

THE GEOTHERMAL ASSOCIATION OF IRELAND

Newsletter

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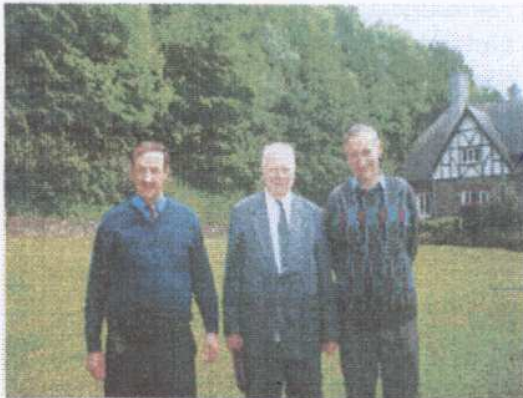
Issue No. 3

Spring 2000

Introduction

Dear readers,

This is the first issue of our Newsletter for the year 2000. We will endeavour to achieve a more regular issue in the future. We need more feedback from members so that we can target the right articles.



Visit of Prof. Arkady Voronov of St. Petersburg University, to Spa House, Mallow. Included from left: Pat Walsh, Secretary; Prof. Voronov; Bob Aldwell, Chairman of the Irish Group of GAI.

Contents of this Issue

- Summary of the Annual General Meeting of GAI, 1999.
- Tribute to the late John Dunne.
- Presentation to Bob Aldwell.
- Heat Pump Installation – examples in South West Ireland.
- **Main Feature:** Geothermal Energy Utilisation in Cork City.
- Report from European Projects Officer.
- Geothermal Resources of Serbia.
- Forthcoming Events.
- Warm Springs in Ireland.

The Geothermal Association of Ireland was formed in January 1998. The mission of the Association is to promote the development of Geothermal Resources in Ireland and to represent the interests of its members. The Officers are: Mr Bob Aldwell (Chairman), Mr. Michael O'Brien (Vice Chairman), Mr Pat Walsh (Secretary), Mr. Seamus Hoyne (Treasurer) Mr Shane O'Neill (Public Relations Officer), Mr Brian P. Connor (European Projects Officer), Prof. Peter Brück (Development Officer).

ATTENDANTS

Mr. Bob Aldwell,
Prof. Peter Bruck,
Ms. Fiona Duggan,
Mr. John Dunne,
Mr. Shane O'Neill,
Mr. Brian P. Connor,
Ms. Mary Walsh,
Mr. Paul Sikora,
Mr Douglas Gordon,
Mr. Pat Walsh.

PROJECTS REPORTS

- ⇒ European projects officer outlined work in progress on various EU projects.
- ⇒ Recommendations were made for the development of the Association.

ELECTION OF OFFICERS

Mr. Bob Aldwell: Chairman
Mr. Michael O'Brien: Vice Chairman
Mr. Pat Walsh: Secretary
Mr. Seamus Hoyne: Treasurer
Prof. Peter Bruck: Development Officer
Mr. Shane O'Neill: P.R.O.
Mr. Brian Connor: Euro-Projects Officer

GENERAL DISCUSSION (Ideas/Plans for the future)

SECRETARY'S REPORT

- ⇒ The secretary outlined a summary of the main activities of the Association since its foundation in 1998.

- ⇒ More Members.
⇒ Detailed Programme needed.
⇒ European Best Practice to be adopted.
⇒ Spa Tourism/Eco. Tourism to be developed.
⇒ Heat Pump Development for Domestic, Commercial and Agricultural Uses to be carried out.
⇒ Sponsorship.
⇒ Holding of Seminars, Articles & Advertisements

TREASURER'S STATEMENT

- ⇒ Financial outline of accounts was stated and thanks was expressed to Cork County Council.

PRESENTATION TO BOB ALDWELL

- ⇒ Presentation on Mr. Bob Aldwell's retirement from the Geological Survey of Ireland.

John Dunne
R.I.P.

