Geothermal Energy

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# COORDINATION OF GEOTHERMAL RESEARCH

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Following the visit of the authors to Halifax and Fredericton in March 1980, no action was taken by either Nova Scotia or New Brunswick to begin a programme of geothermal energy research. Consequently, with the knowledge and approval of the Provinces concerned, the authors prepared specifications for two contracts, one for Nova Scotia (NS) and Prince Edward Island (PEI), and the other for New Brunswick (NB). The Department of Supply and Services combined them into one request for tenders, in two parts. The specifications were technically identical to the statement drawn up in March. The Nova Scotia Research Foundation (NSRF) was not invited to bid, on the grounds that they are not a commercial corporation. This removed from the competition the only organisation known to be competent to carry out the work.

One bid was received for the NS and PEI portion, but no bid was received for the NB portion. The solitary bid came from John A. Leslie and Associates Ltd., a one-man consultant company, based in Halifax.

## PROCEEDINGS IN NOVA SCOTIA

### Meeting with Mr. Leslie

A brief meeting was held between the authors and Mr. Leslie at the Lord Nelson Hotel on 3 September 1980, in order to discuss Mr. Leslie's proposal. The proposal had been designed to fit into the price estimated by E.M.R., but it did not include any provision for costs of data acquisition. Mr. Leslie agreed to submit a revised proposal after he has obtained information on logging prices from NSRF and others. It was recognised that the amount of data that it will be possible to obtain is totally unpredictable and that the total cost estimate will be based on rather speculative assumptions. However, the unit costs will be known and the contractor will have to adjust his work within the maximum cost

agreed to.

Meeting with Provincial Government Personnel

A meeting was held at the offices of the Nova Scotia Dept. of Mines and Energy (NSDME). Present were W. Potter (NSDME), N. Hall (PEI Dept. of Tourism, Industry and Energy), D. Rankin (NSRF), J. Leslie, and the authors.

A project steering committee was appointed to guide the course of the work and to ensure good communications between the three governmental agencies. This committee will consist of M.J. Drury, the Scientific Authority for E.M.R., W. Potter (NSDME) and N. Hall (PEIDTIE). Any persons having relevant technical expertise may be invited to take part in meetings of this committee. The only person in Halifax with any significant geothermal experience is D. Rankin. However, since NSRF operates in a commercial style, any time he spends attending meetings will have to be paid for. It was agreed by the EMR representatives that the revised proposal should include provision for sub-contracting of consultants.

Since NSRF have a large part of the well-logging business in Nova Scotia, they are a key factor in the second part of the contract - the acquisition of new data. D. Rankin pointed out that NSRF do not have a temperature tool for their logging system, but they are willing to acquire one if the prospective revenues from its use can justify the capital expense, which is estimated at $5000. W. Potter stated that NSDME expects to sponsor about 20,000 ft. (6000m) of drilling in the next year, and that in cooperation with the geothermal programme, they intend to require temperature as part of their logging. Furthermore, it was considered probable that NSDME would cover any remaining part of the capital cost of the tool, should the geothermal programme come to a premature end on 31 March

1981 i.e. should the Province not continue the programme under its DREE arrangements. With other use under the contract under discussion and by exploration companies, this seemed to be enough to justify the acquisition of the tool by NSRF.

The timetable was agreed as follows:

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| Signing contract | - | by 30 September |
| Meetings of committee | - 1. | late October or early November |
| | 2. | mid-term |
| Report | - | by 31 March |

A lengthy discussion followed on possible sources of data, sources of advice and information on geology and crustal structure of the research area, sources of laboratory measurement of heat generation and thermal conductivity of rocks, and the probability of cooperation by exploration companies in the data acquisition activities.

Much of the data from offshore oil and gas exploration is on file at the Eastern Petroleum Geology Section of the Atlantic Geoscience Centre. Onshore data is in Provincial files.

When seeking cooperation of exploration companies it will be made clear to them that thermal data will be provided to both Federal and Provincial Governments as well as the cooperating company. For reasons of commercial secrecy it may not be possible to publish the full data collection.

Meeting with D. Rankin

The authors held a brief informal meeting with D. Rankin of NSRF on 4 September 1980. The management of NSRF has accepted the justification for the temperature tool, and an order will be placed as soon as possible. Acquisition is expected to take two months, and the tool is expected to have a precision of about 1K. The authors will look into the possibility of lending a set of EPB heat flow equipment to the contractor, in order to fill this two-month waiting period and to provide the capability of high-precision temperature measurement.

## PROCEEDINGS IN NEW BRUNSWICK

Logging of existing wells

The authors had, before leaving Ottawa, sent a set of well logging equipment to the laboratories of the Dept. of Natural Resources (NBDNR). On arrival, this equipment was unpacked and an attempt was made to log six deep (nominally 300m) holes, drilled as part of the Provincial Carboniferous Project of 1977-78. Of the six holes, two were successfully logged to a reasonable depth, three were partially logged, due to severe water flow or blockage, and one was found to be destroyed. J. Chandra of NBDNR and K. Burke of University of New Brunswick were present at one hole, and the techniques of precise temperature logging in boreholes was demonstrated to them.

All the six holes were in the sedimentary rocks of the triangle Oromocto Lake-Shediac-Bathurst. Preliminary interpretation suggests that there is a great deal of water movement in the upper 300m of the sediments, particularly in the area between Grand Lake and Richibucto, but the holes were not open to sufficient depth to detect the lower limits of this flow. It is so far impossible to say to what

depth temperatures are controlled by lateral water movement rather than by vertical conductive heat flow. Two holes in the Fredericton area were free of strong effects of water movement, and these showed temperature gradients slightly lower than are found at Regina.

Visits to Provincial Personnel

The authors visited D. Gemmell briefly, both before and after the logging operations. He was helpful in making the holes available and in directing us to other members of NBDNR who could be of more specific assistance.

D. Ball, drilling manager, provided information on the precise location of the wells, and also provided access to NBDNR data files. Some data is to be copied and sent to the authors to supplement their own data. Rock samples will also be made available.

J. Chandra, of the Soils and Mineral Laboratory, expressed considerable interest in the geothermal project. He has been mapping the airborne gamma-ray data for New Brunswick, and he has a data file that can readily be made to produce a map of heat production of surface rocks. This will be very useful in the search for hot dry rock in the granitic plutons. With K. Burke (UNB), Mr. Chandra will prepare a draft proposal for a geothermal project, intended as a Provincial submission for funding by Federal-Provincial sources. We have thus located a source of technical enthusiasm in New Brunswick, which we hope to be able to lead towards an active geothermal project.