

Mineral Resources Tasmania

Mineral Exploration Code of Practice

Fifth Edition



Mineral Resources Tasmania

Department of Infrastructure, Energy and Resources



Mineral Exploration Code of Practice

Edition 5 — 2012

MINERAL RESOURCES TASMANIA, PO BOX 56, ROSNY PARK, TASMANIA 7018 ISBN 978-0-7246-4023-2

ENDORSED BY THE TASMANIAN MINERALS COUNCIL

NOTE TO EXPLORERS

This edition of the Mineral Exploration Code of Practice has been arranged in three parts, including a section containing references and links to additional information which may be of use to explorers.

- Exploration procedures — information for explorers
- Mineral Exploration Code of Practice — exploration work standards
- More information

CONTENTS

| | |
|---|-----------|
| INTRODUCTION | 5 |
| Purpose | 5 |
| Sustainable development | 5 |
| Use | 5 |
| History | 5 |
| Petroleum, coal seam gas and geothermal | 5 |
| Occupational Health and Safety | 5 |
| Part 1: EXPLORATION PROCEDURES — INFORMATION FOR EXPLORERS | 7 |
| Gaining approval for exploration work | 7 |
| Exploration approvals on mining leases | 8 |
| Land available for exploration | 9 |
| Land classification in Tasmania | 10 |
| Regional Forest Agreement | 12 |
| Tasmanian Exploration Auditing and Monitoring System | 12 |
| Mineral Exploration Working Group | 12 |
| Cultural heritage | 13 |
| Biodiversity | 13 |
| Wilderness | 14 |
| Geoconservation | 14 |
| Community consultation | 14 |
| Sustainable development | 14 |
| Part 2: MINERAL EXPLORATION CODE OF PRACTICE | 15 |
| Induction and register | 15 |
| Grid lines | 15 |
| Access tracks | 16 |
| Drill sites | 22 |
| Costeans and pits | 31 |
| Rehabilitation and revegetation | 32 |
| Helicopters and helipads | 34 |
| Aerial surveys | 34 |
| Camping... .. | 34 |
| Plant diseases | 36 |
| Weeds | 37 |
| Chytrid fungus | 37 |
| Private property... .. | 38 |
| Part 3: MORE INFORMATION | 39 |
| MRT website resources and links | 39 |
| Other useful links | 40 |
| APPENDIX I: Schedule for onshore exploration for petroleum, coal seam gas or geothermal substances ... | 43 |

While every care has been taken in the preparation of this report, no warranty is given as to the correctness of the information and no liability is accepted for any statement or opinion or for any error or omission. No reader should act or fail to act on the basis of any material contained herein. Readers should consult professional advisers. As a result the Crown in Right of the State of Tasmania and its employees, contractors and agents expressly disclaim all and any liability (including all liability from or attributable to any negligent or wrongful act or omission) to any persons whatsoever in respect of anything done or omitted to be done by any such person in reliance whether in whole or in part upon any of the material in this report.

Introduction

Exploration in Tasmania is regulated under the *Mineral Resources Development Act 1995*, with Mineral Resources Tasmania being responsible for the approval of exploration works. The *Mineral Exploration Code of Practice* is an approved Code under Section 204 of the *Mineral Resources Development Act 1995*. It is a standard licence condition that explorers must comply with this Code.

Purpose

The purpose of this Code is to provide an outline of the current procedures which must be followed to obtain on-ground exploration work approval, and at the same time to give useful, practical information on the expected standards of exploration activities. The Code also details the controls and monitoring procedures which are currently in place. Conditions under which the exploration work may proceed are decided on a site-by-site basis, after consultation with other government departments.

Sustainable development

The Code embodies the principles of sustainable development which are reflected in the emphasis on low impact work which is rehabilitated, the consideration of natural and cultural values that is required before conditions are set for each on-ground activity, the early engagement with the community, and the use of surety bonds to provide the confidence that all works will be repaired.

Use

Extensive liaison networks are in place, and there is regular consultation with land managers such as staff from Forestry Tasmania and the Department of Primary Industries, Parks, Water and Environment.

Earthworks must be rehabilitated on the completion of the exploration program unless the works are specifically required by an incoming explorer. In this case, the new explorer must accept responsibility for the tracks and drill pads left open for their use. Security deposits are held which

are sufficient to cover the environmental liability at each stage of the exploration process.

This Code gives detailed information on various earthmoving activities to allow this work to be done in the best possible way. Other issues of importance to the explorer, such as protocols with private landowners and the need to prevent the spread of weeds and fungal diseases, is also documented. We envisage that the Code will provide explorers with a useful guide to questions relating to all aspects of exploration.

History

The first edition of the *Mineral Exploration Code of Practice* was issued in December 1990. Since then, the code has been updated four times. This edition of the Code has been designed to allow for delivery via the internet and can be downloaded in its entirety or in sections that relate to specific activities. Where information that may be of use to explorers is presented elsewhere links have been provided rather than reproducing the information here. Following the signing of the Regional Forest Agreement between the Tasmanian and Australian governments, it was agreed that the *Mineral Exploration Code of Practice* would be reviewed every five years and consistency would be maintained with the *Tasmanian Reserve Management Code of Practice*.

Petroleum, coal seam gas and geothermal

The approval of onshore exploration for petroleum, coal seam gas and geothermal energy is governed by a schedule (Appendix I). Site access is approved using this Code and explorers should use the 'Onshore wells: approvals to drill checklist' to ensure that they have all the required documentation before submitting a program for approval.

Occupational Health and Safety

Explorers and contractors must comply with the *Workplace Health and Safety Act 1995*, and *Workplace Health and Safety Regulations 1998* and associated legislation.

Exploration procedures — Information for explorers

The following pages contain general information relating to the approval of exploration works. This section also contains explanations of land classifications, heritage issues, geoconservation, biodiversity and wilderness as they relate to exploration. Information on the application and regulation of exploration is outlined in the 'Information for Explorers' brochure available from Mineral Resources Tasmania. Once an exploration licence has been granted the holder must apply for approval to conduct exploration works. No work (ground or air) may be undertaken without written approval.

Gaining approval for exploration work

Mineral Resources Tasmania is the government agency responsible for the approval of on-ground exploration work. MRT will seek comment from land managers and other areas of government that may have a jurisdictional interest in the area of planned works or the potential impact of the works. Explorers must address correspondence to Mineral Resources Tasmania (preferably by email to info@mrt.tas.gov.au) and must not directly contact other Tasmanian Government agencies unless expressly directed to do so by MRT.

On approval of a program the explorer will be supplied with the relevant Land Manager's contact details and asked to inform them when work commences. This will ensure that in the event of a wildfire or any other incident, the relevant authorities will be aware of the explorers' activities and location.

WORK PROGRAM APPROVALS

When the work program details are known, the explorer should send in either a completed work program form (see *More Information* section for download information) or a letter outlining the proposed program. Work programs submitted by email to info@mrt.gov.au, with attached shape files of the planned work areas, are preferred as they allow more efficient entering of the data into the auditing and monitoring system. The following details are required:

- Project supervisor and contact details;
- Land status of the area;
- Description of proposed works (attach a legible map). Location must preferably be related to the MGA94 Datum GDA94 and the grid used must be labelled;
- Present land use of the area;
- Description of the types of soils to be disturbed by earthmoving operations;
- Description of vegetation which will be affected by the proposed operation;
- List of any known rare or threatened species or communities within the area;
- List of any sites of historic or archaeological significance;
- A list of all mechanical equipment and vehicles to be taken on site, and their proposed use;
- Number of personnel in team, period of project, accommodation type;
- Quantities of flammable liquids, explosives and noxious chemicals on site;

- Program features likely to affect the environment, timing of the work and precautions taken to limit impact;
- Proposed methods and extent of rehabilitation to be completed progressively and prior to abandonment.

On receipt of a work program Mineral Resources Tasmania checks the following:

- Land status;
- Threatened species;
- Wilderness Index;
- Geoconservation site register;
- Vegetation type;
- Ramsar Wetlands (protected by the *Convention on Wetlands of International Importance*, especially wildfowls habitat, as agreed at Ramsar, Iran in 1971);
- Nationally significant wetlands;
- Private Reserve under the Regional Forest Agreement;
- Forest community managed by prescription;
- Tasmanian Natural Gas Pipeline corridor;
- State Forest areas where the softwoods are privately owned;
- Phytophthora cinnamomi* management area;
- Archaeologically interesting areas or sites, including mining heritage sites;
- Any other significant features which have been flagged at the application stage:
 - populations of rare plants or animals;
 - forestry plantations, grazing leases, forest licences;
 - licences for any purpose (e.g. water use permits);
- The land manager (Forestry Tasmania/Parks and Wildlife Service) may provide additional advice on:
 - threatened species;
 - Aboriginal archaeological sites and any other archaeological sites;
 - geoconservation matters; and
 - any other relevant management issues.

INSPECTIONS

Earthworks are generally not approved until a site inspection has been made. Inspections are difficult to arrange at short notice. Work programs requiring field inspections must be submitted at least four weeks in advance of the planned starting date.

Explorers are strongly advised not to book contractors prior to receiving work approval.

Following the field inspection, which is usually made jointly with the land manager, approval is given in writing stating the conditions under which the work is to be done. A copy of these conditions is provided to the relevant land manager.

Field inspections are made during the program, on completion, and at a later stage to ascertain if rehabilitation has been successful.

CONDITIONS

The requirement to obtain written approval for all exploration activities is a condition of Exploration Licences, Retention Licences and Special Exploration Licences.

VARIATIONS TO THE PROGRAM

The requirements of the explorer may vary as the exploration program progresses. The nature of exploration means that an entire program usually cannot be planned in detail, later work being dependent upon the results of the first phase of exploration activity.

Variations to the approved exploration program which are likely to have an environmental impact, such as relocation of drill holes or test pits, should be submitted for approval.

FIELD STAFF

All licence holders must ensure that field officers are fully cognisant with the approved program and any variations, together with all conditions applying to the licence. The licence holder remains responsible for the works, their impact, and for any rehabilitation (see *Induction and Register* section).

REHABILITATION

Security deposits are held on licences to ensure compliance with environmental and rehabilitation obligations. Security deposits are not returned until rehabilitation is judged to be successful. See *Links* section for details on Security Deposits.

CODE OF PRACTICE

All exploration activities must abide by the *Mineral Exploration Code of Practice*, and to any additional site-specific conditions imposed on the work.

APPEAL

Explorers can object to work conditions by appealing, in writing, to the Minister within 14 days of receipt of the approval.

ACCESS TO PRIVATE LAND

Explorers wishing to explore on, or use access through private land, should contact the landowner and discuss their exploration plans well in advance of the program commencement date. The *Mineral Resources Development Act 1995* requires that the owner or occupier of the land be given 14 days notice in writing, stating that work is to commence. Explorers must endeavour to contact the

landowner to discuss plans on a personal basis before sending, or delivering, the formal notice.

Note that exploration programs on private property must still be submitted to Mineral Resources Tasmania and the usual assessment process will be followed. (See *Land Owners Questions* in More Information).

Exploration approvals on mining leases

Nothing in any planning scheme or special planning order affects the undertaking of mineral exploration in accordance with a mining lease, an exploration licence, or retention licence, issued under the *Mineral Resources Development Act 1995*, provided that any mineral exploration carried out is consistent with the standards specified in the *Mineral Exploration Code of Practice [Land Use Planning and Approvals Act 1993 (LUPAA) s.20(7)(b)]*.

This means that exploration activities as described in the *Mineral Exploration Code of Practice* may be authorised under the licence or lease and a permit under the LUPAA is not required. The following activities are exploration activities, as described in this Code, which can be approved on exploration licences, retention licences or mining leases:

- Exploration drilling, track construction, costeans, sampling, etc.
- Bulk sampling to a maximum of 1000 tonnes through the life of the licence/lease which may be approved depending on the level of disturbance required to access the site.

Factors such as view fields, proximity to infrastructure, noise or dust disturbance and impact on other lease and licence holders operations may affect the work approval.

A permit under LUPAA is required to undertake mining activities on a mining lease.

The decision on the level of disturbance allowed while exploring is guided by the exemption that exploration has from Tasmania's planning system. For exploration approval to remain under the *Mineral Resources Development Act 1995*, it is crucial that the procedures and requirements of this Code are followed and met at a very high level, and that any work on a mining lease that is regarded as a mining activity be approved through LUPAA.

It must be noted that each site has specific environmental conditions that will affect the decision on what level of disturbance would be regarded as acceptable under this Code. There is commonly a gradation in drilling activity from exploration drilling, during which mineralisation may be encountered, to subsequent drilling to delineate the extent of the resource, to intensive drilling to establish a resource or reserve definition of the mineralisation, and finally drilling for mine planning purposes.

In resource definition drilling, once a status such as 'indicated' under the JORC system, or a status that is considered sufficient for a company to be granted a Mining Lease is reached, further high density infill drilling will not be approved under this Code.

Land available for exploration

The following section briefly describes the types of land tenure where exploration and mining can and cannot take place.

Exploration tenements are based on the Geocentric Datum Australia (GDA94 MGA Zone 55). There are a number of land categories which are not included in the area of licences.

LAND CATEGORIES EXCLUDED FROM EXPLORATION LICENCES

- All Mining Leases, Special Exploration Licences, Exploration Licences and Retention Licences for the same category of mineral as the Exploration Licence application which were in lawful possession or marked out prior to the date of application.
- Land exempt from the provisions of the *Mineral Resources Development Act 1995*, such as 'Exempt Areas', which are usually declared to allow for geological assessment of a particular area by Mineral Resources Tasmania.
- The top two metres of land of a Fossicking Area may be excluded. Land beneath this depth will be included and may be explored from the fossicking area.
- Land reserved under the *Nature Conservation Act 2002*, such as:
 - State Reserves
 - National Parks
 - Historic Sites
 - Nature Reserves
 - Game Reserves
 - Some Conservation Areas (exploration in some Conservation Areas such as the Central Plateau, Marble Hill, Adamsfield and Southport Lagoon conservation areas will not be permitted)
- Land reserved under the *Aboriginal Relics Act 1975*, such as Protected Archaeological Sites, and lands listed in the *Aboriginal Lands Act 1995*.
- Public reserves under the *Crown Lands Act 1975* may be specifically excluded from the *Mineral Resources Development Act 1995*.
- Commonwealth land, Telstra installations and land leased to the Commonwealth for military purposes such as the Buckland Military Training Area.
- Ramsar sites (significant waterbird habitats) are usually excluded from licences.
- Areas which are regarded as having conservation or social values which may conflict with the planned

exploration and potential mining will be excluded from the licence application even though the area may technically be available under the *Mineral Resources Development Act 1995*. Examples include megafauna and other fossil sites, urban areas, historic sites and high value agricultural land.

