

NEWSLETTER
INTERNATIONAL ASSOCIATION OF HYDROGEOLOGISTS
AUSTRALIAN CHAPTER

VOLUME 2 NO.2

SEPTEMBER 1985

1 KIDNAPPED MEMBER AND WIFE STILL CAPTIVE

Australian IAH member, Robert Williamson and his wife Jenny were kidnapped on May 18 by Pakistani tribesmen outside the Baluchistan provincial capital of Quetta. Members of the Salusi tribe then demanded the release of their chief from jail where he has been held since being convicted three years ago on abduction charges. Rob was working for a Melbourne firm, Shedden Pacific Pty Ltd., as a consultant on a watershed management project for the Baluchistan Forestry Department, financed by the World Bank and the United Nations. Rob previously worked for the Victorian Department of Minerals and Energy. Hopes for Rob and Jenny's early release in June, were dashed when negotiations between the Salusi tribesmen and the Pakistani Government broke down. Nothing substantial had been heard of the couple until just recently when Rob's family received a letter from Rob and Jenny (dated August 21) indicating that they were still being held captive, but were alive and well. Negotiations are continuing, but no firm date for their release has been agreed as yet.

2 MEMBERSHIP NEWS

2.1 New Members

The following new members are welcomed:

Dr C Barber
Research Scientist
CSIRO Groundwater
Research Branch
P O Box Wembley
WA 6014

Mr D Karp
Geologist
Dept. Mines & Energy
Water Division
P O Box 607
DARWIN NT 5794

Mr H Qureshi
Hydrogeologist
Dept. Mines & Energy
Water Division
P O Box 607
DARWIN NT 5794

M J Nolan
8/15 Cecil Street
ASHFIELD NSW 2131
Hydrogeologist
Coffey and Partners

Total membership of the Australian Chapter now stands at 128.

2.2 Membership Dues

At the Tucson meeting of the International Council of IAH in January 1985, membership fees for IAH were reassessed as follows;

individual member : DM 30 + DM 10 (postage)
corporate member : DM 150 + DM 10 (postage).

This information did not reach the Australian Executive until May 1985 and arrived too late to be incorporated in the June Newsletter. Consequently the Executive have decided to cover this increase from consolidated revenue in 1985, but advise that the 1986 membership fee for an individual member will be increased to (Aust)\$25.

The Treasurer requests that members who have not already forwarded their 1985 dues, please do so, as he has to compile the annual report (indicating the financial status of each member) and forward this information to the International Council in November 1985.

MEMBERS, WHO HAVE NOT ALREADY DONE SO, SHOULD FORWARD THEIR ANNUAL DUES (A\$20) TO:

Mr A Shugg
Hon. Treasurer IAH
GPO Box 2355V
MELBOURNE VIC 3001

3 NATIONAL COMMITTEE REPORT

3.1 NEW AUSTRALIAN WATER RESEARCH BODY FORMED

Senator Evans announced the Government's response to the report of the Interim Council for an Institute of Freshwater Studies, (tabled in Parliament in October 1984), at a meeting in Darwin of the Australian Water Resources Council, held June 26, 1985 and comprising all Commonwealth, State and Territory Ministers responsible for water management issues. The key items in the Government's response are commitments to establish an Australian Water Research Advisory Council and an associated water research program.

The Interim Council was established by the Government in 1983 to advise on national water research needs, particularly those of the Murray-Darling Basin. The National Committee of IAH made a formal submission to the Interim Council stressing the role of groundwater and the need for an integrated and balanced approach to research.

In its report, the Interim Council identified many pressing water problems requiring additional research. As well, significant deficiencies in current water research arrangements were noted. Recommendations for improvement included a stronger leadership role for the Commonwealth and the establishment of an Australian Water Research Advisory Council.

The Council will advise the Minister for Resources and Energy on water research priorities and goals, and make recommendations as to the most effective means of implementing appropriate research. The Government's stated objective is a balanced national water research effort involving Commonwealth, State and local government, as well as the private sector.

The future level of funds available under the Water Research Program will be determined annually in the light of advice from the new Council. The Council's first task will be to assess national research needs, identify gaps in current research, determine priorities and establish procedures for inviting research proposals and assessing their merits.

