Geothermal Energy

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COORDINATION OF GEOTHERMAL RESEARCH

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Division of Seismology and Geothermal Studies
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During the period 14-22 May 1981 A.M. Jessop visited Victoria, Vancouver, Regina, Brandon and Winnipeg, and on 3-4 June both M.J. Drury and A.M. Jessop visited Halifax, these visits being made for the purpose of confering with colleagues in the geothermal energy programme and of promoting the search for geothermal energy in new areas.

Winnipeg

The coordinator visited the offices of Canertech on the morning of 14 May, and spoke to Mr. R. Bevis, Vice-President. The conversation consisted of a review of the main directions of geothermal energy research in Canada and elsewhere and histories of the two demonstration projects at Mt. Meager and Regina. Canertech have no current plans to enter the geothermal field, but future activities are a possibility.

Vancouver

On 15 May the Coordinator visited the offices of the British Columbia Hydro and Power Authority (BCH) and spoke to Mr. J. Stauder. The Mt. Meager work is progressing well, with enthusiastic support from the management of BCH. It is gratifying to see that, after seven years of GSC and EPB work at Mt. Meager, either alongside or in direct cooperation with BCH, and after several times reviving the flagging interests of BCH, the project now enjoys full commitment on the part of BCH.

Further diamond drilling has been going on since March, in order to obtain further data on shallow temperatures. The contract for the large drilling has been let to Westburne Drilling Ltd., of Calgary. The company has personnel of experience in geothermal drilling in the USA. The rig is to

arrive in late June, to a cleared site of approaching one acre in size, and it is hoped that drilling will commence during the first week of July. A geothermal drilling consultant has been contracted from Kingston, Reynolds, Thom and Allardice Ltd (KRTA) of Auckland, New Zealand. KRTA have long experience in geothermal development in New Zealand, the Philippines, and other countries, and we consider it to be very wise of BCH to obtain consultants of this quality.

On 19 May, the Coordinator visited J.G. Souther at the offices of the Geological Survey of Canada. Plans for field operations at the eastern end of the Anaheim Volcanic Belt are well advanced. This is a large GSC operation, receiving support from the geothermal energy programme because of the clear possibility of anomalous thermal conditions in the crust. However, the energy programme support is a small component of the total operation.

Work at Mt. Cayley will not proceed this year. Although it was originally included in plans for 1981 after successful reconnaissance work in 1980, it was cut out when the NEP geothermal submission was drastically reduced. At that time, late in the planning process, elements to which we were already committed, either as continuations of 1980 elements or because operational preparations were under way, were given priority for 1981. This has resulted in a somewhat unbalanced programme.

Note added later: supplementary funds provided by OERD will now permit a drilling programme at Mt. Cayley.

Regina

On 20-21 May the Coordinator visited L.W. Vigrass at the University of Regina. The Dept. of Mathematics has undertaken some finite-difference numerical analysis of water flow in an aquifer system as driven by a

production-injection pair of wells. Simple potential-theory analysis has shown that a distance of 1.2 to 1.6 km is needed for the two wells, but the individual aquifer layers within the basal clastic unit will balance in different ways. Some time was spent discussing the physical properties needed for true numerical representation of the aquifer formations.

A site has been selected for the second well at a distance of 1.6 km from the first, almost due south. It is planned to drill the well late this year, after final release of the funds and after the necessary permits etc. have been obtained.

The question of the use of the heat was discussed, including briefly with Dr. Barber, the President of the University. The University managers have decided that since they do not yet have approval by the Saskatchewan Universities Commission for their proposed athletic and sports faciity, and since such approval is not imminent, an alternative use of the heat is needed in order to fulfil their obligation to set-up a demonstration project. It has been proposed by Prof. Vigrass, after consultation with University maintenance staff, that the heat should be used in the following ways:

1. Space heating of Maintenance Building, which is not connected to the main campus system;
2. Space heating of Student Union Building, also not on the main system;
3. Winter heating of boiler make-up water;
4. Indirect process heat in Physical Education Building, including swimming pool;
5. Domestic hot water for entire campus.

