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COORDINATION OF GEOTHERMAL RESEARCH

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Geothermal Coordination Meeting of 20 January 1977

A meeting of the Geothermal Coordinating Group was held at the Victoria Geophysical Observatory on Thursday 20 January, 1977. Present were G.C. Rogers, L.K. Law, and R.D. Hyndman of V.G.O., J.G. Souther of G.S.C. Vancouver and A.M. Jessop of E.P.B., Ottawa. This report is a review of the current situation of 1976-77 projects and an account of conclusions reached concerning the use of funds in 1977-78.

Projects of 1976-77

Contracts let during 1976-77 were as follows:

	Subject	Contractor	Cost	
1.	Mapping of Meager volcanic centre	P. Read	$19,353	
2.	Geochemistry of Meager area	U.B.C.	$10,825	
3.	Age-dating of volcanic centres	U.B.C.	$ 8,000	
4.	Sedimentary basin study	Sproule Assoc.	$28,530	
5.	Magneto-telluric study	Ecole Polytech.	$ 9,000	
6.	Reconnaissance of Yukon and N.W.T.	Nevin & Assoc.	$15,000	(+bridge financing)
			$90,708	
	Balance			
7.	Balance at G.S.C.		$ 6,822	
8.	Balance at E.P.B.		$ 2,470	
			$100,000	

The current status of the projects is as follows:

1. Mapping of Meager volcanic centre. A progress report has been received. The Project will be completed by 31 March 1977.

2. Geochemistry of Meager area. A progress report has been received. The Project will be completed by 31 March 1977.

3. Age-dating of volcanic centres. Work is proceeding on schedule. The possibility of measurements of extra samples is being explored, to be financed by part of the balance at G.S.C.

4. Sedimentary basin study. Work is proceeding on schedule. Final report is expected in March.

5. Magneto-telluric study. Work completed. Report in French received: English version expected shortly. Payment has been authorized.

6. Reconnaissance of Yukon and N.W.T. Work completed and report received. Progress payments have been made up to limit of our commitment and final payment by D.S.S. has been approved.

7. Balance at G.S.C. The remaining funds will be used for the measurement of additional age-dating samples, for a start on item No. 2 of 1977-78 below, and possibly for a brief snow-cover survey to detect possible warm ground that may show through the abnormally light snow.

8. Balance at E.P.B. Remaining funds will be used to cover expenses incurred on trips by the coordinator to the West Coast and Calgary.

Aims for 1977-78

Some changes in the philosophy of approach to R and D in geothermal energy were agreed upon. The most significant was the acceptance of the concept of a contracted manager. The detailed investigation of the Meager Creek area is of interest to both B.C. Hydro and D.E.M.R. Both agencies have done research and exploration under contract, and both regard it as the best and most promising site for further studies. It was agreed that the best way to proceed would be for the two agencies to contribute to a single contract to a Geophysical investigator, who would in turn contract for the various specific surveys required. The purposes of this approach are:

1. to obtain exploration coordination from an industrial source in accordance with our "buy" policy;
2. to place the management of exploration of this specific site within a single agency;
3. to develop expertise in geothermal exploration in Canadian industry.

Further advantages of this approach are:

1. the Coordinator is based in Ottawa and the logistic and other local coordination inevitably falls on J.G. Souther;
2. it is undesirable to have both agencies letting contracts for work in the same location, particularly if it should happen that one contractor is working for both agencies;
3. in buying contract management we are relieving our manpower problems to some extent, in an activity in which our experience is small;
4. we are buying further scientific expertise to supplement our own.

The level of financial commitment recommended is K$100 from each government agency in the year 1977-78.

The manner in which particular surveys are to be specified in the contract must be discussed by the contracting agencies. A logical continuation of previous work should be incorporated, e.g. the magneto-telluric work done in 1976 should be extended to the immediate vicinity of Meager Mountain. It is anticipated that particular surveys will be done under sub-contract. In order to meet our objective of developing expertise in Canadian industry, Canadian companies should be used.

The division of funds between surveys should be approximately as follows: geological mapping (K$25), magneto-telluric surveys (K$25) geochemistry (K$5), shallow drilling (K$55), electrical resistivity (K$50) self-potential (K$10), surface temperature probing (K$5), management (K$25).

Outside the Meager Creek area some regional studies of the Garibaldi Volcanic Belt and other volcanic areas of the cordillera are required.

A study of the seismicity of the Garibaldi Volcanic Belt could be undertaken at a cost of K$5 for installation and operation in the first year and K$20 for the cost of two instruments. In view of the negative results from earlier work at Meager Creek and the presence of the WCTN, the Coordinator has decided that the cost is not justified by the probable gains.