LAND CATEGORIES WHICH WILL BE INCLUDED IN AN EXPLORATION LICENCE

Crown Land

- Public Reserves if not proclaimed. Technically speaking these are still uncommitted Crown Land, and are known as 'notary' reserves.
- Public Reserves unless specifically excluded from the *Mineral Resources Development Act 1995*.
- State Forest (if brought back under the *Mineral Resources Development Act 1995* after dedication of the forest).
- Forest Reserves (most Forest Reserves have been brought back under the *Mineral Resources Development Act 1995*).
- Land vested in electricity authorities. Access and work around lakes, dam sites and work areas must be agreed with the relevant electricity authority.
- Most Conservation Areas.
- Regional Reserves.
- Nature Recreation Areas.
- Informal reserves.

OWNERSHIP OF MINERALS ON PRIVATE PROPERTY

The Crown retains the ownership of minerals found on and under most of the private land in Tasmania. Prior to 1890 the rights to coal and metallic minerals, excluding gold and silver, were usually given with the land being granted. From 1893 the rights to various ores and metals were reserved to the Crown, but as the wording varied from grant to grant until around 1910, the only way of ascertaining mineral ownership is to search for the original terms of the land grant.

Some landowners have rights to all minerals in the top 50 feet (15.24 m) of the land surface, others have rights to all minerals excepting gold and silver, and others have only rights to soil and stone. The terms of the original grant may also have been altered by subsequent legislation; in Tasmania the rights to petroleum and atomic substances were resumed by the Crown in 1962.

Land classification in Tasmania — A guide for explorers

There are a number of Acts under which Crown Land may be reserved in Tasmania.

Reservation may mean that the land is excluded from the auspices of the *Mineral Resources Development Act 1995*, and be rendered unavailable for mining or exploration. In addition, Mineral Resources Tasmania may enter into agreement with an Agency to exclude certain lands from mining tenements without this land being excluded formally from the operation of the *Mineral Resources Development Act 1995*. An example of this is the agreement between Mineral Resources Tasmania and the Hydro-Electric Corporation whereby land vested in the HEC remains subject to the *Mineral Resources Development Act 1995* but certain parts (around dams etc.) are excluded from mineral tenements. (The various Acts mentioned in this section are available on-line at www.thelaw.tas.gov.au/index.w3p).

There are additional categories of land not covered by these Acts, such as private property and Commonwealth land.

Private property

This is available for exploration, provided certain protocols are followed. Landowners may object to the grant of an exploration licence over their land. The Director of Mines will attempt to resolve the objection, but if this is unsuccessful, the objection will be heard by the Mining Tribunal. Having ownership of the land does not, in itself, constitute a reason for the exploration licence to be disallowed.

A security deposit is held by Mineral Resources Tasmania to ensure landowners are compensated for any damage not made good by the explorer.

Explorers must give landowners notice, in writing, fourteen days prior to entry on to the property.

Mineral Resources Tasmania has a booklet *Land Owner's Questions* which is a guide to the rights of the property owner and explains the process of approving exploration or mining on private property (see *More Information* section).

Commonwealth land

This is excluded from exploration licences. This includes Telstra installations and the Buckland and Stony Head military training areas.

AREA OF EXPLORATION LICENCES

The area included in an exploration licence and the exclusions from it are provided to the explorer as a plan. The plan details the land tenure types that are excluded.

MINERAL RESOURCES DEVELOPMENT ACT 1995

Administered by Mineral Resources Tasmania

Existing Mineral Tenements

Existing mining leases, exploration licences and retention licences are excluded from exploration licence applications where the existing tenements have been issued for the same category of minerals as the new application.

Exempt Areas

Areas may be declared 'Exempt' from the *Mineral Resources Development Act 1995* to allow Mineral Resources Tasmania to carry out geological investigations. These areas are not generally available for exploration, but access for some work will be considered by Mineral Resources Tasmania.

Licences over same area

Two or more exploration licences can be held over the same piece of ground for different categories of minerals.

The applicant is provided with a map showing any exclusions, or areas of overlap with another licence.

Fossicking Areas

Fossicking Areas can be declared under the *Mineral Resources Development Act 1995*. These areas, which extend from the land surface to two metres depth, have been set aside for use by amateur fossickers. These areas are usually excluded from exploration licence applications. The explorer will be permitted to examine the area in the same way as are the fossickers. Surface access for drilling may be considered on a case-by-case basis. No mechanical excavation will be permitted.

A booklet is available from Mineral Resources Tasmania describing Fossicking Areas in detail. (See *More Information* section).

NATURE CONSERVATION ACT 2002

Administered by Department of Primary Industries, Parks, Water and Environment

Land may be reserved as either:

- National Park
- State Reserve
- Nature Reserve
- Game Reserve
- Conservation Area
- Nature Recreation Area
- Regional Reserve
- Historic Site

Exploration activities are allowed in all Regional Reserves, most Conservation Areas and Nature Recreation Areas.

Where a Reserve is declared over an existing tenement

There are a number of examples where a State Reserve has been declared over an existing mining tenement. In these cases the tenement holder retains a 'private right' under the

Nature Conservation Act 2002 which allows for the continuance of such rights and privileges as were in existence before the Reserve was declared.

Game Reserve

These are exempt from the provisions of the *Mineral Resources Development Act 1995*.

Conservation Areas

These are usually subject to the *Mineral Resources Development Act 1995*, although some are not. For example, the Central Plateau Conservation Area is unavailable for exploration as it is included in the World Heritage Area. Conservation Areas over former Wildlife Sanctuaries and Muttonbird Reserves are not included in exploration licences.

Proposed work programs in Regional Forest Agreement derived reserves are sent to the Mineral Exploration Working Group for comment.

ABORIGINAL RELICS ACT 1976

Administered by Department of Primary Industries, Parks, Water and Environment

Land reserved under this Act as Protected Archaeological Sites is removed from the auspices of the *Mineral Resources Development Act 1995* and is not included in mining tenements.

ABORIGINAL LANDS ACT 1995

Administered by Department of Primary Industries, Parks, Water and Environment

Under this Act parcels of land may be given to the Aboriginal community. An Aboriginal Council manages such lands. Mining leases, exploration licences, special exploration licences and retention licences cannot be granted over such lands without the agreement of the Council.

CROWN LANDS ACT 1976

Administered by Department of Primary Industries, Parks, Water and Environment

Many reserves under the *Crowns Lands Act 1976* were reclassified as Conservation Areas by the *Regional Forest Agreement (Land Classification) Act 1998*.

In many areas strips of land along the margins of rivers and lakes and on coastlines have been reserved by the Crown. On old charts these strips of land, commonly one chain (20.1 m) or one hundred feet (30.5 m) wide, are shown as 'Crown Reservations'. These are subject to the auspices of the *Mineral Resources Development Act 1995*.

Coastal reserves can be established by proclamation or by Crown Land Order under the *Crown Lands Act 1976* and also by S473A of the *Local Government Act 1962*, which requires land to be set aside for public use when subdivisions are created.

Formal public reserves created by these means are exempt from the provisions of the *Mineral Resources Development Act 1995* for a depth of 15 metres. Mineral Resources Tasmania administratively excludes a strip 200 m wide along the coast to allow for protection of aboriginal sites and coastal vegetation.

FORESTRY ACT 1920

Administered by Forestry Tasmania

Most land managed by Forestry Tasmania is available for exploration and mining.

State Forest

This is included in exploration licences. Most State Forest is Crown Land dedicated as State Forest, but Forestry Tasmania does purchase land and has this dedicated as State Forest. These are, in effect, private property blocks owned by Forestry Tasmania.

Forest Reserves

These are set aside for conservation or recreational purposes and when declared are exempt from the *Mineral Resources Development Act 1995*. Most Forest Reserves have now been brought back under the *Mineral Resources Development Act 1995*.

Management Decision Classification System

Forestry Tasmania employs a Management Decision Classification System as a management tool. Areas requiring careful management (such as river banks, scarps, patches of particular habitat, vegetation and animal habitat strips) are designated as informal reserves. Under the Regional Forest Agreement any exploration work approval in informal reserves must be commented on by the Mineral Exploration Working Group.

HYDRO-ELECTRIC CORPORATION ACT 1995

Administered by Hydro-Electric Corporation

The former Hydro-Electric Commission has now been split into three organisations; Aurora, Transend and the Hydro-Electric Corporation.

Aurora is responsible for electricity distribution, and mainly owns small depots, shops, small substations and some corridors of land beneath distribution lines. Land owned by Aurora is mainly in urban areas and generally would not be affected by mineral exploration.

Transend is responsible for transmission line easements and large substations. Exploration would not be permitted on land adjacent to substations but occasionally access will be needed beneath transmission lines. This will be done in consultation with Transend.

The Hydro-Electric Corporation is responsible for all other land including lakes, dams, power station sites, and land alongside canals and some waterways.

Most land vested in the Hydro-Electric Corporation is subject to the *Mineral Resources Development Act 1995*. However exploration works proposed for areas around

dams and transmission lines will require approval from the Hydro-Electric Corporation, Aurora or Transend. Exploration activities which will not affect dam structures and other infrastructure will be permitted.

MINING (STRATEGIC PROSPECTIVITY ZONES) ACT 1992

Administered by Mineral Resources Tasmania

Under this act the status of large parcels of Crown Land within designated Strategic Prospectivity Zones may not be changed without the approval of both houses of Parliament. Should a change in land status made by the State have the effect of revoking a mining lease or an exploration licence, the tenement holder is entitled to compensation. The State is, however, not responsible for actions of the Australian Government which may preclude exploration or mining activity, such as the nomination of parcels of land for World Heritage status.

The status of parcels of land less than 500 ha in area can only be changed with the agreement of the Director of Mines. Private property is exempt from this Act.

Changes in status of land can also be made in extreme circumstances, for example if a species of flora or fauna was to become rare, vulnerable or endangered as a result of mining activity, or where an area having cultural or natural heritage value could suffer substantial effects as a result of mining operations. In these cases the Crown may, after a recommendation from the Resource Planning and Development Commission and some Ministers, change the status of that piece of land, and compensation is payable for this action.

WORLD HERITAGE

Land classed as 'World Heritage' is done so by the Australian Government using the *Environment Protection and Biodiversity Conservation Act 1999* to give effect to Australia's obligations regarding areas it has agreed to protect in accordance with the convention for the *Protection of World Cultural and Natural Heritage (1972)*. This is not a land use, as such. Most of the land classed as World Heritage in Tasmania is also National Park, and so is not open for exploration.

Regional Forest Agreement

In 1997 the Australian and Tasmanian governments signed a Regional Forest Agreement, which agreed on the land to be available for sustainable wood production, access for other industry use, and areas to be set aside for conservation purposes. The Regional Forest Agreement extends to 2017. CAR, as used below, stands for Comprehensive, Adequate and Representative.

The following clauses from the Regional Forest Agreement relate to exploration and mining:

79. The Parties recognise subject to clauses 80, 81 and 82 that mineral exploration and mining can occur in those specified parts of the CAR Reserve System which are identified in Attachment 6.

80. The State confirms that mineral exploration in areas covered by the CAR Reserve System will be subject to the Tasmanian Mineral Exploration Code of Practice and that all exploration proposals will be referred to the Mineral Exploration Working Group who will investigate the potential impact on CAR values and recommend appropriate conditions to protect those values.

81. The State will ensure that all proposed mining activities in areas covered by the CAR Reserve System will be subject to environmental impact assessment and environmental management conditions as required by the *Environment Management and Pollution Control Act 1994* (Tas.), the *State Policies and Projects Act 1993* (Tas.), and/or the *Mineral Resources Development Act 1995* (Tas.).

82. The Parties agree that in relation to those parts of the CAR Reserve System with high quality wilderness values, as identified through the CRA, measures will be taken under State processes to minimise the effects of mineral exploration and mining activities on wilderness values. Rehabilitation of any exploration activity impacts and rehabilitation of any mine site will be in accordance with the provisions of the *Mineral Resources Development Act 1995* (Tas.), and the *Environmental Management and Pollution Control Act 1994* (Tas.) in so far as any permit conditions are relevant, and will aim both to achieve world's best practice and to return the site to its wilderness condition.

Tasmanian Exploration Auditing and Monitoring System

In response to the Regional Forest Agreement and the Resource Planning and Development Commission Land Tenure Inquiry, Mineral Resources Tasmania instigated a GIS-based project in 1998/1999 to develop a recording system of on-ground exploration activity. This project resulted in compliance auditing of the implementation of the *Mineral Exploration Code of Practice* by Mineral Resources Tasmania and in the monitoring of the environmental effects and rehabilitation of exploration works in Tasmania.

This system provides the statistical data presented in Mineral Resources Tasmania's *Annual Review* and provides a comprehensive tracking system of each step in the approval process for exploration work programs.

Mineral Exploration Working Group

PURPOSE

Matters relating to exploration work approval in Regional Forest Agreement designated reserves must be referred to an interdepartmental committee, the Mineral Exploration Working Group, for comment.

The function of the committee is to comment on the potential impact that any works may have on the conservation and cultural values of the area, and if need be, advise Mineral Resources Tasmania of conditions to be placed on the activities so that these values are not permanently adversely affected.

MEMBERSHIP

Membership comprises representatives from Mineral Resources Tasmania (chairperson), the Department of Primary Industries, Parks, Water and Environment, Forestry Tasmania (RFA designated reserves on State Forest) and Aboriginal Heritage Tasmania. On occasions advice and comments are sought from other sections of government when exploration falls under their jurisdictions.

AIM OF MINERAL EXPLORATION WORKING GROUP

The fundamental purpose of the Mineral Exploration Working Group is to allow the aims of the explorer to be met without compromising the conservation, historical, cultural or other natural values of the area.

The Mineral Exploration Working Group may request that conservation studies (heritage, flora and fauna) be carried out prior to the work to properly assess the impact of the proposed activities.

Explorers may be required to engage a specialist to advise crews on field techniques, such as recognition of artefacts, rare species or *Phytophthora cinnamomi* hygiene controls.

Some activities may only be permitted in a modified form; for example, access during the early stages of a project may be allowed by helicopter, but not by construction of a track.

Cultural heritage

In some circumstances an explorer may be asked to undertake an archaeological survey prior to work being approved. The proposed program may be modified or additional conditions placed on the proposed work so that the cultural and historical values of a place are not compromised.

Aboriginal Heritage

Specialist advice must be sought where there is any uncertainty regarding the implications of the *Aboriginal Relics Act 1975*, relating to the definition of Aboriginal relics or any activity which may affect an Aboriginal relic or site.

