

WORK PROGRAM 2008-09



Australian Government
Geoscience Australia

Geospatial & Earth Monitoring Division

(Chief of Division - Dr Chris Pigram)

2008-09 Business Plan

GEM overview

GEM maps, monitors and models changes to the Earth and advises on how they affect Australian Society. GEM works to improve the safety of communities and the protection of Australia's critical infrastructure.

GEM combines its capabilities in geospatial information and knowledge management, research and mapping programs, earth observation capabilities and risk assessment, to bring together a comprehensive capability, able to respond flexibly to current and emerging government priorities.

Priorities for 08-09 are

- Delivery of the geoscience component of the Australian Tsunami Warning System.
- Deploy the Geoscience Australia component and coordinate the deployment of complimentary State and Territory components of the Global Navigation Satellite System part of the AuScope NCRIS program.
- Complete large-scale topographic mapping to support emergency management mitigation through collaboration with State Emergency Services Organisation's and Land Information Agencies, Local Government, and Australian government agencies.
- Provide data from IRS-P6 to Australian government agencies and partners, according to the Landsat Data Contingency Plan.
- Support to key Commonwealth Government partners, including the Department of Climate Change and others, through
 - Ground station establishment and operation.
 - Capabilities for management of processed imagery and other datasets in support of global carbon monitoring systems.
- In support of the Disaster Mitigation Australia Package and AusAID, develop improved risk methods and models, focussing on the completion of a national-scale wind hazard map, tsunami hazard maps for the Indian Ocean and SW Pacific, and a revised earthquake occurrence model for Australia.
- For the Department of Climate Change, provide indicative estimates of the impacts of climate change on coastal infrastructure and population.
- Maintain operational and develop tasking capability for Critical Infrastructure Modelling and Analysis to AGD for application to tasking by industry and government.

This plan captures all of the activities in the division which includes all outputs delivered by projects.

EARTH MONITORING GROUP

(Group Leader: Barry Drummond)

The Earth Monitoring Group monitors and reports on earthquakes, tsunamis and the Earth's magnetic field. It contributes to international efforts to monitor nuclear tests, and provides capacity building to allow the Rabaul Volcanological Observatory in Papua New Guinea to monitor and warn citizens of volcanic eruptions. The Group also monitors the shape of the Earth in the region, and contributes to the development of geospatial reference systems.

Work is conducted through six projects:

- The Australian Tsunami Warning System (ATWS)
- The Geomagnetism Project
- The Nuclear Monitoring Project
- The Rabaul Volcanological Observatory Twinning Project
- The National Geospatial Reference Systems Project
- The Geophysical Network Project

It reports to government, industry and the Australian people on these activities.

AUSTRALIAN TSUNAMI WARNING SYSTEM PROJECT

- 1. Project Description:** The ATWS project is a multi agency project (Geoscience Australia (GA), the Bureau of Meteorology (BoM), Emergency management Australia (EMA), Department of Foreign Affairs and Trade (DFAT) and the Australian Agency for International Development (AusAID) that was established by an Australian Government decision in early 2005 as part of Australia's response to the devastating 24 December 2004 Indian Ocean earthquake and tsunami. The implementation of the ATWS was announced in the May 2005 budget and will take 4 years. GA's role in the ATWS is to detect and analyse earthquakes that pose a threat to Australian communities and infrastructure in Australia and overseas. When GA detects earthquakes that are considered to have the potential to cause a tsunami, the earthquake information is sent to the Bureau of Meteorology. The Bureau will then issue a tsunami warning to the public, emergency managers and the media based on the earthquake advice delivered by GA. To facilitate these roles, GA and BoM operate of the Joint Australian Tsunami Warning Centre (JATWC). Additionally the ATWS Project advises other stakeholders, such as the Attorney-General's Department, of earthquakes in Australia and overseas that are likely to impact Australians or Australian interests.
- 2. Project Outcome:** The policy objectives of the joint-agency Australian Tsunami Warning System (ATWS) project are:
 - To provide a comprehensive tsunami warning system for Australia.
 - To support international efforts to establish an Indian Ocean tsunami warning system.
 - To contribute to the facilitation of tsunami warnings for the South West Pacific.

3. Project Link(s) to Intermediate-level Agency Outcomes:

- Enhanced global attractiveness of Australian exploration investment opportunities
- Improved resource management and environmental protection
- Safer communities and infrastructure

4. Project Link(s) to National Research Priority (NRP) Goals:

- An environmentally sustainable Australia
- Frontier technologies for building and transforming Australian industries
- Safeguarding Australia
- This project does not contribute to the NRPs

5. Key Performance Information:

- Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs
- Quarterly output milestones met
- Project budget met
- This project contributes to agency-level reporting obligations

6. Project Outputs:

6.1 Output 1: Progress reports within the Australian Government

6.1.1 Description: Governance arrangements are in place to ensure that the project is carried out in accordance with the ATWS Implementation Strategy & Plan developed for the Department of Prime Minister and Cabinet (TRIM Record D2006-56498). Project reports describing the progress of the ATWS Project are submitted to DFAT as the lead agency in the ATWS implementation for consideration by the ATWS Interdepartmental Steering Committee. Milestones that are defined in the ATWS Implementation Strategy & Plan are required to be delivered in Q2 and Q4.

6.1.2 Output Delivery Date:

- Q1 Quarterly joint GA/BoM reports to DFAT
- Q2 Milestone : Expansion of seismic network completed.
- Q3
- Q4 Milestone: ATWS exercised and evaluated.

6.1 Output 2: Advice to Bureau of Meteorology (BoM)

6.2.1 Description: Tsunami advisories and warnings for Australia will be issued by the JATWC. For the purpose of advisories, GA will provide BoM with advice on earthquake origin time, location and magnitude. In 2008/09, the following activities will be undertaken to enhance GA's input into the issuance of the advisories and warnings:

- improved/additional data from enhanced Australian network and supplemented with additional international data including CTBTO

- seismic stations, the latter subject to approval of the Preparatory Commission of the CTBTO in 2008;
- continuing system and software development to enhance the quality, timeliness and reliability of advice to BoM;
 - continuing research into techniques to determine earthquake source parameters more accurately and rapidly;
 - quality management procedures, including documentation and change control, completed and implemented.

6.2.2 Output Delivery Date:

- Q1** Advice provided to Bureau of
Q2 Meteorology throughout the year
Q3 as earthquake events happen
Q4 in the region.

6.2 Output 3: Earthquake advisories to Attorney-General's Department (AGD).

6.3.1 Description: GA provides advice to AGD for promulgation to other Australian Government agencies on earthquakes that occur in Australia and the region, for use by emergency workers in the protection of Australian citizens and interests in Australia and overseas.

6.3.2 Output Delivery Date:

- Q1** Information will be provided
Q2 to AGD throughout the
Q3 year as earthquakes
Q4 occur.

6.3 Output 4: Contributions to international activities to coordinate warning systems.

6.4.1 Description: The following activities will be undertaken:

- Continuing to contribute to the activities of the Intergovernmental Coordination Group for the Indian Ocean Tsunami Warning and Mitigation System and the Intergovernmental Coordination Group for the Pacific Tsunami Warning and Mitigation System and associated working groups
- At the 2008 meeting of the Intergovernmental Coordination Group for the Indian Ocean Tsunami Warning System Australia agreed to be a Regional Tsunami Watch Provider (RTWP) in the Indian Ocean. This coming year will be a transitional period where Australia will demonstrate its capability by sensing out earthquake information that can cause tsunamis affecting other countries in the Indian Ocean region and benchmarking against agreed performance criteria. Existing systems will be enhanced to meet this expanded capability.

6.4.2 Output Delivery Date:

- Q1**

- Q2** Contribution to Australian national report to the Intergovernmental Oceanographic Commission for the Pacific Tsunami Warning and Mitigation System meeting in Samoa.
- Q3** Contribution to the Australian national report to the Intergovernmental Oceanographic Commission for the Indian Ocean Tsunami Warning and Mitigation System meeting (venue and time to be announced).
- Q4** Earthquake advice provided to the Bureau of Meteorology as earthquake occur in the Indian Ocean region.

Geophysical Network Project

1. Project Description: This project maintains and operates Australia's National Geophysical Network across Australia, the Antarctic region and in the Pacific and Indian Oceans. This provides real time seismic, infrasound, hydroacoustic and geomagnetic data which underpins the monitoring of both natural and other anthropogenic events that might constitute hazards to the Australian people. The data also contribute to the goals of the Australia Government through the Comprehensive Nuclear Test Ban Treaty Organization (CTBTO) and the Australian Tsunami Warning System (ATWS).

2. Project Outcome: Effective national and international capabilities in Earth monitoring as an input to risk assessment provided through other GEMD and regional collaborative projects for the Australian continent, the South East Asian and South West Pacific regions.

3. Project Link(s) to Intermediate-level Agency Outcomes:

- Enhanced global attractiveness of Australian exploration investment opportunities
- Improved resource management and environmental protection
- Safer communities and infrastructure

4. Project Link(s) to National Research Priority (NRP) Goals:

- An environmentally sustainable Australia
- Frontier technologies for building and transforming Australian industries
- Safeguarding Australia
- This project does not contribute to the NRPs

5. Key Performance Information:

- Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs
- Quarterly output milestones met
- Project budget met
- This project contributes to agency-level reporting obligations

6. Project Outputs:

6.1 Output 1: Seismic, geomagnetic, infrasound, hydroacoustic data and ancillary information.

6.1.1 Description: The Geophysical Network (GN) project provides seismic, infrasound, hydroacoustic, geomagnetic data and information to other GEMD projects, various Australian Government agencies, State/Territory Governments and international seismological data centres and geomagnetic agencies via the Internet. The project also maintains the Australian primary and auxiliary seismic stations, infrasound and hydroacoustic monitoring stations on behalf of the International Monitoring System of the CTBTO in Vienna to support GA's nuclear monitoring capability. The project is responsible for the

transmission of these data to GA for analysis and onto the International Data Centre of the CTBTO.

6.1.2 Output Delivery Date:

- Q1** Continuous
- Q2** ongoing data
- Q3** delivery in
- Q4** near-real-time 24/7

Geomagnetism Project

- 1. Project Description:** The Geomagnetism Project addresses the national and international need for information on the behaviour of the geomagnetic field in the Australian region. This information is used for navigation, geophysical exploration, magnetic direction-finding, magnetic detection, space weather analysis, the mitigation of geomagnetic hazards, and related research into the nature of geomagnetic phenomena, Earth structures and solar-terrestrial physics. The data that underpin this information are obtained from Geoscience Australia's network of nine geomagnetic observatories and fifteen repeat stations in Australia, Antarctica and the southwest Pacific.

The primary outputs of the Project are the Australian Geomagnetic Reference Field (AGRF) model, contributions to international models, time-series and magnetic-activity data, geomagnetic research, magnetometer and compass calibrations, and advice to researchers.

In 2008/09, in addition to operational responsibilities for the collection and analysis of time-series data from the observatory network, maintenance visits to the Macquarie Island and Mawson observatories are planned during the Summer, and visits to repeat stations at Weipa, Hobart, Lord Howe Island and Norfolk Island are planned for the first half of 2009.

- 2. Project Outcomes:** The main outcomes of the Project's geomagnetic-field monitoring work are
 - correct regional and global field models for navigation and research, by provision of accurate geomagnetic main-field and secular-variation data sets for the Australian region;
 - more-effective petroleum and mineral exploration and exploitation;
 - mitigation of geomagnetic hazard to communities, infrastructure (GPS, communications, power lines, pipelines), and in space, caused by geomagnetic disturbances, and;
 - advances in solid-Earth geoscience and solar-terrestrial physics research.
- 3. Project Link(s) to Intermediate-level Agency Outcomes:**

- Enhanced global attractiveness of Australian exploration investment opportunities
- Improved resource management and environmental protection
- Safer communities and infrastructure

- 4. Project Link(s) to National Research Priority (NRP) Goals:**

- An environmentally sustainable Australia
- Frontier technologies for building and transforming Australian industries
- Safeguarding Australia
- This project does not contribute to the NRPs

- 5. Key Performance Information:**

- Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs
- Quarterly output milestones met
- Project budget met

- This project contributes to agency-level reporting obligations

6. Project Outputs:

6.1 Output 1: Primary and derived geomagnetic data

6.1.1 Description: Calibrated time-series data are acquired from the Geoscience Australia geomagnetic observatory and repeat station network in Australia, Antarctica and the southwest Pacific. Indices of geomagnetic activity are derived from these time series. These primary and derived data are provided to international data centres and agencies, space weather analysts, the resource exploration sector, and research institutions. They are used in navigation, magnetic-field modelling, resource exploration and exploitation, space weather monitoring and geoscience research.

6.1.2 Output Delivery Date:

- Q1** Data are delivered to a range
Q2 of Australian and international
Q3 clients in a variety of formats
Q4 and intervals throughout the year.

6.2 Output 2: Reports on geomagnetic research

6.2.1 Description: The Project conducts a research program that addresses matters of national interest related to geomagnetism, geo-electrical conductivity structure, and geo-electromagnetic induction. Results are presented at national and international conferences and in publications.

6.2.2 Output Delivery Date:

- Q1**
Q2 Paper at Electromagnetic Induction workshop, Beijing
Q3 Paper at ASEG conference and exhibition, Adelaide
Q4

6.3 Output 3: Advice to researchers

6.3.1 Description: The Project provides advice and assistance to Australian and international researchers and other stakeholders studying aspects of geomagnetism in the Australian region.

6.3.2 Output Delivery Date:

- Q1** Advice is given throughout the year in
Q2 response to queries from other Government
Q3 agencies, industry clients, research institutions,
Q4 and overseas organizations.

6.4 Output 4: Reports on the calibration of compasses, magnetometers and compass pads

6.4.1 Description: Compass pads, compasses and magnetometers for the aviation, maritime, defence and research communities are calibrated on an as-requested basis.

6.4.2 Output Delivery Date:

Q1 Compasses and magnetometers are calibrated within

Q2 10 working days of their receipt from clients and

Q3 compass pad calibrations are completed within one

Q4 month of a request.

National Geospatial Reference Systems Project

- 1. Project Description:** This project contributes data and derived products to international geodetic programs in order to ensure that the International Terrestrial Reference Frame (ITRF) in the Australian region is as accurate as it can be. The ITRF forms the platform upon which Australia then develops progressively more accurate National Geospatial Reference Systems. A National Geospatial Reference System (NGRS) provides the fundamental, national-scale, reference frame that establishes the spatial relationships on and outside of the Earth's surface and allows spatial information to be interrelated in the same frame. A NGRS supports a wide range of local, regional and national planning and developmental activities, including cadastral and engineering surveys, topographic mapping, mineral and petroleum exploration, hazard monitoring, and navigation, as well as global monitoring of the atmosphere, oceans and coastal zones.

The Project adopts international standards and practices established by the International Association of Geodesy.

Geoscience Australia, through this project, is the certifying agency for position relative to the GDA94 Datum for Australia under the National Measurement Act (1960).

We advise and influence our clients in government, industry and the community through ANZLIC, the Spatial Sciences Institute and Global Geodetic Observing System based on innovative and targeted research. The project provides national leadership and coordination in the field of geodesy.

- 2. Project Outcome:** Accurate and consistent National Reference Systems for all Australians resulting in
 - Satisfied customers
 - A Safer Australia
 - Opportunities for emerging Industries
 - Mitigation of global environmental change

3. Project Link(s) to Intermediate-level Agency Outcomes:

- Enhanced global attractiveness of Australian exploration investment opportunities
- Improved resource management and environmental protection
- Safer communities and infrastructure

4. Project Link(s) to National Research Priority (NRP) Goals:

- An environmentally sustainable Australia
- Frontier technologies for building and transforming Australian industries
- Safeguarding Australia
- This project does not contribute to the NRPs

5. Key Performance Information:

- Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs
- Quarterly output milestones met
- Project budget met
- This project contributes to agency-level reporting obligations

6. Project Outputs:

6.1 Output 1: Data sets and value added products

6.1.1 Description: Quality assured geodetic data sets and value added products including data from the Australian Regional GPS Network (ARGN), Satellite Laser Ranging (SLR) stations at Mt Stromlo (ACT) and Yarragadee (WA), and Very Long Baseline Interferometry (VLBI) stations in Hobart (Tas) and Parkes (NSW).

6.1.2 Output Delivery Date:

- Q1 The GPS data are delivered to the international data centres via
- Q2 GA's FTP site daily, although hourly, fifteen minute
- Q3 and real-time products are also produced. The SLR data are
- Q4 delivered daily to international data centres directly from the two observatories.

6.2 Output 2: Analysis results distributed in the Solution Independent Exchange Format (SINEX)

6.2.1 Description: Integrated, versatile and quality assured derived products that contribute to regional and global reference systems, including routine contributions to the International GNSS service (IGS), the International Laser Ranging Service (ILRS), and the International VLBI Service (IVS) for inclusion into the International Terrestrial Reference Frame (ITRF) definition. Also includes coordination of the annual GPS campaign of the Permanent Committee on GIS infrastructure in the Asia Pacific (PCGIAP) Working Group 1 on regional reference frames, and its subsequent analysis and submission to the ITRF. The IGS Regional Network Associate Analysis Centre (RNAAC) SINEX files are distributed weekly. The SLR SINEX files are also distributed weekly. The PCGIAP results are distributed annually.

6.2.2 Output Delivery Date:

- Q1 SINEX files delivered weekly
- Q2 PCGIAP results distributed, SINEX files delivered weekly
- Q3 SINEX files delivered weekly
- Q4 SINEX files delivered weekly

6.3 Output 3: Scientific Reports and Publications, including Journal papers and presentations at conferences.

6.3.1 Description: A variety of research outputs are reported to the community via reports and publications. These vary from presentations to industry forums to papers in reputable journals. Submission dates by quarter are expected to be:

6.3.2 Output Delivery Date:

- Q1 Dawson (Journal Geophysical Research)
- Q2 Titov (Astronomy and Astrophysics)
- Q3 Titov (Journal of Geodesy)
- Q4 Jia, Dawson (Journal of Geophysical Research)

6.4 Output 4: Expert advice including the AUSPOS positioning service and astronomical enquiries

6.4.1 Description: Responsive, accessible, accurate and reliable expert analysis and advice services including legal traceability of position from GPS and delivery of the AUSPOS service. Delivery of advice on AUSPOS is continuous. Other advice is ad hoc but generally involves tens of enquiries per week.

6.4.2 Output Delivery Date:

- Q1 Online service accessed by customers daily
- Q2 Online service accessed by customers daily
- Q3 Online service accessed by customers daily
- Q4 Online service accessed by customers daily

6.5 Output 5: Delivery of Local Tie SINEX file to the International Reference Frame combinations centres

6.5.1 Description: Precision spatial measurements including Local Tie surveys and neo-tectonic deformation campaigns. These surveys are undertaken routinely and the results are delivered to the international community for use in reference frame combinations. Technical reports are also produced and made available through the GA library and web page.

6.5.2 Output Delivery Date:

- Q1
- Q2 Stromlo
- Q3
- Q4 Hobart

6.6 Output 6: Data and analysis reports for the South Pacific Sea Level and Climate Monitoring Project

6.6.1 Description: Delivery of geodetic services to the South Pacific Sea Level Climate Monitoring Project, including delivery of services to the Bureau of Meteorology and AusAID. These services consist of the operation of the CGPS network in the south Pacific, levelling connections between the CGPS sites and the tide gauge sites, and the

analysis of GPS data and levelling data. The data is delivered daily to the research community via the GA FTP site. The analysis report is produced annually.

6.6.2 Output Delivery Date:

- Q1 data
- Q2 data
- Q3 data
- Q4 Analysis report

6.7 Output 7: Progress reports to AuScope

6.7.1 Description: Management of the Geospatial component of the AUSCOPE initiative funded under NCRIS. It will also involve the collation of progress reports and financial reports from participating agencies. Quarterly reports to AuScope will be produced.

6.7.2 Output Delivery Date:

- Q1 Report to AuScope
- Q2 Report to AuScope
- Q3 Report to AuScope
- Q4 Report to AuScope

6.8 Output 8: Construction of the AuScope GNSS Array

6.8.1 Description: This output is based on the number of stations constructed under the AuScope GNSS network deployment project as a commitment under the contract with AuScope Ltd. Working collaboratively with the state governments GA will construct 20 GNSS sites this year.

6.8.2 Output Delivery Date:

- Q1 3 sites constructed
- Q2 6 sites constructed
- Q3 6 sites constructed
- Q4 5 sites constructed

6.9 Output 9: AuScope Gravity data

6.9.1 Description: Quality assured geodetic gravity data sets and value added products including data from the AuScope Geospatial Gravity program

6.9.2 Output Delivery Date:

- Q1 Data delivered to AuScope data Centre
- Q2 Data delivered to AuScope data Centre
- Q3 Data delivered to AuScope data Centre
- Q4 Data delivered to AuScope data Centre

Rabaul Volcanological Observatory Twinning Program

- 1. Project Description:** The Rabaul Volcanological Observatory Project provides capacity building to develop the Rabaul Volcanological Observatory in Papua New Guinea to monitor and warn citizens of volcanic. The current phase of the project is a follow on from the Papua New Guinea – Australia Volcanological Service Support Project that was initiated following the 1994 eruption of Rabaul volcanoes.

The Project is funded by the Australian Agency for International Development (AusAID) and contributes to the Australian Government’s foreign policy objectives in the region.

- 2. Project Outcome:** Reduce the impact of volcanic hazards on Papua New Guinean communities through the development of effective indigenous volcano monitoring capabilities.

- 3. Project Link(s) to Intermediate-level Agency Outcomes:**

- Enhanced global attractiveness of Australian exploration investment opportunities
- Improved resource management and environmental protection
- Safer communities and infrastructure
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- 4. Project Link(s) to National Research Priority (NRP) Goals:**

- An environmentally sustainable Australia
- Frontier technologies for building and transforming Australian industries
- Safeguarding Australia
- This project does not contribute to the NRPs

- 5. Key Performance Information:**

- Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs
- Quarterly output milestones met
- Project budget met
- This project contributes to agency-level reporting obligations

- 6. Project Outputs:**

- 6.1 Output 1:** Local capacity to monitor and mitigate volcanic risk

- 6.1.1 Description:** Develop local capability that will deliver 75% data flow for the period for 5 monitoring sites at 5 high risk volcanoes and be in a position to provide a reliable early warning function to national and local authorities with disaster management responsibilities in the vicinity of the volcanoes.

- 6.1.2 Output Delivery Date:**

- Q1 Ongoing
- Q2 Ongoing
- Q3 Ongoing
- Q4 Ongoing

6.2 Output 2: Reports to AusAID

6.2.1 Description: Reports to AusAID on progress with the project, including evidence of on-going engagement by RVO with National Disaster Centre, NGO's, Provincial Disaster Committees and local communities.

6.2.2 Output Delivery Date:

- Q1 Report to AusAID on the outcomes of the previous phase of the project ending June 2008.
- Q2
- Q3 Verbal evidence provided to AusAID at Project Coordination Committee (PCC) forum.
- Q4 Written evidence provided to AusAID in May Progress Report.

6.3 Output 3: New Project Proposal

6.3.1 Description: Develop a new Twinning Program project proposal for submission to and consideration by AusAID that will initiate a longer-term extension (5-years) to the Project activities.

6.3.2 Output Delivery Date:

- Q1
- Q2 Draft proposal submitted to AusAID by the end of the 2008 calendar year.
- Q3 Final Project proposal submitted to AusAID following review and adjustments to draft proposal following AusAID feedback.
- Q4 If the proposal is accepted by AusAID, signing of new record of Understanding between Geoscience Australia and AusAID.

Nuclear Monitoring Project

- 1. Project Description:** Australia signed the Comprehensive Nuclear-Test-Ban Treaty (CTBT) in 1996 and ratified the Treaty in 1998. As part of the ratification process new legislation had to be enacted. The new laws are detailed in the “Comprehensive Nuclear-Test-Ban Treaty Act 1998”. This Act requires the Australian government to fulfil its obligations before and after entry-into-force of the Treaty.

To initiate the process, the Australian Government had earlier agreed to fund the development of a seismic network in Australia to monitor nuclear explosions worldwide. Subsequently, hydroacoustic and infrasound monitoring capacity has been added, and the capacity of the integrated network continues to be upgraded. The network is managed by Geoscience Australia on behalf of the Australian Government, represented by the Department of Foreign Affairs and Trade. Australia considers progress in nuclear disarmament and non-proliferation to be vital to international security. Australia is fully committed to realising a world free of nuclear weapons and sees entry-into-force of the CTBT as an important step to limit the further development and proliferation of nuclear weapons. Australia is actively working to achieve the earliest possible entry-into-force of the CTBT.

2. Project Outcome:

- (i) Enhance Australia’s national technical means to monitor nuclear explosions worldwide. As well as identifying a suspected nuclear explosion, location accuracy and the size of the blast are equally as important;
- (ii) Support Australia’s commitment to the establishment of the global verification system to monitor future compliance to the Comprehensive Nuclear-Test-Ban Treaty.

3. Project Link(s) to Intermediate-level Agency Outcomes:

- Enhanced global attractiveness of Australian exploration investment opportunities
- Improved resource management and environmental protection
- Safer communities and infrastructure

4. Project Link(s) to National Research Priority (NRP) Goals:

- An environmentally sustainable Australia
- Frontier technologies for building and transforming Australian industries
- Safeguarding Australia
- This project does not contribute to the NRPs

5. Key Performance Information:

- Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs
- Quarterly output milestones met
- Project budget met
- This project contributes to agency-level reporting obligations

6. Project Outputs:

6.1 Output 1: Technical Advice and Research Reports

6.1.1 Description:

- (i) Provide technical advice and information to the Departments of Foreign Affairs and Trade, Prime Minister & Cabinet, Defence, Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO), media and the public, to meet Australian national technical means requirements and obligations to the CTBT.
- (ii) Develop enhanced discrimination procedures for Australia and the international community to improve Australia's capability to discriminate nuclear explosions. This involves research and development of applications in seismic, hydroacoustic and infrasound technologies.

6.1.2 Output Delivery Date:

- Q1 Time frame determined by issues arising
- Q2 within DFAT, in the international arena,
- Q3 and including if and when other nations
- Q4 conduct nuclear tests

6.2 Output 2: Construction of Australian CTBT Monitoring Stations

6.2.1 Description:

- (i) Installation of Australian CTBT monitoring stations to meet Australia's obligations in building a global verification system. Work towards the obtaining permissions and construction of infrasound stations at Cocos (Keeling) Islands and Davis, Antarctica, will be conducted in 2008/09.

