUBIC YARD.
240N	4,539	2.03	57.75	38.94	7	10	5	4	78.6
960S	32,942	14.70	36.66	61.85	5	0	8	5	898.6
1400S	32,723	14.61	43.52	62.34	5	11	8	6	751.9
1800S	24,729	11.04	50.27	54.53	6	10	7	5	491.9
2200S	6,511	2.91	28.85	56.83	3	11	7	9	225.7
3000S	2,170	0.97	10.04	71.5	1	4½	9	9	216.1
3800S	23,224	10.40	16.46	69.67	2	3	9	6	141.1
4600S	2,356	1.05	1.69	93.94		3	12	10	1394.0
5400S	4,335	1.94	30.69	60.5	4	2	8	3	141.2

TABLE 3.

TONNAGES OF EACH OF THE HEAVY MINERALS.

ESTIMATED FROM PERCENTAGE COMPOSITIONS DETERMINED BY GRAIN COUNTING.

AREA BETWEEN BORE LINES.	TONNAGES OF HEAVY MINERAL CONCENTRATES.	PERCENTAGE COMPOSITIONS # AND TONNAGES OF HEAVY MINERALS.											
		M O N A Z I T E		Z I R C O N		R U T I L E		I L M E N I T E		G A R N E T		OTHER MINERALS.	
		PER CENT	TONS	PER CENT	TONS	PER CNT	TNS	PER CNT.	TONS	PER CENT	TONS	PER CENT	TONS.
240N-960S.	4,183	0.575	24.05	39.4	1648.1	34.96	1462.4	22.4	937.0	1.2	50.2	1.46	61.25
960S-1400S.	2,145	0.60	12.9	39.28	842.6	35.12	753.3	22.54	483.5	1.05	22.5	1.41	30.2
1400S-1800S.	1,710	0.77	13.2	39.20	670.3	34.91	597.0	22.81	390.1	0.94	16.1	1.37	23.43
1800S-2200S.	929	0.92	8.5	39.67	368.5	34.36	319.2	22.88	212.6	0.96	8.9	1.21	11.3
2200S-3000S.	517	0.62	3.2	39.76	205.6	34.60	178.9	23.37	120.8	0.75	3.9	0.90	4.6
3000S-3800S.	1,452	0.56	8.1	37.19	540.0	34.79	505.2	25.17	365.5	1.06	15.4	1.23	17.8
3800S-4600S.	1,523	0.59	9.0	37.16	565.9	34.59	526.8	25.23	384.3	1.12	17.1	1.31	19.9
4600S-5400S.	298	0.68	2.0	38.73	115.4	34.62	103.2	23.69	70.6	0.85	2.5	1.43	4.3
Total 240N-960S.	12,757	0.63	80.95	38.85	4956.4	34.85	4446.0	23.23	2964.4	1.07	136.6	1.35	172.65

From Table H.

APPENDIX. TABLE A. QUANTITIES OF HEAVY MINERALS INTERSECTED IN BORES.

LINE 240N.

BORE NO. & R.L.	CO-ORDINATES FROM 126' S. OF PEERLESS AVENUE.	SAMPLE NO. FIELD	SAMPLE NO. LABORATORY	DEPTH FROM	DEPTH TO	QUANTITY OF HEAVY MINERALS LBS PER CU. YD.	QUANTITY OF HEAVY MINERALS WT. PER CENT	THICKNESS OF SAMPLE (FT.) X (LBS. PER CU. YD).	REMARKS.
1.	240N/0.	1.	L3835	0	9'6"	34.6	1.25	328.7	
		2.	L3836	9'6"	11'0"	114.7	4.5	172.1	
19-3.	(4760S/00.)	3.	L3837	11'0"	16'6"	28.2	1.1	155.1	
		4.	L3838	16'6"	17'0"	130.2	3.9	65.1	
			Thickness of 17':-			45.5		721.0	
2.	240N/33E.	1.	L3839	0	6'0"	11.8	0.45		
		2.	L3840	6'0"	12'0"	46.2	1.8	277.2	
17.2.	(4760S/33E.)	3.	L3841	12'0"	15'3"	Tr.	Tr.		
		4.	L3842	15'3"	15'6"	82.3	2.9		
			Thickness of 6':-			46.2		277.2	
3.	240N/66E.	1.	155	9'3"	9'7"	684.2	23.0	228.1	D.C.22
		2.	156	10'0"	10'9"	337.1	11.9	252.8	Line 47.6
14.	(4760S/66E.)	3.	157	10'9"	11'9"	719.7	23.8	719.7	
			Thickness of 2'6":-			480.2		1200.6	

APPENDIX. TABLE A. - Page 2. QUANTITIES OF HEAVY MINERALS INTERSECTED IN BORES.

LINE 960S.

BORE NO. & R.L.	CO-ORDINATES FROM 126' S. OF PEERLESS AVENUE.	SAMPLE NO. FIELD	SAMPLE NO. LABORATORY	DEPTH FROM	DEPTH TO	QUANTITY OF HEAVY MINERALS LBS PER CU. YD.	QUANTITY OF HEAVY MINERALS WT. PER CENT	THICKNESS OF SAMPLE (FT.) X (LBS. PER CU. YD).	REMARKS.
1.	960S/00.	1.	L3848	0	9'	42.8	1.5		
		2.	L3849	9'	9'8"	720.4	24.0	480.3	
18.72		3.	L3850	10'	12'	679.7	22.6	1359.4	
		4.	L3851	12'	16'	158.4	6.0	633.6	
		5.	L3852	16'	16'4"	1577.0	46.4	525.7	
		6.	L3853	16'4"	17'	62.5	2.3		
			Thickness of 7'4":			409		2999.0	
2.	960S/33E.	1.	L3854	0	8'				
		2.	L3855	8'	8'3"	1086	32.8	271.2	
20.57		3.	L3856	8'3"	9'	272.7	9.7	204.5	
		4.	L3857	9'	9'6"	3683.0	85.5	1841.5	
		5.	L3858	10'	10'9"	2858.0	69.6	2143.5	
		6.	L3859	13'	13'6"	3722.0	85.7	1866.5	
			Thickness of 5'6":			1150.4		6327.2	
3.	960S/66E.	1.	185	8'9"	9'	558.1	18.8	139.5	D.C.22
		2.	186	10'	10'6"	4351	81.6	2175.1	Bore 59.6A.
16'									
			Thickness of 1'9":			1322.6		2314.6	

APPENDIX. TABLE A.- Page 3. QUANTITIES OF HEAVY MINERALS INTERSECTED IN BORES.

