

Science Capability Audit: Geological Survey of Queensland and Safety in Mines Testing and Research Station Final Report



The Queensland Government is committed to using science and innovation for economic success by ensuring it has access to the best possible scientific advice and that this is directed toward meeting the future policy challenges of Queensland industries and contributes to sound decision-making about environmental, economic, industry and social issues.

This is the fourth in a series of audits of scientific services performed by Queensland Government departments. The series is oversighted by the Office of the Queensland Chief Scientist.

This document summarises this review of selected programs of the Department of Natural Resources and Mines (DNRM), noting that the scope of this internal audit excludes the areas of water and land – mapping and spatial.

This audit focuses solely on Geological Survey of Queensland (GSQ) and the Safety in Mines Testing and Research Station (SIMTARS). (Science activities in relation to water are being addressed in a separate stand-alone, cross agency audit.)

For the purpose of this science audit, activities examined cover any science services that collects, analyses, interprets, reports or models scientific or technological data.

© Department of Natural Resources and Mines (DNRM), 2014.

Images courtesy of Simtars

Biography of Mark Annandale (Lead author)

Mark is a Director of Landroc Pty Ltd and a senior consultant specialising in sustainable development, community forestry, environmental management, and cultural heritage management. An environmental scientist and community forestry specialist, Mark has Australian and international experience and works closely with private, public and NGO sector clients, including the establishment and management of multidisciplinary teams for project implementation. He is a member of the Australian Institute Company Directors, the Forestry Stewardship Council Australia and the Institute Foresters Australia.

He has extensive experience working with clients in stakeholder engagement, review and assessment of mine site environmental management, site rehabilitation and mine closure planning. Through implementation of resource development agreements and sustainability reporting he has been able to support clients achieve greater transparency, maintain a lower risk profile, benchmark and report their sustainability performance in public reports.

With over 20 years' experience in developing environmental rehabilitation strategies, environmental and cultural heritage audits, managing community relations, stakeholder engagement, cross cultural communication, cultural heritage management and the lead for negotiations between Indigenous communities and project proponents.

Additional authors

Mel Wagner, Department of Science, Information Technology, Innovation and the Arts

Lauren Stephenson, Office of the Queensland Chief Scientist

Jenny Riches, Office of the Queensland Chief Scientist

Contents

Background	4
Summarised Terms of Reference	5
Summary: Key findings and recommendations	6
Audit process	9
Audit process steps, timeline, consultation	
Program description (TOR 1 – 4)	10
Program history, Overview, Current program areas, Scope, Alignment, Overall client focus, Client focus by program, Overall funding, Funding sources, Staffing	
Budget summary	16
Current Business Model (TOR 5 and 6)	19
Business model summary, Advantages and disadvantages, Efficiency and effectiveness	
Alternative business model (TOR 6 and 7)	21
Benefits and risks	
Findings	25
Recommendations (TOR 8)	32
Appendix 1 Consultation list	34
Appendix 2 Clients and collaborators	35
Appendix 3 DNRM organisational structure	40

Background

During the 1860s the Queensland government appointed the first government geologist, which led to what became known as 'publications of the Geological Survey of Queensland'. This was essentially the precursor to the Queensland Department of Mines and its various iterations to now be part of the Department of Natural Resources and Mines (DNRM).

DNRM was formed in April 2012 incorporating the mining and resource functions of the former Department of Employment, Economic Development and Innovation (DEEDI) and the land and water management functions of the former Department of Environment and Resource Management (DERM).

DNRM is committed to implementing the Queensland Government's 'four-pillars' policy as the basis for developing Queensland's economy. The four pillars, comprise resources, agriculture, tourism and construction, all rely strongly on the sustainable use of Queensland's natural geological, land and water endowments.

The department also has a key role in protecting the safety and health of workers employed in the mining, quarrying, explosives, and petroleum and gas industries.

The Department has identified five key objectives in the delivery of these goals. These comprise:

- a globally competitive mining, petroleum and gas industry
- a safe and healthy resources industry
- sustainable and productive use of land and water resources
- balance in the access to and use of natural resources; and
- regulatory certainty for communities, industry and investors.

These objectives and strategies proposed to achieve them are outlined in the *DNRM Strategic Plan 2012 – 2016*.

DNRM is not a dedicated agency for the delivery of science, however it does have some specific science functions and delivers a range of services to dedicated science providers. DNRM undertakes the collection of data for a range of regulatory purposes some of which are utilised by the public and private sectors science communities.

Summarised Terms of Reference

The Queensland Government has committed to rebuild the state's practical and applied scientific and technology capability, including by partnership with Queensland's universities, to provide practical research that boosts the four pillars of the economy – agriculture, construction, resources and tourism.

This commitment includes placing the Queensland Chief Scientist in charge of science policy in the state and is balanced against the considerable fiscal challenges faced by the government.

The government's science policy directions include:

- ensuring that sound, practical and independent scientific advice is directed toward meeting the future policy challenges of Queensland's industries and that it contributes to decision making about environmental, economic, industry and social issues; and
- using science, technology and innovation to realise the full potential of the state's extraordinary natural and human resources.

Applied science and research and development (R&D) within DNRM is intended to help the department deliver its commitment that Queenslanders benefit from the productive and sustainable use of the state's natural resources. Applied science within DNRM focuses on:

- provision of geoscience and resource information to improve the understanding of the geology, minerals and energy resource potential of Queensland
- specialised mining safety.

Note: These Terms of Reference (TORs) were revised February 2014, following discussion with departmental officers, to exclude water and spatial groups of DNRM from the scope of the audit.

This audit describes and analyses DNRM's science capability in relation to the following questions:

TOR 1: What is the scope and content of the scientific program in DNRM?

TOR 2: How does this program align with the government's objectives and priorities, including legislative requirements for scientific services and advice?

TOR 3: Who are the key clients and stakeholders?

TOR 4: What resources and capabilities (cost, staffing, infrastructure, funding arrangements) are required to conduct the program?

TOR 5: What are the advantages and disadvantages of the program in terms of its efficiency, effectiveness and service quality?

TOR 6: What alternative models and suppliers could be considered to provide the scientific services and advice currently provided by the program?

TOR 7: What are the benefits, cost and risks associated with the alternative models?

TOR 8: What recommendations are proposed for future provision of scientific services and advice?

Key findings

This audit involved information gathering in relation to DNRM Geological Survey of Queensland (GSQ) and the Safety in Mines Testing and Research Station (SIMTARS) program activities. More than 30 interviews were conducted with DNRM senior managers and science leaders, clients, collaborators and other stakeholders. This was coupled with an evaluation of DNRM's business activities pertaining to its science-related activities.

The audit identified that DNRM's annual budget includes the collection, analyses, interpretation, reporting or modelling of scientific or technological data totalling approximately \$20 million, which is approximately 4 per cent of DNRM's total annual budget. The annual budget includes approximately \$12 million (or 60 per cent) of income sourced from fee for service work completed by GSQ and SIMTARS. *(Refer page 34 Appendix 1 for Glossary of Terms.)*

SIMTARS has approximately 85 staff, over five specialist streams. GSQ includes approximately 100 staff spread over six line units.

GSQ and SIMTARS are leaders at a national and international level and are aligned to government priorities and legislative requirements, and have:

- relevance to their current program requirements, including scientific services
- adopted a professional approach to their business activities
- general acknowledgement by their peers and industry as being independent, authoritative and leaders in their respective fields
- good representation in key geographical areas across Queensland.

Connections between public sector research and industry are increasing. The SIMTARS business unit has demonstrated a strong capability to operate in a fee for service environment and provides its services both nationally and internationally and can be used as a model for other Queensland Government business units.

Recommendations (TOR 8)

After consultation with research group clients, collaborators and stakeholders, and with GSQ and SIMTARS inputs, it is our view that, while some services provided by GSQ and SIMTARS can be provided by the private sector, the current mix of services be maintained.

