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AGSO
AUSTRALIAN GEOLOGICAL SURVEY ORGANISATION

PRODUCTIVITY COMMISSION INQUIRY INTO THE IMPLEMENTATION OF ECOLOGICALLY SUSTAINABLE DEVELOPMENT (ESD) BY COMMONWEALTH DEPARTMENTS AND AGENCIES

Dear Dr Byron

I refer to your letter of 21 September 1998 to Ken Matthews, the Secretary of the former Department of Primary Industries and Energy (DPE), which you copied to me as Executive Director of the Australian Geological Survey Organisation (AGSO), extending an invitation to participate in the inquiry.

The Issues Paper that accompanied your letter indicated that a key focus of the inquiry is the integration of economic and environmental considerations by those Commonwealth Departments and agencies with significant responsibility for ESD implementation. AGSO, as a scientific research agency, does not have any direct government policy or program management responsibilities related to ESD. However, we produce considerable outputs that other agencies use as inputs to policy development and program management.

I am attaching for your information some material on AGSO's research activities that are relevant to the achievement of sustainable development outcomes. These include geoscientific research **associated** with land and water and marine zone management.

Under the Administrative Arrangements Orders issued on 21 October 1998, DPIE was abolished and AGSO now forms part of the Industry, Science and Resources portfolio. However, the land and water geoscience function undertaken by AGSO may soon come under the Agriculture, Fisheries and Forestry portfolio, but discussions concerning this change in arrangements are still in progress . Given the recent nature of the administrative changes, and the fact that land and water functions were originally developed as part of AGSO's operations, reference to the land and water activities is included in the attachment.

Should you need further information, please contact Mr Jon Hayes on 02 6249 9260.

Yours sincerely

Neil Williams

Executive Director
17 November 1998

ATTACHMENT

INTRODUCTION

As a national body, AGSO's geoscientific outputs are necessary to facilitate information-based policy development by scientifically underpinning Commonwealth and state resource management programs and thereby increasing their effectiveness and value to the community.

Scientific research plays a vital role in terms of underpinning both government policy and program development. As examples, AGSO provides technical advice in support of Australia's legal continental shelf claims under the United Nations Convention on the Law of the Sea. AGSO has also provided inputs to the development of the Natural Heritage Trust. It has also provided expertise to the states in such areas as salinity, groundwater hydrology and data management.

These geoscience research inputs also serve as a 'reality check' on the direction of existing programs and the development of new initiatives.

Key Outcomes Consistent with the Government's adoption of an integrated accrual-based resource management framework for the Commonwealth, with its explicit focus on outputs and outcomes, AGSO's Business Plan identified each its planned outputs against one of four key planned outcomes, namely:

· Investment and Uptake - making Australia's products and services more attractive to investors.

· Sustainability - managing our natural resources and resource-based industries so that the needs of the present generation are met without compromising the ability of future generations to meet their own needs.

· Infrastructure - providing the infrastructure on which Australia's resource-based industries and their communities depend for their viability.

· Increased productivity - increasing industry output by using existing resources more effectively.

Research Outputs
AGSO's has several broad areas of planned research outputs, each aligned with one or more of the key outcomes:

· Petroleum and minerals industry development - designed to support the discovery of new resources through the provision of geoscientific data, information and knowledge as essential incentives for maintaining and increasing exploration investment, this group of outcomes is aligned with the Investment and Uptake and Increased Productivity outcomes. Mitigating the effects of natural geological hazards such as

earthquakes and landslides - aligned with the Infrastructure outcome. Marine zone management - to provide geoscientific inputs to essential baseline information for the effective management of Australia's marine zone, including areas adjacent to urban populations, and is aligned to the Sustainability outcome.

Up until the change in Administrative Arrangements in October 1998, AGSO also had responsibility for a group of outputs relating to land and water geoscience. These outputs were directed at land resource assessment and studies of groundwater resources and land degradation and involve matters of increasing national concern over the threat to Australia's rural industries and communities, its exports and public health. This particular group of research outputs was aligned with the Sustainability outcome .