In memory of the late John Dunne, Mallow, Co. Cork (Well-driller) who died unexpectedly on January 22nd 2000. John was a prominent and respected member of the Geothermal Association of Ireland. He will be sadly missed by his colleagues in the Association.

Deepest sympathy is extended to his wife Kitty and family.

'He will draw waters from the Wells of Salvation'

Bob Aldwell Retires from G.S.I.

Bob Aldwell retired from the Geological Survey of Ireland (GSI) on November 30th 1999 after an eventful career spanning forty years. He joined the GSI immediately after graduating from Trinity College Dublin in 1960. In the opening years his work included Quaternary mapping, in which GSI worked closely with the National Soil Survey of An Foras Taluntais (now Teagasc).

By 1970 his attention was increasingly focused on the topic for which he will be best remembered; groundwater. He played a central role in establishing the Groundwater Section of GSI and in the setting up of the Irish Group of the International Association of Hydrogeologists (IAH) in 1976. During the 1970's he gave lectures to many groups throughout Ireland promoting the importance of groundwater as a valuable and vulnerable resource. At the same time he became actively involved internationally: firstly through the UNESCO sponsored International Hydrological Decade and International Hydrogeological map of Europe. Between 1975 and 1983 Bob was the Irish representative in Brussels on the EC Advisory Committee for the Programme Management on Geothermal Energy and co-ordinated the two EC supported national geothermal research programmes.

Following promotion to Principal Geologist in 1979, Bob was given responsibility for Environmental Geology in GSI. Later in the 1980s, he had responsibility over GSI's wide ranging Mapping Division. At the conclusion of the GSI review in 1992, he was given responsibility for the newly created Environmental Geology Division. Among his last contributions in GSI was to enthusiastically support the organisation's successful attempt to secure Government approval to undertake the Seabed Survey of Ireland.

To mark his retirement a presentation was made by GSI to Bob Aldwell. The gift was a statuette of the hand pumping of an old style well – acknowledging his contribution to the

Heat Pump Projects in the South West of Ireland

The following article was written by the R.E. I.O. in Bandon and produced in their Energy Update magazine.

“Two heat pump projects were completed in the South West in the summer of 1999 to provide efficient heating and cooling for commercial buildings.

A heat pump works by extracting low-temperature heat (from the air, ground, surface or groundwater) and concentrating this heat to raise it to a useful temperature for heating applications. Natural gas or electricity is required to drive the pump, but 2 to 5 times more useful energy can be got from the pump than is needed to drive it.

TRALEE

One of the heat pump systems installed serves 1,400 square metres of floor area in Kerry County Council's new Motor Tax Office. Heat is supplied by an embedded coil underfloor heating array and cooling is delivered through ceiling-mounted cassettes. In addition, a building energy management system controls heat operation and logs performance to provide ongoing feedback.

BANDON

A second heat pump system, installed by the same company (Dunstar Energy, County Cork), is intended to serve heating and cooling needs for new offices at Shinagh House in Bandon, Co. Cork. The system provides heating and cooling to eight wall terminals located in a first-floor office area and canteen. Heat is also supplied, in summer and winter, to the building's water supply.

Other potential applications for heat pump technology include residential or commercial buildings, greenhouses, swimming pools and leisure centres”.

Michael O' Brien, Conor McGovern and Mary Walsh
Cork City Energy Agency, Lord Mayors Pavilion,
Fitzgerald Park, Co Cork

Introduction

Ireland does not possess any known high temperature geothermal energy resources but does possess some warm water resources in the form of warm springs. One such spring is the Mallow warm spring, which has been used for many years to heat the local municipal swimming pool.

There are, however, tepid water resources in the larger cities and towns of Ireland that could be exploited to provide low cost space heating in buildings. These tepid water resources arise as a result of the 'heat island effect' that occurs in urban areas. This phenomenon may be explained by the generation and trapping of heat by a combination of factors including the activities of people, machines and traffic and the absorption of heat by concrete and tarmac surfaces. These factors can be responsible for increasing the temperature of gravel aquifers underlying urban areas.