While maintaining the current core strategy of collaborative co-investment for the delivery of scientific/technological services there is, however, an opportunity to develop business strategies for GSQ to vary and increase the mix of program funding for that component of their operations.

The proposed recommendations to the system are aimed at reducing costs and generating increased revenue to further support the delivery of key scientific services and advice to all stakeholders, rather than suggest wholesale change, the basis for which would require more extensive analysis and a detailed business case.

To maximise the return of government investment, meet government priorities and objectives and meet both community and client needs a staged approach towards a more commercial ethos, for provision of science services and advice, is recommended.

1. Efficiency

DNRM, as part of its business improvement process, should adopt a whole of government approach to promote greater efficiency by:

- maximising productive use of assets including GSQ databases, plant, equipment, library, laboratory and other facilities
- ensuring all functions outsourced provide value for money and meet DNRM's strategy and desired outcomes
- promoting internally within DNRM the SIMTARS business model (i.e. fee for service) and service standards as the standard for all DNRM services as part of a DNRM business improvement process
- regularly reviewing and updating the content of the department's website to ensure the information available to the public is current. If any services are identified as no longer being best provided by DNRM business groups then a considered approach be adopted, on a case by case basis, to withdraw those services while ensuring the private sector picks up the services.

2. Collaborative Research Alliances

In the pursuit of excellence in science services delivery and advice, and to improve productivity and competitiveness, further develop strategic alliances between DNRM's groups, universities and the private sector to establish and/or enhance existing research institute(s) through collaborative alliances.

3. Staff retention

In response to both stakeholder feedback and research group inputs, it is recommended that staff retention strategies be considered a priority with the aim of establishing DNRM as a preferred employer.

These strategies may include:

- professional development planning
 - attendance at industry specific conferences
 - mentoring of staff in early stages of their career by senior staff
 - secondments to research organisations, including consideration of the QAAFI model being very successfully used by the Queensland Department of Agriculture, Fisheries and Forestry
 - secondments to industry to build specific skills sets and operational experience
- succession planning for key staff.

4. GSQ

In response to stakeholder feedback it is recommended that:

- GSQ increase interaction with regulation of exploration permit conditions to ensure capture of drilling log data to improve resource mapping
- GSQ continue consulting with end-users in the resource and research sectors to further develop new and existing access to and generation of data in support of exploration activities, in particular base metals.

GSQ and the mining industry will benefit from establishing new partnerships to develop strategic capabilities and better co-ordinate and leverage research, to shift some focus on discovery such as the GSQ-Queensland Resource Council (e.g. Future Resources initiative) and grow key capabilities in Queensland. Therefore, facilitating better co-ordinated research activities between institutions (e.g. James Cook University (JCU), University of Queensland (UQ)-Earth Sciences and Sustainable Minerals Institute), and maximising opportunities for an applied context for research.

5. SIMTARS

SIMTARS services are 'demand driven' through a user-pays approach. Where appropriate consider adopting this model for other service offerings and more broadly across the department.

6. Implementation of recommendations

That the Director-General, as part of the Department's renewal process, consider the implementation of approved recommendations, including the assignment of an appropriately experienced/qualified DNRM person to champion the implementation of the approved recommendations.

Audit process

The scientific information, technology products, and advice aim is to increase the sector's productivity, efficiency and safety and to inform Government policy, planning, decision-making and management processes.

Process

The audit commenced in August 2013 and, after modification of the TOR in February 2014, it was agreed to excluded the water and spatial groups of DNRM. The audit was conducted by external review funded by the Director-General, DNRM. It was undertaken in cooperation with the scientific leadership of DNRM, and with appropriate support from Departmental staff, and from elsewhere (specifically DSITIA) as required.

The audit process involved information gathering in relation to GSQ and SIMTARS activities, interviews with key managers in DNRM, consultation with major clients and a limited comparative review of scientific services in other agencies.

Consultation

Client industry representatives, client departments and external agencies have been consulted in addressing these Terms of Reference, in addition to the leadership and staff of DNRM, the Director-General and Deputy Director-General of DNRM and other relevant officers. (Refer to Appendix 1)

Audit process steps

1. Terms of Reference – preparation and submission
2. Background documentation aggregation
3. Development of consultation list
4. Internal consultations and analysis
5. Client agency consultations and analysis
6. External consultations and analysis
7. Consolidation of themes and findings
8. Interim Report – preliminary recommendations
9. Presentation to Director-General (DG) of DNRM
10. Follow-up on feedback and final consultation
11. Final Report to DG DNRM and a copy to be provided to the Minister for Science, Information Technology, Innovation and the Arts (DSITIA)

Program description

Term of Reference 1: What is the scope and content of the current scientific program? (Geological Survey of Queensland)

Key points

- DNRM is committed to sustainable and productive use of the State's natural resources (including minerals) and support for the safety and health of people working in mining and allied industries. Management of the State's natural resources is central to delivering economic, environmental and social benefits.
- GSQ and SIMTARS provides applied scientific services, advice and information, significantly on a fee for service basis, targeted to specific commercial requirements and in the form of public goods with broader business and community benefits. These include support for better management, protection and use of Queensland's environmental, land, water and mineral resources, while informing government policy, planning, decision-making and including health, safety and risk management.

Geological Survey of Queensland (GSQ) acquires, interprets, and promotes geo-science and resource information to improve the understanding of the geology, minerals and energy resource potential of Queensland.

GSQ provides fundamental geological information for government stewardship of mineral and energy resources and provides industry with modern and historical geo-scientific information to support and encourage exploration for the discovery of new mineral and energy resources.

It also carries out geological mapping and associated cartographic services, mineral and petroleum resource assessment, maintains and updates geo-science and resource databases, including drill core management.

Industry support

In 2012-13 DNRM released the new Geology of Queensland book, related maps and scientific data, results of the Galilee and Thomson airborne magnetic and radiometric surveys.

Program description

Term of Reference 1 - What is the scope and content of the current scientific program? (SIMTARS)

Mining Safety & Health Services (incorporating SIMTARS): ensures strong, independent regulation and an effective response capability, builds industry awareness and skills, uses research and new technologies to reduce safety and health risks in the mining quarrying, explosives, and petroleum and gas industries and mitigate safety risks at abandoned mines. Its centre of mining research – SIMTARS - provides mining research and consultancy services throughout the state, as well as nationally and internationally.

SIMTARS' mission is to provide research, development, testing, certification and associated scientific services, including facilitating the introduction of new technologies, which will reduce the risk of mine disaster events, and minimise fatalities, lost time, injuries and disease. SIMTARS plays a critical role in the prevention of, and response to, major mine incidents and disasters. It also provides scientific support to the Mines Inspectorate.

SIMTARS

- provides most of its services on a fee-for-service basis (research, training, testing/certification) to improve safety and health across the mining industry.
- are an acknowledged world leading centre for mining health and safety, with clients around Australian and in over 20 countries.

Further, SIMTARS provides scientific services including scientific advice, testing and certification services, specialised mining research and consultancy services on a fee-for-service basis, including:

- occupational health and safety, occupational hygiene, environmental management, technology development and analytical services to government and industry
- technical and professional services advice relating to mine gas management and other broader safety and health issues in underground coal mines
- research and development activities specifically dealing with the prevention of explosions and fires in mines
- customised safety training programs in accredited courses for the oil and gas and mining sector for both local and international market.

SIMTARS comprises four centres of excellence:

1. Occupational Hygiene, Environment and Chemistry Centre
2. Engineering, Testing and Certification Centre
3. Mining Research and Development Centre
4. Safety Training Centre

Program description

Term of Reference 2: How does the program align with government objectives and priorities, including legislative requirements for scientific services and advice?

Key points

GSQ:

- provides professional and technical information and advice on Queensland's geology, mining, surveying, spatial data and exploration sectors.
- supports programs aligned to requirements and supporting decision-making under key DNRM acts
- provides geological mapping, cartographic services, resource assessment
- maintains digital geoscience data sets.