The Government proposes to allocate more than \$600 000 in 1985/86 to begin a program of research recommended by the new Council and for the completion of existing research projects commenced under the Australian Water Resources Council's research program.

AUSTRALIAN WATER RESEARCH ADVISORY COUNCIL - TERMS OF REFERENCE

The Council will :

- . advise the Minister for Resources and Energy on goals for water research in Australia;
- . maintain a continuing overview of water research in Australia with a view to developing an overall balanced national water research effort involving all three tiers of government and the private sector;

- assess on a continuing basis national needs and recommend national research priorities,
 - make recommendations on the levels of funds necessary from all sources to implement a balanced program of research and development;
 - advise on proposals for research and demonstration programs and projects and appropriate cost-sharing arrangements;
 - advise on an effective program of information dissemination, including technology transfer, from the research and demonstration sectors to operating authorities and users;
- and
- monitor the progress of funded programs and projects and ensure, as far as possible, the achievement of their objectives.

MEMBERSHIP

CHAIRMAN

Mr K W Lewis CE
 Director and Engineer-in-Chief
 Engineering and Water Supply Department SA
 - Engineer

MEMBERS -

Dr A T Arthington
 Reader, School of Australian Environmental Studies
 Griffith University, QLD
 - Biologist

Mr D W Beattie
 Commissioner
 Queensland Water Resources Commission, QLD
 - Civil Engineer

Mr M Bennett
 Chairman
 NSW Irrigator's Council, NSW
 - Agricultural Economist

Dr P J Crawford
 General Manager
 Metropolitan Water Sewerage and Drainage Board
 Sydney NSW
 - Industrial Chemist

Dr B T Hart
 Director, Water Studies Centre
 Chisholm Institute of Technology, VIC
 - Physical Chemist

Mr J C McColl
 Director-General
 Department of Agriculture, SA
 - Agricultural Economist

Prof. N F Millis MBE
Professor of Microbiology
University of Melbourne, VIC
- Microbiologist

Prof. W F Musgrave
Professor of Agricultural Economics
University of New England, NSW
- Agricultural Economist

Dr J P Paterson
Director-General
Department of Water Resources, VIC
- Economist

Mr C F Porter
Director
Department of Conservation and Environment, WA
- Civil Engineer

EXECUTIVE MEMBER

Mr A Manderson
First Assistant Secretary
Water and Development Division
Department of Resources and Energy, ACT
- Economist

EXECUTIVE COMMENT

The executive has written to Senator Evans and expressed concern and disappointment that the Council membership does not include a single hydrogeologist or hydrologist and sought his assurance that Council membership will be revised or augmented to overcome this glaring oversight.

3.2 NEW SCIENTIFIC AND TECHNOLOGICAL EXCHANGE PROGRAMME WITH THE ROYAL SOCIETY OF LONDON AND POST GRADUATE FELLOWSHIPS TO JAPAN

Royal Society; Australian Academy of Science; Australian Academy of Technological Sciences
Scientific and Technological Exchange Programme

The Australian Academies signed a Memorandum of Understanding with the Royal Society of London to foster co-operation in the natural and technological sciences between Australia and the United Kingdom by means of interchange and collaboration of scientists and technologists of the two countries.

The Academies invite applications from Australians who wish to visit the United Kingdom to conduct short or long term research projects in the 1986 calendar year. Proposals should be specific and developed in consultation with contacts in the United Kingdom. The scientific and/or technological merit of the proposal will be a major criteria for selection.

Successful applicants will receive an advance purchase international air fare and a contribution towards living and travel costs associated with their stay.

Post-Doctoral Scientific Exchanges with Japan

The Australian Academy of Science invites applications from scientists resident in Australia to participate in a post-doctoral exchange programme with the Japan Society for the Promotion of Science.

Applications for fellowships will be considered from biological and physical scientists who have less than five years post-doctoral experience. Fellowships will be for visits to Japan of six to twelve months.

The Academy of Science will provide international air fares (advance purchase or excursion fares) and the Japan Society for the Promotion of Science will provide an appropriate remuneration.

