Dr. Jessop

Geothermal Energy
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COORDINATION OF GEOTHERMAL RESEARCH

Alan M. Jessop

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Crustal Studies
Division of Gravity, Geothermics & Geodynamics
Earth Physics Branch
Department of Energy, Mines & Resources

Parts of this report were written before the announcement of budget cuts on 8 November 1984. In order to show the thinking and intentions at the time, these parts have not been changed, but the reader should combine them with a reading of the final section, which attempts to draw together coherent thoughts on a future after the cuts.

During the time period covered by this report outside interest in geothermal demonstration projects has increased significantly. This was regarded as providing the opportunity and need to implement a change in the direction of the Programme towards applications and away from earth-science. It was expected that this change would be a gradual process over two years, with a change of over-all coordination of the Programme in the direction of the engineering component in the Division of Mechanical Engineering of NRC.

In order to present clearly the current situation in each of the specific demonstration projects, this report will begin with an account of each of them separately, rather than a time-ordered account of the Programme as a whole.

Moose Jaw.

On 4 April, 1984 the Coordinator was visited at the Earth Physics Branch by Lois Epp, CREO for Saskatchewan. The municipality of Moose Jaw had expressed interest in restoring the geothermal supply to an indoor swimming pool, known as the Natatorium, that has been popular since 1932. The pool was originally fed by water from a Jurassic aquifer through a well that was drilled for gas. The water is reported to have had a temperature of about 40°C and a salinity of about 8000 ppm, mainly of sodium chloride. The well produced about 13 m^3/hr by artesian flow. In 1952 the casing of the well rotted away and the flow stopped. During the time of geothermal supply the pool was a tourist attraction and the town officials would like to restore this situation. In addition they see potential applications for a deep well, as at Regina, for heating buildings.

The Coordinator commented that there are two distinct projects here. Whereas the pool needs water from a well that is about 1000m in depth, the heating of buildings will depend on a well to the basal clastic unit at about 2000m depth. Water from the shallower aquifers will be at a lower temperature but much less saline than the deeper water. Separate wells would be needed for the two aquifers, but disposal may be possible through one well only.

Since most of the people involved in sedimentary geothermal energy research were to be in Regina for the Energex symposium on 17 May, it was agreed that Mrs. Epp would attempt to set up a meeting with representatives from Moose Jaw on Friday 18 May, the discussion to include a description of the proposed projects, sources of government funding, and sources of technical help and advice.

At the meeting in Regina on 18 May Mr Andre Gate and Mr H. Taylor presented the ideas for geothermal applicaion at Moose Jaw, and these are

summarised in Appendix 1. In addition to providing the water supply for the Natatorium, the library and the YM-YW building could be heated by geothermal water. It was agreed that a feasibility contract, to examine the possible sources, possible loads, the means of application and the costs involved was needed. This falls within the mandate of the Geothermal R & D Programme, and was expected to cost about $40,000. It was optimistically estimated that the contract for this could be let by the end of July, and completed by the end of September.

The contract was finally let by Dept. of Supply and Services to Acres Consulting Services Ltd. of Vancouver, in mid-November. A meeting was held at Moose Jaw on 21 November between representatives of the City of Moose Jaw, the federal government, and the contractor. The Coordinator and Lois Epp, CREO for Saskatchewan attended for EMR, B. Larkin attended for NRC, and Richard Cousins attended for the contractor, accompanied by Brian Fairbanks of Nevin Sadlier-Brown, Goodbrand Ltd. geological sub-contractors.

As detailed discussion on the possible source reservoirs, the possible loads, sources of information on energy usage for the various loads, and the scope of the contract filled the morning. After lunch a brief press-conference was held for the benefit of the local journalists and radio reporters. After this the contractor began to collect the information necessary for the contracted study. A final report is expected in March.

Edson, Alberta

On 10 April 1984 the Coordinator attended a meeting called by the town of Edson for the purpose of reviewing the potential for geothermal heating of a range of facilities and buildings at Edson. David Jones, Town Manager of Edson, acted as chairman of the meeting, which was attended by representatives of Underwood MacLellan, engineering consultants to the town, the University of Alberta, Sproule Associates Ltd., geological consultants, and federal and provincial governments. The record of the meeting, provided by the town, is attached as Appendix 2.

