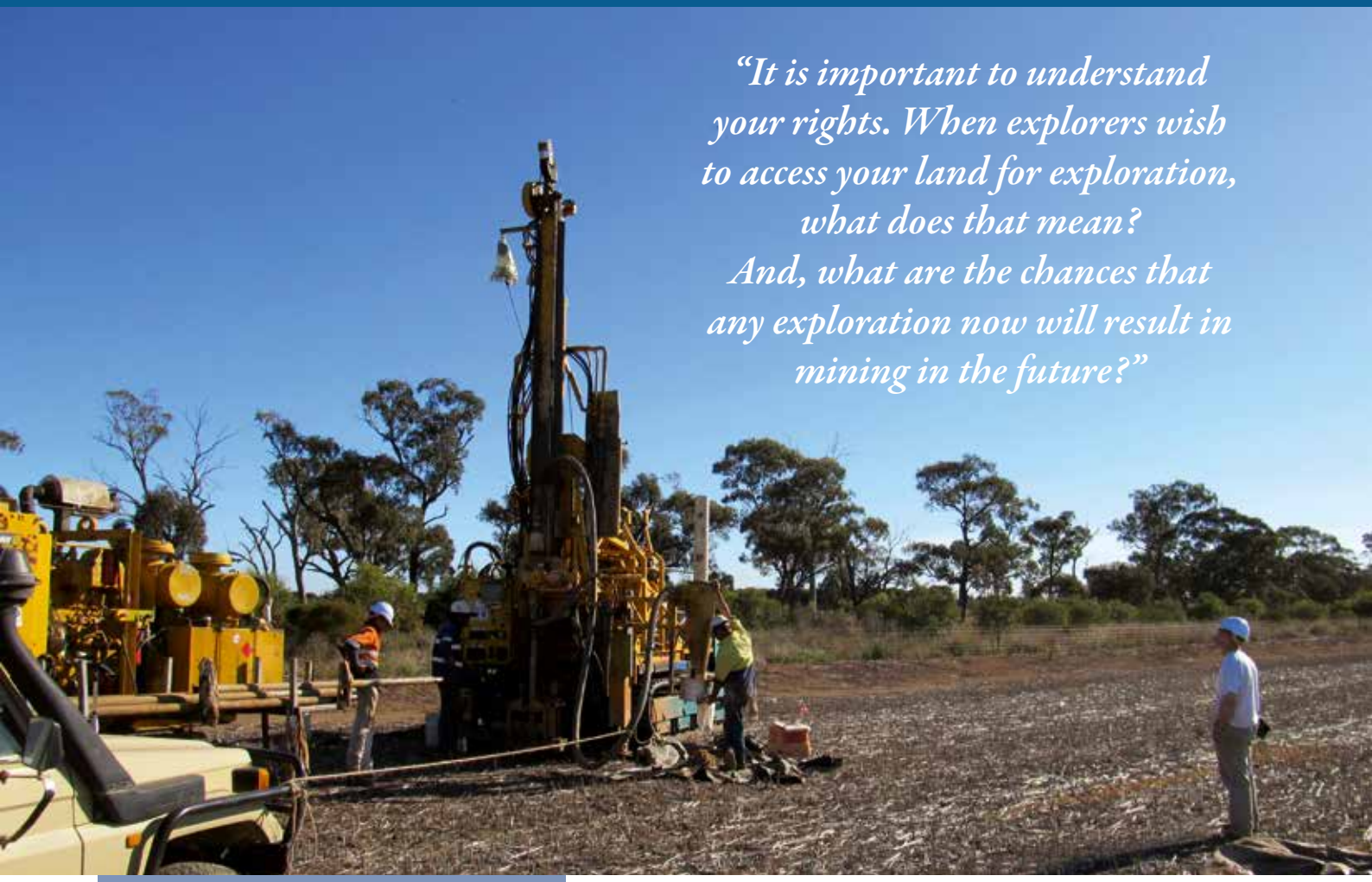
EXPLORATION & MINING Part 1

What does it mean when it's your land?



"It is important to understand your rights. When explorers wish to access your land for exploration, what does that mean? And, what are the chances that any exploration now will result in mining in the future?"

Fiona Makin is an exploration geologist working with various exploration companies across the eastern states. Her work is primarily focused on community engagement, environmental management and regulatory compliance. Fiona is also the former editor of Town & Country Farmer Magazine.