Australian scientists interested in commencing their visit prior to the end of the 1985/86 financial year may obtain more information about the programme and application forms from:

International Relations
Australian Academy of Science
GPO Box 783
CANBERRA ACT 2601

Deadline for applications : 30 September 1985. Enquiries : (062) 47 3966.

Regrettably it was not possible to circulate this information to the full membership at an earlier date and the September 30 deadline leaves very little time for preparation of a proposal for 1986. However, this information serves as advance notification for those who might wish to take advantage of these schemes in 1987.

3.3 HYDROGEOLOGY AND DRILLING WORKSHOP - CHRISTCHURCH, NEW ZEALAND

Mr Bill Williamson, President of the Australian Chapter of IAH and Mr Colin Barden, Manager of the Australian Drilling Industry Training Committee, gave a three day Hydrogeology and Drilling Course in Christchurch from 22-24 July, 1985.

The course was well organized by Dr Hugh Thorpe, Ministry of Works and Development attracting about 35 participants mainly from regional catchment and water boards and from the Ministry of Works and Development. Bill presented 12 hours of lectures on various aspects of hydrogeology and groundwater extraction and Colin presented 6 hours of lectures on drilling. Whilst in Christchurch, Bill also gave a lecture to the Geomechanics Society at Canterbury University on "Hydrogeological aspects of coal mining under stored waters".

3.4 COASTAL AREAS COMMISSION

A constitution has been proposed for a 'Coastal Areas Commission' under the Presidency of Prof. Ing. Vincenzo Cotecchia of the Università Di Bari, Facoltà D'ingegneria, Istituto Di Geologia Applicata E Geotecnica, 70125 Bari, via re David, 200, Italy. A first meeting has been planned during the 5th International Conference on Groundwater in Taormina (Sicily, Italy) in November of 1985. The Commission is interested in representation from each nation interested in problems of the various and complex coastal areas. IAH members in Australia are asked to contact R Lakey immediately if they personally have a desire to effectively collaborate in this commission and are willing to strive for its goals.

4 AUSTRALIAN HYDROGEOLOGY TRAINING SURVEY

The National Committee forwarded a questionnaire to twenty-six Tertiary Institutions across Australia in an endeavour to compile a comprehensive listing of graduate and post graduate courses offering training in hydrogeology. It is intended that this information will be updated and conveyed to the membership annually as a major feature of the September Newsletter. It is also intended that the listing will include overseas courses in 1986. A summary of the information obtained thus far follows;

4.1. AUSTRALIAN CAPITAL TERRITORY

4.1.1 CANBERRA COLLEGE OF ADVANCED EDUCATION

School: Applied Science

Department: Resource Science

Address: P O Box 1

Belconnen ACT 2616

Contact:

Dr N O Jones

Ph: (062) 52 2518

Mr E J Best

Ph: (062) 52 2033

or

Graduate Level

No specific course

Subjects in other courses : Subject, Hydrology in B. App. Sci (Geol.), available as a single subject.

Post-graduate Level

Subject, Hydrology PG in Grad. Dip. Resource Management, available as a single subject. M.App. Sci. in Resource Management : Two years full time or equivalent part time. The first year consists of course work which may include the subject Hydrology PG. The second year comprises a research project and a supervisor is available for topics in hydrogeology.

4.2 NEW SOUTH WALES

4.2.1 UNIVERSITY OF NEW SOUTH WALES

Faculty: Applied Science

School: Applied Geology

Address: University of N.S.W.

P O Box 1

KENSINGTON VIC 2033

Contact: Dr M Knight

Ph: (02) 697 4275

Graduate Level

Specific courses: B.Sc., B.Sc. (Hons).

Year 3; 14 hours in Engineering and Environmental Geology

Year 4; Session 1 - 2 hours/week for seven weeks

Session 2 - Research project, 4 months full time usually in co-operation with a government department or private enterprise.

Post-graduate Level

M.App. Sci. Available in Hydrogeology, Engineering Geology and Environmental Geology.
Part time, full time and external candidature. May be part course-work or entirely research.