The Town was sufficiently encouraged by the meeting to prepare a proposal for a feasibility study, which was delivered by Mr Jones on the occasion of his visit to Ottawa on 10 May. On that occasion he met with P. Dyne, deputising for K. Whitham, J. Legg, M. Drury and the Coordinator. The proposal included both geological work to identify target aquifers and predict characteristics, and engineering work to identify the most suitable loads and to perform an economic analysis. It was decided to let a contract for this study, jointly funded by the NRC and EMR parts of the R & D Programme, the technical authorities to be B. Larkin and A. Jessop. The contract was let in late August, and was expected to be completed late in the year, but the final report had not been received by 31 December.

A public information meeting was held at Edson on 9 August, to describe to the audience the nature and uses of geothermal energy and the prospects for Edson. B. Larkin and A. Jessop spoke on the engineering and earth-science aspects, the B.C. Hydro film was shown, and questions from the

audience were answered. The meeting attracted interest from the local and the Edmonton press and the CBC. It was attended by the J. Hill, CREO for Alberta, and representatives of the University of Alberta and Underwood MacLellan, consultants to the Town. It was generally agreed that the meeting was successful in presenting the project to the public.

A draft report of Phase 1 of the feasibility study was presented by the contractor to the Economic Development Committee of the Town on 10 December, and a meeting to discuss the next phase of the project is expected to be called during the winter.

Vancouver, 11 April 1984.

The Annual General Meeting of the Canadian Geothermal Resources Association was held in Vancouver on 11 April. A new board of directors was elected, and it was decided to change the name of the organisation to Canadian Geothermal Energy Association, to reflect the fact that it is concerned with all aspects of geothermal energy and not just with the search for and description of the resources. This meeting was a revival of the organisation, which had been inactive for about four years, except for a newsletter compiled by T. Lewis of the Earth Physics Branch (Sidney, B.C.). A technical session followed the business meeting.

The Association remains small, and its activities will probably be confined to publishing the regular newsletter and providing information on geothermal energy, including possible maintenance of a collection of illustrative material and lists of speakers for informational talks. T. Lewis of EPB will continue to compile the newsletter.

Calgary, 12 April 1984.

On 12 April the Coordinator and M. Drury visited Page petroleum Ltd. and met Mr Henning Lies. A temperature log in a well drilled by Page Petroleum in the Dodsland field was reported in the previous coordination report (Internal Report 84-6). The purpose of this well was to obtain hot saline water from the basal clastic unit for enhanced oil recovery by water injection in the Viking formation. This project is now in operation, with water being produced from this one well and being injected into three wells.

The present well is limited by its 229 mm casing and the size of the pumnp that can be installed within the casing to a flow rate of about 50 m^3/hr. A second well is planned, at a site 12 km to the east, that will produce up to 250 m^3/hr. This second well will be drilled in the winter of 1984/85.

The temperature of the water in the basal clastic unit is about 60°C and the salinity is about 320,000 ppm, mostly sodium chloride.

Cincinatti, 15 May 1984.

On 15 May the Coordinator met with US scientists in Cincinatti to discuss the subject of geothermal mapping for scientific purposes. It was recognised by all that the mapping of sedimentary basins is a special

problem and does not respond well to the old idea of regional heat flow purely by conductive transport. During the discussions it was proposed that a workshop on geothermics of sedimentary basins in North America should be held, possibly at a conference centre owned by Southern Methodist University in New Mexico. Such a workshop would be of great value to government, University and industry scientists seeking to delineate the geothermal resource beneath the Prairies. The Coordinator will attempt to provide further information as it becomes available to all that might be interested in attending such an event.

Regina, 17-18 May 1984.

The Energex-84 Coference at the University of Regina included a one-day symposium on geothermal energy. Many of the papers were the direct result of work done under the Geothermal Energy Programme. The list of papers is attached as Appendix 3. This event provided an excellent opportunity for those involved in research in the sedimentary basins to meet and present their results and conclusions.