Recently my career and my personal life collided. An exploration client had exploration licences over my brother's farm – the property that I had grown up on – and they were keen to drill.

Fortunately for the client, my brother was open to the idea and the whole process was carried out with no issues. See case study page 59. We'll keep you up to date in future issues if there is any further exploration based on results or if mining becomes likely.

I started my career as a geologist in the mid 90's and though I diverted into IT and business for sometime, over the last 5 years I've spent more and more time working as a consultant geologist as well as being the editor of this magazine. I feel that I am in a unique position to write an article on exploration and mining for Town & Country Farmer magazine. However, this is a huge topic and I may miss things or not go into the detail you'd like to read about. I welcome your feedback and questions.

This article has focussed on mineral exploration rather than petroleum industries, that topic will be covered in a future issue.

By FIONA MAKIN

IMAGES FOR THIS ARTICLE PROVIDED BY DPI VICTORIA & VICTORIAN IRON.

EXPLORATION & MINING Part 1

What is Exploration?

MINERALS EXPLORATION

Minerals exploration under the MRSD Act is the search for minerals. The MRSD Act separates the terms 'low impact exploration' and 'exploration'. The respective definitions are:

Exploration means exploration for minerals and includes:

a. conducting geological, geophysical and geochemical surveys
b. drilling
c. taking samples for the purposes of chemical or other analysis
d. extracting minerals from land, other than for the purpose of producing them commercially
e. in relation to an exploration licence, anything else (except mining) that is specified in the licence.

Low impact exploration is limited to work that does not involve:

- use of excavation equipment (other than non-mechanical hand tools);
- use of explosives;
- removal or damage to trees or shrubs;
- disturbance to Aboriginal heritage; or
- disturbance to any archaeological site or relic.

Low impact exploration is typically exploration activity such as geological surveys and mapping, small-scale soil and rock sampling and some geophysical surveys.

The search for minerals covers a wide range of activities from desk-top literature reviews and surveys to costeans and drilling programs. The purpose of undertaking exploration activities is to prove an economically demonstrable resource. Exploration in economic terms is a high risk activity, with approximately only 1 in 5000 exploration programs resulting in a mine. Exploration activities have the potential to generate impacts on people (communities) and the environment, with the risks increasing as exploration programs progress to more targeted investigations.

Some exploration activities and potential impacts are listed below.

Exploration activities may include:

- research and review of geological data including previous licence holders' results
- local–scale geophysics, geochemistry & hand sampling
- geological mapping
- broad-scale and aerial geophysical surveys
- construction of access tracks, camps and other infrastructure
- reconnaissance drilling and auger sampling
- rapid trench sampling (ditch witching)
- close-spaced drilling of target sites
- costeaning, bulk sampling
- underground exploration.

Potential impacts from exploration activities may include:

- clearing of vegetation
- disturbance to fauna
- soil erosion and stream sedimentation
- spreading of weeds
- noise, light and dust levels
- disturbance to culturally significant sites
- disruption to other land users, such as farmers and the local community
- contamination of soil and water
- injury to, or detrimental effects on, the health and wellbeing of employees, other persons at work and the public.

The precise definition of mineral exploration from state to state may vary, the following definition was provided by the Department of Primary Industries - Earth Resources in Victoria. See the resources section on page 57 for how to access specific information for your own state.

WHAT IS AN EXPLORATION LICENCE?

Exploration licences allow licence holders to explore for minerals on limited areas of land. Exploration licences are typically granted and renewed for set periods of time. Those periods vary from state to state but typically represent a period between 2 to 5 years. An exploration licence can cover up to hundreds of square kilometres.

An exploration licence contains detailed conditions to protect the environment. A substantial security deposit must also be lodged by the explorer with their relevant state authority to ensure explorers satisfy licence requirements and complete rehabilitation of areas disturbed during exploration.

Before an exploration licence is granted, the applicant must advertise their application in a state wide newspaper, and in a newspaper with circulation covering the biggest population base for the area.

CAN AN EXPLORATION LICENCE HOLDER UNDERTAKE MINING?

Exploration licences do not permit mining, nor do they guarantee that a mining lease will be granted. Exploration does not always lead to mining. Exploration licences simply allow the licence holder to explore for minerals. Economically recoverable mineral resources are not always discovered, which means that mining may not be viable at that time.