6.2.2 Output Delivery Date:

- Q1
- Q2 Costings for phase 1 of the construction for Cocos infrasound station completed. Technical and cost proposal sent to the CTBTO for negotiation.
- Q3
- Q4 Completion of work programme and obtaining permissions for installation of infrasound station at Davis Base, Antarctica, developed in conjunction with and for Australian Antarctic Division.

6.3 Output 3: Seismic, hydroacoustic and infrasound data provided to CTBTO

- 6.3.1 **Description:** Provision of data to the CTBTO through operation of a National Data Centre on behalf on Australia's National Authority so that Australian national technical means requirements and obligations to the CTBT are met.

6.3.2 Output Delivery Date:

- Q1 Ongoing data delivery
- Q2 Ongoing data delivery
- Q3 Ongoing data delivery
- Q4 Ongoing data delivery

GROUNDWATER GROUP

(Group Leader: Matt Hayne)

The Groundwater Group's key role is to extend and enhance the Commonwealth Government's capability to address groundwater policy development and program administration. It will do this by applying geoscientific expertise to the mapping and understanding of Australia's groundwater aquifer systems and their impacts upon the management of the broader environmental and natural resource environments.

The Group, through peak body funding, undertakes a number of applied research activities of national significance. Activities are principally carried out with multi-agency teams including relevant Federal, State agencies, and the private sector as required.

The Groundwater Group comprises 2 projects, each with a number of activities:

1. Groundwater Project

- Palaeovalley Groundwater Resources - will deliver a national approach to understanding the capacity, quality, quantity and dynamics of groundwater resources in Australia's palaeovalley aquifers in arid and semi-arid environments.
- Groundwater Advice - this activity includes advice to the Department of Resources, Energy and Tourism (DRET) on the implications of groundwater resources on Departmental considerations.
- Deep Australian Water Resources Information System - this is a scoping study that aims to define the necessary data for a full evaluation of Australia's deep groundwater resources.
- Groundwater Processes in Australia's Ramsar Wetlands - this activity will investigate the relationship between groundwater aquifers and the Ramsar wetland ecology.
- Northern Territory Coastal Plain - this pilot project will partner with GA's airborne electro-magnetic (AEM) data collected as part of the Onshore Energy Security Program to assess seawater intrusion in coastal plain aquifers.

2. Aquifer Systems and Water Quality Mapping Project.

- Ord Valley II AEM Mapping activity will provide GIS, map-based products and reports for salinity and groundwater mapping based on airborne electro-magnetics mapping and complementary hydrogeological studies.

CRC LEME Salinity Legacy Products will produce scientific papers in special monograph volumes that summarise 7 years of research findings for CRC LEME.

Groundwater Geoscience Project

- 1. Project Description:** The project will develop and apply GA's geoscientific expertise to the groundwater resource issues, and provide geoscientific support for the Commonwealth's groundwater policy development and program administration.

The project will involve a number of externally-funded sub-projects carried out in multi-agency teams involving DEWHA, DRET, BOM, relevant State agencies, and the private sector as required. Clients are principally the Federal Government.

- 2. Project Outcome:** Stakeholders across government and the private sector are able to make informed decisions in order to manage groundwater resources more effectively.

- 3. Project Link(s) to Intermediate-level Agency Outcomes:**

- Enhanced global attractiveness of Australian exploration investment opportunities
- Improved resource management and environmental protection
- Safer communities and infrastructure

- 4. Project Link(s) to National Research Priority (NRP) Goals:**

- An environmentally sustainable Australia
- Frontier technologies for building and transforming Australian industries
- Safeguarding Australia
- This project does not contribute to the NRPs

- 5. Key Performance Information:**

- Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs
- Quarterly output milestones met
- Project budget met
- This project contributes to agency-level reporting obligations

- 6. Project Outputs:**

- 6.1 Output 1: Palaeovalley Groundwater Resources**

- 6.1.1 Description:** Coordination and development of a national framework for evaluating and managing palaeodrainage groundwater resources – first year of a 4.25 year project.

- 6.1.2 Output Delivery Date:**

- Q1
- Q2 Workshop report to project steering committee
- Q3 Progress report on field investigations
- Q4

6.2 Output 2: Groundwater Advice

6.2.1 Description: Provision of technical and strategic advice as requested by DEWHA, DRET and other Commonwealth agencies relating to groundwater issues.

6.2.2 Output Delivery Date:

- Q1 Provision of technical and strategic advice.
- Q2 Provision of technical and strategic advice.
- Q3 Provision of technical and strategic advice.
- Q4 Provision of technical and strategic advice.

6.3 Output 3: Deep Australia Water Resource Information System scoping study.

6.3.1 Description: Definition of the activities, partnerships and costs associated with acquiring and synthesising the necessary data for evaluating Australia's deep groundwater resources.

6.3.2 Output Delivery Date:

- Q1
- Q2 Report and recommendations from scoping study.
- Q3
- Q4

6.4 Output 4: Groundwater-dependent wetlands

6.4.1 Description: Provision of geoscientific information relating to the groundwater influences on the hydrology and ecology of groundwater-dependent and groundwater-influenced ecosystems

6.4.2 Output Delivery Date:

- Q1 12 scoping studies to MDBC (Sept 08).
- Q2
- Q3
- Q4

6.5 Output 5: Northern Territory AEM and Saline Aquifer Project

6.5.1 Description: Interpretation of the implications of AEM data for understanding groundwater characteristics and the potential for salt water intrusion of the Darwin coastal plain

6.5.2 Output Delivery Date:

- Q1
- Q2
- Q3
- Q4 Progress report to stakeholders.

6.6 Output 6: Broken Hill

6.6.1 Description: Scoping of the implications of existing information for evaluating the potential of groundwater resources and aquifer storages as long-term water supply options for Broken Hill.

6.6.2 Output Delivery Date:

Q1 Scoping study report and recommendations.

Q2

Q3

Q4

Aquifer Systems and Water Quality Mapping Project

- 1. Project Description:** The project will develop and apply GA's geoscientific expertise to the mapping and understanding of Australia's groundwater aquifer systems, and the mapping and assessment of salinity hazard and broader environmental threats to natural resource management within the context of the broader climate change debate. The project will also provide geoscientific support for the Commonwealth's groundwater and natural resource management policy development and program administration.

The project will involve a number of externally-funded sub-projects carried out in multi-agency teams involving CSIRO's Water for a Healthy Country (WfHC) Flagship Program, relevant State agencies, and the private sector as required. Clients are principally the Federal Government

- 2. Project Outcome:** An improved geoscientific basis for groundwater, water quality (salinity) and broader natural resource management assessments at the Commonwealth and cross-jurisdictional level.

- 3. Project Link(s) to Intermediate-level Agency Outcomes:**

- Enhanced global attractiveness of Australian exploration investment opportunities
- Improved resource management and environmental protection

- 4. Project Link(s) to National Research Priority (NRP) Goals:**

- An environmentally sustainable Australia
- Frontier technologies for building and transforming Australian industries
- Safeguarding Australia
- This project does not contribute to the NRPs

- 5. Key Performance Information:**

- Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs
- Quarterly output milestones met
- This project contributes to agency-level reporting obligations

- 6. Project Outputs:**

- 6.1 Output 1: Ord Valley II AEM Mapping Project**

- 6.1.1 Description:** Provision of GIS, map-based products and reports for salinity and groundwater mapping based on airborne electromagnetics mapping and complementary hydrogeological studies.

- 6.1.2 Output Delivery Date:**

- Q1
- Q2
- Q3
- Q4 Maps, GIS and reports to Ord Irrigation Cooperative

RISK & IMPACT ANALYSIS GROUP

(Group Leader: John Schneider)

The Risk & Impact Analysis Group's (RIAG) key role is to develop knowledge of the risk from natural and human-caused hazards for input to policy and operational decision makers for the mitigation of risk to Australian communities. RIAG achieves this through the development of computational methods, models and decision support tools for use in assessing the impact and risk posed by hazards. RIAG contributes to the National Research Priority of Safeguarding Australia by providing an improved understanding of the vulnerability of the built environment in Australia, including critical infrastructure. RIAG is also addressing the National Research Priority for an Environmentally Sustainable Australia through new work in the assessment of coastal vulnerability to climate change.

RIAG works with other agencies to promote disaster mitigation activities across government, with about 60% of the Group's support drawn from external funding:

- The Natural Disaster Mitigation Programme (NDMP), administered by Emergency Management Australia in the Attorney General's Department, is currently a one-year grants scheme (2008-09) for all levels of government aimed at reducing the impact of natural disasters in Australia. RIAG has the lead role in developing models, tools, data and advice to support the implementation of the National Risk Assessment Framework. This research requires the development and integration of scientific results across several technical disciplines and for a diverse range of hazards. The primary focus is on earthquake, severe wind and tsunami in Australia, with additional advice and data integration for landslide, flood and bushfire hazards. In this role, GA also provides leadership to national working groups in risk assessment that support the Australian Emergency Management Committee's workplan on implementing the framework.
- The Critical Infrastructure Protection Modelling and Analysis (CIPMA) program, administered by the Attorney General's Department, is a program that received in the 2008-2009 budget four years of additional funding (to 2012) to develop a Critical Infrastructure Protection (CIP) modelling capability within Australian Government. Geoscience Australia is the technical developer of this capability which is delivered through RIAG. The role entails the development of a modelling capability for analysing the vulnerability and inter-dependencies of key infrastructure systems in Australia. Further, following the announcement by the Attorney in October 2007, the capability is now being tasked by stakeholders to provide information to decision makers. The Attorney General's Department has established the Trusted Information Sharing Network (TISN) in order to facilitate communication between critical infrastructure sectors.
- Several emergency management agencies in Australia are supporting research into tsunami hazard and impact analysis for input to emergency management planning. Specifically, Emergency Management Australia (EMA), the Fire and Emergency Services Authority (FESA) of WA and Minerals Resources Tasmania are providing funds to expedite this work. In addition, RIAG is working collaboratively with Tasmania, New South Wales and Queensland to assist them with tsunami risk and impact assessments. Internationally, AusAID is providing capacity building for tsunami hazard and impact assessments in the SW Pacific and for tsunami hazard assessments in the Indian Ocean. Additionally, AusAID is providing linkage

funding to strengthen the capacity of the Indonesian government to quantify tsunami risk through the conduct of palaeotsunami science.

- Two new areas of risk and impact analysis were initiated during 2007-2008 that are set to continue into the future. First, the Department of Climate Change is providing support to RIAG to contribute to the First Pass Assessment of Coastal Vulnerability to Climate Change. This work is developing geomorphological indicators of coastal vulnerability which will be made available through GA's OzCoast web portal. This analysis will provide input to a longer-term assessment of economic and environmental impact. Second, AusAID engaged RIAG to conduct an overview of natural hazard risks to the Australasian region, concentrating on areas where AusAID contributes the majority of its overseas aid. Scoping missions to Papua New Guinea, Indonesia and the Philippines are planned for 2008-2009 to further the initial study. These new partnerships are indicative of the recognition by the Australian Government that there is a need to understand the underlying risks and potential impacts of natural hazards in the region and the potential effects of climate change to Australia. Future growth in both areas is expected with the resulting creation of the Climate Change Project and there will be increasing synergies between the two work areas.

RIAG comprises four projects:

1. The Georisk Project is defining the national risk from a range of natural hazards including earthquake, tsunami, landslide, and flood. This activity will provide risk assessment models, methods and tools to support a range of risk mitigation options including emergency response, recovery and preparedness, building regulation, land-use planning and insurance.
2. The Critical Infrastructure Project provides a modelling and analysis capability to support national initiatives in critical infrastructure protection (CIP) within a spatial information framework. The project focuses on research related to modelling critical infrastructure networks and systems from an "all hazards" approach within a geospatial data environment. The project also has a major role in liaising with sectors of the Trusted Information Sharing Network for Critical Infrastructure Protection (TISN), notably the Energy, Communications, Water, and Banking & Finance Infrastructure Assurance Advisory Groups (IAAGs).
3. The Climate Change Project aims to define the impact and long-term risk from climatic phenomena (e.g., initially, cyclones, severe winds, sea level rise) on infrastructure, community assets and the environment. The current climate impact/risk and how this will be affected by climate change is being considered. This knowledge will be applied to planning and policy through strategic partnerships with external agencies which include the Department of Climate Change and the Attorney-General's Department. More broadly, the project activity supports decision making across a range of risk mitigation options including emergency response, recovery and preparedness, building regulation, land-use planning and insurance.
4. The Engineering, Economics and Exposure Project is developing representative engineering vulnerability models for the range of buildings and critical infrastructure found in the Australian built environment. The broadened project scope now includes the economic vulnerability and demographic exposures associated with specific assets and communities. Elements of this work are the development of a National Exposure Information System (NEXIS) along with tools

for vulnerability assessment and the evaluation of mitigation strategies for regulators, government and industry.

Georisk Project

1. **Project Description:** The Project aims to define the national risk from a range of natural hazards including earthquake, tsunami, landslide, and flood. This activity will provide risk assessment models, methods and tools to support a range of risk mitigation options including emergency response, recovery and preparedness, building regulation, land-use planning and insurance.
2. **Project Outcome:** Stakeholders across government and the private sector are able to make informed decisions to manage the risk from natural hazards.
3. **Project Link(s) to Intermediate-level Agency Outcomes:**
 - Enhanced global attractiveness of Australian exploration investment opportunities
 - Improved resource management and environmental protection
 - Safer communities and infrastructure
4. **Project Link(s) to National Research Priority (NRP) Goals:**
 - An environmentally sustainable Australia
 - Frontier technologies for building and transforming Australian industries
 - Safeguarding Australia
 - This project does not contribute to the NRPs
5. **Key Performance Information:**
 - Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs
 - Quarterly output milestones met
 - Project budget met
 - This project contributes to agency-level reporting obligations
6. **Project Outputs:**

6.1 Output 1: Earthquake Risk Modelling

6.1.1 Description: Provide all levels of the Australian government, industry and public with information on the hazard and risk associated with earthquakes in Australia. This year's work program is focused on the completion of a fundamentally new model for the rate of occurrence of earthquakes based on the concept of neotectonic domains. The program will also develop and implement complementary tools for modelling the rate of occurrence of earthquakes based on historic seismicity and crustal deformation. In addition to this model development, the program will work in partnership with the South Australian government to assist in their development of an earthquake management plan for Adelaide.

6.1.2 Output Delivery Date:

- Q1
- Q2 External review of GA's models relating earthquake magnitude to rupture dimensions.
- Q3 Development of earthquake impact scenarios for Adelaide's earthquake management plan.
- Q4 Submission for peer review of an Australian earthquake domain model based on neotectonic features.
Revised, consistent EQ magnitude scale for SA.

6.2 Output 2: Tsunami Risk Modelling

6.2.1 Description: Provide all levels of the Australian government and public with information on the risk associated with tsunami in Australia. This work is based around strong collaborative links with State governments and the Australian Tsunami Warning System. This year's work program is focused on understanding the potential for catastrophic tsunami impacts to the east coast of Australia, the continued relationship with FESA to develop a tsunami impact assessment for the WA coast and the completion of palaeotsunami studies of the north-west of WA. In addition to this the program will continue development of the fundamentals of tsunami science and model validation.

6.2.2 Output Delivery Date:

- Q1
- Q2 Tsunami impact assessments for WA communities
- Q3 Submission for peer review of: *Validation of GA's tsunami inundation model* and *Testing of the NSW mega tsunami hypothesis*.
- Q4 A tsunami inundation model for Hobart in collaboration with MRT.

6.3 Output 3: Development of regional capacity for modelling natural hazard risks

6.3.1 Description: Support AusAID in the development of capacity for modelling the risks from natural hazards in the Asia-Pacific region. This years program will be focused on completing tsunami modelling work in the Pacific Region and targeted capacity building and planning for natural hazard modelling in the Asia-Pacific Region.

6.3.2 Output Delivery Date:

- Q1 Development of SW Pacific Tsunami hazard map
- Q2 Development of Indian Ocean Tsunami hazard map
- Q3 Provide AusAID with options papers outlining opportunities for strategic engagement in risk assessment capacity building in Indonesia and Philippines.
- Q4 Feasibility study of a pilot natural hazard risk assessment project for the Philippines.

6.4 Output 4: Contribution to key government initiatives for managing the risks from natural hazard

6.4.1 Description: Contributions to key Australian Government initiatives including the Disaster Mitigation Australia Package including the development of risk modelling tools and capabilities for local scale hazards such as floods and landslides.

6.4.2 Output Delivery Date:

Q1

Q2

Q3 Analysis of the costs of landslides in the Sydney region

Q4 Assessment of GA's 2D flood modelling capability

Critical Infrastructure Protection Project

- 1. Project Description:** The Critical Infrastructure Project is providing the technical resources and capacity required to support the Attorney-General's Critical Infrastructure Protection Modelling and Analysis (CIPMA) Program. This national initiative in critical infrastructure protection (CIP) is undertaken within a geospatial data and modelling framework. The project focuses on research related to modelling critical infrastructure networks and systems from an "all hazards" perspective using real data and knowledge provided by the owners of critical infrastructure. The project also has a major role in liaising with sectors of the Trusted Information Sharing Network for Critical Infrastructure Protection (TISN), notably the Energy, Communications, Water, and Banking & Finance Infrastructure Assurance Advisory Groups (IAAGs).

The objective of the CIPMA Program is to deliver strategic support to government and business decision makers involved in CIP, counter-terrorism and emergency management, especially with regard to prevention, preparedness and planning, and recovery.

Funding for the continuation of the development and operational use of the CIPMA program was provided in the FY2008-09 Budget for the next four years. The Attorney General's Department (AGD) CIP Branch will be establishing a Memoranda of Understanding (MoU) with Geoscience Australia (GA) to continue to provide lead technical support for building the CIPMA capability. GA will also provide additional departmental co-funding towards the technical development of CIPMA.

Over the past 2 years GA has been the lead technical agency for the development of CIPMA which has involved establishing a project team to build the computational tool housed within the secure facility at GA's premises. With the advent of this new funding cycle the project will undergo a restructure to enable the resourcing of 'Tasking' and system modelling. These changes mark the project's transformation in status from pilot to operational and also necessarily compensates for the loss of the CSIRO modelling team.

The CI Project is responsible for:

- the overall technical lead for the development of the CIPMA capability,
- housing and maintaining the capability in a secure environment,
- housing and managing ASNET secure communications,
- engaging and liaising with industry experts,
- scenario analysis and delivery of tasking requirements from business and government,
- sourcing and managing infrastructure data,
- modelling infrastructure systems,
- developing a decision support framework,
- developing an effective data information architecture, and
- developing appropriate outputs and visualisation capabilities.

- 2. Project Outcome:** This project will enable GA to deliver:
- A national integrated CIP modelling simulation and analysis capability to examine the primary dependencies and interdependencies between energy, banking & finance, communications, and water critical infrastructure.
 - Enhanced understanding of critical infrastructure relationships, dependencies and vulnerabilities.
 - Scenario task outputs that are able to provide strategic and operational support to decision makers involved in CIP, counter terrorism and emergency management, especially with regard to prevention, preparedness and planning, and recovery.

3. Project Link(s) to Intermediate-level Agency Outcomes:

- Enhanced global attractiveness of Australian exploration investment opportunities
- Improved resource management and environmental protection
- Safer communities and infrastructure

4. Project Link(s) to National Research Priority (NRP) Goals:

- An environmentally sustainable Australia
- Frontier technologies for building and transforming Australian industries
- Safeguarding Australia
- This project does not contribute to the NRPs

5. Key Performance Information:

- Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs
- Quarterly output milestones met
- Project budget met
- This project contributes to agency-level reporting obligations

6. Project Outputs:

6.1 Output 1: An operational CIPMA Program providing an infrastructure modelling and analysis capability to Industry and Governments for a number of priority sectors.

6.1.1 Description: An operational CIPMA capability that is open to limited tasking by industry and Government to model and analyse system behaviour, consequences of CI failure and interdependencies across priority infrastructure sectors; energy, banking & finance, communications, and water. Expansion of the CIPMA capability with the development and integration of water infrastructure including potable and waste systems.

6.1.2 Output Delivery Date:

- Q1 - A round 1, Banking & Finance task completed.
 - Reports to Communications, Banking, and Water IAAGs.
- Q2 - A round 1, Gladstone Cyclone task and Flinders Port task, and support to Mercury 08 completed.

- Report to Energy IAAG and CIAC.
- Q3 - A round 1, WA Gas Disruption task completed.
- Reports to Communications, Banking, and Water IAAGs.
- Q4 - A round 3 industry submitted scenario task completed.
- Report to Energy IAAG and CIAC.
- Limited priority areas of the water sector integrated into the capability.

Climate Change Project

1. Project Description: This new project aims to define the impact (damage caused, economic costs) and long-term risk from climatic phenomena (eg, initially, cyclones, severe winds, sea level rise) on infrastructure, community assets and the environment. Both current climate impact/risk and also the impact/risk influenced by climate change are being considered. This knowledge will be applied to planning and policy through strategic partnerships with external agencies (initially with the Department of Climate Change and Attorney-General's Department, Tasmanian Government and the Commonwealth Environment Research Funds (CERF) project with the Antarctic Climate & Ecosystems CRC (ACECRC). This project currently provides an assessment of coastal stability through a Heads of Agreement with the Department of Climate Change. The project also supports the Attorney-General's Critical Infrastructure Project (through tasking) and the Disaster Mitigation Australia Package (through informing mitigation decisions). More broadly, the project supports decision making across a range of risk mitigation options including emergency response, recovery and preparedness, building regulation, land-use planning and insurance.

2. Project Outcome: Stakeholders across government and the private sector are able to make informed decisions (planning and policy) to manage the risk from climatic hazards and evaluate the cost/benefit of climate change adaptation policy.

3. Project Link(s) to Intermediate-level Agency Outcomes:

- Enhanced global attractiveness of Australian exploration investment opportunities
- Improved resource management and environmental protection
- Safer communities and infrastructure

4. Project Link(s) to National Research Priority (NRP) Goals:

- An environmentally sustainable Australia
- Frontier technologies for building and transforming Australian industries
- Safeguarding Australia
- This project does not contribute to the NRPs

5. Key Performance Information:

- Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs
- Quarterly output milestones met
- Project budget met
- This project contributes to agency-level reporting obligations

6. Project Outputs:

6.1 Output 1: Wind hazard and risk in the Australian region

6.1.1 Description: Provide all levels of government and the public with information on the hazard associated with severe wind in the Australian region. This information will inform revision of Standards Australia's

wind loadings standard and feed into the review of the ABCB building code regions (wrt wind loading). This year's work program is focused on the development of data contributing to a regional hazard map that combines the output from the GA-developed cyclonic hazard and synoptic hazard models. In addition, we intend to provide information to the Dept. Climate Change on the future hazard and risk associated with tropical cyclones in the Australian region. A contractual agreement details the outputs which are focused primarily on hazard/risk levels for 2030 and 2070 under a range of climate change scenarios.

6.1.2 Output Delivery Date:

- Q1
- Q2 Impact of climate change scenarios on tropical cyclone activity evaluated (for DCC contract).
- Q3 Report to DCC (re: tasks listed in contract).
Australian regional cyclonic wind hazard evaluated.
- Q4 Australian regional synoptic wind hazard evaluated.

6.2 Output 2: Severe Wind Hazard/Risk for Tasmania

6.2.1 Description: Provide the Tasmanian State Emergency Service (SES) and the stakeholders of the Antarctic Climate & Ecosystems CRC (ACECRC) "Tasmanian Climate Futures" CERF project with information on the local scale hazard and risk associated with severe wind in Tasmania. This work is based around strong collaborative links (CRA) with the Tasmanian State government and an "in-kind" CERF agreement. This year's work program is focused on the delivery of a web-based module describing current climate hazard/risk (two regions of the island of Tasmania).

6.2.2 Output Delivery Date:

- Q1
- Q2
- Q3 Current climate wind hazard for Tasmanian region evaluated (using modelled climate).
- Q4 Web-based tool for exploring output operational for stakeholder feedback.

6.3 Output 3: Coastal Vulnerability Assessment

6.3.1 Description: As part of the Department of Climate Change's "Plan for a First Pass Assessment of Australia's Coastal Vulnerability to Climate Change" the project will identify and map shoreline substrates and landforms that have a greater or lesser sensitivity to potential impacts of climate change. The work will prioritise areas for future, more comprehensive assessments. It will also provide indicative but quantitative estimates of climate change impacts on human settlements and nationally-significant infrastructure across different timescales. Some of this work has been contracted to UTAS and is managed by GA. Two contractual agreements detail this work.

6.3.2 Output Delivery Date:

- Q1 Delivery of the National shoreline geomorphic and sensitivity maps (Smartline) via the OzCoasts website.
- Q2
- Q3 Maps of Australia highlighting impacts of climate change on human settlement and infrastructure completed.
- Q4 Data gap analysis of existing polygon datasets completed.

Engineering, Economics & Exposure Project

1. Project Description: Development of engineering and economic vulnerability models for the built environment that are representative of buildings, critical infrastructure and the economic activity associated with both. In parallel, the national definition of infrastructure and demographic exposure integrating the specific information held within jurisdictions and the confidential datasets collated by the Critical Infrastructure Project. The research vulnerability scope includes the broad and diverse range of infrastructure found in the Australian built environment for application in the scenario modelling and risk studies of the GR, CC and CI Projects. The provision of guidance on tasking scenarios developed in the CI Project. The development of tools to identify engineering factors influencing vulnerability and the evaluation of cost effective mitigation strategies for regulators, government and industry, particularly in the context of climate change.

2. Project Outcome: Stakeholders are able to make reliably informed decisions to manage the risk from natural hazards and malevolent acts. Impacts of natural hazards on critical infrastructure are reliably assessed as key inputs into utility system behaviour and the evaluation of attendant economic losses. Finite mitigation resources are more effectively deployed to achieve the greatest benefit to Australian communities. Significantly, climate change related effects are captured quantitatively to provide to inform mitigation policy.