As outlined above, some of AGSO's outputs have therefore been directly linked with ESD through the sustainability outcome identified in AGSO's 1998/99 Business Plan (a copy of which is enclosed). Parts A and B of this Attachment focus on those groups of AGSO outputs - respectively land and water and marine zone management - which are primarily directed towards achieving the Sustainability outcome. The term 'sustainability' is defined in AGSO's Business Plan as being the "sustainability of production, processing and delivery of the associated natural resource base".

The majority of AGSO's outputs are not ESD related. AGSO's petroleum and minerals geoscience outputs are directed primarily towards achieving key economic outcomes by improving investment opportunities and increasing productivity in sectors that are vital to the future of the Australian economy. Similarly, AGSO's geohazards activities are principally aimed at achieving economic outcomes. By monitoring and providing essential public good information on risks from earthquakes and landslides, such outputs are designed to assist with the development of national infrastructure.

Client Consultation

All of AGSO's outputs have been developed after detailed consultation with respective client groups and output recipients. These encompass a wide range of public sector agencies at Commonwealth, state or local government level as well as private sector bodies. AGSO helps ensure the appropriateness of its outputs by liaising with clients and output recipients on a continuing basis.

The development of individual research priorities and identification of individual projects involves a process of extensive and detailed client and stakeholder consultation. Many projects are undertaken in partnership with key clients and client groups and are the subject of a range of cooperative funding agreements.

AGSO's Building

Since early 1998, AGSO has occupied a purpose-designed building with innovative environmental features, including an air conditioning system which incorporates the largest geothermal heat pump system in Australia and an in-built design which enhances natural lighting access to all areas of the building's interior. These features

are designed to significantly improve the efficiency of building energy consumption consistent with overall ESD objectives.

Part A

LAND AND WATER RESOURCES GEOSCIENCE

Background and Objectives

The economic, environmental and social objectives of land and water geoscience activities are closely intertwined. The principal outcome of land and water geoscience is to achieve the sustainability of two areas fundamental to national prosperity and quality for life, namely: groundwater resources for all users, encompassing both qualitative and quantitative issues land and surface water resources in order to maintain Australia's primary industries and environment.

Land and water resources geoscience activities have been linked to the 'sustainability' outcome, as enunciated in AGSO's current Business Plan. However, such activities must also be viewed within the context of the economic objective of maintaining and increasing the productivity of Australia's rural sector. This is being achieved through the delivery of products that focus on enhancing productivity and development opportunities for primary industries and identifying risks from land and water degradation.

These activities have been pursued at Commonwealth level to scientifically underpin, and thereby increase the effectiveness and value to the community, of Commonwealth and state resource management programs by addressing the following needs: facilitating information-based policy development preventing unnecessary duplication of effort avoiding the emergence of parallel and non-compatible data ensuring resource agencies and companies adopt common terminology, operating procedures and quality control.

Strategic outcomes identified for the land and water geoscience program, which are broadly in keeping with ESD objectives, include:

- improving the capability of Landcare groups to manage land sustainably through the provision of natural resource information
- increasing prosperity of rural industries based on development and application of improved land evaluation technology
- enhancing the sustainable usage of major groundwater resources through the provision of scientific advice to water resource managers
- minimising impacts upon public health and production systems through better identification ofgroundwater contamination threats and consequent development of appropriate management strategies
- minimising economic and environmental impacts from land and water degradation through the provision of improved risk assessment methods for application by Landcare, Natural Heritage Trust and other government and community programs.

Operation of Program

Land and water geoscience activities are structured into a number of individual projects each with a leader. Groups of like projects relevant to a specific research area are managed under a group leader who is responsible for strategic leadership of the science and for overseeing the work of project leaders. A major feature of the projects is the establishing of partnerships with other research providers including state agencies, CSIRO and the universities. This approach assists in building multidisciplinary teams to tackle key issues.