LINE 1400S.

BORE NO. & R.L.	CO-ORDINATES FROM 126' S. OF PEERLESS AVENUE.	SAMPLE NO. FIELD	SAMPLE NO. LABORATORY	DEPTH FROM	DEPTH TO	QUANTITY OF HEAVY MINERALS LBS PER CU. YD.	QUANTITY OF HEAVY MINERALS WT. PER CENT	THICKNESS OF SAMPLE (FT.) X (LBS. PER CU. YD).	REMARKS.
1.	1400S/00.	1.	L3864	1'	8'6"	27.5	1.0		
		2.	L3865	8'6"	11'6"	174.6)	6.68	523.8)	
18.99		3.	L3866	11'6"	13'0"	192.2)	6.5	288.3)	
		4.	L3867	13'0"	16'0"	305.2)	10.8	915.6)	
		5.	L3868	16'0"	18'6"	22.6	0.8		
			Thickness of 7'6":			230.4		1727.7	
2.	1400S/33E.	1.	L3869	1'	10'	Trace	Trace		
		2.	L3870	10'	15'6"	843.1	25.5	4637.0	
16.51									
			Thickness of 5'6":			843.1		4637.0	
3.	1400S/66E.	1.	201	5'6"	5'9"	295.0	10.4	73.9)	
		2.	202	6'3"	7'0"	679.7	21.9	509.8)	
16'		3.	203	7'0"	7'6"	1212.0	37.3	606.0)	
		4.	204	8'0"	9'9"	3007.0	75.0	5262.0)	
		5.	205	10'6"	10'9"	1585.0	46.2	396.1)	
			Thickness of 5'3":			1304.3		6847.8	

APPENDIX. TABLE A. - Page 4. QUANTITIES OF HEAVY MINERALS INTERSECTED IN BORES.

LINE 1800S.

BORE NO. & R.L.	CO-ORDINATES FROM 126' S. OF PEERLESS AVENUE.	SAMPLE NO. FIELD	SAMPLE NO. LABORATORY	DEPTH FROM	DEPTH TO	QUANTITY OF HEAVY MINERALS LBS PER CU. YD.	QUANTITY OF HEAVY MINERALS WT. PER CENT	THICKNESS OF SAMPLE (FT.) X (LBS. PER CU. YD).	REMARKS.
1.	1800S/00.	1.	L3871	0	10'	Trace	Trace		
		2.	L3872	10'	10'9"	206.8	7.5	156.6)	
16.71		3.	L3873	10'9"	11'6"	426.9	8.6	320.7)	
		4.	L3874	11'6"	11'8"	1646.0	47.2	274.2)	
		5.	L3875	11'8"	13'6"	65.8	2.4	109.7)	
		6.	L3876	13'6"	13'11"	Trace	Trace		
		7.	L3877	13'11"	14' 0"	2704.0	94.5	225.4)	
		8.	L3878	14'8"	14'10"	442.0	11.9	73.1)	
			Thickness of 4' 10":-			239.9		1159.7	
2.	1800S/33E.	1.	L3879	2'	7'6"	871.2	35.1	4062.8	Overburden 2 ± 5
		2.	L3880	7'6"	12'4"	Trace	Trace		
16.57		3.	L3881	12'4"	12'6"	1370.0	39.9	228.2	
		4.	L3882	12'6"	15'3"	525.9	18.3	1446.2	
		5.	L3883	15'3"	15'6"	153.8	4.9	38.4	
			Thickness of 8'8":-			663.9		5775.6	
3.	1800S/66E.	1.	215	5'9"	6'	205.0	7.8	51.2	
		2.	216	7'9"	8'3"	264.6	9.2	132.3	
17'		3.	217	10'6"	11'	1188.0	36.5	594.0	
			Thickness of 5'3":-			148.1		777.5	

APPENDIX. TABLE A. - Page 5. QUANTITIES OF HEAVY MINERALS INTERSECTED IN BORES.

LINE 2200S.

BORE NO. & R.L.	CO-ORDINATES FROM 126' S. OF PEERLESS AVENUE.	SAMPLE NO. FIELD	SAMPLE NO. LABORATORY	DEPTH FROM	DEPTH TO	QUANTITY OF HEAVY MINERALS LBS PER CU.YD.	QUANTITY OF HEAVY MINERALS WT. PER CENT	THICKNESS OF SAMPLE (FT.) X (LBS. PER CU. YD).	REMARKS.
1.	2200S/00.	1.	L3805	0	10'	10.43	0.4		
		2.	L3805A.	10'	10'6"	109.0	4.0	54.1)	
19.3		3.	L3806	11'	12'3"	2008.0	53.0	2510.0)	
		4.	L3807	12'3"	13'6"	137.7	5.0	172.1)	
			Thickness of 3'6" :-			496.7		1736.2	
2.	2200S/33E.	1.	L3808	0	7'6"	20.1	0.5		
		2.	L3809	7'6"	12'6"	23.0	0.85	115.0	
21.9									
			Thickness of 5':-			23.0		265.7	
3.	2200S/66E.	1.	228	6'0"	7'0"	1228.0	36.7	1228.0)	
		2.	229	8'0"	8'3"	225.1	8.0	56.3)	
14.7									
			Thickness of 2'3" :-			570.8		1284.3	

APPENDIX. TABLE A. - Page 6. QUANTITIES OF HEAVY MINERALS INTERSECTED IN BORES.