3. Project Link(s) to Intermediate-level Agency Outcomes:

- Enhanced global attractiveness of Australian exploration investment opportunities
- Improved resource management and environmental protection
- Safer communities and infrastructure

4. Project Link(s) to National Research Priority (NRP) Goals:

- An environmentally sustainable Australia
- Frontier technologies for building and transforming Australian industries
- Safeguarding Australia
- This project does not contribute to the NRPs

5. Key Performance Information:

- Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs
- Quarterly output milestones met
- Project budget met
- This project contributes to agency-level reporting obligations

6. Project Outputs:

6.1 Output 1: Development of the National Exposure Information System (NEXIS)

6.1.1 Description: Delivery of an “operational” capability for generating national residential, business, institutions and emergency use exposure

information derived from and consistent with nationally available datasets. Upgrade of these capabilities through specific exposure information derived from the jurisdictions. Scope and develop an approach to integrate critical infrastructure asset data within a secure environment.

6.1.2 Output Delivery Date:

- Q1
- Q2 Development of institutional building exposure prototype
- Q3
- Q4 Development of methodology for integrating critical infrastructure specific data

6.2 Output 2: Development of Vulnerability Models for Building Structures

6.2.1 Description: Develop vulnerability models for buildings used for a range of purposes including those that house critical infrastructure assets. Natural hazards of interest include severe wind, earthquake and tsunami.

6.2.2 Output Delivery Date:

- Q1 Develop wind vulnerability relationship of Sydney house type using engineering approach.
- Q2
- Q3 Development of Monte Carlo tool for simulating building wind vulnerability.
- Q4

6.3 Output 3: Critical Infrastructure Vulnerability Model Development and System Dynamic Model Development Support

6.3.1 Description: Develop and adapt preliminary earthquake vulnerability models for electricity, telecommunications and transport sector assets for use in developing the CIPMA Decision Support module. The provision of engineering support to the development of interdependent utility system dynamic models.

6.3.2 Output Delivery Date:

- Q1
- Q2 Develop preliminary earthquake vulnerability models for key telephone exchange types.
- Q3 Develop Monte Carlo simulation tools for the generation of vulnerability relationships for thermal power stations based on component level vulnerabilities.
- Q4 Categorisation of main roads bridge assets and mapping of these to US earthquake vulnerability models.

6.4 Output 4: Economic Vulnerability Model Development

6.4.1 Description: The Economics component of the E³ project provides

support to other RIAG projects (CIP, CCP, GRP) and develops economic models to assess the impact of all hazards including the evaluation of casualty costs, indirect losses and economy wide effects. These modelling and analytical tools also support analysis and decision making in terms of mitigation, loss amplification, business resilience and policy settings.

6.4.2 Output Delivery Date:

Q1

Q2 Flinders Port Task – Management and Reporting

Q3 Gladstone Task Economic Impacts

Q4 Preliminary Casualty Cost Model

NATIONAL MAPPING & INFORMATION GROUP

(Group Leader: Greg Scott)

The National Mapping & Information Group provides spatial information to address government policy, industry development needs and community needs. This is delivered in the form of topographic maps and fundamental spatial data sets for emergency managers, defence, other government departments and the public.

The Group also plays a fundamental role in coordinating national topographic mapping activities and standards, through the Intergovernmental Committee for Surveying and Mapping (ICSM) and other national coordination initiatives.

The National Mapping and Information Group comprises four projects:

- The Geographic Data Management and Products team manage and maintain the National Topographic Database (NTDB) and develop digital and hard copy topographic spatial products to support government priorities, industry development and community needs.
- Defence Mapping undertakes the production of geospatial data and map products for onshore areas on behalf of the Department of Defence.
- Geographic Research and Data Acquisition undertakes the capture, maintenance and provision of topographic and related spatial data infrastructure to address government priorities such as emergency management mitigation and response, industry development and community needs. Most of this work is undertaken in collaboration with State/Territory and other Commonwealth agency partners.
- The National Landscape Information Infrastructure project provides a conduit for liaison with key government bodies and industry stakeholder groups on the prioritisation and coordination of national spatial data infrastructure and landscape monitoring projects. These include: contributing to the development of a new National Elevation Data Framework; National Land Cover Monitoring initiatives, and the development of a major proposal, in collaboration with the Bureau of Meteorology and CSIRO, on the creation of the Australian Hydrological Geofabric to support the Bureau's Australian Water Resources Information System.

Geographic Data Management & Products

1. Project Description: Manage and maintain the National Topographic Database (NTDB) and develop digital and hard copy topographic spatial products to support government priorities, industry development and community needs.

2. Project Outcome: Government, industry and the community have ready access to authoritative national scale geographic information.

3. Project Link(s) to Intermediate-level Agency Outcomes:

- Enhanced global attractiveness of Australian exploration investment opportunities
- Improved resource management and environmental protection
- Safer communities and infrastructure

4. Project Link(s) to National Research Priority (NRP) Goals:

- An environmentally sustainable Australia
- Frontier technologies for building and transforming Australian industries
- Safeguarding Australia
- This project does not contribute to the NRPs

5. Key Performance Information:

- Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs
- Quarterly output milestones met
- Project budget met
- This project contributes to agency-level reporting obligations

6. Project Outputs:

6.1 Output 1: Maintenance and development of the National Topographic Database (NTDB).

6.1.1 Description:

- Maintenance of the 250K NTDB, population of the 100K NTDB, population of the Holding Database with data from large scale mapping activities, population of the NTDB with small scale topographic data, 1M through to 10M scale (ongoing).
- Maintenance of the topographic database and digital product specifications (on-going).
- Quality validation of NTDB data (on-going).
- Administration of the NTDB management software (SDE) and user access to the NTDB (on-going).
- Application support for development of the NTDB (on-going).

6.1.2 Output Delivery Date:

- Q1 - 100K Map Indexes, Vermin Proof Fences, Foot Tracks and Horizontal Control Points layers loaded in 100K NTDB (meet specification and pass validation)
 - Mt Lindesay tile loaded in 100K NTDB
- Q2 - Aviation and Spot Elevation layers loaded in 100K NTDB
 - Relevant 250K layers copied to 100K NTDB
 - 5 Mackay tiles loaded in 100K NTDB
 - 7 Bundaberg tiles loaded in 100K NTDB
 - Murwillumbah tiles loaded in 100K NTDB
 - MacDonnell Ranges data loaded in 100K NTDB
 - Narrabri tile loaded in 250K NTDB
- Q3 - Pipeline and Powerline layers loaded in 100K NTDB
 - Qld/NT contours work package data loaded in 100K NTDB
 - Shoalwater tiles loaded in 100K NTDB
 - 2 Argyle Downs tiles loaded in 100K NTDB
 - Innisfail tile loaded in 250K NTDB

- Q4 - Railway layer loaded in 100K NTDB
 - Beenleigh tiles loaded in 100K NTDB
 - Carnarvon National Park and Francois Peron National Park - - - 100K data loaded in 100K NTDB
 - Moree tile loaded in 250K NTDB
 - Wangaratta tile loaded in 250K NTDB
 - WAC data loaded into 1M NTDB
 - IMW data layers loaded in 1M NTDB

6.2 Output 2: Topographic and Thematic Map and Data Products

6.2.1 Description:

- Maintenance of the 1M World Aeronautical Chart data and maps in collaboration with Airservices Australia (on-going)
- Production of 100K through to 10M vector, map and raster products (on-going)
- Maintenance of 1M Global Map data for input into International Global Map Program (on-going)
- Development of Gazetteer of Australian Placenames (on-going)
- Ad hoc support for Department of Prime Minister and Cabinet, and other Australian Government agencies for the production of thematic maps (on-going)
- Enhancement of MapConnect for the delivery of spatial data and maps (on-going)
- Development of and technical support for the GA node of the LYNX2 data infrastructure (on-going)

6.2.2 Output Delivery Date:

- Q1 - Minister's Wall Map printed
 - 250K Raster Maps product released
 - Updated Global Map product released
 - MapConnect moved to Zoom2 server
- Q2 - Norfolk Island, Christmas and Cocos Islands maps printed
 - MacDonnell Ranges 100K maps printed
 - Narrabri 250K map printed
 - Gazetteer of Placenames 2008 released
 - 100K Raster maps released
 - Updated MapConnect interface released
- Q3 - 250K GeoPDF product released on DVD
 - Innisfail 250K map printed
 - Shoalwater 100K maps printed
 - 2 Argyle Downs 100K maps printed
 - Customised GeoPDF maps offered through MapConnect
- Q4 - Moree 250K map printed
 - Wangaratta 250K map printed
 - Carnarvon National Park and Francois Peron National Park

- 100K maps printed
- Australian 2.5M map released
- 100K data made available through MapConnect
- New Global Map web mapping application released

Defence Mapping

1. **Project Description:** Manage the production of geospatial products on behalf of Department of Defence - Defence Imagery and Geospatial Organisation (DIGO)
2. **Project Outcome:** DIGO and its Defence clients have access to geospatial data and map products that meet their requirements.

3. Project Link(s) to Intermediate-level Agency Outcomes:

- Enhanced global attractiveness of Australian exploration investment opportunities
- Improved resource management and environmental protection
- Safer communities and infrastructure

4. Project Link(s) to National Research Priority (NRP) Goals:

- An environmentally sustainable Australia
- Frontier technologies for building and transforming Australian industries
- Safeguarding Australia

5. Key Performance Information:

- Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs
- Quarterly output milestones met
- Project budget met
- This project contributes to agency-level reporting obligations

6. Project Outputs:

6.1 Output 1: Deliver geospatial maps and data products to DIGO

6.1.1 Description:

- Deliver Orthophotos, DEMs, vector data and maps of priority areas to DIGO including Yampi training area and PNG 1:10K mapping according to DIGO timeframes.
- Deliver structured and attributed data derived from IGDS data for 1:50K map areas according to the program supplied by DIGO.
- Facilitate the development of a 'soft copy' map library for DIGO by completing scanning of maps supplied by DIGO (target completion in August 2008 maps) and metadata creation according to DIGO timeframes. If required, manage georeferencing of selected titles.
- If required, acquire air photography, satellite imagery and associated source data for the production of spatial data and map products according to DIGO timeframes.

6.1.2 Output Delivery Date:

- Q1
- Q2
- Q3
- Q4

Geographic Research & Data Acquisition

1. Project Description: The capture, maintenance and provision of topographic data and related Spatial Data Infrastructure products to meet government priorities, emergency management mitigation and response, industry development and community needs. This is undertaken in collaboration with state and other Commonwealth agencies and industry partners through the National Topographic Information Coordination Initiative (NTICI).

2. Project Outcome: Government, industry and the community have access to fundamental spatial data via a program that meets their needs and reduces duplication in capture and maintenance.

3. Project Link(s) to Intermediate-level Agency Outcomes:

- Enhanced global attractiveness of Australian exploration investment opportunities
- Improved resource management and environmental protection
- Safer communities and infrastructure

4. Project Link(s) to National Research Priority (NRP) Goals:

- An environmentally sustainable Australia
- Frontier technologies for building and transforming Australian industries
- Safeguarding Australia
- This project does not contribute to the NRPs

5. Key Performance Information:

- Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs
- Quarterly output milestones met
- Project budget met
- This project contributes to agency-level reporting obligations

6. Project Outputs:

6.1 Output 1: Contribution to National Spatial Data Infrastructure Initiatives

6.1.1 Description:

- Contribution to ICSM initiatives, including planning, management and implementation of the Roads Working Group and NTICI, and contribution to the Imagery SIG.
- Liaison with key government bodies and industry stakeholder groups to incorporate requirements into collaborative mapping programs.

6.1.2 Output Delivery Date:

- Q1
- Q2
- Q3
- Q4 - Implementation of NTICI capture and revision program for 2009/10 including incorporation of requirements of key

stakeholders.

- Coordination and implementation of ICSM Roads Working Group activities
- Provision of geographic datasets and imagery to clients on as needs basis.

6.2 Output 2: Maintenance and Revision of Fundamental National Scale Topographic Data

6.2.1 Description: On-going maintenance of priority themes in conjunction with emergency management organisations, state land information agencies, Australian Government agencies and other GA projects, in particular those related to Australian government priorities of emergency management, community safety in remote areas, safer transportation, and sustainable use of mineral and water resources.

6.2.2 Output Delivery Date:

Q1

Q2 - Completion of transport revision in central west NSW for NSW Department of Lands
- Completion of data capture for Carnavon Gorge National Park (Qld) and Francois Peron National Park (WA)

Q3 - Completion of revision of priority themes for emergency management in the Yorke Peninsula, SA and Stanthorpe, Qld
- Completion of revision of drainage and landforms in the north-east Flinders Ranges for Primary Industries & Resources SA

- Complete integration of pastoral infrastructure data from NT government into the National Topographic Database

Q4 - Completion of revision of priority themes for emergency management in western Victoria.
- Completion of revision of farm dams in priority areas of the Murray-Darling Basin for the Murray-Darling Basin Commission
- Completion of improvements to the drainage network in the Gwydir catchment for the Bureau of Meteorology
- Completion of revision of priority themes and priority areas for emergency management in the ACT Region.
- Ongoing maintenance of national coverage information for safer communities and transport, including maintenance of underlying spatial datasets for the National Exposure Information System, location of vertical obstructions for RAAF, and energy, land administration and transport datasets.

6.3 Output 3: Geographic Research

6.3.1 Description:

- Undertake research to determine priorities for revision of fundamental spatial data at a national level.

6.3.2 Output Delivery Date:

Q1

Q2 - Development of national theme-based revision strategy to determine areas of prioritisation.

Q3 - Complete investigation into efficiencies in the collection and maintenance by GA of national roads datasets.

- Undertake systematic change detection over 10% of Australia, focusing on areas of interest to key stakeholders, and identify areas requiring revision in 2009/10.

Q4

National Landscape Information Infrastructure

- 1. Project Description:** Climate change, water and natural resource management, emergency management, and urban development require a range of common fundamental data to support policy development and implementation. Information on how the landscape is changing through time is also required to enable governments and communities to track the performance and outcomes of mitigation initiatives and to develop adaptation strategies based on the continuous improvement of data and knowledge and information systems. The project has two primary outputs that aim to leverage existing capabilities and projects across NMI and SIARS to develop new capabilities for GEMD including: the coordination of spatial data infrastructure initiatives, and the development of a new National Elevation Data and Information System, as part of the National Elevation Data Framework (NEDF) being developed in collaboration with ANZLIC, CRCSI and the DCC. Work relating to Land Cover Monitoring has been included in the Remote Sensing Science and Strategy Project of SIARS for the 2008/09 period. Activities relating to Geoscience Australia's role in the National Plan for Water Security, and in particular, providing support to the Bureau of Meteorology's role under the Water Act (2007) are still developing. These activities will be incorporated into the work program as they develop with the approval of the Executive.
- 2. Project Outcome:** Government, industry and the community have access to fundamental spatial data and information required to deliver safe, sustainable and prosperous communities.
- 3. Project Link(s) to Intermediate-level Agency Outcomes:**
 - Enhanced global attractiveness of Australian exploration investment opportunities
 - Improved resource management and environmental protection
 - Safer communities and infrastructure
- 4. Project Link(s) to National Research Priority (NRP) Goals:**
 - An environmentally sustainable Australia
 - Frontier technologies for building and transforming Australian industries
 - Safeguarding Australia
 - This project does not contribute to the NRPs
- 5. Key Performance Information:**
 - Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs
 - Quarterly output milestones met
 - Project budget met
 - This project contributes to agency-level reporting obligations

6. Project Outputs:

6.1 Output 1: Coordination of National Spatial Data Infrastructure Initiatives

6.1.1 Description:

- Provision of Secretariat for the Intergovernmental Committee on Surveying and Mapping (ICSM) as well as advice and promotion of 'best practice' standards and guidelines for topographic and related mapping and data generation, maintenance, and dissemination within the ambit of ICSM (Q1-4).
- Membership on ICSM Permanent Committees and Working Groups, and in particular the Permanent Committee on Topographic Information that oversees NTICI and the Roads Working Group (Q1-4).
- Liaison with key government bodies and industry stakeholder groups on matters of prioritisation and national coordination of spatial data infrastructure and landscape monitoring projects (Q1-4).
- Advise on initiatives that aim to raise the awareness of government, industry and the community to the benefits of spatial data infrastructure (Q1-4).
- Participate in Commonwealth and State Technical Committees associated with the development and maintenance of the Australian Spatial Data Infrastructure (Q1-4).
- Contribute to development of Land Cover and Landscape monitoring capabilities and initiatives being developed through SIARS (Q1-4)
- Development of a major proposal in collaboration with BOM and CSIRO on the creation of the Australian Hydrological Geofabric to support the BOM's new water accounting requirements under the Water Act (2007) (Q1)

6.1.2 Output Delivery Date:

Q1

Q2

Q3

Q4 Ongoing advice and participation as appropriate

6.2 Output 2: National Elevation Data and Information System

6.2.1 Description: Australian government agencies at all levels, the community and industry are driving significant increases in the demand for high quality elevation data. Issues such as climate change, coastal vulnerability, water and natural resource management, emergency management, health and safety issues all require access to better quality information which seamlessly integrates topography and bathymetry with accuracy requirements far exceeding that currently available at the national level. The overall objective of this program is to further develop the National Elevation Data Framework (NEDF) particularly in relation to technical capacity and institutional arrangements.

During 07/08 Geoscience Australia worked with ANZLIC, the Australian Government (DCC in particular), and the CRCSI to complete:

- User Needs Analysis through direct contact with stakeholders around Australia.
- Business Plan, setting out the intent and potential form of a NEDF, identifying key stakeholders and a preliminary review of existing usage of elevation data sets and products in Australia.
- Science Case to support the implementation of the project including the running of a National Workshop and review by the Academy of Science.
- Agreement on use of applicable data standards and access arrangements such as licensing.
- Implementation Plan using the User Needs Analysis and feedback from stakeholders on issues such as governance arrangements, funding and standards.

In addition to the above activities the project also:

- Institutionalised the Single Point of Truth (SPOT) process for elevation data in GA.

During 2008/09 the emphasis of the Project will be on delivering the recommendations of the Business Plan and Implementation Plan in collaboration with ANZLIC, DCC, CRCSI and other Australian Government stakeholders such as the BOM. GA will be represented on the NEDF Steering Committee and Management Committee. GA will also drive the development of a number of new National Products and capabilities.

6.2.2 Output Delivery Date:

Q1

Q2

Q3

Q4 As detailed in description above

SPATIAL INFORMATION ACCESS & REMOTE SENSING GROUP

(Group Leader: Adam Lewis)

SIARS provides advice, expertise, operational capability and services in spatial decision support systems and remote sensing.

SIARS includes several projects and activities:

- The Australian Centre for Remote Sensing,
 - o Remote Sensing Science and Strategy (RSSS),
 - o Remote Sensing Infrastructure and Engineering (RSIE), &
 - o Remote Sensing Information Services (RSIS)
- Geospatial Decision Support Information (GDSI) and
- The CRC-Spatial information (CRC-SI)

The Group has evolved over the past 3 years to focus largely on public-good remote sensing / Earth observation through ACRES. The on-going changes in that area have been guided by the 2004 internal review of ACRES. The directions identified in that review remain valid.

A Strategic Plan for remote sensing, initiated in late 2007 is being developed to provide more specific directions and priorities through to 2013. Development of the strategic plan is a significant undertaking in its own right. The Strategic Plan identifies the following mission statement for SIARS Remote Sensing:

SIARS will extend capabilities to deliver spatial information from remote sensing, focusing on environmental and community safety decision makers.

SIARS Group priorities for 2008/9

SIARS Group priorities support GEMD priorities.

GEMD priorities for 2008/9 remain largely unchanged from 2007, ie, with strategic foci of groundwater, environment change / land cover, community safety / natural hazards. An emerging question in regard to environmental monitoring is the role of the division in stewardship of national datasets to enable national environmental reporting systems.

1. National planning, coordination and advice for remote sensing for partners in Australian Government.
2. Full development and commencing implementation of the ACRES / Remote Sensing 5-Year Strategic Plan as a basis for future activities and investment.
3. Land cover : as part of a national infrastructure to service the climate change agenda, and in cooperation with the CRC-SI, develop robust, science-based, remote sensing methods to inform land cover change.
4. Provision of data from IRS-P6 to Australian government agencies and partners, according to the Landsat Data Contingency Plan.

5. Improved operational support for EMA and emergency managers in the event of floods and natural disasters, through implementation of protocols developed in 2007/8, and through enhancements to Sentinel.
6. With the CRC-SI, further development and demonstration of the PEMS (Platforms for Environmental Modelling Support) demonstrator to deliver decision support information into a specific government business such as National Environment Reporting.
7. Further development of GAIA-View to fully demonstrate technical capabilities and concepts around discovery and access to GA spatial data holdings on-line.
8. Support to key Commonwealth Government partners, including the Department of Climate Change and others, through
 - Ground station establishment and operation
 - Capabilities for management of processed imagery and other datasets in support of global carbon monitoring systems

Remote Sensing Science and Strategy Project (Australian Centre for Remote Sensing)

1. **Project Description:** Remote Sensing Science and Strategy (RSS&S) actively develops applications using ACRES archive to deliver national scale information on land cover dynamics and emergency response in line with SIARS and GEMD strategic priorities. The project provides advice to the Group Leader, SIARS on remote sensing strategic issues and maintains international science linkages that underpin Australia's public-good and Government remote sensing activities.
2. **Project Outcome:** Increased influence and capability in remote sensing through a recognised science profile, effective translation of R&D activities to operational applications within GA; application of ACRES remote sensing capability to nationally significant issues such as community safety, climate change and water.
3. **Project Link(s) to Intermediate-level Agency Outcomes:**
 - Enhanced global attractiveness of Australian exploration investment opportunities
 - Improved resource management and environmental protection
 - Safer communities and infrastructure
4. **Project Link(s) to National Research Priority (NRP) Goals:**
 - An environmentally sustainable Australia
 - Frontier technologies for building and transforming Australian industries
 - Safeguarding Australia
 - This project does not contribute to the NRPs
5. **Key Performance Information:**
 - Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs
 - Quarterly output milestones met

- Project budget met
- This project contributes to agency-level reporting obligations

6. Project Outputs:

-

- **6.1 Output 1:** Development and communication of the SIARS/ACRES 5-Year Strategic Plan – scientific information products and advisory services.

6.1.1 Description: The remote sensing strategic plan includes scientific information products and advisory services which must be specified and communicated to users.

6.1.2 Output Delivery Date:

Q1

Q2 Science advisory ‘services’ and client base defined for the ACRES 5-year strategic plan

Q3

Q4

- **6.2 Output 2:** Operational deployment of emergency protocols for timely access to satellite data and improvements to Sentinel.

6.2.1 Description: This output will involve simulation exercises that will test the protocols and timely delivery of ACRES satellite data to emergency managers and workshop with stakeholders such as EMA and AGDRC, AFAC. This output also includes developing methodology, based on land cover pilot project outputs, to monitor vegetation condition for bushfire risk assessment.

6.2.2 Output Delivery Date:

Q1 Identification of roles and trial run of procedures

Q2 Final documentation and communication

Q3

Q4 Maintain Sentinel Services noting the limitations of and reliance on Corporate IM readiness

- **6.3 Output 3:** Operational Methodology for land-cover change detection at the national scale to service the environment and climate change agenda – water and national environment reporting.

6.3.1 Description: This output includes completion of the Gwydir pilot project; developing specific time series analysis tools to map key indicators of climate change; extending and refining the methodology to other geographic regions of Australia, gaining confidence of user community (eg. DEHWA for environmental reporting), developing a detailed scope of national land cover mapping; hosting a national workshop and agreements with key government departments; detailed advice to the Chief of Division on the process to transition to an operational methodology within GEMD. Use of IRS-P6 for land cover mapping will be explored.

6.3.2 Output Delivery Date:

- Q1 Recommendations from the Gwydir pilot study
- Q2 National workshop with stakeholders
- Q3 Geographic extension of the pilot study to ensure applicability across the continent. Refined methodology; Operational implementation plan and recommendations to the COD;
- Q4 'MODIS Scale' first-pass National Land Cover Map;

6.4 Output 4: Aquatic remote sensing capability development in the coastal and marine environment, including support of the off-shore energy security program.

6.4.1 Description: This output provides access to remote sensing data and builds remote sensing data analysis capability in SAR and multi-/hyperspectral data applications for the off-shore energy security program which is funded by PMD. This output also develops remote sensing-based high resolution bathymetry estimation capabilities for coastal waters, currently funded by AusAID. In addition, this output provides advice on the potential for national scale monitoring of open ocean water quality parameters.

6.4.2 Output Delivery Date:

- Q1 Brief report on potential coastal and marine remote sensing needs of GA projects/groups. Report/paper on laboratory-based oil measurements and sensitivity study.
- Q2 Delivery of Solomon Islands bathymetry product to Risk and Impact Analysis Group
- Q3 Development of oil slicks detection methodologies
- Q4 Remote sensing data analysis to meet the PMD project requirements for frontier regional studies

- **6.5 Output 5:** Scientific support to Department of Climate Change (DCC) in implementing the International Forest Carbon Initiative (IFCI).

- **6.5.1 Description:** This is a DCC funded activity seeking scientific advice and regional/global satellite data from GA. This includes data acquisition, data processing, data management and delivery of outputs to enable DCC extending the NCAS framework to South East Asia as part of the International Forest Carbon Initiative.

6.5.2 Output Delivery Date:

- Q1 Detailed project scope documents in place with DCC sign-off; Data acquisition under way. First Quarter meeting with client.
- Q2 Scene selection report for the regions of interest completed; Acquisition of data 50% complete. 2nd Quarter meeting with client.
- Q3 Development of Data management and delivery capabilities. 3rd Quarter meeting with client.
- Q4 Data management and delivery capabilities in place. Project

outputs delivered to the satisfaction of DCC. Fourth Quarter meeting with client.

