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Activities of the Technical Committee
on Underground Water of the
Australian Water Resources Council
1963-1966

by
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ACTIVITIES OF THE TECHNICAL COMMITTEE
ON UNDERGROUND WATER OF THE AUSTRALIAN
WATER RESOURCES COUNCIL 1963-1966

by

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for

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ABSTRACT

The Technical Committee on Underground Water (T.C.U.W.) is one of three technical committees of the Australian Water Resources Council, which was established in 1963 as a central advisory body for government activities related to underground water resources in Australia.

The items considered so far by T.C.U.W. cover a wide range of subjects the principal of which were - the publication "Review of Australia's Water Resources, 1963" which was issued in 1965 and contains an underground water map of Australia at a scale of 1:5,000,000; an expedited 5-year programme of underground water investigations to assist proposals for a Commonwealth grant to States; the provision of adequate legislation for States and Territories to control the investigation and use of underground water resources; a programme of hydrogeological study of the Great Artesian Basin; training requirements for staff engaged in underground water investigations; publication of information; and methods of storage and retrieval of data.

ACTIVITIES OF THE TECHNICAL COMMITTEE ON UNDERGROUND
WATER OF THE AUSTRALIAN WATER RESOURCES COUNCIL, 1963 - 1966*

INTRODUCTION

The need for joint consultation among underground water government authorities in Australia was recognised early in the 20th century following the large number of bores drilled in the Great Artesian Basin. One of the earliest artesian bores drilled within the Basin was in 1878 at Kallara Station near Bourke in New South Wales, and subsequent drilling and development of bores revealed many problems in investigating and developing underground water; these activities eventually led the New South Wales Government in 1912 to invite other State Governments to form a consultative board known as the Interstate Conference on Artesian Water.

The Interstate Conference on Artesian Water met in 1912, 1914, 1921, 1924 and 1928; all States except Tasmania were represented on the Conference. The aims of the Conference were generally to discuss underground water problems which included terminology, origin of water and cause of flow, outlets, recording of yields, legislation and others; the ultimate aim was to attempt to define the most satisfactory methods and to reach some degree of uniformity in observations.

The Interstate Artesian Conference last met in 1928 and it was not until 1955 when during a conference on the status of hydrology in Australia convened by the Australian Academy of Science that a move was made to revive the Conference with wider terms of reference to include the consideration of all aspects of underground water in Australia. This action by the Australian Academy of Science culminated in the formation of the Underground Water Conference of Australia (U.W.C.A.) which was agreed to by senior State and Commonwealth officers at a meeting in June, 1959.

* Issued by permission of the Deputy Chairman, Technical Committee on Underground Water.

The purpose of the U.W.C.A. was to develop knowledge of and review the underground water resources of Australia. For this purpose the Conference proposed to:

- . collect, collate and publish data on;
- . encourage greater activity in research, investigation and conservation of;
- . sponsor, and co-ordinate (where necessary) investigation of; the underground water resources of Australia.

The membership of U.W.C.A. consisted of officers from the principal Departments and Authorities responsible for the research into, the conservation of and development of underground water in Australia. U.W.C.A. met annually from 1961 to 1963 before it was abandoned and its activities incorporated in a technical committee on underground water as part of the Australian Water Resources Council.

STRUCTURE OF AUSTRALIAN WATER RESOURCES COUNCIL

In late 1962 the Australian Water Resources Council was established as a central advisory body with its principal objective to provide a comprehensive assessment on a continuing basis of Australia's water resources and to extend the measurement and research of these resources. Appendix 1 sets out the details of objectives and functions of the Council.

Membership of the Council consists of State and Commonwealth Ministers whose Departments are responsible for water supplies in the relevant State and Territory. There are eight Ministers on the Council including the Chairman who is the Minister for National Development. The Council is advised by a Standing Committee which in turn is provided with information from three technical committees - research and education; surface water; and underground water. The committee dealing with research and education differs from the other two committees in that its membership is smaller - consisting of 6 - and it appoints advisory panels to examine certain aspects of research and education such as desalination, training of staff, catchment studies, and evaporation measurement. Also the research and education committee often refers matters to both surface water and underground water for advice.