This groundwater which is slightly warm may be exploited for space heating by passing it through a heat pump to extract several degrees of heat from it. The heat pump that is used can be an important determinant of the success of the system. Most heat pumps have a Coefficient of Performance (COP) of > 4 , i.e. for every unit of electricity it consumes, at least 4 units of heat energy are generated. Heat is extracted from the water as it passes through the heat pump, lowering its temperature by several degrees. The water at its reduced temperature can then be used for cooling purposes and finally, can be used for flushing before being discharged from the system.

The heat pump can be used at night using cheaper electricity rates, this allows the production of heat energy at a cost of 0.6p per kWh (approx. half the cost of natural gas at normal domestic rates). Furthermore, the performance of heat pumps is continually being improved and the resultant increases in the COP will allow generation of reduced cost heat.

Geothermal potential in Cork City

Cork City has been described as an ideal setting for the 'heat island' effect to manifest itself. The city is lo-

cated in a steeply-bounded valley occupied by the Lee and Tramore rivers, and it could be expected that heat generated in the central city would be confined by the steep valley sides. The Lee Valley overlies an old buried river channel and thick deposits of sand and gravel are known to occur at various locations along both the Lee and Tramore valleys. A number of projects are underway in Cork that aim to investigate and exploit geothermal energy for the production of space heating.

The Lee Valley Geothermal Project

The Lee Valley Geothermal Project is being funded by the Renewable Energy Feasibility Study Grant and the project partners (Cork Corporation, Cork County Council and University College Cork).

Objectives

- ⇒ To assess potential for exploitation of Geothermal groundwater in Cork City for space heating purposes.
- ⇒ A desktop study of Cork City geothermal data in order to identify potential sites for the extraction of geothermal energy.
- ⇒ Drilling of three boreholes (these were at Cork County Hall, Cork City Hall and the Lee Maltings). Water quality and temperature were evaluated and pump tests were carried out to determine the yield and transmissivity of the gravels. The results were encouraging and indicated that potential for groundwater exploitation exists at these sites.
- ⇒ Phase three, which has yet to be funded, involves detailed analysis of the results of phase two, assessment of the physical process of extraction of heat from groundwater, and connection to existing space heating systems. It will also involve an economic analysis of cost savings in utilising the resource for the space heating of the buildings at the sites.

The cost of this feasibility study has been approx. £20,000-£25,000 and the potential for space heating of buildings at three locations in Cork City has been established. This should now be used as a basis for the introduction of the technology to these locations, in fact geothermal derived space heating is now being considered as an option for a number of new buildings which are currently at planning stage.

Sports Complex – Knockfree Avenue

Cork Corporation has recently constructed a Sport's Complex in Knockfree, which is on the north side of Cork City; this complex includes 6 all weather pitches and a pavilion. Geothermal heating is used to heat changing rooms.

The project uses two types of heat pumps;

(i) A horizontal heat collector. This system consists of 600 m of 1" light gauge LDPE (low density polyethylene) tube buried at a depth of 0.5 metres over a ground area of 300 m². This system has been used for the exploitation of heat from soil at other sites in Ireland.

(ii) Two vertical heat collectors. Each vertical heat collector is a 60 m long bore-hole (150 mm diameter) which has a LDPE loop installed to extract geothermal energy from rock and soil. This type of collector is used extensively in Europe – particularly in Switzerland – but never before in Ireland.

The heat collection systems will provide energy for the heat pumps, each having 4.2 kW nominal output.

The space heating for the complex is being produced from geothermal sources for the majority of the year. However, during periods of extreme cold weather when the geothermal heating is not sufficient, heat can be supplemented by a gas-fired boiler.

This project is being supported technically by the Geological Survey of Ireland and Cork Institute of Technology (CIT) who will carry out a 2 year study of the operation of the system. Using this system of heating at Knockfree Sport's complex will demonstrate that this Geothermal heating system can be exploited throughout Ireland. The promotion of the use of renewable energies will help achieve E.U. and National objectives in the reduction of Greenhouse gases. The particular system proposed for this site will not have any impact on the aquifer water underlying the site or on the load bearing capacity of the ground in the area.