The energy usage estimates for these five uses are as follows:

	Energy usage 10 kJ/years	Est. load kW (thermal)
1. Maintenance Building	4.2	240
2. Student Union Building	4.2	240
3. Boiler make-up	6.2	355
4. Phys. Ed. Bldg.	5.4	210
5. Domestic hot water	44.4	1425
Totals	64.4	2470

The potential saving of natural gas at $2.00 per thousand cubic feet is about $121,500 per year. The probable seasonal load factor is high, about 70%, because the largest load is for hot water, a relatively uniform load. C.W. Blachford, Dean of Graduate Studies said in a memorandum to Dr. Barber:

'The disadvantage to this approach is that we do not have an obvious physical building which we can point to for the PR value. However, we should be able to assure the governments that the next building on the campus will be heated with geothermal water should our initial experience prove satisfactory'.

Brandon

On 22 May the Coordinator visited Prof. H. Young of the University of Brandon to discuss the apparent temperature anomalies in southwest Manitoba. Prof. Young was interested in the topic, and would like to take part in data compilation and mapping activities.

A Review Meeting

During the past month, the Coordinator has discussed with several people the possibility of holding a review meeting of the Geothermal Energy

Programme. It is proposed to hold this meeting in March 1982, at the Earth Physics Branch, Ottawa. It is anticipated that the meeting would include comprehensive reviews of activities in the four projects by the project leaders, reviews of the two demonstration projects, Mt. Meager and Regina, by J. Stauder and L.W. Vigrass, and more technical statements as appropriate. Participants will include EMR scientific personnel, representatives of Provincial Governments, Utilities, Universities and Contractors, as appropriate, and members of OERD, CREB and the National Research Council ERDP.

The objectives of the meeting are to subject projects to peer review, to present a comprehensive picture of the work to our administrative colleagues, and to generate enthusiasm in the Provinces.

A draft agenda and invitation list will be drawn up during the summer, for discussion by the key personnel.

Dartmouth

A meeting of people concerned with or interested in the programme of assessment of the geothermal energy potential of Atlantic Canada was held in Dartmouth, N.S. in the morning and afternoon of 03 June, 1981. Dr. M.J. Keen, Director of the Atlantic Geoscience Centre, Bedford Institute of Oceanography, kindly arranged for meeting room facilities at the Institute. Thirteen people, excluding the two EMR Ottawa representatives, had been invited to attend, in order to have input from federal government scientists, provincial government programme administrators and scientists, and scientists from universities and industry. All had indicated that they would attend the meeting, but only eight of the thirteen actually did so. The provincial government administrators did not attend, on the assumption that discussions would be mainly on technical matters relating to the scientific aspects of the

assessment programme. A draft record of the meeting is attached (Appendix I). Some aspects of the meeting deserve comment. Firstly, the authors feel that it was unfortunate that no energy programme managers from any of the four Atlantic provincial governments attended, but technical personnel from three of the provinces were present and such people are probably more essential at the present stage of the programme.

Secondly, it is the authors' opinion that the proposal for DREE funding of a geothermal energy research programme put forward by representatives of the Government of New Brunswick is on too large a scale at present. Their planned programme should consist of a series of conditional steps rather than an immediate large-scale effort.

Appendix 1

Panel on Geothermal Resources of Atlantic Canada

'POGRAC'

DRAFT RECORD

Meeting of 3 June 1981 at

Atlantic Geoscience Centre, Dartmouth

A meeting was held at the Atlantic Geoscience Centre, Darmouth, on Wedneday 3 June 1981, to discuss the future of research into geothermal energy resources in Atlantic Canada. Scientists from universities, federal and provincial governments, and the consulting industry were present, but no programme administrators from the provincial governments were able to attend.

The meeting was convened by M.J. Drury, Earth Physics Branch, Energy, Mines and Resources Canada. Drury opened the meeting by welcoming those present and asking each person to identify himself and his affiliation. Drury continued to act as chairman.

1. Opening remarks

The chairman explained that the meeting had been called in order that both scientists and administrators from federal and provincial governments could discuss their plans for future work in assessing the geothermal energy resources of the Atlantic region. As only scientists were present, it was necessary to restrict discussions to technical matters, but it had previously been hoped that discussions would be on not only what scientific work was still required, but also on what degree of involvement the provincial

governments would be willing to undertake. The chairman explained that a small contract had been completed in F.Y. 1980-81 to compile existing data and acquire new data in Nova Scotia and Prince Edward Island. A similar contract for work in New Brunswick had attracted no bids because of its small size.

