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COMMONWEALTH OF AUSTRALIA.

DEPARTMENT OF SUPPLY AND SHIPPING.
BUREAU OF MINERAL RESOURCES
GEOLOGY AND GEOPHYSICS.

REPORT No. 1949/70 - (GEOL. SER. 51).

PLAN NO. Q25 - 10C - 9.

BEACH SANDS INVESTIGATION.

THE BURLEIGH AREA (WEST OF THE ESPLANADE).

by

D. E. GARDNER, Geologist.

LABORATORY WORK

by

L. R. LEE, Laboratory Assistant.

SOUTHPORT, QUEENSLAND.

30TH APRIL, 1949.

Miami, Jan 1969.

Zone line is about 200' W. of Beach.

Positions, with resp. to beach, of blocks of Mineral, Av. Compars. stated by J. W.

Block I

Line	Coords.	Dist. W. of Beach
2135	00 - 155 W	200 - 355
8635	00 - 132 W	200 - 332
12635	00 - 200 W	200 - 400
17275	00 - 230 W	200 - 430

Block II

2135	224 W - 371 W	420 W - 571 W
8635	200 W - 339 W	400 W - 539 W
12635	200 W - 644 W	400 W - 844 W

Block III (one line, only, two cores)

12635	493 W - 593 W	693 W - 793 W
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Distance of Samples 1, 2 and 3
(Blocks 1, 2 and 3 approx)
00 to approx 300 W

Samples (Blocks) 4, 5 & 6

300 W to 593 W

From Beach
200 W - 500 W

500 - 600 W

% Compars. Av. of Samples											
B.H.	M	Z	R	I	Co.	B.H.	M	Z	R	I	Co.
1.	1.4	40.6	30.3	26.3	1.4	4	0.1	28.8	18.9	51.7	0.5
2	0.5	40.1	28.7	30.1	0.6	5	0.1	35.5	22.3	41.4	0.7
3	0.8	44.4	26.8	27.0	1.0	6	0.0	26.1	18.3	54.3	0.3
Tot.	2.7	125.1	85.8	83.4	3.0	Tot.	0.2	90.4	59.5	147.4	2.5
Av.	0.9	41.7	28.6	27.8	1.0	Av.	0.1	30.1	19.8	49.1	0.8
	0.91	42.1	28.9	28.1	(-)			30.3	19.9	49.7	

(Tweed-Rutile Syndicate).

PRINCIPAL BEACH SAND OPERATORS.

Operator	Location of 1. Plant. 2. Deposits	Approximate monthly through- put (as heavy mineral concentrates after removal of quartz.	Method of Mining.	Outline of Treatment Method	PRODUCTS Marketed.
		TONS.			
Tweed-Rutile Syndicate.	1. Cudgen Beach, N.S.W., 9 miles south of border. 2. Cudgen, adjacent to beach.	500	Stripping over- burden and loading motor trucks with diesel shovel.	Wilfly tables, de watering and draining, rotary drier, removal of ilmenite with Maelean magnetic separation, electrostatic separation of zircon and rutile. Electro- static and electromagnetic cleaning of the rutile.	Rutile 96% Zircon: concentrates being stock- piled.

DEPARTMENT OF SUPPLY AND DEVELOPMENT.

Bureau of Mineral Resources, Geology and Geophysics.

Report No. 1949/70 - (Geol. Ser. 51).

Plan No. Q25-10C-9.

BEACH SANDS INVESTIGATION.

THE BURLEIGH AREA (WEST OF THE ESPLANADE).

Plans and sections of the area are included at the back of this report.

INTRODUCTION.

Locality.

The area is adjacent to Miami Beach, between South Nobby and Burleigh Heads, 8 miles south from Southport. The Pacific Highway passes through the eastern part of the area.

Occurrence.

The area forms the northernmost 1,800 feet of a narrow sandy strip 8 to 20 feet above mean sea level which extends, adjacent to the beach, from Burleigh Heads to South Nobby, a distance of about 6,000 feet.

The surface of the sandy strip is composed of fine-grained dune sand, which continues beneath the surface to a few feet above high water level. There the fine sand gives way to a coarser sand which resembles the present-day beach sand. At its western margin, the sandy strip merges into low-lying country which is swampy in the wet season. Apart from the deposits which appear on the ocean-beach after storms, the known deposits of heavy minerals between South Nobby and Burleigh Heads, and probably the only deposits, occur in the northern part of this narrow sandy strip, immediately west of the Esplanade. Deposits did occur between the Esplanade and the beach, but these were mined some years ago.

FIELD WORK.

Boring and sampling of the area was carried out in February, 1949. Bores were put down to water level using a post-hole auger. When the sand appeared to contain appreciable quantities of heavy mineral, it was sampled by quartering. Every third bore was sampled whether or not mineral appeared to be present. Details of samples are given in Table A at the end of this Report.

LABORATORY WORK.

Samples were dried and their weights and volumes were determined. The samples were then concentrated by means of a laboratory Wilfley table, and the weights and volumes of the dry concentrates were determined. The percentage composition of a composite sample of the concentrates from each bore line was determined by grain counting. The quantities of heavy minerals in the samples expressed as

weight per cent and "Lbs./Cu.Yd." (pounds weight of heavy mineral concentrate per cubic yard of sand) are given in Table A at the end of this report. The average percentage composition of the heavy mineral concentrate in the area, obtained from the percentage composition at each bore line, weighted for the quantity of mineral at the line, is given in Table 2.