Performance monitoring, evaluation and reporting

Each project is specifically identified within an annual business plan, in which the planned outputs, milestones, communication strategies and progress reporting mechanisms for the project are spelled out. Communication strategies are developed for each client-focussed activity to ensure that client needs are fully understood and that results are clearly articulated and can be delivered. These strategies include community consultation, technical reports and scientific papers. Emphasis is placed on ensuring that as much information and data as possible is publicly accessible, including via World Wide Web pages.

All projects are the subject of a quarterly reporting process in which project leaders are required to notify slippages to schedules, identify any impediments to achieving planned project outputs and to propose solutions to these.

Program Review

AGSO's land and water geoscience program was the subject of a formal internal evaluation in 1997. The evaluation steering committee included two external members, one member being from a key client organisation for which AGSO has undertaken significant geoscientific services and the other from the land resources policy arm of the former Department of Primary Industries and Energy. The report of the evaluation was not published but is available on request.

Following the evaluation, there was a substantial redefinition of much of the land and water research, development and information management program. A new 5 year strategic plan was developed which took into account portfolio needs and those of a range of clients and collaborators, while maintaining the delivery of high quality geoscience information of relevance to environmental management. Key features of the plan, implementation of which began in July 1998, are:

· an increasing emphasis on degradation issues impacting on groundwater and land management - a greater focus on data and information management to facilitate easier access by clients and collaborators to facilitate greater use of land and water information in policy development.

Impact of Program in Promoting ESD-related Outcomes

ESD in Australia has been handicapped by a lack of a concerted approach across states and agencies. The National Resource Management Strategy being developed within the Agriculture, Fisheries and Forestry portfolio will go some way towards achieving national approach. The roles played by a number of R&D Corporations, including the Land and Water Resources R&D Corporation, will materially assist with the development of a national approach. The National Land and Water Resources Audit is also very important in that it established a national benchmark with respect to the states. To be truly effective, the data must be actively maintained, the common approaches to measurement of land qualities must be further developed and the audit redone in the future as a means of measuring the success of state and Commonwealth programs.

Progress towards achieving the sustainability outcome for land and water geoscience is monitored at output level via the products and services delivered to the client base. These enable an assessment of the efficiency of providing planned outputs, the effectiveness of achieving planned outcomes and the appropriateness of outcomes against client needs. Specific performance indicators for planned outputs include the timeliness of output delivery, and the demand for and quality/cost of outputs.

A key indicator of the effectiveness of the land and water geoscience program in delivering planned outcomes is in changes to the utilisation of land and water resources in Australia. This is assessed on the basis of information gathered from a wide range of organisations over a longer time frame.

During 1997/98 outputs included:

· Reports on groundwater availability and recharge processes in the Uluru National Park

· Contributing geomorphological classification techniques and subsequent assessments to the development of Environment Australia's Coastal Atlas

· Preliminary assessments of the impact of climate change on coastal swamplands in Arnhem Land

· Development of integrated land degradation assessment projects which consider on-site impacts and off-site environmental effects.

A recent example of a priority area of research contributing directly to the sustainability outcome has been the development of better approaches to catchment management by addressing the geological and groundwater aspects of catchment degradation in high priority regions. This has included studies of the distribution and mobilisation of salt and the characteristics of groundwater and geomorphology. A major output delivered through this work has been the development of a methodology for catchment classification that provides a basis for understanding groundwater

behaviour and associated dryland salinisation hazards. The results have been accepted by key clients and stakeholders within the framework of the National Land and Water Audit, the National Dryland Salinity Program Phase 2 and the Murray-Darling Basin.

Another recent example of geoscientific work designed to achieve sustainability outcomes as well as meeting essential social justice objectives, is the groundwater research undertaken in Aboriginal lands. Better water supplies are a basic need of Aboriginal and Torres Strait Islander communities and many investigations have identified water supply as a critical health factor, and therefore a major equity issue.