Aboriginal site surveys can be requested by Mineral Resources Tasmania on advice from land managers or Aboriginal Heritage Tasmania.

Mining Heritage

Exploration often overlaps with past mining. The explorer may, on occasion, be required to engage an archaeologist to record a site and provide recommendations on how work should proceed.

Abandoned machinery and equipment

Under the provisions of the *Mineral Resources Development Act 1995*, abandoned mining machinery belongs to the Crown. When working around an old mine every effort should be made to leave such machinery as it is, where it is. Under no circumstances should such items be moved.

Mining relics must not be souvenired by workers or visitors to the site. The remains of old machinery can give a valuable insight into the history of working a deposit and every effort should be made to have such relics left as they are found.

Biodiversity

In 1993 the Australian and State governments signed a *National Strategy for the Conservation of Australia's Biological Diversity*. The strategy is meant to be a blueprint for the ecologically sustainable management and use of Australia's natural resources. Tasmania has enacted the *Threatened Species Protection Act 1995* which outlines measures to protect Tasmania's rare, vulnerable and endangered species.

On receipt of a work program Mineral Resources Tasmania searches the State's conservation databases (see *More Information* for Natural Values Atlas). Advice is sought from the Mineral Exploration Working Group and land managers.

If the proposed work is near any population of rare or endangered species the explorer may be required to do a site survey and conditions will be formulated in conjunction with the land manager to ensure that the *Threatened Species Protection Act 1995* is not transgressed. On occasions the explorer may be required to employ a specialist to assist in planning the location of works.

Explorers should be aware of the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* by which the Federal Minister may deem an activity to be a 'controlled action', whereby the activity may only be undertaken in accordance with conditions placed on it by the Minister. The responsibility of complying with the Act rests with the proponent. Under the Act, actions that are likely to have a "significant impact on matters of national environmental significance" must be referred to Environment Australia for assessment.

The eight matters of national environmental significance are:

- world heritage properties;
- national heritage places;
- wetlands of international importance (listed under the Ramsar Convention);
- listed threatened species and ecological communities;
- migratory species protected under international agreements;
- Commonwealth marine areas;
- the Great Barrier Reef Marine Park;
- nuclear actions (including uranium mines).

The explorer must decide whether an activity should be referred to Environment Australia for assessment and is advised to access their web site (<http://www.environment.gov.au/epbc/>). Guidelines on the likely impact of exploration activities on matters of national environmental significance can be found in *Matters of National Environmental Significance, Significant impact guidelines 1.1* (see *Other Information* section).

Wilderness

Clause 82 of the Regional Forest Agreement says:

82. The Parties agree that in relation to those parts of the CAR Reserve System with high quality wilderness values, as identified through the CRA, measures will be taken under State processes to minimise the effects of mineral exploration and mining activities on wilderness values. Rehabilitation of any exploration activity impacts and rehabilitation of any mine site will be in accordance with the provisions of the *Mineral Resources Development Act 1995* (Tas.), and the *Environmental Management and Pollution Control Act 1994* (Tas.) in so far as any permit conditions are relevant, and will aim both to achieve world's best practice and to return the site to its wilderness condition.

Wilderness values as used in the Regional Forest Agreement are explained and shown in the *State of the Environment Report 2003* (see *Further Information* section). Values of 12+ represent 'high quality wilderness'. Exploration proposals in such areas will be referred to the Mineral Exploration Working Group and conditions may be placed on activities to ensure that values in such areas are not permanently adversely affected by such work.

In wilderness areas Mineral Resources Tasmania will meet clause 82 of the Regional Forest Agreement by ensuring that:

- The disturbance is kept to a minimum;
- The disturbance can be reversed by rehabilitation.

Geoconservation

The range of earth features, including bedrock, soil and landforms, together with earth processes, make up our geological heritage.

Mineral Resources Tasmania has contributed to the Tasmanian geoconservation database which lists sites of geoheritage significance. The database is used to identify sites of significance during the work approval process. Information on how to access this data is available on the Department of Primary Industries, Parks, Water and Environment web site (see links to Natural Values Atlas).

In most cases the identified values are robust and large scale, with exploration unlikely to have any impact. Where vulnerable small-scale features (such as mound springs or rare fossil sites) are present, management prescriptions could involve protection by avoiding ground disturbance in close proximity to the site.

Community consultation

Exploration Licence applications are advertised in the major Tasmanian newspapers. Explorers are requested to provide a summary of their proposed exploration program which

can be given to anyone interested in their application and proposed work program.

If an objection to the application is received, the Director of Mines will convene a meeting between the applicant and objector in an effort to resolve the matters of concern. If the matter cannot be resolved, the objection is heard by the Mining Tribunal. The Minister must consider any recommendations from the Mining Tribunal before making a decision to grant or refuse to grant the application.

Explorers are obliged to observe statutory provisions relating to exploration on private land. In addition to these provisions, explorers are encouraged to enter into open dialogue with landowners and relevant community groups at an early stage in the exploration process. It is recommended that explorers maintain good documentation and records of all interactions with the community.

A number of useful guidelines have been produced in recent years and explorers are referred to the following:

- Ministerial Council on Minerals and Petroleum Resources (2005). *Principles for engagement with communities and stakeholders*.
- Australian Government Department of Industry, Tourism and Resources (2006). *Leading practice sustainable development program for the mining industry. Community engagement and development*.

Sustainable development

The Minerals Council of Australia has produced a framework for sustainable development (*Enduring Value — the Australian Minerals Industry Framework for Sustainable Development*). It is strongly recommended that any explorer new to Tasmania familiarise themselves with the principles outlined in this document. This framework:

- aligns with global industry initiatives, and in particular provides critical guidance on the International Council on Mining and Metals (ICMM) Sustainable Development Framework Principles and their application at the operational level;
- builds on the Australian Minerals Industry Code for Environmental Management — the platform for industry's continual improvement in managing environmental issues since its introduction in 1996;
- provides a vehicle for industry differentiation and leadership, building reputational capital with the community, government and the finance and insurance sectors; and
- assists the industry to operate in a manner which is attuned to the expectations of the community, and which seeks to maximise the long-term benefits to society that can be achieved through the effective management of Australia's natural resources.

Mineral Exploration Code of Practice — Exploration work standards

The following pages outline the standard requirements for exploration work.

INDUCTION AND REGISTER

- Following receipt of written approval the person responsible (site supervisor) for the on-ground works must conduct an orientation (site familiarisation) and induction (documentation and sign off) for all workers (employees and contractors) who will be involved in the approved program.
- A register must be kept which clearly documents (signed off by the site supervisor and worker) that all workers have been made aware of the approval conditions and are familiar with the sections of the *Mineral Exploration Code of Practice* that apply to that program.
- In situations where site-specific conditions refer to particular flora the register must contain signed-off proof that the workers can recognise those plants or trees.
- The site supervisor must ensure that works comply with the *Mineral Exploration Code of Practice* and site-specific approval conditions, and the register must be available during site inspections for examination by any person nominated by the Director of Mines.

GRID LINES

ESTABLISHING CUT LINES

- Cut lines must not exceed one metre in width.
- Access must be discreet.
- Cut lines are to be established using hand-held tools such as machete, fern hook, axe and chainsaw only.

CUTTING VEGETATION

- For safety reasons, vegetation should be cut as close as possible to ground level and overhanging branches should be trimmed.
- No trees of any species over 150 mm diameter should be felled unless they are unsafe.
- Track cutters should recognise and avoid cutting the following species:

Common Name

King Billy Pine
Huon Pine
Celery Top Pine
Cheshunt Pine
Creeping Pine
Deciduous Beech
Pandani

Scientific Name

Athrotaxis selaginoides
Lagarostrobos franklinii
Phyllocladus aspleniifolius
Diselma archeri
Microcachrys tetragona
Nothofagus gunnii
Richea pandanifolia

Where plants such as manferns (*Dicksonia antarctica*, *Cyathea* spp.) are encountered, individual specimens are not to be decapitated. Fronds may be shaved off one side of the plant.

USE OF PEGS AND TAPE

- Mineral Resources Tasmania must be consulted on what colour tape to use to avoid confusion, as Forestry Tasmania has well established colours to depict coup boundaries and areas to be left uncut.
- Small lengths of biodegradable tape should be used.
- Conspicuous markers such as pegs and tape should be removed wherever possible on completion of the program, especially from the beginning of grid lines.
- In alpine and highly visible areas cutting should be kept to a minimum and pegs and tape should be recovered on completion of the program.



Grid line showing width and removal of trip hazards

USE OF GRID

- Whilst cutting and later using a grid, all introduced debris (bottles, cans, paper) is to be removed.
- If changing oil in grid-based machines, waste oil is to be collected and taken to an appropriate disposal area.
- Remove all wires used in geophysical surveys.

FIRE PREVENTION

- Explorers are advised to be aware of their responsibilities and obligations under the *Tasmanian Fire Service Act 1979* and the *Tasmanian Fire Service Regulations 2007*.

- On all work sites where petrol-driven machinery is used provision must be made to enable the suppression of accidental fires. Fire fighting equipment is to be kept on hand.
- Unless following prescriptions in an approved fire management plan, all machinery based activities (including chainsaws) are to cease on declared Total Fire Ban days.
- When using a portable generator for geophysical surveys ensure the exhaust area is clear of leaves and twigs. On Total Fire Ban days the above prescription applies.

ACCESS TRACKS

Properly made and carefully sited tracks will remain visually obscure and environmentally acceptable. A well planned track will cost less than one which is badly placed and requires frequent maintenance. When planning a track, the maintenance, rehabilitation and flora, fauna and heritage surveys must be considered, and included in the cost estimates. It is recommended that a suitably qualified track planner be employed to ensure that the best environmental and cost outcomes are achieved. Explorers are advised to familiarise themselves with the requirements for track work outlined in the *Tasmanian Reserve Management Code of Practice* and in the *Forest Practices Code* (see *More Information*).

COST-BENEFIT ANALYSIS

Helicopters

It is recommended that a cost-benefit analysis comparing helicopter access versus ground access is completed by the explorer prior to seeking approval for the works. Experience has shown that where access is through steep, heavily-timbered country, or where a long access track is being contemplated, the use of a helicopter is usually cheaper and certainly more environmentally responsible in the initial phase of exploration.

All Terrain Vehicles (quad bikes)

The use of all terrain vehicles may be advantageous in some situations where a narrow track is required. Operators must be trained in the safe use of these vehicles.

PUBLIC AND OTHER PRE-EXISTING ROADS

- Always use an existing road or track in preference to constructing a new one.
- When advised by MRT seek permission from the responsible authority (e.g. from the Hydro-Electric Corporation, Forestry Tasmania or from private landholder) before use.
- Do not accelerate deterioration by excessive speed, use of oversize or overloaded vehicles, or use in extreme weather conditions.
- Do not use tracked vehicles on unsuitable surfaces (such as bitumen).

- Drainage and any other damage on existing roads must be repaired.

PLANNING

The following points should be considered to establish the standard of track required:

- The volume of traffic, and type of traffic to use the track?
- For what period is the access required?
- Will it only be used in summer?
- How will potential future developments affect the track use?
- How will public access be stopped?

Once the planner has determined the standard to which the track must be constructed, some estimate should be made of costs. A costing must include:

- Planning and approval including flora, fauna and heritage survey costs.
- Allowance for proper drainage.
- Cost of pipes and culverts.
- Cost of maintenance.
- Cost of gates/access cut off.
- Cost of rehabilitation.
- Cost of increase in security deposit to cover increased rehabilitation requirements.

CLASS OF TRACK

Forestry Tasmania has designed a classification system for the construction of permanent roads, and this is reproduced below. Most exploration tracks will never be subject to the heavy use many forestry roads experience, and are highly unlikely to be of a higher grade than a Class 4 road. Most temporary exploration tracks required for limited use, such as drilling one hole, need not be constructed to this standard.

The *Tasmanian Reserve Management Code of Practice* has included a fifth type of road called an 'access track' which caters for temporary low-use exploration tracks:

| | |
|-----------------------|-----------------------------|
| Function | Temporary track |
| Pavement type | Unsurfaced dry weather only |
| Pavement width | 3 to 3.7 m |
| Shoulder width | No shoulder required |
| Desired maximum grade | +15%, -15% |

Road Design — Basic Approach

A guide to road design for permanent roads based on average tonnes per week carted (Forest Practices Code)

| Characteristics | Road Class | | | |
|---------------------------|--|---|--|---|
| | Class 1 (Main) | Class 2 (Semi-main) | Class 3 (Spur) | Class 4 (Track) |
| Function | Primary road in large network (two lane) | Significant feed road (slower two lane) | Terminal road (fast or slow single lane) | Special purpose access road, single lane — low cost |
| Log traffic volume | 2500 t/week | 1000–2500 t/week | <1000 t/week | very low |
| Pavement type | Heavy duty, all weather | Heavy duty, all weather | Can be all or summer only | Usually not metalled |
| Pavement width | 5.5–6.0 m | 5.5 m | 3.7–4.0 m | 3.7 m |
| Shoulder width | 0.6–1.0 m | 0.6 m | 0.5–1.0 m | 0.6 m |
| Desired maximum gradients | +5, -8% | +8, -10% | +12, -15% | +15, -15% |

LOCATION

- Possible routes should be found using available maps and air photos, then by field inspection. Walk the whole length of the proposed track.
- An assessment should be made of the potential visible impact of different routes.
- Colour contrasts between soil and the underlying material can produce a high visual impact and must be taken into account in the planning.
- Learn to recognise and avoid rare or valued tree species.
- Consider routes which minimise tree clearing.
- Mark both sides of the track by tying a corridor of tapes along the proposed route.
- To assist in the location of the track, establish control points at creek crossings and saddles and then decide on the required gradient between the control points.
- Avoid poor or difficult ground such as rock outcrops, soaks and swamps. The best track locations will be found by following the contour, on ridge tops or on bottom slopes just above the valley floor.
- Minimise the number of stream crossings.
- Fit the track to the topography so that the disturbance will be kept to a minimum.
- Avoid sudden changes in gradient.
- Steep sections of tracks are prone to severe erosion and must have drainage grips or cross drains put in during construction.
- Avoid level tracks, as water will pool on the flat sections.
- Ideally tracks should be built to a grade of not less than 1% and preferably not more than 5%.
- When developing a new track off an existing roadway ensure the junction is discreet, but is also safe. Traffic management may be required.