Full time course structure: Session 1 - 6 subjects, 3 hours/week each. Subjects include Hydrogeology, Geopollution Management, Environmental Geology.
Session 2 - Research Project.

Ph.D candidates are expected to have their own data or be currently employed in a position that enables the acquisition of appropriate data and a source of funds to carry out the research. Research may be undertaken in any branch of Hydrogeology and may be full-time or part-time.

School : Civil Engineering

Address and Contact : Head

School of Civil Engineering
The University of NSW
P O Box 1
KENSINGTON NSW 2033

Graduate Course in Hydrology : Course commences March 10, 1986 and terminates on June 13, 1986.

Common Core

Special course work 40 hours lectures and 40 hours tutorials.

Hydrological Processes 28 hours lectures plus 14 hours tutorials.

Flood Design 28 hours lectures plus 14 hours tutorials.

Groundwater Hydrology 28 hours lectures plus 14 hours tutorials

Investigation of Groundwater Resources I 28 hours lectures plus 14 hours tutorials.

Electives

- Surface Water

Advanced Flood Estimation 28 hours lectures plus 14 hours tutorials

Reservoir Design and Yield Determination 28 hours lectures plus 14 hours tutorials.

- Groundwater

Groundwater Hydraulics 28 hours lectures plus 14 hours tutorials

Investigation of Groundwater Resources II 28 hours lectures plus 14 hours tutorials.

Fee \$1 500 exclusive of accommodation and other living expenses.

4.3 QUEENSLAND

4.3.1 QUEENSLAND INSTITUTE OF TECHNOLOGY

School: Applied Science

Department: Applied Geology

Address: GPO Box 2434
Brisbane QLD 4001

Contact: Mr L Hamilton
(Ph) (07) 223 2324

Graduate Level:

No specific course

Subjects in other courses: Two subjects -

i) Introduction to groundwater and petroleum,

ii) Hydrogeology available within B.App.Sc. (App. Geol.).

Post-graduate Level

M.Sc. by research available and several students have undertaken M.Sc. degrees in hydrogeological topics.

4.3.2 UNIVERSITY OF QUEENSLAND

Department: Civil Engineering
Address: St Lucia
QLD 4067

Contact: Mr C J Apelt
Ph (07) 377 1111
or Dr Isaacs
Ph (07) 377 1111

Graduate Level

No specific courses or subjects in other courses available.

Post-graduate Level

When there is sufficient demand the subject Groundwater and Seepage Analysis is given as part of the M. Eng. Sci. programme. Some M.-Eng. Sci. students have chosen groundwater topics for their research and the Department has the expertise to supervise post-graduate research in some groundwater topics.

4.4 SOUTH AUSTRALIA

4.4.1 SOUTH AUSTRALIAN INSTITUTE OF TECHNOLOGY

School: Applied Geology
Address: P O Box 1
Ingle Farm SA 5098

Contact: Prof. D Stapleton
(08) 260 2055

Graduate Level

No specific course or subjects

Post-graduate Level

Grad-Dip. 30% course work, 70% thesis, 1 year full time, 2 years part time. Students specialising in hydrogeology receive supervision from Mr D Armstrong (SA Dept. Mines and Energy), Mr F Barrow (Applied Geology) and Mr J Argue (Civil Engineering).

M.Sc. research topics in hydrogeology are also acceptable and normally require 2 years full time or 4 years part time study. Supervisors, as above, plus Prof. Stapleton.

4.5 TASMANIA

4.5.1 UNIVERSITY OF TASMANIA

Faculty: Civil and Mechanical Engineering
Address: Box 252C
HOBART TAS 7000

Contact: Dr J S Montes
Ph (002) 20 2113

Graduate Level

No specific course

Subjects in other courses : Subject, Hydrology given in the Civil Engineering Practice course covers deterministic hydrology, the atmosphere, precipitation, extreme event analysis, evaporation, run-off, infiltration, flood flows and an introduction to flow in porous media.