LINE 3000S

BORE NO. & R.L.	CO-ORDINATES FROM 126' S. OF PEERLESS AVENUE.	SAMPLE NO. FIELD	SAMPLE NO. LABORATORY	DEPTH FROM	DEPTH TO	QUANTITY OF HEAVY MINERALS LBS PER CU. YD.	QUANTITY OF HEAVY MINERALS WT. PER CENT	THICKNESS OF SAMPLE (FT.) X (LBS. PER CU. YD).	REMARKS.
1. 21.39	3000S/00.	1.	L3810	0	9'	13.2	0.5	53.4	
		2.	L3811	9'	11'	26.7	1.0		
		3.	L3812	11'	17'6"	15.5	0.58		
		4.	L3813	17'6"	20'6"	18.5	0.7		
			Thickness of 2':-			26.7		53.4	
2. 11.54	3000S/33E.	1.	L3814	0	10'0"	9.6	0.36	502.3	
		2.	L3815	10'0"	10'9"	669.7	19.1		
			Thickness of 9" :-			669.7		502.3	
3. 13.31	3000S/66E.	1.	L3816	0	10'0"	18.4	0.7	126.	
		2.	L3817	10'0"	12'0"	63.0	2.4		
			Thickness of 2'0":-			63.0		126.	

APPENDIX. TABLE A. - Page 7. QUANTITIES OF HEAVY MINERALS INTERSECTED IN BORES.

LINE 3800.

BORE NO. & R.L.	CO-ORDINATES FROM 126' S. OF PEERLESS AVENUE.	SAMPLE NO. FIELD	SAMPLE NO. LABORATORY	DEPTH FROM	DEPTH TO	QUANTITY OF HEAVY MINERALS LBS PER CU. YD.	QUANTITY OF HEAVY MINERALS WT. PER CENT	THICKNESS OF SAMPLE (FT.) X (LBS. PER CU. YD).	REMARKS.
1.	3800S/00.	2.	L3818	10'0"	12'6"				
		3.	L3819	12'6"	13'6"	2038.0	53.8	2038.0	
16.59.			Thickness of 1':-			2038.0		2038.0	
2.	3800S/33E.	1.	L3820	0	9'0"	30.3	1.2		
		2.	L3821	9'	9'6"	530.7	18.1	265.3)	
		3.	L3822	9'6"	11'0	2880.0	87.7	4320.0)	
15.34		4.	L3823	11'6"	12'3"	742.0	20.5	556.2)	
			Thickness of 3'3":-			1582.0		5141.5	
3.	3800S/66E	1.	L3824	0	7'6"	15.0	0.5		
		2.	L3825	7'6"	8'9"	113.0	4.1	141.2	
11.04		3.	L3826	8'9"	9'0"	825.4	25.4	206.3	
			Thickness of 1'6":-			231.7		347.5	

APPENDIX. TABLE A. - Page 8. QUANTITIES OF HEAVY MINERALS INTERSECTED IN BORES.

LINE 4600S.

BORE NO. & R.L.	CO-ORDINATES FROM 126' S. OF PEERLESS AVENUE.	SAMPLE NO. FIELD	SAMPLE NO. LABORATORY	DEPTH FROM	DEPTH TO	QUANTITY OF HEAVY MINERALS LBS PER CU. YD.	QUANTITY OF HEAVY MINERALS WT. PER CENT	THICKNESS OF SAMPLE (FT.) X (LBS. PER CU. YD).	REMARKS.
1.	4600S/00.	2.	L3827	11'0"	11'6"	57.5	2.1		
		3.	L3828	12'6"	12'9"	1873.0	50.9	468.0	
14.73									
			Thickness of 3":-			1873.0		468.0	
2.	4600S/33E.	1.	L3829	0	8'0"	Trace	Trace		
		2.	L3830	8'0"	14'9"	13.07	0.5		
16.7		3.	L3831	14'9"	15'0"	1506.0	42.6	376.5	
			Thickness of 3":-			1506.0		376.5	
3.	4600S/66E.	1.	L3832	0	7'0"	13.27	0.5		
		2.	L3833	7'0"	9'3"	23.7	0.88		
11.7		3.	L3834	9'3"	9'5"	388.9	10.5	64.8	
			Thickness of 2":-			388.9		64.8	

APPENDIX. TABLE A. - Page 9. QUANTITIES OF HEAVY MINERALS INTERSECTED IN BORES.

LINE 5400S.

BORE NO. & R.L.	CO-ORDINATES FROM 126' S. OF PEERLESS AVENUE.	SAMPLE NO. FIELD	SAMPLE NO. LABORATORY	DEPTH FROM	DEPTH TO	QUANTITY OF HEAVY MINERALS LBS PER CU. YD.	QUANTITY OF HEAVY MINERALS WT. PER CENT	THICKNESS OF SAMPLE (FT.) X (LBS. PER CU. YD).	REMARKS.
1. 12.08	5400S/00.	1.	L3843	0.	8'0"	Trace	Trace		
		2.	L3844	8'0"	11'0"	82.3	3	246.9	
			Thickness of 3':-			82.3		246.9	
2. 16.66	5400S/33E.	1.	L3845	0	10'0"	Trace			
		2.	L3846	10'0"	15'6"	73.6	1.8	404.8	
			Thickness of 5'6":-			73.6		404.8	
3. 10.63	5400S/66E.	1.	L3847	0'	5'	31.83	1.0		
		2.	L3847A.	5'	8'9"	370.8	12.9	1390.5	
			Thickness of 3'9":-			370.8		1390.5	

APPENDIX. TABLE B.- Page 1.

WEIGHT OF MINERAL IN 1 YARD STRIP ALONG BORE LINE.