Remote Sensing Infrastructure and Engineering Project (RSIE)

- 1. Project Description:** Provides infrastructure and processing systems in support of other ACRES projects (RSIS and RSSS). These systems provide data reception, management and processing necessary to provide timely, operationally ready, remote sensing data. Primary clients of RSIE are the remote sensing information services project (RSIS). RSIE operates reception facilities at Alice Springs and Hobart (the Tasmanian Earth Resources Satellite System consortium - TERSS). Relationships with, and quid-pro-quo services to, the United States Geological Survey are key to ensuring cost effective access to current and future data sources.
- 2. Project Outcome:** Geoscience Australia is able to provide cost-effective, timely, relevant, and on-going remote sensing data and information in support of Australian Government programs and the community.
- 3. Project Link(s) to Intermediate-level Agency Outcomes:**
 - Enhanced global attractiveness of Australian exploration investment opportunities
 - Improved resource management and environmental protection
 - Safer communities and infrastructure
- 4. Project Link(s) to National Research Priority (NRP) Goals:**
 - An environmentally sustainable Australia
 - Frontier technologies for building and transforming Australian industries
 - Safeguarding Australia
 - This project does not contribute to the NRPs
- 5. Key Performance Information:**
 - Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs
 - Quarterly output milestones met
 - Project budget met
 - This project contributes to agency-level reporting obligations
- 6. Project Outputs:**
 - 6.1 Output 1:** Development and communication of the ACRES strategic plan, and implementation of high-priority components of the plan.
 - 6.1.1 Description:** A major component of the 5-year strategic plan for remote sensing is the specification of a system to support future needs and a path to evolve or migrate from the current systems. Some of those elements will be progressed in this financial year in support of key initiatives and major externally funded projects.
 - 6.1.2 Output Delivery Date:**
 - Q1 Review the status and adequacy of the PIA.
 - Q2 Detailed systems transition plan complete; Revised QA and

production procedures leading to increased throughput viz. automatic processing and archiving of processed imagery; Generic GCP database in place; PIA processes are in place allowing load and efficient retrieval of new Quickbird imagery.

- Q3 Client management system implemented; Integrate PIA data holdings with the HSM system on the robotics tape system.
- Q4 Ortho-processing systems are in place for ALOS and P6; Identify methodology to implement satellite scheduling to gain the greatest benefit from prospective satellite passes;

6.2 Output 2: Reception, processing and archival systems are available for use by internal and, where relevant, external clients.

6.2.1 Description: The Alice Springs data acquisition facility (DAF) operates on a 24/7 basis to capture remotely sensed satellite data from a variety of satellites including Landsat-5, Landsat-7, ALOS, IRS-P6, Aqua, Terra, Radarsat-1 and ERS. These data are captured in Alice Springs and written to tape which is then archived, and processed to imagery on demand in Canberra. This output is delivered through well maintained infrastructure managed by skilled and qualified engineers and technicians. GA also operates facilities in Hobart on behalf of the TERSS consortium which functions similarly to those at Alice Springs.

6.2.2 Output Delivery Date:

- Q1 Continuous output
- Q2 Review and recommendations for new transfer media and off-site back-up finalised
- Q3 Continuous output
- Q4 Transcription of archive to new robotics system operational

6.3 Output 3: Additional reception capabilities are implemented to support the GIFC initiative of the Australian Government

6.3.1 Description: Geoscience Australia will work with the Department of Climate Change to deliver the expansion of national infrastructure required for the Global Initiative on Forests and Climate (GIFC). This program is largely funded by DOCC. Timing of outputs is contingent on DCC sign-off and coordination.

6.3.2 Output Delivery Date:

- Q1 Field site inspections complete;
- Q2 Tender evaluations complete; Purchasing initiated
- Q3 Purchasing complete
- Q4 Installation and commissioning of new ground stations

6.4 Output 4: Operational processing of IRS-P6 data

6.4.1 Description: Systems will be implemented to allow data from IRS-P6 to be available to the Australian Community as a contingency for Landsat-5 failure. Key unknowns are the degree to which the system to be

provided by Antrix can be integrated with existing systems to allow automation of processes, and ortho-rectification.

6.4.2 Output Delivery Date:

Q1 Install and commission Antrix system

Q2 'Manual' system operational for processing, storage and distribution of P6 data

Q3

Q4 Fully integrated system through to ortho-rectified imagery and links with the PIA.

Remote Sensing Information Services Project (RSIS)

1. Project Description:

- Builds relationships with remote sensing users in the Australian community through development of professional, needs-based relationships within government and through networks of users and distributors.
- Manages the generation and distribution of public good satellite data for Australia.
- Works to maximise the value of public-good remote sensing products to Australia by improving the timeliness, affordability, and relevance of data.
- Maintains distribution models, supplier agreements, and promotions/communications for ACRES.
- Monitors the quality of all the satellite data held in the ACRES archive. third parties.

The RSIS project is a user of systems provided by the RSIE project. The relationship between RSIS and RSIE is particularly important to ensure that engineering developments are directed toward user needs.

- 2. Project Outcome:** The value of the ACRES facility to the Australian community is maximised through the timely availability of relevant satellite data, image products and knowledge in support of government, academia, and the private sector. Geoscience Australia's Influence is increased through the provision of remote sensing products to government partners. Geoscience Australia's Capability is increased through significantly improved access to and application of its image holdings, including images purchased from third parties.

3. Project Link(s) to Intermediate-level Agency Outcomes:

- Enhanced global attractiveness of Australian exploration investment opportunities
- Improved resource management and environmental protection
- Safer communities and infrastructure

4. Project Link(s) to National Research Priority (NRP) Goals:

- An environmentally sustainable Australia
- Frontier technologies for building and transforming Australian industries
- Safeguarding Australia
- This project does not contribute to the NRPs

5. Key Performance Information:

- Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs
- Quarterly output milestones met
- Project budget met
- This project contributes to agency-level reporting obligations

6. Project Outputs:

- **6.1 Output 1:** Development and communication of the SIARS/ACRES Strategic Plan, and implementation of Customer and Product plans identified in the Strategic Plan.

6.1.1 Description: The strategic development of remote sensing systems is being strongly guided by newly developed client and product/service plans which describe what is being done, for whom, and how services will be delivered. These plans must be further refined during the year.

6.1.2 Output Delivery Date:

Q1

Q2 procedures for client management are in place; procedures for service delivery are in place including support for emergency managers and the Sentinel service.

Q3 stakeholder and product plans are reviewed

Q4 stakeholder and product plans are reviewed

6.2 Output 2: Client relationships – planning, development, management including meetings of the National Remote Sensing Technical reference Group (NRSTRG) establishment of MoU's with key clients, and documentation of all current services including those to CSIRO, BoM, WASTAC and others.

6.2.1 Description: ACRES meets the remote sensing needs of the Australian government through the provision of services and information to a range of Government and other clients. The hosting of regular client/stakeholder meetings and the development of MOUs will be a means of recognising and managing these client relationships.

6.2.2 Output Delivery Date:

Q1 A detailed and complete inventory of current services is in place and maintained;

Q2 ACRES distributor Meeting; October 2008 NRSTRG Meeting;

Q3 MoUs are in place / letters are exchanged with / all key stakeholder-clients.

Q4 April 2009 NRSTRG Meeting;

- **6.3 Output 3:** Provision of services according to agreed priorities.

6.3.1 Description: Scheduling of acquisitions to maximise data value and resolve conflicts between satellite overpasses; provide processed images to clients; provide ortho-rectification of data; emergency support; liaise with satellite operators to maximise benefit to Australia.

6.3.2 Output Delivery Date:

Q1 Major revision of work processes including consideration of QA processes, automated through-put, prioritisation, the 'ACRES guarantee' and mission planning.

- Q2 800 or more images provided
- Q3 800 or more images provided
- Q4 1100 or more images provided

- **6.4 Output 4:** Provision of image data from the IRS-P6 satellite.
 - 6.4.1 Description:** Implementation of processes to support distribution of image data from the IRS-P6 satellite.
 - 6.4.2 Output Delivery Date:**
 - Q1 Data supply licence developed; image processing work procedures developed;
 - Q2 Image product specifications and distribution procedures are finalised and negotiated/communicated
 - Q3 Procedures are reviewed to make use of further systems developments from RSIE
 - Q4
- **6.5 Output 5:** Support to the remote sensing community in the application of new and alternative image products
 - 6.5.1 Description:** The development of higher level information products is an ongoing activity at ACRES. The generation of MODIS Composite Products and Ortho P6 Products is a specific part of this activity.
 - 6.5.2 Output Delivery Date:**
 - Q1 Recommendations on best practice ortho-rectification methods for P6 data through relationship with the CRC-SI.
 - Q2 Paper on data quality and applications for IRS-P6
 - Q3 Feedback from the user community on MODIS composites is incorporated
 - Q4 Landsat-7 SLC information sheet

Geospatial Decision Support Information

1. **Project Description:** This project develops and demonstrates spatial technology solutions to allow access to geographic information over the web, enable interoperability with other agencies, and develop decision support systems for key GA clients. The project is a working example of the ways in which spatial information can be applied within government to inform the development of advice and policy.
2. **Project Outcome:** Spatial enablement of GA and government departments leading to enhanced influence and capability of GA. Improved accessibility to Australia's spatial information, in particular, information derived from remotely sensed imagery and energy infrastructure for utilisation in government administration, management and policy development
3. **Project Link(s) to Intermediate-level Agency Outcomes:**
 - Enhanced global attractiveness of Australian exploration investment opportunities
 - Improved resource management and environmental protection
 - Safer communities and infrastructure
4. **Project Link(s) to National Research Priority (NRP) Goals:**
 - An environmentally sustainable Australia
 - Frontier technologies for building and transforming Australian industries
 - Safeguarding Australia
 - This project does not contribute to the NRPs
5. **Key Performance Information:**
 - Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs
 - Quarterly output milestones met
 - Project budget met
 - This project contributes to agency-level reporting obligations
6. **Project Outputs:**
 - 6.1 **Output 1:** Deployment of remote sensed information into decision making environments, such as National Environment Reporting, through PEMS.
 - 6.1.1 **Description:** The PEMS demonstrator project, sponsored by the CRC SI, is a prototype for a grid cell data infrastructure of the ASDI that could provide extended data management support to modellers and analysts. One of its many objectives is to provide a platform that could facilitate integrated research among scientists from different 'earth based' disciplines and provide a decision support system to users who wish to use PEMS to get answers to well-defined (and pre-defined) questions based on customised dataset queries. A perfect case study for PEMS would be its applicability and usefulness for National

Environment Reporting. No outputs are planned beyond the expected life of the current demonstrator.

6.1.2 Output Delivery Date:

- Q1 Agree on an application scenario for PEMS to address the business needs of a Commonwealth agency BRS / DAFF for National Environment Reporting; Acquire additional data from commonwealth agencies; Determine additional functions needed;
- Q2 Implement new functionality; load data; Test functionality; Formal evaluation; Documentation of the extended commonwealth demonstrator for PEMS.
- Q3
- Q4

6.2 Output 2: Image discoverability and delivery through GAIA-VIEW increases the impact of GA imagery

6.2.1 Description: Geospatial and Earth Monitoring Division (GEMD) has significant holdings of satellite and raster imagery. The task is to assess and further develop the high-performance browser based application for image and vector data visualisation and searching, including ability to: switch layers on and off; conduct 'basic' image comparisons; identify all image holdings at a given location; display the footprint of an image; using existing ACRES archive metadata; and enable download of imagery from site.

6.2.2 Output Delivery Date:

- Q1 Formal prototype testing including functionality and performance with internal and external users
- Q2 Additional data added to GAIA-View, including ALOS, P6, and MODIS data and newly purchased high-resolution imagery of coastal areas
- Q3 Additional functionality added to support JPEG2000, authentication and integration with the processed image archive
- Q4 Formal evaluation including advice to SIARS and GA on the future role of the technology; GA seminar.

6.3 Output 3: EISys – phase-down for DRET Energy and Environment Division

6.3.1 Description: Due to a lack of funding from DRET EISys will be managed as 'unsupported'. Public versions of data will be migrated elsewhere, and the systems will continue to operate, however software licences will be allowed to lapse, significant failures will not be addressed, and any map production work will be fee-for-service.

6.3.2 Output Delivery Date:

- Q1 Continue to make available non-spatial and spatial front end of EISys available to DRET, however provide no data maintenance and very limited system support in case of unforeseen failure.

Transfer the public version of EISys data onto the GAIA-VIEW application.

Q2 fee for service map production

Q3 fee for service map production

Q4 fee for service map production

6.4 Output 4: Remote Sensing data discoverability and on-line services specifications and implementation plan as part of the Remote Sensing / SIARS Group 5-year strategic plan.

6.4.1 Description: This output will use the experience of GAIA-View to provide a definitive specification for the data discoverability component of the SIARS 5-year strategic plan, and to plan the future of Sentinel.

6.4.2 Output Delivery Date:

Q1 nil

Q2 nil

Q3 draft specifications and implementation plan for data discoverability and on-line services for remote sensing (including the future of Sentinel)

Q4 final specifications and implementation plan

CRC-Spatial Information Project

2. Project Description: This project manages Geoscience Australia's relationship with the CRC-SI and participates in the CRC through input and in-kind contributions, particularly in:
Geodesy / AuScope;
Methods for accurate ortho-rectification of remotely sensed imagery;
Translation of remote sensing information into decision making, through the Platforms for Environmental Modelling Support (PEMS) Demonstrator; and
Methods for the extraction of information from time-series of remotely sensed data

3. Project Outcome: GA's return on investment from the CRC-SI is maximised, by ensuring that CRC work is directly aligned with GA research needs. The relationship between GA and the CRC-SI involves significant administration of agreements and reporting to the CRC. GA's commitments to CRC programmes and projects come from several parts of the agency, and these must be accounted through this activity to produce the output. In line with the project outcome, the project will administer GA's relationship with the CRC-SI, to:

- ensure that GA meets its commitments to the CRC-SI
- represent GA's interests in the CRC, and where appropriate influence CRC directions, programmes and projects accordingly;

4. Project Link(s) to Intermediate-level Agency Outcomes:

- Enhanced global attractiveness of Australian exploration investment opportunities
- Improved resource management and environmental protection
- Safer communities and infrastructure

4. Project Link(s) to National Research Priority (NRP) Goals:

- An environmentally sustainable Australia
- Frontier technologies for building and transforming Australian industries
- Safeguarding Australia
- This project does not contribute to the NRPs

5. Key Performance Information:

- Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs
- Quarterly output milestones met
- Project budget met
- This project contributes to agency-level reporting obligations

6. Project Outputs:

6.1 Output 1: As a participating member of the CRC-SI, GA supports the governance and reporting requirements of the CRC-SI. The GA executive is provided with advice as required on CRC-SI activities at GA.

6.1.1 Description: As part of the governance of the CRC-SI, GA as a participant organisation is required to approve changes to the

participating agencies, Project Agreements, & report on Project activity within GA.

6.1.2 Output Delivery Date:

Q1 GA interests are reflected in CRC-SI plans and project proposals in PEMS, ortho-rectification of imagery, and in analysis of time-series imagery.

Q2 Reports on in-kind contributions and advice to the Chief of GEMD

Q3 Reports on in-kind contributions and advice to the Chief of GEMD

Q4 Reports on in-kind contributions and advice to the Chief of GEMD

Onshore Energy & Minerals Division

2008–09 Work Plan

Overview

OEMD is a multi-disciplinary division dedicated to providing pre-competitive geoscience information in support of and to facilitate onshore energy and mineral exploration in Australia. This is achieved through integrated programmes of data gathering and assessment, conducted at national and regional scale, and commonly in collaboration with the states and Northern Territory geoscience agencies. Use is made of the latest geophysical imaging, research and mapping techniques to enhance the chances of mineral discovery and reduce the risks involved with exploration. The division also operates a state-of-the-art Sensitive High Resolution Ion Microprobe, which provides geochronology data to assist with mineral exploration and studies into the geological evolution of Australia.

When required OEMD undertakes activities of national strategic importance such as the five-year Onshore Energy Security Programme (OESP). Many of the division's current activities are captured under this programme, which will be completed in mid-2011.

OEMD advises the Australian Government on mineral resources, mining and land use. This work is integral to decisions in regard to multiple and sequential land use, and to an informed understanding of the nation's known mineral endowment, the sustainable development of mineral resources, and levels of exploration activity.

Priorities for 2008-09 are

- Ongoing implementation of the OESP, including acquisition and interpretation of geophysical datasets, national projects, regional geology investigations and integrated commodity studies
- Release of new gravity and radiometric anomaly maps of Australia as products from the OESP
- Production of a 3D geological model to assist with assessment of geothermal energy potential in the Cooper Basin region
- Provision of technical advice to the Government on minerals-related issues, particularly in relation to petroleum, uranium, thorium and geothermal energy
- Preparation of a report on geoscientific aspects of onshore energy security as input to the Government's deliberations on energy policy
- Extension of the international programme of coordinated technical promotion of Australia's mineral prospectivity in partnership with the states and Northern Territory (Team Australia)

This plan captures all of the activities in the division, which includes all outputs delivered by projects.

NATIONAL PROJECTS, RESOURCES & ADVICE
(Ian Lambert)

Mineral Resources Project
(Aden McKay)

1. Project Description

This project encompasses assessment of national mineral and solid fuel resources, development of the on-line Australian Mines Atlas and assistance in provision of authoritative scientific/technical advice in support of policies and decisions on minerals, energy and land use issues.

2. Project Outcome

Informed decision-making for mineral resource management, land use planning and environmental protection

3. Project Link(s) to Intermediate-level Agency Outcomes:

- Enhanced global attractiveness of Australian exploration investment opportunities
- Improved resource management and environmental protection
- Safer communities and infrastructure

4. Project Link(s) to National Research Priority (NRP) Goals:

- An environmentally sustainable Australia
- Frontier technologies for building and transforming Australian industries
- Safeguarding Australia
- This project does not contribute to the NRPs

5. Key Performance Information:

- Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs

6. Project Outputs

6.1 Output 1: National assessment of mineral resources

6.1.1 Description:

- (a) Publication of annual commodity summaries for Australia's Identified Mineral Resources (AIMR) 2008
- (b) Updating of Geoscience Australia's Mineral Deposits database (OZMIN), Mineral Occurrence database and publication of resource assessments for AIMR 2009 (Table 1)

6.1.2 Output Delivery Date

- Q1 (a)
- Q2
- Q3
- Q4 (b)

6.2 Output 2: Australian representation at Joint OECD/NEA-IAEA Uranium Group and contribution to the publication ‘Uranium 2009, Resources, Production & Demand’ (Red Book)

6.2.1 Description:

- (a) Respond to OECD/NEA–IAEA *Red Book Questionnaire 2009*
- (b) Review draft of ‘Uranium 2009, Resources, Production & Demand’
- (c) Update Australia’s data on uranium deposits for the IAEA database (UDEPO)
- (d) Participation in and reports for meetings of Uranium Group as Australian delegate and Vice Chair

6.2.2 Output Delivery Date

- Q1
- Q2 ✓ (a, b)
- Q3
- Q4 ✓ (c, d)

6.3 Output 3: Australian Mines Atlas (AusMA)

6.3.1 Description:

Maintain AusMA, which is now core to online presentation of *Australia’s Identified Mineral Resources*, and is a popular site for seeking information on Australia’s minerals sector with a diverse range of users from government agencies and the wider community.

6.3.2 Output Delivery Date

- Q1
- Q2
- Q3
- Q4 ✓

6.4 Output 4: Australian Government representation on the Ministerial Council of Mineral and Petroleum Resources’ Subcommittee of Chief Inspectors of Mines (SCIM)

6.4.1 Description:

- (a) Represent the Commonwealth at SCIM annual meeting
- (b) Finalise actions and communiqué from the meeting and update the SCIM’s website

6.4.2 Output Delivery Date

- Q1
- Q2 ✓ (a) and (b)
- Q3
- Q4

6.5 Output 5: Indian Ocean Territories GIS for Attorney-General's Dept.

6.5.1 Description:

In collaboration with OEMD's GIS team and with funding from client agency:

- (a) Integration of new data sets and reports.
- (b) Development and delivery to clients and stakeholders of up-to-date versions of both the Christmas Island GIS and the Cocos Island GIS.
- (c) Support to clients and stakeholders in using the GIS.
- (d) Annual / half-yearly reports on GIS (both islands).

6.5.2 Output Delivery Date:

- Q1
- Q2 (d)
- Q3
- Q4 (a), (b) & (c) are ongoing.

6.6 Output 6: Web maps for Department of Environment, Water, Heritage and the Arts (DEWHA) and Office of Renewable Energy Regulator (ORER)

6.6.1 Description:

In collaboration with GIS team and with funding from client agencies, updating existing online web maps of electricity generating stations (fossil fuels and renewable) as requested by DEWHA and ORER.

6.6.2 Output Delivery Date

- Q1
- Q2
- Q3
- Q4

6.7 Output 7: Release of uranium exploration reports from Australian Atomic Energy Commission records.

6.7.1 Description:

Prepare digital versions (pdf format) of uranium exploration reports, maps and data previously submitted by exploration companies under the *Atomic Energy Act 1953* to the then Australian Atomic Energy Commission between the 1950s to early 1990s. The CD's are to be released to the State/Northern Territory Geological Surveys.

- (a) Complete CDs/DVDs for exploration reports for selected provinces.
- (b) Establish a permanent directory for long-term storage and accessibility of these data files on old uranium exploration reports.

6.7.2 Output Delivery Date:

- Q1
- Q2
- Q3
- Q4 (a), (b)

Minerals & Energy Advice Project (Leesa Carson)

1. Project Description

Provision of timely authoritative scientific and technical advice to the Australia Government and industry to assist the development and growth of a sustainable mineral and energy resources sector.

2. Project Outcome

Better knowledge of minerals and energy resource management, land use planning and environmental protection to inform decision-makers in the minerals and energy resources sector.

3. Project Link(s) to Intermediate-level Agency Outcomes:

- Enhanced global attractiveness of Australian exploration investment opportunities
- Improved resource management and environmental protection
- Safer communities and infrastructure

4. Project Link(s) to National Research Priority (NRP) Goals:

- An environmentally sustainable Australia
- Frontier technologies for building and transforming Australian industries
- Safeguarding Australia
- This project does not contribute to the NRPs

5. Key Performance Information:

- Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs

6. Project Outputs

6.1. Output 1: Advice

6.1.1 Description:

Timely provision of high quality authoritative, independent scientific and technical advice on mineral and energy resources; exploration and mining, associated environment matters, land use, industry developments and technologies.

6.1.2 Output Delivery Date

Q1

Q2

Q3

Q4 ongoing

6.2 Output 2: Current and potential uranium projects report

6.2.1 Description:

Prepare a report summarising the current status of operating mines and advanced projects to bring together essential information to facilitate quick and

accurate responses to the Department of Resources, Energy and Tourism and the Minister.

6.2.2 Output Delivery Date

Q1

Q2

Q3

Q4

6.3 Output 3: Energy security paper

6.3.1 Description:

Prepare a report on geoscientific and geotechnical aspects of onshore energy security that will contribute to the Energy White Paper, including policy issues in relation to geothermal energy, thorium and clean coal issues.

6.3.2 Output Delivery Date

Q1

Q2

Q3

Q4

34th International Geological Congress Project (Paul Kay)

1. Project Description

Establish the contractual, marketing and logistical framework for the 34th International Geological Congress (AUSTRALIA 2012), to be held in Brisbane 2-10 August 2012.

2. Project Outcome

A higher international profile and enhanced reputation for the region's geoscientific strengths and resource-based industries.

3. Project Link(s) to Intermediate-level Agency Outcomes:

- Enhanced global attractiveness of Australian exploration investment opportunities
- Improved resource management and environmental protection
- Safer communities and infrastructure

4. Project Link(s) to National Research Priority (NRP) Goals:

- An environmentally sustainable Australia
- Frontier technologies for building and transforming Australian industries
- Safeguarding Australia (Energy security)
- This project does not contribute to the NRPs

5. Key Performance Information:

- The cost effective establishment of programs supporting the AUSTRALIA 2012, in particular the contractual, marketing and logistical framework supporting the Congress.

6. Project Outputs

6.1 Output 1: AUSTRALIA 2012

6.1.1 Description:

Preparations for and international promotion of the 34th IGC, including ongoing formal and informal liaison with the International Union of Geological Sciences (IUGS is the scientific sponsor of the IGC); production of a promotional video and brochures for international promotion of AUSTRALIA 2012; and preparation for production of the book "GEOSCIENCE OF AUSTRALIA".

6.1.2 Output Delivery Dates

- Q1
- Q2
- Q3
- Q4 (ongoing)

National Geological Maps and Standards Project (Ollie Raymond)

1. Project Description:

Building on-line delivery of a seamless digital synthesis of Australian geology. Plan and develop national standards and underpinning principles for national geological maps including of solid geology and regolith maps, and contribute to the international GeoSciML Data Model. Development and maintenance of the National Stratigraphic Units database.

2. Project Outcome:

Enhanced potential for the Australian community to obtain economic, social and environmental benefits through the delivery of seamlessly joined digital geology of the continent.

3. Project Link(s) to Intermediate-level Agency Outcomes

- Enhanced global attractiveness of Australian exploration investment opportunities
- Improved resource management and environmental protection
- Safer communities and infrastructure

4. Project Link(s) to National Research Priority (NRP) Goals

- An environmentally sustainable Australia
- Frontier technologies for building and transforming Australian industries
- Safeguarding Australia
- This project does not contribute to the NRPs

5. Key Performance Information

- Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs
- Quarterly output milestones met
- Project budget met
- This project contributes to agency-level reporting obligations

6. Project Outputs:

6.1. Output 1: 1:1M Surface Geology of Australia

6.1.1 Description:

Import State and Territory ArcInfo coverages to Geodatabase structure, join into a single data set, and release. Develop appropriate

- (a) workflow for ongoing update and maintenance of the surface geology geodatabase,
- (b) delivery via the web
- (c) compilation list of recent state/Territory mapping to be incorporated in future releases.

6.1.2 Output Delivery Date

- Q1
- Q2 (a) and (c)

- Q3
- Q4 (b)

6.2 Output 2: Australian Stratigraphic Units Database

6.2.1 Description:

Update the Australian Stratigraphic Units Database through consultation with State and Territory Geological Survey staff and by capture of data from appropriate geoscience journals. Upgrades to the database structure to capture data required for GA projects and external clients.

6.2.2 Output Delivery Date

- Q1
- Q2
- Q3
- Q4

6.3 Output 3: Geological Data Modelling, including GeoSciML and national geological standards

6.3.1 Description:

Contribute to the development of GeoSciML ver. 3 and delivery of the GeoSciML testbed at IGC. Develop standards for compilation of national coverages of solid geology and regolith geology in collaboration with GA and state survey scientists. Update the GA GIS data dictionaries to reflect standards developments.