The GSQ acquires, interprets, provides and promotes geo-science and resource information to improve the understanding of the geology and minerals and energy resource potential of Queensland.

GSQ provides fundamental geological information for government stewardship of mineral and energy resources and provides industry with modern and historical geo-scientific information to support and encourage exploration for discovery of new mineral and energy resources.

GSQ is represented on or aligned with a number of national co-ordinating and liaison committees that provide essential overarching direction on data management and delivery e.g. Australia New Zealand Land Information Council and Exploration Investment and Geoscience Working Group.

GSQ information and services also support the mineral, coal, extractive, coal seam gas, petroleum, gas, carbon dioxide capture and storage and geothermal exploration industries, including but not limited to:

- Collaborative Drilling initiative (CDI) – funded from the Greenfields 2020 and the Future Resources Programs
- Coastal Geothermal Energy Initiative
- Carbon Capture and Storage.

GSQ carries out geological mapping and associated cartographic services, mineral and petroleum resource assessment, maintains and updates geo-science and resource databases, including drill core management, promotes the mineral and petroleum prospectivity of the State and contributes to the policy and land use planning initiatives that impact on the mineral, petroleum and extractive sectors.

The scientific services and advice provided by GSQ are governed by legislation, including but not limited to:

- *Mineral Resources Act 1989*
- *Mining and Quarrying Safety and Health Act 1999*
- *Offshore Minerals Act 1989*
- *Petroleum Act 1923*
- *Petroleum and Gas (Production and Safety) Act 2004.*

Program Description (cont)

Term of Reference 2: How does the program align with government objectives and priorities, including legislative requirements for scientific services and advice?

Key points

SIMTARS:

- offers a wide range of safety and health courses for mining
- provides testing, certification and calibration services for a wide range of mining equipment
- conducts monitoring, analysis and reporting services to help manage risks
- undertakes mining research and consulting services.

SIMTARS scientific services and advice to government ensures strong, independent regulation and an effective response capability to reduce safety and health risks in the mining quarrying, explosives, and petroleum and gas industries and mitigate safety risks at abandoned mines.

SIMTARS, including its four centres of excellence, are represented on or aligned with a number of national and international organisations (*refer to page 38 for a list of SIMTARS key collaborators/external partners*).

The scientific services and advice provided by SIMTARS are governed by legislation, including but not limited to the following:

- *Coal Mining Safety and Health Act 1999*
- *Coal Mining Safety and Health Regulation 2001*
- *Mining and Quarrying Safety and Health Act 1999*
- *Mining and Quarrying Safety and Health Regulation 2001*
- *Environmental Protection Act 1994*
- *Environmental Protection Regulations 2008*
- *Petroleum and Gas (Production and Safety) Act 2004.*

Term of Reference 3: Who are the key clients and stakeholders?

DNRM's scientific services and advice to key clients and stakeholders (*detailed list provided in Appendix 1*), include external collaborative partners grouped into:

- International, commonwealth, state and local government agencies
 - Directorate-General of Mine Safety (DGMS) in India
 - Mines Inspectorates from India (DGMS), Indonesia, Mongolia, Vietnam, Laos, China and Ghana
 - Australian Government on Mine Safety Technology
 - Queensland Mines Inspectorate
 - Queensland Department of Emergency Services
 - Queensland DSITIA
 - NSW Mines Inspectorate
 - Queensland Central Highlands Regional Council
- Universities and research organisations
 - UQ
 - JCU
 - CSIRO
- Industry bodies
 - industry advisory bodies
 - National Association of Testing Authorities (NATA)
 - peak representative bodies
 - Geoscience Australia
 - Safety and health providers
 - Minerals Industry Safety and Health Centre (UQ)
- Industry
 - All mines in Queensland
 - Explosion barrier suppliers
 - Suppliers of mining equipment
 - Exploration companies
 - Mineral processing companies such as Sun Metals, Boyne Smelters, Queensland Alumina Limited

Program description

Term of Reference 4: What resources and capabilities are required to conduct the program?

GSQ and SIMTARS, in particular GSQ, are involved in the collection and management of an extensive and diverse range of information to enable DNRM to deliver its responsibilities, including a number of key databases. (Many of the databases are available online now or will be in the near future; others will not be released due to privacy, security or confidentiality arrangements, but are generally available in another form).

DNRM has more than 29 business centres and offices which offer a range of services and products including information on GSQ and SIMTARS.

The audit identified that approximately \$20 million of DNRM's annual budget supports the collection, analyses, interpretation, reporting or modelling of scientific or technological data, which is approximately 4 per cent of DNRM's total annual budget. Approximately \$12 million (or 60 per cent) of the annual budget is sourced from fee-for-service work completed by GSQ (\$150,000) and SIMTARS (\$11.9 million).

SIMTARS has approximately 85 staff, over five specialist streams. GSQ's staff number around 100 staff and are spread over six line units.

SIMTARS facilities are located at Redbank (Head Office) and Mackay. Their services include:

- The Mine Safety Technology group, which comprises chemical and dust explosibility testing laboratories, one of only two explosion testing facilities in Australia. Further, SIMTARS is the only provider in Australia of a broad range of tests that allow assessment of the potential danger of dust layers and dust clouds.
- Occupational Hygiene, Environment and Chemistry Centre
- Engineering, Testing and Certification Centre
- Calibration and Technical Services
- Mining Research and Development Centre.

Geological Survey of Queensland (GSQ) operates the following six line units which provide fundamental geological information for government stewardship of mineral and energy resources, and provides industry with modern and historical geoscientific information to support and encourage exploration for the discovery of new mineral and energy resources

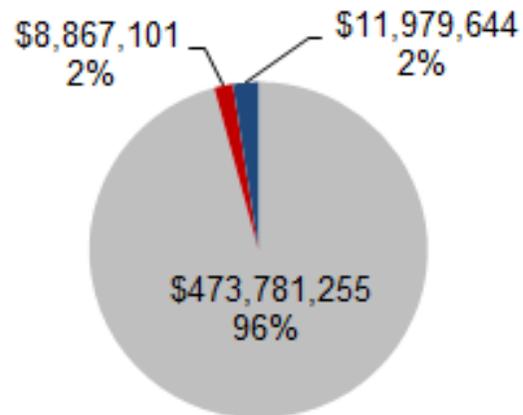
- Exploration Attraction
- Mineral Geoscience
- Energy Geoscience
- Greenfields Prospectivity
- Geoscience Information
- Resource Planning.

Budget Summary

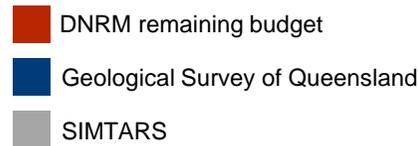
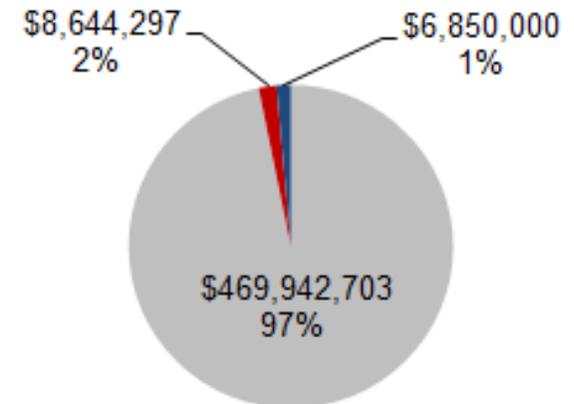
DNRM funding sources

Term of Reference 4: What resources and capabilities are required to conduct the program?

