

Work Program 2002-03



A Message from the CEO

The coming year promises to present exciting challenges for our organisation.

Last October's merger of AGSO and AUSLIG to form the new Geoscience Australia and the continued funding in the 2002-03 Budget for our offshore petroleum activities provide us with significant opportunities to make an even greater contribution to the Australian community.

The merger has brought with it an enhanced role for us in the provision of spatial information and is itself a clear statement by Government about the importance it places on the spatial information industry. It is already generating synergies in the development and implementation of on-line data distribution and the development of new spatial data management and interpretation systems.

The Government's new spatial data pricing and access policy presents a particular challenge for us in that our external revenue stream has been significantly reduced, however, I believe the policy is a far-sighted one for industry, which will reap considerable benefits.

Although not part of Geoscience Australia, the new Office of Spatial Data Management has been located with us and we provide support services to that Office, reaffirming our important role in the spatial information arena.

On the petroleum front, the appropriation in this year's Budget reflects well on the important work that we have done in petroleum exploration promotion since 1998-1999. Our work has been instrumental in generating a commitment by industry to offshore petroleum exploration of over \$840 million, with more to come. We will need to demonstrate, through the review of this program being chaired by the Department of Industry, Tourism and Resources, that funding for petroleum exploration promotion should be continued at a level that will bring enough new petroleum on stream to slow the projected decline in Australia's oil self-sufficiency.

Onshore, the challenge for Geoscience Australia is to gain a better understanding of the three- and four- dimensional evolution of the Australian landscape. We need to develop new data-acquisition tools that allow us to probe further under the Earth's surface, better analytical methods to interpret both existing and new geoscience data, and new exploration models that overcome the predictive weaknesses of current models. Industry will then be able to apply these tools to conquering the tyranny of depth – the next big challenge for our mineral explorers.

We are continuing our research into natural and human-induced hazards in our environment. The hazard and risk models we are developing will help communities to put in place measures that will lessen the impact of disasters.

While the scope of these challenges is very broad, indeed daunting, it reflects the critical role that geoscience plays in our lives. I have no doubt that we will meet these challenges head on.

Neil Williams
July 2002

Geoscience Australia's Outcome/Output Structure

Geoscience Australia is the national geoscience research and information agency. It was created on 1 October 2001 with the merger of AGSO and AUSLIG, the nation's national mapping agency.

Our work contributes to enhanced economic, social and environmental benefits for the Australian community by informing decisions which impact upon resource use, management of the environment, and the safety and wellbeing of Australians.

Beneath this broad corporate outcome we have intermediate outcomes and outputs that provide a link with the various projects we undertake each year and the many products and services that we deliver.

At the intermediate level (level 2) our planned outcomes are:

- Enhanced global attractiveness of Australia's offshore and onshore exploration opportunities
- Improved resource management and environmental protection
- Safer communities and transportation

Our intermediate level (level 2) outputs are:

- Geoscience for onshore activities
- Geoscience for offshore activities
- Spatial information

The third level in the hierarchy comprises the specific projects that we undertake, each of which has its own project outcome and a series of products and services such as research reports, maps, datasets, and advice to government and other clients. As well as achieving its own project-specific outcome, each project contributes to the achievement of one or more of the intermediate outcomes and in turn to the corporate outcome.

Geoscience Australia's Organisational Structure

Geoscience Australia has three divisions – Minerals and Geohazards, Petroleum and Marine, and National Mapping – that deliver our geoscientific and spatial information outputs. For the most part there is a one to one relationship between these divisions and our intermediate outputs groups – onshore, offshore and spatial information.

The Corporate Branch, Corporate Information Management and Access Group and Geoscience Australia's Chief Scientist support the three divisions.

1 Geoscience for Onshore Activities

Australia's largest export earner is minerals, contributing about \$500 billion to Australia's wealth over the past 20 years. In 2000 - 2001 Australia's mineral exports were worth \$55.6 billion. Australia is the world's leading exploration destination attracting 17.5% of world mineral exploration budgets.

New and economically feasible mineral deposits must be found to maintain Australia's wealth as existing mines become exhausted. Mining has been responsible for the growth of towns, roads and ports in regional and rural Australia, and has opened up isolated outback areas.

Geoscience Australia reduces exploration risk and encourages investment in Australia through targeted geoscientific surveys and research to locate potential mineral areas. It advises the Government on mineral prospects and potential, resources and mining, and exploration trends. It promotes Australia's exploration opportunities internationally.

This research also provides a basis for sound land resource and environmental management including addressing the problem of dryland salinity, which costs Australia \$270 million per year in lost production and damage to infrastructure. Developing methods to understand and map the movement of salt in the landscape will allow better design of intervention strategies to manage the salinity problem.

Australia is the most urbanised country on Earth. More than 65 per cent of its population lives in five coastal cities. Australia's current population of 19 million is expected to reach 25 million by 2050, and most of this growth will be accommodated in urban areas. Urban growth is spreading into hinterlands and placing pressure on Australia's coastlines and rivers as cities expand and join up.

Cities are built on geological materials and are affected by geological processes. Earthquakes, landslides, floods, storm surge, severe winds, and bushfires can greatly affect urban communities. These natural hazards can damage buildings and interrupt water, power, transport, and communication services, and cause loss of life.

While natural hazards cannot be prevented, governments can reduce their impact by identifying the potential risks and vulnerable areas, and adopting disaster-mitigation measures such as appropriate building codes.

Geoscience Australia monitors and assesses all Earth-surface processes that pose a risk to Australia. It gathers data and develops tools that governments and others can use to make Australia as safe as possible from natural and human-induced hazards.

It also monitors nuclear explosions and carries out research into nuclear explosion discrimination in order to fulfil Australia's commitment to world peace in the region as a signatory to the Comprehensive Nuclear-Test-Ban Treaty. Through AusAID, Geoscience Australia is also called upon to help neighbouring countries such as Papua New Guinea manage natural hazards.

1.1 Minerals Promotion

This work promotes mineral exploration opportunities to the national and international exploration industry.

1.1.1 Minerals Promotion

Outcome

Increased global awareness of mineral exploration opportunities in Australia.

Outputs

- A coordinated Australian Governments' technical promotion at Mining 2002, Brisbane October 30 to November 1, for the Ministerial Council on Minerals and Petroleum Resources (MCMPR).
- A coordinated Australian Governments' technical promotion at Prospectors and Developers Association of Canada's (PDAC) Annual Convention and Trade Show, Toronto March 9-12, 2003 for the MCMPR.
- Research reports and reviews on exploration, discovery and resources.
- Technical promotion of Australia's mineral potential.