If there is the potential for a mine to be developed, any mine proposal must undergo a rigorous assessment. In Victoria this assessment is under the Environmental Planning and Assessment Act 1979 and involves a series of stages that normally take several years. Each proposal must be considered on its merits and there is no guarantee that approval will be granted.

DESCRIPTION OF TYPICAL EXPLORATION ACTIVITIES

MINERAL EXPLORATION FIELD WORK MAY TYPICALLY INCLUDE:

Remote sensing: This may involve the interpretation of satellite imagery, airborne or radiometric data or aerial photography to identify the topography, broad-scale geological formations or the geophysical properties of subsurface rocks. Remote sensing identifies broad targets for more detailed examination.

Ground-based gravity and magnetic surveys: Gravimeters and magnetometers are small portable instruments used to determine the geophysical properties of rocks. The surveys are either carried out on foot or with the aid of a light vehicle and are designed to further define broad geophysical features.

Resistivity, induced polarisation and electromagnetic surveys: These methods are used to differentiate the electrical properties of rocks. They use electronic equipment and interconnecting arrays of electrical cable to induce and measure an electrical response through a body of rock. The surveys are carried out on a grid pattern and may require the excavation of shallow holes up to 500 mm deep and 1m square (although they are usually much smaller), which are sometimes lined with aluminium foil through which a mild electrical current is passed. Alternatively, metal probes may be used.

Seismic surveys: Shock waves are generated in the ground using either small explosive charges detonated below the surface, hand-held mechanical hammers or vehicle-mounted weights. Measurement of the time delay for the shock waves to reach an array of geophones, which are connected by cable to measuring instruments mounted in a vehicle, is used to differentiate the geophysical properties of subsurface rocks. The require any excavations. When explosives are used, an auger may be used to drill shallow holes (typically only a few metres deep).

Sampling – hand tools: This includes local-scale geological mapping (involving the examination of rock outcrops using hand tools, such as geological hammers and hand picks) and geochemical sampling (involving the taking of small rock chip, soil or stream sediment samples, using hand-held equipment such as shovels or hand augers or sieves, or the taking of small samples of vegetation). Sampling with hand-held tools is usually carried out on foot. While the sample sites of geological surveys are often opportunistic (on encountering a prospective rock outcrop), geochemical surveys may involve either irregular surveys, such as taking small samples of stream sediments from a stream bed, or sampling on a regular grid pattern.

EXPLORATION & MINING Part 1

Sampling – drilling: Drilling is used to determine the nature and structure of the subsurface material and to obtain samples of rock and any potential mineralisation at depth. Drilling equipment ranges in size from handheld power augers to large fixed rigs, but is usually mobile – mounted on a rubber-tyred or tracked vehicle or trailer. Drillholes are of varying depths and may be vertical or angled. Various mediums or fluids, ranging from air and water through to oil-based mud, may be used to assist drilling and the recovery of samples. Some drilling applications require the construction of level and compacted drill pads and / or drill sumps or mud pits. Drilling may be conducted both from the surface (either on existing tracks or in off-road locations) and from underground mines. A variety of drilling methods are available.

A power auger is usually employed where shallow drilling is required and may comprise a hand-held unit or a rig mounted on a small vehicle or trailer.

SOME OF THE DIFFERENT DRILLING TECHNIQUES/METHODS ARE AS FOLLOWS:

- **Open-hole percussion, reverse circulation, air core and rotary air-blast drilling** usually involve a truck-mounted rig and a compressor to supply air for drilling and recovery of samples and at least one support vehicle. The noise of such drilling may be high in the immediate vicinity of the rig. Some dust may also be generated by this drilling method. There is usually little evidence that the drillhole has been drilled after backfilling. In instances where groundwater is encountered, or where water needs to be injected down the drillholes to recover samples, sumps may be required.
- **Diamond drilling** involves the extraction of a continuous cylindrical core of rock. It is usually the slowest and most expensive form of drilling and often requires some site preparation, a supply of water and sumps for mixing and recovering drilling mud or fluids. The method generally requires the use of a vehicle-mounted drill rig and support vehicle.
- **Rotary mud drilling** is most commonly used for deep stratigraphic investigation and petroleum exploration. The method involves circulation of thick drilling mud for drillhole stability and recovery of samples. It uses substantial quantities of mud, and requires water and sumps.
- **Wide-diameter drilling** is most commonly used in the sampling of shallow alluvial deposits or coal, from which large samples are needed to give a reliable estimate of ore reserves. The method utilises bucket auger (or Calweld) drilling equipment, which is usually truck mounted. Drillholes are commonly up to 1.2 m in diameter and up to 30 m deep. The boring bucket is a cylindrical bit into which the sample is forced as the bit rotates. When full, the bucket is hoisted from the drillhole and the sample dumped on the surface. Drilling is usually conducted without drilling fluids, though water or drilling mud may be added to stabilise the drillhole.

