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Peninsula Prospecting and Mining Pty. LimitedQuarterly Report Special Mining Lease No. ~~118~~ and No. 122
Period Ending December 16th, 1966

An investigational programme was prepared and submitted to the Mines Department involving the drilling of 31 holes on gypsum, 11 holes on lime sand. Later on this programme was supplemented by a proposal to drill 4 holes for the testing of the deeper formations, underlying the gypsum deposits, for salt brines (potash) and phosphate.

The programme was approved by the Mines Department and arrangements were made to hire specialised drilling equipment and experienced drilling personnel from the Department with supervision of the work by the Company.

As at December 16th, 1966, fourteen holes on gypsum were completed, total footage 381 ft.6 in., and four holes on lime sand, total footage 335 ft. 14 samples of gypsum and 24 samples of lime sand were sent for analyses.

During this period a study was commenced into the possible markets for gypsum on a large scale in Australia and in the South Pacific Area generally. A major part of this study comprised the possible use of gypsum as a substitute for sulphur in the manufacture of fertilizers, in particular ammonium sulphate, which is produced extensively from gypsum in countries where the gypsum factory delivered cost is low. This study is still in progress.

Total expenditure incurred for the period is estimated at \$5,000 including the mobilization expenses for the drilling, drill progress payments and the costs of the commercial studies, planning work and field supervision.

The programme and investigations are common to both these mining leases.

Peninsula Prospecting and Mining Pty. LimitedQuarterly Report Special Mining Leases ~~No. 118 & 122~~
Period Ending March 16th, 1967

Following a brief Xmas holiday break the drilling programme on the leases was resumed on January 23rd and on March 10th, 1967, the drilling and field sampling work was completed. An additional 13 bores were sunk on the gypsum deposits, three bores were drilled in search of enriched potash brines and phosphate, and one additional bore on lime sand was completed.

The completed programme thus involved the following:-

	<u>No. of Bores</u>	<u>Total Footage</u>	<u>No. of Samples</u>
Gypsum bores	27	564 ft.	44
Lime Sand Bores	5	407 ft.	30
Potash brine and phosphate exploration bores	3	477 ft.	29
Total	<u>35</u>	<u>1448 ft.</u>	<u>103</u>

All the samples are now with the A.M.D.L. Laboratories for analysis and all results are expected to be to hand by April 30th.

On receipt of the analytical data a full report will be prepared on the potential of the prospecting authorities with respect to quantity and quality of the gypsum, lime sand and salt brines revealed by the drilling.

Further enquiry was made on markets and uses for gypsum, salt and lime sand.

Preliminary discussions were held with the General Manager of the South Australian Harbour Board on the possibilities of accommodating large ships in the area.

The expenditure incurred to March 16th, 1967, is estimated at \$12,000.

PENINSULA PROSPECTING AND MINING PROPRIETARY LIMITEDQuarterly report on SML's 116 and 122 for the period ended September 16th 1967

With the establishment of the proven reserves of gypsum, lime sand, and concentrated brines on SML's 116 and 122 during the period ended June 16th 1967, the investigational work has been directed to the following matters which are briefly reported as follows:-

1. A review has been made of the brine analyses of the samples taken in the three bores drilled through the gypsum deposits to bedrock. Table 1 attached, compares the concentrations of Cl, K, Mg and Br with the Na concentrations at various depths of the bores. It is of interest that the Na/Cl ratio is quite constant with depth for the three bores (and the same is true of the Na/Mg and Na/Br) but that the Na/K ratio in No. 1 is somewhat greater than in Nos. 2 & 3, and actually shows an increase between 125 feet and 145 feet, and that this increase is maintained at the greater depths even as the concentration of the No. 1 brine is more than doubled from 125 feet to 245 feet. This apparent slight depletion of K is difficult to interpret except in so far as the notable increase in concentration corresponds to a change from the porous limestone beds to the weathered granite bedrock in which the contained brines would have less freedom of movement and some of the K content might be chemically deposited in this bedrock environment.

In respect of computing an average composition for the brine underlying the gypsum, it is to be noted that there are anomalies in respect of Brine Bore No. 2 that make any arithmetic or even weighted average suspect, without a much larger number of bores being drilled and sampled in a similar manner to that for Nos. 2 & 3. Table 2 compares the three brine bores with Port Le Hunte seawater at the various sampling depths; Brine Bore No. 2 seems to exhibit somewhat anomalous behaviour through the first half of its depth, approaching the composition of seawater at 25-45 feet, and then increasing in concentration. This might suggest an incursion of seawater or more probably fresh water from some local drainage at this point.

An interesting consideration is the increase in brine concentration with depth in all three bores (noting the exception of the anomaly at certain depths in No. 2 Bore). The concentration increases markedly with depth. The ratios of the components to those of seawater certainly suggests that the concentration of seawater produced the brines.

In considering salt production by solar evaporation we have sought advices from an overseas consultant and are also continuing our studies on the surface areas required for specific tonnages in respect of utilizing the underground brines and the natural inflow of brines as either the main source or as a supplementary source for salt production by solar evaporation.