Mine air heating

Potash mines in Saskatchewan use large amounts of heat to control the temperature of the air being driven down the shafts. The conventional method of maintaining a temperature of 20 to 25 C is to burn natural gas directly in the air-stream. The purpose of the temperature control is the avoidance of stresses in the shaft lining due to large temperature changes. Geothermal energy is a much more suitable way to provide large quantities of low-grade heat, and so a study was commenced to investigate the feasibility of substitution. The study was divided into two parts, to be let in two separate contracts: an engineering and economic analysis and a geological assessment of the potential aquifers.

In October, at an early stage of the economic analysis it was found that the royalty and taxation system in Saskatchewan makes innovation of this kind economically unattractive. It was thus seen that installation of a geothermal system, with its capital-intensive nature would not be undertaken by any company, even if the real before-tax savings were substantial. The engineering-economic contract has been reduced in scope accordingly, and the geological contract was not let, although the tenders by potential performers were in the hands of the Coordinator.

Atlantic Region

Contracts and results in the Atlantic Region have been described in an earlier report (84-16) by Drury. Temperature gradients in Prince Edward Island seem to be uniformly low, and it is not intended to proceed further with gradient measurement through drilling. Active investigations are continuing in the Stellarton area and in the Fredericton graben. During the last quarter of 1984 a hole was to be drilled in a granitic batholith in southern Nova Scotia, as a test of the ability of the airborne gamma-ray survey to predict high gradients. This process did not show encouraging

results in New Brunswick. The hole in Nova Scotia is a financially shared project with the A-base scientific programme, and the results will be used by both programmes.

Later note - the hole was drilled in the Wedgeport granite in January 1985.

SPONGE

The Sedimentary Panel on Geothermal Energy (SPONGE) has not met in 1984. The last meeting was a public meeting in November 1983, at the Institute of Sedimentary and Petroleum Geology (ISPG) in Calgary. A meeting is planned for early March 1985, to discuss current progress in temperature gradient and temperature mapping, modelling of water-flow profiles, and future cooperative work under the Northern Energy Programme and the Frontier Geoscience Programme. As the mapping in the Prairies is completed, the work will continue in northeastern British Columbia and northwards in the Mackenzie Valley. The interest of the Geothermal Energy Programme will decline, in favour of the other Programmes, but a smooth transition must be worked out.

APPENDIX 1

GEOTHERMAL PROJECT CITY OF MOOSE JAW

BEDROCK WATERS

In 1910 a deep well was bored at a point about eighty feet from the power house in the hope of locating natural gas. On reaching a depth of some twelve hundred feet the drilling was temporarily abandoned on account of the heavy flow of water encountered. This water is saline and by itself not potable.

The use of the raw water from the infiltration gallery, from the gas-well, and from Moose Jaw Creek should be discontinued for domestic purposes at the earliest possible moment.

The deep well at the Power house, Moose Jaw, extended to a depth of 3,302 feet. No important flows of water were found until a depth of about 900 feet was reached. A flow of water amounting to about 4,000 gallons per hour was obtained at 980 feet and somewhat larger flows at greater depths. The water flowing from the well in August 1930 had a temperature of 60°F. and probably comes from a depth of about 1,000 feet. The water from a depth of 2,950 feet is said to have had a temperature of 81°F. According to an analysis of the well water made in 1928 by the Provincial Laboratories, Regina, for the city of Moose Jaw the water contains 6,280 parts per million of soluble salts consisting chiefly of sodium chloride or common salt.

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In 1981 the City's Energy Conservation Committee, having heard of the work of Dr. Lawrence Vigrass at the University of Regina began considering the possibilities of bringing back the well. Two thoughts were in mind: - the escalating high energy costs, - and the tourist attraction concept.

Several meetings were held and then due to lack of funding and the extended illness of the chairman the work of the committee lapsed.

The new committee is now geared to proceed.

Heating costs of the Natatorium are still rising. A year's summary is attached. The YM/YWCA heating bill for December, 1983, was $1,316.00. It is an acknowledged fact that such a project as contemplated would drastically reduce costs. (See attached clippings).

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Again, we would point out the natural tourist attraction such as a "Spa" would provide for people from the North American Continent to say nothing of European visitors who are well acquainted with such facilities.