1.2. Regional Studies

Projects in this group are primarily carried out under the National Geoscience Agreement (NGA) or through AMIRA International – the Australian minerals industry research association. They are designed to provide pre-competitive geoscience information to promote exploration opportunities and include regional studies and specialist services.

1.2.1 Gawler Mineral Promotion

Outcome

Enhanced mineral exploration strategies and the promotion of the Gawler Craton for mineral exploration

Outputs

- Reports and digital datasets on a regional framework for discovery of Cu-Au in the Olympic Cu-Au province and lode Au deposits in the Gawler Craton, including information on crustal architecture, lithostratigraphy, magmatism, fluids and mineralisation.
- Reports and digital datasets on increasing the effectiveness of exploration in regolith dominated regions of the Gawler Craton, including interpretation of AEM and hydrogeochemical studies.
- Report and online GIS on prospectivity for Archaean Ni-Cu deposits in the Harris greenstone belt.

- Promotion of exploration opportunities for Proterozoic Cu-Au, lode Au and Archaean Ni deposits in the Gawler Craton at the 16th AGC, Minerals Open Day, and at a project workshop for industry.

1.2.2 North Australia Project (NAP) Mineral Promotion

Outcome

Increased exploration activity in and the promotion of the Northern Territory for mineral exploration.

Outputs

- A series of reports and web-based visual products to promote the Au potential of the Tanami Region.
- A series of reports to promote the potential of the Arunta Region for Ni-Cu, Cu-Zn-Pb and Au.
- A series of reports to understand the geological evolution of the North Australia Craton and its mineral potential.
- Promotion of exploration opportunities for Au, Ni-Cu and Cu-Zn-Pb deposits in the Tanami and Arunta at Minerals Open day and AGES.

1.2.3 TASMAR: Understanding Major Geological Elements and Mineral Potential

Outcome

Enhanced exploration strategies and promotion of Tasmania through a better understanding of the tectonic evolution of the region.

Outputs

- Report on the crystallisation ages and the age distribution of inherited zircons for Palaeozoic granites and volcanics from Tasmania, the South Tasman Rise, east Tasman Plateau and Northern Victoria Land.

1.2.4 Geochronology Laboratories

Outcome

Improved age-dating standards.

Outputs

- Report on a comparison of new and current standards for U-Pb geochronology
- Report on Pb migration mechanisms in zircon crystals.

1.2.5 National Geological Events Synthesis

Outcome

Improved understanding of the timing, origin and links between geological events that impacted northern and central Australia during the resource-rich Palaeoproterozoic and early Mesoproterozoic.

Outputs

- A preliminary Event Chart documenting accommodation, igneous, tectonic, metamorphic and fluid migration events during the interval 1900Ma to 1500Ma.
- User requirements for Events Data Model.

1.3 Mineral Provinces

Projects in this group are designed to provide pre-competitive geoscience information to promote exploration opportunities and are primarily focused on key Australian mineral provinces. The projects are carried out under a number of banners, including the National Geoscience Agreement (NGA), Predictive Mineral Discovery Cooperative Research Centre (*pmd**CRC) and AMIRA International.

1.3.1 Broken Hill Exploration Initiative (BHEI)

Outcome

Enhanced exploration strategies for, and promotion of, the Curnamona province as an area of Cu-Au and Pb-Zn mineral potential.

Output

- Geoscience information and concepts to increase understanding of the three-dimensional regional structure and distribution of mineralised sequences in the Olary sub-domain.

1.3.2 Norseman-Wiluna Synthesis

Outcome

Enhanced mineral exploration strategies and the promotion of the eastern Yilgarn Craton through the provision of an improved geological framework of the region.

Outputs

- Online reports, data, and a GIS interface to promote the mineral potential of the eastern Yilgarn Craton.
- Final report on interpretation of MERIWA seismic data.
- Final reports on mineral system research results: integration of geology, geophysics, geochemistry, geochronology, and three-dimensional modelling for the highly prospective Eastern Yilgarn Craton.

1.3.3 Fluid Flow Modelling in the Mt Isa and McArthur Basins (AMIRA International P552)

Outcome

Enhanced exploration strategies for, and the promotion of, the Mt Isa and McArthur Basins through a better understanding of the geochemical and physical characteristics, timing, origin, reactivity and flow history of fluids in the basins.

Outputs

- AMIRA International Project P552 year 3 final report and sponsors meeting containing the integrated results of detailed research activities in this project.
- Two AMIRA International quarterly reports containing an update of current research activities in AMIRA International Project P552.

1.3.4 Predictive Mineral Discovery Cooperative Research Centre (*pmdCRC)**

Outcome

A fundamental shift in mineral exploration practice and cost-effectiveness through improved understanding of mineralising processes and a 4D understanding of the evolution of mineralised terranes

Outputs

- Reports on the results of mineral system-related research.

1.4 National Resources and Land Use Advice

Projects in this group are generally national in character. They include the provision of technical advice and participation in the Cooperative Research Centre for Landscape Environment and Mineral Exploration.

1.4.1 Mineral Resources and Advice

Outcome

Informed decision-making and improved resource management.

Outputs

- Authoritative, independent scientific and technical advice on: — known and potential mineral resources; exploration and discovery (including offshore programs in Commonwealth waters, and uranium as required under the Atomic Energy Act); mining (including under the Environment Protection and Biodiversity Conservation Act); processing; land access and use; environment protection; metals and the environment (including waste management); and sustainable development.
- Information and analyses in relation to the proposed Minerals Exploration Action Agenda, should it go ahead.

- In collaboration with the Minerals Council of Australia and with funding support from the Government's Regional Minerals Program, completion and online commissioning of Stage 1 (core components) of the *Atlas of Australia's Mineral Resources, Mines and Processing Centres*.
- Publication of national resource assessments for 2002 by Geoscience Australia (online) and ABS (hardcopy).
- Second version of mineral potential of Australia GIS (OZPOT)
- Information and analyses for Australia's contribution to OECD/NEA and IAEA publication "Uranium: Resources, Production and Demand".
- Report on uranium developments in Australia for the Joint OECD/NEA-IAEA Uranium Group meeting, China.
- Commonwealth representation on the national Conference of Chief Inspectors Mines and reports from the Conference for the Ministerial Council on Mineral and Petroleum Resources.
- CDs, manuals and webmaps of the Christmas Island and Cocos (Keeling) Island geographic information systems and client support in accord with MOUs.
- Updated web-based maps of renewable energy and fossil fuel power stations for the Australian Greenhouse Office (Renewable Energy and Energy Markets Programs) and Office of Renewable Energy Regulator.