6.3.2 Output Delivery Date

- Q1 Test bed delivery at 33rd IGC, Oslo
- Q2
- Q3
- Q4 Ongoing

National Geochemical Survey of Australia Project (Patrice de Caritat)

1. Project Description

Produce a series of geochemical maps of surface and near-surface materials over the whole continent by applying ultra-low sampling density principles. Samples are being collected, using nationally consistent protocols, at the outlets of major catchments. Results will be correlated with radiometrics information from the Australia Wide Airborne Geophysical Survey (AWAGS).

2. Project Outcome

National geochemical atlas; report on implications for onshore energy; ground truthing of airborne radiometrics; geochemical data.

3. Project Link(s) to Intermediate-level Agency Outcomes:

- Enhanced global attractiveness of Australian exploration investment opportunities
- Improved resource management and environmental protection
- Safer communities and infrastructure

4. Project Link(s) to National Research Priority (NRP) Goals:

- An environmentally sustainable Australia
- Frontier technologies for building and transforming Australian industries
- Safeguarding Australia
- This project does not contribute to the NRPs

5. Key Performance Information:

- Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs
- Quarterly output milestones met
- Project budget met
- This project contributes to agency-level reporting obligations

6. Project Outputs:

6.1. Output 1: Sample collection

6.1.1 Description:

- (a) Field sampling by all States/NT due to be 75% completed by September 2008 and 100% completed by December 2008.
- (b) The NGSA website will be updated to show the progress map.

6.1.2 Output Delivery Date:

- Q1 (a)
- Q2 (b)
- Q3
- Q4

6.2. Output 2: Sample preparation

6.2.1 Description:

Sample preparation at GA targeted to be 50% completed by December 2008 and 75% completed by June 2009. The NGS website will be updated to show progress.

6.2.2 Output Delivery Date

Q1

Q2

Q3

Q4

6.3. Output 3: Sample analysis

6.3.1 Description:

Sample analysis targeted to be 25% completed by December 2008 and 50% completed by June 2009. The NGS website will be updated to show progress.

6.3.2 Output Delivery Date

Q1

Q2

Q3

Q4

CRC Landscape Environments & Mineral Exploration (LEME) Project (Ken Lawrie)

1. Project Description

GA has been working with CRC LEME on a range of collaborative regolith geoscience research activities. All mineral exploration and most natural resource management related products were published or available in pre-release form by the end of CRC LEME. A small number of salinity outputs remain to be completed in 2008-09.

2. Project Outcome

An enhanced information base for environmental management.

3. Project Link(s) to Intermediate-level Agency Outcomes:

- Enhanced global attractiveness of Australian exploration investment opportunities
- Improved resource management and environmental protection
- Safer communities and infrastructure

4. Project Link(s) to National Research Priority (NRP) Goals:

- An environmentally sustainable Australia
- Frontier technologies for building and transforming Australian industries
- Safeguarding Australia
- This project does not contribute to the NRPs

5. Key Performance Information:

- Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs
- Quarterly output milestones met
- Project budget met
- This project contributes to agency-level reporting obligations

6. Project Outputs

6.1 Output 1: CRC LEME Salinity Final Products

6.1.1 Description:

Summaries of 7 years of research findings for CRC LEME will be published in special monograph volumes and scientific papers in journals, and presented at major conferences.

6.1.2 Output Delivery Date

- Q1 Presentation at International Geological Congress, Oslo
- Q2
- Q3
- Q4 Publications: monographs and research papers

GEOPHYSICS

(Ned Stolz)

Continental Geophysics 2008-09 (Murray Richardson)

1. Project Description

The Continental Geophysics project engages in the acquisition, processing, archiving, enhancement, presentation and interpretation of pre-competitive geophysical data, and the development of new computational methods that can be applied to these data. The project also manages geophysical surveys on behalf of State and Territory geological surveys.

2. Project Outcome

New insights into Australia's onshore energy and mineral potential, which contribute significantly to the Onshore Energy Security Program. Enhanced exploration strategies, promotion of mineral exploration opportunities and improved environmental management in Australia.

3. Project Link(s) to Intermediate-level Agency Outcomes:

- Enhanced global attractiveness of Australian exploration investment opportunities
- Improved resource management and environmental protection
- Safer communities and infrastructure

4. Project Link(s) to National Research Priority (NRP) Goals:

- An environmentally sustainable Australia
- Frontier technologies for building and transforming Australian industries
- Safeguarding Australia
- This project does not contribute to the NRPs

5. Key Performance Information:

- Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs
- Quarterly output milestones met
- Project budget met
- This project contributes to agency-level reporting obligations

Project Outputs

6.1. Output 1: Updates to National Geophysical Databases

6.1.1 Description:

Updated datasets from the National Geophysical Databases including aeromagnetics, airborne radiometrics, airborne EM, and ground gravity data. National Radioelement Database adjusted using results from the AWAGS2 Australia-wide geophysical survey.

- 6.1.2 Output Delivery Date
Q1 Gravity Anomaly Map of Australia
Q2 Radiometric Anomaly Maps of Australia
Q3
Q4 Updates of datasets

6.2. Output 2: Geophysical data acquisition project management

- 6.2.1 Description:
Manage geophysical data acquisition under the OESP and on behalf of the States and Territories under the NGA. Oversee contract procurement and monitor the contractor's performance against the technical and administrative specifications. Undertake quality assurance of all data delivered by contractors, produce value-added products, archive data, and release to the public via GADDS.

- 6.2.2 Output Delivery Date
Q1
Q2
Q3
Q4

6.3 Output 3: Updates to the Australian Fundamental Gravity Network (AFGN)

- 6.3.1 Description:
Absolute gravity measurements to establish new AFGN stations which will enhance the coverage of base stations throughout Australia. The AFGN provides the absolute gravity datum for gravity surveys collected in Australia. Updated information about AFGN sites released to the public via the GA website.

- 6.3.2 Output Delivery Date
Q1
Q2
Q3
Q4

6.4 Output 4: Research into new methodologies for generating continental-scale geophysical data sets.

- 6.4.1 Description:
Research and implementation of new computational methods for compiling continental-scale products from geophysical data. Development of methods for refining the National Radioelement Database and the Magnetic Anomaly Map of Australia incorporating results from the AWAGS2 survey. Development of value-added predictive products from geophysical datasets generated during the OESP.

6.4.2 Output Delivery Date

- Q1
- Q2
- Q3
- Q4

6.5 Output 5: Reports on computational methods for 3D geological mapping and geophysical inversion

6.5.1 Description:

Development of methodologies and tools for 3D geological mapping and geophysical inversion. Develop and improve the 3D mapping capability and the geophysical modules of the GeoModeller software. Present two papers pertaining to 3D modelling at the International Geological Congress 2008. Report on OEMD high performance computing requirements.

6.5.2 Output Delivery Date

- Q1
- Q2
- Q3
- Q4

6.6 Output 6: Reports on continental-scale 3D rock property and rock type models

6.6.1 Description:

Scope and plan the user requirements and information content of a rock property database. Produce a continental-scale gravity grid from a geophysical simulation of a global crustal model to provide context for regional studies. Present a paper at ASEG2009 pertaining to continental-scale geophysical modelling.

6.6.2 Output Delivery Date

- Q1
- Q2
- Q3
- Q4

Seismic Acquisition & Processing (Jenny Maher)

1. Project Description

The key objectives of the Seismic Acquisition & Processing Project are to:

- manage and deliver the seismic data acquisition and processing component of the OESP
- operate the GA component of ANSIR (National Research Facility for Earth Sounding) in conjunction with the ANU and Adelaide University by acquiring earth imaging data sets (eg seismic, magnetotelluric) as approved by ANSIR for its clients
- process seismic and MT data sets as per agreements with external stakeholders including AuScope, NGA partners, and other research projects
- maintain and develop legacy onshore seismic datasets. Respond to client requests for seismic and ancillary data.

2. Project Outcome

New insights into Australia's onshore energy and mineral potential, which contribute significantly to the Onshore Energy Security Program. Australia is at the leading edge of key technological developments in the field of imaging of the Earth's crust using seismic techniques.

3. Project Link(s) to Intermediate-level Agency Outcomes:

- Enhanced global attractiveness of Australian exploration investment opportunities
- Improved resource management and environmental protection
- Safer communities and infrastructure

4. Project Link(s) to National Research Priority (NRP) Goals:

- An environmentally sustainable Australia
- Frontier technologies for building and transforming Australian industries
- Safeguarding Australia
- This project does not contribute to the NRPs

5. Key Performance Information:

- Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs
- Quarterly output milestones met
- Project budget met
- This project contributes to agency-level reporting obligations

6. Project Outputs

6.1. Output 1: Seismic and MT Data Acquisition

- 6.1.1 Description: Acquisition of earth imaging data sets (seismic and MT) for the OESP, seismic data sets as approved by the ANSIR Access Committee, seismic data sets for NGA partners and seismic data sets for AuScope programs.

6.1.2 Output Delivery Date

Q1 Gawler, Arrowie and Curnamona Surveys (~600km)

Q2

Q3 Gawler-Officer-Musgrave Survey (~600km)

Q4

6.2. Output 2: Seismic and MT Data Processing

6.2.1 Description:

Seismic and MT data processing of surveys acquired for the OESP, ANSIR, NGA partners, and AuScope. Seismic images and technical information as inputs into seismic interpretation workshops.

6.2.2 Output Delivery Date

Q1

Q2

Q3

Q4

6.3 Output 3: Seismic Data Management

6.3.1 Description: Management, recovery and delivery of legacy onshore seismic data in the custodianship of GA. Scoped plan (short and long term) for delivering seismic data over the internet.

6.3.2 Output Delivery Date

Q1

Q2

Q3

Q4

AEM Acquisition and Interpretation Project (Alan Whitaker)

1. Project Description:

Acquire, process and interpret airborne electromagnetic data for the OESP in selected areas of Australia.

2. Project Outcome:

Increased investment in exploration for onshore energy-related resources, including geothermal, uranium, thorium and hydrocarbons, in selected provinces and basins across Australia, to improve discovery rates for onshore energy-related resources.

3. Project Link(s) to Intermediate-level Agency Outcomes: [tick one]

- Enhanced global attractiveness of Australian exploration investment opportunities
- Improved resource management and environmental protection
- Safer communities and infrastructure

4. Project Link(s) to National Research Priority (NRP) Goals: [tick one]

- An environmentally sustainable Australia
- Frontier technologies for building and transforming Australian industries
- Safeguarding Australia
- This project does not contribute to the NRPs

5. Key Performance Information: [tick one]

- Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs
- Quarterly output milestones met
- Project budget met
- This project contributes to agency-level reporting obligations

6. Project Outputs:

6.1. Output 1: Acquisition planning

6.1.1 Description:

Detail acquisition plans for Frome Embayment, SA and more general plans for a fourth project area to be decided.

6.1.2 Output Delivery Date

- Q1
- Q2 Frome
- Q3
- Q4 Fourth area

6.2. Output 2: Paterson Project - AEM data

6.2.1 Description:

Contractor supplied AEM data and processed value-added products released into the public domain.

6.2.2 Output Delivery Date

Q1

Q2

Q3

Q4

6.3 Output 3: Paterson Project – Geology Interpretation

6.3.1 Description:

Geological maps of the Paterson region incorporating new information from the AEM data. Interpretation report documenting the geological evolution of the Paterson and including insights gained from the AEM results.

6.3.2 Output Delivery Date

Q1

Q2

Q3

Q4

6.4 Output 4: Pine Creek – Survey Report

6.4.1 Description:

Report documenting the survey objectives and the completed data compilation released to the public.

6.4.2 Output Delivery Date

Q1

Q2

Q3

Q4

ENERGY MINERAL SYSTEMS PROGRAM
(Andy Barnicoat)

Uranium Systems Project
(Roger Skirrow)

1. Project Description

Under the Onshore Energy Security Program, this project will acquire and interpret pre-competitive geoscience information related to the distribution of uranium across the Australian continent to identify prospectivity and promote the results to industry.

Objectives:

1. Develop new understandings of the processes that control where and how uranium mineral systems develop;
2. Map the distribution of known uranium enrichments and related rocks in Australia;
3. Assess potential for undiscovered uranium deposits at regional to national scales.

2. Project Outcome

Increased investment in exploration for uranium within Australia via an enhanced understanding of the distribution of uranium resources and the factors controlling their distribution.

3. Project Link(s) to Intermediate-level Agency Outcomes

- Enhanced global attractiveness of Australian exploration investment opportunities
- Improved resource management and environmental protection
- Safer communities and infrastructure

4. Project Link(s) to National Research Priority (NRP) Goals

- An environmentally sustainable Australia
- Frontier technologies for building and transforming Australian industries
- Safeguarding Australia
- This project does not contribute to the NRPs

5. Key Performance Information

- Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs
- Quarterly output milestones met
- Project budget met
- This project contributes to agency-level reporting obligations

6. Project Outputs

6.1 Output 1: Reports on processes in uranium mineral systems

6.1.1 Description:

Integrated geochemical, geochronological and geological studies and modelling of basin-related and other uranium mineral systems to identify the key processes and spatial controls on the development of major uranium provinces.

6.1.2 Output Delivery Date

- Q1
- Q2
- Q3
- Q4

6.2 Output 2: Maps and report on distribution of uranium enrichments

6.2.1 Description:

Digital map data and report on the distribution of uranium enrichments in surface and subsurface geological materials of selected uranium provinces and greenfields regions, based on compilation of publicly available exploration and other geochemical data.

6.2.2 Output Delivery Date

- Q1
- Q2
- Q3
- Q4

6.3 Output 3: Area selection criteria for basin-related uranium mineral systems

6.3.1 Description:

Digital products and reports on predictive criteria for targeting areas with high potential for undiscovered uranium mineralisation in sedimentary basins, using the Frome Embayment as a case study and utilising 2D and 3D digital data and numerical simulations.

6.3.2 Output Delivery Date

- Q1
- Q2
- Q3
- Q4

Geochemistry Laboratory (Terry Mernagh)

1. Project Description:

Geochemistry Laboratory. OEMD's inorganic chemistry laboratory providing whole rock, mineral, fluid inclusion and other geochemical data for OEMD, other GA divisions, NGA partners and other partners as required.

2. Project Outcome:

Geochemical and XRD mineralogical data for GA and external clients. Increasing pre-competitive Australian geoscience by improved understanding of the geochemistry of the Australian continent through provision of high quality geochemistry data and development of appropriate analytical techniques.

3. Project Link(s) to Intermediate-level Agency Outcomes: [tick one]

- Enhanced global attractiveness of Australian exploration investment opportunities
- Improved resource management and environmental protection
- Safer communities and infrastructure

4. Project Link(s) to National Research Priority (NRP) Goals: [tick one]

- An environmentally sustainable Australia
- Frontier technologies for building and transforming Australian industries
- Safeguarding Australia
- This project does not contribute to the NRPs

5. Key Performance Information: [tick one]

- Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs
- Quarterly output milestones met
- Project budget met
- This project contributes to agency-level reporting obligations

6. Project Outputs:

6.1 Output 1: Undertake and provide geochemical analysis of submitted samples, as required, by GA and collaborative external clients.

6.1.1 Description:

Undertake and provide quality geochemical analysis (by X-Ray Fluorescence, Inductively Coupled Plasma-Mass Spectrometry, wet-chemistry and other techniques), as required, of samples (rock, soil, water, vegetation, oil samples). Where necessary, chiefly for rock samples, the output also requires sample preparation (rock crushing, milling & grinding) for submitted rock samples.

6.1.2 Output Delivery Date

Q1

Q2

Q3

Q4 ongoing

Ongoing output, undertaken as samples submitted.

6.2 Output 2: Undertake and provide mineralogical and other determinations of submitted samples, as required, by GA and collaborative external clients. Includes providing access and assistance to GA equipment, as required, by GA and collaborative external clients

6.2.1 Description:

Undertake and provide mineralogical information (determination of mineral species and other mineralogical characteristics), by X-Ray Diffraction analysis, for submitted rocks and mineral samples. Provide access to, and assistance with, Laser Raman analysis, PIMA analysis, fluid inclusion analysis, and microscope use.

6.2.2 Output Delivery Date

Q1

Q2

Q3

Q4 ongoing

Ongoing output, undertaken as samples submitted.

6.3 Output 3: Develop protocols for laser-ablation ICPMS analysis of samples.

6.3.1 Description:

Develop single point laser ablation techniques for the analysis of individual grains, crystals and fluid inclusions with the ICPMS.

6.3.2 Output Delivery Date

Q1

Q2

Q3

Q4

6.4 Output 4: Commence development of a management system for GA geochemical data, which uses a redefined storage model (database) which is flexible and adaptable for both internal and external clients.

6.4.1 Description:

This is the first phase of the redesign of GA's OZCHEM database, which will focus on the following components:

(a) Management

(b) Collection

(c) delivery of geochemical data. Development will involve:

- determining client requirements for the system and tools for interoperable delivery of geochemical data
- establishing detailed end-to-end data workflow processes for geochronology and geochemistry data

- conceptual data models for geochronology and geochemistry, based on international standards where possible
- information system design
- relevant documentation

6.4.2 Output Delivery Date

Q1

Q2

Q3

Q4

Geothermal Energy Project (Anthony Budd)

1. Project Description

Provide precompetitive geoscience information including compilations of existing data, new data collections, and interpreted products, in formats useful to the geothermal industry and decision makers.

External stakeholders of this Project include: Minister and Department of Resources, Energy and Tourism; companies engaged in Australia's geothermal industry including those represented by the Australian Geothermal Energy Association; State and Northern Territory geological surveys; the Australian Greenhouse Office in the DEWHA; and participants in the Australian Geothermal Energy Group (AGEG), which includes government, industry and academia.

Internal stakeholders include other projects within the OEMD and OESP including Minerals and Energy Advice, databases project of PMD, CO2CRC, Groundwater project in GEMD, and GA's Education and Communications sections.

2. Project Outcome

Increased exploration and development activity in this type of renewable energy system as a result of better geoscience information lowering risk to geothermal explorers and funding and decision making agencies.

3. Project Link(s) to Intermediate-level Agency Outcomes:

- Enhanced global attractiveness of Australian exploration investment opportunities
- Improved resource management and environmental protection
- Safer communities and infrastructure

4. Project Link(s) to National Research Priority (NRP) Goals:

- An environmentally sustainable Australia
- Frontier technologies for building and transforming Australian industries
- Safeguarding Australia
- This project does not contribute to the NRPs

5. Key Performance Information:

- Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs
- Quarterly output milestones met
- Project budget met
- This project contributes to agency-level reporting obligations

6. Project Outputs

6.1. Output 1: IM scoping report for Thermal Conductivity Meter including standard operating procedures

- 6.1.1 Description:
Investigate options for connecting the thermal conductivity meter to corporate Oracle databases via Laboratory Information Management System.

Prepare Standard Operating Procedures (SOP) for preparation of thermal conductivity samples and operation of the thermal conductivity meter, working with the geothermal community on agreed standards where appropriate.
Produce SOP for operation of the down hole logging equipment.

- 6.1.2 Output Delivery Date

Q1
Q2 SOPs
Q3
Q4 LIMS report

6.2. Output 2: Acquisition of new geothermal data

- 6.2.1 Description:
Undertake measurements of thermal conductivity of rock samples, temperature in drill holes, and geochemical analyses specifically from buried granites and sediments. Wherever possible link thermal conductivity to Stratigraphic Index. Engage with State and Territory surveys and industry to access drill holes. Report on new heat flow measurements.

- 6.2.2 Output Delivery Date

Q1
Q2
Q3
Q4 Ongoing

6.3. Output 3: Geothermal data capture and storage system

- 6.3.1 Description:
Continue development of a corporate repository for heat flow measurements, and ensure that field and lab-based data generated by this project are captured and stored. Continue database entry of legacy heat flow data.

Plan and make progress towards implementing an information system to store, manipulate and archive as many types of geothermal data as practicable, utilising relational databases, GIS and the internet. This has linkages into the AGEG Technical Interest Group 9 (Databases), recommendations of the RET Geothermal Industry Development Framework, and RET's Geothermal Drilling Program.

Contribute to agency-wide work towards a single temperature database in collaboration with the CO2CRC, PMD databases, and GEMD groundwater projects.

Prepare a working (draft). Access database for storage and delivery of lab and field results with broader IM planning - ongoing

6.3.2 Output Delivery Date

- Q1
- Q2
- Q3
- Q4

6.4 Output 4: 3D geological modelling

6.4.1 Description:

Production of a 3D geological model of the Cooper Basin region showing granite depth, volume, and sediment thickness, using potential field inversion techniques, to assist with assessment of geothermal energy potential; another area may be investigated in collaboration with OESP Geodynamic Framework and Uranium projects (e.g. Mt Isa).

6.4.2 Output Delivery Date

- Q1
- Q2
- Q3
- Q4 Cooper Basin region

6.5 Output 5: Geothermal energy advice and information

6.5.1 Description

As required:

- (a) provide advice as required, especially to Government including technical input to the Geothermal Drilling Program
- (b) provide information for promotional and educational purposes and participate in the Organising Committee for the Australian Geothermal Energy Conference, August 20-22 2008
- (c) assist Mineral and Energy Advice project with regard to Energy White Paper and other policy issues
- (d) scope New Policy Proposal for a pre-competitive data acquisition program specifically to support geothermal exploration and development.

6.5.2 Output Delivery Date

- Q1 Australian Geothermal Energy Conference
- Q2
- Q3
- Q4 NPP due, other ongoing

**ONSHORE ENERGY GEODYNAMICS GROUP
(Russell Korsch)**

Onshore Energy Geodynamic Framework Project (OESP, PL David Huston)

1. Project Description

This project will acquire, process and interpret pre-competitive geoscience information related to energy resources in selected provinces and basins across Australia to identify prospectivity and promote new data and results to industry, in partnership with state and territory geological surveys.

2. Project Outcome

Increased investment in exploration for onshore energy-related resources, including geothermal, uranium, thorium and hydrocarbons, in selected provinces and basins across Australia, to improve discovery rates for onshore energy-related resources.

3. Project Link(s) to Intermediate-level Agency Outcomes:

- Enhanced global attractiveness of Australian exploration investment opportunities
- Improved resource management and environmental protection
- Safer communities and infrastructure

4. Project Link(s) to National Research Priority (NRP) Goals:

- An environmentally sustainable Australia
- Frontier technologies for building and transforming Australian industries
- Safeguarding Australia
- This project does not contribute to the NRPs

5. Key Performance Information:

- Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs
- Quarterly output milestones met
- Project budget met
- This project contributes to agency-level reporting obligations

6. Project Outputs

6.1 Output 1: Interpretation and release of seismic and MT data

6.1.1 Description:

Seismic and MT data from the 2007 Cloncurry-Georgetown-Charters Towers seismic survey interpreted and released into the public domain.

6.1.2 Output Delivery Date

- Q1
- Q2
- Q3
- Q4

6.2 Output 2: Acquisition of new seismic and MT data

6.2.1 Description:

Seismic and MT data related to the Onshore Energy Security Program acquired along transects in the Curnamona and Gawler provinces, and Eastern Officer Basin, South Australia, and in the Northern Territory.

6.2.2 Output Delivery Date

Q1

Q2

Q3

Q4

6.3 Output 3: 3D geological and geophysical maps

6.3.1 Description:

3D geological and geophysical maps of selected areas, including the Mt Isa-Georgetown-Charter Towers area, based on seismic, geological and potential field data.

6.3.2 Output Delivery Date

Q1

Q2

Q3

Q4

6.4 Output 4: Geodynamic and metallogenic synthesis in a time-space framework

6.4.1 Description:

Geodynamic and metallogenic synthesis in a time-space framework for North Queensland, including a comparative analysis of key aspects of the Mt Isa and Georgetown Inliers, and development of predictive map products and accompanying reports

6.4.2 Output Delivery Date

Q1

Q2

Q3

Q4

6.5 Output 5: Assessment of energy systems (particularly geothermal and uranium) potential of selected regions

6.5.1 Description: Semi-regional mineral system studies of selected uranium districts, assessment of geothermal and uranium potential of the Mt Isa-Georgetown-Charter Towers area, including the timing of uranium mineral systems, and the development of predictive map products and accompanying reports (in collaboration with the Geothermal and Uranium Projects)

6.5.2 Output Delivery Date

- Q1
- Q2
- Q3
- Q4

6.6 Output 6: Acquisition, interpretation and publication of other data

6.6.1 Description:

Acquisition and interpretation of other data (e.g. geochronology, geochemistry, hyperspectral data) to support interpretations of the new geophysical data, and publication of key results, including material coming out of confidentiality.

6.6.2 Output Delivery Date

- Q1
- Q2
- Q3
- Q4

MINERAL PROMOTION & GEOCHRONOLOGY LABORATORY
(Lynton Jaques)

Mineral Exploration Promotion Project
(Mike Huleatt)

1. Project Description

The project aims to encourage increased investment in mineral exploration and discovery of mineral resources in Australia by increasing the awareness of mineral exploration opportunities and by increasing the awareness of the availability of pre-competitive geoscience. Project activities include technical presentations and exhibitions at selected major national and international mineral exploration and mining technical conferences, and targeted release of scientific reports, maps and datasets that highlight Australia's mineral resources and potential. The international promotion and some of that in Australia is conducted in partnership with the State and Northern Territory geological surveys and coordinated through the Chief Government Geologist's Conference (CGGC) under the auspices of the Ministerial Conference of Mineral and Petroleum Resources (MCMPR). The technical information and products are disseminated to Australian and international mining and exploration companies through the Internet, technical journals and magazines, as digital products, and/or as hard copy as appropriate.

2. Project Outcome

Increased global awareness of mineral exploration opportunities in Australia.

3. Project Link(s) to Intermediate-level Agency Outcomes:

- Enhanced global attractiveness of Australian exploration investment opportunities
- Improved resource management and environmental protection
- Safer communities and infrastructure

4. Project Link(s) to National Research Priority (NRP) Goals:

- An environmentally sustainable Australia
- Frontier technologies for building and transforming Australian industries
- Safeguarding Australia
- This project does not contribute to the NRPs

5. Key Performance Information:

- Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs
- Quarterly output milestones met
- Project budget met
- This project contributes to agency-level reporting obligations

6. Project Outputs

6.1. Output 1: International Mineral Exploration Promotion Events

6.1.1 Description:

Coordinated technical promotions by Geoscience Australia in partnership with the State and NT geological surveys at:

- (a) China Mining 2008 in Beijing
- (b) Australian Mineral Exploration Investment Seminar in Tokyo, Japan,
- (c) Prospectors and Developers Association of Canada International Convention, Trade Show and Investors Exchange in Toronto, Canada (PDAC 2009).