The projected cost would be in the neighbourhood of one millions of dollars. We attach a summary of projected costs in 1981 dollars.

Another advantage of this project is that no major construction would be required as the existing structures i.e. the Natatorium Complex and the adjoining YM/YWCA would make an ideal pilot project and practical demonstration site for the U of R's research in the field of Geothermics.

The indoor pool would utilize water directly from the well acting as a Mineral Spa. In addition, the outdoor pool, the Natatorium, and the YM/YWCA would be heated by a heat exchanger system.

Today's technology will permit us to circumvent the problems encountered in the 1930's and because the University of Regina Energy Research Unit has endeavoured to be an active participant, we feel confident of the success of this project.

The obvious benefits:

A. Educational - as a geothermic demonstration centre for students and the public.

B. Utilization of an alternate and renewable source of energy in place of the current use of fossil fuels.

C. Revitalization of a Unique Prairie Spa and Tourist Attraction.

H.E. Taylor

Ald. Herb Taylor
Chairman
City-Wide Energy Committee

APPENDIX 2

MINUTES OF SPECIAL MEETING OF THE ECONOMIC DEVELOPMENT COMMITTEE HELD IN THE COUNCIL CHAMBERS, EDSON CIVIC BUILDING, ON TUESDAY, 10 APRIL 1984.

PRESENT: Economic Development Committee

Duane Catterall
Dennis Conerroe
Jerry J. Doyle
Clarence E. Joly
David G. Jones, Coordinator
Ernie Mushtuk
Gerry Schoettler

Alberta Energy & Natural Resources

Juergen K. Kleta, Director
Energy Conservation & Renewable Energy Research

Energy, Mines and Resources Canada

Alan M. Jessop, Ph.D. - Earth Physics Branch

Erwin Kilotat, P.Eng. - Head, Project Management
Conservation and Renewable Energy, Edmonton

Lavender Management Services Ltd.

Grant Falkenberg

St. John's Hospital Complex

Leslie B. Halliwell, Administrator

Sproule Associates Limited

H. A. Gorrell, P.Geol. - Director/Corporate Secretary

Town of Edson

Ronald J. Linford - Mayor
Charles R. Ward - Superintendent of Public Works
Jack Andrews - Superintendent of Recreation, Parks and Culture

Underwood McLellan Ltd.

D.G. Gilbertson, C.E.T. - Manager Hinton District
D.J. Phelps, M.Eng., P.Eng. - Head
Geotechnical Department

University of Alberta - Department of Geophysics

Prof. F.W. Jones, M.Sc., Ph.D., F.R.A.S.
Dr. H.L. Lam, Ph.D.

Yellowhead School Division No. 12

Grant D. Smith - Director of Facilities

Recording Secretary

Elizabeth F. Smyth

1. Call to Order

Mr. David G. Jones, Coordinator acted as Chairman and called the meeting to order at 1:30 p.m. He introduced Councillor Doyle who welcomed those persons attending, and extended greetings from the Economic Development Committee.

2. Background

Mr. Jones then outlined the background to the present meeting. Approximately two months ago the Edson Economic Development Committee had been advised that a geothermal possibility exists in the Edson area. A meeting was held with representatives from the University of Alberta and a great deal of correspondence was entered into in this regard. The Committee now hopes to move to the next phase on this proposal which is a more thorough study of the feasibility of proceeding with a geothermal analysis for and in the Town.

Mr. Jones indicated that Underwood McLellan Ltd. are providing technical expertise for this project. He then introduced Professor Walter Jones of the University of Alberta, who provided information on the studies done of some 55,000 temperature values from about 28,000 gas and oilwells throughout the province. These values were plotted on geothermal gradient maps. Mapping has also been done of the rate of increase of temperature with depths for the province. A number of areas have been identified in Alberta in which the rate of increase is higher than might be expected from the world's average values. One of these areas is between Edson and Hinton. Professor Jones illustrated his remarks with overhead transperencies showing the mapping he had outlined. He indicated that, in the Edson area, one would expect the uncorrected temperature to be about 50°C at a depth of 2 kilometers, 80°C at a depth of 3 kilometers, and about 105°C at 4 kilometers.