RESULTS.

Distribution of Heavy Mineral. The plan accompanying this report shows that the heavy mineral-bearing sand occurs from the eastern boundary of the area to approximately 600 feet west of the boundary. Narrow northerly trending barren strips divide the area into three blocks (Blocks I, II and III). Tables 1/300 and 1/120 show a steady decrease in tonnage of heavy mineral and thickness of mineral-bearing sand, at least for the high grade sand, from east to west. The overburden is least in Block II, i.e., in the middle portion of the area. South of line 1729-south the area is covered by buildings, and it was not practicable to extend the boring and sampling in this direction. However, the quantity of mineral appears to decrease towards the south.

Quantities. Two separate estimates have been made (Tables 1 and 2) of the tonnages of heavy minerals, volumes and average thicknesses of mineral-bearing sand and of overburden, average grade of mineral-bearing sands, and tonnages of each of the heavy minerals. The figures of Table 1/300 are based on a thickness of mineral-bearing sand in each borehole which has a minimum average grade of 300 lbs. of heavy mineral per cubic yard, while the figures of Table 1/120 are based on a minimum average grade of 120 lbs. per cubic yard. Quantities of overburden have been included with the mineral-bearing sands to obtain a maximum thickness of "working face" and a minimum thickness of overburden, while still maintaining the desired grade.

Where the minimum grade is 300 lbs. per Cu.Yd. the total thickness of mineral-bearing sand given for a small number of the bores does not represent a continuous working face, but is made up of two portions separated by barren sand. For a minimum grade of 120 lbs/ Cu. Yd. the thickness of mineral-bearing sand given for each bore represents a continuous or unbroken working face.

Tonnages Available for Mining. All of the allotments in the area have been taken up for residential purposes and most of them have been built on. It will not be practicable to obtain much, if any, mineral from the area.

SOUTHPORT, QUEENSLAND.

D. E. GARDNER
Geologist in Charge.

TABLE 1.

SUMMARY.TONNAGES, VOLUMES, AVERAGE THICKNESSES AND AVERAGE GRADES.

BLOCK	AREA	WEIGHT OF HEAVY MINERAL CONCENTRATE. TONS.	VOLUME		AVERAGE THICKNESS		AVERAGE GRADE OF MINERAL BEARING SANDS. LBS. OF HEAVY MINERAL CONCENTRATE PER CUB. YD.
	SQ. YDS.		MINERAL-BEARING SANDS CUBIC YDS.	OVER- BURDEN. CUBIC YDS	MINERAL-BEARING SANDS FEET	OVER- BURDEN FEET	
<u>Minimum Grade 300 lbs./cu. yd.</u>							
Block I.	25,200	6,134	42,613	51,252	5.0	6.1	322.4
" II.	21,242	4,829	21,529	20,844	3.0	2.9	502.4
" III.	4,807	1,674	5,386	8,973	3.3	5.6	699.1
TOTAL.	51,249	12,637	67,510	98,878	3.9	5.8	419.2
<u>Minimum Grade 120 lbs/cu. yd.</u>							
Block I.	26,643	6,447	69,848	45,602	7.7	5.1	206.8
" II.	34,672	8,381	56,599	19,185	4.8	1.6	331.3
TOTAL.	61,315	14,828	126,447	64,787	6.2	3.2	262.7

TABLE ~~B~~. 2.

TONNAGES OF EACH OF THE HEAVY MINERALS

ESTIMATED FROM PERCENTAGE COMPOSITIONS DETERMINED BY GRAIN COUNTING

[illegible]

DETAILED STATEMENT.

TABLE 1./300. BLOCK I. TONNAGES, VOLUMES, AVERAGE THICKNESSES AND AVERAGE GRADES.

BLOCK	AREA SQ.YDS.	WEIGHT OF HEAVY MINERAL CONCEN- TRATE. TONS.	V O L U M E		AVERAGE THICKNESS		AVERAGE GRADE OF MINERAL BEARING SANDS. LBS.OF HEAVY MINERAL CONCENTRATE PER CUB.YD.
			MINERAL-BEARING SANDS	OVER- BURDEN.	MINERAL-BEARING SANDS	OVER- BURDEN	
			CUBIC YDS.	CUBIC YDS	FEET	FEET	
<u>213S - 863S.</u> Block IA.	1,982	539	3,857	6,392	5.8	9.6	313
" IB.	7,866	1,471	10,835	22,970	4.1	8.7	304.1
<u>863S - 1263S.</u> Block I.	6,731	1,976	13,463	17,809	5.9	7.9	328.7
<u>1263S -1729S.</u> Block IA.	3,339	872	6,134	8,339	5.5	7.4	318.4
" IB.	5,280	1,276	8,324	13,551	4.7	7.6	343.4
TOTAL - BLOCK I.	25,200	6,134	42,613	69,061	5.2	8.2	322.4

DETAILED STATEMENT.

TABLE 1./300.

TONNAGES, VOLUMES, AVERAGE THICKNESSES AND AVERAGE GRADES.

BLOCK II & III.