4.6 VICTORIA

4.6.1 FOOTSCRAY INSTITUTE OF TECHNOLOGY

Faculty: Engineering
Department : Civil Engineering

Address: Ballarat Road
Footscray VIC 3011

Contact: Mr P Lechte
Ph (03) 688 4438

Graduate Level
No specific course.

Subjects in other courses: Groundwater Resources (final year Civ. Eng. elective) 2 hrs/week for 15 weeks. Topics include origin, occurrence and movement of groundwater, aquifer parameters, exploration, drilling methods, bore construction and development, well hydraulics, pumps, bore maintenance - in service problems, artificial recharge, conjunctive use, pollution, management and legislation. Can be taken as a single subject.

4.6.2 MONASH UNIVERSITY

Faculty: Engineering
Address: Wellington Road
Clayton VIC 3168

Contact: Assoc. Prof. R G Mein
Ph (03) 541 3444

Graduate Level
No specific course or subjects in other courses available.

Post-graduate Level

Unit 5263, Groundwater Hydrology, part of M.Eng.Sci. in Water Resources. 20 lectures and 10 tutorials covering aquifers, well hydraulics, pumping tests, geophysics, unsaturated flow, modelling and water quality. Can be taken as a single subject.

Department: Geography
Address: Wellington Road
Clayton VIC 3168

Contact: Dr D L Dunkerley
Ph: (03) 541 2914

Graduate Level

No specific course, but subject CY353.06/354.06 Fluvial Geomorphology is available as a single subject and is concerned with riverine erosion, transportation and landforms and has application to many aspects of hydrogeology.

4.6.3 ROYAL MELBOURNE INSTITUTE OF TECHNOLOGY

Faculty: Engineering
Department: Geology and Geological Engineering
Address: 124 LaTrobe Street
Melbourne VIC 3000

Contact: Mr J Robinson
Ph (03) 660 2208

4.7 WESTERN AUSTRALIA
4.7.1 MURDOCH UNIVERSITY

School: Environmental and Life Sciences
Address: Murdoch
WA 6150

Contact: Dr W D Scott
Ph (09) 332 2328

Graduate Level

Specific course: Groundwater Hydrology N227. An applied approach to groundwater flow. Topics include saturated and unsaturated flow, Darcy's Law and hydraulic characteristics, modelling and subsidence. The course is oriented toward a quantification of groundwater containment, yield, quality and contamination.

Post-graduate Level

Honours, Grad. Dip and further post-grad. study is available by theses.

4.7.2 UNIVERSITY OF WESTERN AUSTRALIA

Faculty: Science
School: Geology
Address: Nedlands
WA 6009

Contact: Prof. P G Harris
Ph (09) 380 2637

Graduate Level

No Specific Course

Subjects in other courses: 6 Lectures and 6 hours Lab. work on hydrogeology given in Geology 315 (3rd year). Can be taken as a single subject (Earth Resources).

Post-graduate Level

Some honours students elect to work on hydrogeological topics.

Several Ph.D students are undertaking hydrogeological research in collaboration with organizations such as the Geological Survey of Western Australia, WA Water Authority, Centre for Water Research, WA Department of Agriculture and Alcoa.

4.7.3 WESTERN AUSTRALIAN INSTITUTE OF TECHNOLOGY

Faculty: Engineering and Science
School: Physics and Geosciences
Address: Kent Street
Bentley WA 6102

Contact: Dr Q Rathur
Ph (09) 350 7486
or
Dr C B Collins
Ph (09) 350 7844

Graduate Level

No specific course

Subjects in other courses: Geology 303 (Hydrogeology) 2 hours/week for one semester within the 3rd year B.App.Sci. (Geology) course.

Post-graduate Level

Graduate Diploma in Natural Resources, coursework and research. M.App. Sci. in Natural Resources is also available.

Brief details of a number of recent publications from the International Hydrological Program, UNESCO, are given below:

Groundwater in hard rocks, Studies and Reports in Hydrogeology No.33, 228 pp, UNESCO, 1984.

The purpose of the book is to inform water resources specialists, especially in developing countries, of the possibilities of finding and developing groundwater resources in what has been previously considered one of the least promising hydrological environments. While most of the material deals with the scientific and technological aspects of the occurrence of groundwater in hard rock areas and related exploration and development activities, some planning and economic aspects are also considered.