BORE NOS.	LBS. OF MINERAL PER SQ. YD. AT BORE. (FROM TABLE A.)	AVERAGE LBS. WEIGHT OF MINERAL PER SQ. YD. BETWEEN BORES.	DISTANCE BETWEEN BORES (YDS) (FROM TABLE A.)	WEIGHT OF MINERAL In 1 YD. STRIP BETWEEN BORES (LBS)
LINE 240N.				
1.	$\frac{721}{3} = 240.3$	$\frac{332.7}{2} = 166.35$	11.0	1829.85
2.	$\frac{277.2}{3} = 92.4$			
2.	92.4			
3.	$\frac{1200.6}{3} = 400.2$	$\frac{492.6}{2} = 246.3$	11.0	2709.3
Total for line:				4539.15
LINE 960S.				
1.	$\frac{2999.0}{3} = 999.7$	$\frac{3108.8}{2} = 1554.4$	11.0	17,098.4
2.	$\frac{6327.2}{3} = 2109.1$			
2.	2109.1			
3.	$\frac{2314.6}{3} = 771.5$	$\frac{2880.6}{2} = 1440.3$	11.0	15,843.3
Total for line:				32,941.7

APPENDIX. TABLE B. - Page 2. WEIGHT OF MINERAL IN 1 YARD STRIP ALONG BORE LINE.

BORE NOS.	LBS. OF MINERAL PER SQ. YD. AT BORE. (FROM TABLE A.)	AVERAGE LBS. WEIGHT OF MINERAL PER SQ. YD. BETWEEN BORES.	DISTANCE BETWEEN BORES (YDS) (FROM TABLE A.)	WEIGHT OF MINERAL In 1 YD. STRIP BETWEEN BORES (LBS)
LINE 1400S.				
1.	$\frac{1727.7}{3} = 575.9$	$\frac{2121.6}{2} = 1060.8$	11	11,668.8
2.	$\frac{4637.0}{3} = 1545.7$			
2.	1545.7	$\frac{3828.3}{2} = 1914.1$	11	21,055.1
3.	$\frac{6847.8}{3} = 2282.6$			
Total for line:				32,723.9
LINE 1800S.				
1.	$\frac{1159.7}{3} = 386.6$	$\frac{2311.8}{2} = 1155.9$	11	12,714.9
2.	$\frac{5775.6}{3} = 1925.2$			
2.	1925.2	$\frac{2184.4}{2} = 1092.2$	11	12,014.2
3.	$\frac{777.5}{3} = 259.2$			
Total for line:				24,729.1

APPENDIX. TABLE B. - Page 3. WEIGHT OF MINERAL IN 1 YARD STRIP ALONG BORE LINE.

BORE NOS.	LBS. OF MINERAL PER SQ. YD. AT BORE. (FROM TABLE A.)	AVERAGE LBS. WEIGHT OF MINERAL PER SQ. YD. BETWEEN BORES.	DISTANCE BETWEEN BORES (YDS) (FROM TABLE A.)	WEIGHT OF MINERAL In 1 YD. STRIP BETWEEN BORES (LBS)
LINE 2200S.				
1.	$\frac{1736.2}{3} = 578.7$			
2.	$\frac{265.7}{3} = 88.6$	$\frac{667.3}{2} = 333.6$	11	3,669.6
2.	88.6			
3.	$\frac{1284.3}{3} = 428.1$	$\frac{516.7}{2} = 258.3$	11	2,841.3
Total for line:				6,510.9
LINE 3000S.				
1.	$\frac{53.4}{3} = 17.8$			
2.	$\frac{502.3}{3} = 167.4$	$\frac{185.2}{2} = 92.6$	11	1,018.6
2.	167.4			
3.	$\frac{126}{3} = 42.0$	$\frac{209.4}{2} = 104.7$	11	1,151.7
Total for line:				2,170.3

APPENDIX. TABLE B. - Page 4. WEIGHT OF MINERAL IN 1 YARD STRIP ALONG BORE LINE.

BORE NOS.	LBS. OF MINERAL PER SQ. YD. AT BORE. (FROM TABLE A.)	AVERAGE LBS. WEIGHT OF MINERAL PER SQ. YD. BETWEEN BORES.	DISTANCE BETWEEN BORES (YDS) (FROM TABLE A.)	WEIGHT OF MINERAL In 1 YD. STRIP BETWEEN BORES (LBS)
LINE 3800S.				
1.	$\frac{2038}{3} = 679.3$	$\frac{2393.1}{2} = 1196.5$	11	13,161.5
2.	$\frac{5141.5}{3} = 1713.8$			
2.	1713.8	$\frac{1829.6}{2} = 914.8$	11	10,062.8
3.	$\frac{347.5}{3} = 115.8$			
Total for line:				23,224.3
LINE 4600S.				
1.	$\frac{468}{3} = 156.0$	$\frac{281.5}{2} = 140.7$	11	1,547.7
2.	$\frac{376.5}{3} = 125.5$			
2.	125.5	$\frac{147.1}{2} = 73.5$	11	808.5
3.	$\frac{64.8}{3} = 21.6$			
Total for line:				2,356.2

APPENDIX. TABLE B. - Page 5. WEIGHT OF MINERAL IN 1 YARD STRIP ALONG BORE LINE.

BORE NOS.	LBS. OF MINERAL PER SQ. YD. AT BORE. (FROM TABLE A.)	AVERAGE LBS. WEIGHT OF MINERAL PER SQ. YD. BETWEEN BORES.	DISTANCE BETWEEN BORES (YDS) (FROM TABLE A.)	WEIGHT OF MINERAL In 1 YD. STRIP BETWEEN BORES (LBS)
LINE 5400S.				
1.	$\frac{164.6}{3} = 54.9$	$\frac{189.8}{2} = 94.9$	11	1043.9
2.	$\frac{404.8}{3} = 134.9$			
2.	134.9	$\frac{598.4}{2} = 299.2$	11	3291.2
3.	$\frac{1390.5}{3} = 463.5$			
Total for line:				4335.1

APPENDIX. TABLE C. - Page 1. VOLUME AND AVERAGE THICKNESS OF MINERAL-BEARING SAND ALONG BORE LINE.