2012-13 budget allocations GSQ and SIMTARS to total DNRM budget



2013-14 forecast budget allocations GSQ and SIMTARS to total DNRM budget



Key point

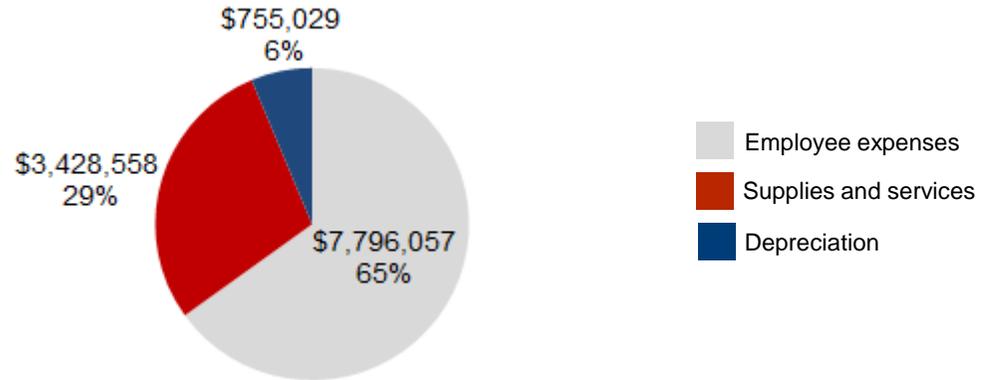
The audit identified that DNRM's annual budget includes the collection, analyses, interpretation, reporting or modelling of scientific or technological data totalling approximately \$20 million, which is 4 per cent of the DNRM's total annual budget and includes \$12 million of income, or around 60 per cent, sourced from fee for service work.

Budget summary

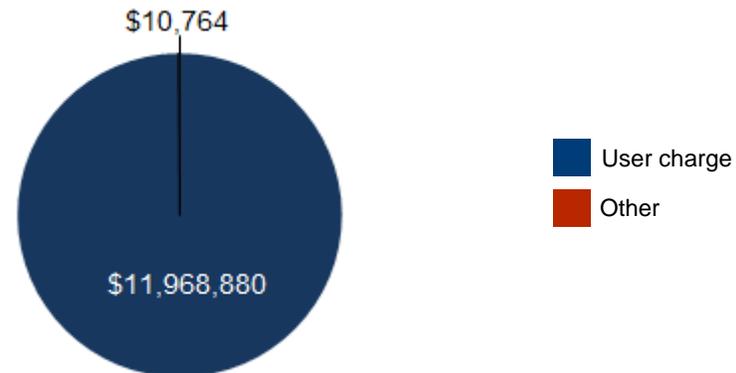
Key points

- In 2012-13, the SIMTARS' group science expenditure exceeded \$11 million.
- In 2012-13, SIMTARS continued to source almost 100 per cent of its income from user charges which includes fee-for-service.

SIMTARS funding expenditure 2012-13 financial year = \$11,979,644



SIMTARS funding sources 2012-13 financial year = \$11,979,644

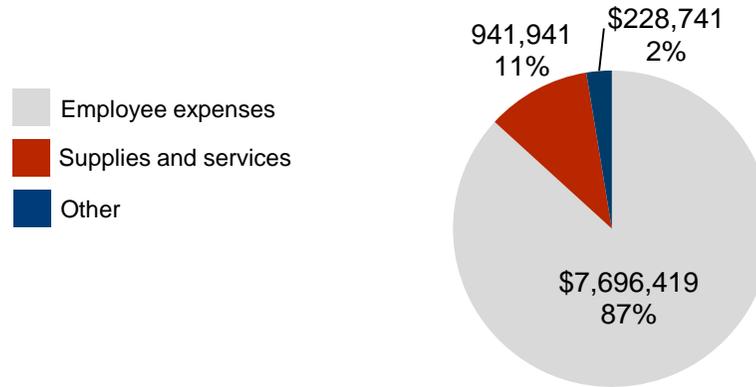


Budget Summary (cont)

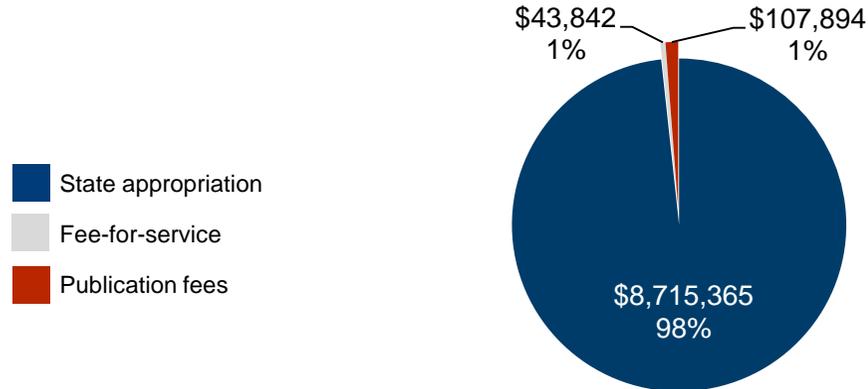
Key points

- In 2012-13, the GSQ group's science expenditure was close to \$9 million, with 87 per cent of expenditure for employee expenses.
- In 2012-13, GSQ continued to source the vast majority of its income from State appropriation while fee-for-service (user charges) accounted for only 2 per cent of funding sources.

Geological Survey of Qld Funding Expenditure 2012-13 Financial Year = \$8,867,101



Geological Survey of Qld Funding Sources 2012-13 Financial Year = \$8,867,101



Summary of findings: Terms of Reference 1 - 4

- The current business models are: SIMTARS – demand-driven and industry focused; and GSQ – industry focused.
- Scientific advice underpins evidence-based decision making; policy, planning and risk management. It is applied science-focused; based on collaborative co-investment with a diversity of stakeholders from all tiers of government, the university/research sector, the private sector and the broader community.
- The services provided are considered to be impartial and of a high standard. The science capability of the department's is recognised nationally and internationally.
- There are challenges that impact on efficiency related to the relationship between the government sector science providers and other sectors, with each having constraints regarding funding, sharing of information and more broadly how each conducts their business.
- There are a number of concerns particularly in GSQ in relation to staffing matters i.e. age profile of key staff, staff retention, succession planning and professional development.
- GSQ are active in the government's Open Data Initiative which is considered by all stakeholders as an increasingly significant positive initiative with improved knowledge of, and open access to, the databases and datasets. There is increased opportunity for all stakeholders to add value to the data.
- GSQ collaborative drilling initiative provides grants to industry to fund collaborative drilling and the Industries Priorities Initiative funds geoscience projects identified by industry.

Snapshot: Data and information management

DNRM collects and manages an extensive and diverse range of information, including: descriptions of the geography of Queensland; statistical activity level analysis; registries securing resource rights; mine safety and health records; and the Queensland Globe. Much of this is available to the public through the Queensland Government Open Data Strategy.

Current Business Model (cont)

Terms of Reference 5 - What are the advantages and disadvantages of the current science program in terms of its efficiency, effectiveness and service quality?

Key points

- DNRM utilises a range of models for delivery of scientific services and advice.
- Services are impartial and of a high standard, with capability recognised nationally and internationally, dedicated research, investigative and testing, equipment, facilities and expertise.
- The department utilises fee-for-service delivery options and a combination of mechanisms.
- Some services are 'demand-driven' through a user-pays approach, particularly SIMTARS, therefore providing funding that supports specific project needs to meet client requirements while contributing the broader goals of science program.
- Core levels of specialist skills are required within the regions to support critical business needs such as provision of high quality (and high cost) research facilities, equipment, monitoring data and technical expertise to support statutory decision-making.
- GSQ is acknowledged to have high quality data that may be an avenue for revenue however this is contrary to the open data policy of the government.