Guide to the hydrology of carbonate rocks, Studies and Reports in Hydrology No.41, 345 pp, UNESCO, 1984.

The purpose of this guide is to assist hydrogeologists and others working toward the solution of practical water problems in carbonate terrains. It presents principles, practices and experiences in the fields of geology, chemistry, hydrology and engineering which are used in the study of water and on carbonate rocks.

Guidebook to studies of land subsidence due to groundwater withdrawal, Studies and Reports in Hydrology No.40, 327 pp, UNESCO, 1984.

The working group which has prepared this guidebook has paid particular attention to measures to control and arrest subsidence including the use of artificial recharge and the repressuring of aquifers. The book will serve as a guide to engineers, geologists and hydrologists faced with the problem of land subsidence. They may be asked to answer the questions of whether land subsidence is occurring, if so, where and at what rate, the cause or causes, and what can be done to stop it or at least slow it down. The guidebook should be of assistance in planning and undertaking the necessary field studies.

Sedimentation problems in river basins, Studies and Reports in Hydrology No.35, 152 pp, UNESCO, 1982.

This report has four main objectives.

- 1) To define the effects of man's activities on erosion and sedimentation processes in river basins, including activities such as land use, irrigation and drainage practices, and also the effects of reservoirs and dams, river control works and interbasin transfers of water.
- 2) To inform about the state of knowledge of the cause and effect relationships between plant cover, surface runoff, sediment production and deposition.
- 3) To inform about possibilities for the amelioration of the existing sedimentary conditions.
- 4) To describe methods for the estimation and prediction of changes in erosion and sedimentation processes following man-made changes in the river basin. This includes changes in the watershed as well as in the river channels.

6 SYMPOSIA, CONFERENCES AND MEETINGS UPDATE

SEPTEMBER 30 - OCTOBER 6 : ICSI INTERNATIONAL ON THE GLACIER MASS-BALANCE FLUCTUATIONS AND RUNOFF, Alma-Ata, United Soviet Socialist Republic. Contact : Prof. V Mn Kotlayakov, Organizing Committee of International Symposium, Institute of Geography, USSR Academy of Sciences, Staromentny St., 29, Moscow, 109017, USSR.

OCTOBER 9-10 : INTERNATIONAL SYMPOSIUM ON MANAGEMENT OF HAZARDOUS CHEMICAL WASTE SITES, Winston-Salem, North Carolina, USA. Contact : Prof. Norman R Tilford, General Chairman, C/- Dept. of Geology, Texas A & M University, College Station, Texas 77843-3115, USA, Telephone : (409) 845 9682.

NOVEMBER 17-21 : INTERNATIONAL SYMPOSIUM ON GROUNDWATER, TAORMINA, SICILY, ITALY. Sponsored by UN, UNESCO, CCE, IAH, ESA and CEMPA. Contact EGA Productions - Congress Organiser, Piazza Trento 2, 95128 Catania, Italy.

1986

May 11-16 : INTERNATIONAL CONFERENCE ON GROUNDWATER SYSTEMS UNDER STRESS, Brisbane. Venue: University of Queensland. Sponsored by AWRC, IAH and Inst. Eng. Aust. Contact: The Conference Manager, Groundwater Systems Under Stress, Uniquet Conference Systems, Univ. of Queensland, St Lucia 4067. See 6.1.

July 2-10 : 2nd SCIENTIFIC GENERAL ASSEMBLY FOR THE INTERNATIONAL ASSOCIATION OF HYDROLOGICAL SCIENCES, Budapest, Hungary. Sponsored by UNEP, UNESCO and WHO. Contact: Dr A Syallasi-Nagy, Executive Secretary, 2nd IAHS Scientific Assembly, Water Resources Research Centre (VITUKI) H-1453, Budapest, P O Box 27, Hungary. Telephone (361) 338-160.

August 26 - September 28 : POST-GRADUATE TRAINING COURSE ON GROUNDWATER TECHNIQUES, Curay, Austria. Contact: Prof. H Holmer, Institute of Technology, Rechbauerstrasse 12, A-8010 Curay, Austria.