As part of a longer term program to improve safe water supplies in Aboriginal lands, AGSO has had strong ties with the Aboriginal and Torres Strait Islander Commission (ATSIC) and has completed work under a Memorandum of Understanding. This gave priority to arid and remote areas where there are no surface resources and where all communities depend on groundwater. AGSO has had a major coordination role in the water study that began in the Papunya region of the Northern Territory in 1994 in collaboration with the Central Land Council, ATSIC and the NT Power & Water Authority and is being completed in 1998. The Geographical Information System compiled from the work will assist planning, management and decision making by Aboriginal councils and community groups.

Consultations have been undertaken with Aboriginal communities in this region and a regional water consultative group has been established. The outcome of the consultations is a clear statement from the Aboriginal people about the water issues that affect them. This is a significant step towards empowering Aboriginal communities with the definition and development of their basic and cultural needs.

The poor quality of groundwater for arid-zone Aboriginal communities is a health concern. Groundwater quality is being investigated in the Anangu Pitjantjatjara (AP) Lands of South Australia in conjunction with Nganampa Health Council and the SA Health Commission, the SA Department of Primary Industry and Resources, the SA Department of State Aboriginal Affairs and the Commonwealth Department of Health and Family Services.

At the request of ATSIC, this work in the AP Lands is being extended to an assessment of the sustainability of water resources for nine Aboriginal communities.

MARINE ZONE MANAGEMENT GEOSCIENCE

Background and Objectives

Part B

A small cluster of projects undertaken by AGSO is designed to assist the achievement of improved sustainability in Australia's marine zone and as such are identified under the 'sustainability' outcome of Government, as spelt out in AGSO's Business Plan. These projects include: Urban and Coastal Impacts

· Law of the Sea Antarctic and Southern Oceans CRC

· Ocean Drilling.

Of the projects, the urban and coastal impacts project has the most clearly defined focus on delivering scientific data and information outputs to underpin policy and program development for the sustainable management of the marine zone.

Each of these projects is essentially the current phase of research activities carried out over recent years. In keeping with scientific research generally, objectives have evolved and been redefined in the light of geoscientific results and to address changes in client needs. The following is brief overview of the development and current activities of each of the marine zone management projects:

Urban and Coastal Impacts project
This project has been designed to provide clients with high quality scientific advice in support of the ecologically sustainable development of renewable and non-renewable marine and coastal resources. AGSO has undertaken a series of seabed mapping surveys in coastal areas, particularly in areas adjacent to urban populations, to provide information for resource and environmental management. Recent significant studies undertaken for clients include:
- Tracing and examination of nutrient discharge from Sydney's deepwater ocean outfalls
Background environmental assessments on the continental shelf between Sydney and Wollongong
Seafloor biogeochemistry of Port Phillip Bay
Catchment and estuarine characteristics in the Swan-Canning estuary.

The project is currently involves contracts, surveys and **studies in three areas.**

1. Brisbane River Moreton Bay Wastewater Management Study.
Objective - To provide high quality scientific advice to the Study on processes controlling nutrient and anthropogenic inventories in sediments, and processes specifically controlling N & P cycling through sediments.

Strategies - AGSO has conducted three major surveys to the Brisbane River and Moreton Bay and delivered three Reports to the Client. These reports focussed on (i) toxicant distributions in sediments of the Brisbane River and Moreton bay (ii) nutrient distributions in sediment facies of Moreton bay and the Brisbane River and (iii) processes controlling key nutrients (nitrogen and phosphorus) in sediments of the river and bay.
Impact - The AGSO contract delivered key information to the Study on the role of the seafloor in processing nutrients and toxicants delivered from the catchment to the river and bay. The seafloor was found to be the site where most catchment and riverine discharges were processed. Several sediment- zones where identified where key processes of coupled nitrification and denitrification were occurring. This knowledge and its implications for water and sediment qualities were adopted by the BRMBWMS into the Wastewater Management Plan. The seafloor is now recognised as a key location for understanding the capacity of near shore environments to accommodate anthropogenic loads from catchments and rivers, and to potentially alleviate eutrophication.. Management Authorities must grasp these concepts to sustain ESD principles. The results have been reported to stakeholders via various workshops.