Advantages	Disadvantages
<ul style="list-style-type: none">• Availability of dedicated science technical and training capacity e.g. SIMTARS provides easy access to science inputs and advice• Demand driven science that supports policy, planning and decision making by public and private sector clients• Client satisfaction levels are high• Scientific services are impartial and of a high standard• Some applied science is nationally significant and internationally recognised• Impartial government scientists minimise risks of conflicts of interest and motivation by personal financial gain in key positions• Strong collaborative partnerships within and outside government• Unique long-term databases with high public good value	<ul style="list-style-type: none">• Funding models can be complex, when private and public sector funds combined e.g. CDI• GSQ is dependant on allocation of state funds• Research facilities and associated equipment are expensive to purchase and maintain• Cost to maintain databases and information systems are high• Communications between science providers and policy makers, as a general comment, pose risks of disconnect between science and policy• Staff age profile and reliance on key staff approaching retirement, in particular GSQ• Limited capacity for professional development and succession planning

Alternative Business Model

Term of Reference 6: What alternative models and suppliers could be considered for provision of the scientific services and advice currently provided by the program?

No alternative models and suppliers were identified directly through the consultation process. However some suggested alternative strategies for consideration are presented in the following pages.

It was also acknowledged that there are some services that are now exclusively provided by the private sector where the technology and services were developed by the SIMTARS and 'made available' to the private sector. However, there are some scientific services currently provided that cannot be provided by the private sector and or are required to be provided by government as an independent science provider e.g. digital geoscience data.

After extensive consultation with DNRM clients, collaborators and stakeholders, and with research group inputs, it is our view that while some services can be provided by the private sector the current mix of services be maintained. It is also recommended that all services be subject to regular review, seek regular client feedback and satisfaction surveys and if any services identified through that process are considered no longer best provided by DNRM then a considered approach be adopted on a case by case basis to withdraw those services while ensuring the private sector picks up the services.

Case study: SIMTARS fee-for-service *(see also page 17)*

- Provides a range of services (research, training, testing/certification) to improve safety and health across the mining industry
- Is acknowledged as world leading centre for mining health and safety
- Has clients around Australian and in more than 20 countries
- Comprises four centres of excellence:
 1. Occupational Hygiene, Environment and Chemistry Centre
 2. Engineering, Testing and Certification Centre
 3. Mining Research and Development Centre
 4. Safety Training Centre
- Provides most of its services on a fee-for-service basis
- Invests revenue into building further capacity

Alternative Business Model (cont)

Terms of Reference 6 cont - What alternative models and suppliers could be considered for provision of the scientific services and advice currently provided by the science program?

Key points

While maintaining the current core strategy for the delivery of scientific services and advice i.e. fee for service, cost recovery and public good, there is an opportunity to develop business strategies to vary and increase the mix of program funding.

The possible modifications to the current system are aimed at improving DNRM objectives while both reducing costs and generating increased revenue to further support the delivery of services and advice to all stakeholders, rather than suggest wholesale change, the basis for which would require a detailed business case.

	Current business model	Possible alternative business models
DNRM	DNRM scientific services and advice are generally delivered through as mix of fee for service, cost recovery and public good	DNRM scientific services and advice are focussed to maximise return of Government investment by charging clients for services provided
SIMTARS	Scientific services and advice are provided on a fee for service basis	Maintain current business strategy
GSQ	Scientific services and advice are provided through a mix of fee for service, cost recovery and public good	GSQ scientific services and advice to increasingly focus on maximising return of Government investment by <ol style="list-style-type: none"> 1. charging clients on a fee for service basis 2. cost recovery 3. science service shrinkage Increased outsourcing of scientific services and advice aligned with strategic withdrawal of services.

Note: see pages 23 and 24 to follow for further detail on GSQ possible alternative business models

Alternative Business Models (cont)

Term of Reference 7: What are the benefits, costs and risks associated with the alternative models outlined for GSQ?

Model	Benefits	Risks
<p>1. Scientific services and advice, a fee for service model</p> <p>DNRM scientific services and advice are focussed to maximise return of Government investment by charging clients for services provided</p>	<ul style="list-style-type: none"> Improved industry engagement, clients paying for required services, promotes as external industry/client focus Stronger business focus on services and value for money Greater relevance to industry Expanded revenue opportunities for delivery of science services and advice 	<ul style="list-style-type: none"> Potential for perceived or actual competition with existing science and or training service providers e.g. university sector As a government agency a perception/need to operate under competitive neutrality Increased cost of DNRM services
<p>2. Scientific services and advice are increasingly offered on a full cost recovery basis</p>	<ul style="list-style-type: none"> Provides greater community visibility of government services and benefits e.g. safety, building capacity i.e. training Supports innovation and development of new technology Utilise existing funding sources to leverage new funding sources e.g. CDI Explicit project costing Revenue neutral or revenue positive for DNRM Greater capacity to manage demand for science services and products 	<ul style="list-style-type: none"> Limitation of government financial and business practices e.g. staff employment conditions Reduced responsiveness to emergency situations Potential reduction in appropriation funding Project/client specific and variable revenue streams-reduced continuity of programs Limited capacity to utilise government funding to leverage external science co-investment

Alternative Business Models (cont)

Terms of Reference 7 - What are the benefits, costs and risks associated with the alternative models outlined for GSQ?

Model	Benefits	Risks
<p>3. Science Service shrinkage Increased outsourcing of scientific services and advice aligned with strategic withdrawal of services with reduced DNRM GSQ capacity</p>	<ul style="list-style-type: none"> • Potentially reduced costs and associated risks to government • Private and university sectors take on the overheads and risks associated with large science providers • Government focus on managing the business and not the science, establish standards and benchmark science service providers • Government focus on critical high priority science 	<ul style="list-style-type: none"> • Some DNRM scientific programs GSQ-CDI and GSQ databases are unique to the department and cannot be outsourced due to specialised technical skills, statutory requirements, privacy, security or confidentiality arrangements. (This comment may also be applicable to parts of SIMTARS program offering). • Loss of core science skills and capacity • If all scientific services are outsourced is potential reduced availability of required scientific services to inform government for planning, statutory decision-making and integrated science and policy advice • Potential for increased costs for same level of service • Increased science service and delivery contract management costs and risks to ensure science service quality • Managing and security of data at both project and for the long-term • Potential for reduced responsiveness to emergency situations • Increased reliance on external science service providers exposes DNRM to changing priorities that do not align with government priorities

Term of Reference 1: Scope and content of the current program

DNRM provides scientific services, (*detailed in Program Descriptions Terms of Reference 1 pages 10 and 11*), advice and information, in support of sustainable development, better management, protection and use of Queensland's environmental and mineral resources. In addition a range of specialist services are provided to improve mine and related workplace safety, efficiency and build capacity with the resource sector, resources services sector, representative bodies, unions and agencies providing emergency services and community benefits.

Terms of Reference 2: Alignment of Program with Government Objectives and Priorities

DNRM services are:

- Aligned to legislative requirements and government priorities including support of the Queensland Plan and the 4 pillar economy sectors of tourism, agriculture, resources and construction.
- Responsible for 24 government commitments including
 - Globally competitive mining, petroleum and gas industry whilst supporting industry to develop new projects and approaches;
 - A safe and healthy resources industry with response capability, building industry awareness and skills, use research and new technologies.

- Focussed on scientific research, improvement of mine health and safety systems, mine safety standards, training and monitoring, and more broadly sustainable management of the Queensland's natural resources.
- Provision of policy advice and inputs to policy development, and scientific support for government, and industry.
- Provision of services and advice to government agencies e.g. Queensland Department of Emergency Services.
- Provision of expanded competitive tendering process for the release of land for new exploration permits for coal.
- Provision of professional and technical information to the Queensland resource, mining, surveying and exploration sectors, including geological advice and access to core and rock collections and other emerging services support.
- Aligned to requirements and support decision-making under key DNRM Acts, *details provided in summary response to Terms of Reference 2 page 12 and 13.*
- An acknowledged leader at the national and international level for provision of data and information on mineral resources, geological information, data analysis, modelling, scientific/technical information and reporting.
- Provide specialised mining research and consultancy scientific services, including mine health and safety and training
- Delivering the Queensland Government's flagship \$30 million Future Resources Program over the next three years through funding of 7 initiatives in support of Queensland's resources and exploration industries.