ACTIVITIES OF THE TECHNICAL COMMITTEE ON UNDERGROUND WATER

As mentioned previously the activities of the U.W.C.A. were incorporated in those of the Technical Committee on Underground Water (T.C.U.W.) as part of the Australian Water Resources Council, and as such its main functions are to prepare information and to advise Standing Committee on:

- . assessments of the underground water resources of Australia including reviews of such assessments;
- . methods and adequacy of data collection and analyses and on means of achieving co-ordination and uniformity of, and improvement on, methods and techniques.

To achieve these objectives T.C.U.W. meet annually and its sub-committees meet once or twice during the year. Since its inception in 1963 T.C.U.W. has met three times - in 1964, 1965, and 1966 - and discussed and prepared reports on various items of underground water activities, the principles of which were:

1. Publications of "Review of Australia's Water Resources, 1963".
2. States Grants (Water Resources) Act.
3. Legislation.
4. Hydrogeological Study of Great Artesian Basin.
5. Education.
6. Publication of Information.
7. Data Storage and Processing.
8. Survey of Equipment and Facilities.
9. Exhibition of Hydrogeological Maps.

1. Publication of "Review of Australia's Water Resources Act 1963"

As a first stage in the fulfilment of the main objective of the Council, T.C.U.W. compiled the underground water section of the publication entitled "Review of Australia's Water Resources, 1963", which was issued in 1965. The Review treats the occurrence of undergroundwater in three main rock groups - unconsolidated sediments, porous rocks, and fractured rocks - whose extent is shown on a map of Australia at a scale of 1:5,000,000. It is of interest to note that this map is the first produced showing the occurrence of underground water in Australia as a whole. For

each rock group the distribution of water qualities is shown in five ranges 0 to 1,000; 1,000 to 3,000; 3,000 to 7,000; 7,000 to 14,000; and above 14,000 total dissolved salts expressed in parts per million. Areas of insufficient quality data are also shown. In some places, for instance, in the Great Artesian Basin, where important supplies of water of different quality are obtained from more than one aquifer the general distribution of water qualities of an upper and lower aquifer are shown. It is not possible to depict yields on the underground water map, but examples of achieved yields are given in the legend for each rock group.

Among the findings of the Review were the importance of the unconsolidated sediments in the coastal and inland river systems of eastern Australia as suppliers of large quantities of water. For instance it is pointed out that the unconsolidated sediments of the Burdekin Delta in Queensland covering an area of about 200 square miles yield about 200,000 acre feet per annum, which is greater than the estimated long-term yield of the Queensland part of the Great Artesian Basin covering about 430,000 square miles. High yields up to 100,000 gallons per hour are obtained in the deep alluvials of the Lachlan River in New South Wales, and the alluvials associated with this river and other inland rivers, such as the Namoi and Gywdir, are regarded as the most important source of underground water in New South Wales which are sufficient in quantity and quality for irrigation development.

Although the publication of the Review has shown the broad distribution of underground water in Australia perhaps its most important contribution is highlighting the lack of data and deficiencies in the quality of existing data. There are large areas of Western Australia and the Northern Territory for which information on underground water is lacking; and also in the eastern and northern parts of the Murray Basin for which there is insufficient data on the quality of water obtained from the porous rocks.

2. States Grants (Water Resources) Act

In 1963/64 the Commonwealth Government considered an Act to provide funds for the States to accelerate their investigations of water resources. The purpose of the Act was to enable the State authorities to achieve an adequate coverage of underground water

investigations, which was envisaged would be reached when the capital expenditure on investigational drilling and equipment became relatively small and the ensuing work was related mainly to the collection, recording, and analysis of data. As a guide to the likely amount of funds required for this accelerated programme T.C.U.W. provided Standing Committee with estimates for an expedited 5-year programme which it considered to be realistic as an advanced plan. The programme consisted of some 45 projects which involved doubling of the States total annual expenditure for 1963/64 which was about \$1,100,000. Appendix 2 lists the projects which T.C.U.W. considered were requiring urgent acceleration in 1965-1969.