BORE NO.	THICKNESS (TABLE A.) AT BORE	AV. BETWEEN BORES		DISTANCE BETWEEN BORES. (TABLE A.)	AREA OF LONGITUDINAL SECTION BETWEEN BORES.		COMPLETE BORE LINE AV. THICKNESS		VOLUME OF 1YD. STRIP
	INCHES	INCHES	FEET	FEET	SQ. FEET	SQ. YDS.	FEET	INCHES	CUBIC YDS.
LINE 240N.									
1.	204								
2.	72	138	11.5	33	379.5	42.17			
2.	72								
3.	30	51	4.25	33	140.25	15.58			
TOTAL:				66	519.75	57.75	7.87	94	57.75
LINE 960S.									
1.	88								
2.	66	77	6.4	33	211.2	23.46			
2.	66								
3.	21	43.5	3.6	33	118.8	13.2			
TOTAL:					331.0	36.66	5.01	60	36.7
LINE 1400S									
1.	90								
2.	66	78	6.5	33	214.5	23.83			
2.	66								
3.	63	64.5	5.37	33	177.2	19.69			
TOTAL:				66	391.7	43.52	5.9	71	43.52

APPENDIX. TABLE C. - Page 2. VOLUME AND AVERAGE THICKNESS OF MINERAL-BEARING SAND ALONG BORE LINE.

BORE NO.	THICKNESS (TABLE A.) AT BORE	AV. BETWEEN BORES		DISTANCE BETWEEN BORES. (TABLE A.)	AREA OF LONGITUDINAL SECTION BETWEEN BORES.		COMPLETE BORE LINE AV. THICKNESS		VOLUME OF 1YD. STRIP
	INCHES	INCHES	FEET	FEET	SQ. FEET	SQ. YDS.	FEET	INCHES	CUBIC YDS.
LINE 1800S									
1.	58								
2.	104	81	6.75	33	222.75	24.75			
2.	104								
3.	63	83.5	6.96	33	229.7	25.52			
TOTAL:				66	452.45	50.27	6.8	82	50.27
LINE 2200S.									
1.	42								
2.	60	51	4.25	33	140.25	15.58			
2.	60								
3.	27	43.5	3.62	33	119.46	13.27			
TOTAL:					259.71	28.85	3.9	47	28.85
LINE 3000S.									
1.	24								
2.	9	16.5	1.37	33	45.21	5.02			
2.	9								
3.	24	16.5	1.37	33	45.21	5.02			
TOTAL:					90.42	10.04	1.37	16.5	10.04

APPENDIX. TABLE C. - Page 3. VOLUME AND AVERAGE THICKNESS OF MINERAL-BEARING SAND ALONG BORE LINE.

BORE NO.	THICKNESS (TABLE A.) AT BORE	AV. BETWEEN BORES		DISTANCE BETWEEN BORES. (TABLE A.)	AREA OF LONGITUDINAL SECTION BETWEEN BORES.		COMPLETE BORE LINE AV. THICKNESS		VOLUME OF 1YD. STRIP
	INCHES	INCHES	FEET	FEET	SQ. FEET	SQ. YDS.	FEET	INCHES	CUBIC YDS.
LINE 3800S.									
1. 12									
2. 39	25.5	2.12	33	69.96	7.77				
2. 39									
3. 18	28.5	2.37	33	78.21	8.69				
TOTAL:					148.17	16.46	2.25	27.	16.46
LINE 4600S.									
1. 3									
2. 3	3	0.25	33	8.25	0.92				
2. 3									
3. 2	2.5	0.21	33	6.93	0.77				
TOTAL:					15.18	1.69	0.23	2.75	1.69
LINE 5400S.									
1. 24									
2. 66	45	3.75	33	123.75	13.75				
2. 66									
3. 45	55.5	4.62	33	152.46	16.94				
TOTAL:				66	276.21	30.69	4.2	50.3	30.69

APPENDIX TABLE D.

VOLUME AND AVERAGE THICKNESS OF OVERBURDEN ALONG BORE LINE.

BORE NO.	THICKNESS (TABLE A.) AT BORE	AVERAGE BETWEEN BORES	DISTANCE BETWEEN BORES (TABLE A.)	AREA OF LONGITUDINAL SECTION BETWEEN BORES.		COMPLETE BORE LINE. AVERAGE THICKNESS	VOLUME OF 1YD STRIP
	FEET	FEET	FEET	SQUARE FEET	SQUARE YARDS	FEET	CUBIC YARDS
LINE 240N.							
1. 0							
2. 6	3.0		33	99.0	11.0		
2. 6							
3. 9.25	7.62		33	251.46	27.94		
TOTAL:				350.46	38.94	3.31	38.94
LINE 960S.							
1. 9							
2. 8	8.5		33	280.5	31.17		
2. 8							
3. 8.75	8.37		33	276.21	30.68		
TOTAL:				556.71	61.85	8.44	61.85
LINE 1400S.							
1. 8.5							
2. 10.0	9.25		33	205.25	33.92		
2. 10.0							
3. 5.5	7.75		33	255.75	28.42		
TOTAL:				561.00	62.34	8.5	62.34
LINE 1800S.							
1. 10.0							
2. 7.0	8.5		33	280.5	31.17		
2. 7.0							
3. 5.75	6.37		33	210.21	23.36		
TOTAL:				490.71	54.53	7.43	54.53

APPENDIX TABLE D. - Page 2.

VOLUME AND AVERAGE THICKNESS OF OVERBURDEN ALONG BORE LINE.