- Where possible, the angle between track and road should be large and the track should include a dog leg close to the road, to reduce visibility.
- Tracks constructed parallel to a major watercourse should be some distance from the watercourse. Watercourses must be protected in a manner consistent with the guidelines provided in the *Forest Practices Code* as shown below:

| Watercourse type | Streamside reserve (total) |
|--|----------------------------|
| Class 1. Rivers and lakes (as named on 1:100 000 scale topographic series) | 80 m |
| Class 2. Creeks and streams (carrying permanent running water; catchment exceeds 100 ha) | 60 m |
| Class 3. Permanent watercourses (catchment 50–100 ha) | 40 m |
| Class 4. Semi-permanent or ephemeral streams carrying water intermittently | 20 m |

- Streamside reserves are recognised as necessary for the protection of water quality and no machinery should enter them except to cross the streams at defined points.
- Interference with the natural drainage should be kept to a minimum.
- Stream crossings should be at right angles to the stream.

CONSTRUCTION

- Excavators are the recommended machine for exploration earthworks.
- Pre-cut all logs and saplings greater than 150 mm in diameter before being placed aside by the excavator. The reason for pre-cutting is to avoid damage to peripheral vegetation from the uncontrolled falling of large trees.
- On some occasions, pushing over trees in line with the proposed track may be preferable to cutting. This technique is used in the construction of narrow tracks on



ATV track developed to access a drill site.

moderate slopes or short term drill tracks accessed by tracked vehicles.

- ❑ Trees may also be used as cording to cross boggy ground.
- ❑ Any commercial timber in State Forest must be set aside for salvage.
- ❑ Remove topsoil and vegetation and store in a secure windrow alongside the track.
- ❑ If a second cut is made subsoil must be stored in a second separate windrow alongside the track.
- ❑ When a demand for road building material is anticipated, locate a few good compact and inconspicuous borrow pits, and develop these systematically. Do not use subsoil which is required for later rehabilitation.
- ❑ It is recommended that a suitable geotextile is laid out on the prepared surface before gravel is spread.
- ❑ Do not needlessly remove vegetation from either side of the roadway.
- ❑ Gates/ditches/logs must be used to stop public access.

DRAINAGE

Install proper drainage as track construction progresses.

Grips (cross drains)

- ❑ All tracks require grips at frequent intervals.
- ❑ The lack of grips is the most common fault seen in track construction.
- ❑ They should be dish-shaped, approximately 0.6 m wide and 0.3 m deep.
- ❑ Grips should be at an angle across the track to best intercept and direct the water into a drain.
- ❑ Grips function most effectively in combination with a table drain.
- ❑ While the actual spacing of grips and table drains is largely determined on a site-specific basis, the following table (adapted from the *Forest Practices Code*) is a guide for grip spacings on a track which would be required for more than one season.

ERODIBILITY FACTOR

| Grade of track | Low–Medium | High | Very High |
|----------------|------------|-------|-----------|
| 1–5% | 150 m | 120 m | 70 m |
| 6–10% | 120 m | 90 m | 40 m |
| 11–15% | 95 m | 70 m | 30 m |
| 16–20% | 50 m | 35 m | 30 m |

The erodibility factor is governed by the soil type and/or parent rock over which the track is constructed. These are:

- LOW: Dolerite or basalt rock/soils.
- MEDIUM: Mathinna Beds and equivalents rock/soils; sandstone, mudstone; non-limestone soils overlying karst.
- HIGH: Quartzite; coarse sandstone, thin residual soils derived from limestone and granite in wetter areas.
- VERY HIGH: Granite rock/soil in dry areas; fine sandy soils.

Table drains and culverts

- ❑ Table drains should be dish-shaped, at least 0.3 m deep and at least 0.6 m wide.
- ❑ They should be dug on the uphill side of a track and should connect to a properly constructed grip.
- ❑ The dimensions of drains must be adequate to cope with the volume of runoff.
 - In easily eroded soils water velocity in these drains should not exceed 0.5 m/sec.
 - In more resistant soils, the velocity should not exceed 1.0 m/sec.
 - When constructing drains try and stick to the same gradients as used in track construction — between 1% and 5% slope wherever possible.
- ❑ Where drains cannot cope with the volume of water, they can be lined with rip rap (broken rock), half pipes or concrete interlocking channels.



Angled grip, approximately 0.6 m wide and 0.3 m deep.



Note rip rap in discharge area and good foundation.



Well constructed concrete pipe culvert.

- Where excessive silt loads are anticipated, or where water quality is an issue, large cross drains and culverts should be constructed in conjunction with a sediment trap.
- Sediment traps can be made out of geotextile rolled around a stake and placed across the water flow and pinned in place by steel stakes.
- Culverts and cross drains should be located where the run-off either filters through undisturbed forest soil or into natural drainage channels.
- Culvert pipes should be laid on a very slight grade. Rip rap should be placed in the discharge area to prevent erosion.
- Culvert pipes must be laid straight, on a good foundation, to prevent movement of pipes. Where pipes are joined, care must be taken to have them laid straight. Rubber ring joints or external bands can be used where movement is anticipated.
- The minimum recommended cover over pipes is 600 millimetres.
- Check drains and culverts frequently and unblock where necessary.

CREEK CROSSINGS

- Specialist advice must be sought where structures are to be placed in creeks that may have populations of platypus and freshwater crayfish or are used by spawning fish.
- Some creeks may be crossed by fording if a solid rock base or coarse gravel bottom exists and silt is not stirred up or washed into the creek by the access sections of track.
- Small crossings can be made by using logs. Logs are laid in the creek, parallel to each other, so that the water can flow between the logs. Gravel and fill are usually placed over the collection of logs to complete the road surface.
- Larger creeks will require something more substantial, such as a piped culvert or a log culvert.
- Anticipate winter and flood water flows and install culvert pipes which will cope with the maximum expected water flow.
- Log culverts are made by placing two abutment logs on each bank of the creek, parallel with the creek direction, then putting logs (stringers) across the creek, with their ends resting on the abutment logs. The logs are then covered with gravel or soil.
- During the last 50 metres before a track crosses a watercourse, drainage must be diverted into the surrounding vegetation or sediment traps, and not be allowed to continue to the stream unchecked.

DIFFICULT AREAS

Some terrains are more sensitive to the impacts of track construction:

- Buttongrass plains are poorly drained because of thick peat and a lack of gradient and usually have a quartz gravel base which produces a conspicuous colour contrast with the vegetation when exposed.

- Skirt buttongrass plains wherever possible and cross at the narrowest point.
- Dunes are naturally mobile and therefore prone to erosion.
 - Tracks in dunes soon become the domain of unauthorised off-road vehicle users. Stabilisation of sand dunes is often dependent upon their precise shape and a fragile vegetation cover.
 - When working in dune country, the major requirement is to retain the full vegetation cover.
 - Tracks should not be made in dunes unless absolutely essential.
- Tracks are difficult to construct in alpine country and near impossible to restore. Helicopter-assisted drilling should be used in alpine areas wherever possible.

USE OF TRACKS

- The use of temporary tracks should be confined to the summer months.
- Carry a spade to unblock grips and culverts. Keeping water off the surface of tracks will greatly reduce the expenditure required for maintenance.
- Do not wait until tracks fail before doing any maintenance work. Cover boggy areas with tea tree cord or geotextile covered with gravel.
- Plan track use to minimise the number of journeys. Plan your time well, choose a suitable vehicle, and this will minimise both expense and environmental impact on the track.

RE-OPENING OF OLD TRACKS

- Overhanging vegetation should be cut, not pushed out of the way.
- Logs across the track must be cut, not simply pushed out of the way.
- Re-open old drainage and be sure to install additional drainage wherever necessary.

REHABILITATION OF TRACKS

Refer to the chapter on rehabilitation for timing, seeding rates and details on fertiliser types to be used in rehabilitation.

- Should ripping be required:
 - Rip along the contour;
 - Spacing of rip lines should be approximately equal to ripping depth;
 - Do not rip when soil conditions are too wet to allow the soil to shatter;
 - If ripping brings large amounts of rock to the surface, discontinue.
- Pull out culverts (pipes, logs etc.) and re-establish natural drainage pathways.
- Replace stockpiled topsoil over the track (after ripping if this was needed) to a depth of 0.3–0.4 metres.



Track construction through buttongrass on peat — coarse fill from local borrow pit.



Drill track in use.



Drill track soon after rehabilitation.



Drill track four years after rehabilitation.



Drill track ten years after rehabilitation.

DRILL SITES

ENVIRONMENTAL CONSIDERATIONS

- A drill site must be large enough to accommodate the drilling rig, compressor, pumps, drilling rods and sump and allow a safe working area.
- Allowance should be made in planning drill collar locations so that they can be moved to achieve better environmental outcomes.
- Large, dead trees should be avoided or the site must be made safe by cutting dangerous limbs or felling the tree.
- On completion most of the drill pad can be rehabilitated at the time the rig is moved, leaving vehicle access to the drill collar for later down-hole logging and abandonment works. This minimises the time soil is stockpiled and saves on rehabilitation costs.
- Drill sites must be supplied with a portable chemical toilet and the contents must be deposited in a recognised sewage disposal facility.

FIRE PREVENTION

- Explorers are advised to be aware of their responsibilities and obligations under the *Tasmanian Fire Service Act 1979* and the *Tasmanian Fire Service Regulations 2007*.
- No open or enclosed fires are allowed for any exploration related activity in Tasmania. The reason for this is that the danger of escaped fires and the damage of wood collecting to the environment are potentially highly detrimental to the low impact nature of exploration and the continued access to prospective ground.
- On all work sites where petrol-driven machinery is used provision must be made to enable the suppression of accidental fires. Fire fighting equipment is to be kept on hand.
- Unless following prescriptions in an approved fire management plan, all machinery based activities (including chainsaws) are to cease on declared Total Fire Ban days.

CONSTRUCTION

- Pre-cut any timber greater than 150 mm in diameter in the area to be cleared.
- Place topsoil and vegetation to one side of the drill site. If the drill site is to remain in place for a long time, and is on a slope, provide drainage along the top side of the pad. On a slope, topsoil should be stored on the uphill side of the drill pad.

USE OF A DRILL SITE

- Equipment must be in good condition to ensure that oil and hydraulic leaks do not contaminate the site.
- When drilling, place oil absorbent matting under and around the rig.
- Fuel, hydraulic fluids and oils must be stored in a fire safe bund which does not fill up with rainwater. Care should

be taken when refuelling and fuel pumps, pouring spouts and funnels must always be used.

- Remove all rubbish and equipment from the drill site on completion of work. Rubbish bins must be used.
- If soil is contaminated by hydrocarbons it must be removed for disposal at a recognised site.
- On completion immediately cap or cover the drill hole. Do not leave an open hole in the ground. See *Abandonment of Drill Holes* below.
- Drill holes making water must be plugged and sealed off following the completion of any down-hole geophysics. See *Abandonment of Drill Holes* below.
- Drillers must be aware of the dangers of drilling new holes using high pressure air in close proximity to holes that have been sealed. The plugs from the old holes can be expelled forcefully. Explorers must ensure that staff and contractors are aware of this potential danger and must locate old holes and make them safe by removing the plugs or covering them with an appropriate protective mat.
- The site should be monitored periodically and any weed species must be eradicated.

WATER PUMPS

- Water pumps must be placed on oil-absorbent material and regularly checked for hydrocarbon leaks because of their close proximity to water courses.
- Fuel pumps, pouring spouts and funnels must always be used.
- Fuel tanks and lines must be sealed and secure and meet the engine manufacturers' specifications.

SUMPS

- Drill pads should be designed with the sump on the downhill side.
- Drains should be dug to direct any accidental spills into the sump.
- Sumps must always have oil absorbent booms floating in them.
- Booms must be replaced regularly.
- Cutting-rich water from the drill site must not directly enter any nearby watercourse.
- Pump water away from watercourses and allow to drain through vegetation where possible.
- Redirect excess water from the supply pump away from the sump.
- The following are circumstances where an above-ground sump system that recycles the water through a number of tanks should be adopted:
 - helicopter-supported drilling programs;
 - where an excavator is not required on programs utilising track-mounted rigs;
 - where no site preparation is required;
 - where an effective sump cannot be excavated due to difficult ground conditions;



Drill site preparation — note drainage on top side of the pad.



Drill site. Note oil absorbent matting under the rig.



Poor bunding (filling with water) and jury rigged fuel supply to pump.



Excellent fuel tank setup contained within the yellow drum which acts as the bund.



Roofed pump, fuel tank and bund.



Water spraying from pump and fuel tank with no bund — very poor practice.



Excellent example of remote area above ground sumps — note oil absorbent mat and sausage.



Remote area sumps that are working.



Flat remote area showing difficulty of draining drill water.



Creek contamination from drill water.



Dual excavated sump (above) and triple excavated sump (right).



- where the visual disturbance from earthworks is undesirable.
- To avoid the possibility of an unchecked spread of weed species, the practice of using straw bales should be avoided.
- In some cases, where it is not possible to establish a sump, drill hole return water must pass through an oil absorbent boom and then be pumped away from watercourses and allowed to filter through the vegetation. The position of the outlet must be moved on a regular basis to allow the undergrowth to absorb the water and to prevent cuttings from smothering any one area.

STORAGE OF FUELS

- All drums and other containers should be in a sound condition.
- Fuels and oil stored on site must be contained in a bund, away from any watercourses, that is fire proof and does not fill up with rainwater.
- A supply of oil absorbent material should be kept on hand to clean up any minor spills.

ACCIDENTAL SPILLS

- Spills of significant quantities of hydrocarbons (i.e. more than half a 200 litre drum) require notification to the Environment Protection Authority Pollution Control Officer (telephone 1800 005 171) and Mineral Resources Tasmania. Each large mine has a designated contact officer in liaison with the Environment Protection Authority, and notification may also be made using this network.
- Actions which may help clean up such spills include:
 - digging a trench (by hand) just below the spill and filling with oil-absorbent material, which must be replaced at frequent intervals.
 - construct a small dam in any affected watercourse; place a boom of oil absorbent material to trap the spill; replace the boom at regular intervals.

DRILLING ADDITIVES

- Drilling additives should be used sparingly and, where available, alternative biodegradable products should be used.
- Diesel must not be used as a down-hole lubricant.
- Used containers should be stored appropriately or taken off site.
- Material Safety Data Sheets on these products are available from the manufacturer and their recommendations on the safe handling and storage of these substances must be observed.