1.4.2 Applications of Regolith Geoscience (CRC for Landscape Environment and Mineral Exploration (CRCLEME))

Outcome

Greater understanding of the three- and four-dimensional evolution of the Australian landscape, leading to better methods of mineral exploration, and a better appreciation of the geological aspects of environmental problems in Australia.

Outputs

- Reports and data on the results of regolith-related research as applied to mineral exploration and environmental problems.
- Scoping study of low-density geochemical survey, SE Australia.

1.4.3 Salinity Mapping (Program 4, CRC LEME)

Outcome

More effective salinity mitigation through greater understanding of the distribution of and mobility of salts in the regolith.

Outputs

- Reports and data on the results of salinity mapping in the National Action Plan for Salinity and Water Quality.

1.4.4 Land Use Advice

Outcome

Informed decision-making in relation to land use planning and environmental protection.

Outputs

- Scoping report on the potential for Geoscience Australia collaboration in integrated multi-disciplinary regional studies aimed at facilitating decisions on natural resources management through enhanced understanding of processes leading to land and water degradation.

1.5 National Projects

Projects in this group are generally national in nature. They include national maps and databases and the Australian National Seismic Imaging Resource.

1.5.1 Geophysical Acquisition, Processing and Databases

Outcome

Enhanced exploration strategies and promotion of mineral exploration opportunities in Australia, and improved environmental management.

Outputs

Databases and products from them:

- An updated gravity point-located dataset from the National Gravity Database
- Gravity survey meta-data available on the Internet.
- An on-line catalogue of government airborne surveys and index maps.
- Magnetic map of Queensland.
- Information and data from National Airborne Geophysics Database and National Gravity Database.

Data acquisition:

- Airborne geophysical datasets from the west Musgrave area.
- Airborne geophysical datasets from the west Tanami area.
- Airborne geophysical datasets from the Riverland – Tintinara and Angus – Bremer areas in SA.
- Gravity dataset from the west Arnhem Land area.

Fundamental gravity network:

- Methodology for the establishment of a first order absolute gravity network and readjustment of existing Fundamental Gravity.
- Report on earth tide corrections for gravity observations.

Methodological research:

- Report on improving the accuracy of spectral noise reduction methods in gamma-ray spectrometry.
- Progress report on application of portable gamma-ray spectrometry to soil mapping.

1.5.2 National Mineral Databases

Outcome

Improved accessibility for national geoscience data.

Outputs

- Updated and enhanced databases, including priority development of:
 - OZCHRON (geochronology database)
 - Australian Stratigraphic Names Database (Australian stratigraphy)
 - OZEVENTS (geological events database)
 - OZCHEM (whole rock and stream sediment geochemistry)
 - OZMIN (mineral deposits database)

1.5.3 National Maps

Outcome

Improved understanding of the geology of Australia and promotion of Australia for mineral and petroleum exploration investment

Outputs

- The eastern part of a seamless digital geological map of Australia at 1:1,000,000 scale.
- The south-eastern part of a national GIS of geological provinces.

1.5.4 Australian National Seismic Imaging Resource (ANSIR)

Outcome

Enhancement of Australia's scientific and industrial competitiveness by keeping Australia at the leading edge of key technological developments in the field of seismic imaging.

Outputs

- Seismic data sets imaging the Earth's crust for projects approved by the ANSIR Management Advisory Board.
- Extension of Seismic Survey meta-data Database to include tables containing ancillary data which link with online maps.

1.6 Geochemistry and Metallogeny

Projects in this group undertake specialist studies in geochemistry and metallogeny with an emphasis on regional to district scale parameters that enhance an understanding of the controls on the distribution in space and time of Australian Ore deposits and facilitate the development of empirical exploration models. The work of this group in part contributes to the *pmd**CRC.

1.6.1 Minerals Geochemistry Research and Development

Outcome

Improved geochemical understanding and practical techniques.

Outputs

- Documentation of business processes and archiving of all instrumental data to standards specified in Archives Act of 1983.
- Analytical services to other Onshore projects.
- Transfer protocols for services and geochemical data to W3C Standards

1.6.2 Australian Metallogeny

Outcome

Improved understanding of Australian mineral deposits with emphasis on their relationship in space and time to regional petrographic and tectonic features of the Australian Crust.

Outputs

- User requirements for data models for metallogenic properties of certain Australian rocks.
- Presentation of Metallogeny results.

1.7 Urban Risk

Projects in this group focus on developing risk assessments and methodologies, data collection techniques, and information management and analysis.

1.7.1 Risk Modelling

Outcome

Improved natural hazard risk assessment through better modelling capability.

Outputs

- An earthquake hazard risk assessment methodology and computational tools for use in Australia.
- Report on the development of hazard and risk models for coastal storm surge, riverine flooding, wind and severe climatic events.
- Report on landslide hazard and risk modelling and its application to Wollongong.
- Post-disaster hazard and impact data on geohazard events within Australia.

1.7.2 Nuclear Monitoring

Outcome

Support for Australia's commitment to the establishment of the global verification system to monitor future compliance to the Comprehensive Nuclear-Test-Ban Treaty and enhanced national technical means to monitor nuclear explosions.

Outputs

- Technical advice and information provided to the Departments of Foreign Affairs and Trade, Prime Minister and Cabinet, Defence, the Comprehensive Nuclear-Test-Ban Treaty Organisation (CTBTO), and the media, to meet Australian national technical requirements and obligations to the Comprehensive Nuclear Test-Ban Treaty (CTBT).
- Enhanced discrimination procedures developed for Australia and the international community to improve Australia's capability to discriminate nuclear explosions.
- Report to the CTBTO on improved methodologies to characterise signals recorded on the CTBT hydroacoustic system.
- Provision of data to the CTBTO through operation of a National Data Centre on behalf of Australia's National Authority to meet Australian national technical requirements and obligations to the CTBT.
- Installation of CTBT monitoring stations in Australia to meet Australia's CTBT obligations in building a global verification system.

1.7.3 Cities Project Perth

Outcome

- Increased awareness and improved capability of communities to manage the risks from a range of natural hazards.

Outputs

- Preliminary models, products and research results for natural hazard risk assessment (earthquake, flood, wind, landslide and coastal erosion).
- A preliminary vulnerability model for direct economic loss developed with key stakeholders and consultants.
- Information and advice about natural hazards for stakeholders, including the community at large, through workshops, publications, newsletters and other communication activities.