A **drill rig** may operate at different positions for a period of a few hours to a few weeks, depending on the type of drilling, depth and number of holes.

Bulk sampling – re-processing of tailings. Samples of tailings and other materials from previous mining or mine sites are excavated, processed and analysed for mineralisation. Such sampling usually involves excavation and analysis of several tonnes of material.

Bulk sampling – costeaning and test pits. In this method, costeans (a type of trench) or test pits are excavated to investigate geological features and obtain material for sampling. Bulk samples are generally used to further test the grade of the ore and can range from a few tonnes to thousands of tonnes.

- Trenches can range in width from 150 mm to as wide as the available earth-moving equipment (usually a backhoe or excavator, but may also include a bulldozer) and be up to several metres deep and several hundred metres long. A rapid trenching machine or ditch witcher (commonly used in laying underground telephone or power cables) is often used to excavate very narrow and shallow (up to about 1 m-deep) trenches. Ditch witch trenching distributes the excavated material along each side of the trench, from where it can be sampled. Excavators or backhoes produce larger trenches but enable separation of topsoil and subsoil. Bulldozers may also be used.
- In some cases, such as mineral sand projects, large test pits may be excavated to provide more detailed information about the geology, geochemistry and geotechnical properties of the ore and overburden. This data is used to investigate the feasibility of proposed mining and mineral processing methods prior to proceeding to a full-scale mining operation. Such pits may be tens of metres deep and several hectares in area.
- Bulk samples may also be obtained from shafts (sometimes an old existing shaft may be used).

Underground exploration and development includes underground sampling from shafts and adits, drilling and mine construction, as well as associated surface works. It does not include commercial mining.

Landholder Rights

WHAT ARE YOUR RIGHTS AND RESPONSIBILITIES AS A LANDHOLDER?

Landholders do have a number of important rights and responsibilities in the exploration process including:

- Negotiate an agreement for access before exploration commences.
- Advise the exploration licence holder of a change in land ownership or management.
- Work with the explorers and liaise with fairness and in good faith.

Explorer Rights & Obligations

WHAT ARE THE RIGHTS AND RESPONSIBILITIES OF AN EXPLORER?

Explorers also have a number of important rights and responsibilities in the exploration process including:

- Undertake the exploration detailed in their exploration licence.
- Ensure an access agreement is negotiated with the landholder before exploration can commence.
- Advise the landholder of changes to the management or proposed activity in the exploration program.
- Minimise damage to the landholder's property and promptly rehabilitate the land after exploration.
- Respect landholders and liaise with them with fairness and in good faith.

"Exploration and Mining Licence holders are bound by strict regulations. In the next part in this series we will look at what is regulated and how."

Community engagement: Duty to consult

In Victoria, all licensees have a duty to consult with the community throughout the period of the licence. Similar expectations for community engagement exist in other jurisdictions. This involves sharing information about any authorised activities that may affect the community and giving members of the community a reasonable opportunity to express their views about those activities. The type and level of consultation needed depends on the complexity of the project, the potential risks and who may be affected.

Relevant communities should be engaged at an early stage of an exploration project. Maintaining open and transparent communication is essential to good working relationships between explorers and the community to ensure the effective management of any impacts.

The word community is a broad term used to define groups of people, whether they are stakeholders, interest groups or citizen groups. The community may surround a geographic location (community of place), be a community of similar interest (community of practice) or have a special interest or legal interest in the land (community of standing).