As a result of Council's negotiations with the Department of National Development, the Commonwealth Government in 1964 assented to an Act known as the "States Grants (Water Resources)" Act, which granted financial assistance to the States in connection with the measurement and investigation of their water resources. The underground water part of the Act allows the Commonwealth to contribute to the States a total amount of up to \$480,000 in 1964/65, \$390,000 in 1965/66, and \$350,000 in 1966/67; contributions were on the basis of \$2 Commonwealth for every \$1 the State increased its expenditure above the 1963/64 amount, and they were distributed according to a formula based on population and area equally weighted. The total additional amount of funds available over the 3-year period of the Act is \$1,830,000 which means an increase of about 55 percent over the 1963/64 rate of expenditure on underground water investigations.

It is not possible to provide details of progress made by the States in their accelerated programmes of investigation, but generally good progress has been made on the projects listed in Appendix 2 and most States have raised their annual expenditures to qualify for the maximum amount of contribution by the Commonwealth.

The Act is being revised to continue beyond 30th June, 1967, and it is expected that the general level of increased expenditure for measurement and investigation of underground water will be maintained.

The Act does not apply to developmental projects and for some underground projects it is difficult to determine whether expenditure is for investigation and measurement or for development. To assist this determination T.C.U.W. is considering a statement which attempts to define the activities involved in the investigation and measurement of underground water.

3. Legislation

Personnel engaged in underground water activities in Australia are fully aware of the need for States and Territories to provide adequate legislation to control the investigation and use of underground water resources in Australia. To assist States and Territories in their negotiations for legislation on underground water, the Council recommended that such legislation should be designed to:

- (i) conserve their existing assets in underground water and to guard against their depletion, damage by poor drilling, construction methods and over-exploitation;
- (ii) prevent contamination of underground waters by the introduction of trade wastes, contaminated surface or sub-surface water and saline waters occupying parts of the same aquifer series;
- (iii) prevent the continuing loss of valuable stratigraphic and hydrological data which results from the operation of drillers not being required to supply information. Much of this data has already been irrevocably lost and collection of the residual may now only be done at very considerable cost by laborious field work by trained personnel;
- (iv) ensure that adequate standards of bore construction are attained and maintained;
- (v) control waste or excessive usage of underground waters resulting from uncontrolled flow from improperly constructed bores or from bores whose mechanical condition has deteriorated; or by excess pumping from non-flowing bores.

Council appreciated that in order to implement the recommendations (i) to (v) the States and Territories concerned should provide for the licensing of all drillers and the licensing of all bores, and they should have the right to apportion the available underground waters between the various licensed users and public authorities. For this purpose it would be necessary to vest the right to use and control underground waters in the Crown.

At present legislation to cover most of the points raised in recommendations (i) and (v) exists in Queensland, New South Wales and the Northern Territory; in Tasmania and Victoria appropriate Bills are being finalised and are expected to go before the relevant Parliaments shortly; in South Australia draft legislation is being amended for submission to Parliament and in Western Australia legislation is being considered.

Until recently Queensland was the only State where legislation vested in an authority (the Irrigation and Water Supply Commission) for the benefit of the Crown the right to the use and flow and to control of underground water. The New South Wales Act 1912-1955 was amended to widen the powers of the Water Conservation and Irrigation Commission. The new Act, which became operative from 30th March, 1966, not only included the vesting of these rights to the Commission but also, among other things, amended the provisions relating to the licensing of drillers. These provisions in New South Wales now include the issue of drillers' licences in four categories depending on the various complexities of drilling - they are (i) simple sub-artesian stock and/or domestic supply bores, (ii) sub-artesian and/or screened and developed bores for irrigation, industrial or other purposes, (iii) artesian bores including deep pressure cementing, and (iv) all types of bores including artesian, screened and developed, and sub-artesian bores. The licences are issued each for a period of three years on payment of a prescribed fee.

4. Hydrogeological Study of Great Artesian Basin

The need for a comprehensive hydrogeological study of the Great Artesian Basin was initially put forth by the Underground Water Conference of Australia; following support by Council a special sub-committee of T.C.U.W. was established in 1965 to prepare a suitable hydrogeological programme for the study of the Basin and a statement on how the programme is to be carried out. Council recognised that it would be desirable for the collation of results to be undertaken by one authority. The State and Commonwealth authorities concerned with the Great Artesian Basin were represented on the Sub-Committee.