2. Gypsum

Our studies are being continued to define overseas markets for gypsum and also to ascertain the improvements necessary at Thevenard or at a new port site to permit a much greater market potential to be achieved. This study is presently concerned with the assessment of the characteristics of ports in the Pacific area where gypsum is presently being supplied from ex-Australian sources.

The use of the sulphate radical in gypsum is being considered both for sulphuric acid production and for use as a reactant in the form of those compounds to which calcium sulphate may be readily processed.

These possibilities include the production of ammonium sulphate from gypsum, ammonia, and carbon dioxide with the product, ammonium sulphate as a market product. The production of ammonium sulphate from gypsum for use in the production of sulphuric acid is also being investigated through consultants overseas.

The world shortage of elemental sulphur has resulted in increased cost of elemental sulphur, and therefore increased cost of sulphuric acid. A continuation of this trend seems inevitable, on our information for 2 or 3 years, and more if no spectacular discoveries are made. This situation will result in a favourable competitive position for sulphuric acid produced through other routes than elemental sulphur.

Our enquiries accordingly are covering the possible uses of gypsum in the chemical field and these are integrated particularly with transportation and fuel availability.

3. The lime sand utilization study has not been commenced.

We would propose to supply reports as they are completed.

The expenditure on investigational work for the period may be itemized as follows:-

Salaries	\$2050
Travelling Expenses and Sundries	<u>255</u>
Total -	<u><u>\$2305</u></u>

Excluding Head Office expenses.

S. B. Dickinson

S. B. Dickinson
2nd November, 1967

Depth (feet)			Brine Bore No. 1					Brine Bore No. 2					Brine Bore No. 3				
No	1	No	2	No	3	Na Cl	Na K	Na Mg	Na Br	Na Cl	Na K	Na Mg	Na Br	Na Cl	Na K	Na Mg	Na Br
6	6	6				0.559	28.61	8.52	174	0.561	26.29	8.08	161	0.560	25.56	8.76	153
14	14	14				0.557	28.40	8.46	159	0.562	26.42	8.11	162	0.558	27.42	8.34	167
25	25	25				0.557	28.29	8.45	163	0.556	25.35	8.21	144	0.557	26.89	8.49	172
45	45	45				0.558	28.46	8.44	171	0.557	26.44	8.38	169	0.557	27.43	8.59	163
65	65	65				0.558	28.44	8.40	163	0.558	25.49	8.35	166	0.558	26.96	8.60	162
85	85	77				0.558	28.60	8.40	166	0.560	27.65	8.38	158	0.556	27.13	8.50	166
105	105					0.557	28.86	8.54	162	0.558	26.89	8.42	166				
125	125					0.557	28.53	8.54	162	0.557	27.35	8.30	166				
145	150					0.557	30.14	8.43	174	0.555	27.13	8.22	171				
165						0.556	30.48	8.27	170								
185						0.556	29.50	8.45	295								
205						0.581	31.51	11.22	180								
225						0.557	31.65	8.54	169								
245						0.558	32.50	8.59	173								

Wt. ratio of the Na component
to Cl, K, Mg, and Br, respectively

Wt. ratio of the Na component
to Cl, K, Mg, and Br, respectively

Table No. 2.

				Brine Bore No. 1				Brine Bore No. 2				Brine Bore No. 3			
				Na	K	Mg	Cl	Na	K	Mg	Cl	Na	K	Mg	Cl
				Na sw	K sw	Mg sw	Cl sw	Na sw	K sw	Mg sw	Cl sw	Na sw	K sw	Mg sw	Cl sw
6	6	6		2.372	2.326	2.322	2.404	1.789	1.910	1.847	1.808	1.518	1.667	1.445	1.535
14	14	14		2.565	2.535	2.528	2.607	1.405	1.493	1.445	1.416	2.477	2.535	2.477	2.516
25	25	25		2.625	2.604	2.590	2.670	1.066	1.181	1.084	1.086	2.761	2.882	2.714	2.810
45	45	45		2.747	2.708	2.714	2.789	1.047	1.111	1.042	1.065	2.817	2.882	2.735	2.806
65	65	65		2.815	2.778	2.797	2.859	1.230	1.354	1.228	1.247	3.000	3.125	2.910	3.048
85	85	77		2.867	2.812	2.848	2.908	2.155	2.187	2.147	2.179	3.490	3.611	3.426	3.553
105	105			3.000	2.917	2.931	3.048	2.761	2.882	2.735	2.803				
125	125			3.000	2.951	2.931	3.048	3.891	3.993	3.911	3.959				
145	150			3.879	3.611	3.839	3.945	4.665	4.826	4.737	4.765				
165				4.412	4.062	4.448	4.499	(Note: 11-15-51)							
185				3.869	3.681	3.818	3.938								
205				6.470	5.764	4.809	6.307								
225				6.891	6.111	6.729	7.008								
245				7.077	6.111	6.873	7.183								

Wt ratio of the Na, K, Mg & Cl
components of the brines to the
respective components in Port Le
Hunte sea water