ABANDONMENT OF DRILL HOLES

- It is essential that all drill holes have secure collars that can be used to cap the holes or allow re-entry to extend the hole or seal holes that are making water.
- It is the explorer's responsibility to ensure that all flowing drill holes are permanently sealed to prevent surface discharge of groundwater. Publications by the Department of Primary Industries Victoria and the Western Australian Department of Mines and Petroleum (see *More Information* section) give detailed advice on the various procedures available to stop water flow. It is recommended that explorers consult with relevant MRT staff to discuss possible remedial action.
- All cored holes must be accurately surveyed and permanently marked.
- All holes, whether cored or otherwise, must be sealed so as to prevent collapse of the surrounding surface.
- Where any drill hole encounters natural or noxious gases, it must be plugged or sealed so as to prevent their escape.
- Where any drill hole encounters an artesian or sub-artesian flow the hole must be sealed discretely to prevent cross-contamination of aquifers.
- Most exploration holes in Tasmania are cored, and are usually left open after drilling for later access for geophysical logging. These holes must have temporary



Bunded hydrocarbon storage — but no tarp or roof cover.

caps. When a hole is no longer required, it must be backfilled or permanently capped.

- ❑ Holes with PVC collars must be cut off at least 400 mm below surface, sealed with a suitable conical plug, backfilled and mounded with a low permeability material and covered with topsoil. (Refer to the Western Australian Department of Mines and Petroleum document *Mineral Exploration/Rehabilitation Activities Guidelines* for detailed descriptions of techniques to seal PVC collared holes).
- ❑ Sample bags must be removed from the drill site on completion of the hole. If the sample is not toxic, acid forming or containing asbestos, it may be disposed of on site. Disposal options should first be discussed with MRT.
- ❑ A record must be kept of the abandonment procedure that documents the following:
 - Collar position in MGA94 Datum GDA94 co-ordinates;
 - Depth at which the hole is sealed;
 - Quantity and type of sealing materials;
 - Casing and/or collar details;
 - Photographs that illustrate the hole and site on abandonment.

- ❑ This record must be submitted as a report to Mineral Resources Tasmania on completion of the drilling program.
- ❑ No approvals for subsequent drilling programs will be considered until the report has been submitted.
- ❑ In situations where close-spaced drilling takes place a generalised illustrated report will be sufficient.

REHABILITATION

- ❑ If the ground has been compacted the drill pad should be ripped to loosen the soil.
- ❑ Stockpiled soil and vegetation should be spread over the site.
- ❑ If drainage works were put in around the perimeter of a drill site leave them intact. This will prevent erosion of the newly established vegetation.
- ❑ The site should be monitored periodically and further work carried out, if required, to ensure that the rehabilitation has been successful. Security deposits will only be returned when the site has successfully revegetated.

Refer to the chapter on *Rehabilitation and Revegetation* for timing, seeding rates and details on fertiliser types to be used in rehabilitation.



Open hole jammed with grease-soaked rags.



Open hole.



Open hole.



Open hole.



Steel collar — secure, sealed, but number will fade.



Steel collars — secure, sealed and permanent welded number.



Solid PVC collar and cap — no number.

*(left) Solid PVC collar and cap.
Marked by treated pine pole, number will fade.*



Broken PVC cap on steel collar.



Smashed unsealed PVC collar.



Drill hole making water.



Attempts to seal hole failed because of poor collar.



*Three attempts to seal hole with eventual success at great cost.
Note no solid secure collar.*



Drill site rehabilitation adjacent to Jukes Road — July 2001



September 2001



November 2003



March 2004



February 2006



October 2010



Drill site rehabilitation at Lorinna — July 2007



October 2007



February 2008



July 2011

COSTEANS AND PITS

- ❑ Costeans (trenches) and pits should ideally be located to avoid large trees, but where this is not possible trees (greater than 150 mm diameter) should be pre-cut and moved to one side.
- ❑ Topsoil should be stored in a long, narrow pile, no more than 0.6 m high.
- ❑ Topsoil erodes easily and must be protected from needless loss by installing drainage if required.
- ❑ On a slope, a table drain uphill from the costean will be needed.
- ❑ Subsoil should be placed in a separate pile on the other side of the costean from the topsoil.
- ❑ With large costeans that will be left open for weeks or months, the topsoil should be stripped to make room for subsoil storage and the site must be made safe.
- ❑ With costeans that are left open escape ramps must be constructed to allow wildlife to enter and exit safely and the costean should be drained.
- ❑ Large costeans should be benched and made safe. There may not be room on one side for all the subsoil, in which case both soil and subsoil can be piled each side of the costean, but in separate piles.
- ❑ Fill in costeans as soon as possible after the program has finished. Replace subsoil and then spread out topsoil and vegetation.
- ❑ Refer to the chapter on *Rehabilitation and Revegetation* for timing, seeding rates and details on fertiliser types to be used in rehabilitation.



Costean at Stanley Reward showing topsoil to right and gravel to left.



Costean at Rushy Lagoon showing topsoil and gravel stockpiles.

REHABILITATION AND REVEGETATION

TIMING OF WORK

Earthworks should be done when the soil is dry enough to move. Under no circumstances should earthworks be attempted when the soil is wet and waterlogged.

Seeding and fertilising should be done after the replaced soil has been softened by rains. Autumn is the ideal time to seed and fertilise replaced soils.

Peat can be replaced at any time.

ESTABLISHING A VEGETATION COVER

Once topsoil has been respread a vegetation cover must be established. After 3 to 6 months stockpiled soil will have lost much of the regenerative material, and seeding may be needed.

Seeds must be collected from plant populations growing locally, to preserve the integrity of the local gene pool. Seeds, when hand sown, should be bulked with sand or sawdust for ease of sowing.

TEA TREE SLASH

The best, cheapest and easiest method of revegetation, which is appropriate for use in many parts of Tasmania, is tea tree slash. Branches of seed-bearing tea tree are selectively collected and laid over the newly spread topsoil. The seeds drop out of the tea tree, the leaves dry and fall off to form mulch, and the twigs act as sun, wind and grazing protection to the seedlings.

High leverage pruning shears have proven to be very effective in large rehabilitation projects as they allow selective choice of seed-rich branches and avoid the dangers of working with chainsaws in dense vegetation.

MULCHING

Mulching also aids revegetation on very exposed sites by providing protection from extremes of heat and cold and drying winds to the newly germinated seedlings. Mulches should be chosen carefully and must not contain any weed seeds.

Where erosion is a particular problem, such as on steep slopes, mulch can be held in place by using jute mesh held down with steel pins.

POTTED SEEDLINGS

Potted seedlings may be used where 'instant' growth is needed. Seedlings have to be bagged to prevent loss through grazing damage. Field trials have shown that sown seedlings overtake planted out seedlings after about two years. Potted seedlings are an expensive and relatively unsuccessful option in remote exploration areas.

Potted seedlings are very useful in areas where there may be fierce competition with opportunistic grasses, which prevent sown seedlings from making reasonable progress.

HYDROMULCHING

Hydromulching is most useful in covering large bare areas. This consists of spraying a mix of water, appropriate seeds, fertiliser and mulch, such as paper pulp mixed with indicator dye in a water and glue solution. The mix literally 'sticks' wherever sprayed, and the dye enables the sprayer to see what ground has been covered.

FERTILISERS

Field trials have shown that native plants respond well to small doses of fertilisers. There is field evidence that the Myrtaceae family do well with the addition of small amounts of fertiliser; the Proteaceae do not do so well, and may in fact be hindered. Insect damage has been noted in some trials to be more severe in fertilised plots, due to the increase in lush new growth which can sustain greater numbers of insects. Grazing damage can also be greater on fertilised plots than on similar, non-fertilised plots.

On the whole, the use of fertiliser, especially in small amounts, is preferred to non-use. Use a fertiliser such as the off-the-shelf 8:4:10 or 6:5:5 plus magnesium mix, at a rate of no more than 250 kg/ha. At a rate of 250 kg/ha, one kilogram of fertiliser will cover 40 m². One handful (approximately 100 g) will cover four square metres.



Spreading tea tree slash on drill access track.



Tea tree and eucalypt slash.



Track rehabilitation using stored topsoil and vegetation — July 2001.



Track rehabilitation — January 2003.



Track rehabilitation — February 2006.



Track rehabilitation — October 2010.



Balfour — Jute mesh site before spreading, 2002.



Balfour — Jute mesh site soon after spreading, 2004.



Balfour — Jute mesh site, 2005.



Balfour — Jute mesh site, October 2011.

HELICOPTERS AND HELIPADS

In most cases the most economical and environmentally responsible means of access in areas of inaccessible terrain is by helicopter.

The costs of helicopter services and the safety requirements, such as size of the helipad and the size and direction of the flight path corridor, will vary according to the type of aircraft used, the nature of the terrain, the weather and the loads which must be carried. The size of the helicopter landing pads will also vary according to the site and the work envisaged.

Explorers should ascertain from their helicopter contractors the exact requirements for each program.

Explorers must be aware of the principles of air access over and into CAR Reserves as outlined in the *Tasmanian Reserve Management Code of Practice*.

The approval process for helicopter access will examine the likelihood of disturbance to Wedge-tailed Eagles and White-bellied Sea Eagles and their nesting sites and a survey by ornithologists may be required to ensure that the *Threatened Species Protection Act 1995* is not transgressed.

AERIAL GEOPHYSICAL SURVEYS

In accordance with s.165 of the *Mineral Resources Development Act 1995* the Director's approval must be obtained to carry out an airborne geophysical survey. Explorers must seek this approval by submitting a work plan to Mineral Resources Tasmania (preferably by email to info@mrt.tas.gov.au) that clearly outlines the following:

- Geophysical method to be used;
- Type of helicopter or plane and contractor's contact details if known;
- Area to be covered;
- Line spacing and nominal flying height;

- Intended time of flying;
- Intended community and land manager notification.

Mineral Resources Tasmania will review the program and forward it onto the relevant land managers and the Mineral Exploration Working Group, if required, for comment. Issues that are likely to be covered in the approval may include:

- Protection of Wedge-tailed Eagles and White-bellied Sea Eagles;
- Community notification;
- Police and Emergency Service notification.

CAMPING

Large programs may be conducted from hutted camps, whilst smaller programs often involve tented camps for short periods. Camp sites must be removed and the area rehabilitated at the completion of a program or at the expiry of a tenement. Security deposits will need to be adjusted to reflect these potential liabilities.

FIRE PRECAUTIONS — ALL CAMPS

- Explorers are advised to be aware of their responsibilities and obligations under the *Tasmanian Fire Service Act 1979* and the *Tasmanian Fire Service Regulations 2007*.
- No open or enclosed fires are allowed for any exploration related activity in Tasmania. The reason for this is that the danger of escaped fires and the damage of wood collecting to the environment are potentially highly detrimental to the low impact nature of exploration and the continued access to prospective ground.
- Camps should have a fire response and readiness plan and all personnel should be informed and trained about fire hazard conditions and emergency response procedures.
- Generators must be well maintained. Leaves and debris should not be allowed to collect near the exhaust as this is a fire hazard.

- Where petrol-driven machinery or gas-fired cooking equipment is used provision must be made to enable the suppression of accidental fires. Fire fighting equipment is to be kept on hand.
- All hutted camps are to be fitted with serviceable fire extinguishers.
- Unless following prescriptions in an approved fire management plan, all machinery-based activities (including chainsaws) are to cease on declared Total Fire Ban days.

GENERAL GUIDELINES — ALL CAMPS

- All rubbish is to be removed from camp sites and disposed of at a recognised facility. It must not be burnt or buried.
- No littering to occur and food and food waste must be stored in a manner that does not attract local wildlife.
- Ensure washing (of people, dishes and clothes) is done at least 50 m from any watercourse or lake. Scatter soapy water into the ground, so some filtering is done before water percolates back to the nearest stream. Use biodegradable soaps and detergents.
- Pets must be left at home.
- Firearms are not to be used on any exploration licence by the explorers or contractors associated with the holder of the licence.

TENTED CAMPS

- ❑ Unless completely unavoidable, no vegetation should be cut to provide a camp site. Suitable camp sites can often be found without resorting to the cutting of standing vegetation. Use existing camp sites wherever possible.
- ❑ Camp at least 50 m away from watercourses of any size.
- ❑ Camps must be equipped with a chemical toilet. The contents of the latter must be removed for disposal at a recognised site.
- ❑ The construction of camp site 'furniture' using native vegetation is not acceptable.



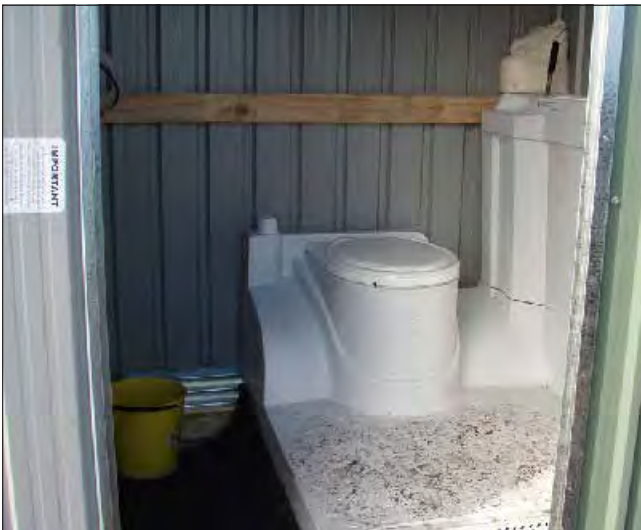
Hatted camp using converted rain water tanks as huts and a garden shed.

HUTTED CAMPS

- ❑ Hutted camps must be equipped with a chemical toilet. The contents of the latter must be removed for disposal at a recognised site.
- ❑ The provision of cording or duck boarding around hut/s in boggy areas will be both more comfortable for camp users and environmentally responsible. Such materials should be ferried into the camp, not cut from local vegetation.



Garden sheds as individual bedrooms.



Chemical toilet.



Large capacity sewage storage.

PLANT DISEASES

Plant diseases and weed species can easily be transported by people and vehicles, and especially by heavy earth-moving machinery, if hygiene measures are not observed between jobs. Whilst mineral explorers are not the sole users of heavy machinery in isolated areas, or the sole users of many West Coast tracks, there remains an obligation on all users of all tracks to prevent the spread of weeds, and of pathological fungal diseases. One of the worst plant diseases in Tasmania is the fungus *Phytophthora cinnamomi*, and whilst this disease is incurable, strict hygiene measures will retard its spread.

PHYTOPHTHORA

Five species of *Phytophthora* (commonly known as 'water moulds') have been found in native vegetation in Tasmania (Rudman and Whinam, 1995).

Phytophthora cinnamomi (known as Cinnamon Fungus) is an introduced plant fungus which causes dieback and death in many of our native plant species. The fungus can be waterborne, and lives in soil. One of the prime methods by which this disease is spread is by the carriage of particles of soil from infected to uninfected zones.

The quantity of soil which must be moved to infect an area is small. The fungus is known to have been spread by the passage of walkers, while wombats and sulphur-crested cockatoos are also suspected vectors. The spread of this fungus by earth-moving machinery is common.