September 8-15 : 19th CONGRESS OF THE INTERNATIONAL ASSOCIATION OF HYDROGEOLOGISTS, Karlovy Vary, Czechoslovakia. Sponsored by UNESCO. Contact: Stavebni Geologie, Praha, Garkeho namesti 7, 113 Q9 Praha 1, Karlovy Vary, Czechoslovakia. Telephone: 24 8751; Telex: 12

6.1 INTERNATIONAL CONFERENCE ON GROUNDWATER SYSTEMS UNDER STRESS

CONFERENCE PROGRAMME

Sunday 11 May	Thursday 15 May
PM Registration	AM Technical Sessions
Welcoming Function	PM Technical Sessions
	Conference Dinner
Monday 12 May	Friday 16 May
AM Keynote Address	AM Technical Session
Technical Sessions	PM Closing of Conference
PM Technical Sessions	
Tuesday 13 May	Saturday 17 May
AM Technical Sessions	Commencement of Post
PM Technical Sessions	Conference Tour

Wednesday 14 May
Whole Day Study Tour to
the Lockyer Valley

REGISTRATION FEES

Delegates : \$240 Discount: A discount of \$30 ~ if payment is received before 15 March, 1986.

This registration fee entitles delegates to:

- . Technical sessions
- . Opening and closing ceremony
- . A copy of preprints of technical papers
- . Morning and afternoon teas
- . Welcoming function
- . Conference dinner
- . Conference study tour to the Lockyer Valley
- . Copy of the conference proceedings.

Accompanying Persons: \$75 per person.

This registration fee entitles such persons to participate in:

- . Welcoming function
- . Conference dinner
- . Study tour to the Lockyer Valley
- . One day tour to the Gold Coast and Dreamworld Entertainment Complex
- . Local Sightseeing.

ACCOMMODATION:

The following range of accommodation has been selected with a view to meeting the requirements of all delegates. The Hotel and Motels are conveniently located on the bus route to the Venue.

University of Queensland Residential Colleges - Bed and Breakfast: Single:\$30
Double/Twin: N/A

Coronation Motel, Coronative Drive, Milton (4 km from Venue) Single and Double/Twin:\$55

Lennox Brisbane Hotel, Brisbane City (7 km from Venue) Single and Double/Twin:\$60.

Hotel and Motel prices shown have been specifically negotiated for this Conference, and represent a daily tariff for room only.

Accommodation at the University will be in halls of residence and consist of single rooms only with shared bathroom and toilet facilities. These Colleges are within comfortable walking distance of the venue. Accommodation rates include breakfast. Dinner is available at a reasonable fee.

POST CONFERENCE STUDY TOUR 17 - 22 MAY, 1986

This comprehensive study tour has been arranged to supplement the conference and provide delegates with excellent technical value, as well as the opportunity of seeing some of Queensland's most interesting and beautiful regions. Persons familiar with projects visited will join the tour at appropriate locations to give technical commentary and answer questions.

Tour Cost:

Option A	Brisbane-Mackay	4 days	\$420
Option B	Brisbane-Mackay-Townsville	6 days	\$520
Option C	Brisbane-Mackay-Barrier Reef	6 days	\$560

Additional Cost for Single Accommodation
The cost of the Tour includes:

Option A \$80 Option B and C \$120
. Comfortable, modern coach travel
. Motel accommodation (twin)
. Breakfast, lunch and dinner
Single supplement is also available.

Not included:

- . The tours end at Mackay and Townsville - Tour participants should arrange their own travel beyond these points.
- . Meals other than specified.

Cancellation Fees:

- . Prior to 31 March 1985, full refund (less \$30 cancellation charge)
- . 31 March - 1 May 1986 - a 50% refund
- . After 1 May 1986 - no refund possible.

Day 1 Saturday 17 May 1986 : Depart Brisbane and travel through the Sunshine Coast, a very popular tourist area and continue via Childers to the sugar cane area of Bundaberg. A tour of inspection, discussion and displays on Bundaberg's irrigation areas and the combined use of surface water and groundwater resources in this area will complete the day. Overnight in Bundaberg.