Findings

Terms of Reference 3: Key clients and stakeholders

DNRM provides scientific services and advice to clients and stakeholders (detailed list provided in Appendix 1), including external collaborative partners grouped into:

- all tiers of government and utilities, e.g.
 - Queensland Mines Inspectorate
 - New South Wales Mines Inspectorate
- academia and research organisations
- industry bodies, e.g. Australian Coal Association
- industry advisory bodies, e.g. National Association of Testing Authorities
- safety and health providers and industry
 - Queensland Department of Emergency Services
 - Minerals Industry Safety and Health Centre
- all Queensland mines and other regions (particularly coal) New South Wales, New Zealand, India, China and USA

Terms of Reference 4: Resources and capabilities required to conduct the program

There are more than 29 DNRM business centres and offices across the state that provide information about the range of products and services offered by DNRM including GSQ and SIMTARS.

SIMTARS includes mines testing and research stations located at the Redbank head office and in Mackay. SIMTARS roles and services include Occupational Hygiene, Environment and Chemistry Centre; Mining Safety Technologies; Engineering, Testing and Certification Centre; Calibration & Technical Services; Mining Research and Development Centre. There are approximately 30 Professional Officers and 15 Technical and Operations Officers at SIMTARS Mackay Branch office.

GSQ's head office is located in Mary Street, Brisbane while the GSQ Exploration Data Centre is located at Zillmere.

GSQ include approximately 100 staff spread over six line units including Exploration Attraction; Mineral Geoscience; Energy Geoscience; Energy Geoscience; Geoscience Information (Spatial and Graphical Services and Exploration Data Centre); Resource Planning.

Findings

Term of Reference 5: Advantages and disadvantages of the current program

Advantages

- Availability of dedicated science capacity within government provides access to scientific advice and information in support of informed science based decision-making, risk management and therefore better informed government policy and planning, for sustainable development of Queensland's mineral resources.

GSQ

- Unique long-term databases e.g. digital geoscience data with high public good value.
- Strong relationships with other state and commonwealth geoscience organisations.

SIMTARS

- SIMTARS services are impartial and of a high standard that are nationally significant and internationally recognised.
- Strong collaborative partnerships with other agencies e.g. Queensland Department of Emergency Services.

Disadvantages

- A fee for service focus does pose risks of directing resources to short and medium term client needs.
- Funding models that may include private sector, state and commonwealth agencies can be complex, lack flexibility and dependant on other agencies e.g. geoscience data.
- Science facilities including laboratories, plant, equipment and maintaining data and information systems are a high cost e.g. GSQ regional core facilities.
- The ongoing need to maintain strong relationships with other agencies and industry is based on existing positive relationships that include good communication skills, if lost due to poor succession planning there is a risk of disconnect between science/policy and industry/community needs.
- Staff demographics and reliance on key staff approaching retirement particularly GSQ. An unintended consequence of government agencies providing these services may include a limited capacity for professional development e.g. travel to other jurisdictions, conference attendance and succession planning. What might be needed is clear, transparent and merit based career pathways to provide options for continued progression; high performing junior staff having great access to job evaluation management system to reduce staff being lost to industry; and programs that attract quality new staff.
- Variable cost to access databases i.e. align to open data initiative while ensuring cost recovery of services.

Term of Reference 5: Advantages and disadvantages of the current program

DNRM utilises a range of delivery models in providing scientific services and advice.

- Scientific services provided by SIMTARS are acknowledged as impartial and of a high standard, their science capability and innovation are recognised nationally and internationally as with their broader expertise, training programs and practical application of knowledge.
- Utilises both government funded and external (fee for service) delivery options and a combination of mechanisms to deliver scientific services and advice.
- The majority of SIMTARS work is 'demand-driven' through a 'user-pays' approach that meets specific client/project requirements while contributing to the broader goals of the science programs and mine safety.
- Core level specialist skills are required within the regions to support critical business needs, regional geologists are available within DNRM Mining and Petroleum Operations Group.
- Mining lease data and data collection by exploration companies if reported to GSQ for inclusion in their mineral and energy reserve database would address some current gaps in the resource information base.

The long term viability of the mining sector requires identification of ore bodies for future mines. GSQ has acquired/compiled an excellent regional foundation through remotely-sensed geophysical data for the metalliferous sector, requiring mineral exploration for target ore bodies located at depth (>1 km.). The geological information requires deep core drilling. Due to costs and technical risks associated with such exploration, state and private sector

collaborative funding support is likely to increase exploration activity. The Queensland Government Collaborative Drilling Initiative (CDI) currently provides grants that cover 50% of the drilling costs (up to \$150,000) of a project. To promote metalliferous exploration, which generally have higher exploration costs than for other mineral resources, an increase in the cap of the CDI may assist.

Establishing and strengthening strategic geoscience alliances by linking JCU, UQ and GSQ. This has the potential for a significant positive impact on the industry, while maintaining Queensland's competitive edge in resource investment.

Maximising efficiency for exploration activities can be achieved by reducing re-acquisition of data and focussing investment on new data generation/acquisition i.e. capturing data from exploration companies for the public record to reduce duplication of exploration activities over the same tenements if tenement ownership changes hands.

Geoscience organisations in other jurisdictions provide geoscience information/data to government/community to inform decisions on broader socioeconomic and environmental management issues through provision of resource data to better inform regional policy development and the overall decision making process. GSQ could play a more proactive role in regional development/policy by making geoscience information/data more accessible to government/community when they are planning for community growth, development of infrastructure and services for consideration in areas with potential for resource development.

Findings

Terms of Reference 6: Alternative suppliers and models

It is recognised that some scientific services provided by GSQ and SIMTARS could be provided by the private sector. While acknowledging that some services that are now exclusively provided by the private sector utilising technology and services developed by SIMTARS and 'made available' to the private sector.

Some scientific services currently provided e.g. geological survey related work cannot be provided by the private sector, or are required to be provided by government as an independent science provider.

Despite the fact that some further services can be provided by the private sector it is our view that the current mix of services be maintained and that all services be subject to regular review by seeking client feedback and satisfaction surveys. If any services identified through that process are considered no longer best provided by the DNRM then a considered approach be adopted on a 'case by case' basis to withdraw those services while ensuring the private sector picks up the services.

Terms of Reference 7: Benefits, costs and risks associated with alternative models

The current business model utilised by SIMTARS is based on 'fee for service' basis aimed at both recovering costs and generating revenue to further support the delivery of scientific and other services.

GSQ has adopted a co-investment model for the delivery of scientific and related services that includes some 'fee for service' functions e.g. provision of publications, data, resource mapping etc., while relying on government funds to improve the understanding of the geology, minerals and energy resource potential of Queensland. Promote the geoscientific data and exploration potential to attract investment, through provision of geoscience and resource information.

Rather than suggest wholesale change, the basis for which would require a detailed business case, there is an opportunity to increase fee for service functions by GSQ, the user pays model, for the delivery of scientific and related services.

Other DNRM business units, even for functions that were primarily established for regulatory purposes, have an opportunity to learn from the SIMTAR's business model so they too can vary and increase the mix of program funding options that provide the opportunity to:

- 1) Maximise return of Government investment; and
- 2) Achieve full cost recovery, or a profit on delivery of scientific services and advice

Recommendations

Term of Reference 8: What recommendations are proposed for future provision of scientific services and advice?