BORE NO.	THICKNESS (TABLE A.) AT BORE	AVERAGE BETWEEN BORES	DISTANCE BETWEEN BORES (TABLE A.)	AREA OF LONGITUDINAL SECTION BETWEEN BORES.		COMPLETE BORE LINE. AVERAGE THICKNESS	VOLUME OF 1YD STRIP
	FEET	FEET	FEET	SQUARE FEET	SQUARE YARDS	FEET	CUBIC YARDS
LINE 2200S.							
1.	10	8.75	33	288.75	32.08		
2.	7.5						
2.	7.5	6.75	33	222.75	24.75		
3.	6.0						
TOTAL:				511.50	56.83	7.75	56.83
LINE 3000S.							
1.	9.0	9.5	33	313.5	34.83		
2.	10.0						
2.	10.0	10.0	33	330.0	36.67		
3.	10.0						
TOTAL:				643.5	71.50	9.75	71.5
LINE 3800S.							
1.	12.5	10.75	33	354.75	39.42		
2.	9.0						
2.	9.0	8.25	33	272.25	30.25		
3.	7.5						
TOTAL:				627.00	69.67	9.5	69.67

APPENDIX TABLE D. - Page 3.

VOLUME AND AVERAGE THICKNESS OF OVERBURDEN ALONG BORE LINE.

BORE NO.	THICKNESS (TABLE A.) AT BORE	AVERAGE BETWEEN BORES	DISTANCE BETWEEN BORES (TABLE A.)	AREA OF LONGITUDINAL SECTION BETWEEN BORES.		COMPLETE BORE LINE. AVERAGE THICKNESS	VOLUME OF 1YD STRIP
	FEET	FEET	FEET	SQUARE FEET	SQUARE YARDS	FEET	CUBIC YARDS
LINE 4600S.							
1. 12.5 2. 14.75		13.62	33	449.46	49.94		
2. 14.75 3. 9.25		12.0	33	396.0	44.0		
TOTAL:				845.46	93.94	12.81	93.94
LINE 5400S.							
1. 8.0 2. 10.0		9.0	33	297.0	33.0		
2. 10.0 3. 5.0		7.5	33	247.5	27.5		
TOTAL:		8.25	66	544.5	60.5	8.25	60.5

APPENDIX. TABLE. E.

AVERAGE WEIGHT OF HEAVY MINERAL CONCENTRATE PER 1 YARD STRIP BETWEEN BORE LINES, AND AVERAGE AREA OF LONGITUDINAL SECTION OF MINERAL-BEARING SANDS AND OF OVERBURDEN BETWEEN BORE LINES.

LINES	ALONG BORE LINES			AVERAGE BETWEEN BORE LINES		
	WEIGHT OF MINERAL PER 1 YARD STRIP. FROM TABLE B.	AREA OF LONGITUDINAL SECTION OF MINERAL-BEARING SANDS FROM TABLE C.	AREA OF LONGITUDINAL SECTION OF OVERBURDEN FROM TABLE D.	WEIGHT OF MINERAL PER 1 YARD STRIP.	AREA OF LONGITUDINAL SECTION OF MINERAL-BEARING SANDS	AREA OF LONGITUDINAL SECTION OF OVERBURDEN
	LBS.	SQ. YARDS	SQ. YARDS	LBS.	SQ. YARDS	SQ. YARDS
240N	4,539.1	57.75	38.94	18,740.4	47.20	50.39
960S	32,941.7	36.66	61.85			
960S	32,941.7	36.66	61.85	32,832.8	40.09	62.09
1400S	32,723.9	43.52	62.34			
1400S	32,723.9	43.52	62.34	28,726.5	46.89	58.43
1800S	24,729.1	50.27	54.53			
1800S	24,729.1	50.27	54.53	15,620.0	39.56	55.68
2200S	6,510.9	28.85	56.83			
2200S	6,510.9	28.85	56.83	4,340.6	19.44	64.16
3000S	2,170.3	10.04	71.50			
3000S	2,170.3	10.04	71.50	12,197.3	13.25	70.58
3800S	23,224.3	16.46	69.67			
3800S	23,224.3	16.46	69.67	12,790.2	9.07	81.80
4600S	2,356.2	1.69	93.94			
4600S	2,356.2	1.69	93.94	3,345.6	16.19	77.22
5400S	4,335.1	30.69	60.50			

APPENDIX. TABLE F.

TOTAL WEIGHT OF HEAVY MINERAL CONCENTRATE, TOTAL VOLUME OF MINERAL-BEARING SANDS AND TOTAL VOLUME OF OVERBURDEN BETWEEN BORE LINES.

BORE LINES (TABLE A.)				WT. OF HEAVY MIN. CONC.		VOL. OF MINERAL-BEARING SANDS		VOL. OF OVERBURDEN	
DESIG-NATION	LENGTH	DISTANCE BETWEEN	AREA BETWEEN	AV. PER 1 YD. STRIP (TABLE E.)	TOTAL BE-TWEEN LINES	AV. AREA OF LONGI-TUDINAL SECTION. (TABLE E.)	VOL. BETWEEN BORE LINES.	AV. AREA OF LONG. SECTION (TABLE E.)	VOL. BETWEEN BORE LINES.
Y	YDS.	YDS.	SQ. YDS.	LBS.	TONS	SQ. YDS.	CU. YDS.	SQ. YDS.	CU. YDS.
240N 960S	22 22	400	8,800.0	18,740.4	4,183	47.20	18,880	50.39	20,156
960S 1400S	22 22	146.67	3,226.7	32,832.8	2,145	40.09	5,880	62.09	9,107
1400S 1800S	22 22	133.33	2,932.6	28,726.5	1,710	46.89	6,252	58.43	7,790
1800S 2200S	22 22	133.33	2,933.3	15,620.0	929	39.56	5,275	55.68	7,424
2200S 3000S	22 22	266.67	5,866.7	4,340.6	517	19.44	5,184	64.16	17,110
3000S 3800S	22 22	266.67	5,866.7	12,197.3	1452	13.25	3,533	70.58	18,822
3800S 4600S	22 22	266.67	5,866.7	12,790.2	1523	9.07	2,419	81.80	21,814
4600S 5400S	22 22	266.67	5,866.7	3,345.6	298	16.19	4,317	77.22	20,592
&									

APPENDIX. TABLE G. AVERAGE THICKNESSES OF MINERAL-BEARING SANDS AND OF OVERBURDEN.