Studies (Podger *et al.*, 1990) have shown that the fungus is already present over much of Tasmania, but it is unlikely to survive at altitudes above 700 mASL, where the mean annual temperature does not exceed 7.5°C, or the annual mean rainfall is less than 600 mm; i.e. the fungus will not live in cold, dry areas such as on parts of the Central Plateau.

Whilst strict hygiene measures must be observed in the *Phytophthora*-free zones, there are also good arguments for continuing some hygiene procedures in areas known to be already infected with the fungus. In an infected area, the species most susceptible to the fungus will brown off and die completely. Susceptible species include Blackboys

(*Xanthorrhoea australis*), Christmas Bells (*Blanfordia punicea*), Springelia (*Sprengeia incarnata*), white Waratah or whitey-wood (*Agastachys odorata*), Melaleuca (*Melaleuca squarrosa*), Pandani (*Richea pandanifolia*) and Mountain Berry (*Gaultheria hispida*). Most of the heath family (Epacridaceae), the pea family (Fabaceae), and the Proteaceae (Banksias, Hakeas and the like) are all very susceptible, while rainforest tree species and many eucalypts are also not immune from this disease.

Special care should be taken in coastal heathlands, buttongrass, sedgeland plains, and in dry eucalypt forest areas.

After an area becomes infected the more susceptible plants die, and these are replaced by other, more hardy types. Thus the core area of an infected zone may well seem to be of healthy vegetation but a number of key species will be missing. Out from this now-revegetated core will be a zone where the susceptible species will be dead and dying, then beyond this, healthy plants in the uninfected zone. Always clean boots and tools, and wash machinery and vehicles when moving from an infected to an uninfected area. Plan routes to avoid entering infected regions then passing into uninfected country. Visit infected areas last.

Explorers will be required to observe hygiene regulations before undertaking certain activities in areas known to be *Phytophthora*-free. Mineral Resources Tasmania, in consultation with other government agencies, will advise what precautions are required.

Detailed information on the disease, its spread, management and washdown procedures can be found at the Department of Primary Industries, Parks, Water and Environment website (see *More Information* section).

MYRTLE WILT

Myrtle wilt is a natural fungal disease which kills myrtles, especially where the tree has been damaged or disturbed. It is recommended that disturbance to myrtle roots and damage to limbs and trunks be minimised to stop the spread of myrtle wilt.



Phytophthora cinnamomi wash down station in the field.

WEEDS

- Weeds are opportunistic and can quickly cover a barren area from where they will spread into the surrounding native vegetation. For this reason steps should be taken to prevent weed seed being spread by people and machinery.
- Tasmanian weeds are classed into three categories:
 - Noxious;
 - Secondary;
 - Prohibited.
- All noxious and some secondary weeds are classed as 'prohibited'. This means that these plants may not be propagated, sold or transported within Tasmania.
- The Department of Primary Industries, Parks, Water and Environment has further information on how to recognise the listed weed species and control measures.

PREVENTION OF SPREAD

- Earthmoving machinery must be washed down to remove all soil, seeds and vegetation when moving from one location to another.
- Vehicles and boots must be cleaned between different localities.
- Any weeds found growing in newly revegetated zones or during track construction should be removed by digging, or poisoning with an appropriate herbicide.
- Seed pods, if present, should be removed from the area.
- Some exotic species which are not classified as a noxious weed are nevertheless environmentally undesirable plants. Always check that species to be used in revegetation projects are of local provenance and acceptable before planting.

FROG DISEASE — CHYTRID FUNGUS

WHAT IS CHYTRID FUNGUS?

Chytrid (pronounced kit-rid) fungus (*Batrachochytrium dendrobatidis*) causes the disease known as chytridiomycosis or chytrid infection which currently threatens Tasmania's native amphibians. The fungus infects the skin of frogs, destroying its structure and function, and can ultimately cause death. Sporadic deaths occur in some frog populations with 100 per cent mortality occurring in other populations.

Chytrid infection has been devastating to frog species, causing extinctions worldwide. The international trade of frogs probably brought the fungus to Australia from Africa. The disease has now been recorded in four regions in Australia — the east coast, southwest Western Australia, Adelaide, and more recently Tasmania. In mainland Australia chytrid has caused the extinction of one frog species and has been associated with the extinction of three other species. In addition, the threatened species status of others frogs has worsened through severe declines in numbers.

HOW IS IT SPREAD?

The movement of infected frogs, tadpoles and water are the known key agents of spread. The fungus (or infected frogs or tadpoles) can be spread by people in water and mud on boots, camping equipment and vehicle tyres, and in water used for drinking, or spraying on gravel roads or fighting fires.

WHERE IS CHYTRID IN TASMANIA?

In Tasmania, chytrid infection has spread widely in habitats associated with human disturbance and will continue to spread unless we act quickly. Once established, it is

extremely difficult to eradicate chytrid fungus from the natural environment. Remote areas in Tasmania, particularly the Tasmanian Wilderness World Heritage Area, are still largely free of the disease and it is our challenge to keep it out.

WHAT YOU CAN DO TO STOP THE SPREAD OF CHYTRID

- Keep your gear clean — clean boots and camping equipment of soil and allow to dry completely before visiting remote areas.
- Plan to wash and dry vehicles (including tyres) and equipment before entering dirt roads within areas that are reserved or largely free of human disturbance.
- Think about water disposal — when disposing of small or large volumes of water within a natural environment ensure you are as far as possible from creeks, rivers, ponds and lakes. A dry stony disposal site is far preferable to a moist muddy one.
- Avoid transferring aquatic plants, water, soils and animals between frog habitats (for example, nursery plants, wetland fill and fish).
- Hygiene protocols for biologists and field workers visiting freshwater environments are outlined at the James Cook University web site on amphibian diseases.
- Education in relation to disease management is critical if we are to stop the spread of this important disease.

More information is available from Wildlife Enquiries at the Department of Primary Industries, Parks, Water and Environment in Hobart (telephone 03 6233 6556 or email wildlife.enq@dpipwe.tas.gov.au), or from the DPIPWE website.

PRIVATE PROPERTY

Explorers may enter upon private property to explore in most parts of Tasmania. A balance must be maintained between the interests of the landholders, who have surface rights, and the explorer who has rights to explore for minerals, which are usually the property of the Crown. The question of ownership of minerals can be complex in Tasmania and is addressed in the *Land Available for Exploration — Private Property* section of this Code.

A pamphlet entitled *Land Owner's Questions* is available from Mineral Resources Tasmania and this clearly outlines the rights of the landowner and responsibilities of the explorer. Distribution of these pamphlets to landowners, and a discussion of the proposed activities with them, is recommended.

Harmonious working relationships with landowners can be achieved by adherence to these principles:

- Select a field supervisor who has, if possible, some knowledge of farming and grazing practice.
- The field supervisor must be familiar with all aspects of the field program.
- The field supervisor should make direct contact with the landholder well in advance of entering the property, and discuss the exploration program and how any procedures may affect the land, stock or infrastructure.
- Give the landowner the names of the senior field staff, and leave a telephone number where the field supervisor can be contacted should any problems arise.
- Leave a location map showing the position of any proposed grids or drill holes with the landowner.
- Discuss with the landowner and be advised of any particular areas which require special care — such as buried water pipes, contour banks, windbreaks, erosion-prone land and the position of gates and fences.
- Make all contractors and subcontractors aware of company policy in the field and ensure that this is adhered to. Do not leave liaison with the landholder solely to the contractor. The holder of the exploration licence must bear the responsibility for establishing good working relationships with the landowner.
- Ensure that the operation of heavy machinery is supervised at all times and ensure that the contractor understands what is required.
- Where practicable the explorer should contact the landholder before each phase of the program. Keep the landowner informed of progress and discuss any changes to the program.
- Let the landowner know when machinery will be entering the property.
- No fishing, hunting or carrying of firearms without the express permission of the landowner.
- When ground is wet, limit or curtail entirely machine movements which would damage tracks and paddocks. If machinery must be moved, and damage occurs, then repair the damage as soon as possible, and to the satisfaction of the landowner.
- Keep the number of vehicles on a property to a minimum, and where possible keep to the same track.
- Use existing gates wherever possible.
- Leave gates as you found them. Do not shut an open gate, and do not leave open a gate which was shut.
- Ensure any tracks put in for exploration are properly made and drained, and will not degenerate into an erosion hazard.
- Prevent the spread of noxious weeds by frequently hosing down heavy machinery and vehicles.
- Enquiries should be made at the local Department of Primary Industries, Parks, Water and Environment office concerning stock health campaigns.
- As little timber should be cleared as possible. Try and remain flexible on the precise positioning of drill holes and grid lines, and be prepared to move (if possible) the proposed location.
- If timber is cleared be sure to do so in a manner acceptable to the landowner.
- Rehabilitation requirements should be discussed with the landowner on completion of the exploration work.
- When the project is finished invite the landowner to inspect the work area so any problems can be discussed and rectified promptly.
- Remove all rubbish from drill sites — including piles of cuttings if holes are chip drilled — unless you have agreed with the farmer that these can be left and spread over the drill site on completion of work. Make sure drill holes are either filled in completely, or capped and made safe for stock.

More information

A large amount of information relevant to explorers is available on the internet. This section provides links to material which may be of use to explorers. Although all links were correct at the time of compilation, MRT has no control over changes to external websites and can take no responsibility for non-functioning links. Where a link may be broken the information can usually be found using a search engine.

MRT WEBSITE RESOURCES AND LINKS

The following resources are available on the Mineral Resources Tasmania website (www.mrt.tas.gov.au). The information below gives the navigation sequence in the website to locate the resource and the direct link to the page.

Proposed Exploration Work Program Form

Environmental Impact Information to accompany Exploration Licence Work Programs.

go to Exploration and Mining — Tenement Information — Tenement Forms

http://www.mrt.tas.gov.au/portal/page?_pageid=35,830956&_dad=portal&_schema=PORTAL

Exploration Licence Document

Sample of Exploration Licence document.

go to Exploration and Mining — Exploration Licences — General Information — Exploration Licence Document

http://www.mrt.tas.gov.au/pls/portal/docs/PAGE/MRT_INTERNET_PAGE_GROUP/MRT_EXPLORATION_AND_MINING/MRT_EXPLORATION_LICENCES/GENERAL%20CONDITIONS/EXPLORATION_LICENCE_DOCUMENT.PDF

Guidelines for Reporting

Guidelines to assist the holders of mineral exploration tenements in Tasmania with the preparation and submission of reports on exploration activity.

go to Exploration and Mining — Exploration Licences — General Information — Mineral Tenements – Guidelines for Reporting

http://www.mrt.tas.gov.au/pls/portal/docs/PAGE/MRT_INTERNET_PAGE_GROUP/MRT_EXPLORATION_AND_MINING/MRT_EXPLORATION_LICENCES/GENERAL%20CONDITIONS/GUIDELINES_FOR_REPORTING_2009.PDF

Information for Explorers

General information on the requirements relating to exploration licences in Tasmania.

go to Exploration and Mining — Exploration Licences — General Information — Information for Explorers

http://www.mrt.tas.gov.au/pls/portal/docs/PAGE/MRT_INTERNET_PAGE_GROUP/MRT_EXPLORATION_AND_MINING/MRT_EXPLORATION_LICENCES/GENERAL%20CONDITIONS/INFORMATION_FOR_EXPLORERS.PDF

Fossicking Areas in Tasmania

Ten areas, extending from the ground surface to a depth of two metres, are currently declared official Fossicking Areas under the *Mineral Resources Development Act 1995*. These areas have been specially set aside for the use of fossickers and gem and mineral collectors. Information on Fossicking Areas is available in a hard-copy book from MRT or can be accessed through the MRT website.

go to Community — Fossicking — Fossicking Areas

http://www.mrt.tas.gov.au/portal/page?_pageid=35,831327&_dad=portal&_schema=PORTAL

Land Owners Questions

Notes prepared for owners and occupiers of land which may be subject to an application for an exploration licence or mining lease under the *Mineral Resources Development Act 1995*.

go to Community — Land Owners Q & A — Land Owners Questions

http://www.mrt.tas.gov.au/portal/page?_pageid=35,830893&_dad=portal&_schema=PORTAL

Onshore wells: Approval to drill checklist

Listing of documents which must be provided before approval to drill an onshore well can be given (see Appendix I).

go to Exploration and Mining — Exploration Issues — Mineral Exploration Code of Practice — Onshore wells: Approval to drill checklist

http://www.mrt.tas.gov.au/pls/portal/docs/PAGE/MRT_INTERNET_PAGE_GROUP/MRT_PUBLICATIONS/MRT_EXPLORATION_CODE_OF_PRACTICE/ONSHORE_CHECK_LIST_2010.PDF

Security Deposits

Description of the Tasmanian security deposit system for mining and exploration tenements.

go to Exploration and Mining — Exploration Licences — General Information — Security deposit system

http://www.mrt.tas.gov.au/pls/portal/docs/PAGE/MRT_INTERNET_PAGE_GROUP/MRT_EXPLORATION_AND_MINING/MRT_EXPLORATION_LICENCES/GENERAL%20CONDITIONS/UR2008_02.PDF

Schedule for onshore exploration for petroleum, coal seam gas or geothermal substances

Information to ensure that petroleum and geothermal exploration is conducted in accordance with good oilfield practice (see also Appendix I).

go to Exploration and Mining — Exploration Issues — Mineral Exploration Code of Practice — Schedule for onshore exploration for petroleum, coal seam gas or geothermal substances

http://www.mrt.tas.gov.au/pls/portal/docs/PAGE/MRT_INTERNET_PAGE_GROUP/MRT_PUBLICATIONS/MRT_EXPLORATION_CODE_OF_PRACTICE/SCHEDULE_C_2010.PDF

Mineral Resources Tasmania Map Viewer

Map viewer enabling users to access tenement information.

go to Exploration and Mining — Tenement Information — Tenement Map Viewer— Full browser map viewer

http://www.mrt.tas.gov.au/portal/page?_pageid=35,832426&_dad=portal&_schema=PORTAL

OTHER USEFUL LINKS

Chytrid fungus

Information on the Chytrid fungus can be obtained from the Department of Primary Industries, Parks, Water and Environment website (www.dpipwe@tas.gov.au).

go to Weeds, Pests and Diseases — Animal Diseases — Frog Disease – Chytrid Fungus

<http://www.dpipwe.tas.gov.au/inter.nsf/WebPages/LJEM-673V89?open>

Community consultation

Ministerial Council on Minerals and Petroleum Resources (2005). *Principles for engagement with communities and stakeholders*.