GOOD CONSULTATION INCLUDES:

- identifying relevant stakeholders including community, government authorities and employees
- identifying the potential impacts of exploration activities on relevant stakeholders
- establishing clear, open and ongoing channels of communication with all relevant stakeholders and ensuring they are aware of any real and potential impacts
- responding to stakeholder concerns in a timely, transparent and effective manner
- establishing stakeholder feedback mechanisms and demonstrating how feedback contributed to decision making
- respecting the rights, cultural beliefs and concerns of all parties having an interest in the land (and waters) within and surrounding the exploration project area
- enlisting local knowledge and relevant authorities in the design of the exploration works.

Compensation agreements

Exploration licence holders must reach a land access agreement with the landholder before exploring on their land. Landholders may not veto exploration, but access arrangements must be negotiated and in place before exploration may commence. The negotiations regarding access arrangements are part of the important consultative process undertaken by the explorer. Legal advice may be sought to assist in the negotiation process. The access agreement details the conditions on which an explorer will access the land and any compensation payable. All access arrangements should be based on the understanding that explorers are „guests" on private land and an appreciation by landholders of the needs and rights of mineral explorers. Courtesy, respect and honesty help to build effective working relationships between explorers and landholders.

Most states have template compensation agreements available, please refer to your state branch of the Minerals Council of Australia or Farmers Federation.

See page opposite for contact information.

Resources

FARMERS FEDERATIONS

- **Victorian Farmers Federation**
  www.vff.org.au
- **Queensland Farmers Federation**
  www.qff.org.au
- **South Australian Farmers Federation**
  www.saff.com.au
- **Western Australian Farmers Federation**
  www.waff.org.au
- **New South Wales Farmers Association**
  www.nswfarmers.org.au
- **National Farmers Federation**
  www.nff.org.au

MINERALS COUNCIL OF AUSTRALIA

- www.minerals.org.au

DEPARTMENT OF PRIMARY INDUSTRIES

- **Victorian Department of Primary Industries**
  www.dpi.vic.gov.au
- **Queensland Department of Primary Industries**
  www.daff.qld.gov.au
- **PIRSA (Department of Primary Industires and Regions SA)**
  www.pir.sa.gov.au
- **Tasmania Department of Primary Industries, Parks, Water & Environment**
  www.dpiw.tas.gov.au
- **Western Australia Department of Agriculture and Food**
  www.agric.wa.gov.au
- **New South Wales Department of Primary Industries**
  www.dpi.nsw.gov.au
- **North Territories Department of Resources - Primary Industry**
  www.primaryindustry.nt.gov.au
- **Australian Government Department of Agriculture, Fisheries & Forestry**
  www.daff.gov.au

QUEENSLAND RESOURCES

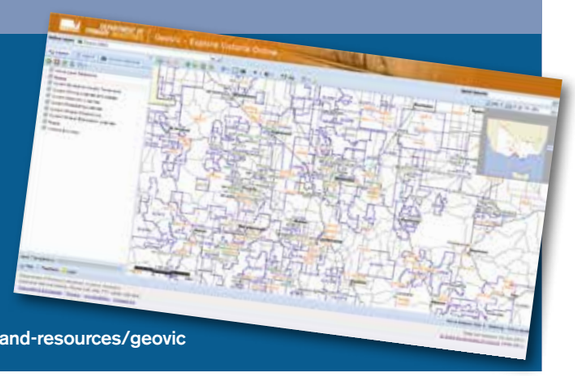
- **This column explains the recently announced QLD GasFields Commission**
  www.qff.org.au/gasfields-commission-the-opportunity-that-must-be-realised/
- **Queensland's land access laws**
  mines.industry.qld.gov.au/mining/landholder-information.htm

Resources: GeoVic

The Earth Resources web mapping application allows users to search geospatial databases and display the results as maps or tables.

Website shows all current exploration and mining licences.

Each state has different tools to access tenement information, contact your local DPI for details.



www.dpi.vic.gov.au/earth-resources/exploration-and-mining/tools-and-resources/geovic

EXPLORATION & MINING Part 1

National Farmers Federation position on Landholder rights

The key to productive relationships between agriculture and mineral and petroleum industries is relationships built on genuine trust and goodwill and appropriate community engagement. Agriculture and the mineral and petroleum industries underpin the social and economic fabric of rural and regional communities. The social licence of mineral and petroleum industries is dependent on constructive, transparent and quality engagement and participatory decision-making processes over time. Moreover, best practice engagement should include essential elements such as:

- Transparency and full disclosure;
- Collaboration;
- Inclusiveness;
- Ethical and responsible business practice;
- Integrity and appropriate behaviour;
- Capacity building; and
- Listening and responding to community concerns.