The programme was considered under the following headings:

- (i) Geological mapping - the review of the status of regional geological mapping of the Basin in 1965 indicated that 43 1:250,000 Sheet areas have been completed and there were 64 Sheet areas remaining to be mapped. The importance of mapping the intake areas along the eastern margins of the Basin in Queensland and New South Wales of the Basin was recognised and certain sheets in the Queensland and New South Wales part of the Basin were recommended to be given first priority if regional mapping programmes by the authorities concerned.
- (ii) Stratigraphic studies - the Sub-Committee considered a comprehensive stratigraphic study of existing information would take at least 6 man-years and at the moment there was no single authority with the suitable staff available to carry out the study. However valuable contributions to the understanding of the Basin could be made by detailed stratigraphic studies of sections of it, such as that being made in the Northern Eromanga Sub-Basin and that proposed for the southern part of the Basin in New South Wales.

The importance of palynology, sedimentary petrology, geophysical surveying and logging, particularly gamma-ray logging, and shallow stratigraphic boring as aids to stratigraphic studies in the Great Artesian Basin were recognised by the Sub-Committee.

- (iii) Study of the water quality - although analyses are available for most of the existing bores in the Basin and all aquifers intersected during drilling are sampled, the Sub-Committee stressed the importance of resampling to give repeat analyses of at least a representative coverage of bores at not longer than 5-year intervals.
- (iv) Study of aquifer characteristics - the detailed observations and measurements and the systematic studies of the various parameters required for this study are regarded by the Sub-Committee to be beyond the present resources of existing authorities. However these studies would be assisted by existing geological field parties systematically collecting samples of intake beds for porosity and permeability studies, and by establishing river and rainfall stations in intake areas and using this information in conjunction with other studies such as fluctuations of water levels in bores.

The Sub-Committee recommended that the study of aquifer characteristics would also be assisted by establishing post-graduate scholarships to enable research projects on selected topics of the hydrogeological study of the Great Artesian Basin to be undertaken. The broader aspects of establishing scholarships for studies of water resources is being examined by Council and this is discussed under the heading of Education.

- (v) Review and assessment of behaviour of Basins - this task is best commenced when more data becomes available from the studies listed in (i) and (iv), and the Sub-Committee considered it to be a major project which should be undertaken by a single authority. Again there is scope for research projects in this review and assessment such as the

use of mathematical techniques of analysis and the use of computers for storage, retrieval, and analysis of hydrological data.

The present position concerning the hydrogeological study of the Great Artesian Basin is that the recommendations by the Sub-Committee are being considered by the relevant authorities concerned.

5. Education

There are no formal undergraduate courses on underground water in Australia. The subject is only briefly referred to in most Bachelor of Science (Geology) and Engineering degree courses. Post-graduate training in underground water exists only at the University of New South Wales in the form of "Groundwater Hydrology" as one of 13 elective subjects from which 5 have to be selected to fulfil the requirements of the Master of Technology Course in Water Engineering.

The general lack of training facilities in underground water has led most authorities who are fortunate to have a number of officers experienced in underground water hydrology to train their own staff, who are mostly recent graduates in geology and to a lesser extent engineering, to a suitable proficiency.

In 1965, T.C.U.W. assisted this scheme of "in training" by holding a school of about 2 weeks duration at which lectures on most aspects of underground water were given voluntarily by senior experienced officers from various Government authorities. The subjects covered were hydrology, exploration geophysics, hydraulics, pumping tests, drilling techniques, bore construction and chemistry of undergroundwater; and these were designed as a refresher course for practising underground water personnel as well as an introduction to the new graduate recently engaged in undergroundwater activities.

T.C.U.W. is organizing a second school of training on undergroundwater over 2 weeks in May, 1967, which will include similar subjects to those of the 1965 School. The syllabus will be strengthened by lectures dealing with groundwater hydrodynamics, including reference to the determination of safe yields, to be given by an hydrologist from the United States Geological Survey.