2. Wilson Inlet WA: a focus catchment of the National Eutrophication Management Program. *Objective* - To provide high quality scientific advice to the client, Land and Water Resources Research and Development Corporation and the Waters and Rivers Commission (WA), on processes in sediments and their role in plant growth in Wilson Inlet; an environment thought to be approaching eutrophic conditions. *Strategies* - AGSO has conducted four seasonal surveys to Wilson Inlet to measure nutrient inventories in sediments and examine processes controlling nutrient exchanges across the sediment-water interface. The project is completing its second year of a three-year program. Milestone reports have been delivered to clients at regular intervals. This last year will be focussed about data analyses and reporting. *Impacts* - The scientific program has already identified several processes, which are occurring in sediments, which had not been known to the Management Authority. These include flushing of the sediments of Wilson Inlet by incoming dense marine water, but only during those winter/spring months, when the Inlet is open to the sea. Combined these events lead to periods of anoxia in bottom waters; a potentially 'unhealthy' condition. Denitrification has been identified in sediments and the sediments again are recognised as major sites for processing of nutrients from catchments. These project outputs will be included in the development of Catchment and Wastewater Management Plans. The complete impacts of the program will be known when data analyses are complete during this final year.

South Eastern Australia Estuaries.
Objective - To provide scientific input to develop a program to assess the role of the sediments in processing nutrients and toxicants in coastal lakes, estuaries and open marine embayments of southeastern Australia.
Strategies - Already several 'hot spots' of potentially deteriorating water and sediment qualities have been noted in southeastern Australia. ea. Lake Illawarra, Lake Conjola. AGSO has made contact with potential clients and research organisation in

southeastern Australia, to develop project plans. A pilot survey is planned for later this financial year.
Impacts. This project is only in the scoping phase. The needs have been identified as some of these waterways are potentially threatened with eutrophication.

Law of the Sea Project The project was developed primarily to assist the Government in fulfilling Australia's legal obligations in documenting Australia's claims under the United Nations Convention on the Law of the Sea (UNCLOS), to which Australia is a signatory. The project was aimed at providing information to maximise and sustain Australia's claims to legal extensions beyond a 200 nautical mile exclusive economic zone. This claim is to be lodged with the UNCLOS Commission on the Limits of the Continental Shelf by 2004.

Following provision by the Government of supplementary funding for AGSO of $16.7 million in 1996 to enable completion of technical data acquisition to document Australia's claims under UNCLOS, the data collection phase for the Law of the Sea project was completed early in 1998. Post-survey phases of the project now in progress involve the compilation and interpretation of all relevant data, the delineation of the outer limits of the Continental Shelf and input to the submission of Australia's case to the UN. Technical information derived from the surveys by AGSO is being provided to DFAT and the Attorney-General's Dept which have carriage of Australia's commitments under the UNCLOS.

Datasets acquired from the Law of the Sea surveys are also used for marine zone regional geological framework studies and resource assessment. As such, the project is providing a unique opportunity to improve the scientific understanding of the morphology and non-living resource potential of the more remote parts of Australia's continental margins and its ocean territories.

Antarctic and Southern Oceans CRC project This project is aimed at promoting a better understanding of global climate change by providing statements of the Antarctic and Southern Ocean palaeoenvironments over the following time intervals: the Holocene (0-10,000 years); the last glacial cycle (0-160,000 years) and; the Pliocene "warning" of Antarctica (0-5,000,000 years). This involves studies of the Antarctic and Southern Ocean sedimentary record for evidence of Antarctic ice sheet changes and changes in Southern Ocean circulation and geochemical cycles. The project currently involves specific studies in several different regions of Antarctica.

AGSO is a partner in the CRC with four other organisations, namely the Antarctic Division, CSIRO's Division of Marine Research, the Bureau of Meteorology and the University of Tasmania.

Ocean Drilling project Australia has been a member of the Ocean Drilling Program (ODP) since 1988. The ODP is the largest international geoscience partnership in the world. Twenty countries are in the partnership, providing a budget of $45 million per year to investigate geologic processes that control the distribution of natural resources,

the environment and geohazards. ODP science is a key component of Australia's marine zone management research.