BLOCK	AREA SQ.YLS.	WEIGHT OF HEAVY MINERAL CONCEN- TRATE. TONS.	V O L U M E		AVERAGE THICKNESS		AVERAGE GRADE OF MINERAL BEARING SANDS. LBS.OF HEAVY MINERAL CONCENTRATE PER CUB.YD.
			MINERAL-BEARING SANDS CUBIC YDS.	OVER- BURDEN. CUBIC YDS	MINERAL-BEARING SANDS FEET	OVER- BURDEN FEET	
BLOCK II.							
213S - 863S.	8,321	3,335	12,081	7,910	4.9	2.9	618.3
863S - 1263S.	7,618	1,164	7,072	6,452	2.8	2.5	368.7
1263S - 1729S.	5,308	330	2,376	6,482	1.3	3.5	311.3
Total, BLOCK II.	21,242	4,829	21,529	20,844	3.0	2.9	502.4
BLOCK III.							
863S - 1263S.	2,221	774	2,479	4,146	3.3	5.6	699.3
1263S -1729S.	2,586	900	2,889	4,827	3.4	5.6	699.0
Total, BLOCK III.	4,807	1,674	5,368	8,973	3.3	5.6	699.1

DETAILED STATEMENT.Minimum Grade 120 lbs./cu.yd.TABLE 1. /120. BLOCK I.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.	VOLUME		AVERAGE THICKNESSES		AVERAGE GRADE OF MINERAL-BEARING SANDS.
	(TABLE KB)	MINERAL-BEARING SANDS	OVER-BURDEN	MINERAL-BEARING SANDS	OVER-BURDEN	LBS. OF HEAVY MINERAL CONCENTRATE PER CUB YD
	TONS	(TABLE KB) CUBIC YDS.	(TABLE KB) CUBIC YDS.	(TABLE KC) FEET INCHES	(TABLE KC) FEET INCHES	
213S to 863S. Block Ia:1,983 sq.yd.	693	5,415	3,976	8.2	6.0	286.7
Block Ib:7,866 sq.yd.	1,544	22,697	9,424	8.7	3.6	152.4
863S to 1263S. Block I :7,398 sq.yd.	2,089	20,661	13,499	8.4	5.9	226.5
1263S to 1729S. Block Ia:3,339 sq.yd.	726	7,751	6,844	6.7	6.1	209.8
Block Ib:6,057 sq.yd.	1,395	13,323	11,859	6.6	5.9	234.6
TOTAL: BLOCK I - 26,643 sq.yd.	6,447	69,848	45,602	7.7	5.1	206.8

DETAILED STATEMENT.

Minimum Grade 120 lbs./cu.yd.

TABLE 1. /120. BLOCK II.

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.	VOLUME		AVERAGE THICKNESSES		AVERAGE GRADE OF MINERAL-BEARING SANDS. LBS. OF HEAVY MINERAL CONCENTRATE PER CUB YD
	(TABLE KB)	MINERAL-BEARING SANDS	OVER- BURDEN	MINERAL-BEARING SANDS	OVER- BURDEN	
	TONS	(TABLE KB) CUBIC YDS.	(TABLE KB) CUBIC YDS.	(TABLE KC) FEET INCHES	(TABLE KC) FEET INCHES	
XX 213S to 863S. 10,293 sq.yd.	3,746	22,218	4,536	6.5	1.3	377.6
863S to 1263S. 12,910 sq.yd.	2,941	21,998	8,915	5.1	2.0	299.4
12,263S to 1729S. 11,469 sq.yd.	1,694	12,383	5,734	3.2	1.5	306.3
TOTAL BLOCK II. 34,672 sq.yd.	8,381	56,599	19,185	4.8	1.6	331.3
TOTAL, BLOCKS I & II. 61,315 sq.yd.	14,828	126,447	64,787			

APPENDIX. TABLE A.

QUANTITIES OF HEAVY MINERALS INTERSECTED IN BORES.

LINE 213.

BORE NO. & R.L.	CO-ORDINATES FROM	SAMPLE NO.		DEPTH		QUANTITY OF HEAVY MINERALS		THICKNESS OF SAMPLE		OVERBURDEN	
		FIELD	LABOR- ATORY	FROM	TO	LBS.PER CU.YD.	WT.PER CENT	(FT.) X (LBS.PER CU.YD.)			
								300	120	300	120
00 29.4	S.E. CORNER OF 8TH AVENUE.	1	L6484	13'9"	13'11"	975.7	33.3	162.6	162.6		
		2	L6485	17'1"	17'7"	3241.0	75.43	1620.5	1620.5		
			Thickness		14'6"	123.0		1783.1		11'10"	3'1"
					5'9"	306.6		1783.1			
22W 27.9		1	L6580	2'0"	9'6"	Trace					
		2	L6581	10'9"	13'0"	Trace					
		3	L6582	13'0"	14'6"	44.94	1.7				
		4	L6583	14'6"	18'3"	47.1	1.74				
36W 26.3		1	L6697	2'9"	3'0"	Trace	-				
		2	L6698	3'0"	6'0"	Trace	-				
		3	L6699	6'0"	9'0"	32.0	1.2				
		4	L6700	9'0"	12'0"	42.3	1.6				
		5	L6701	12'0"	15'0"	Trace	-				
		6	L6702	15'0"	16'9"	Trace	-				
79W 22.5		1	L6490	12'3"	12'7"	687.7	23.5	229.2	229.2		
		2	L6491	12'7"	13'0"	1445.0	43.5	606.8	606.8		
		3	L6492	13'0"	14'3"	981.1	32.1	1226.4	1226.4	7'5"	Nil.
			Thickness		14'3"	144.7		2062.4			
					6'10"	301.9		2062.4			

QUANTITIES OF HEAVY MINERALS INTERSECTED IN BORES.