After a few further remarks, he introduced Dr. H.L. Lam, also of the University of Alberta, who discussed the detailed work which has been done in the Edson area in this respect. Again transperencies were used to illustrate the information. Dr. Lam advised the first graph had been derived from a study done of about 134 wells in the Edson area. The wells were contained in a 3 by 3 area -- that is an area covering Townships 52, 53 and 54 in Ranges 16, 17 and 18. This transparency showed the uncorrected values while a second one graphed the corrected values. He then discussed data derived from 18 wells (and based on 42 points) located in Township 53, Range 17 (in which Edson is located) which showed that the uncorrected temperature was 53°C at 2 kilometers, 80°C at 3 kilometers, and 100°C at 4 kilometers. Corrected temperature values were 60°C at 2 kilometers, 86°C at 3 kilometers, and 115°C at 4 kilometers. He then stated that the minimum temperature requirement is about 50°C for low-grade geotechnology.

The next question Dr. Lam dealt with was whether or not there is actually hot water below the surface in the study areas. Again using study material from the 3 by 3 area, he outlined the flow rates of water recovery in the formations covered. He also dealt with how far water can be expected to rise and the salinity of the water. The salinity of water in the Devonian layer is in the realm of 170,000 parts per million as compared to the salinity of sea water which is about 50,000 parts per million.

Dr. Lam concluded by indicating that he believes water is recoverable from the formations in the Edson area. The Chairman then invited those present to ask any questions they might have for Professor Jones and Dr. Lam.

After clarification of some of the points of these presentations, the Chairman stated that, recognizing that difficulties certainly exist, the Committee had looked at potential applications of geothermal energy in the Town of Edson. Taking into account Underwood McLellan's advice that a single use project would not be acceptable, a project which would be both useful and practical (and something beyond just a pilot project) had been investigated. Messrs. Don Phelps and Dale Gilbertson of Underwood McLellan Ltd. were introduced to outline these proposals.

3. <u>Possible Future and Existing Applications</u>

Mr. Gilbertson extended a welcome from Underwood McLellan Ltd. and indicated he was very encouraged by the amount of interest being shown in a resource of this type. Underwood McLellan introduced the concept of geothermal energy to the Town some months ago, and is very happy to see the follow-up being done. Mr. Gilbertson stated that, on the surface, it appears the project could be economical. However, there are many variables to be studied in more detail. This further study could establish the economy of a geothermal project, how to pursue different sources of funding, and other aspects of a project. He then went on to state that one of the most practical applications of geothermal energy would be space heating, and several different possibilities have been outlined in terms of existing and future buildings.

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At this point, Mr. Phelps was introduced to deal with a site which has been identified in the north end of the town, and the possible applications envisioned -- both existing and future. The future site could possibly house a recreation complex for the 1986 Winter Games, a Provincial Building or new school, etc. There is also a residentially zoned subdivision which might be developed in this area. A calculation of minimum and maximum heat loads for these possibilities was done, as was a calculation of the potential supply from a geothermal well. One possible application would be to use geothermal energy for the base heat load and use gas to pick up the balance for peak loads.

Mr. Phelps then dealt with an existing cluster which could consist of Pine Grove School, the Senior Citizens Home, and the hospital, library and existing outdoor pool, as well as others. An assumption made with respect to this area was that it will be possible to retrofit the existing heating systems to accept a geothermal supply. He indicated that, by matching requirement and production, it should be possible to minimize costs, and this proposal would appear to be an economically viable project that warrants further investigation.

4. Possible Study Approach

In outlining a possible study approach, Mr. Phelps suggested that a preliminary geological assessment would be an initial requirement. This would consist of the information presented by the University of Alberta personnel at this meeting and information dealing with flow rates, temperatures, location of wells relative to usage areas, etc. A viable project would have to be confirmed and, if all components looked favourable, the next steps could be proceeded with; however, if they didn't look favourable, this would be the time to look at possible changes (such as different well location, another project site or whatever). Some of the areas the study would be looking at were:

possibility of bringing hot water into town if well not located right in town
costs involved -- i.e. capital and operating costs for retrofitting; costs and locations for delivery system; costs of and possibilities for existing and future buildings
heat loads for existing buildings and future buildings
what type of retrofitting would be appropriate for existing buildings
heat exchange units for future buildings

After these steps have been completed and analyzed, it would then be possible to establish a system lay-out. The next step would be a detailed cost analysis. The overall concept is a phased program with a number of decision points for "Go" or "No Go".