Day 2 Sunday 18 May 1986 : Travel from Bundaberg through the Burnette Valley and visit an artificial recharge weir and conjunctive use scheme for irrigation development in the Monto area of Three Moon Creek. Continue through the National Park and visit Cania Dam and Cania Gorge a beautiful spot featuring caves and rock formations. Then continue on to another conjunctive use scheme in the rich farming region of the Callide Valley and inspect Callide Dam before arriving at Biloela. Overnight in Biloela.

Day 3 Monday 19 May 1986 : Travel through the Wowan area, where salinity is a problem, and then onto Emerald in the Central Highland to inspect one of the largest surface water irrigation projects in the State - the Emerald irrigation scheme and Fairbairn Dam. Overnight in Emerald.

Day 4 Tuesday 20 May 1986 : Travel through the vast open cut coal mining area of the Bowen Basin. The route takes us to the northern end of the Bowen Basin through Goonyella and Norwich Park coal mines, two of the largest coal mines in Australia. Travel via Sarina to Mackay and visit the world's largest coal export terminal at Hay Point. Overnight in Mackay.

OPTION B

Day 5 Wednesday 21 May 1986 : We travel through the Hibiscus Coast to Proserpine, a busy sugar center and the staging point for the Whitsunday Islands and then to the small crop area of Bowen which has one of Australia's finest natural harbours. Both the Proserpine and Bowen regions have Groundwater over-use problems, which will be inspected and discussed. Continue on to the sugar cane centre of Ayr and observe the Burdekin Delta, the site of Australia's largest artificial recharge works. Overnight in Ayr.

Day 6 Thursday 22 May 1986 : Inspect the Burdekin Delta and the artificial recharge works, which have been successfully implemented to overcome an overuse problem and forestall potentially serious salt water intrusion. Travel through Sugar and Rice growing areas to Townsville, Australia's largest tropical City and nerve centre of North Queensland. Overnight in Townsville and conclusion to tour.

OPTION C

Day 5 and 6 Wednesday & Thursday 21 and 22 May 1986 : Transfer by boat into the wonderworld of the Whitsunday region to Brampton Island. BRAMPTON, the only resort island in the Cumberland Group, 32km north-east of Mackay, is noted for its white sandy beaches and fringing coral. Brampton Island resort has two swimming pools, a six-hole golf course, and tennis courts. Walking tracks lead through the National Park. The Resort can be used as a staging point to explore the Barrier Reef with its many islands. On Thursday return to Mackay or extend your holiday (extensions can be arranged at the Conference Office or directly with the Island Management).

6.2 CANADIAN/AMERICAN CONFERENCE ON HYDROGEOLOGY BANFF, ALBERTA, CANADA 1985

The Second Annual Canadian/American Conference on Hydrogeology, 'Hazardous Waste in Groundwater - a Soluble Dilemma' held in Banff, Alberta in June of this year was enjoyed by IAH members from both Canada and the U.S. A wide variety of excellent presentations ranging from theoretical considerations through case histories on topics related to contaminated areas, hazardous waste disposal, landfill practices, and deep-well injection made this meeting one that was truly outstanding.

Proceedings from the First Canadian/American conference on Hydrogeology - Practical Applications of Ground Water Geochemistry can be purchased from Mika Madunicky, Alberta Research Council, Geology Department, 6th Floor, Terrace Plaza, 4445 Calgary Trail South, Edmonton, Alberta, Canada. T6H 5R7, for \$45.00 plus postage.

6.3 TWENTY-FIRST IAHR CONGRESS

The International Association for Hydraulic Research held their twenty-first Congress at the University of Melbourne between the 19 and 23 August 1981. The overall theme of the Congress was 'Hydraulic Research for Water Management in the Eighties'. Papers presented at the Congress were grouped into one of four general themes. The groundwater theme comprised, subsurface flow, pollutant transport and salinity and the relevant papers are collated in Volume 1 of the proceedings. Sub-themes :

- . Modelling of recharge and subsurface flows 8 papers
- . Natural and Artificial groundwater recharge 4 papers
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