1.7.4 Earthquake Hazard and Neotectonics

Outcome

- Reduced social and economic costs of the effects of earthquakes.

Outputs

- Advice and seismic information to government agencies and other clients, of potentially damaging earthquakes and tsunamigenic events in the Australian region.

- A revised seismicity model for Australia based on neotectonics and paleoseismological investigations for input and improved earthquake hazard assessment.
- A regional ground motion model applicable to Australia for input to earthquake hazard studies.
- Physical upgrade of the Rabaul network in line with contractual obligations to AusAID.

2 Geoscience for Offshore Activities

Australia has more territory under the sea than land surface. It is an island continent with more than 35 thousand kilometres of mainland coastline and 964 estuaries that empty into coastal waters. Australian Marine Jurisdiction extends over 200 kilometres beyond its shores and includes a large area of Antarctica, as well as Heard, Macquarie, Norfolk, Lord Howe, Christmas and Cocos (Keeling) Islands, and waters around these territories.

Our offshore areas have a unique biodiversity, ecosystems and valuable fisheries. They also house most of Australia's oil and gas reserves. Under the United Nations Convention on the Law of the Sea, Australia has significant management responsibilities for its marine jurisdiction.

Australia needs to know the extent of its continental shelf, the shape and composition of its ocean floors, and where it has oil and gas resources. It also wants to know what effect estuaries, many of which are outlets for major rivers that traverse hundreds of kilometres through agricultural land and major towns, are having on coasts and ocean ecosystems. Australia is obtaining that data through Geoscience Australia's research in ocean and coastal geoscience.

Geoscience Australia researches and advises government and industry on Australia's petroleum prospects, reserves and potential. Its work is used by the Australian Government to attract international exploration investment to search for petroleum and hence sustain Australia's indigenous oil supply into the future. On current trends Australia's oil production will decline by around 50% over the next 5-10 years.

Geoscience Australia also provides technical data to define Australia's offshore boundaries, and geoscience knowledge for regional marine planning and environmental management of Australia's oceans and coasts.

2.1 Petroleum and Regional Geology

Projects in this group undertake the regional studies to assess the geological risks of petroleum occurrence, and underpin assessment of petroleum potential and promotion of prospectivity. They also provide regional studies to underpin definition of offshore boundaries under the United Nations Convention on the Law of the Sea.

2.1.1 North and Northwestern Region

Outcome

An improved understanding of the current state of knowledge of the petroleum prospectivity and resource potential of the northern and northwestern offshore region of Australia to underpin promotion of selected areas for petroleum exploration and an improved understanding of petroleum potential and aspects of exploration risk.

Outputs

- Scientific advice on the petroleum potential of the NNW Australian region to government and industry for the annual acreage release process and promotion of exploration investment.
- An assessment of the remaining hydrocarbon resources of the Bonaparte and Browse basins, offshore Australian basins.
- A database and report on the geochemistry of oils and oil families of offshore Western Australia (Oils of WA 2).
- A report on geochemical characteristics of hydrocarbon families and oil-source correlations in the Vulcan Sub-basin.
- A report on the application of the SANS/USANS technique to identify effective source rocks in the Browse Basin.
- A study into aspects of the petroleum geology of the Browse Basin to promote petroleum exploration.
- A report on geohistory and hydrocarbon expulsion modelling in the Petrel Sub-basin.
- Upgraded regional source rock maps for NNW Australia.

2.1.2 Southern Region

Outcome

An improved understanding of the petroleum potential of the offshore southern region of Australia to underpin promotion of selected areas for petroleum exploration, including an understanding of potential economic values, petroleum potential and aspects of exploration risks.

Outputs

- Scientific advice on the petroleum potential of the southern offshore region of Australia to government and industry for acreage release and planning purposes.
- A study of the geology and petroleum prospectivity of the Otway Basin to underpin future promotion of the area for petroleum exploration, and to provide an understanding of potential economic values.

- A study into aspects of the petroleum geology of the Bight Basin to underpin future promotion of the area for petroleum exploration, including prospectivity studies, structural mapping, and utilisation of 3D visualisation tools.
- A study into aspects of the petroleum geology of the Bass Basin to underpin future promotion of the area for petroleum exploration, including an integrated sequence stratigraphic analysis and geochemical characterisation of known and potential petroleum systems.
- An integrated margin-scale synthesis of the tectonostratigraphic evolution and petroleum geology of the southern margin basins of Australia, to underpin future promotion of the area for petroleum exploration, and to provide an understanding of potential economic values.

2.1.3 Eastern and Onshore Region

Outcome

Informed decision-making on petroleum exploration opportunities and acreage release and improved understanding of petroleum potential and decreased exploration risk.

Outputs

- Scientific advice to government and other clients on the geoscience of eastern and onshore areas for acreage release and regional planning purposes.
- Assessments of the petroleum prospectivity of basins straddling the eastern seaboard, including the Sydney, Lorne, Clarence-Moreton, Ipswich, Nambour and Maryborough basins, plus ongoing studies on the Lord Howe Rise, for the purposes of underpinning advice to government and selected acreage release.
- Assessments of the petroleum prospectivity of the Cooper-Eromanga, Bowen-Surat, Georgina, Lakefield-Laura, Amadeus and Officer Basins for the purposes of underpinning advice to government, and assist in promoting Australia as a preferred exploration destination.
- A report on the geochemistry and geological setting of Australia's principal source rock intervals.
- Geochemical and other joint studies with the States/NT to reduce perceptions of risk in the Darling and Georgina Basins.

2.1.4 Australian Basins Information Management Systems (AusBIMS)

Outcome

Improved accessibility of data and knowledge relating to the regional petroleum geology and prospectivity of Australia's sedimentary basins.

Outputs

- A new Geographic Information System (GIS) of Australian basins to underpin advice, research and petroleum prospectivity assessments.
- A new database of Australian basins capturing basic knowledge and key maps to underpin advice, research and petroleum prospectivity assessments.

2.1.5 Basement and Crustal Studies (BCS)

Outcome

Improved understanding of the role of crystalline basement in the formation and development of sedimentary basins in the Australian Marine Jurisdiction.

Outputs

- An evaluation of new regional data and review of previous studies of the Otway Basin basement character, crustal type and thickness to provide constraints for studies of basin evolution and regional petroleum geology.
- A prototype database of seismic velocity information applicable to converting seismic two-way times to depths.
- New regional grids and interpretations of crustal structure to underpin studies of Australia's regional setting and geological evolution.
- Scientific advice on sediment thickness, basin boundaries, crustal types and thickness, and heat flow in the Eastern and NNW regions for constraining studies of crustal evolution and regional petroleum geology.