BORE NO. & R.L.	CO-ORDINATES FROM	SAMPLE NO.		DEPTH		QUANTITY OF HEAVY MINERALS		THICKNESS OF SAMPLE		OVERBURDEN	
		FIELD	LABORATORY	FROM	TO	LBS. PER CU. YD.	WT. PER CENT	(FT.) X (LBS. PER CU. YD.)		300	120
								300	120		
119W. 21.3	S.E. CORNER OF 8TH AVENUE.	1	L6493	9'3"	10'0"	1063.0	34.2	797.2	797.2		
		2	L6494	10'0"	11'0"	1784.0	52.8	1782.0	1782.0		
			Thickness		11'0" 8'7"	234.5 300.6				2'5"	Nil.
137W. 21.6		1	L6584	0'6"	3'0"	53.2	2.0		<u>2' - 3'</u> 53.2		
		2	L6585	3'0"	6'0"	56.2	2.0		168.6		
		3	L6586	6'0"	8'6"	39.8	1.5	<u>7' - 9'</u> 29.9	99.5		
		4	L6587	8'6"	9'0"	277.2	10.0	138.6	138.6		
		5	L6588	9'0"	10'0"	529.8	18.6	529.8	529.8		
			Thickness		8'0" 2'3"	123.7 310.3		698.3	989.7	7'9"	2'0"
155W. 21.87		1	L6653	0'0"	4'0"	Trace	-				
		2	L6654	4'0"	7'0"	Trace	-				
		3	L6655	7'0"	10'0"	65.54	2.45				
191W. 21.8		1	L6656	0'0"	3'0"	Trace					
		2	L6657	3'0"	6'0"	Trace					
		3	L6658	6'0"	10'0"	Trace					

APPENDIX. TABLE A.

QUANTITIES OF HEAVY MINERALS INTERSECTED IN BORES.

LINE 213S. (Continued).

BORE NO. & R.L.	CO-ORDINATES FROM	SAMPLE NO.		DEPTH		QUANTITY OF HEAVY MINERALS		THICKNESS OF SAMPLE		OVERBURDEN		
		FIELD	LABOR- ATORY	FROM	TO	LBS.PER CU.YD.	WT.PER CENT	(FT.) X (LBS.PER CU.YD.)		300	120	
								300	120			
224W.- 22.41	S. E. CORNER OF 8TH AVENUE.	1	L6659	0'0"	3'0"	Trace						
		2	L6660	3'0"	6'0"	Trace						
		3	L6661	6'0"	10'0"	Trace						
1		L6495	0'0"	9'10"	348.1	13.73	3336.0	3336.0				
2		L6496	9'10"	10'0"	949.3	31.68	158.2	158.2				
3		L6497	10'2"	10'5"	1940.3	56.20	485.0	485.0				
4		L6498	10'5"	11'0"	2059.0	57.84	1194.2	1194.2	NIL.	NIL.		
		Thickness		11'0" 11'0"	470.3 470.3		5173.4 5173.4					
286W.- 20.81		1	L6589	0'0"	3'0"	488.2	17.3	1464.6	1464.6			
		2	L6590	3'0"	6'0"	592.9	19.4	1778.7	1778.7			
		3	L6591	6'0"	8'0"	1110.0	37.7	2220.0	2220.0			
		4	L6592	8'0"	9'0"	2923.0	72.2	2923.0	2923.0	NIL.	NIL.	
		Thickness		9'0"	931.8		8386.3	8386.3				
316W.- 19.8	1	L6499	0'0"	9'0"	239.4	8.88		1675.8				
		Thickness		9'0"	186.2			1675.8				
346W.- 18.26	1	L6593	0'0"	3'0"	184.8	6.7		554.4				
	2	L6594	3'0"	6'0"	67.0	2.54		20.1				
		Thickness		6'0"	125.9			755.4				

APPENDIX. TABLE A.

QUANTITIES OF HEAVY MINERAL INTERSECTED IN BORES.

LINE 213S. (Continued).

BORE NO. & R.L.	CO-ORDINATES FROM	SAMPLE NO.		DEPTH		QUANTITY OF HEAVY MINERALS		THICKNESS OF SAMPLE (FT.) X (LBS. PER CU. YD.)		OVERBURDEN	
		FIELD	LABOR- ATORY	FROM	TO	LBS. PER CU. YD.	WT. PER CENT	300	120	300	120
371W. 17.30	S. E. CORNER OF 8TH AVENUE.	1	L6595	0'0"	3'0"	93.16	3.48				
		2	L6596	3'0"	4'9"	40.23	1.51				
431W. 14.53				0'0"	4'0"	NO SAMPLE					
477W. 13.9				0'0"	3'6"	NO SAMPLE					
550W. 12.8				0'0"	2'9"	NO SAMPLE					

QUANTITIES OF HEAVY MINERALS INTERSECTED IN BORES.