6.1.2 Output Delivery Date

- Q1 ✓ Australian Governments Mineral Exploration Promotion Plan for 2008-09
- Q2 ✓ China Mining 2008, 11-13 November 2008
- Q3 ✓ Fourth Australian Mineral Exploration Investment Seminar, Tokyo, 24 February, 2009; PDAC 2009, 1-4 March 2009
- Q4 ✓ Report to CGGC on outcomes of 2008-09 Australian Governments' mineral exploration promotional program.

6.2. Output 2: Domestic Mineral Exploration Promotion Events

6.2.1 Description:

Technical presentations; Coordinated technical promotions by Geoscience Australia in partnership with participating State and NT geological surveys at:

- (a) Technical paper at Australian Earth Sciences Convention July 2008
- (b) Technical promotion at Diggers and Dealers Mining Forum 2008 in Kalgoorlie
- (c) Technical promotion and presentation at Mining 2008 Resources Convention in Brisbane.
- (d) Technical paper at Australian Nickel Conference Perth October 2008
- (e) Technical promotion and presentation at AMEC National Mining Congress 2009

6.2.2 Output Delivery Date

- Q1 ✓ Australian Earth Sciences Convention July 2008; Diggers & Dealers Mining Forum August 2008
- Q2 ✓ Mining 2008 Resources Convention, 31 October- 2 November 2007; Australian Nickel Conference October 2008
- Q3
- Q4 ✓ AMEC National Mining Congress May 2009

6.3 Output 3: Mineral exploration promotional outputs

6.3.1 Description:

Compile and revise maps of Australian mineral deposits and mineral resources; technical reports, briefings, reviews, presentations, research papers, and syntheses of Australian mineral resources, mineral resource potential, and exploration trends and outcomes.

- Revised editions of Australian Au, Cu, Ni, Zn-Pb, and U resource maps (1:10 million).
- Australian Fe, and Mn resource maps (1:10 million).
- Updated 1:5 million map of Australian diamond deposits, kimberlites and related rocks.
- Updated 1:5 million Australian Operating Mines map and 1:10 million map of Australian Mineral Deposits;
- Maps of Australian Archaean gold mineralising events.
- Review of mineral exploration in Australia in 2008;

- Draft report on Australian carbonatites and their resources;
- Compilation datasheets of platinum-group element occurrences in Australia

6.3.2 Output Delivery Date

- Q1 ✓ Australian Mineral Deposits (1:10 million)
- Q2 ✓ Australian Au, Fe, Mn and U resource maps (1:10 million)
- Q3 ✓ Review of mineral exploration in Australia in 2008; Australian Cu, Ni, Zn-Pb, resource maps (1:10 million)
- Q4 ✓ Draft report on Australian carbonatites and their resources; Compiled datasheets of platinum-group element occurrences in Australia; Australian Archaean gold mineralising events; Australian diamond deposits, kimberlites and related rocks; Australian Operating Mines (1:5 million)

6.4 **Output 4: *Synthesis maps and reports on mafic-ultramafic mineralising events***

6.4.1 Description:

Compiled maps and draft report synthesising information on mafic-ultramafic events in Australia; draft summary report on PGE occurrences and potential in Australia.

- Compiled database and map showing the distribution of Archaean tholeiitic and komatiitic magmatic events and associated metal resources in Australia.
- Compiled map and draft report showing the mineral potential of two major Proterozoic mafic-ultramafic magmatic events in Australia

6.4.2 Output Delivery Date:

- Q1
- Q2
- Q3
- Q4 ✓ Web-based map of the distribution of Archaean tholeiitic and komatiitic magmatic events and associated metal resources in Australia; map and draft report on the mineral potential of two major Proterozoic mafic-ultramafic magmatic events in Australia

Geochronology Laboratory (Keith Sircombe)

1. Project Description

Determine the ages of rocks and geological events using U-Pb SHRIMP and Ar-Ar analytical techniques in support of GA and State and Northern Territory geoscience programs under the National Geoscience Agreement.

2. Project Outcome

Enhanced mineral exploration strategies through a better understanding of the ages of geological events, leading to the provision of an improved chronologic framework of Australia to assist resource exploration.

3. Project Link(s) to Intermediate-level Agency Outcomes:

- Enhanced global attractiveness of Australian exploration investment opportunities
- Improved resource management and environmental protection
- Safer communities and infrastructure

4. Project Link(s) to National Research Priority (NRP) Goals:

- An environmentally sustainable Australia
- Frontier technologies for building and transforming Australian industries
- Safeguarding Australia
- This project does not contribute to the NRPs

5. Key Performance Information:

- Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs
- Quarterly output milestones met
- Project budget met
- This project contributes to agency-level reporting obligations

6. Project Outputs

6.1. Output 1: Processed mineral samples

6.1.1 Description:

Process approximately 200 rock samples per annum to separate mineral grains, and prepare and document samples so that they are suitable for geochronology using SHRIMP and Ar-Ar techniques.

6.1.2 Output Delivery Date

- Q1
- Q2
- Q3
- Q4

6.2. Output 2: SHRIMP U-Pb age determinations

6.2.1 Description:

Maintain an in-house facility housing the GA Sensitive High Resolution Ion Microprobe (SHRIMP)-II ion probe and scanning electron microscope for the production of state-of-the-art U-Pb isotopic ages of minerals aiming for approximately 200 production days per annum. Manage joint use of the facility on the behalf of GA and licensee, Australian Scientific Instruments. Manage and develop relations with State and Territory NGA partners. Provide an annual report on the operational aspects of the SHRIMP laboratory.

6.2.2 Output Delivery Date

Q1

Q2

Q3 Annual Report

Q4

6.3 Output 3: New geochronological procedures, applications and standards

6.3.1 Description:

Develop and report on new and improved analytical procedures, applications and standards that enhance the acquisition, quality and information management of the geochronological data. Annual summary report on laboratory information management systems development.

6.3.2 Output Delivery Date

Q1

Q2

Q3

Q4

6.4 Output 4: New GA geochronology data management systems

6.4.1 Description:

Provide expert and user advice to IM development specialists regarding the development of new systems for managing geochronological data from SHRIMP Laboratory (part of the RAGING SPOT project). The focus is on developing tools to improve the delivery of geochronology data to clients.

6.4.2 Output Delivery Date:

Q1

Q2

Q3

Q4

OEMD SERVICES **(Bill McKay)**

OEMD Information Services **(Bruce Kilgour)**

1. Project Description:

OEMD Information Services provides client-focussed information systems that support key OEMD Information Management (IM) and delivery of outputs. It manages the following capabilities

- ICT project management
- web publishing
- business analysis
- geospatial ICT skills
- software engineering

The OEMD IM work program, developed in collaboration with the Management Team, aligns ICT service provision with OEMD strategic direction. This project coordinates OEMD input into Geoscience Australia's strategic ICT plan.

2. Project Outcomes:

- To improve the decision making ability of internal and external clients, based on information delivered via quality, client-focussed information systems.
- To enable sustainable management of the Division's information assets and collection, management and delivery systems.

3. Project Link(s) to Intermediate-level Agency Outcomes:

- Enhanced global attractiveness of Australian exploration investment opportunities
- Improved resource management and environmental protection
- Safer communities and infrastructure

4. Project Link(s) to National Research Priority (NRP) Goals:

- An environmentally sustainable Australia
- Frontier technologies for building and transforming Australian industries
- Safeguarding Australia
- This project does not contribute to the NRPs

5. Key Performance Information:

- Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs
- Quarterly output milestones met
- Project budget met
- This project contributes to agency-level reporting obligations

6. Project Outputs

6.1 Output 1: OEMD IM Work Program

6.1.1 Description:

Develop with OEMD Management an agreed two-year rolling IM work program.

6.1.2 Output Delivery Date

Q1

Q2

Q3

Q4

6.2 Output 2: OEMD ICT applications

6.2.1 Description:

Manage and develop OEMD's ICT applications for client benefit. 2008-09 projects to be defined within the OEMD IM 08/09 Work Program.

6.2.2 Output Delivery Date

Q1

Q2

Q3

Q4

6.3 Output 3: OEMD web content management

6.3.1 Description:

Develop and manage web pages for the Onshore Energy and Minerals Division on the Geoscience Australia website and all hosted sites and applications for client benefit. 2008-09 projects to be defined within the OEMD IM 08/09 Work Program.

6.3.2 Output Delivery Date

Q1

Q2

Q3

Q4

6.4 Output 4: OEMD geospatial information management

6.4.1 Description:

Develop client-focussed systems and tools and assist staff to sustainably manage OEMD's geospatial information. 2008-09 projects to be defined within the OEMD IM 08/09 Work Program.

6.4.2 Output Delivery Date

Q1

Q2

Q3

Q4

GIS and Management Services

(Andrew Retter, Lindsay Highet - GIS and Wendy van Tol - Management)

1. Project Description:

GIS Services provides support to the division's projects with development and delivery of geographic information system outputs.

Management Services provides administration support and organisational assistance to the Chief of Division, Group Leaders and Executive Officer (Senior Management Team).

2. Project Outcomes:

- Enhanced value-adding to project outputs and sound administration and organisation of the SMT

3. Project Link(s) to Intermediate-level Agency Outcomes:

- Enhanced global attractiveness of Australian exploration investment opportunities
- Improved resource management and environmental protection
- Safer communities and infrastructure

4. Project Link(s) to National Research Priority (NRP) Goals:

- An environmentally sustainable Australia
- Frontier technologies for building and transforming Australian industries
- Safeguarding Australia
- This project does not contribute to the NRPs

5. Key Performance Information:

- Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs
- Quarterly output milestones met
- Project budget met
- This project contributes to agency-level reporting obligations

6. Outputs

6.1 Output 1: GIS Team

6.1.1 Description:

Client-focussed support with all GIS outputs as defined within the Group 08/09 Work Programs.

6.1.2 Output Delivery Date

Q1

Q2

Q3

Q4

6.2 Output 1: GIS Team

6.2.1 Description:

Client-focussed support with all GIS outputs as defined within the Group 08/09 Work Programs.

6.2.2 Output Delivery Date

Q1

Q2

Q3

Q4

Petroleum and Marine Division

2008 - 09 Work Plan

PMD overview

PMD provides geoscientific and technical advice to government on:

- petroleum resources and their development;
- marine and Antarctic geoscience;
- carbon dioxide capture and geological storage (CCS);
- defining Australia's offshore boundaries.

This assists government and the community to make appropriate and informed decisions about the use of resources and the management of the environment, including contributing to regional marine planning and management of Australia's oceans and coasts.

PMD also provides pre-competitive data and information to industry on Australia's offshore acreage, hydrocarbon reserves, and potential. This assists in attracting petroleum exploration investment to Australian waters in a very competitive international market for exploration capital.

Two ongoing, government initiatives, the Offshore Energy Security Program and the Carbon Capture and Storage – Implementation program, move into their second full year of operations.

Priorities for 08-09 are:

- Promotion of petroleum prospectivity in Australia, particularly provision of scientific and technical support to Government for the 2009 offshore petroleum acreage release;
- As part of the new Offshore Energy Security Program:
 - acquisition of geophysical and other data to assess the hydrocarbon potential of the Mentelle and Perth basins in south-west Western Australia;
 - assessment of the petroleum potential of remote eastern frontier basins;
 - completion of Phase 2 of a new Petroleum Data Access Facility for the petroleum industry.
- Provision of marine and coastal geoscience inputs for the Department of the Environment, Water Heritage and the Arts for the development of regional marine plans and to assist in the management of Australia's estuaries and offshore marine environment;
- Development and promotion of a carbon dioxide capture and geological storage (CCS) program, including offshore acreage release and assessment;

This plan captures all of the activities in the Division which includes all outputs delivered by projects.

PETROLEUM PROSPECTIVITY AND PROMOTIONS GROUP OVERVIEW

The Petroleum Prospectivity and Promotions (PPP) Group of Geoscience Australia's Petroleum and Marine Division (PMD) provides datasets and integrated geoscientific syntheses and products to government and the petroleum exploration industry to assist in the assessment of the hydrocarbon potential of Australia's Offshore sedimentary basins. In partnership with the Department of Resources Energy and Tourism the Group is responsible for the promotion of offshore exploration opportunities through the yearly acreage release program.

Regional projects form the core of the group's structure and are separated on the basis of their geographic location, knowledge-base and petroleum systems. There are three Frontier Basin projects 1) Southern Frontiers, 2) Remote Eastern Frontiers and 3) Southwest Margin. The Producing Regions Project includes specialist studies and syntheses of selected regions of the NW Shelf and Gippsland, Bass and Otway regions. A fifth project is responsible for the delivery of these results at APPEA and the promotion of Australian exploration opportunities to industry.

SOUTHERN FRONTIERS

1. Project Description: The project encompasses basin and margin synthesis studies within the Australian Marine Jurisdiction along Australia's southern continental margin. The area of interest extends from Bass Strait in the east to offshore Cape Leeuwin in the west.

2. Project Outcome: An improved understanding of the petroleum prospectivity and resource potential of frontier basins along the southern Australian margin to underpin promotion of selected areas for petroleum acreage release, as part of the Offshore Energy Security Program; and future marine planning.

3. Project Link(s) to Intermediate-level Agency Outcomes:

- Enhanced global attractiveness of Australian exploration investment opportunities
- Improved resource management and environmental protection
- Safer communities and infrastructure

4. Project Link(s) to National Research Priority (NRP) Goals:

- An environmentally sustainable Australia
- Frontier technologies for building and transforming Australian industries
- Safeguarding Australia
- This project does not contribute to the NRPs

5. Key Performance Information:

- Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs
- Quarterly output milestones met
- Project budget met
- This project contributes to agency-level reporting obligations

6. Project Outputs:

6.1 Output 1: Southern margin geophysical data programs

6.1.1 Description: Processing and interpretation of geophysical data in the eastern and central parts of the southern margin, to underpin an improved understanding of the petroleum prospectivity of the region.

6.1.2 Output Delivery Date:

- Q1
- Q2
- Q3
- Q4

6.2 Output 2: Southern margin prospectivity studies

6.2.1 Description: Geological studies and reports to underpin acreage release on the Australian southern margin, specifically the Bight Basin.

6.2.2 Output Delivery Date:

Q1

Q2

Q3

Q4

PRODUCING REGIONS

1. **Project Description:** Provide a scientific overview and update of Australia's principle petroleum producing regions. Investigate the potential for extending known petroleum system plays within the producing regions, in support of acreage release and to assist with the nomination of areas for marine planning.
2. **Project Outcome:** An improved understanding of the petroleum prospectivity of Australia's offshore proven petroleum provinces to underpin the annual release of offshore petroleum exploration areas in the Producing Regions.
3. **Project Link(s) to Intermediate-level Agency Outcomes:**
 - Enhanced global attractiveness of Australian exploration investment opportunities
 - Improved resource management and environmental protection
 - Safer communities and infrastructure
4. **Project Link(s) to National Research Priority (NRP) Goals:**
 - An environmentally sustainable Australia
 - Frontier technologies for building and transforming Australian industries
 - Safeguarding Australia
 - This project does not contribute to the NRPs
5. **Key Performance Information:**
 - Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs
 - Quarterly output milestones met
 - Project budget met
 - This project contributes to agency-level reporting obligations
6. **Project Outputs:**
 - 6.1 **Output 1: Regional Petroleum Systems**
 - 6.1.1 **Description:** Compile and provide pre-competitive information on aspects of the petroleum systems and prospectivity of Australia's offshore producing regions.
 - 6.1.2 **Output Delivery Date:**
 - Q1
 - Q2
 - Q3
 - Q4

6.2 Output 2: Timescales-VCEMP

6.2.1 Description: Refine and document Australian biozonations to improve the correlation of events and biozones within Australia and to the global geological timescale.

6.2.2 Output Delivery Date:

Q1

Q2

Q3

Q4

ACREAGE RELEASE AND PROMOTION

1. **Project Description:** Provide scientific and technical support to the Department of Resources, Energy & Tourism for the release of the 2009 Offshore Petroleum Exploration Areas and to promote the petroleum prospectivity of Australia, as part of the Offshore Energy Security Program.
2. **Project Outcome:** Broad awareness and acceptance of the technical opportunities of the acreage offered by the Australian government for petroleum exploration investment.
3. **Project Link(s) to Intermediate-level Agency Outcomes:**
 - Enhanced global attractiveness of Australian exploration investment opportunities
 - Improved resource management and environmental protection
 - Safer communities and infrastructure
4. **Project Link(s) to National Research Priority (NRP) Goals:**
 - An environmentally sustainable Australia
 - Frontier technologies for building and transforming Australian industries
 - Safeguarding Australia
 - This project does not contribute to the NRPs
5. **Key Performance Information:**
 - Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs
 - Quarterly output milestones met
 - Project budget met
 - This project contributes to agency-level reporting obligations
6. **Project Outputs:**
 - 6.1 **Output 1: 2009 Acreage Release**
 - 6.1.1 **Description:** Plan, scope and compile technical reports and datasets that support the 2009 release of Offshore Petroleum Exploration Areas.
 - 6.1.2 **Output Delivery Date:**
 - Q1
 - Q2
 - Q3
 - Q4
 - 6.2 **Output 2: Petroleum Prospectivity Promotion**
 - 6.2.1 **Description:** Promotion of Australia as an attractive exploration destination both nationally and internationally at petroleum conferences and through planned meetings with petroleum exploration companies.
 - 6.2.2 **Output Delivery Date:**

Q1
Q2
Q3
Q4

SOUTHWEST MARGIN

1. **Project description:** The Southwest Margin Project involves basement, basin and petroleum systems studies of the southwest continental margin, within the Australian Marine Jurisdiction, as part of the Offshore Energy Security Program. The area of interest includes the Perth and Mentelle basins, and extends from the southern Carnarvon Basin to the eastern Naturaliste Plateau.
2. **Project Outcome:** The objective is to gain an improved understanding of the petroleum prospectivity and resource potential of the Mentelle and Perth basins on Australia's southwest margin. The main aims are to: maximise opportunities for the discovery of a new oil province; underpin promotion of selected areas for petroleum exploration via acreage release; reduce exploration risk through provision of new data and interpretive information, and assist future marine planning.
3. **Project Link(s) to Intermediate-level Agency Outcomes:**
 - Enhanced global attractiveness of Australian exploration investment opportunities
 - Improved resource management and environmental protection
 - Safer communities and infrastructure
4. **Project Link(s) to National Research Priority (NRP) Goals:**
 - An environmentally sustainable Australia
 - Frontier technologies for building and transforming Australian industries
 - Safeguarding Australia
 - This project does not contribute to the NRPs
5. **Key Performance Information:**
 - Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs
 - Quarterly output milestones met
 - Project budget met
 - This project contributes to agency-level reporting obligations

6. Project outputs

6.1 Output 1: 2D seismic survey data acquisition, processing and re-processing.

6.1.1 **Description:** Plan, scope and acquire 2D seismic, gravity, magnetics and bathymetric geophysical datasets to underpin petroleum assessment and marine planning. Reprocess selected portions of open file seismic surveys to complement acquired 2D seismic data.

6.1.2 Output Delivery Date:

- Q1
- Q2
- Q3
- Q4

6.2 Output 2: Marine reconnaissance survey data acquisition and processing.

6.2.1 Description: Plan, scope and acquire reconnaissance geophysical and geological datasets to underpin petroleum assessment and marine planning. Datasets include; magnetics, gravity, multibeam swath, sub-bottom profiler, sea-floor sampling and photography.

6.2.2 Output Delivery Date:

- Q1
- Q2
- Q3
- Q4

6.3 Output 3: A study of the geology and petroleum prospectivity of the Mentelle and North Perth Basins.

6.3.1 Description: Interpretation, integration and synthesis of geological and geophysical datasets to provide reports, maps and concepts that enable assessment of the petroleum prospectivity of the basin, to support future acreage release.

6.3.2 Output Delivery Date:

- Q1
- Q2
- Q3
- Q4

REMOTE EASTERN FRONTIERS

1. **Project Description:** The project encompasses studies of basement terrain, structure, stratigraphy and potential petroleum systems of the Capel, Faust, Moore, Monowai and Gower basins within the Australian Marine Jurisdiction, as part of the Offshore Energy Security Program.
2. **Project Outcome:** Pre-competitive data and information to lessen geologic and environmental uncertainty, in the search for a new petroleum province, through the acquisition and interpretation of new datasets.
3. **Project Link(s) to Intermediate-level Agency Outcomes:**
 - Enhanced global attractiveness of Australian exploration investment opportunities
 - Improved resource management and environmental protection
 - Safer communities and infrastructure
4. **Project Link(s) to National Research Priority (NRP) Goals:**
 - An environmentally sustainable Australia
 - Frontier technologies for building and transforming Australian industries
 - Safeguarding Australia
 - This project does not contribute to the NRPs
5. **Key Performance Information:**
 - Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs
 - Quarterly output milestones met
 - Project budget met
 - This project contributes to agency-level reporting obligations
6. **Project Outputs:**
 - 6.1 **Output 1: Reporting on Petroleum Prospectivity of the Capel and Faust basins**
 - 6.1.1 **Description:** Reports and maps that synthesise basement and tectonostratigraphic interpretations of geological and geophysical datasets from the Capel and Faust basins to improve our understanding of the petroleum prospectivity of the region, and underpin future marine planning.
 - 6.1.2 **Output Delivery Date:**
 - Q1
 - Q2

Q3

Q4

6.2 Output 2: Remote Eastern Frontiers Regional Synthesis

6.2.1 Description: Reports and maps that utilize synthesised knowledge from the Capel and Faust basins to constrain remotely sensed and geophysical datasets for the greater Remote Eastern Frontiers region to improve our understanding of the location of basin depocentres, and underpin future marine planning.

6.2.2 Output Delivery Date:

Q1

Q2

Q3

Q4

ONSHORE PETROLEUM

1. **Project Description:** The project involves the acquisition, interpretation and integration of geophysical, geological and geochemical data sets that relate to under-explored onshore petroleum provinces. The project will utilise methodologies that have been applied in both the mineral and hydrocarbon exploration sectors and the work is carried out in close cooperation with relevant State geological/energy departments.
2. **Project Outcome:** An improved understanding of the petroleum prospectivity and untapped energy resource potential of Palaeozoic and Neoproterozoic basins in onshore Australia. A key result area is to maximise opportunities for discovering new hydrocarbon resources and to minimise the risk to explorers with current or future interests in these provinces. The results will also be used to support the various State organisations in their efforts to select areas for exploration acreage release. Ultimately, the results of this project will profoundly contribute to Australia's onshore energy security.

3. Project Link(s) to Intermediate-level Agency Outcomes:

- Enhanced global attractiveness of Australian exploration investment opportunities
- Improved resource management and environmental protection
- Safer communities and infrastructure

4. Project Link(s) to National Research Priority (NRP) Goals:

- An environmentally sustainable Australia
- Frontier technologies for building and transforming Australian industries
- Safeguarding Australia
- This project does not contribute to the NRPs

5. Key Performance Information:

- Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs
- Quarterly output milestones met
- Project budget met
- This project contributes to agency-level reporting obligations

6. Project Outputs:

6.1 Output 1: Onshore data acquisition

- 6.1.1 **Description:** Planning, scoping and acquisition of geophysical/geological data in the Central Australian region (eastern Officer, eastern Amadeus, and southern

Georgina basins) in order to delineate structural linkages between basement and basins and geological controls on the presence and operation of hydrocarbon systems and other commodities such as geothermal energy. Input into geological interpretation of newly acquired Rankins Springs seismic survey as part of a joint program with NSW DPI.

6.1.2 Output Delivery Date:

- Q1
- Q2
- Q3
- Q4

6.2 Output 2: Summary of hydrocarbon prospectivity in the greater Cooper/Eromanga region.

6.2.1 Description: Editing, updating and publishing B. Radke's gap analysis report, as a first product of a continuing onshore petroleum "atlas" series. This work will be carried out in close cooperation with relevant State government departments.

6.2.2 Output Delivery Date:

- Q1
- Q2
- Q3
- Q4

6.3 Output 3: Geochemical Analyses of selected source rocks in Amadeus and Georgina basins.

6.3.1 Description: Evaluation of source rock maturities from new sample material collected during forthcoming drilling program by Central Petroleum (geochem. work carried out by C. Boreham).
Sampling of available core material for analyses of shale gas potential in old Palaeozoic basins. Cores are available from strat. wells drilled in the Amadeus and Georgina basins. Geochem. analyses to be carried out by GfZ Potsdam, Germany.

6.3.2 Output Delivery Date:

- Q1
- Q2
- Q3
- Q4

6.4 Output 4: Data capture and storage

6.4.1 Description: The newly acquired and interpreted data will be loaded onto GA's corporate database with the aim to make it available to all stakeholders in the project.

6.4.2 Output Delivery Date:

- Q1
- Q2
- Q3
- Q4

PETROLEUM ENGINEERING AND IDENTIFIED RESOURCES

1. **Project Description:** This project provides technical advice related to: petroleum developments under the *Petroleum (Submerged Lands) Act* [P(SL)A]; petroleum reserves and production, and associated safety matters; and carbon dioxide capture and geological storage (CCS).

2. **Project 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, and advice on geological storage of carbon dioxide.

3. **Project Link(s) to Intermediate-level Agency Outcomes:**

- Enhanced global attractiveness of Australian exploration investment opportunities
- Improved resource management and environmental protection
- Safer communities and infrastructure

4. **Project Link(s) to National Research Priority (NRP) Goals:**

- An environmentally sustainable Australia
- Frontier technologies for building and transforming Australian industries
- Safeguarding Australia
- This project does not contribute to the NRPs

5. **Key Performance Information:**

- Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs
- Quarterly output milestones met
- Project budget met
- This project contributes to agency-level reporting obligations

6. **Project Outputs:**

6.1 **Output 1: Engineering and Resource Advice**

6.1.1 **Description:** To provide advice on: petroleum engineering issues and carbon dioxide capture and geological storage (CCS), and identified petroleum resources; for government 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).