2.2 Petroleum Promotion and Specialist Studies

Projects in this group undertake formal assessments of petroleum potential, technical promotion of the annual acreage release round and specialist studies in geochemistry, biostratigraphy and geological disposal of carbon dioxide.

2.2.1 Petroleum Geochemistry – Research and Development

Outcome

Fundamental research and development of new tools, including databases, to address exploration uncertainty about the distribution and characteristics of petroleum source rocks, migration pathways, and reservoir accumulations of hydrocarbons. This work in part contributes to the Australian Petroleum Cooperative Research Centre (APCRC).

Outputs

- Reports on tools and techniques for correlation of hydrocarbon sources and their accumulations using isotopes, biomarker signatures, and other geochemical parameters.
- Development of the ORGCHEM database for additional data capture and external user access through the APCRC web site, as part of APCRC Program 5.
- A report on analytical protocols between Curtin University, CSIRO and Geoscience Australia to provide consistent data between all laboratories within Program 5 of the APCRC.
- A report on the Geochemistry R&D group protocols used for routine assessment of source, maturity and correlation of hydrocarbons.
- Report on the uses of carbon isotopes and palynology to address critical events across the Permian-Triassic Boundary.

2.2.2 Australian Petroleum Cooperative Research Centre (APCRC) – GEODISC Program (Geological storage of carbon dioxide)

Outcome

Integration and database archiving of compatible research results from all projects within the APCRC GEODISC Program with ESSCI (Environmentally Sustainable Site for CO₂ Injection) site data.

Outputs (subject to finalisation of APCRC GEODISC Program)

- A series of GIS datasets for all projects of the GEODISC Program, from available and compatible spatial datasets, especially those from Project 2 – Site Specific Studies
- Design and initial development of Oracle databases to be integrated with the GIS datasets; to include ESSCI risk data sets, spatial GIS data and the Geoscience Australia Heat Flow data set

2.2.3 Petroleum Promotion and Prospectivity Assessment

Outcome

Broad awareness and acceptance of the technical opportunities of the acreage offered by the Australian government for petroleum exploration investment, and an effective assessment of petroleum potential of offshore Australian basins to underpin advice on petroleum prospectivity for planning purposes.

Outputs

- A report and seminars on the 2003 acreage release to the Australian and international petroleum industry.
- Report on improvements to the AUSTPLAY resource assessment software, with development of links to Oracle databases.
- A report on the resource assessment of Gippsland and Otway basins, jointly conducted with the Victorian Department of Natural Resources and Environment (NRE).
- Promotion of Australia as an attractive exploration destination at national and international petroleum conferences and a report on market intelligence gained at these meetings.

2.2.4 Timescales – Virtual Centre of Economic Micropalaeontology & Palynology (VCEMP)

Outcome

The maintenance and development of the geological timescale for national application, through improved resolution of biostratigraphic zonations, with emphasis on those parts of the stratigraphic column where economic resources are important. The VCEMP is jointly established between Geoscience Australia, the University of Western Australia, and the British Geological Survey.

Outputs

- Establish business processes from future planning and decision making for the Virtual Centre of Economic Micropalaeontology & Palynology (VCEMP), and provide a forward program.
- A revision of Late Cretaceous (Santonian) biozones used by Industry, including updating of the biozonations in the STRATDAT database (VCEMP project).
- Report on Sr/Sr and palaeontological dating of Jurassic and Cretaceous shelly faunas from the North West Shelf (VCEMP project).
- A report on palynofloras from a proposed global reference section for the non-marine Permian/Triassic.

2.3 Petroleum Technical Advice

Projects in this group provide technical advice to government on the administration of the petroleum industry in Australia. They are also responsible for the administration and availability of industry and Geoscience Australia geoscientific data.

2.3.1 Exploration Advice

Outcome

Improved scientific resource management and environmental protection through the provision of scientific advice on exploration, environmental issues and other upstream petroleum matters.

Outputs

- Advice about exploration issues including exploration permits, award of vacant acreage, analysis of release data, exploration strategies and protocols relating to the P(SL)A.
- Advice on environmental and marine issues relating to the Petroleum (Submerged Lands) Act.
- Advice about upstream petroleum industry activity.

2.3.2 Petroleum Engineering and Identified Resources

Outcome

Improved resource management through the provision of engineering and scientific advice on petroleum developments and the extent and rate of production of Australia's identified petroleum resources.

Outputs

- Advice about petroleum engineering issues and identified resources for agencies which administer the P(SL)A, Excise Tariff Act, Petroleum Resource Rent Tax Assessment Act, Trade Practices Act and the Joint Petroleum Development Area (JPDA).
- Engineering and production geological reports on Australian Petroleum Accumulations.

- Contribution of identified petroleum resources, development, production, forecasts and sufficiency components to Oil and Gas Resources of Australia 2001 (OGRA).

2.3.3 Petroleum Information and Data Management

Outcome

Provision of comprehensive and accurate petroleum exploration data for Geoscience Australia projects and industry through management and population of petroleum databases. Databases include PEDIN, STRATDAT, RESFACS, ORGCHEM and DEVIANT.

Outputs

- Oracle databases migrated to the Database Corporate Model.
- PIMS database of seismic surveys and also incorporating information on collections such as oil and gas samples, and Orgchem rock samples.
- An Oracle database of petroleum industry activity statics.
- Client support for users of PMD's Oracle Databases.
- Petroleum exploration statistics to support production of the annual Oil and Gas Resources of Australia publication and quarterly exploration reports.

2.3.4 Geophysical Processing and Data Access

Outcome

Ready access for clients to marine and petroleum geophysical datasets and metadata.

Outputs

- Processed marine and petroleum seismic and non-seismic geophysical datasets and associated metadata.
- OZMAR-2 Oracle database of navigation, bathymetry, gravity and magnetic data, and survey metadata.
- Bathymetric grids at 250m cell size for the Australian region.

2.3.5 Data Repository

Outcome

Public access to data and information acquired by Geoscience Australia or submitted to government under legislation.

Outputs

- A collection of petroleum exploration and other geoscientific information, including digital seismic field and processed data and related reports, and reports from drilling, other sampling and analysis.
- A collection of petroleum, mineral, geological and palaeontological specimens and samples.

2.4. Marine Geoscience and Environment

Projects in this group undertake studies to define Australia's Marine Jurisdiction under the UN Convention on the Law of the Sea, regional studies of the bathymetry and character of the seabed to underpin regional marine regional marine planning, and evaluate estuarine health for coastal management purposes.