BORE LINES (TABLE F.)		VOLUME (TABLE F.)		AVERAGE THICKNESS.			
DESIGNATION.	AREA BETWEEN LINES	MINERAL-BEARING SANDS	OVERBURDEN	MINERAL-BEARING SANDS		OVERBURDEN	
	SQUARE YARDS	CUBIC YARDS	CUBIC YARDS	FEET	INCHES	FEET	INCHES
240N 960S	8,800.0	18,880	20,156	6	5	6	10
960S 1400S	3,226.7	5,880	9,107	5	6	8	6
1400S 1800S	2,932.6	6,252	7,790	6	5	8	0
1800S 2200S	2,933.3	5,275	7,424	5	5	7	7
2200S 3000S	5,866.7	5,184	17,110	2	9	8	9
3000S 3800S	5,866.7	3,533	18,822	1	8	9	7
3800S 4600S	5,866.7	2,419	21,814	1	3	11	2
4600S 5400S	5,866.7	4,317	20,592	2	2	10	6
240N to 5400S	41,359.4	51,740	122,815	3	9	8	11

APPENDIX. TABLE H. PERCENTAGE COMPOSITIONS OF CONCENTRATES.

From Table E.

LINE	LABORATORY DETERMINATIONS						WEIGHT (LBS.) OF MINERAL IN 1 YD. STRIP ALONG BORE LINE.						
	Monazite	Zircon	Rutile	Ilmen.	Garnet	Others	Total Conc.#	Monazite	Zircon	Rutile	Ilmen.	Garnet	Others
240N.	0.4	37.55	35.0	24.0	1.35	1.7	4,539	18.16	1,704.4	1,588.6	1,089.4	61.3	77.2
960S.	0.6	39.65	34.95	22.2	1.2	1.4	32,942	197.65	13,061.5	11,513.2	7,313.1	395.3	461.2
240N-960S. Average	0.575	39.4	34.96	22.4	1.2	1.46	37,481 / 2	215.81 / 2	14,765.9 / 2	13,101.9 / 2	8,402.5 / 2	456.6 / 2	538.4 / 2
1400S.	0.6	38.9	35.3	22.9	0.9	1.3	32,723	196.34	12,729.2	11,551.2	7,493.6	294.5	425.4
960S-1400S. Average	0.6	39.28	35.12	22.54	1.05	1.41	63,665 / 2	393.99 / 2	25,790.7 / 2	23,064.4 / 2	14,806.7 / 2	689.8 / 2	886.6 / 2
1800S.	1.0	39.6	34.4	22.7	1.0	1.3	24,729	247.29	9,792.7	8,506.8	5,613.5	247.3	321.5
1400S-1800S. Average.	0.77	39.20	34.91	22.81	0.94	1.37	57,452 / 2	443.63 / 2	22,521.9 / 2	20,058.0 / 2	13,107.0 / 2	541.8 / 2	746.9 / 2
2200S.	0.6	39.95	34.2	23.6	0.8	0.7	6,511	39.07	2,601.1	2,226.8	1,536.6	52.1	45.6
1800S-2200S. Average	0.92	39.67	34.36	22.88	0.96	1.21	31,240 / 2	286.36 / 2	12,393.8 / 2	10,733.5 / 2	7,150.1 / 2	299.4 / 2	367.1 / 2
3000S.	0.7	39.2	35.8	22.7	0.6	1.0	2,170	15.19	850.6	776.9	492.6	13.0	21.7
2200S-3000S. Average.	0.62	39.76	34.60	23.37	0.75	0.77	8,681 / 2	54.26 / 2	3,451.8 / 2	3,003.6 / 2	2,029.2 / 2	65.1 / 2	67.3 / 2
3800S.	0.55	37.0	34.7	25.4	1.1	1.25	23,224	127.73	8,592.9	8,058.7	5,898.9	255.5	290.3
3000S-3800S. Average	0.56	37.19	34.79	25.17	1.06	1.23	25,394 / 2	142.92 / 2	9,443.5 / 2	8,835.6 / 2	6,391.5 / 2	268.5 / 2	312.0 / 2
4600S.	1.0	38.8	33.55	23.5	1.3	1.8	2,356	23.56	914.1	790.4	553.7	30.6	42.4
3800S-4600S. Average	0.59	37.16	34.59	25.23	1.12	1.31	25,580 / 2	151.29 / 2	9,507.0 / 2	8,849.2 / 2	6,452.6 / 2	286.1 / 2	332.7 / 2
5400S.	0.5	38.7	35.2	23.8	0.6	1.2	4,335	21.67	1,677.6	1,525.9	1,031.7	26.0	52.0
4600S-5400S. Average	0.68	38.73	34.62	23.69	0.85	1.43	6,691 / 2	45.23 / 2	2,591.8 / 2	2,316.4 / 2	1,585.4 / 2	56.6 / 2	94.4 / 2

240 N

960 S

1400 S

1800 S

2200 S

3000 S

3800 S

4600 S

5400 S

PEERLESS AV.

ORIGIN

SUNBRITE AV.

CRONULLA AV.

VENTURA RD.

FRANCIS ST.

ATLANTIC

278

277

276

275

274

273

272

271

GLEN

PACIFIC HIGHWAY

OCEAN ST.

WILLIAM ST.

SEABEACH AV.

TAMBORINE ST

SEASHELL AV.

TRUE NORTH

6
○ = BORE 6

---5400S = BORE LINE 5400 FT SOUTH OF ORIGIN

NORTH BURLEIGH AREA

PLAN OF BORING

SCALE 1 INCH - 500ft

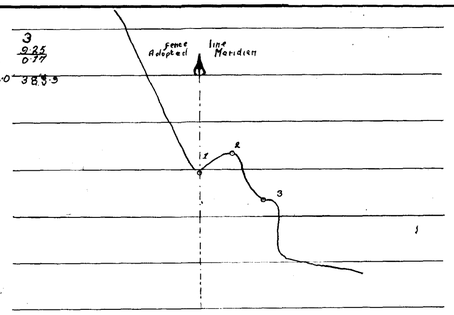
0 500

DRAWN BY F.L.J.