A regional heat-flow study is required to support the magneto-telluric work done by L.K. Law between Britannia and Anderson Lake. This profile crosses the axes of volcanic centres in the Garibaldi Volcanic Belt and of hot spring activity in the Lillooet Valley. The objectives of this project is to determine the relative importance of the two axes in the location of potential geothermal reservoirs and to determine the extent and intensity of the thermal anomaly zone. It will be essential to choose good drill sites and to support the work by measurement of heat generation at E.P.B. Ottawa. It is difficult to find good drill sites in mountainous terrain, free from excessive topographic influence and disturbance by moving groundwater. It may be necessary to let a small contract to collect and summarize the information required for site selection. Other regional heat flow studies will be carried out in Chilko Lake and the fjords of the west coast as part of E.P.B.'s continuing scientific activities.

As a further broad regional study, a compilation and classification of all Tertiary rocks, volcanism and tectonic events is required. An intruded body of magma loses its heat over a period of about 10^7 years, but a study of a longer time period is required in order to provide an understanding of the continuing tectonic processes. This study will be started before the end of the current financial year.

Further work in age-dating of volcanic centres is required to follow the successful project of 1976.

In addition to the regional and localized studies of geothermal energy sources, some attention should be paid to possible uses. It is therefore proposed to let contracts for two feasibility studies. The first of these will be directed towards the use of known springs and sources of hot water and the uses to which they might be put, including space heat, fish breeding, forestry, agriculture and water supply. The second will be directed towards the use of high temperature sources on the sea floor, as are found on the Juan de Fuca Ridge.

The feasibility of use of water from sedimentary basins may be an appropriate subject of study, depending on the results of the study now in progress.

Development of measurement techniques is not an important part of our activities for 1977-78, except where unique requirements in the Canadian terrain can be demonstrated. It was agreed that the testing of the Geoprobe should be carried out at the same sites in the Lillooet Valley that were occupied in the magneto-telluric survey of 1976. This is the experiment that was originally intended for July 1976, but was delayed by late completion of the equipment. The further use of this instrument should not be included in the main stream of Meager Creek

investigations until the results of this first test are known. The unsolicited proposal now under consideration for the further development of the instrument should not be supported from geothermal energy funds, at least until the present instrument has been thoroughly proved and the need for the more sophisticated version is demonstrated.

Allocation of funds

The allocation of funds for 1977-78 was determined as follows. This allocation is subject to the proposed agreement between B.C. Hydro and D.E.M.R. and to final prices agreed between D.S.S. and contractors.

		Units of $1000
a)	Detailed assessment of Meager Creek	
	1. A continuation of the geological and geophysical surveys of the Meager Creek thermal area. A cooperative programme between B.C. Hydro and D.E.M.R. Total cost K$200, D.E.M.R. share 50%.	100
b)	Regional studies	10
	2. A compilation and review of Tertiary rock and events. If the paper work can be done in time part of this study will be done and paid for before the end of the current financial year, thus using the balance of funds remaining in G.S.C.	
	3. Regional heat flow in the Garibaldi Volcanic Belt and the Lillooet Valley.	55
	4. Age-dating of volcanic centres	10
c)	Feasibility studies	
	5. Use of known spring waters	10
	6. Use of high temperature sources offshore	5
	7. Use of hot water from sedimentary basins, subject to results of study now in progress	35
d)	Equipment development	
	8. Testing of Geoprobe	20
	Total	245

Collections of documents

There has been no disagreement from any source with the memorandum of 1st December 1976 that established the principle to be observed in maintaining collections of documents related to geothermal energy in Canada. Complete sets of all documents should be maintained in the libraries of E.P.B. Ottawa, G.S.C. Vancouver and by the Geothermal Coordinator. These collections should now contain:

1. Geothermal Series No. 4 - the original proposed geothermal programme.

2. The first Sproule report on sedimentary basins.

3. Geothermal Series No. 8 - Geothermal Energy from Sedimentary Basins.

4. Report on the reconnaissance in the Yukon & N.W.T. by Nevin & Assoc.

5. Report on magneto-telluric survey by Becker & Assoc.

6. Preliminary report on geological mapping by Read.

7. Preliminary report on geochemical survey by Hammerstrom & Brown.

8. Geothermal Energy Progress Report No. 1. Int Report 75/1

Item 2 is not available in sufficient numbers and extra copies will be obtained by A.M. Jessop.

Item 5 is not yet received in English.

Item 6 and 7 have been published in Report of Activities G.S.C. Paper 77-1.

Internal progress reports

It is essential that annual progress reports be compiled to inform Departmental Management and other interested parties of the use of special funds and the progress made. Each contract manager or involved scientist should write a brief statement summarizing the aims and conclusions of the projects under his care. Statements should not normally exceed two typewritten pages per project or contract. The coordinator will write an introductory statement and will compile the whole report. Deadlines agreed to are as follows:

Coordinators introductory statement circulated by 15 February 1977

Individual statements sent to coordinator by 1 March 1977

Next meeting

The Coordinator expects to be in Vancouver at the time of the G.A.C. meeting, which includes an important geothermal symposium. It would be advisable to hold a meeting immediately after the G.A.C. meeting, on Thursday 28 April 1977. Discussions with B.C. Hydro may necessitate an earlier visit by the Coordinator to Vancouver.