2.4.1 Seabed Mapping and Characterisation

Outcome

Improved understanding of the relationships between oceanographic processes, marine geology, benthic habitats and the ocean environment to assist in Regional Marine Planning, establishment of Marine Protected Areas and the management of the Australian Marine Jurisdiction.

Outputs

- Geomorphic units map of the Australian marine jurisdiction.
- Marine geoscience in support of regional marine planning:
 - A report reviewing marine geoscience work carried out in the Northern Australian Region
 - Conduct a survey on *RV Southern Surveyor* in the Gulf of Carpentaria
 - A report on the sediments and bioregionalisation of Bass Strait
- A proposal to National Oceans Office to develop the currents component of the GEOMAT model of the Northern Region of Australia.
- A report on the *RV Franklin* Cruise FR1/02 (Geoscience Australia cruise 234) – Torres Strait.

2.4.2 Law of the Sea – Australia and its island territories

Outcome

Definition of the outer limit of the extended Continental Shelf around Australia and its island territories, and the submission of the particulars of the outer limit and supporting information to the UN Commission on the Limits of the Continental Shelf (CLCS). The project is conducted in association with the Department of Foreign Affairs and Trade, and the Attorney General's Department.

Outputs

- Advice, reports and maps related to maritime boundary negotiations and continental shelf definition around Australia and its island territories.
- Participation in the deliberations of the United Nations Commission on the Limits of the Continental Shelf (CLCS) by Commissioner, and associated activities.
- GIS and supporting documentation comprising Australia's CLCS submission for extended Continental Shelf in the following regions:
 - Great Australian Bight region
 - Kerguelen Plateau region
 - Lord Howe Rise region
 - Exmouth/Wallaby Plateaux region

- Norfolk/Three Kings Ridge region
- South Tasman Rise region
- Macquarie Ridge region

2.4.3 Australian Antarctic & Southern Ocean Profiling

Outcome

Increased knowledge of the bathymetry, seabed characteristics and geology of the Southern Ocean adjacent to the Australian Antarctic Territory (AAT) to underpin definition of the outer limit of the extended Continental Shelf around the AAT. This will place Australia in a position to make a submission to the UN Commission on the Limits of the Continental Shelf, should it decide to do so, and will provide information in support of regional marine planning and environmental management under Australia's Oceans Policy.

The Department of Finance and Administration manages this project. Geoscience Australia carries out its component under a Service Level Agreement.

Outputs

- Databases from Survey 229 conducted along the Antarctic Margin – non-seismic data, seismic data, and Law of the Sea parameters.
- Interpretation of Survey 229 geophysical data.

2.4.4 Geoscience for Coastal Waterway Management

Outcome

Improved decision making in the areas of natural resource management and environmental conservation in the coastal zone.

Outputs

- A report to the Water and Rivers Commission (WRC) on the benthic fluxes occurring in Torbay Inlet and Lake Powell, Western Australia.
- Report on the benthic processes occurring in Lake Wollumboola, NSW.
- Report to the Water and Rivers Commission (WRC) on sediment nutrient concentrations and their link to catchment clearing, and the change in sediment characteristics and sedimentation rates in SW Western Australian estuaries.
- Report on nutrient concentrations and sedimentation rates in Eastern Australian estuaries, including Wallis Lake acoustic diversity profiling.
- A pilot for a national Coastal Geoscience Database – Cape Yorke Peninsula

2.4.5 CRC – Coastal Zone, Estuary and Waterway Management

Outcome

Improved management of Australian estuaries and coastal waterways.

Outputs

- An enhanced version of the OzEstuaries database.

- A report, which reviews the currently available estuary education material and scopes the development of an estuary action education package.
- Conceptual models of biological, sedimentological and hydrological processes in estuarine environments.
- A web-based information and education tool to help managers and researchers utilise and develop indicators for estuarine and waterway health.
- A report documenting how satellite and airborne sensors data can be used to provide spatial indicators of ecosystem health at a national scale.

2.4.6 Geological Framework of Australian Marine Jurisdiction

Outcome

An increased understanding of the geological framework of the Australian Marine Jurisdiction and enhanced geoscientific knowledge of the Australian marine environment.

Outputs

- Marine geoscience studies:
 - Geoscience Australia Record and external publication on RV *Franklin* geoscience cruise (FR 9/01) to Lord Howe Rise
 - Reports on offshore Tasmanian geology in external publications
 - Participation in RV *Southern Surveyor* sampling cruise (SS 2/03) in the Norfolk Basin in conjunction with Universities of Tasmania and Sydney
 - Planning and participation in RV *Marion Dufresne* cruise to Australian Southern Margin in cooperation with National Oceans Office
 - Proposal for RV *Southern Surveyor* geoscience cruise in 2003/2004 to Kenn Plateau in cooperation with University of Sydney
- Marine geoscience advice and information.
- Planning and advice associated with the Ocean Drilling Program (ODP).
- Reports on ODP Leg 189 in the offshore Tasmanian region in external publications.

2.4.7 Antarctic CRC and Antarctic Science Administration

Outcome

Maintenance of the Antarctic Treaty System and enhancement of Australia's influence within the System; protection of the Antarctic environment; and improved understanding of the role of Antarctica in the global climate system.

Outputs

- Synthesis paper and editorial work on Scientific Results Volume for ODP Leg 188 to Prydz Bay.
- Summary papers on Antarctic CRC palaeoclimatic research.
- Pilot GIS and database of topography, geomorphology and geology of the Australian Antarctic Territory – Loewe Massif, Manning Massif, Pagodroma and Beaver Lake area.
- Collection of multibeam bathymetry and sediment core samples from the continental margin of the Australian Antarctic Territory by the French vessel *RV Marion Dufresne*

3 Spatial Information

Australia has an area of more than 7.5 million square kilometres and a coastline that is almost 60 000 kilometres long.

Accurate maps and spatial data are critical, whether they are for recreation, business or government. Satellite imagery is used for mineral exploration, environmental management, agriculture and map revision. Fisheries, immigration and customs authorities also need to know the location of our offshore boundaries.

Geoscience Australia provides this essential geographic information as well as the geodetic framework that underpins all accurate mapping and global positioning systems in Australia.

Geoscience Australia's small and medium scale topographic mapping programs provide Australia with national coverage. They provide users with both maps and high quality digital data that are essential for the nation's defence and emergency services, tourism and business applications.