5. General Information

The Chairman asked if there were any questions. Councillor Doyle asked how long the process of bringing water to the surface and returning it to the pool being tapped could be continued before change occurred. Mr. Jessop answered this question by providing information on the geothermal energy system presently in place in several large apartment complexes (some of which are government-owned and some privately owned) in Paris, France. He advised that the majority of the wells used are right in the city where space is at a premium. One of the solutions to this problem was the use of directional drilling of the wells with hot water being produced in one, cooled at the surface, and pumped back to the producer well. However, he indicated that they try to design systems that will last approximately 40 years. He also indicated that the further apart the wells are, the longer the system will last. Technically, geothermal energy is not a renewable resource as there is some limit to how much energy can be taken out of the basins.

The matters of the depth to which water might rise, the depths from which pumping might be required, and the salinity of the water were again touched upon. Mr. Gorrell stated that he had been very concerned about saline waters when he first started in his business but, after seeing the way oilwells are producing without

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corroding, now feels that perhaps there is no reason to worry. A suggestion was made that the corrosion study done at Regina, Saskatchewan could provide some leads as to what should be checked. A question was also asked with respect to the possibility of hydrogen sulphide being present and creating an unpleasant situation. It was indicated that, as most of the water in this area has to come through limestone, it should not be very acidic.

Other questions asked covered the feasibility of bleeding some of the hot water out of the system for use as a hot spring, and the possibility of problems such as earthquakes from pumping out hot water and putting back cold water. It was indicated that the possibility of a hot spring would be dependent on several things, one of which would certainly be the presence (or not) of hydrogen sulphide, with another being the high salinity of the water. With respect to the possibility of seismic activity, such as earthquakes, the answer was that one would be dealing with a small temperature difference, and the rock structure in this area makes the chances of earthquakes or fractures very small.

Mr. Mushtuk asked if it was reasonable to perhaps dream of heating the entire town by this method. He was assured by Mr. Phelps the concept of district heating is not new.

The matter of how heating pipes would be installed was discussed. It was indicated that the utilidor approach (laying pipes above ground in insulated containers) would likely be used in the existing area, while buried pipes would be installed in a future project. It was also indicated that Edson has a definite advantage in the fact that the proposed project has a cluster of potential users in one area instead of their being scattered all over town. Another advantage is that the municipality owns much of the land in areas where pipes would have to be laid.

When the question of possible damage to the Town's water supply from the use of salt water close to the surface was raised, those present were assured that the possibility is quite remote.

Mr. Halliwell left the meeting at 2:33 p.m.

6. Possible Funding

Mr. Conarroe stated that, while realizing the necessity for further studies, he is very interested in cost factors and possible funding for such studies. He further indicated that, if the system is not basically self-supporting, the Town would find it very difficult to proceed. Mr. Mushtuk suggested it is very difficult not to get excited about something that is presently unique in this part of the world and asked if it was being suggested that geothermal energy is going to be cheaper than the present forms of heating. Mr. Gilbertson indicated that there is no way of answering this until all the components are known and evaluated, while Mr. Phelps advised that initial indications look very favourable. He further stated that no one is going to make a comparison yet and the biggest single factor in determining economic viability is probably how much money has to be set aside annually to pay for the capital debt or sinking fund. He suggested that operating costs are really not that high but capital funding for such a project becomes a very significant issue.

Mr. Kleta of Alberta Energy and Natural Resources suggested at this time that costs appear to depend very much on whether a well exists that would be usable or one would have to be drilled. A suggestion was made that it might be possible to take over a "dry hole" well if one in the area had been drilled and didn't produce either gas or oil. It was also suggested that this might not be a solution, however, as it could be difficult or impossible to activate if it had been cemented in as a non-producer.