1 CHAIN STRIP

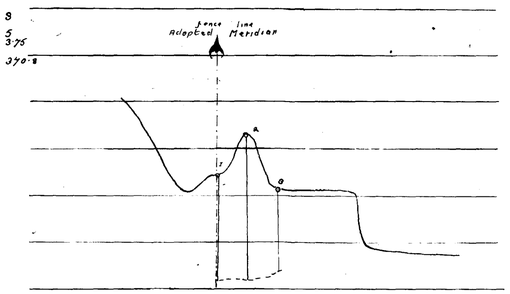
925-10C-1

BORE	1	2	3
OVERBURDEN (FT)	12.5	14.75	9.25
SAMPLE (FT)	0.25	0.25	0.75
LBS PER CU YD IN SAMPLE	1873.0	1056.0	383.3



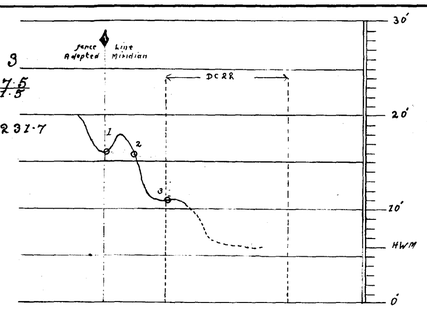
LINE 4600S

BORE	1	2	3
OVERBURDEN	9	19	5
SAMPLE	1	2.5	3.75
LBS PER CU YD IN SAMPLE	82.3	73.6	370.8



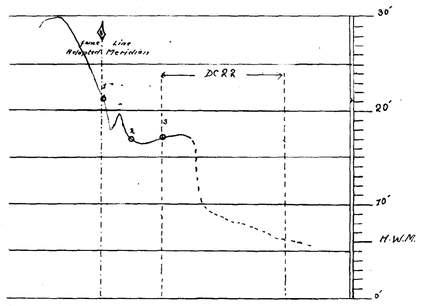
LINE 5400S

BORE	1	2	3
OVERBURDEN FT	12.5	9.0	7.5
SAMPLE FT	1.0	3.25	3.5
LBS PER CU YD IN SAMPLE	2038.0	1582.0	231.7



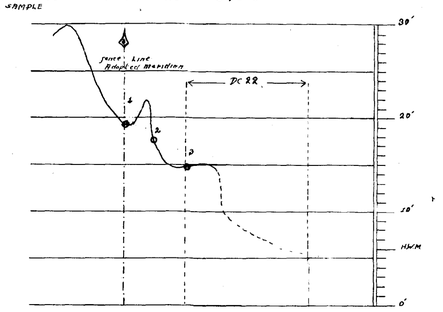
LINE 3800S

BORE	1	2	3
OVERBURDEN FT	8.0	10.0	10.0
SAMPLE FT	2.0	0.75	1.5
LBS PER CU YD IN SAMPLE	26.7	869.7	63.0



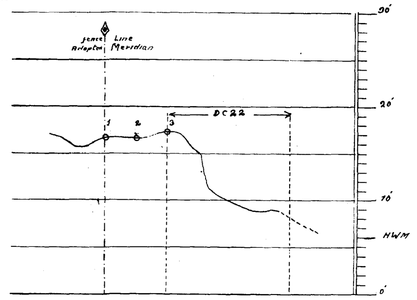
LINE 3000S

BORE	1	2	3
OVERBURDEN FT	10.0	7.5	6.0
SAMPLE FT	3.5	5.0	2.25
LBS PER CU YD IN SAMPLE	496.7	23.0	570.8



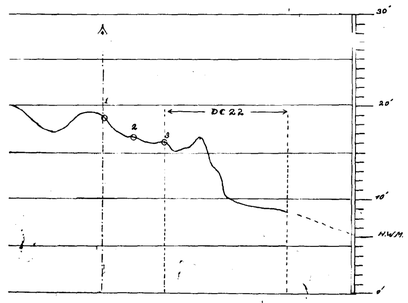
LINE 2200S

BORE	1	2	3
OVERBURDEN FT	10.0	2.5	5.75
SAMPLE FT	4.83	8.65	5.25
LBS PER CU YD IN SAMPLE	299.8	663.9	148.1



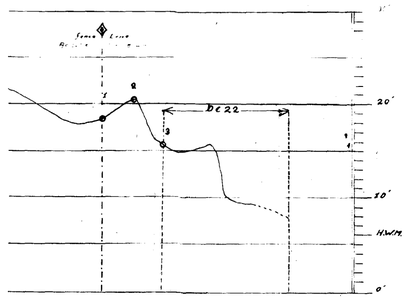
LINE 1800S

BORE	1	2	3
OVERBURDEN FT	8.5	10.0	5.5
SAMPLE FT	7.5	8.5	5.25
LBS PER CU YD IN SAMPLE	230.4	843.1	1804.3



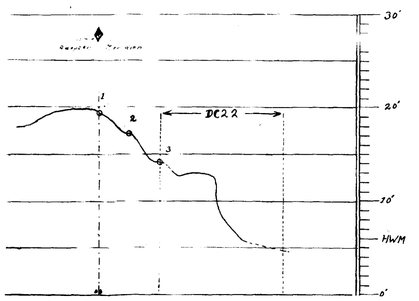
LINE 1400S

BORE	1	2	3
OVERBURDEN FT	9	8	1.75
SAMPLE FT	7.5	2.75	3.5
LBS PER CU YD IN SAMPLE	409	1504.1	1322.6



LINE 960S

BORE	1	2	3
OVERBURDEN FT	0	25	3.25
SAMPLE FT	1.7	6	2.25
LBS PER CU YD IN SAMPLE	47	462	480



LINE 240N

SCALE
HORIZONTAL 0 50' 100' 150'
VERTICAL 0' 5' 10' 15'
BY A.D. CAMERON

NORTH BURLEIGH AREA - DC22

SECTION ALONG BORE LINES