1. Efficiency

- Maximising productive use of assets including GSQ databases, plant, equipment, library, laboratory and other facilities.
- Promoting internally within DNRM the SIMTARS business model (i.e. fee for service) and service standards as the standard for all DNRM services as part of a DNRM business improvement process.
- Regularly reviewing and updating the content of the department's website to ensure the information available to the public is current if any services identified after review are considered no longer best provided by the DNRM Mining group then a considered approach be adopted, on a case by case basis, to withdraw those services while ensuring the private sector picks up the services.
- Actively seeking "innovative ideas" for scientific services and advice from research groups, clients, collaborators and other stakeholders by inviting expressions of interest (that meet agreed criteria), for new initiatives that help provide a clear benefit to industry, the community, and meet government priorities, in particular those that utilise existing data, information and infrastructure and or build on existing services.
- Identifying additional collaborative opportunities to build scientific services and utilisation of existing major plant, equipment and other assets.
- Further developing public, private sector partnerships including mineral exploration programs.
- Identifying if services currently provided on a fee for service basis, may be more cost effective to be provided free of any charges e.g. some Geoscience publications provided through the Open Data Initiative.
- Providing geoscience information/data to government/community to inform decisions on broader socioeconomic and environmental management issues.
- Capturing data from exploration companies for the public record to reduce duplication of exploration activities over the same tenements if tenement ownership changes hands.
- Further develop private and public sector investment in strategic exploration programs e.g. metalliferous sector, mineral exploration deep core drilling for target ore bodies located at depth (>1 km).
- Mining lease data and data collection by exploration companies if reported to GSQ for inclusion in their mineral and energy reserve database would address some current gaps in the resource information base.
- GSQ could usefully work closer with regulation of exploration permit conditions to ensure capture of drilling log data to improve resource mapping.
- Ensuring all functions outsourced provide value for money and meet DNRM's strategy and desired outcomes.

Terms of Reference 8: What recommendations are proposed for future provision of scientific services and advice?

2. Collaborative Research Alliances

In the pursuit of excellence in science services delivery and advice and to improve productivity and competitiveness further develop strategic alliances between the DNRM groups, universities and the private sector to establish and/or enhance existing research institute(s) through collaborative research alliance(s)

- In a coordinated effort, bring together scientists from relevant science disciplines and acknowledged areas of expertise. Both QAAFI and TIA provide very positive models for consideration.
- QAAFI-Queensland Alliance for Agriculture and Food Innovation is a strategic alliance between UQ and Queensland Government.
- TIA-The Tasmanian Institute of Agriculture is a joint venture between the University of Tasmania and the Tasmanian Government.

3. Staff retention

In response to both stakeholder feedback and research group inputs, it is recommended that staff retention strategies be considered a priority with particular reference to GSQ, with the aim of establishing DNRM as a preferred employer.

These strategies may include:

- Professional development planning
 - attendance at industry specific conferences
 - mentoring of staff in early stages of their career by senior staff
 - secondments to research organisations, including consideration of the QAAFI model being very successfully used by the Queensland Department of Agriculture, Fisheries and Forestry
 - secondments to industry to build specific skills sets and operational experience
- Succession planning for key staff
 - Retired staff be considered for adjunct positions.

4. GSQ

In response to both stakeholder feedback it is recommended that:

- GSQ increase interaction with regulation of exploration permit conditions to ensure capture of drilling log data to improve resource mapping
- GSQ continue consulting with end-users in the resource and research sectors to further develop new and existing access to and generation of data in support of exploration activities, in particular base metals.

GSQ and the mining industry will benefit from establishing new partnerships to develop strategic capabilities and better co-ordinate and leverage research, to shift some focus on discovery such as the GSQ-Queensland Resource Council (e.g. Future Resources initiative) and grow key capabilities in Queensland. Therefore, facilitating better co-ordinated research activities between institutions (e.g. James Cook University (JCU), UQ - Earth Sciences and Sustainable Minerals Institute), and maximise opportunities for an applied context for research.

5. SIMTARS

SIMTARS services are 'demand driven' through a user-pays approach. Where appropriate consider adopting this model for other service offerings more broadly across the department.

6. Implementation of Recommendations

That the Director-General, as part of the department's renewal process, consider the implementation of approved recommendations, including the assignment of an appropriately experienced/qualified person to champion the implementation of the approved recommendations.



Appendix 1: Consultation List

Glossary

CSIRO: Commonwealth Scientific and Industrial Research Organisation

DNRM: Department of Natural Resources and Mines

DSITIA: Department of Science, Information Technology, Innovation and the Arts

GSQ: Geological Survey of Queensland, DNRM

GSQ-CDI: Collaborative Drilling Initiative – part of the Future Resources Program of grant funding

SIMTARS: Safety in Mines Testing and Research Station

Process

Face-to-face consultation was conducted with DSITIA and DNRM contacts.

Telephone interviews were conducted with the external stakeholders (see table at right).

DNRM	DSITIA	External Stakeholders
Dr Brett Heyward Director General	Science Delivery Division	Dr Sue Vink Centre for Water in the Minerals Industry Sustainable Minerals Institute (SMI) University of Qld (UQ)
Dan Hunt Former Director General	Dr Christine Williams Assistant Director-General	Dr Chris Pigram CEO Geoscience Australia
Sue Ryan Deputy Director-General, Policy and Program Support	Paul Lawrence Director Landscape Sciences	Oliver Raymond Geoscience Australia
Katrina Platt Executive Director Finance and Corporate Operations	John Ridgeway General Manager Science Delivery Division	David Mulligan Professor and Director Centre for Mined Land Rehabilitation SMI, UQ
Melissa Harris-Tutt Manager Management Accounting	Christina Jones A/ General Manager Science Delivery Division	Matt Glover Manager Environment & Sustainability Ensham Coal Mine
Stuart Flatley Senior Finance Officer	Alex Cody Principal Project Officer.	Dr Peter Erskine Centre for Mined Land Rehabilitation (CMLR) SMI, UQ
Lloyd Taylor Executive Director Operations Support		Professor Margie Scott Director WH Bryan Mining and Geology Centre, SMI, UQ
Lyall Hinrichsen Executive Director Water Policy		Professor David Cliff Director of the Minerals Industry Health and Safety Centre SMI, UQ
Geological Survey of Queensland		Corinne Unger Senior Research Officer CMLR, SMI, UQ
Stewart Bell Commissioner		David Lewin Mining Safety Advisor Cavall Ridge Thiess Coal
Russell D'Arcy Principal Coal Geologist		Dr Angelica Vecchio-Sadus Deputy Chair College of Fellows Safety Institute of Australia
SIMTARS		Dr Peter Thorburn Research Group Leader Agricultural Systems Program CSIRO Ecosystem Sciences
Dr Tilman Rasche A/Executive Director		Darren Brady Principal Consultant Mine Safety Institute of Australia
Greg Manthey Principal Occupational Health and Hygiene Specialist		

Appendix 2: Clients / Collaborators – GCQ key collaborative / external partners

Stakeholder group or entity	Relationship / Nature of business
Minister for Natural Resources and Mines	Provision of information and advice on Queensland’s mining and exploration industries, government’s impact on these industries and their impact on other sectors of the Queensland economy
Assistant Minister for Natural Resources and Mines	Provision of information and advice on Queensland’s mining and exploration industries, government’s impact on these industries and their impact on other sectors of the Queensland economy
The Premier of Queensland	Provision of information and advice on Queensland’s mining and exploration industries, government’s impact on these industries and their impact on other sectors of the Queensland economy
Queensland Parliament	Reporting on budgets and results and briefings on key issues within the GSQ’s areas of responsibility
Senior management of the Department of Natural Resources and Mines	Provision of information and advice on Queensland’s mining and exploration industries, government’s impact on these industries and their impact on other sectors of the Queensland economy. Reporting on budgets and results and briefings on key issues within the GSQ’s areas of responsibility.
Department of Natural Resources and Mines	Collaboration, advice, and assistance to attain Departmental and whole-of-Government objectives
Mines and Energy	Collaboration, advice, and assistance to attain Departmental and whole-of-Government objectives
Geological Survey of Queensland	Collaboration, advice, and assistance to attain Departmental and whole-of-Government objectives
Other Queensland Government departments and agencies	Collaboration, advice, and assistance to attain whole of government and Departmental objectives. Exchange of information to assist policy development. Obtaining necessary permits and clearances for GSQ field operations. Planning advice on mineral and extractive resources and geological resource protection.
Queensland Trade Commissioners	Provision of information and advice on investment and business matching opportunities.
Queensland Local Governments	Provision of information and advice on extractives and possible mining project impacts and also notification of GSQ activities in their area. Planning advice on mineral and extractive resources and resource protection.
Australian Government departments	Collaboration and exchange of information and advice to further joint state and commonwealth objectives
Interstate Government Departments and Agencies	Collaboration and exchange of information and advice to further mutual objectives
The Standing Council on Energy and Resources, including various associated subcommittees	Collaboration, advice, and assistance to attain state and departmental objectives
Federal, State, Territory Geological Surveys; Chief Government Geologists Committee; Government Geologists Information Committee; Australian Geothermal Energy Group; and Team Australia	Collaborative geoscience agreements on trialling new technologies, national and regional geoscientific surveys and mapping programs, including geochronology, national and international marketing and promotion, development of industry standards and standardisation of reporting and information delivery over the internet.
Statutory Authorities, such as Energex and Ergon	Information and advice usually in relation to project facilitation