2. Present Status of the work

The chairman asked A.M. Jessop to provide a brief overview of our other geothermal interests and activities in Canada. The purpose of this was to set the scene in terms of the types of resource that might be found and those that certainly will not be found in Atlantic Canada. The chairman then reviewed the report that arose from the contract in F.Y. 1980-81 to John A. Leslie and Associates Ltd., Bedford, N.S. He pointed out the problems caused by the lack of relevant existing data and the difficulties involved in acquiring new data. At a meeting in Halifax in September 1980 W. Potter of the N.S. government had indicated that the province would seriously consider the possibility of having temperature logs run under contract at the same time as other geophysical logs in the holes drilled under the provincial minerals exploration programme. The Nova Scotia Research Foundation currently does such geophysical logging, and their representative said, in September 1980, that they would be willing to acquire a temperature probe if the province requested that temperature logs be run as part of the geophysical logging package. Nova Scotia regulations require that exploration holes be cemented in as soon as borehole logging is completed, and so the only means of obtaining temperature data from new holes is as part of the standard logging or by making a series of bottom-hole temperature readings during drilling. D. Keppie reported that the NSRF (whose representative did not attend the meeting) had now decided that they did not wish to acquire a temperature

probe. Mr. Keppie was unable to give the province's view on this decision as he is not concerned with their energy programme management, although he said that the province is still interested in the work.

J. Chandra reported that he was preparing, for the N.B. Department of Natural Resources, a request for $1,000,000 over five years from DREE for a geophysical study to determine the geothermal potential of a small area bounded by the Pokiok and St. George Batholiths and encompassing the Marysville Sub-basin, which has a maximum basement depth of less than 2 km.

J.A. Wright was the only representative of Newfoundland, and hence no policy position for the Newfoundland government was forthcoming. He reported that there is still some drilling going on in the province, from which temperature data could be obtained.

3. Future work

The chairman pointed out that one of the requirements for the assessment of geothermal potential of sedimentary basins is a good knowledge of basin hydrology. L.P. Peters felt that little was known of the New Brunswick basins on a regional scale, but that studies suggested that groundwater circulates in small, localised patterns rather than in a gross regional way as is found in the Western Sedimentary Basin. C. Lin has been doing some modelling of the hydrology of some N.S. basins, and he feels that much the same kind of very local circulation is occurring there. The general conclusion was that much more hydrological information is needed, particularly in New Brunswick. The N.B. Department of the Environment would be interested in doing such a study if both funds and manpower were available.

A great deal of discussion was given to how the work that will be done for EMR will be contracted. It was unanimously agreed that by far the best

approach would be for one master contract to be let. This could be broken up by the contractor into sub-contracts, making use wherever possible of local people with their detailed local knowledge. It was also agreed that the first two data collection phases of the work, modes A and B as were used in Leslie's contract in 1980-81, should be considered as inseparable. These phases are for the compilation of existing data and the acquisition of new data on an opportunity basis.

The chairman and A.M. Jessop described EMR's plans for future work. Jessop, as coordinator of the federal government's activities in this repect, said that limited funding was available for extension of the work into New Brunswick and Newfoundland in F.Y. 1981-82. D. Keppie said that the N.S. government was giving consideration to employing a person to collect a relevant data base that would include temperature logging and heat generation measurements on core samples. He indicated that analysis of such data would probably be done by others, and asked for suggestions. Jessop said that it would be appropriate for the universities to do this work.

J.A. Wright said that Shell had put forward a proposal to drill a deep hole (4 km) in the Deer Lake Basin, in Newfoundland, to complement seismic studies of the basin. He expressed an interest in making temperature measurements in holes currently being drilled by mineral exploration programmes.

4. Future of the group.

The chairman asked those present if they felt that the meeting had served a useful purpose. There was general agreement that it had, and it was agreed that the group should meet again later in the year, probably in October.

Invited participants
(* indicates attendance)

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