It is not the aim of T.C.U.W. to continue to hold the schools on underground water indefinitely and recommendations have been made to the committee on education and research to establish a special B.Sc university course in underground water and a one-year post-graduate (4th year) course at one University. This committee is exploring the possibilities of Universities securing a senior staff appointment of a specialist in underground water hydrology.

In addition to these activities Council has under consideration a submission to the Commonwealth Cabinet on the establishment of post-graduate scholarships for hydrological study both overseas and in Australia. It is proposed that a certain number of the post-graduate overseas scholarships will be allocated specifically for training in underground water. The provision of scholarships in Australia will enable future proposals for short-term post-graduate courses on underground water hydrology to be supported, such as the one-term course proposed by the University of New South Wales in 1968.

6. Publication of Information

The publication of information on underground water has been recently reviewed by T.C.U.W. At present reports on underground water investigations are either published by most State and Commonwealth authorities in their own publication series or included in reports dealing with broader aspects of geology.

In an attempt to define the type of information which is desirable to publish, T.C.U.W. considered that basic data, which refers to details of bores and the results obtained by their subsequent measurements, water analyses, various types of logs etc., need not be published as long as these details are well recorded and preserved in at least two repositories. T.C.U.W. considered however that there is a need for increased publication of reports synthesising the results of studies of the basic data, reports on specific underground water investigations, research projects, hydrology of basins, water quality studies, underground water studies. To achieve this increase in publication additional finance is required particularly for authorities to employ editorial staff.

The Council has established a publication referred to as the "Australian Water Resources Council Hydrological Series" to cater mainly for results of investigations carried out by the Council. It is proposed that the first publication in this series will be the report of the Council's advisory panel on desalination methods and their relevance to Australia. T.C.U.W. has in mind that it would recommend publications in the Hydrological Series of papers on special aspects of underground water, such as the report compiled on nomenclature by Mr. N. O. Jones, Bureau of Mineral Resources, for T.C.U.W.

7. Data Storage and Processing

Earlier discussions in 1961-62 on data storage and processing of underground water information were carried out by U.W.C.A. who recommended the use of edge-punch cards as the first stage of data processing with the ultimate transfer of this data to 80 column punched cards. A suggested design for an edge-punch card was produced by U.W.C.A.

A Sub-Committee of Standing Committee has recently examined the methods of handling and storage of records associated with all elements in the hydrological cycle. The Sub-Committee recommended that:

- (i) hydrological data be stored on either punched cards, punched paper tape or magnetic tape, as appropriate to the individual organization and the type of data. For instance where the data consists of readings taken at particular times it is recommended that punched cards should be used as the initial form of data storage; and for continuous records punched paper tape be used;
- (ii) magnetic tape be adopted as the ultimate form of data storage for all elements of the hydrological cycle; $\frac{1}{2}$ " wide IBM compatible tape is preferred;
- (iii) $\frac{1}{2}$ " wide IBM compatible magnetic tape written in BCD mode should be used where practicable when data are to be transferred between authorities;
- (iv) the initial storage medium for manuscript records should be 80 column punched cards.

The Sub-Committee envisaged that the transfer of data to computer compatible form would be undertaken in stages from the original manuscript, chart, or paper tape records.

As a follow up to the recommendations of Standing Committee, a Sub-Committee of T.C.U.W. is examining the following underground water aspects of data storage and processing:

- (i) material to be recorded in numerical and non-numerical form;
- (ii) units to be used for the data recorded in numerical form;
- (iii) formats for recording numerical data on punched cards and paper tape;
- (iv) standardized formats for data to be transferred between authorities on magnetic tape.

8. Survey of Equipment and Facilities

T.C.U.W. is assisting in a survey of equipment and facilities for the investigation and measurement of underground water resources. The need for this survey arose from the accelerated State programmes in connection with the States Grants (Water Resources) Act for which new equipment is being purchased. The survey will report on the type, use, and effectiveness of geological, geophysical and drilling equipment and facilities used by underground water authorities throughout Australia.

It is expected that the information compiled by the survey will be a useful guide to authorities purchasing new equipment, and in some instances it will highlight the need for developing improved or new equipment.