Operating within Geoscience Australia is the nation's major satellite remote sensing agency, ACRES, which acquires, maintains and periodically refreshes a comprehensive archive of satellite remotely sensed data over Australia. Imagery is downlinked at its receiving stations in Alice Springs and Hobart and the data is processed and archived in Canberra into a wide range of digital products.

Digital map data and satellite imagery are used by many industries for environmental monitoring, site planning, risk assessment, map production, demographic analysis and navigation. Satellite imagery is also essential for updating national topographic maps.

Geoscience Australia uses space geodesy techniques to measure movement of the Australian landmass and provides the basis for all Australian spatial information. Through the Space Geodesy Analysis Centre, it contributes to the global geodetic infrastructure and to the understanding of global change processes.

Geoscience Australia is responsible for defining Australia's maritime boundaries which have strategic, economic and environmental implications for Australia. Significant users of maritime boundaries information include the fishing industry, customs and surveillance, exploration companies and legal authorities.

Geoscience Australia also operates the integrated geophysical network that carries out synoptic observations of earthquakes, nuclear explosions, the geomagnetic field and tsunamis. As well as informing Geoscience Australia's work on geohazards and nuclear monitoring, these observations reduce the risk of navigation (magnetic compass) errors, assist the exploration industry and provide a framework for solar-terrestrial physics research.

3.1 Spatial Information Product Management

Outcome

Industry, government and the Australian community are aware of and able to access spatial information products that meet their evolving needs.

Outputs

- Development of spatial information product strategies that address customer requirements and release of new spatial information products to a consistent standard (quality, pricing, formats, documentation and packaging).
- Implementation of a promotional strategy on spatial information products.
- An effective network of distributors for products that promotes access to spatial information products and industry participation in their distribution.
- Quality accreditation of National Mapping Division to ISO 9000:2000.
- Contribution to the coordination and cooperation of Federal / State / Territory surveying and mapping programs.

3.2 National Geodetic Operations

Outcome

An enhanced fundamental positional framework over Australia and its offshore territories as the basic framework for all national spatial information activities.

Outputs

- A consistent, accurate and accessible National Geodetic Infrastructure for Australia and its territories as the basis for all spatial information activity.
- Acquisition and on-line distribution of observed space geodetic data to support national and international geodetic programs.
- Represent Australia's interest in key international and national Geodesy forums.
- Consistent and current technical information to Government, business and the public.
- Establishment and provision of data from the continuous GPS base station network for the South Pacific Sea Level and Climate Monitoring Project.

3.3 Space Geodesy Analysis

Outcome

Improved celestial and terrestrial reference frames, which provide the foundation to monitor, model and hence predict physical changes in the Earth's systems.

Outputs

- Space geodesy solutions for determining global, regional and local geodynamics for the maintenance and enhancement of the terrestrial and celestial reference frames.
- Monitoring of the movement of the Australian plate for maintenance of the Geocentric Datum of Australia within the global terrestrial reference framework.

- An accurate GPS height time series for determining regional absolute sea level, including the South Pacific.
- An effective on-line GPS processing service

3.4 National Satellite Remote Sensing Program

Outcome

Industry, government and the Australian community have access to satellite imagery and associated products and services that meet their evolving needs.

Outputs

- High quality data acquisition, cataloguing and archiving of fundamental satellite remote sensed data sets.
- Supply of high quality remotely sensed imagery products to our customers
- Development of the remote sensing industry through research and development and service support.
- A bureau information service for satellite remote sensing data for industry, and government.
- A continuing and viable national archive of satellite data

3.5 National Topographic Map Production

Outcome

Industry, government and the Australian community have access to national scale topographic information to meet their evolving needs.

Outputs

- 'Series 2' national topographic maps and data coverage at 1:250,000 scale completed and revision program commenced.
- Coordination and management of Defence (DIGO) onshore topographic map and digital data production.
- Publicly accessible atlas maps and associated digital data.

3.6 National Topographic Database Development

Outcome

Industry, government and the Australian community are able to access national topographic databases and associated products to meet their evolving needs.

Outputs

- Development of an object oriented spatial database for 'seamless' access to national scale, fundamental topographic and related thematic data.
- An updated national land tenure database for use in mapping applications.

3.7 National Maritime Boundaries

Outcome

Industry, government and the Australian community have access to national maritime boundary information and associated products to meet their evolving needs.

Outputs

- Advice, reports, maps and associated data relating to Australia's maritime boundaries including assistance in international delimitation negotiations, and enhanced access to maritime boundary information.
- Maps, geodetic advice, computations and related assistance on Australia's submission to the United Nations Commission on the Limits of the Continental Shelf (CLCS), including work within Australia's Antarctic Territory (AASOP Project).

3.8 Integrated Geophysical Network

Outcome

Effective national capabilities in geophysical risk assessment provided through associated Geohazard projects, and geophysical data underpinning mineral exploration, navigational accuracy.

Output

- Seismic, geomagnetic, infrasound and hydroacoustic data, models and information for the Commonwealth Government, States/Territories and International seismological and geomagnetic agencies, through the operation of an integrated national geophysical network and databases.

Corporate Initiatives and Priorities

Corporate Branch will complete the following key projects to improve the organisation's effectiveness over 2002-2003:

- Complete market testing/outsourcing of the organisation's information technology infrastructure.
- Move National Mapping Division into Symonston headquarters.
- Find a tenant for the Scrivener Building at Bruce.
- Introduce the I-procurement and I-expenses modules of Oracle Financials across the organisation to devolve greater responsibility to operating divisions.
- Maintain and improve the graduate trainee program.
- Improve Geoscience Australia's introduction program for new staff.
- Action Executive Board decisions flowing from the Staff Survey 2002.
- Establish a new Geoscience Australia rewards and recognition policy in the light of the NMD merger.
- Review project management training needs across the organisation.
- Review performance of key contracts for facilities management of the Symonston building, payroll processing, financial systems bureau services, and the secure internet gateway.

The Corporate Information Management and Access Group [CIMA] will:

- Complete the re-engineering and integration of information management capabilities previously duplicated at the Symonston and Bruce sites - specifically Internet, Intranet and Product Distribution Support Systems.
- Complete a major revision of the Information Management Plan to provide a 5 year strategic vision for information management initiatives in Geoscience Australia.
- Complete implementation of the Electronic Document Management System (EDMS) in Geoscience Australia, including the incorporation of National Mapping Division record keeping requirements, in accordance with the recommendations of ANAO Audit Report No. 45 2001-02.
- Progress implementation of the Commonwealth Spatial Data Pricing and Access Policy by increasing the number of Geoscience Australia datasets available on-line, and improving both the on-line and off-line access mechanisms.
- Complete an audit of Geoscience Australia's spatial information holdings and develop policies for the long term preservation or disposal of these holdings as appropriate.
- Implement new cooperative map and data distribution arrangements with the Defence Imagery and Geospatial Organisation (DIGO).