This book can be accessed from the Department of Resources, Energy and Tourism website (<http://www.ret.gov.au/>)

go to Resources — Publications — Principles for Engagement with Communities and Stakeholders

http://www.ret.gov.au/resources/Documents/mcmpr/Principles_for_Engagement_with_Communities_and_Stakeholders.pdf

Department of Industry, Tourism and Resources (2006). *Leading practice sustainable development program for the mining industry. Community engagement and development*.

This book can be accessed from the Department of Resources, Energy and Tourism website (<http://www.ret.gov.au/>)

go to Resources — Publications — Leading Practice Sustainable Development Program – Community Engagement and Development Handbook

<http://www.ret.gov.au/resources/Documents/LPSDP/LPSDP-CommunityEngagement.pdf>

Drill Hole Abandonment

These publications give detailed advice on the various procedures available to stop water flow from abandoned drill holes.

Department of Mines and Petroleum Western Australia (2007). *Mineral Exploration/Rehabilitation Activities Guidelines*.

These guidelines can be accessed through the Western Australia Department of Mines and Petroleum website (<http://www.dmp.wa.gov.au>)

<http://www.dmp.wa.gov.au/documents/ENV-MEB-206.pdf>

Department of Mines and Petroleum Western Australia (2002). *Guidelines for the protection of surface and groundwater resources during exploration drilling*.

These guidelines can be accessed through the Western Australia Department of Mines and Petroleum website (<http://www.dmp.wa.gov.au>)

http://www.dmp.wa.gov.au/documents/Shed_env_guide_protectwaterdrill.pdf

Department of Primary Industries, Victoria (2002). *Guidelines for environmental management in exploration and mining. 2. Abandonment of mineral drillholes*.

These guidelines can be accessed through the Department of Primary Industries Victoria website (<http://new.dpi.vic.gov.au>)

go to Earth Resources — Exploration and Minerals — Environmental Guidelines

http://new.dpi.vic.gov.au/__data/assets/pdf_file/0017/21284/2_GFEM.pdf

Environment Australia

(Department of Sustainability, Environment, Water, Population and Communities)

Matters of National Environmental Significance, Significant impact guidelines 1.1, published by the Department of the Environment, Water, Heritage and the Arts, December 2009.

These guidelines can be accessed through the Department of Sustainability, Environment, Water, Population and Communities website (<http://www.environment.gov.au>).

Go to Environment home — EPBC Act — Publications and resources — Policy statements — Significant impact guidelines

<http://www.environment.gov.au/epbc/publications/nes-guidelines.html>

Fire prevention

Explorers have responsibilities and obligations under the *Tasmanian Fire Service Act 1979* and the *Tasmanian Fire Service Regulations 2007*. This legislation can be accessed at the Tasmanian Legislation website (<http://www.thelaw.gov.au>).

Forest Practices Code

Forest Practices Board Tasmania (2000). *Forest Practices Code*.

This report can be accessed at the Forest Practices Authority website (<http://www.fpa.tas.gov.au>).

go to Publications — Document List — The Forest Practices System — Forest Practices Code 2000

http://www.fpa.tas.gov.au/__data/assets/pdf_file/0020/58115/Forest_Practices_Code_2000.pdf

Geoconservation

Geoconservation aims to preserve the natural diversity of the non-living environment by protecting significant examples of bedrock features, landforms and soil features and processes. Information about geoconservation can be accessed at the Department of Primary Industries, Parks, Water and Environment website (www.dpipwe@tas.gov.au).

go to Managing Our Natural Resources — Geoconservation — About Geoconservation

<http://www.dpiw.tas.gov.au/inter.nsf/WebPages/SJON-57W4FD?open>

The Tasmanian Geoconservation Database is a source of information about earth science features, systems and processes of conservation significance in the State of Tasmania. This can be accessed at the Department of Primary Industries, Parks, Water and Environment website (www.dpipwe@tas.gov.au).

go to Managing Our Natural Resources — Geoconservation — Tasmanian Geoconservation Database

<http://www.dpiw.tas.gov.au/inter.nsf/WebPages/LBUN-6TY32G?open>

High Quality Wilderness

The *State of the Environment* report summarises Tasmanian environmental condition, trends and changes over a five-yearly period and provides recommendations for future management of the environment. The report is designed for use by the general community and policy makers to help inform decision-making. It is also intended for use by scientists, students and resource managers who require summary information and perspectives from other disciplines.

The reports can be accessed at the Tasmanian Planning Commission website (www.planning.tas.gov.au):

go to Assessments and Reviews — State of the Environment report

http://www.planning.tas.gov.au/assessments_and_reviews/state_of_the_environment_report

or the State of the Environment website (<http://soer.justice.tas.gov.au/2003/>)

go to Chapter contents — Land — Wilderness

<http://soer.justice.tas.gov.au/2003/lan/2/issue/78/ataglance.php>

Myrtle wilt

More information on myrtle wilt can be obtained from the 2009 State of the Environment website (<http://soer.justice.tas.gov.au/2009/>).

- go to State of the Environment Report Tasmania 2009 — Natural Values — Plant Pest (Weeds) and Native Plant Diseases — Plant Pest (Weeds) and Disease Issues Report — Myrtle Wilt in Tasmania
<http://soer.justice.tas.gov.au/2009/copy/49/index.php>

Natural Values Atlas

The Natural Values Atlas is a database with a web-based interface that allows observations of Tasmanian plants and animals to be viewed, recorded and analysed. It can be used to search for information on more than 20,000 plant and animal species from Tasmania and can display maps showing their location.

The atlas can be accessed at the Department of Primary Industries, Parks, Water and Environment website (www.dpipwe@tas.gov.au).

- go to Managing Natural Resources — Natural Resource Management and Conservation — Natural Values Atlas
<http://www.dpipwe.tas.gov.au/inter.nsf/WebPages/LJEM-6TV6TV?open>

Phytophthora cinnamomi

Phytophthora cinnamomi (or Root Rot) is an introduced pathogen that attacks the roots of susceptible plants. Information on this fungus can be accessed at the Department of Primary Industries, Parks, Water and Environment website (www.dpipwe@tas.gov.au).

- go to Weeds, Pests & Diseases — Plant Diseases — Phytophthora
www.dpipwe.tas.gov.au/inter.nsf/ThemeNodes/EGIL-53Y2ZC?open

Washdown guidelines for weed and disease control have been established.

- go to Weeds, Pests & Diseases — Plant Diseases — Phytophthora — Phytophthora Publications — Washdown Procedures
<http://www.dpiw.tas.gov.au/inter.nsf/Attachments/LJEM-5ZM43C?open>

Other references which may be useful are:

PODGER, F. D.; PALZER, C.; BROWN, M. J. 1990. Bioclimatic analysis of the distribution of damage to native plants in Tasmania caused by *Phytophthora cinnamomi*. *Australian Journal of Ecology* 15:281.

RUDMAN, T.; WHINAM, J. 1995. *Interim Pine Lake Dieback Management Plan*. Parks and Wildlife Service, Tasmania.

Sustainable Development

Minerals Council of Australia (2005). *Enduring value — the Australian minerals industry framework for sustainable development*.

Two reports, a *Guidance for Implementation* and *Summary Booklet*, are available from the Minerals Council of Australia website (<http://www.minerals.org.au>)

- go to Focus — Sustainable Development — Enduring Value
http://www.minerals.org.au/file_upload/files/resources/enduring_value/EV_GuidanceForImplementation_July2005.pdf
http://www.minerals.org.au/file_upload/files/resources/enduring_value/EV_SummaryBooklet_June2005.pdf

Tasmanian Reserve Management Code of Practice

Parks and Wildlife Service, Forestry Tasmania and Department of Primary Industries, Water and Environment (2003). *Tasmanian Reserve Management Code of Practice*.

This report can be accessed at the Parks and Wildlife Service Tasmania website (<http://www.parks.tas.gov.au>)

- go to Publications — Management Plans, Site Plans and Other Publications — Tasmanian Reserve Management Code of Practice — Other Publications
<http://www.parks.tas.gov.au/index.aspx?base=7154>

Weeds

Comprehensive information on weeds, their identification and best methods of control can be accessed at the Department of Primary Industries, Parks, Water and Environment website (www.dpipwe@tas.gov.au).

- go to Weeds, Pests & Diseases — Weeds
<http://www.dpipwe.tas.gov.au/inter.nsf/ThemeNodes/SSKA-52J2K4?open>

Appendix I

Schedule for onshore exploration for petroleum, coal seam gas or geothermal substances

CONTENTS

PART 1: PRELIMINARY MATTERS

| | | |
|----|---|----|
| 1. | Objectives | 47 |
| 2. | Workplace Health and Safety Act, 1995 | 47 |
| 3. | Definitions | 47 |
| 4. | Suspension of operation of this schedule | 47 |

PART 2: GENERAL CONDITIONS

| | | |
|-----|--|----|
| 5. | Good oilfield practice | 48 |
| 6. | Equipment validation | 48 |
| 7. | Competent persons | 48 |
| 8. | Control of environmental, health and safety hazards | 48 |
| 9. | Control of fire | 48 |
| 10. | Noise | 48 |
| 11. | Submission of data | 48 |
| 12. | Daily Drilling Reports | 48 |
| 13. | Well Site Completion Reports | 49 |
| 14. | Petroleum reservoir fluid analysis reports | 50 |
| 15. | Other technical reports | 50 |
| 16. | Reporting incidents | 50 |

PART 3: DRILLING AND WORKOVER OPERATIONS

| | | |
|-----|---|----|
| 17. | Operation plan for drilling or workover operations | 51 |
| 18. | Drilling at location not approved | 51 |
| 19. | Casing requirements | 51 |
| 20. | Blow-out prevention equipment | 51 |
| 21. | Formation integrity testing | 51 |
| 22. | Drilling fluid | 51 |
| 23. | Cuttings, cores and fluid samples | 51 |
| 24. | Well samples | 51 |
| 25. | Coring, logging and testing | 52 |
| 26. | Age dating | 52 |
| 27. | Well evaluation logs | 52 |
| 28. | Protection of aquifers | 52 |
| 29. | Consent to conduct production or drill stem tests | 52 |
| 30. | Well completion | 52 |
| 31. | Protection of well site | 53 |
| 32. | Disposal of oil or gas produced | 53 |
| 33. | Consent for workover operations | 53 |
| 34. | Cessation of drilling operations | 53 |
| 35. | Consent to suspend or abandon a well | 53 |

| | | |
|--|--|-----------|
| | ONSHORE WELLS: APPROVAL TO DRILL CHECKLIST | 54 |
|--|--|-----------|

PART I: PRELIMINARY MATTERS

1. Objectives

The objectives of this schedule are to ensure that petroleum and geothermal exploration is conducted in accordance with good oilfield practice, and that the environmental, health and safety hazards and risks involved in undertaking petroleum or geothermal operations are eliminated or minimised so far as is practicable.

2. Workplace Health and Safety Act, 1995

This schedule does not alter any duties, obligations or procedures which apply under the *Workplace Health and Safety Act 1995*. The licensee shall ensure that drilling and other petroleum or geothermal operations conform with the requirements of the Act.

3. Definitions

In this Schedule:

'Completion' means a flowpath in a well that allows the production of fluids from, and the injection of fluid into, a discrete formation interval through the well, and includes the equipment necessary for that production or injection independent of other flowpaths in the well;

'Directional drilling' in relation to drilling a well means drilling that involves intentional changes in the direction of drilling;

'Facility' means a structure that:

- (a) is used or constructed for the purpose of recovering petroleum or geothermal energy; or
- (b) carries, contains or includes equipment for the drilling or workover of a well.

'Good oilfield practice' means all those things that are generally accepted as good and safe in:

- (a) the carrying on of exploration for petroleum; or
- (b) petroleum recovery operations.

'Incident' means an accident or dangerous occurrence;

'Lifecycle' of an operation, includes the design, construction, abandonment and rehabilitation stages of the operation;

'Practicable' in relation to eliminating or minimising hazards and risks means practicable having regard to:

- (a) the severity of the hazard or risk;
- (b) the state of knowledge about the hazard or risk and any means of eliminating or minimising that hazard or risk;
- (c) the availability and suitability of ways to eliminate or minimise that hazard or risk;
- (d) the cost of eliminating that hazard or risk;

'Workover operation' means a modification, maintenance or repair operation made to a well.

4. Suspension of operation of this schedule

The Director may give approval for the suspension of all or part of this schedule on the basis of a risk assessment where he is convinced that it is safe to do so.

PART 2: GENERAL CONDITIONS

5. Good oil field practice

- (1) The Licensee must ensure that exploration is carried out to good oil field practice to protect persons, the environment and petroleum resources.
- (2) Work programs must be designed and carried out by persons with appropriate qualifications and experience.
- (3) Where geothermal drilling is proposed, the licensee must demonstrate that procedures meet the same standard of safety and environmental control as that required by good oil field practice in petroleum exploration.

6. Equipment validation

Before any drilling commences, the Licensee shall provide the Director with reports from suitably qualified and independent assessors confirming that the drill rig and associated equipment has the capability to undertake the program in question and that the state of maintenance of the equipment satisfies current oilfield standards. Relevant Australian standards must be applied and otherwise those of the American Petroleum Institute must apply. Drilling may not commence without such certification.

7. Competent Persons

The Licensee shall ensure that employees and independent contractors associated with petroleum operations are competent, by reason of having the necessary skills, training and ability, to undertake their duties.

8. Control of environmental, health and safety hazards

- (1) The Licensee shall ensure that each environmental, health and safety hazard associated with the lifecycle of a petroleum operation is eliminated or, if it is not practicable to eliminate the hazard, must ensure that the risk associated with the hazard is minimised so far as is practicable and according to good oil field practice.
- (2) The Licensee shall ensure that the control of the hazards and risks is maintained in the event of significant change in conditions, and
 - (a) that systems are established to detect and respond to emergency situations;
 - (b) that the systems are documented and the documentation retained for inspection purposes;
 - (c) that there are regular audits and reviews of the systems for their continuous improvement.
- (3) The Licensee shall establish and maintain management systems to ensure and demonstrate compliance with condition (8)(2).

9. Control of fire

Before any drilling commences, the Licensee shall obtain confirmation that precautions to control a fire in the event of flaring meet the requirements of the Tasmania Fire Service. The Licensee shall provide the Director with a copy of the confirmation.

10. Noise

- (1) Where residences exist within two kilometres of a well site the Licensee shall advise those residents of the operating hours and expected noise levels before any drilling commences. The Licensee should employ a noise consultant in this situation.
- (2) The Licensee shall ensure that noise emissions are controlled. Noise levels at nearby residences must conform with those which would be applied to permits for industrial operations in a similar situation.
- (3) If requested by the Director the licensee shall provide him with a copy of report from an independent consultant predicting noise levels at nearby residences and providing details of control measures which should be applied to comply with this condition.