Landholder rights impacted by mineral and petroleum licences must be protected by strong regulatory frameworks. NFF recognises that the mineral and petroleum industries have a right under State and Territory legislation to explore and mine across the landscape. However, NFF notes that further work is required to ensure there are strong regulatory frameworks with clearly specified legal rights, protections and obligations consistent across all jurisdictions.

Land access agreements should recognise landholder and occupier property rights, and the negotiations must be respectful of farmers. NFF recognises that land access agreements may be the only time where landholders can actually seek to positively influence the process, and receive some protections and assurances from the mineral and petroleum industries. However, it is worthwhile noting that farmers may be overwhelmed, confused and under stress and therefore should seek legal advice. The companies must undertake best practice during and in finalising land access negotiations, and that such agreements must include among others:

- Appropriate recompense for the full range of costs;
- Clear agreements with landholders regarding the disposal and acquisition of any exploration/extraction licence;
- Mining practices including complying with drilling legislation, and the use of chemicals;
- Biosecurity arrangements;
- OH&S requirements;
- Rehabilitation of land;
- Appropriate insurance and bond arrangements;
- Arrangements for normal agricultural operations; and
- Any and all conduct whilst operating within the landscape.

Next issue – Part 2 Exploration & Mining

In the next issue we'll take a closer look at the process from exploration to mining and the regulatory compliance associated. We'll also discuss in detail considerations around environment and rehabilitation of exploration and mining sites.

If you'd like us to include any other topics in the next issue please email Fiona Makin directly at **fiona@tacfarmer.com.au**

PHOTOS COURTESY OF BLACKLAWS DRILLING.

DISCLAIMER This article was prepared in consultation with the National Farmers Federation (and their associated state bodies where possible), the Minerals Council of Australia (Victorian and NSW Divisions) and the Victorian Department of Primary Industries - Earth Resources. All efforts have been made to represent these bodies accurately, any errors or ommissions are the responsibility of the author alone.

Case study: Aircore drilling program

IDENTIFICATION OF EXPLORATION TARGET AREAS

- Target areas were determined using GIS software and 'on the ground' familiarisation to ascertain land use and identify potential no-go areas.

MAKE CONTACT WITH LANDHOLDERS ON ONE-TO-ONE BASIS, PREFERABLY BY IN-PERSON VISITS OR BY PHONE

- Explain company background, exploration project and proposed activities
- Provide details of VFF (Victorian Farmers Federation)/MCA (Minerals Council Australia) access agreement and compensation offered
- Provide further information (Landholder rights booklets, VFF and DPI (Department of Primary Industries) contacts if required)

SIGNING OF COMPENSATION AGREEMENT

- Initial feedback from landholder as to access restrictions and conditions

ARRIVAL OF EXPLORATION DRILLING RIG

- Confirmation of landholder requirements around access points and care of land
- Discuss planned drilling operations with landholder to minimise impact on farming activities

EXPLORATION DRILLING

- Continued contact between company and landholder to convey updates on activities and feedback on field staff – all concerns addressed as they arise
- Rehabilitation of drill sites occurs immediately after drilling

AFTER DRILLING

- Meet with landholder as soon as possible to review activities and agree final compensation
- Obtain feedback about company performance during exploration

COMPENSATION PAID AS SOON AS POSSIBLE TO LANDHOLDER

- Contact to confirm payment received

POST-DRILLING CHECKS

- Work with landholder to arrange time for company representative to periodically 'walk the lines' to ensure no further rehabilitation required

VICTORIAN IRON DRILLED A TOTAL OF 215 AIRCORE HOLES.

EACH HOLE WAS IMMEDIATELY REHABILITATED AT DRILLING COMPLETION.

"The landholder is, of course, the one who knows their land best. Our priority is to work with farmers throughout our exploration programs to ensure we minimise any impact we could have."

– Benj Beatty, Senior Geologist & Operations Manager – Victorian Iron

EXPLORATION WAS CARRIED OUT ON PRIVATE LAND NEAR RUSHWORTH, VICTORIA

"My concerns around the exploration were in regards to what interference the operations might have to my routine work and rehabilitation of the site. Explaining my concerns and making sure I was kept up to date with exploration activities meant I was always aware of what was going on." – Andy Czuczman, landholder