Extract from Geoscience Australia's Budget Statement in the Industry, Tourism and Resources Portfolio Budget Statements 2002-03

Section 3: Budgeted financial statements

Table 3.1: Budgeted Departmental Statement of Financial Performance for the period ended 30 June

	Estimated actual 2001-02 \$'000	Budget estimate 2002-03 \$'000	Forward estimate 2003-04 \$'000	Forward estimate 2004-05 \$'000	Forward estimate 2005-06 \$'000
Revenues from ordinary activities					
Revenues from government	83,681	(K1) 89,016	85,912	86,885	87,871
Sales of goods and services	9,457	7,842	8,645	8,851	9,039
Interest	528	300	300	300	300
Dividends					
Proceeds from sales of assets					
Net foreign exchange gains					
Other	16,697				
Total revenues from ordinary activities	110,363	97,158	94,857	96,036	97,210
Expenses from ordinary activities (excluding borrowing costs expense)					
Employees	41,065	43,000	44,720	46,510	48,370
Suppliers	46,307	44,159	40,479	40,116	39,123
Grants					
Depreciation and amortisation	5,849	6,955	6,613	6,365	6,672
Write-down of assets					
Value of assets sold					
Net foreign exchange losses					
Other					
Total expenses from ordinary activities (excluding borrowing costs expense)	93,221	94,114	91,812	92,991	94,165
Borrowing costs expense					
Net surplus or deficit from ordinary activities	17,142	3,044	3,045	3,045	3,045
Gain or loss on extraordinary items					
Net surplus or deficit	17,142	3,044	3,045	3,045	3,045
Capital use charge	3,045	3,044	3,045	3,045	3,045
Net surplus or deficit after capital use charge	14,097	-	-	-	-

**Table 3.2: Budgeted Departmental Statement of Financial Position
as at 30 June**

	Estimated actual 2001-02 \$'000	Budget estimate 2002-03 \$'000	Forward estimate 2003-04 \$'000	Forward estimate 2004-05 \$'000	Forward estimate 2005-06 \$'000
ASSETS					
Financial assets					
Cash	17,258	17,824	17,983	17,260	16,847
Receivables	1,223	925	946	968	968
Investments					
Accrued revenues	782	500	500	500	500
Other					
Total financial assets	19,263	19,249	19,429	18,728	18,315
Non-financial assets					
Land and buildings	4,334	4,104	3,874	4,072	4,078
Infrastructure, plant and equipment	21,019	18,456	19,579	19,656	21,450
Inventories	1,067	1,067	1,067	1,067	1,067
Intangibles	2,145	2,039	2,451	2,719	2,537
Other	1,623	1,657	1,691	1,727	1,727
Total non-financial assets	30,188	27,323	28,662	29,241	30,859
Total assets	49,451	46,572	48,091	47,969	49,174
LIABILITIES					
Debt					
Loans					
Leases					
Deposits					
Overdrafts					
Other					
Total debt	-	-	-	-	-
Provisions and payables					
Employees	18,608	17,214	18,483	18,402	19,607
Suppliers	3,069	1,583	1,833	1,792	1,792
Grants					
Other	99	100	100	100	100
Total provisions and payables	21,776	18,897	20,416	20,294	21,499
Total liabilities	21,776	18,897	20,416	20,294	21,499
EQUITY					
Capital	3,180	3,180	3,180	3,180	3,180
Reserves	1,547	1,547	1,547	1,547	1,547
Accumulated surpluses or deficits	22,948	22,948	22,948	22,948	22,948
Total equity	27,675	27,675	27,675	27,675	27,675
Current liabilities	12,101	8,436	9,130	8,151	8,457
Non-current liabilities	9,675	10,461	11,286	12,143	13,042
Current assets	21,953	21,972	22,187	21,521	21,109
Non-current assets	27,498	24,600	25,904	26,448	28,065

**Table 3.3: Budgeted Departmental Statement of Cash Flows
for the period ended 30 June**

	Estimated actual 2001-02 \$'000	Budget estimate 2002-03 \$'000	Forward estimate 2003-04 \$'000	Forward estimate 2004-05 \$'000	Forward estimate 2005-06 \$'000
OPERATING ACTIVITIES					
Cash received					
Appropriations for outputs	83,681	89,016	85,912	86,885	87,871
Sales of goods and services	9,457	8,423	8,624	8,829	9,039
Interest	528	300	300	300	300
Other					
Total cash received	93,666	97,739	94,836	96,014	97,210
Cash used					
Employees	38,672	44,395	43,451	46,592	47,166
Suppliers	45,847	45,679	40,263	40,192	39,123
Grants					
Interest					
Other					
Total cash used	84,519	90,074	83,714	86,784	86,289
Net cash from operating activities	9,147	7,665	11,122	9,230	10,921
INVESTING ACTIVITIES					
Cash received					
Proceeds from sales of property, plant and equipment					
Repayments of loans made					
Other					
Total cash received	-	-	-	-	-
Cash used					
Purchase of property, plant and equipment	4,562	4,055	7,918	6,908	8,289
Loans made					
Other					
Total cash used	4,562	4,055	7,918	6,908	8,289
Net cash from investing activities	(4,562)	(4,055)	(7,918)	(6,908)	(8,289)
FINANCING ACTIVITIES					
Cash received					
Proceeds from issuing equity instruments					
Proceeds from debt					
Other					
Total cash received	-	-	-	-	-
Cash used					
Repayments of debt					
Capital use and dividends paid	3,045	3,044	3,045	3,045	3,045
Other					
Total cash used	3,045	3,044	3,045	3,045	3,045
Net cash from financing activities	(3,045)	(3,044)	(3,045)	(3,045)	(3,045)

**Table 3.3: Budgeted Departmental Statement of Cash Flows
for the period ended 30 June (continued)**

	Estimated actual 2001-02 \$'000	Budget estimate 2002-03 \$'000	Forward estimate 2003-04 \$'000	Forward estimate 2004-05 \$'000	Forward estimate 2005-06 \$'000
Net increase (decrease) in cash held	1,540	566	159	(723)	(413)
Cash at the beginning of the reporting period	15,718	17,258	17,824	17,983	17,260
Cash at the end of the reporting period	17,258	17,824	17,983	17,260	16,847