11. Submission of data

Reports on operations, copies of original data and the results and interpretations of all processing tests, surveys, measurements and analyses must be submitted as soon as is practicable, in accordance with MRT guidelines.

12. Daily drilling reports

- (1) A licensee who undertakes any drilling on any day must furnish to the Director a **daily drilling report** in accordance with the requirements listed below.
- (2) A daily drilling report —
 - (a) must relate to a period not exceeding 24 hours, calculated from the end of the period reported on in the immediately preceding daily drilling report (unless the report is the first report for the well);

- (b) must be provided to the Director —
 - (i) unless subparagraph (ii) applies — within 12 hours after the end of the period to which it relates;
 - (ii) if the end of the period of 12 hours under subparagraph (i) would fall on a Saturday, Sunday or public holiday — by 10 am on the first business day following the end of that 12 hour period.
- (3) A daily drilling report must include —
 - (a) the name and number of the well;
 - (b) a report number or the number of days from spud;
 - (c) the time and date of well spud and rig release;
 - (d) the depth of the well at the end of the reporting period (in metres);
 - (e) information on operations carried out during the reporting period;
 - (f) the mudlog for the reporting period;
 - (g) resource show descriptions;
 - (h) a description of the formations, and the depth of any geological formation tops, encountered during the reporting period;
 - (i) well logs acquired during the reporting period;
 - (j) the drill stem test intervals and results, including recoveries and the API gravity of any liquid hydrocarbons recovered during the reporting period, and the resistivity of any water recovered during the reporting period;
 - (k) results of cement calculation; and
 - (l) results of formation integrity tests (including leak off tests).

13. Well completion reports

- (1) A licensee who undertakes any drilling must furnish to the Director, within 6 months after rig release, a **well completion report** in accordance with the requirements of this schedule.
- (2) A well completion report must include —
 - (a) the name and number of the well;
 - (b) a summary page or pages, located at the beginning of the report, which set out in a concise form basic information relating to the well found in the report; and
 - (c) a diagram that shows —
 - (i) the latitude and longitude of the well in GDA 94 values, computed within accuracy levels approved by the Director;
 - (ii) the direction of true north;
 - (iii) any other well and all roads, access tracks, public utilities or substantial buildings or other structures within 300 metres of the site of the well, and any significant topographical, environmental or cultural features;
 - (iv) where applicable, the boundaries and legal description of the section of land within which the well is situated;
 - (d) the name of any drilling contractor;
 - (e) the spud date, the date of rig release, and the total depth drilled (to drillers and loggers depths, in metres);
 - (f) a summary of the lithologies encountered during the drilling, and a summary of the geological formations taken to have been encountered during drilling;
 - (g) a composite log, formulated to a scale comparable with the wireline logs used in connection with the drilling, that includes the following:
 - (i) the bit record;
 - (ii) the penetration rate;
 - (iii) the casing record;
 - (iv) a lithological summary;
 - (v) geological formation tops;
 - (vi) representative open hole and cased hole logs;
 - (vii) sidewall core points;
 - (viii) palaeontological analysis results;
 - (ix) hydrocarbon shows;

- (x) the drillstem test intervals and results;
 - (xi) core intervals and recoveries;
 - (xii) the log analysis result;
 - (h) core and sidewall sample descriptions, and an analysis of these;
 - (i) relevant petrographic descriptions;
 - (j) the palaeontological analysis results and interpretation, if undertaken;
 - (k) the formation test reports, charts and interpretation;
 - (l) log interpretations;
 - (m) details of hole sizes, casings and cementing that has been undertaken;
 - (n) details of well completion or abandonment;
 - (o) a velocity survey, if undertaken;
 - (p) for exploration and appraisal wells — an interpreted post drill structure map of the primary objective and an interpreted seismic section;
 - (q) a location survey;
 - (r) headflow data — downhole temperature, thermal conductivity etc. for geothermal wells.
- (3) For the purposes of clause (2), all depth references for a well must be in metres.

14. Petroleum reservoir fluid analysis reports

- (1) A licensee who samples reservoir fluid (including water) must furnish to the Director, within six months after the date of sampling, a **petroleum reservoir fluid analysis report** in accordance with the requirements of these regulations.
- (2) A petroleum reservoir fluid analysis report must include —
- (a) the name and number of the well;
 - (b) the date on which the reservoir fluid was sampled;
 - (c) the interval from which the sample was obtained;
 - (d) a description of any analysis or test that has been performed on the sample;
 - (e) the results of any analysis or test;
 - (f) the name of the laboratory or other place at which any analysis or test was undertaken.
- (3) A copy of a report under this regulation will be available for public inspection after the expiration of two years from the date on which the sampling was carried out.

15. Other technical reports

- (1) A licensee who prepares or commissions any other technical report in connection with an activity conducted under the licence must furnish a copy of the report to the Director within two months after the report is in a reasonable state of completion or received by the licensee (as the case may be).

16. Reporting of incidents

- (1) Where an incident occurs that:
- (a) involves the release or spill of more than 80 litres of petroleum; or
 - (b) involves the release of a petroleum emulsion in which the petroleum concentration is greater than 30 milligrams per litre; or
 - (c) involves any uncontrolled escape by ignition of flammable or combustible material; or any uncontrolled escape of high temperature (>40° Celsius) fluid or gas,
- the Licensee shall submit to the Director a report of as soon as is practical after the incident occurs.
- (2) The report must include:
- (a) the date, time and place of the incident;
 - (b) a description of the incident;
 - (c) any known or suspected causes of the incident;
 - (d) a description of the steps taken to minimise the impact of the incident;
 - (e) a description of the steps taken or proposed to prevent a recurrence of the incident.

PART 3: DRILLING AND WORKOVER OPERATIONS

17. Operation plan for drilling or workover operations

- (1) The Licensee shall submit a operation plan in accordance with good oilfield practice and satisfactory to the Director for drilling or workover operations.
- (2) An operation plan for drilling or workover operations must include:
 - (a) details of the operation, including the location of wells and any equipment to be used;
 - (b) an environment and safety assessment which:
 - (i) identifies the environment, health and safety hazards and risks associated with the operation;
 - (ii) provides an assessment of the risks;
 - (iii) identifies the measures to be used to eliminate the hazards and to minimise the risks so far as is practicable.
 - (c) a description of the management systems.
- (3) The operation plan must be submitted at least one month before the proposed start of the drilling or workover operations, unless the Director agrees otherwise. The plan must demonstrate compliance with good oilfield practice.

18. Drilling at location not approved

- (1) The Director may direct that a well that is drilled at a location that is not identified in an operation plan for drilling operations must be plugged and abandoned.
- (2) The holder of an authority must comply with such a direction within the time specified by the Director in giving the direction.

19. Casing requirements

The Licensee shall ensure that a well is lined with casing and that the casing is cemented in accordance with good oilfield practice.

20. Blow-out prevention equipment

The Licensee shall ensure that the blow-out prevention equipment (including accumulators) of a well is installed, operated, maintained and pressure tested in accordance with good oilfield practice.

21. Formation integrity testing

The Licensee shall ensure that formation integrity testing of a well is undertaken before drilling to the next casing point in accordance with good oilfield practice.

22. Drilling fluid

The Licensee must ensure that the characteristics and the use of drilling fluid and equipment used in a well provide adequate control of any sub-surface pressures likely to be encountered in the well.

23. Cuttings, cores and fluid samples

- (1) The Licensee shall ensure that any cuttings, cores or fluid samples recovered in connection with the drilling of a well are processed and stored in accordance with good oilfield practice and that undue deterioration and loss of the cuttings, cores and fluids is prevented.
- (2) The Licensee shall ensure that the results obtained from any analysis of a fluid sample is submitted to the Director as soon as is practicable after the results are obtained.
- (3) If directed to do so by the Director, the Licensee shall give the Director cuttings, cores or fluid samples in accordance with the direction.

24. Well samples

- (1) A licensee must provide all cuttings and core obtained from a well to the Core Library within one month after rig release.
- (2) Each cutting sample must —
 - (a) be at least 200 g weight;
 - (b) be washed and dry;
 - (c) be contained in a container suitable for long-term storage, as determined by the Director;
 - (d) be clearly and permanently marked with the well name and number and the depth interval represented by the cutting (in metres).

- (3) A licensee may, with the approval of the Director, retain a $\frac{2}{3}$ proportion of a core (split lengthwise) for analysis.
- (4) Cuttings and core must be accompanied by a statement that includes —
 - (a) the name and number of the relevant well;
 - (b) the depth ranges from which the samples were obtained;
 - (c) the cuttings sample interval for each depth range;
 - (d) a statement identifying any variation from an evaluation program previously proposed under this schedule;
 - (e) a statement as to whether the core is complete and, if it is not complete —
 - (i) a list of the intervals that are not complete; and
 - (ii) a statement as to why the core is not complete.

25. Coring, logging and testing

- (1) If the Director considers that the Licensee is not undertaking sufficient coring, logging or testing to evaluate an occurrence, or potential occurrence, of petroleum, the Director may direct the Licensee to carry out any coring, logging and testing that the Director thinks is necessary and reasonable in the circumstances.
- (2) The Licensee shall comply with such a direction within the time specified by the Director.

26. Age dating

- (1) The Director may direct the Licensee to undertake all reasonable steps to ascertain the ages of rock strata penetrated by an exploration well.
- (2) The Licensee shall comply with such a direction within the time specified by the Director.

27. Well evaluation logs

- (1) Other than with surface or intermediate casing, the Licensee shall ensure that before a well is cased, completed or abandoned, a suite of logs is run and recorded.
- (2) The Licensee shall ensure that the suite of logs is sufficient to at least provide a proper determination of:
 - (a) formation porosity;
 - (b) formation fluid saturation;
 - (c) stratigraphic correlation with surrounding wells;
 - (d) if inadequate control exists in the vicinity of the well velocity control.
- (3) Condition 27(2) does not apply if:
 - (a) there is an immediate threat to the integrity of the well; or
 - (b) the Director states in writing that a suite of logs is not required before casing in certain circumstances, and those circumstances exist.
- (4) The Licensee shall ensure that a copy of each log run is submitted to the Director as soon as is practicable after it is recorded.

28. Protection of aquifers

The Licensee shall ensure that all reasonable steps are undertaken during an operation on a well to prevent communication between, leakage from, or the pollution of, aquifers.

29. Consent to conduct production or drill stem tests

- (1) The Licensee shall not conduct a production or drill stem test in an exploration or development well that has not been opened to production except with, and in accordance with, the written consent of the Director.
- (2) An application for consent must provide details of the testing program and the equipment to be used.

30. Well completion

- (1) As far as is practicable, the Licensee shall ensure that the surface, and sub-surface, equipment of a completed well is arranged to allow the pressure and temperature to be measured, at the well-head and at the bottom of the well and also to allow for any other test required for the maintenance or management of the well or the reservoir.
- (2) The Licensee shall ensure that the surface equipment is fitted with sampling means.

- (3) On the completion and any re-completion of a well, the Licensee shall make and retain for inspection purposes an accurate record of all;
 - (a) sub-surface equipment; and
 - (b) material remaining in the well as a result of maintenance work.
- (4) The Licensee shall ensure that before opening a well to production and after every major repair, re-completion or workover operation, the well-head and flow line of the well is pressure tested.

31. Protection of well site

The Licensee shall ensure that adequate controls are in place to protect a completed well site from outside interference and to ensure the safety of the public.

32. Disposal of oil or gas produced

The Licensee shall ensure that any oil or gas; or high temperature (>40° Celsius) fluid or gas:

- (a) that is circulated out of, or produced from, a well during a drilling, testing or repair operation; and
- (b) that has not flowed through the flow line of the well to a gathering facility

is disposed of in a manner that minimises any environmental damage in accordance with good oilfield practice.

33. Consent for workover operations

- (1) The Licensee shall ensure that a well is not worked over except with, and in accordance with, the written consent of the Director.
- (2) An application for consent must include details of:
 - (a) the zone in the well to be abandoned (if any);
 - (b) the zone in the well to be developed (if any);
 - (c) the proposed modifications, maintenance or repair to equipment in the well;
 - (d) the proposed modifications, maintenance or repair to the well-head and production equipment;
 - (e) the proposed procedures for undertaking the workover operation.
- (3) The Licensee shall ensure that a well that is to be worked over for gas lift operations is pressure tested in the 12 months before the operations start to prove the integrity of the well production casing, tubing and associated equipment.

34. Cessation of drilling operations

The Licensee shall ensure that a well is made safe in accordance with good oilfield practice whenever drilling operations cease.

35. Consent to suspend or abandon a well

- (1) The holder of an authority must ensure that a well is not suspended except with, and in accordance with, the written consent of the Director.
- (2) The Licensee shall ensure that a well with a measurable interval of petroleum is not abandoned except with, and in accordance with, the written consent of the Director.
- (3) An application for consent to suspend or abandon a well must include:
 - (a) the name and number of the well;
 - (b) the reasons for the proposed suspension or abandonment;
 - (c) details of the proposed suspension or abandonment program, including the method by which the well will be made safe.
- (4) Confirmation of completion of the approved abandonment or suspension program must be provided to the Director at the completion of the program.
- (5) Where a well has been suspended a report is to be provided at six monthly intervals following the suspension outlining the proponent's plans for development or abandonment of the well.

ONSHORE WELLS: APPROVAL TO DRILL CHECKLIST

The following documents must be provided before approval to drill an onshore well can be given.

- Landowner's Consent
- Threatened Species Study
- Cultural Heritage Study (Aboriginal and European)
- Hydrogeological Report
- Acoustic Survey
- Tasmanian Fire Service Certificate
- Third party validation of drilling rig and operating systems
- Driller's Well Control and First Aid Certificates
- Public Liability Insurance

Operation Plan

- Drilling Program
- Drilling Montage
- Drilling Operations Manual (Operator)
- Drilling Operations and Safety Manual (Drilling Company)
- Environmental Impact/Assessment detailing the potential environmental impacts, and mitigation measures; sumps, water, site hygiene, lease construction, accidental release of petroleum from the well, etc.
- Emergency Response Plan (Drilling Company)
- Operator's bridging document to the Emergency Response Plan

Department of Infrastructure, Energy and Resources
MINERAL RESOURCES TASMANIA

PO Box 56 Rosny Park
Tasmania Australia 7018
30 Gordons Hill Road Rosny Park
Tasmania Australia
Tel: +61 3 6233 8377 Fax: +61 3 6233 8338
Email: info@mrt.tas.gov.au
Internet: www.mrt.tas.gov.au