BORE NO. & R.L.	CO-ORDINATES FROM	SAMPLE NO.		DEPTH		QUANTITY OF HEAVY MINERALS		THICKNESS OF SAMPLE		OVERBURDEN	
		FIELD	LABOR- ATORY	FROM	TO	LBS.PER CU.YD.	WT.PER CENT	(FT.) X (LBS.PER CU.YD).		300	120
								300	120		
00 22.5	S. E. CORNER OF 8TH AVENUE.	1	L6382	9'9"	10'4"	1030.0	27.2	600.8	600.8		
		2	L6383	10'8"	11'5"	2558.0	64.9	1918.5	1918.5		
		3	L6384	12'6"	12'9"	1749.9	24.4	187.5	187.5		
		4	L6385	12'9"	13'3"	2312.0	61.0	1156.0	1156.0		
		5	L6386	13'9"	14'4"	1063.0	26.2	620.1	620.1		
			Thickness		14'4"	312.7		4482.9	4482.9	NIL.	NIL.
33W. 24.3		1	L6387	9'3"	9'7"	376.7	12.7	-	-	14'8"	12'8"
		2	L6388	15'0"	15'4"	317.8	11.0	102.6			
		3	L6389	15'8"	16'0"	920.0	23.1	306.7			
			Thickness		3'4" 1'4"	122.8 307.7		409.3	409.3		
69W. 22.0	1	L6394	14'3"	14'7"	1195.0	37.6	398.3		10'4"	0'2"	
	2	L6395	16'0"	16'4"	1745.0	50.9	581.7				
	3	L6396	16'6"	17'0"	2080.0	57.5	1040.0				
		Thickness		16'10" 6'8"	120.0 302.8		2020.0	2020.0			

APPENDIX. TABLE A.

QUANTITIES OF HEAVY MINERALS INTERSECTED IN BORES.

LINE 863S. (Continued).

BORE NO. & R.L.	CO-ORDINATES FROM	SAMPLE NO.		DEPTH		QUANTITY OF HEAVY MINERALS		THICKNESS OF SAMPLE		OVERBURDEN	
		FIELD	LABORATORY	FROM	TO	LBS. PER CU. YD.	WT. PER CENT	(FT.) X (LBS. PER CU. YD.)			
								300	120	300	120
99W. 20.7	S.E. CORNER OF 8TH AVENUE.	1	L6397	9'9"	10'0"	2170.0	59.34	542.5	542.5		
		2	L6398	11'9"	12'4"	529.1	18.4	308.6	308.6		
			Thickness		7'1"	120.2		851.1	851.1	9'6"	5'3"
					2'10"	300.8					
132W. 18.23		1	L6480	7'3"	7'7"	64.0	2.2	GRADE TOO LOW.			
			Thickness:-	Grade too low.							
165W. 14.9				0'0"	10'0"	NO SAMPLE.					
201W. 13.5		1	L6662	0'0"	3'	98.7	3.7	-	-		
		2	L6663	3'0"	6'0"	118.2	4.5	-	-		
234W. 13.9		1	L6481	0'0"	8'6"	490.8	17.9	4178.8	4178.8		
			Thickness		8'6"	491.6		4178.8		NIL	NIL.
					8'6"	491.6			4178.8		
270W. 15.2		1	L6482	8'0"	9'0"	926.0	24.5	926.0	926.0		
			Thickness		7'8"	120.7		926.0		5'11"	1'4"
					3'1"	300.7			926.0		
291W. 16.3		1	L6572	0'0"	3'	112.4	3.98	-	337.2		
		2	L6573	3'0"	6'0"	215.5	7.56	646.5	646.5		
		3	L6574	7'0"	8'6"	790.2	26.09	1185.2	1185.2		
			Thickness		8'6"	255.1		1831.7		3'0"	NIL.
					5'6"	333.0			2168.9		

APPENDIX. TABLE A.

QUANTITIES OF HEAVY MINERALS INTERSECTED IN BORES.

LINE 863S. (Continued).

BORE NO. & R.L.	CO-ORDINATES FROM	SAMPLE NO.		DEPTH		QUANTITY OF HEAVY MINERALS		THICKNESS OF SAMPLE		OVERBURDEN	
		FIELD	LABOR- ATORY	FROM	TO	LBS.PER CU.YD.	WT.PER CENT	(FT.) X (LBS.PER CU.YD).			
								300	120	300	120
309W. 17.14	S.E. CORNER	1	L6483	8'0"	9'2"	614.1	19.86	716.3	716.3	6'6"	2'6"
			Thickness		5'10" 2'3"	122.8 306.9		716.3	716.3		
339W. 18.3	OF 8TH AVENUE.	1	L6575	0'0"	2'0"	TRACE	-	-	-	GRADE TOO LOW.	
		2	L6576	2'0"	5'0"	TRACE	-	-	-		
		3	L6577	5'0"	8'0"	TRACE	-	-	-		
		4	L6578	8'0"	9'6"	TRACE	-	-	-		
359W. 19.0				0'0"	11'6"	NO SAMPLE.					
425W. 19.8		1	L6664	0'0"	3'0"	TRACE	-	-	-	GRADE TOO LOW.	
		2	L6665	3'0"	6'0"	TRACE	-	-	-		
		3	L6666	6'0"	10'6"	TRACE	-	-	-		
469W. 19.6		1	L6667	0'0"	3'0"	TRACE	-				
		2	L6668	3'0"	6'0"	TRACE	-				
		3	L6669	6'0"	9'0"	TRACE	-				
		4	L6670	9'0"	10'0"	70.5	2.5				
508W. 18.7				0'0"	12'9"	NO SAMPLE.					