6.1.2 **Output Delivery Date:**

- Q1
- Q2
- Q3
- Q4

6.2 Output 2: Engineering and Production Geological Reports on Australian Petroleum Accumulations

6.2.1 Description: To compile and update Browse Basin and Vulcan Sub-basin APA reports.

6.2.2 Output Delivery Date:

- Q1
- Q2
- Q3
- Q4

6.3 Output 3: Contribution to the “Oil and Gas Resources of Australia” web report

6.3.1 Description: Contribution of identified petroleum resources, resources growth, development, coalbed methane, production, production forecasts and resources sufficiency components to the web-based “Oil and Gas Resources of Australia” report.

6.3.2 Output Delivery Date:

- Q1
- Q2
- Q3
- Q4

EXPLORATION AND ENVIRONMENT ADVICE

1. **Project Description:** Technical advice to government on petroleum exploration, environmental and marine issues under the *Petroleum (Submerged Lands) Act* and other upstream petroleum industry matters.
2. **Project Outcome:** Improved resource management and environmental protection by provision of scientific advice on petroleum exploration, environmental issues and other upstream petroleum matters.
3. **Project Link(s) to Intermediate-level Agency Outcomes:**
 - Enhanced global attractiveness of Australian exploration investment opportunities
 - Improved resource management and environmental protection
 - Safer communities and infrastructure
4. **Project Link(s) to National Research Priority (NRP) Goals:**
 - An environmentally sustainable Australia
 - Frontier technologies for building and transforming Australian industries
 - Safeguarding Australia
 - This project does not contribute to the NRPs
5. **Key Performance Information:**
 - Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs
 - Quarterly output milestones met
 - Project budget met
 - This project contributes to agency-level reporting obligations
6. **Project Outputs:**
 - 6.1 **Output 1: Environment Advice**
 - 6.1.1 **Description:** Technical advice to government on environmental and marine planning issues.
 - 6.1.2 **Output Delivery Date:**
 - Q1
 - Q2
 - Q3
 - Q4

6.2 Output 2: Exploration Advice

6.2.1 Description: Technical advice to government on petroleum exploration under the P(SL)A, and other upstream petroleum industry matters including prospectivity and resource assessment.

6.2.2 Output Delivery Date:

Q1

Q2

Q3

Q4

6.3 Output 3: Industry and Statistics Advice

6.3.1 Description: Advice to the Department of Resources, Energy and Tourism, other government agencies, and industry, on petroleum industry activities in Australia including delivery of *Oil and Gas Resources of Australia (OGRA)*.

6.3.2 Output Delivery Date:

Q1

Q2

Q3

Q4

GEOLOGICAL STORAGE OF CARBON DIOXIDE (CO2CRC)

- 1. Project Description:** This project is part of Geoscience Australia's contribution to the core program of the Cooperative Research Centre for Greenhouse Gas Technologies (CO2CRC).
- 2. Project Outcome:**

Specialised input by GA researchers into selected CO2CRC projects led by researchers in other participating agencies including the CO2CRC Otway Basin Pilot Project and the Sequestration in Coal Project. This project also includes a GA staff member as a PhD student working at the Australian School of Petroleum.
- 3. Project Link(s) to Intermediate-level Agency Outcomes:**
 - Enhanced global attractiveness of Australian exploration investment opportunities
 - Improved resource management and environmental protection
 - Safer communities and infrastructure
- 4. Project Link(s) to National Research Priority (NRP) Goals:**
 - An environmentally sustainable Australia
 - Frontier technologies for building and transforming Australian industries
 - Safeguarding Australia
 - This project does not contribute to the NRPs
- 5. Key Performance Information:**
 - Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs
 - Quarterly output milestones met
 - Project budget met
 - This project contributes to agency-level reporting obligations

6. Project Outputs:

6.1.1 Output 1: CO2CRC Involvement

6.1.2 Description: Continued technical input on an as required basis into projects led by researchers from other CO2CRC Research Participants, including the Otway Basin Pilot Project.

6.1.3 Output Delivery Date:

Q1

Q2

Q3

Q4

DOMESTIC CARBON CAPTURE AND STORAGE (CCS) - STORAGE

1. Project Description:

Develop a carbon dioxide capture and geological storage (CCS) program, including acreage release packages, and provide technical advice to Government on the legislative framework for acreage release, risks and management of carbon dioxide and other greenhouse gas geological storage.

Develop an independent in-house expertise in the evaluation of selected offshore sedimentary basins for geological storage, to aid in the advice both on acreage release and potential applications for injection licences under the proposed legislation.

2. Project Outcomes:

Establishment of a CCS Acreage Release regime leading to the award of CCS exploration permits.

3. Project Link(s) to Intermediate-level Agency Outcomes:

- Enhanced global attractiveness of Australian exploration investment opportunities
- Improved resource management and environmental protection
- Safer communities and infrastructure

4. Project Link(s) to National Research Priority (NRP) Goals:

- An environmentally sustainable Australia
- Frontier technologies for building and transforming Australian industries
- Safeguarding Australia
- This project does not contribute to the NRPs

5. Key Performance Information:

- Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs
- Quarterly output milestones met
- Project budget met
- This project contributes to agency-level reporting obligations

6. Project Outputs:

6.1 Output 1: Carbon dioxide Capture and geological Storage (CCS) advice

6.1.1 Description:

Provide technical advice to the Department of Resources, Energy and Tourism on: Australian carbon dioxide capture and geological storage projects; revisions to the Offshore Petroleum Act for the development of regulations and guidelines for CCS operations.

6.1.2 Output Delivery Date:

Q1

Q2

Q3

Q4

6.2 Output 2: CCS Acreage Release

6.2.1 Description: Develop a program for the release of CCS exploration permits.

Data packages to be produced for each area. CCS exploration permits will be promoted through industry presentations and the media.

6.2.2 Output Delivery Date:

Q1

Q2

Q3

Q4

DOMESTIC CARBON CAPTURE & STORAGE - REGULATIONS

1. **Project Description:** The Domestic Carbon Capture and Storage Projects provide geoscientific and technical advice to government on development of a Carbon dioxide Capture and geological Storage (CCS) industry for Australia. The Regulations project includes development of a regulatory regime and establishment of a baseline greenhouse gas monitoring program.
2. **Project Outcomes:**
 - Technical support for establishment of a CCS regulatory regime.
 - Monitoring program for baseline greenhouse gas flux.
3. **Project Link(s) to Intermediate-level Agency Outcomes:**
 - Enhanced global attractiveness of Australian exploration investment opportunities
 - Improved resource management and environmental protection
 - Safer communities and infrastructure
4. **Project Link(s) to National Research Priority (NRP) Goals:**
 - An environmentally sustainable Australia
 - Frontier technologies for building and transforming Australian industries
 - Safeguarding Australia
5. **Key Performance Information:**
 - Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs
 - Quarterly output milestones met
 - Project budget met
 - This project contributes to agency-level reporting obligations
6. **Project Outputs:**
 - 6.1 **Output 1: Carbon dioxide Capture and geological Storage (CCS) regulatory advice**
 - 6.1.1 **Description:**

Provide geoscientific and technical advice to the Department of Resources, Energy and Tourism on:

 - The regulatory regime for CCS operations,
 - Australian Carbon dioxide Capture and geological Storage (CCS) projects,
 - Greenhouse gas issues including measurement, monitoring, and verification.

6.1.2 Output Delivery Date:

Q1

Q2

Q3

Q4

6.2 Output 2: Monitoring program for baseline greenhouse gas flux

6.2.1 Description:

Implement and manage a monitoring program to measure baseline greenhouse gas flux within one potential CCS storage basin. Develop technical expertise by monitoring CO₂ emissions from known analogs such as water bores. The study is to include evaluation of monitoring technologies, development of methodology and acquisition of flux data.

6.2.2 Output Delivery Date:

Q1

Q2

Q3

Q4

INTERNATIONAL CARBON CAPTURE & STORAGE

1. **Project Description:** This project will provide technical and advisory support for Carbon dioxide Capture and Storage (CCS) at an international level, and will be engaged in the development of international collaboration activities through government to government mechanisms such as the Carbon Sequestration Leadership Forum (CSLF), and through country to country activities such as the Asia-Pacific Partnership on Clean Development and Climate (APP).
2. **Project Outcome:** Active Australian Government engagement in international CCS activities, leading to improved economic and environmental outcomes.
3. **Project Link(s) to Intermediate-level Agency Outcomes:**
 - Enhanced global attractiveness of Australian exploration investment opportunities
 - Improved resource management and environmental protection
 - Safer communities and infrastructure
4. **Project Link(s) to National Research Priority (NRP) Goals:**
 - An environmentally sustainable Australia
 - Frontier technologies for building and transforming Australian industries
 - Safeguarding Australia
 - This project does not contribute to the NRPs
5. **Key Performance Information:**
 - Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs
 - Quarterly output milestones met
 - Project budget met
 - This project contributes to agency-level reporting obligations

6. Project Outputs:

6.1 Output 1: China Capacity Building Activities (CAGS Project)

6.1.1 Description: Management of a project with the Chinese Government for capacity building activities for assessment of Geological Storage sites for CO₂ through APP.

6.1.2 Output Delivery Date:

Q1

Q2

Q3

Q4

6.2 Output 2: Support for RET engagement in international CCS fora

6.2.1 Description: Continued technical and advisory support to RET for CCS activities in international fora, including CSLF, UNFCC and IPCC etc.

6.2.2 Output Delivery Date:

Q1

Q2

Q3

Q4

GEOLOGICAL AND GEOPHYSICAL DATA REPOSITORIES

1. **Project Description:** Provision of efficient and effective access to the seismic data, physical samples and other datasets, submitted under the *Petroleum (Submerged Lands) Act* and from other sources.
2. **Project Outcome:** To increase and improve exploration and resource management by rapid access to the P(SL)A and Geoscience Australia collections held within the Repositories.
3. **Project Link(s) to Intermediate-level Agency Outcomes:**
 - Enhanced global attractiveness of Australian exploration investment opportunities
 - Improved resource management and environmental protection
 - Safer communities and infrastructure
4. **Project Link(s) to National Research Priority (NRP) Goals:**
 - An environmentally sustainable Australia
 - Frontier technologies for building and transforming Australian industries
 - Safeguarding Australia
 - This project does not contribute to the NRPs
5. **Key Performance Information:**
 - Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs
 - Quarterly output milestones met
 - Project budget met
 - This project contributes to agency-level reporting obligations

6. Project Outputs:

6.1 Output 1: PSLA / GA Seismic Collection

6.1.1 Description: Maintenance of, and efficient client access to, the seismic data, submitted through the PSLA and from other sources. Included is the migration of digital data to the Robotics system.

6.1.2 Output Delivery Date:

Q1

Q2

Q3

Q4

6.2 Output 2: PSLA Well data, Petroleum Well and Seismic Reports and Hardcopy Scanning

6.2.1 Description: Maintenance of, and efficient client access to, digital well data and seismic reports submitted through the PSLA and from other sources. Included is the migration of digital data to the Robotics system.

6.2.2 Output Delivery Date:

Q1

Q2

Q3

Q4

6.3 Output 3: Seismic Navigation Database

6.3.1 Description: Maintenance and ongoing development of the seismic navigation database, with map making capabilities, to provide reliable navigation data to petroleum clients.

6.3.2 Output Delivery Date:

Q1

Q2

Q3

Q4

6.4 Output 4: PSLA Cores / Cuttings and Fluid Samples

6.4.1 Description: Maintenance of, and efficient client access to, the physical samples submitted through the PSLA and from other sources.

6.4.2 Output Delivery Date:

Q1

Q2

Q3

Q4

6.5 Output 5: Corporate Physical Samples (Marine, Minerals and Rock Stores)

6.5.1 Description: Maintenance of and provision of access to physical samples collections acquired by GA.

6.5.2 Output Delivery Date:

Q1

Q2

Q3

Q4

6.6 Output 6: Transcription project

6.6.1 Description: Under the current Energy Security Program continue the transcription of current digital data holdings to an industry standard medium.

6.6.2 Output Delivery Date:

Q1

Q2

Q3

Q4

COASTAL RESEARCH AND MANAGEMENT

- 1. Project Description:** The Coastal Research and Management project (CREAM) provides geoscientific and environmental information on estuaries and the coastal zone around Australia. Research is carried out to assess and predict changes in coastal water quality resulting from land use in coastal catchments. Observed effects of deteriorating water quality include algal blooms, fish kills and loss of aquatic habitats. In collaboration with federal, state and regional natural resource management authorities and policy-makers, field studies and desk-top studies are carried out. An integrated approach is used accounting for geological, biogeochemical, and hydrodynamic processes and conditions. Sediment and nutrient retention and transformations are studied in tropical rivers and estuaries as part of the project on Tropical Rivers and Coastal Knowledge (TRACK) funded through the Commonwealth Environmental Research Fund (CERF) and associated funding partners. Sources and sinks of nutrients are determined in the Coorong (SA) in collaboration with CSIRO's Flagship 'Water for a Healthy Country'. Water quality assessments are carried out in WA estuaries in collaboration with the Department of Water (WA) to support the development of Condition Report Cards.
- 2. Project Outcome:** The project provides information and advice supporting effective management of Australian estuaries and coastal waterways. In particular, new environmental data are acquired and compiled to establish a national overview of coastal water quality and to develop effective methods and indicators for the assessment of water quality and ecosystem integrity.
- 3. Project Link(s) to Intermediate-level Agency Outcomes:**
 - Enhanced global attractiveness of Australian exploration investment opportunities
 - Improved resource management and environmental protection
 - Safer communities and infrastructure
- 4. Project Link(s) to National Research Priority (NRP) Goals:**
 - An environmentally sustainable Australia
 - Frontier technologies for building and transforming Australian industries
 - Safeguarding Australia
 - This project does not contribute to the NRPs
- 5. Key Performance Information:**
 - Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs
 - Quarterly output milestones met
 - Project budget met
 - This project contributes to agency-level reporting obligations

6. Project Outputs:

6.1 Output 1: Two completed surveys to the Daly River and a report on the source and fate of nutrients in Darwin Harbour (NT)

6.1.1 Description: Field surveys at the beginning and the end of the dry season will be carried out to collect water and sediment samples from the Daly River. Nutrient sources will be identified and the abundance of nitrogen and phosphorous will be traced downstream. The derived information will be used to establish a nutrient budget for the Daly River. Results from previous surveys to Darwin Harbour will be reported to support the development of a water quality management plan for Darwin Harbour. The two project components are part of the Commonwealth Environment Research Facility (CERF) funded program on Tropical Rivers and Coastal Knowledge (TRACK).

6.1.2 Output Delivery Date:

Q1

Q2

Q3

Q4

6.2 Output 2: Report on sediment and water quality in relation to reduced freshwater inflow to the Coorong (SA)

6.2.1 Description: Sediment and water quality in the Coorong (SA) have been studied during two previous field surveys. Results will now be reported and communicated to stakeholders including the Murray Darling Basin Commission, CSIRO, and SA departments and regional natural resource management groups. This project is carried out in collaboration with CSIRO's Flagship program on the Coorong, Lower Lakes And Murray Mouth (CLLAMM).

6.2.2 Output Delivery Date:

Q1

Q2

Q3

Q4

6.3 Output 3: Sediment and water quality in estuaries of southern WA: Report on Hardy Inlet and two completed surveys

6.3.1 Description: The role of sediments as a source of nutrients and specific biogeochemical processes removing nitrogen and phosphorous from the aquatic environment will be determined in estuaries during two surveys in collaboration with the Water and Rivers Commission (WA). These results will be used to develop Condition Report Cards, an initiative of the National Land and Water Resources Audit and endorsed by State governments. A report on current water quality and paleo-environmental changes such as changes in sedimentation rates and the accumulation of organic matter in Stokes Inlet will be prepared using data from previous surveys.

6.3.2 Output Delivery Date:

Q1

Q2

Q3

Q4

6.4 Output 4: Uploading estuarine sediment and water quality data from 20 surveys into the Cooperate Data Model

6.2.1 Description: The coastal geoscience program has acquired estuarine sediment and water quality data such benthic nutrient and gas fluxes, surface and pore water nutrient concentrations and total organic carbon concentrations for more than 10 years. However, the population of data into the Cooperate Data Model (CDM) is incomplete. Data from 20 estuarine surveys will be reviewed, data will be QCed and uploaded into the CDM where necessary. External access to GA's estuarine data will be established through OzCoasts (www.ozcoasts.org.au), which will serve State government authorities when Condition Report Cards will be developed.

6.2.2 Output Delivery Date:

Q1

Q2

Q3

Q4

LAW OF THE SEA AND MARITIME BOUNDARY ADVICE

(LOSAMBA)

1. **Project Description:** The LOSAMBA project supports Australia's submission to the Commission on the Limits of the Continental Shelf; maritime boundary advice and information to Government and geoscientific advice on aspects of the law of the sea where appropriate. This involves:
 - provision of accurate and current data locating Australia's national maritime jurisdiction and limits, and:
 - Supporting the technical case for definition of the outer limit of the extended continental shelf around Australia and its external territories under Article 76 of the UN Convention on the Law of the Sea including the technical preparations for its final declaration and lodgement at the United Nations
 - The on-going administration and enhancement of web based information systems, in particular the Australian Marine Spatial Information System (AMSIS)
 - provision of specific ad-hoc advice including provision of related maps written boundary descriptions and digital data.
2. **Project Outcome:** Improved management and administration of Australia's coastal and marine jurisdiction via provision of reliable and accurate information and advice.
3. **Project Link(s) to Intermediate-level Agency Outcomes:**
 - Enhanced global attractiveness of Australian exploration investment opportunities
 - Improved resource management and environmental protection
 - Safer communities and infrastructure
4. **Project Link(s) to National Research Priority (NRP) Goals:**
 - An environmentally sustainable Australia
 - Frontier technologies for building and transforming Australian industries
 - Safeguarding Australia
 - This project does not contribute to the NRPs
5. **Key Performance Information:**
 - Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs
 - Quarterly output milestones met
 - Project budget met
 - This project contributes to agency-level reporting obligations

6. Project Outputs:

6.1 Output 1: Maritime Boundaries Advice – data maintenance. Reports and maps for boundary definition, negotiations and ECS definition around Australia in general and its external territories

6.1.1 **Description:** Determination of Australia’s national boundaries under the UN Convention on the law of the Sea and the Seas and Submerged Lands ACT. Provision of ad hoc advice, including the provision of maps, written boundary descriptions and digital data, on article 76 of the law of the Sea (UNCLOS) geoscientific aspects of (UNCLOS), and national and administrative maritime boundaries. Included in this output is the maintenance of the Australian Maritime Boundaries data.

6.1.2 Output Delivery Date:

- Q1
- Q2
- Q3
- Q4

6.2 Output 2: Activities associated with role of Commissioner on the UN Commission on the Limits of the Continental Shelf

6.2.1 **Description:** Participation by Commissioner Symonds in the deliberations of the UN Commission on the Limits of the Continental Shelf

6.2.2 Output Delivery Date:

- Q1
- Q2
- Q3
- Q4

6.3 Output 3: Management of Australian Marine Spatial Information System (AMSIS)

6.3.1 **Description:** Ongoing administration and enhancement of the Australian Marine Spatial Information System (AMSIS) including to its underlying support systems

6.3.2 Output Delivery Date:

- Q1
- Q2
- Q3
- Q4

6.4 Output 4: Support of Australia’s Submission to the UN Commission on the Limits of the Continental Shelf

6.4.1 **Description:** Participation in the activities that support Australia’s continental shelf submission during the deliberations of the UN Commission on the Limits of the Continental Shelf, and associated activities

6.4.2 Output Delivery Date:

- Q1
- Q2
- Q3
- Q4

6.5 Output 5: Advice, to Pacific Island States on Continental Shelf issues

6.5.1 Description: Advice to be given to Pacific Island Countries (co-operating with SOPAC which will undertake the in-State co-ordination role) to assist them in the definition of their maritime boundaries and preparation of their Submissions to the Commission on the Limits of the Continental Shelf. This output is tied to a letter of understanding from the CEO Neil Williams to the Director of SOPAC approving GA to commit 3 man months per year of resources to this activity

6.5.2 Output Delivery Date:

Q1

Q2

Q3

Q4

6.6 Output 6: Determination of and technical descriptions of Port Security Zones for the Department of Infrastructure, Transport, Regional Development and Local Government (Dept. of Infrastructure) :

6.6.1 Description: GA has entered into a 30 month MOU (starting January 2008) with the Dept. of Infrastructure to undertake the field work and technical definition of Port Security Zones under the Maritime Transport Security Act 2003 for the majority of Australia's ports.

6.6.2 Output Delivery Date:

Q1

Q2

Q3

Q4

FIELD AND ENGINEERING SERVICES

1. **Project Description:** Field and Engineering Support (FES) supplies a wide variety of sampling, geophysical, mapping and geochemical equipment to marine survey operations and the skilled personnel to operate and maintain the equipment and provide logistics support. FES also designs and develops marine geoscience equipment for new survey applications as well as supplying miscellaneous survey and engineering services to other Geoscience Australia Divisions (GEMD, OEMD, Corporate) and external agencies and organizations.
2. **Project Outcome:** The Field and Engineering Support project provides services which allow Geoscience Australia's scientists to undertake marine geoscience and oceanographic research in the field and laboratory and thus complete environmental management and resource assessment tasks. The services allow clients to conduct marine field surveys and laboratory research work with access to well-maintained (mainly state-of-the-art), fully-functional equipment. Data sets and samples are collected to the highest standards allowing the marine program to successfully meet its goals. Support provided to non-marine and external geoscience projects and organizations allow them also to undertake research, mapping, education and other core geoscience activities.
3. **Project Link(s) to Intermediate-level Agency Outcomes:**
 - Enhanced global attractiveness of Australian exploration investment opportunities
 - Improved resource management and environmental protection
 - Safer communities and infrastructure
4. **Project Link(s) to National Research Priority (NRP) Goals:**
 - An environmentally sustainable Australia
 - Frontier technologies for building and transforming Australian industries
 - Safeguarding Australia
 - This project does not contribute to the NRPs
5. **Key Performance Information:**
 - Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs
 - Quarterly output milestones met
 - Project budget met
 - This project contributes to agency-level reporting obligations

6. Project Outputs:

6.1 Output 1: Marine surveys and miscellaneous science services to PMD

6.1.1 Description: FES provides technical support for the safe and effective delivery of field programs and instrumentation. Major PMD survey activities include:

- Collaborative survey(s) to Ningaloo Reef, WA with AIMS under a MOU (Q1);
- Three (3) planned OESP surveys on the RV Sonne (Q2-Q3);
- Coastal surveys in Northern Australia under TRACK
- Coastal surveys in WA for both nutrient and paeleo climate studies
- Arrange field tests of equipment (multibeam, SBP, camera, chamber etc) and field training for science and technical staff (Q1-Q4)
- Arrange Sea Safety Training for ocean going crew and Small Boat Training for MCEG staff (Q1)

6.1.2 Output Delivery Date:

Q1

Q2

Q3

Q4

6.2 Output 2: Engineering design, development, maintenance and construction projects (including provision of software) – PMD projects.

6.2.1 Description: The major works for 2009-2009 includes:

- Continue vessel installations and testing of EM3002 multibeam system (Q1-Q4)
- Provision of geological sampling equipment – upgrading coring equipment for OESP, and acquisition of new box corer (Q1)
- Biological sampling equipment provision including benthic sled / beam trawl equipment
- Testing new digital multi-channel seismic streamer (Q1)
- Finalising the construction of a new automatic benthic chamber (Q1-Q2)
- Enhancing the deep sea camera system with extra meta data functionality and technical capability (Q1-Q4)
- Commissioning shallow water video system and implementing metadata requirements (Q1)
- ADP and ADV testing and mooring design and manufacture (Q1)
- Capital bid management
- Equipment maintenance, calibration and testing and update of SOPs (Q1-Q4)

6.2.2 Output Delivery Date: [tick one]

Q1

Q2

Q3

Q4

6.3 Output 3: Engineering and survey services to other GA Divisions (GEMD, OEMD, & Corporate) and GA external clients.

6.3.1 Description: Projects include:

- Construction of an OEMD wireline logging trailer for thermal energy research; (Q1)
- Provision of equipment components for tsunami and magnetic stations; (Q1-Q4)
- Infrasound hardware for Cocus Island; (Q1-Q2)
- Laboratory and incidental maintenance work; (Q1-Q4)
- Construction of coring equipment and dredges for CMAR
- Tsunami coastal investigations (coring) with GEMD in WA (Q1)
- Marine survey equipment for ANU, UTAS and UN (Q1)

6.3.2 Output Delivery Date: [tick one]

Q1

Q2

Q3

Q4

CERF Marine Biodiversity Research Hub

- 1. Project Description:** This is the 2nd year of the 4 year CERF Marine Biodiversity Hub. The Hub is a collaborative research program funded by the Department of Environment, Water, Heritage and the Arts (DEWHA) which aims to improve the management of Australia's marine biodiversity. GA is working in partnership with the University of Tasmania (Lead Agency, UTAS), CSIRO Marine and Atmospheric Research (CMAR), Australian Institute of Marine Science (AIMS) and the Museum of Victoria (Mus Vic). Key project stakeholders are Australian Fisheries Management Authority (AFMA), Australian Petroleum Production and Exploration Association (APPEA), DEWHA and the World Wildlife Fund for Nature (WWF). In 2008/2009 the Project will undertake marine surveys to strategically collect new seabed biophysical data and deliver progress reports on research into the performance of a range of physical seabed parameters as surrogates of benthic habitats and biological communities.
- 2. Project Outcome:** Increased availability and use of biodiversity information and resources in the science and management of Australia's marine biodiversity.
- 3. Project Link(s) to Intermediate-level Agency Outcomes:**

 - Enhanced global attractiveness of Australian exploration investment opportunities
 - Improved resource management and environmental protection
 - Safer communities and infrastructure
- 4. Project Link(s) to National Research Priority (NRP) Goals:**

 - An environmentally sustainable Australia
 - Frontier technologies for building and transforming Australian industries
 - Safeguarding Australia
 - This project does not contribute to the NRPs
- 5. Key Performance Information:**

 - Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs
 - Quarterly output milestones met
 - Project budget met
 - This project contributes to agency-level reporting obligations

6. Project Outputs:

6.1 Output 1: Provision of project metadata

6.1.1 Description: Metadata for all Geoscience Australia data sets that will be utilised in the Hub will be made available online via the CERF Hub's website.