9. Exhibition of Hydrogeological Maps

A set of about 100 hydrogeological maps were obtained from the International Association of Scientific Hydrology and displayed for about two weeks in 1964 at each of the Australian underground water authorities. The set consisted of maps from Germany, Hungary, Italy, Madura, Morocco, Netherlands, Russia, South Africa, U.S.A. and Tunisia. The maps were well received by Australian authorities and they clearly showed the techniques used by overseas workers to illustrate the various properties of underground water.

Other activities of T.C.U.W. during its inception in 1964 have included assistance to an Editorial Panel of the Hydrological Series Publication, provision of material for the compilation of Australian activities related to the International Hydrological Decade and for the Council's Newsletter which is published twice a year.

CONCLUSION

The Technical Committee on Underground Water has been operative since late 1963; during this period it has provided a means for State and Commonwealth Government authorities to discuss mutual problems, to compile information on the underground water resources of Australia and to bring to the attention of Council various deficiencies in the knowledge of these resources, and to recommend ways and means to improve various activities in the investigation and measurement of underground water.

APPENDIX 1OBJECTIVES AND FUNCTIONS OF THE AUSTRALIAN
WATER RESOURCES COUNCILOBJECTIVES OF THE COUNCIL

The provision of a comprehensive assessment on a continuing basis of Australia's water resources and the extension of measurement and research so that future planning can be carried out on a sound and scientific basis. The assessment would indicate the extent to which availability of water will be a factor in influencing future development. It would show, for instance -

- (a) areas which offer the greatest potential for absorption of population growth from the point of view of availability of unused water resources;
- (b) areas lacking in adequate water resources where special measures may be needed in the bear future to provide opportunities for development.

FUNCTIONS OF THE COUNCIL

- (a) Determine the areas of Australia wherein information is inadequate for the preparation of reliable assessments of water resources because of lack of measurement of precipitation, evaporation, stream flow and underground water.
- (b) Foster water resources measurement and assessment in areas where deficiencies in information are known to exist with a view to establishing records of precipitation, run-off and underground water movement over a long enough period to be of value for future planning.
- (c) Provide collaboration in the broad fields of hydrometeorological research, biological research, the efficiency of engineering structures and the use of

natural water courses as water conveyors with the aim of controlling run-off, decreasing evaporation, transpiration and seepage losses and promoting re-use of water.

- (d) Foster improvements in and standardisation of hydrological measurement, standardisation of analysis and provide a means of publication of the results of such works.
- (e) Promote education in hydrological research and engineering hydrology with the aim of increasing knowledge and the availability of trained personnel.
- (f) Further a close and continuous liaison with overseas and international activities in the field of water resources.
- (g) Provide a means of collaboration in respect of local and overseas investigations in the field of water resources, to assist such investigations and to minimise duplication.
- (h) Promote continuous collaboration between agencies dealing with the conservation of water (both surface and sub-surface) and those agencies concerned with mapping and land use, forests and other natural resources having interrelated problems.
- (i) Review water resources research activities by Government authorities and by non-Government organizations with a view to fostering collaboration in such activities.
- (j) Consider matters submitted by the Standing Committee.

APPENDIX 2INVESTIGATIONS OF UNDERGROUND WATER RESOURCES PROJECTS
REQUIRING URGENT ACCELERATION IN 1965-1969New South Wales

- . Geophysical surveys, compilation of valley bedrock plans, geophysical logging of test bores and water analyses in the Lachlan, Namoi, Murrumbidgee and Macquarie River valleys. The delineation and assessment of the underground water resources of the alluvium in the Lachlan (between Cowra and Hillston) and Namoi valleys,
- . Compilation and assessment of hydrological data and regional geological investigations of the Great Artesian Basin, the Murray Basin and the south-eastern part of the State.
- . Sampling and geophysical logging of bores in the Great Artesian Basin.
- . Inventory of current data leading to assessment and evaluation of information.

Victoria

- . Exploratory drilling, investigations and geochemical study of the relationship between underground water qualities of intake areas and sub-surface reservoirs in the Western District Basin.
- . Exploration, mapping and construction of observation bores in the Central Sunklands Area (Melbourne-Geelong).
- . Mapping, construction of observation bores, determination of aquifer constants, and observation of movement of saline water - fresh water interface in the Murray Basin.
- . Mapping, detailed surveys and exploratory drilling for irrigation supplies in the Gippsland Basin.
- . Study of underground water quality in particular the origin of high nitrate in the volcanic aquifers in the Western District Volcanics.