QUANTITIES OF HEAVY MINERALS INTERSECTED IN BORES.

BORE NO.
& R.L.

SAMPLE NO.

FIELD

LABOR-
ATORY

DEPTH

FROM

TO

QUANTITY OF HEAVY MINERALS

LBS. PER CU. YD.		WT. PER CENT	
100	100	100	100
101	101	101	101
102	102	102	102
103	103	103	103
104	104	104	104
105	105	105	105
106	106	106	106
107	107	107	107
108	108	108	108
109	109	109	109
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112	112	112	112
113	113	113	113
114	114	114	114
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132	132	132	132
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152	152	152	152
153	153	153	153
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171	171	171	171
172	172	172	172
173	173	173	173
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179	179	179	179
180	180	180	180
181	181	181	181
182	182	182	182
183	183	183	183
184	184	184	184
185	185	185	185
186	186	186	186
187	187	187	187
188	188	188	188
189	189	189	189
190	190	190	190
191	191	191	191
192	192	192	192
193	193	193	193

THICKNESS OF SAMPLE

(FT.) X (LBS.PER
CU.YD).

OVERBURDEN

300

120

300

120

S. E. CORNER

01011

11'6"

NO SAMPLE.

OF

1

L6703

O.C.11

5101

29.4

1.1

8th AVENUE.

1

L6704

010

3:61

29.2

1.1

APPENDIX. TABLE A.

QUANTITIES OF HEAVY MINERALS INTERSECTED IN BORES.

LINE 1263S.

BORE NO. & R.L.	CO-ORDINATES FROM	SAMPLE NO.		DEPTH		QUANTITY OF HEAVY MINERALS		THICKNESS OF SAMPLE (FT.) X (LBS. PER CU. YD).		OVERBURDEN	
		FIELD	LABOR- ATORY	FROM	TO	LBS. PER CU. YD.	WT. PER CENT	300	120	300	120
00 27.42	S. E. CORNER OF 8TH AVENUE.	1	L6513	8'4"	8'6"	1096.0	29.17	182.66	182.66		
		2	L6514	13'1"	13'5"	1790.0	47.32	596.66	596.66		
		3	L6515	13'5"	13'11"	4460.0	78.7	2230.0	2230.0		
		4	L6516	14'8"	14'10"	1945.0	54.92	324.1	324.1		
			Thickness		14'10" 11'1"	224.7 300.7		3333.4	3333.4	3'9"	N11.
33W. 29.05		1	L6517	10'0"	10'3"	210.7	7.51	52.67	52.67		
		2	L6518	11'10"	12'4"	1888.0	53.98	944.0	944.0		
		3	L6519	12'4"	13'3"	3508.0	68.41	3215.63	3215.63		
			Thickness		13'3" 13'3"	317.9 317.9		4212.31	4212.31	N11.	N11.
69W. 30.78		1	L6520	14'3"	14'6"	2291.0	60.66	572.75	572.75		
			Thickness		4'9" 1'10"	120.5 315.0		572.75	572.75	12'5"	9'9"
102W. 28.16		1	L6521	14'6"	14'9"	693.46	28.8	173.36	173.36		
		2	L6522	16'0"	16'4"	1459.0	44.86	466.34	466.34		
			Thickness		5'3" 2'1"	121.8 300.7		639.70	639.70	14'3"	11'1"
493W. 25.55		1	L6649	0'0"	3'0"	Trace	-	-	-		
		2	L6650	3'0"	6'0"	Trace	-	-	-		
		3	L6651	6'0"	9'0"	186.3	6.58	-	558.9	-	6'0"
		4	L6652	9'0"	10'0"	135.9	5.01	-	135.9		
			Thickness		4'0"	173.7			694.8		

APPENDIX. TABLE A.

QUANTITIES OF HEAVY MINERALS INTERSECTED IN BORES.

LINE 1263S. (Continued).

BORE NO. & R.L.	CO-ORDINATES FROM	SAMPLE NO.		DEPTH		QUANTITY OF HEAVY MINERALS		THICKNESS OF SAMPLE (FT.) X (LBS. PER CU. YD.)		OVERBURDEN	
		FIELD	LABOR- ATORY	FROM	TO	LBS. PER CU. YD.	WT. PER CENT	300	120	300	120
533W.	S. E. CORNER OF 8TH AVENUE.	1	L6607	0'6"	3'0"	196.3	7.06	490.7	490.7		
		2	L6608	3'0"	6'0"	348.8	12.42	1046.4	1046.4		
		3	L6609	6'0"	8'0"	441.8	15.33	883.6	883.6		
		4	L6610	8'0"	9'0"	1343.0	40.3	1343.0	1343.0		
			Thickness		9'0" 9'0"	417.1 417.1		3753.7	3753.7	Nil	Nil.
563W. 23.0		1	L6528	0'0"	11'6"	637.5	21.25	7331.3	7331.3		
			Thickness		11'6" 11'6"	637.5 637.5		7331.3	7331.3	Nil	Nil.
593W. 21.27		1	L6611	0'0"	3'0"	247.8	8.97	-	743.4		
		2	L6612	3'0"	6'0"	185.6	6.58	-	556.8		
			Thickness		6'0"	216.7			1300.2	-	Nil.
261W. 18.81		1	L6526	0'0"	7'0"	97.90	3.51	-	-		
294W. 19.49		1	L6602	1'0"	3'0"	133.0	4.79	-	266.0		
		2	L6603	3'0"	6'0"	124.4	4.58	-	373.2		
			Thickness		5'0"	127.8			639.2	-	1'0"
324W. 20.97		1	L6712	0'0"	3'0"	165.6	6.2		496.8		
		2	L6713	3'0"	6'0"	197.8	7.3		593.4		
		3	L6714	6'0"	8'0"	161.3	5.9		322.6		
			Thickness		8'0"	176.6			1412.8	-	Nil.