Administration building – Kinsale road Landfill site

Biodegradation involves the microbial digestion of organic material to produce sugar and a mixture of gases. Heat is a by-product of this process, this heat is evident in compost heaps or silage pits where temperatures in excess of 60°C are common. It is known that landfill heats up in a similar manner.

It has been suggested that this heat could be abstracted and used for heating purposes. As part of the development and decommissioning of the landfill site in the Cork City south link road, a large administration building is proposed. Cork Corporation is currently carrying out a project to evaluate the viability of utilising heat generated in landfill as a source of space heating for the new administration building. This project, which could be broadly described as a 'geothermal investigation' will involve evaluation of the quality and quantity of heat produced and construction of the profile of its production over time.

Conclusion

The exploitation of geothermal sources for the production of space heating is being investigated and exploited by Cork Corporation at a number of sites, this form of space heating has a number of advantages, namely;

- ⇒ Considerable savings in heating and cooling bills;
- ⇒ Conservation of fossil fuel resources;
- ⇒ Conservation of large quantities of treated water through the use of cooled water which is leaving the heat pump for flushing purposes in the building;
- ⇒ Reduction of gaseous emissions (of CO₂, CO, SO₂, etc.) associated with energy use – by reducing dependency on fossil fuel combustion and transport;
- ⇒ Increase self-efficiency and sustainability in energy consumption; and
- ⇒ Improve the public image of local authorities /industry.



Boiler House at Sports Complex



Sports Complex- Knockfree Avenue

BRUSSELS VISIT NOVEMBER 1999

In November 1999, I was in Brussels for a Partner's Meeting regarding a Joule project. While there, it seemed like an opportunistic time to introduce the Association to the Commission staff, in particular those who had responsibility for geothermal projects.

Meetings were held with Mr. Stathakis and Mr. Tiberi of DG17. Apart from informing them of the Association and presenting them with Information Packs, which were kindly provided by the Association's Secretary, funding for geothermal projects in Ireland was also discussed.

With regard to funding, I was looking for funding for projects, in particular the promotion of low temperature geothermal energy in Ireland and also some preliminary funding for medium temperature geothermal (50° to 90°C) investigation and promotion.

In addition, a meeting was held with the Chairman of the European Geothermal Energy Council (EGEC), Dr. Christian Bois-savy to discuss further co-operation between the Irish Geothermal Association and the EGEC. EGEC are prepared to fund the printing of a brochure on geothermal energy in Ireland. This will be an eight-page colour brochure and represents an investment of IR£1,500 to IR£2,000.

In conclusion, the meetings were very worthwhile – funding was obtained for a brochure and the Commission were pleased to be informed of the Association and will I am sure, support us when suitable funding mechanisms are in place in Brussels.

LECTURE 8th MARCH 2000 UNIVERSITY COLLEGE CORK

A lecture entitled:

HYDROGEO THERMAL RE-SOURCES OF SERBIA – POTENTIAL CONDITION OF EXPLOITATION, USES AND PLANS FOR THE FUTURE

was given to the Geothermal Association of Ireland by Mr. Dejan Milenic from the Institute of Hydrogeology at the University of Belgrade, Yugoslavia.

This lecture was held at 8.30pm on the 8th March 2000 in the Geology building of University College Cork.

