#

Radio Telescope Mineral Resources Management Area

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# Introduction

The Department of Mines, Industry Regulation and Safety (DMIRS) has established a Radio Telescope Mineral Resource Management Area (RTMRMA) in support of sensitive radio- astronomy operations in the vicinity of the Murchison Radio-astronomy Observatory (MRO). The goal is to ensure that exploration, prospecting and mining activities within this management area are consistent with the radio-quiet requirements of radio-astronomy in the RTMRMA.

The Minister for Mines and Petroleum has also created two Mining Act 1978 Section 19 Exemption Areas in the region (S19/157 and S19/158). These have been created to prevent the granting of tenements in an area around the MRO to further protect radio-astronomy.

These areas are shown in the map in the rear of these guidelines or in a more detailed map at <http://www.dmp.wa.gov.au/Documents/Minerals/Minerals-SKA-Murchison_radio_telescope_observatory_map.pdf>. The areas can also be viewed on DMIRS’ website <http://www.dmp.wa.gov.au/Index.aspx> in Tengraph or GeoView.

# Scope of the Radio Telescope Mineral Resource Management Area Requirements

These guidelines are applicable to all Mining Act tenements granted inside the RTMRMA after December 2006 in line with conditions imposed on grant. The conditions require a Radio Emissions Management Plan (REMP) to be lodged and approved by the Director General of DMIRS before conducting exploration activities. This is in accord with *Mining Act 1978* powers that authorise the Minister to impose any conditions he considers are reasonable. The REMP must indicate how activities undertaken will be consistent with the radio-quiet requirements of radio-astronomy in the area and compliance with the REMP will be a condition of approval of the activity.

These conditions and guidelines do not apply to titles granted under the Petroleum and Geothermal Energy Resources Act 1967.

These guidelines apply to management of radio frequency interference in exploration activities, as well as productive mining.

# Murchison Radio-astronomy Observatory

The MRO is located within the Boolardy Pastoral Lease as a *Land Administration Act 1997* General Purposes Lease ( L 139 058) situated 315 km northeast of Geraldton and 180 km west of Meekatharra. The facility is currently managed by the Commonwealth Scientific and Industrial Research Organisation (CSIRO).

The location was identified after detailed investigations by the Geological Survey of Western Australia, a division of DMIRS, in collaboration with CSIRO that commenced in the 1990s, and was selected because of the then interpreted low mineral and petroleum prospectivity and the remoteness of the area. The low levels of human activity mean that the site is superbly radio-quiet, making it the premier location for future radio-astronomy in Australia.

The MRO and its surrounding area has been selected to be Australia’s site for the international Square Kilometre Array (SKA) radio telescope, and currently hosts three important SKA precursor radio telescopes, the:

* CSIRO Australian SKA Pathfinder;
* Murchison Widefield Array; and
* [Experiment to Detect the Global Epoch of Reionization Signature.](http://www.haystack.mit.edu/ast/arrays/Edges/)

# Radio Frequency Interference

Radio-astronomy entails the receiving of extremely weak radio signals from across the universe over a broad range of radio frequencies. The radio-astronomy signal receivers are highly vulnerable to radio frequency radiation generated and emitted by almost all electrical and electronic equipment, especially radio-signal transmitting equipment. These emissions (known as radio frequency interference) can drown out weak extraterrestrial signals. Radio frequency interference from mining, exploration and prospecting activities can reduce the ability of radio telescopes to detect extraterrestrial signals, can make observations impossible and, in extreme cases, radio frequency interference can damage the radio-astronomy receiving equipment.

# Mineral Resource Implications

The RTMRMA extends for 70 km from a defined point within the MRO site at:

Latitude26° 42' 15" S, Longitude116° 39' 32" E; and

Grid co-ordinates: Zone 50, 466 070 mE, 7 046 285 mN (GDA94 datum)

RTMRMA is identified in Tengraph (DMIRS’ spatial title system) as a file notation area. The MRO can be located in Tengraph by enquiring for the “Australian Square Kilometre Array Pathfinder” as a “minesite”.