APPENDIX. TABLE A.

QUANTITIES OF HEAVY MINERALS INTERSECTED IN BORES.

LINE 1263S. (Continued).

BORE NO. & R.L.	CO-ORDINATES FROM	SAMPLE NO.		DEPTH		QUANTITY OF HEAVY MINERALS		THICKNESS OF SAMPLE		OVERBURDEN	
		FIELD	LABOR- ATORY	FROM	TO	LBS.PER CU.YD.	WT.PER CENT	(FT.) X (LBS.PER CU.YD).		300	120
								300	120	300	120
357W. 22.55	S. E. CORNER OF 8TH AVENUE	1	L6647	0'0"	3'0"	105.6	3.98	1" - 2' 211.2	316.8		
		2	L6648	3'0"	6'0"	154.2	5.72	462.6	462.6		
		3	L6605	6'0"	8'0"	233.5	8.64	467.0	467.0		
		4	L6606	8'0"	9'0"	1359.0	41.55	1359.0	1359.0		
			Thickness	9'0" 8'0"		289.5 312.5		2499.8	2605.4	1'0"	Nil.
427W. 26.03		1	L6705	0'0"	3'0"	Trace	-	-	-		
		2	L6706	3'0"	6'0"	Trace	-	-	-		
		3	L6707	6'0"	9'0"	Trace	-	-	-		
		4	L6708	9'0"	11'0"	Trace	-	-	-		
135W. 25.94		1	L6523	9'0"	10'0"	2797.11	72.31	2797.11	2797.11		
		2	L6524	11'0"	11'9"	2863.0	75.36	2147.25	2147.25		
		3	L6525	13'5"	13'6"	1545.04	45.83	128.75	128.75		
			Thickness	13'6" 13'6"		375.7 375.7		5073.11	5073.11	Nil.	Nil.
171W. 25.51		1	L6636	0'0"	3'0"	Trace	-	-	-		
		2	L6637	3'0"	6'0"	Trace	-	-	-		
		3	L6638	6'0"	9'0"	71.78	2.72	-	(7' - 9') 143.6		
		4	L6639	9'0"	12'0"	153.6	5.75	-	460.8		
			Thickness	5'0"		120.9			604.4		7'0"

APPENDIX. TABLE A.

QUANTITIES OF HEAVY MINERALS INTERSECTED IN BORES.

LINE 1263S. (Continued).

BORE NO. & R.L.	CO-ORDINATES FROM	SAMPLE NO.		DEPTH		QUANTITY OF HEAVY MINERALS		THICKNESS OF SAMPLE (FT.) X (LBS. PER CU.YD).		OVERBURDEN	
		FIELD	LABOR- ATORY	FROM	TO	LBS.PER CU.YD.	WT.PER CENT	300	120	300	120
201W. 22.0	S. E. CORNER OF 8TH AVENUE	1	L6640	0'0"	3'0"	26.6	1.06	-	-		
		2	L6641	3'0"	6'0"	118.5	4.4	-	-	-	-
		3	L6642	6'0"	9'0"	42.3	1.65	-	-		
1		L6643	0'0"	3'0"	178.1	6.86	-	534.3			
2		L6644	3'0"	6'0"	54.78	2.03	-	3' - 5'6" 137.0			
Thickness		5'6"	122.0					Nil.			
1		L6645	0'0"	3'0"	97.43	3.07	-	-			
2		L6646	3'0"	5'0"	95.94	3.50	-	-			
644W. 18.8		1	L6709	0'0"	3'0"	Trace	-	-	-		
		2	L6710	3'0"	5'0"	Trace	-	-	-		
695W. 17.23	1	L6711	0'0"	3'0"	Trace	-	-	-			

APPENDIX. TABLE A.

QUANTITIES OF HEAVY MINERALS INTERSECTED IN BORES.

LINE 1729S. (Continued).

BORE NO. & R.L.	CO-ORDINATES FROM	SAMPLE NO.		DEPTH		QUANTITY OF HEAVY MINERALS		THICKNESS OF SAMPLE (FT.) X (LBS. PER CU. YD.)		OVERBURDEN	
		FIELD	LABOR- ATORY	FROM	TO	LBS. PER CU. YD.	WT. PER CENT	300	120	300	120
213W. 25.9	S. E. CORNER OF 8TH AVENUE.	1	L6613	0'0"	3'0"	Trace	-				
		2	L6614	3'0"	6'0"	Trace	-				
		3	L6615	6'0"	9'0"	Trace	-				
		4	L6616	9'0"	9'4"	75.19	2.9	18.8	18.8		
		5	L6617	9'4"	10'8"	1992.0	51.6	2656.0	2656.0		
		6	L6618	10'8"	11'6"	76.3	2.9	63.6	63.6		
		Thickness			11'6"	238.1		2738.4		2'6"	Nil.
231W. 25.6					9'0"	304.3			2738.4		
		1	L6671	0'0"	3'0"	Trace	-	-			
		2	L6672	3'0"	6'0"	Trace	-	-			
		3	L6673	6'0"	9'0"	Trace	-	-			
267W. 22.15		4	L6674	9'0"	11'6"	19.6	0.7				
		1	L6675	0'0"	3'0"	24.8	0.9				
		2	L6676	3'0"	6'0"	57.9	2.3				
		3	L6677	6'0"	8'0"	42.8	1.7				
300W. 19.9		1	L6678	0'0"	3'0"	25.6	1.02				
		2	L6679	3'0"	6'0"	40.58	1.2				

APPENDIX. TABLE A.