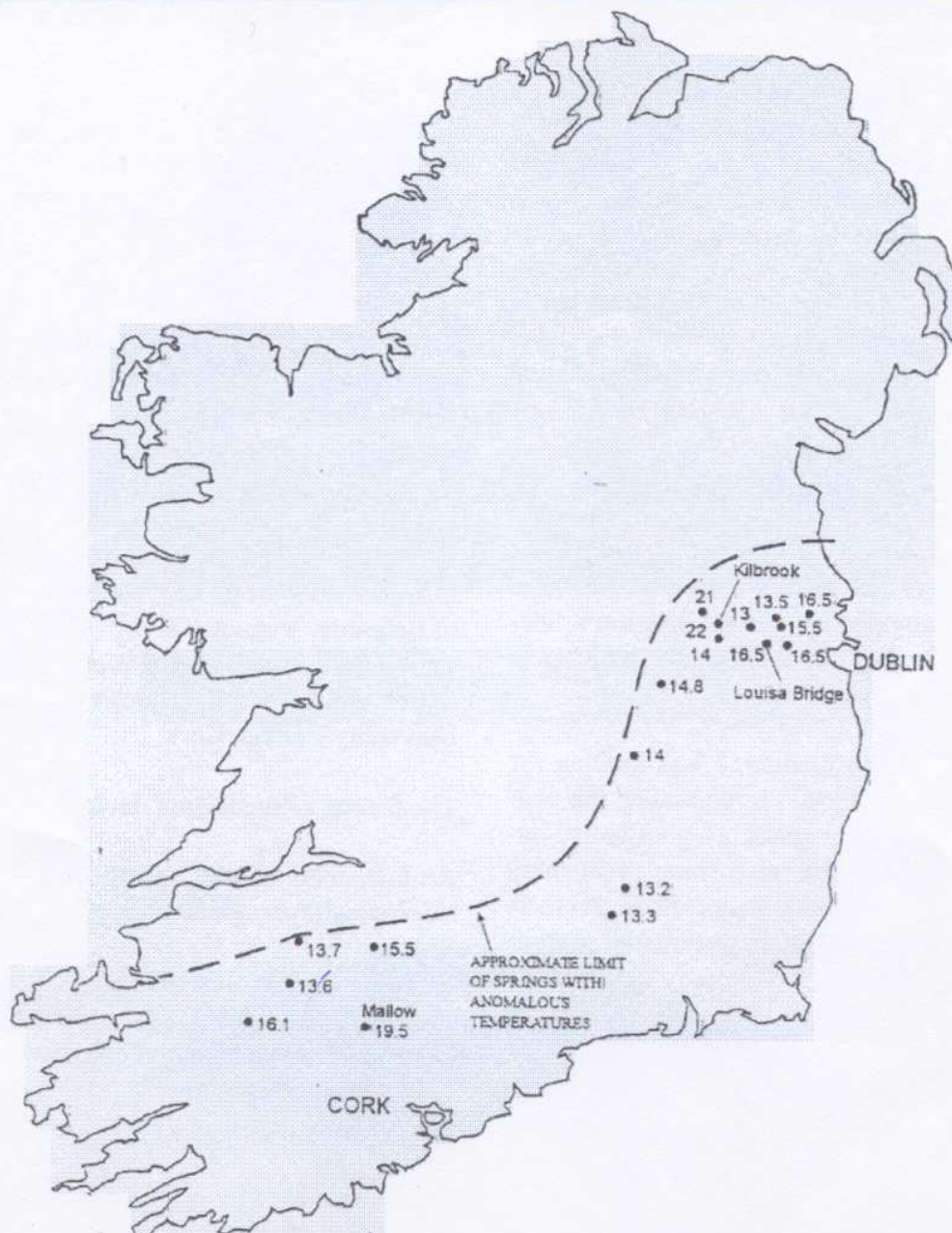
The format of the lecture included:

- An Introduction/Brief history
- Geological-hydrogeological zonation of Serbia
- Basic geothermal characteristics of Serbia
- Hydrogeothermal resources of Serbia
- Hydrogeothermal energy use of Serbia
- Other geothermal resources of Serbia (petrogeothermal resources)
- Conclusion

Forthcoming Events

As a return to Prof. Voronov's visit, a trip to St. Petersburg is proposed for a number of delegates from the Association in the coming year. Anyone interested in travelling should contact the Chairman or the Secretariat.

Warm Springs In Ireland



Location of warm springs in Ireland, with average temperatures of 13°C (based on information in GSI)

Your Views

If you wish to contribute an article, feature etc. to this Newsletter we would be delighted to hear from you. We would be happy to include such articles in future Issues. We intend to compile a stock of material for future publications. Subject matter we hope to cover would involve National and International aspects of Geothermal Development as well as creating a Forum for interested parties

Please send your views and articles to:

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