Appendix 2: Clients / Collaborators – GCQ key collaborative / external partners

Stakeholder group or entity	Relationship / Nature of business
Australian and international mineral exploration and mining companies	Business matching, technical assessment of projects, land releases, collaborative drilling grants, provision of pre-competitive geological data, research collaboration, project EIS assessments
Australian and international coal exploration and mining companies	Business matching, technical assessment of projects, land releases, collaborative drilling grants, provision of pre-competitive geological data, research collaboration, project EIS assessments
Extractive industries	Provision of geological information and advice, project EIS assessments
Stakeholder group or entity	Relationship / Nature of business
Australian and international geothermal exploration and development companies	Business matching, technical assessment of projects, land releases, collaborative drilling grants, provision of pre-competitive geological data, research collaboration, project EIS assessments
Australian and international petroleum and gas exploration and development companies	Business matching, technical assessment of projects, land releases, collaborative drilling grants, provision of pre-competitive geological data, research collaboration, project EIS assessments
The international Carbon Dioxide Storage industry	Business matching, technical assessment of projects, land releases, collaborative drilling grants, provision of pre-competitive geological data, research collaboration, project EIS assessments
Mining industry professionals	Exchange of information and expertise through seminars and training. Recruitment as required, collaboration on special projects and networking
Investment companies	Business matching, provision of information and advice
Commodity buyers and traders	Advice and business matching
Mining equipment and service companies	Business Matching, information and advice
Australian and Queensland peak industry bodies i.e. <ul style="list-style-type: none"> Queensland Resources Council The Australian Petroleum Production and Exploration Association the Petroleum Exploration Society of Australia the Australasian Institute of Mining and Metallurgy the Australian Institute of Geoscientists Australian Coal Association Australian Geothermal Implementation Authority Geological Society of Australia. 	Exchange of information, views and advice to assist in policy and research direction development. Geoscience collaboration and networking.
International industry bodies, i.e. <ul style="list-style-type: none"> International Union of Geological Surveys (IUGS), and International Geological Congress (IGC) 	Exchange of information, views and advice to assist in policy and research direction development. International geoscientific collaboration and networking. Planning for 34th IGC in Brisbane in 2012 and organising associated pre and post conference field trips.

Appendix 2: Clients / Collaborators – GCQ key collaborative / external partners

Stakeholder group or entity	Relationship / Nature of business
Australian research providers, i.e. <ul style="list-style-type: none"> • the Commonwealth Scientific and Industrial Research Organisation (CSIRO); • James Cook University of North Queensland • Queensland University • Monash University and • Cooperative Research Centres (CRCs) 	Exchange of information, views and advice to assist in policy and research direction development. Collaboration on various geoscience projects and networking. Exchange of information and expertise through seminars and training.
Aboriginal and Indigenous communities	Advice on activities, land access and cultural heritage negotiation, possible employment opportunities.
Unions	Employment
Non -government Organisations	Communication of GSQ current and future activities
Information and Communication Technologies and Geographic Information Systems modelling and system providers.	Information management and dissemination, interoperability training, new technologies, national and international collaboration.
People of Queensland	Enhancing the knowledge of the geology and mineral and energy resource potential of the State. Communication of the benefits from supporting healthy and efficient mineral and energy exploration and mining industries. Employment advice

Appendix 2: Clients / Collaborators – SIMTARS key collaborative / external partners

Category	Organisation / Company
Academia and research	• ACARP (Australian Coal Industry's Research Program)
	• Australian Coal Research Limited
	• Centre for Mined Land Reclamation (UQ)
	• CSIRO
	• Griffith University
	• Julius Kruttschnitt Mineral Research Centre
	• Mining Industry Safety and Health Centre (MISHC)
	• Queensland Centre for Advanced Technologies
	• Queensland University of Technology
	• Sustainable Minerals Institute
	• University of NSW
	• University of Queensland
	Associations and clubs
• Gympie Kilkivan Rifle Club	
Community	• Kalkadoon Community Pty Ltd
	• Wowan-Dululu Landcare
Explosives	• AFER (Australian Forum of Explosives Regulators)
	• Dyno Nobel Asia Pacific Pty Limited
	• Johnson Hi Tech Australia Pty Ltd
	• Kalari Pty Ltd
	• Maxam Australia Pty Ltd
	• Orica Australia Pty Ltd
	• Port of Brisbane
	• Queensland Police
	• Rocky's Own Transport Co
	• Scotts Transport (Chemtrans)
	• Shanna Blasting Services Pty Ltd
• Toll Mining Services	
Local government	• Brisbane City Council - Asphalt & Aggregates Branch
	• Queensland Health

Category	Organisation / Company
Mining	• Barro Group
	• BHP Billiton Minerals Pty Ltd
	• Boral
	• Cannington Mine
	• Cape Alumina
	• Cape Flattery Silica Mines Pty Ltd
	• Carpentaria Gold Pty Ltd (Resolute Mining Limited)
	• Centennial Coal
	• Central Gold Mines Pty Ltd
	• Conquest Mining
	• Consolidated Tin Mines Ltd
	• CRC Mining
	• Downer EDI Mining
	• Ensham Resources Pty Limited
	• Ernest Henry Mine
	• Fulton Hogan Pty Ltd
	• George Fisher Mine
	• Gillies Wu Mining
	• Hanson Construction Materials
	• Holcim (Australia) Pty Ltd
	• Kagara Zinc
	• Karreman Quarries
	• Kinetic Group
	• Kopex Waratah Engineering Pty Ltd
	• Macmahon Contractors
	• Minerals and Metals Group (MMG) Century Mine
	• Mt Isa Mines Limited
• Nielsens Quality Gravels Pty Ltd	
• Nucrush Pty Ltd	
• Perilya	
• Sibelco Australia Limited	
• Thiess Pty Ltd	
• Wagners	
• Xstrata Copper	

Appendix 2: Clients / Collaborators – SIMTARS key collaborative / external partners

Category	Organisation/Company
Peak Body	<ul style="list-style-type: none"> • Australian Explosives Industry and Safety Group Inc • Institute of Quarrying Australia • LPG Australia • Pyrotechnics Industry Association of Australia • Safety Institute of Australia • Standards Australia International
Retailer	<ul style="list-style-type: none"> • Interactive Images and Displays • TMC Tours
Safety and health	<ul style="list-style-type: none"> • Agilent Technologies • Ampcontrol • Ausdac Pty Limited • EMR Switchboards • Gasco • Govan Industries Pty Ltd • Industrea • International Electrotechnical Commission • Joint Accreditation System of Australia and New Zealand • National Association of Testing Authorities, Australia • Queensland Mines Rescue Service • Skillpro Services • VR Space • Workplace Health and Safety Qld
Union	<ul style="list-style-type: none"> • Australian Workers Union - Queensland Branch • Construction Forestry Mining and Energy Union - Queensland Branch • Plumbers Union Queensland

Appendix 3: DNRM Organisational Structure