RTMRMA is not intended to be an embargo area on exploration activities but a region where restrictions on activities will apply unless it is established that any radio frequency interference emitted by electrical or electronic equipment used in the activities can be minimised to a level that is acceptable for operations of the radio telescope facilities. However, the requirements for radio-quietness are particularly stringent and require extremely low-level use of electronic and electrical equipment.

Those parts of a tenement falling within the RTMRMA will have two conditions applied:

1. *Prior to carrying out any on-ground activities, the \*\*LESSEE\*\* developing a plan of activities to ensure that electromagnetic emissions from those activities will not interfere with the radio-quiet emission requirements of radio- astronomy activities. The plan shall be submitted to the "Coordinator for Radio Emissions Management Issues" at the Department of Mines, Industry Regulation and Safety) for approval by the Director General of DMIRS.*
2. *The approved plan to be included with any Programme of Work or Mining Proposal submitted to the Department of Mines, Industry Regulation and Safety for approval under the Mining Act.*

The Director General of DMIRS is responsible for approving a REMP. The Director General will take into account expert technical and scientific advice, including from the MRO entity. Contact information for the Coordinator is contained at the end of the document.

A REMP must demonstrate that a proponent will minimise electromagnetic emissions from the proposed activities such that they will not conflict with radio telescope operations. DMIRS’ Director General will make the final determination under the Mining Act 1978 following investigation and after engaging with CSIRO. If a Programme of Work (POW) or Mining Proposal (MP) is to be presented for approval, then a REMP will require approval prior to consideration of the POW or MP.

Even when a REMP has been approved by DMIRS, all obligations under the Commonwealth’s *Radio communications Act 1992*, as regulated by the Australian Communications and Media Authority (ACMA), are also applicable (refer to <https://www.acma.gov.au/> under “radio quiet” issues).

# Radio Emissions Management Plan - early consultation

Mineral explorers and miners considering exploration or mining activities within the RTMRMA should consult early with CSIRO to discuss the nature of the activities proposed. DMIRS recommends that an initial approach at the time of conceiving the proposed activity to seek early guidance may assist in reducing subsequent approval timelines and may avoid the proponent pursuing courses of action that could lead to generating excessive radio frequency interference.

# Radio Emissions Management Plan compilation and assessment

The tenement holder will be responsible for compilation of the final REMP for submission to DMIRS. An example has been provided to guide industry in the requirements (see below)

The completed REMP is to be submitted to DMIRS’ Coordinator for Radio Emission Management Issues for formal referral to the CSIRO for assessment. The Co-ordinator will assess the REMP for completeness and once satisfied will forward it to the CSIRO for comment on its acceptability to radio-astronomy activities.

On referral from DMIRS, CSIRO will then assess the final REMP and provide feedback to DMIRS as to whether the REMP is complete and provides satisfactory compliance with radio frequency interference requirements of the radio telescope facilities. Following submission of a REMP by DMIRS to CSIRO, if the documentation is deficient, CSIRO is expected to advise DMIRS of this within 10 days requesting further information, amendments or a recompilation.

CSIRO is committed to a 20 day timeframe to assess a complete and sufficient REMP and advise DMIRS and the proponent in regard to the acceptability of the REMP. If CSIRO requires further time to provide a response, it will advise DMIRS and the proponent of likely timing.

Should CSIRO’s response be unfavourable, the proponent will be notified and DMIRS may organise a mediation session between the parties to clarify the issues and work with them towards achieving a mutually satisfactory outcome. DMIRS may also seek additional advice.

DMIRS’ Director General will ultimately decide on approving or not approving a REMP. In instances where the REMP is approved, it will form a requirement of any subsequent POW or MP. If DMIRS does not approve the REMP, the activities are deemed unacceptable.

# Example Radio Emissions Management Plan

To guide explorers and miners an example of a basic REMP for reconnaissance drilling within an exploration program is provided at this link, <http://www.dmp.wa.gov.au/Documents/Minerals/Minerals-SKA-Radio_Emissions_Management_Plan.docx>

# Contact

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# Map

Generalised map of the outlines of the Radio Telescope Mineral Resource Management Area and Mining Act Section 19 exemption areas. Note that details can be sourced from Tengraph or downloaded from DMIRS’s website.