QUANTITIES OF HEAVY MINERALS INTERSECTED IN BORES.

LINE 1729S. (Continued).

LINE 1729S. (Continued).

BORE NO. & R.L.	CO-ORDINATES FROM	SAMPLE NO.		DEPTH		QUANTITY OF HEAVY MINERALS		THICKNESS OF SAMPLE (FT.) X (LBS. PER CU.YD.)		OVERBURDEN	
		FIELD	LABOR- ATORY	FROM	TO	LBS.PER CU.YD.	WT.PER CENT	300	120	300	120
356W. 20.4	S. E. CORNER OF 8TH AVENUE.	1	L6680	0'0"	3'0"	40.9	1.6				
		2	L6681	3'0"	6'0"	34.3	1.2				
419W. 22.1		1	L6682	0'0"	3'0"	50.5	1.8				
		2	L6683	3'0"	6'0"	95.9	3.6				
		3	L6684	6'0"	7'0"	102.7	3.9				
479W. 24.2		1	L6685	0'0"	3'0"	Trace	-				
		2	L6686	3'0"	6'0"	Trace	-				
		3	L6687	6'0"	9'0"	Trace	-				
529W.		1	L6688	0'0"	3'0"	Trace	-				
		2	L6689	3'0"	6'0"	Trace	-				
		3	L6690	6'0"	9'0"	Trace	-				
579W. 24.7		1	L6689A	0'0"	3'0"	Trace	-				
	2	L6689B	3'0"	6'0"	Trace	-					
	3	L6689C	6'0"	9'6"	Trace	-					

APPENDIX. TABLE A.

QUANTITIES OF HEAVY MINERALS INTERSECTED IN BORES.

LINE 1729S.

BORE NO. & R.L.	CO-ORDINATES FROM	SAMPLE NO.		DEPTH		QUANTITY OF HEAVY MINERALS		THICKNESS OF SAMPLE		OVERBURDEN	
		FIELD	LABOR- ATORY	FROM	TO	LBS.PER CU.YD.	WT.PER CENT	(FT.) X (LBS.PER CU.YD.)		300	120
								300	120	300	120
00. 28.2	S. E. CORNER OF 8th AVENUE.	1	L6500	13'2"	13'6"	831.4	26.77	277.1	277.1		
		2	L6501	14'6"	14'9"	542.4	19.04	135.6	135.6		
			Thickness		3'4" 1'3"	123.8 330.2		412.7	412.7	13'6"	11'5"
30W. 27.41		1	L6504	11'0"	11'3"	768.6	25.36	192.5	192.5		
		2	L6505	14'0"	14'2"	773.4	35.39	-	-		
			Thickness		1'6" 0'7"	128.3 330.0				10'8"	9'9"
60W. 28.66				0'0"	17'3"	NO SAMPLE					
96W. 28 30.62				0'0"	19'0"	NO SAMPLE					
129W. 28.2		1	L6506	0'0"	17'9"	60.89	2.26				
162W. 25.28		1	L6507	12'0"	12'4"	1687.0	48.71	562.3	562.3		
			Thickness		4'8" 1'9"	120.4 321.3		562.3	562.3	10'7"	7'8"
198W. 25.21		1	L6508	9'9"	10'3"	447.5	15.63	223.7	223.7		
		2	L6509	10'5"	11'2"	1455.0	43.07	848.7	848.7		
		3	L6510	12'0"	12'4"	3979.0	75.25	1326.3	1326.3		
			Thickness		12'4" 7'9"	194.3 309.5		2398.7	2398.7	4'7"	Nil.

APPENDIX. TABLE A.

QUANTITIES OF HEAVY MINERALS INTERSECTED IN BORES.

LINE 1729S. (Continued).

BORE NO. & R.L.	CO-ORDINATES FROM	SAMPLE NO.		DEPTH		QUANTITY OF HEAVY MINERALS		THICKNESS OF SAMPLE		OVERBURDEN	
		FIELD	LABOR- ATORY	FROM	TO	LBS.PER CU.YD.	WT.PER CENT	(FT.) X (LBS.PER CU. YD).			
								300	120	300	120
649W. 24.0	S. E. CORNER OF 8TH AVENUE.	1	L6691	0'0"	3'0"	Trace	-				
		2	L6692	3'0"	6'0"	Trace	-				
		3	L6693	6'0"	9'0"	0.9	.03				
700W.		1	L6694	0'0"	3'0"	Trace					
		2	L6695	3'0"	6'0"	Trace					
		3	L6696	6'0"	7'0"	70.7	2.6				
800W.		1	L6696A.	0'0"	12'0"	7.3	0.03				