At this point, Mr. Grant Smith, of Yellowhead School Division, asked just what dollar number was being talked about in this regard. An amount of 1.5 million dollars was suggested for drilling a well. After adding in a return well, tying in facilities over a 4 to 7 block area, and retrofitting, it was established

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that the cost could be in the range of 5 to 7 million dollars. However, it was pointed out that the Committee might want to consider the cost of some 8.4 million BTU's of present energy (which represents mean load requirements for the existing facilities in the project area) which increases in cost approximately 10 to 12 percent per year. Mr. Phelps stated that this would be in the range of about $225,000.00 per year. He then indicated that the next step of this meeting would be to discuss possible funding and grants for the proposed project.

Mr. Klete detailed the areas which his department has funded over several years but indicated that, as the department is concerned with research, there would be difficulty in applying funds to the proposed project. However, he suggested that a contribution in an amount of approximately $200,000.00 could be made toward a detailed engineering design when that point is reached.

Mr. Jessop then advised that his department handles two different types of funds; one being research and the other development programs. He pointed out that these funds have to cover the whole of Canada but indicated that consideration for funding from his section could be given to a preliminary geological assessment. He went on to outline the kind of criteria involved -- i.e. is the question being asked a reasonable one? Mr. Jessop then indicated that he was delighted to find a community like Edson asking questions about alternate energy sources, and introduced Mr. Kilotat, of Energy, Mines and Resources, Edmonton to deal with possible funding of actual development.

Mr. Kilotat informed the group present that Energy, Mines and Resources Canada had had in place a program called Accrede which had provided funding for a project in Regina and one in British Columbia. This program has just been replaced by one called Enerdemo which is prepared to provide some cost sharing for actual demonstration projects. He went on to state that it would appear that the involvements would be in the following order: Mr. Jessop's area first with research; Mr. Klete's assistance secondly with engineering studies; and finally his department's involvement with the actual demonstration project. Mr. Kilotat advised that his contribution would be a capital program but it would be impossible to attempt to guestimate any amount at this time. Priority would be given to projects where oil is being replaced as an energy source and to projects where results could be easily transferred to other parts of the country.

After some discussion with respect to possible funding, Mr. Jessop suggested that the Committee should put together a carefully detailed one or two page analysis of the proposed project and forward it to him for study. He answered "Yes" to the Chairman's question with respect to the feasibility of going on a unique application basis. The question of risk was also raised and discussed. Then Mr. Jessop was asked if the proposal could be seen as a viable project. He replied that he feels it is and is very keen to see it go. He then indicated he would supply materials covering well information to the Committee, and advised that a symposium called Energex '84 will be held in Regina on Friday, May 17, 1984.

7. Adjourn

On behalf of both the Economic Development Committee and the Town of Edson, the Chairman then thanked everyone for attending. The meeting adjourned at 4:03 p.m.

APPENDIX 3

ENERGY DEVELOPMENTS:
NEW FORMS, RENEWABLES, CONSERVATION

Proceedings of ENERGEX 84,
The global energy forum,
Regina, Saskatchewan,
Canada
14-19 May 1984

Geothermal Energy

Geothermal energy in Canada - a review of the resource
A.M.Jessop

Low temperature geothermal energy in Canada
R.J.Cousins and B.S.Larkin

An assessment of the low-grade geothermal potential in a foothills area of west-central Alberta
H.L.Lam and F.W.Jones

Heat flow and geothermal gradient studies in the Alberta basin - an essential part of the geothermal potential evaluation
J.A.Majorowicz, F.W.Jones, H.L.Lam and A.M.Jessop

Assessment of the geothermal resources of Atlantic Canada
M.J.Drury

Application of existing data to low temperature geothermal exploration
H.A.Gorrell

Evaluating the influence of groundwater flow systems on geothermal conditions
G.van der Kamp

Regina geothermal experiment - geological and hydrological aspects
L.W.Vigrass and A.M.Jessop

Modelling the Regina geothermal aquifer
K.Hutchence, L.W.Vigrass, A.G.Law and J.H Weston

The Regina geothermal experiment - thermal aspects
A.M.Jessop and L.W.Vigrass