- . Investigation of the distribution of aquifers in the Northern Valleys and Plains around the margin of the Murray Basin.
- . Investigation of the problem of industrial effluent disposal via bores coupled with the problem of recharging aquifers near Laverton.
- . Evaluation of the sand screens available for the development of sand aquifers.
- . Geochemistry of the mineral waters from springs in the Dalesford - Hepburn district.
- . Drilling for town water supplies.
- . Investigation of shallow aquifers in several irrigation areas.

Queensland

- . Detailed investigation of underground water supplies required for irrigation in the Lower Burdekin, Haughton, Callide, Don and Dee River Valleys.
- . Assessment of the overall performance of the underground water system in the alluvium of the valleys of the upper tributaries of the Burnett River and investigation of stock water supplies in the adjoining hill country. Continuation of investigations to assess groundwater for irrigation in the southern Burnett tributaries.
- . Drilling programme to assess, and provide information for management of the underground water of the Brisbane Valley.
- . Investigation of available groundwater in the Pioneer Valley.
- . Detailed investigation of the aquifer system in the Bundaberg District required for expected doubling in size of irrigated sugar cane over next five years.
- . Continuation of investigations into the availability of underground water in the alluvium of the Condamine River valley.
- . Investigation of underground water resources in the valleys of the Upper Isaacs, Flinders, Gilbert and Proserpine Rivers and the Bowen area.
- . Continuation of collection and analysis of data from the Great Artesian Basin.

South Australia

- . Investigation of underground water from aeolianities on Eyre and Southern Yorke Peninsulas.
- . Investigation of saline water encroachment and fall of the underground water table in the North Adelaide Plains.
- . Flow measurement and investigation of large supplies in the south-east Murray Basin.
- . Flow measurements in the Great Artesian Basin.
- . Investigation of additional water supplies and drilling investigatory bores in the Great Artesian Basin.
- . Investigation of underground water occurrence in hard rock areas.

Western Australia

- . Investigations and exploratory drilling for town water supplies.
- . Investigations to choose drilling sites for bores to provide water supplies to landholders throughout the State.
- . Investigations of potential underground water, including drilling, in the Perth Basin.
- . Investigations of the extent and hydrological characteristics of aquifers in the Perth Metropolitan Area.
- . Geophysical investigations of supplies and salinities in the shallow basement rock areas on the Archaean Shield.
- . Investigation of the underground water occurrence in the "Hills" District near Perth.
- . Regional hydrological survey and drilling in the Esperance Plains.
- . Investigations and test drilling in the Fortescue and De Grey River Valleys in the Pilbara Region.
- . Investigations for irrigation water supplies in the Wiluna Region.
- . Investigations and drilling to assess the aquifers of the Eucla Basin.

- . Collation of hydrological information and possible test drilling in the Fitzroy River Basin.

Tasmania

- . Geological and hydrological studies and drilling in the Launceston Tertiary Basin.
- . Mapping and drilling of exploratory bores in the sub-basaltic deep leads of North-West Tasmania.

Northern Territory

- . Assessment of underground water in Lower Proterozoic dolomites of the Pine Creek Basin, involving drilling, pumping tests, and geophysical surveys.
- . Evaluation of water quality, recharge, drainage characteristics and potential yields of the permeable formations along the northern fringe of the Amadeus Basin and in particular the Mereenie Sandstone near Alice Springs.
- . Assessment of the recharge potential of the Town and Inner Farm Basins using flood waters from the Todd River for possible application to the Alice Springs Water Supply.
- . Exploration and assessment of two perched groundwater basins near Tennant Creek.
- . General assessment of two major aquifers of the Daly River Basin.
- . Investigations including drilling of perched groundwater basins in alluvium overlying impermeable basement rock in the Alice Springs Complex.
- . Collection of all available data and planning further exploration in the Daly and Barkly Basins.
- . Detailed outcrop geology of the dolomites and minor drilling in the Pine Creek Basin.
- . Preliminary investigations of the Port Keats and Arnhem/Carpentaria Basins.