Table No. 3. (The elements of Table 1, rearranged) 008

Depth (feet)			Wt ratio: Na / Cl			Wt ratio: Na / K			Wt ratio: Na / Mg			Wt ratio: Na / Br		
No 1	No 2	No 3	No 1	No 2	No 3	No 1	No 2	No 3	No 1	No 2	No 3	No 1	No 2	No 3
6	6	6	0.559	0.561	0.560	28.61	26.29	25.56	8.52	8.08	8.76	174	161	153
14	14	14	0.567	0.562	0.558	28.40	26.42	27.42	8.46	8.11	8.34	159	162	167
25	25	25	0.557	0.556	0.557	28.29	25.35	26.69	8.45	8.21	8.49	163	144	172
45	45	45	0.558	0.557	0.557	28.46	26.44	27.43	8.44	8.38	8.59	171	169	163
65	65	65	0.558	0.558	0.558	28.44	25.49	26.96	8.40	8.35	8.60	163	166	162
85	85	77	0.558	0.560	0.556	28.60	27.65	27.13	8.40	8.38	8.50	166	158	166
105	105		0.557	0.558		28.86	26.89		8.54	8.42		162	16	
125	125		0.557	0.557		28.53	27.35		8.54	8.30		162	166	
145	150		0.557	0.555		30.14	27.13		8.43	8.22		174	171	
165			0.556			30.48			8.27			170		
185			0.556			29.50			8.45			295		
205			0.581			31.51			11.22			180		
225			0.557			31.65			8.54			169		
245			0.558			32.50			8.59			173		

Table No. 4. (The elements of Table 2, rearranged)

Depth (feet)			Wt ratio: Na / Na _{sw}			Wt ratio: K / K _{sw}			Wt ratio: Mg / Mg _{sw}			Wt ratio: Cl / Cl _{sw}		
No 1	No 2	No 3	No 1	No 2	No 3	No 1	No 2	No 3	No 1	No 2	No 3	No 1	No 2	No 3
6	6	6	2.372	1.789	1.518	2.326	1.910	1.667	2.322	1.847	1.445	2.04	1.808	1.531
14	14	14	2.565	1.405	2.477	2.535	1.493	2.535	2.528	1.445	2.477	2.07	1.416	2.511
25	25	25	2.625	1.066	2.761	2.604	1.181	2.882	2.590	1.084	2.714	2.070	1.006	2.821
45	45	45	2.747	1.047	2.817	2.708	1.111	2.882	2.714	1.042	2.735	2.029	1.005	2.811
65	65	65	2.815	1.230	3.000	2.778	1.354	3.125	2.797	1.228	2.910	2.059	1.007	3.041
85	85	77	2.867	2.155	3.490	2.812	2.187	3.611	2.848	2.147	3.426	2.008	2.179	3.553
105	105		3.000	2.761		2.917	2.882		2.931	2.735		3.048	2.803	
125	125		3.000	3.891		2.951	3.993		2.931	3.991		3.048	3.959	
145	150		3.879	4.665		3.611	4.826		3.839	4.737		3.945	4.765	
165			4.412			4.062			4.448			4.499		
185			3.869			3.681			3.818			3.938		
205			6.470			5.764			4.809			6.307		
225			6.891			6.111			6.729			7.008		
245			7.077			6.111			6.873			7.183		

Quarterly Report on S.M.L.122 to December 16th, 1967

Investigational work, apart from that described in the report for the adjoining S.M.L.116, has been confined to planning a scheme for the development of a deep water berth on St. Peters Island, especially in relation to the capital cost of a possible loading berth for gypsum and salt, with provision also for grain, into bulk carriers having a berth depth of 50 feet.

The outcome of such preliminary studies have led to the need for finding high tonnage markets to justify the high capital costs. Brief discussion with South Australian Government officers have led us to believe that a deep water berth can be operated in parallel with the existing and planned facilities at Thevenard from where it may prove practicable to ship smaller tonnages pending the development of a deep sea berth.

At this stage no detailed harbour investigations are considered justified as in general the locality tentatively chosen for a berth seems to have the necessary attributes for a reasonably protected loading wharf.

In the next quarter it is hoped to report more fully on these studies which are continuing.

The investigation expenses are summarized as follows:-

Salaries and wages	\$550
Travelling Expenses and Sundries	<u>\$275</u>
Total =	<u>\$825</u>

Excludes Administration expenses.

Quarterly Report on SML.122 to March 16th 1968

The investigational work on SML.122 has been clearly related to that on SML.116 which has been concerned with the development of tonnage markets for gypsum, lime sand and salt, outside those which are catered for by the A.P.I. and C.S.R. with respect to building materials.

With the assistance of overseas consultants the latest technical information on the extraction of sulphur from gypsum is being assembled whereby it is hoped that it may be possible to set up a local industry to expand the use of gypsum other than in the construction material field.

It is the intention of the Company to fully support the research work on the process referred to in the SML.116 report as well as to evaluate other processes which have been developed overseas and are about to be exploited commercially.

It is the object of the Company's present work to further its research and market studies on tonnage uses for gypsum before further investigating the shipping facilities.

The investigational expenses may be summarised as follows:-

Salaries and Wages	\$1050
Travelling Expenses and Sundries	\$ 215
Total	<u>\$1265</u>

Excluding Administration expenses.