6.1.2 Output Delivery Date:

Q1

Q2

Q3

Q4

6.2 Output 2: Review of literature on the utility of physical variables as surrogates for marine biodiversity.

6.2.1 Description: A review of literature on surrogacy (the empirical and hypothesised relationships between physical environmental variables and marine biodiversity) will be undertaken to provide an overview of our current understanding of the influence of physical variables on biodiversity and to set the broader marine biodiversity research context for the surrogacy work.

6.2.2 Output Delivery Date:

Q1

Q2

Q3

Q4

6.3 Output 3: Report that describes progress in the development of: 1) seabed disturbance indexes; 2) a geophysical seabed model; and 3) the testing of new physical surrogates of benthic communities.

6.3.1 Description:

1) For various types of seabed disturbance regimes identified using the GEOMAC seabed shear stress model, representative time series will be selected and further analysed to develop integrated indexes that represent a measure of potential seabed disturbance for each grid cell. The indexes may be potential new surrogates for biodiversity.

2) A geophysical model of the seabed can be produced by integrating several physical variables. The model will identify broad areas of seabed with similar or unique morphological and compositional character, known as the Seascapes approach to benthic habitat delineation. This modelling approach generates map outputs based on meso-scale (0.01°) grids that represent multivariate geophysical and oceanographic data layers.

3) New physical variables will be derived from existing and new physical/oceanographic datasets where it is anticipated that they may be related to ecological processes. This work will address fundamental issues regarding the potential and limits of the physical surrogacy approach such as, 'which measurable sedimentological properties have the strongest influence on the biodiversity of soft-sediment communities?'; and 'are morphological parameters derived from multibeam bathymetric data useful metrics for communities found on rocky and soft substrate?'.

6.3.2 Output Delivery Date:

- Q1
- Q2
- Q3
- Q4

6.4 Output 4: Report on completed marine surveys.

6.4.1 Description: Marine surveys will be undertaken to collect data to fill important gaps and provide data to test new physical surrogates. The proposed survey areas (Jervis Bay - July; Ningaloo Shelf - August; Tasman Shelf - February) have been selected because there are existing useful biological or physical seabed data, the targeted seabed habitats occur more widely in the bioregions, and the habitats have not previously been assessed for surrogacy. The surveys will be collaborative activities, with significant support from the partner organisations, especially in terms of the provision of vessels (UTAS, AIMS), a multibeam sonar system (GA) and associated technical and engineering support (GA, CMAR, UTAS).

6.4.2 Output Delivery Date:

- Q1
- Q2
- Q3
- Q4

SEABED MAPPING AND CHARACTERISATION

1. **Project Description:** The Seabed Mapping and Characterisation (SMAC) project coordinates the delivery of scientific products and technical advice to the Department of Resources, Energy and Tourism in support of the Offshore Energy Security Program and Department of the Environment, Water, Heritage and the Arts in support of bioregional planning and the development of a national representative system of marine protected areas. This involves:
 1. conducting three marine reconnaissance surveys;
 2. preparing seabed environmental assessments for acreage release areas;
 3. providing technical input to other Australian Government Departments on management of marine biodiversity as required
 4. developing and undertaking scientific research in the use of abiotic variables to predict potential marine biodiversity and habitat distributions; and
 5. providing scientific support for the development of web-based information systems to deliver high-quality data and scientific products to government and the public.

2. **Project Outcomes:** A raised awareness of the use of geoscience data in marine environmental assessments by the resource industry and government. Emplacement of geoscience data in the Australian Federal Government's decision-making processes for resource development and marine environmental management.

3. **Project Link(s) to Intermediate-level Agency Outcomes:**
 - Enhanced global attractiveness of Australian exploration investment opportunities
 - Improved resource management and environmental protection
 - Safer communities and infrastructure

4. **Project Link(s) to National Research Priority (NRP) Goals:**
 - An environmentally sustainable Australia
 - Frontier technologies for building and transforming Australian industries
 - Safeguarding Australia
 - This project does not contribute to the NRPs

5. **Key Performance Information:**
 - Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs
 - Quarterly output milestones met
 - Project budget met
 - This project contributes to agency-level reporting obligations

6. Project Outputs:

6.1 Output 1: Undertake three reconnaissance surveys to the Western Australian margin and preparation of associated post-survey reports

6.1.1 Description: This output involves the planning, execution and write up of three marine reconnaissance surveys to the Western Australian margin as part of the Offshore Energy Security Program. Baseline marine geoscience data will be collected on the seabed environments for the Zeewyck-Houtman, Mentelle and Exmouth Basins to assess the petroleum potential for these frontier basins, and for the SE portion of the Wallaby-Cuvier Plateau in support of Australia's submission to the UN Convention on Law of the Sea. Data collected will be deep-water multibeam sonar (bathymetry and backscatter), sub-bottom profiler, gravity and magnetics to correlate with deep seismic data. Physical samples of the seabed will also be collected to characterise the seabed and biota and determine any prolongation of the Australian continent beneath parts of the Wallaby Plateau. Data will also be used to assess the environmental significance of the environments to support the establishment of a national representative system of marine protected areas.

6.1.2 Output Delivery Date:

- Q1
- Q2
- Q3
- Q4

6.2 Output 2: Preparation of two environmental assessment reports in support of petroleum acreage release regions

6.2.1 Description: This output involves the drafting of two reports summarising and synthesising environmental geoscience information for two offshore basins that will be released for petroleum acreage. The reports will be delivered to the Department of Resources, Energy and Tourism in support of the acreage release products. Information synthesised in the reports is designed to provide technical advice to the Department on the environmental geoscience components of the acreage release areas. Information to be summarised include seabed geomorphology, oceanography, sedimentology, biota and benthic habitats.

6.2.2 Output Delivery Date:

- Q1
- Q2
- Q3
- Q4

6.3 Output 3: Report on correlating seascapes for the Australian margin with national biological datasets.

6.3.1 Description: This outputs involves drafting a report that describes the results of correlating national biological datasets with the national seascapes (benthic habitats). New seabed sediment grids based on new interpolation methods, a seabed substrate map from backscatter and the new outputs from GEOMACS (Output 4) will be incorporated into the national seascapes which will then be correlated with the biological datasets. The report will contain technical advice on the biological significance of the seascapes to the Department of the

Environment, Water, Heritage and Arts in support of the drafting of bioregional plans and design of a national representative system of marine protected areas.

6.3.2 Output Delivery Date:

- Q1
- Q2
- Q3
- Q4

6.4 Output 4: Report on new GEOMACS model of seabed disturbance including extreme events

6.4.1 Description: This output involves drafting a report summarising updates to Geoscience Australia's Geological and Oceanographic Model of Australia's Continental Shelf (GEOMACS). The GEOMACS model is a model of sediment transport or seabed stability that will be updated by adding two more years of hydrodynamic data and then re-run using the latest available bathymetry and sediment grids. These updated model results will be used to produce the following derived products: 1 Extreme seabed stress statistics as a GIS layer and interpreted shelf regionalisation; 2 Seabed disturbance index for seascape/habitat mapping applications. The model output and GA Record containing technical advice will provide a regional context on seabed stability in response to an interest by APPEA for products to assist with their engineering assessments relating to the commissioning and de-commissioning of offshore petroleum infrastructure.

6.4.2 Output Delivery Date:

- Q1
- Q2
- Q3
- Q4

6.5 Output 5: Preparation of fact sheets for vulnerable marine ecosystems for OzOceans marine web portal.

6.5.1 Description: This output involves drafting fact sheets on the geoscience and ecosystem processes for two vulnerable marine ecosystems for delivery over the 'OzOceans' marine web portal. Fact sheets will be developed for submarine canyons and seamounts, which are designated by the United Nations Convention on Biodiversity as vulnerable marine ecosystems. A fact sheet will also be drafted for the general geomorphology and sedimentology of the Australian margin (based on the geomorphological and sedimentology syntheses completed in the '07-'08 financial year for the Department of the Environment, Water, Heritage and the Arts), and another Fact-Sheet will be drafted on the methods for collecting bathymetry data in the marine environment. These facts sheets will help fulfil Geoscience Australia's role to deliver high-quality geoscience information to its stakeholders and the general public.

6.5.2 Output Delivery Date:

- Q1
- Q2
- Q3
- Q4

ANTARCTIC GEOSCIENCE

1. **Project Description:** Provide advice to government on issues relating to Antarctic Geoscience as necessary, in particular by updating the Australian National Antarctic Research Expeditions (ANARE) Geoscience strategic plan, organising assessment of project proposals and providing annual reports to government.
 - Provide leadership for Australian Antarctic geoscience research by directing potential researchers into work contributing to the Australian Government Antarctic Division (AAD) strategic plan.
 - Carry out marine geoscience research in the Antarctic.
 - Capture and disseminate geoscience information to meet Government Goals for Antarctic research.
2. **Project Outcome:** Maintenance of the Antarctic Treaty System (ATS) and enhancement of Australia's influence within the ATS; protection of the Antarctic environment; and improved understanding of the role of Antarctica in the global climate system.
3. **Project Link(s) to Intermediate-level Agency Outcomes:**
 - Enhanced global attractiveness of Australian exploration investment opportunities
 - Improved resource management and environmental protection
 - Safer communities and infrastructure
4. **Project Link(s) to National Research Priority (NRP) Goals:** [tick one]
 - An environmentally sustainable Australia
 - Frontier technologies for building and transforming Australian industries
 - Safeguarding Australia
 - This project does not contribute to the NRPs
5. **Key Performance Information:**
 - Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs
 - Quarterly output milestones met
 - Project budget met
 - This project contributes to agency-level reporting obligations
6. **Project Outputs:**
 - 6.1 **Output 1: Australian Antarctic Geoscience program leadership**
 - 6.1.1 **Description:** Geoscience Australia provides the Geoscience Program Leader for Australia's Antarctic Program. This involves provision of advice to government

on geoscience issues in the Antarctic, organisation of project proposal reviews for Australian Antarctic Division (AAD) and participation in international Antarctic bodies. Products: Project reviews for the Antarctic Research Advisory Committee Physical Sciences. Biannual report on Australian Antarctic geoscience research to the international Scientific Committee for Antarctic Research.

6.1.2 Output Delivery Date:

- Q1
- Q2
- Q3
- Q4

6.2 Output 2: Census of Antarctic Marine Life – geoscience component

6.2.1 Description: Australian Antarctic Division is coordinating a major international project to survey Antarctic biodiversity through multiple marine surveys in 2007/8. Results of this initiative will contribute to regional marine planning and environmental management in the Antarctic. Two outputs will

- i) Report on the interpretation of seabed mapping and sediment data collected during an AAD marine survey to the George V margin of Antarctica in December 2007-January 2008.
- ii) Presentation on the role of geoscience in understanding benthic habitats to the SCAR conference session on marine biodiversity (requested by AAD).

6.2.2 Output Delivery Date:

- Q1
- Q2
- Q3
- Q4

6.3 Output 3: Benthic Bioregionalisation of Antarctic waters

6.3.1 Description: Australian Antarctic Division (AAD) represents Australia at the Commission for the Conservation of Antarctic Living Marine Resource (CCAMLR). CCAMLR has begun the process of setting up a system of Marine Protected Areas. They wish to start with a bioregionalisation of Antarctic waters as a first step. AAD wishes to use the approach developed by GA and others using geomorphology as the fundamental layer. GA will provide geomorphology and sediment type layers for an online GIS system for delivery of data and information. GA will also provide fact sheets on several Vulnerable Marine Ecosystems (seamounts, gas seeps and hydrothermal vents).

6.3.2 Output Delivery Date:

- Q1
- Q2
- Q3
- Q4

6.4 Output 4: Geology of the Australian Antarctic Territory continental margin

6.4.1 Description: GA is custodian of the Australian Antarctic Southern Ocean Profiling Project (AASOPP) geophysical data used in the Australian Law of Sea submission. Australia's position in the Antarctic Treaty makes it necessary to be

seen to be using these data for research. Outputs: Contributing existing interpretations to international projects as follows:

- Paper on the climate controls on Pleistocene ice accumulation rates presented at International Geological Congress.
- Existing AASOPP interpretations contributed to the international project on Antarctic palaeobathymetry (CASP) and to planning for IODP Leg to Wilkes Land in early 2009.

Output Delivery Date:

Q1

Q2

Q3

Q4

OZCOASTS

1. **Project Description:** The OzCoasts project provides web-based tools, geoscientific data, coastal environmental information (the OzCoasts website) and knowledge-brokering (National Estuaries Network) to help bridge gaps between science, management, community and policy making organizations.
2. **Project Outcome:** Improved natural resource management and environmental conservation of Australia's coastal zone, estuaries and near-shore environments.
3. **Project Link(s) to Intermediate-level Agency Outcomes:**
 - Enhanced global attractiveness of Australian exploration investment opportunities
 - Improved resource management and environmental protection
 - Safer communities and infrastructure
4. **Project Link(s) to National Research Priority (NRP) Goals:** [tick one]
 - An environmentally sustainable Australia
 - Frontier technologies for building and transforming Australian industries
 - Safeguarding Australia
 - This project does not contribute to the NRPs
5. **Key Performance Information:**
 - Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs
 - Quarterly output milestones met
 - Project budget met
 - This project contributes to agency-level reporting obligations

Project Outputs:

- 6.1 **Output 1: Addition of SWBHM toolkit, Smartline maps & the ABSAMP Beach geomorphic database to the OzCoasts website.**
 - 6.1.1 **Description:** GA is a national custodian for coastal geoscientific data and information and OzCoasts draws together a diverse range of information on nearly 1000 of Australia's estuaries. This output aims to enhance the OzCoasts website with the integration of the Shallow Water Benthic Habitat Mapping Toolkit (former CRC), additional Smartline maps and query options and the ABSAMP "beach" database and new map layers and query functions. Clients include DCC, GEMD, Caring for Country, Surf life saving Australia, Various State agencies and the Universities of Sydney, Tasmania and Western Australia.
 - 6.1.2 **Output Delivery Date:**

- Q1 (SWBHM toolkit)
- Q2 (Smartline map – simple search)
- Q3 (Smartline maps – advanced search)
- Q4 (ABSAMP database)

6.2 Output 2: Chair and Coordinate NEN meetings

6.2.1 Description: The National Estuaries network evolved during the first NLWRA out of a recognized need for an organized network for coastal managers to exchange knowledge and keep up-to-date with scientific research. The bi-annual NEN forums are now a key mechanism for linking estuarine decision makers and scientists. For this output GA will coordinate the meetings in collaboration with partners from state and commonwealth coastal management and research organizations.

6.2.2 Output Delivery Date:

- Q1
- Q2
- Q3
- Q4

6.3 Output 3: Requirements document on potential web-products from DCC-sponsored climate change projects

6.3.1 Description: DCC's Coastal Vulnerability Program includes a coastal geomorphological mapping project run by GEMD that aims to identify regions of the Australian coast most sensitive to erosion due to the likely impacts of climate change in the marine environment. This output will scope the web-delivery of products from the *Estimating impacts from climate change on coastal inundation & severe wind* component of the project (Phase I/Part II). Clients: DCC, GEMD, University of Tasmania

6.3.2 Output Delivery Date:

- Q1
- Q2
- Q3
- Q4

6.4 Output 4: Implement internal search in OzCoasts

6.4.1 Description: An internal search engine is an integral part of a website. This output will deliver a search engine to the OzCoasts website based on current best practice.

6.4.2 Output Delivery Date:

- Q1
- Q2
- Q3
- Q4

LABORATORY SERVICES

1. **Project Description:** PMD's Laboratory Services Project provides specialist Geochemical, Palaeontology and Sedimentology laboratory services and support in the disciplines of organic and marine geochemistry and palaeontology and sedimentology analysis services to support to the Division, other areas of Geoscience Australia, and collaborative external projects.
2. **Project Outcome:** The Laboratory Services Project provides cost effective specialist laboratory services with high throughput involving:
 - sample preparation services
 - high-quality petroleum and bio-geochemical analyses
 - high-quality sedimentological and palaeontological analyses and imaging servicesThe impact of the Laboratory Services Project is to
 - deliver timely, high-quality geochemical, sedimentological and palaeontological results to projects to allow them to produce organic and marine geochemistry and sedimentological and palaeontological services to petroleum, marine, coastal, minerals and hazards projects within the Division,
 - continue the delivery and development of a range of petroleum, bio-geochemistry, sedimentological and palaeontological techniques to the Division to allow the production of a range of project outputs.
3. **Project Link(s) to Intermediate-level Agency Outcomes:**
 - Enhanced global attractiveness of Australian exploration investment opportunities
 - Improved resource management and environmental protection
 - Safer communities and infrastructure
4. **Project Link(s) to National Research Priority (NRP) Goals:**
 - An environmentally sustainable Australia
 - Frontier technologies for building and transforming Australian industries
 - Safeguarding Australia
 - This project does not contribute to the NRPs
5. **Key Performance Information:**
 - Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs
 - Quarterly output milestones met
 - Project budget met
 - This project contributes to agency-level reporting obligations

6. Project Outputs.

6.1 Output 1: Delivery of high-quality Organic and Marine Geochemistry services to the Division in a timely manner that meet the projects' requirements.

6.1.1 Description: Through the provision of cost effective specialist laboratory services, the Geochemistry Laboratory provides high throughput sample preparation and high-quality petroleum and bio-geochemical analyses services in a timely manner to support and meet project objectives.

6.1.2 Output Delivery Date:

Q1

Q2

Q3

Q4

6.1 Output 2: Delivery of high-quality Palaeontology and Sedimentology services and results to the Division in a timely manner that meet the projects requirements.

6.2.1 Description: Through the provision of cost effective specialist laboratory services, the Palaeontology and Sedimentology Laboratory provides high-throughput sample preparation and high-quality sedimentological and palaeontological analyses and imaging services in a timely manner to support and meet project objectives and outcomes.

6.2.2 Output Delivery Date:

Q1

Q2

Q3

Q4

INFORMATION DEVELOPMENT AND ANALYSIS SERVICES

1. **Project Description:** This project provides support and advice on all PMD information management and information technology systems capable to deliver Petroleum and Marine Division's (PMD) business outcomes.

This includes:

- Providing clients with business analysis, project planning and general project services (including communication and governance).
- Analysis, development and support of geospatial applications (ie. GIS web & databases)
- Development and support of PMD's information systems and tools within a corporate infrastructure.

2. **Project Outcomes:** To facilitate access to our clients and stakeholders with quality information in a timely manner and to ensure effective and efficient decision-making.

To develop a comprehensive, integrated information management system that makes it possible to collect relevant information from various sources and deliver in such a way that is timely, efficient, accurate and complete with respect to divisional and corporate standards.

To provide a central point of contact for all Information Service matters in PMD.

To provide technical influence and decisions with regard to Information Management (IM) and the strategic IM direction for the division and the organisation.

3. **Project Link(s) to Intermediate-level Agency Outcomes:**

- Enhanced global attractiveness of Australian exploration investment opportunities
- Improved resource management and environmental protection
- Safer communities and infrastructure

4. **Project Link(s) to National Research Priority (NRP) Goals:**

- An environmentally sustainable Australia
- Frontier technologies for building and transforming Australian industries
- Safeguarding Australia
- This project does not contribute to the NRPs

5. **Key Performance Information:**

- Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs Quarterly output milestones met
- Project budget met
- This project contributes to agency-level reporting obligations

6. Project Outputs:

6.1 Output 1: To develop and maintain GA collection, management and delivery systems, including tools within the corporate infrastructure.

6.1.1 Description: Provide technical application advice and development services to PMD projects and existing applications ensuring maximum access and delivery to support core divisional and external programs.

6.1.2 Output Delivery Date:

- Q1
- Q2
- Q3
- Q4

6.2 Output 2: To provide geospatial applications analysis, support and data maintenance including administration.

6.2.1 Description: Provide technical advice and support to PMD projects and applications ensuring maximum access to support core divisional and external programs.

6.2.2 Output Delivery Date:

- Q1
- Q2
- Q3
- Q4

6.3 Output 3: To facilitate clients with identifying business requirements and analysis, project planning and the promotion of project outcomes.

6.3.1 Description: Design and develop business requirements based on business feedback. To analysis business requirements and develop specific documentation for development or reporting functions.

6.3.2 Output Delivery Date:

- Q1
- Q2
- Q3
- Q4

GEOPHYSICAL ANALYSIS AND DATA ACCESS

- 1. Project Description:** This project provides geophysical and swath services for internal and external clients. This project has three components, swath/bathymetry, geophysical techniques and geophysical analysis. The swath/bathymetry component is committed to providing swath acquisition/processing for GA projects including the Offshore Energy Security Program. It is heavily involved in data QA/QC and incorporation of all available bathymetric products for the use of a range of projects within GA. It also provides swath acquisition/processing services for collaborative partners and some National Facility surveys that have benefit to GA's program. This component is also involved in development of tools required for the integration and interpretation of acoustic data within PMD.

The geophysical techniques component includes seismic, potential field and electrical acquisition, processing and integration techniques and provides the majority of the support for the seismic and potential field acquisition and processing as well as support for the seismic interpretation platforms within PMD.

The geophysical analysis component is involved with providing expert geophysical advice, geophysical analysis for projects and developing/producing specialist geophysical products for projects within the Division.

- 2. Project Outcome:** Project outcomes include:

- An improved understanding of the third dimension of the Australian marine environment through the provision of seismic reflection, seismic refraction, potential field and other geophysical datasets.
- An improved understanding of the Australian marine environment through the enhancement of bathymetric and acoustic data.
- Management of the reprocessing and collection of seismic data and other geophysical datasets for the enhancement of petroleum prospectivity within Australia.
- Improved geophysical techniques and processes to detect evidence of hydrocarbon migration and seepage.
- Enhanced capacity for scientific research through the use of acoustic techniques on, and derived from marine vessels.
- Cost effective and stable data interpretive platforms within PMD.

- 3. Project Link(s) to Intermediate-level Agency Outcomes:**

- Enhanced global attractiveness of Australian exploration investment opportunities
- Improved resource management and environmental protection
- Safer communities and infrastructure

- 4. Project Link(s) to National Research Priority (NRP) Goals:**

- An environmentally sustainable Australia
- Frontier technologies for building and transforming Australian

- industries
- Safeguarding Australia
- This project does not contribute to the NRPs

5. Key Performance Information:

- Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs
- Quarterly output milestones met
- Project budget met
- This project contributes to agency-level reporting obligations

6. Project Outputs:

6.1 Output 1: Delivery of swath support for GA (e.g. Offshore Energy Security Program) and External Collaborative projects

6.1.1 Description: Provide Swath, Bathymetry and other acoustic data collection support, processing support, distribution and archival mechanism for surveys as part of PMD, GA (e.g. Offshore Energy Security Program), External Collaborative projects and National Facility surveys that have benefit to GA's current and future program. Use best practices for the processing, archiving and distribution of bathymetric products. Broker all possible sources of quality bathymetric data for use by GA in a multiplicity of programs and outputs.

6.1.2 Output Delivery Date:

- Q1
- Q2
- Q3
- Q4

6.2 Output 2: Geophysical support for GA (e.g. Offshore Energy Security Program) and External Collaborative projects.

6.2.1 Description: Provide Geophysical data (Seismic, Potential Field etc) collection support, processing support, integration support and archival mechanism for surveys as part of PMD projects (e.g. Offshore Energy Security Program). Manage all aspects of PMD's seismic data collection program including environmental applications, contractor supervision and working with appropriate commonwealth, state and industry groups as is required.

6.2.2 Output Delivery Date:

- Q1
- Q2
- Q3
- Q4

6.3 Output 3: Management of PMD's seismic interpretation platform/s for PMD projects (including Acreage release)

6.3.1 Description: Integration of seismic and navigation into Geoquest, Petrel and Kingdom platforms plus ongoing support and development of existing and new applications. Determine best solutions to the Petroleum and Marine groups integrated interpretation needs. As part of the Offshore Energy Security

Program manage all new data loaded into the physical and virtual data rooms.
As part of Acreage Release coordinate, manage and distribute all relevant data,

6.3.2 Output Delivery Date:

Q1

Q2

Q3

Q4

6.4 Output 4: Management of PMD's seismic data reprocessing program

6.4.1 Description: Manage all aspects of PMD's seismic data reprocessing, including processing for new seismic surveys, reprocessing of existing data for acreage release and specialist processing (eg steep dips, AVO, deep sections).

6.4.2 Output Delivery Date:

Q1

Q2

Q3

Q4

6.5 Output 5: Analysis of geophysics requirements and development of staff and new technologies

6.5.1 Description: Geophysicists meet to analyse geophysics requirements of PMD projects to develop optimum processes and methodologies to deliver geophysics. Investigation and evaluation of new technologies in Geophysics and Bathymetry areas as applicable to the Offshore Energy Security Program e.g. UAV drones, application of remote sensing, specialised processing, and data integration and delivery.

6.5.2 Output Delivery Date:

Q1

Q2

Q3

Q4

PETROLEUM INFORMATION AND DATA MANAGEMENT

1. **Project Description:** The Petroleum Data and Information Management Project manages and populates Geoscience Australia's petroleum databases.
2. **Project Outcome:** Provision of comprehensive and accurate petroleum exploration data for Geoscience Australia projects and industry through management and population of petroleum databases.

Databases include WELLS, STRATDAT, RESFACS, ORGCHEM, and DEVIANT. Data types include Well header data, biostratigraphic data, depositional environments and reservoir data, source rock and maturity data, checkshot data and directional survey data.

3. **Project Link(s) to Intermediate-level Agency Outcomes:**
 - Enhanced global attractiveness of Australian exploration investment opportunities
 - Improved resource management and environmental protection
 - Safer communities and infrastructure
4. **Project Link(s) to National Research Priority (NRP) Goals:**
 - An environmentally sustainable Australia
 - Frontier technologies for building and transforming Australian industries
 - Safeguarding Australia
5. **Key Performance Information:**
 - Level of uptake by, and satisfaction levels of, key stakeholders with GA outputs
 - Quarterly output milestones met
 - Project budget met
 - This project contributes to agency-level reporting obligations

6. Project Outputs:

6.1 Output 1: Management, population, and delivery of the corporate-compliant PMD petroleum databases (including RESFACS, ORGCHEM, WELLS, DEVIANT)

6.1.1 **Description:** Project output meets requirements of delivery of petroleum databases to PMD projects in support of PMD project requirements, Ministerial advice requirements, the 2009 Acreage Release, GA research projects, and the wider petroleum exploration industry.

6.1.2 Output Delivery Date:

- Q1
- Q2
- Q3
- Q4