

Government of Western Australia Department of Mines, Industry Regulation and Safety Resources Safety

Mineral exploration: Site operations audit – guide

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Introduction

This document was reformatted in November 2015. At this time no material changes were made to the content of the guide, which was originally published in February 2014 under the title *Guide to mineral exploration high impact function (HIF) audit 2014 Part 2 – Site operations*.

Note: The Safety Regulation System (SRS) has replaced the AXTAT system and all reporting is done online through SRS.

The scope of the mineral exploration audit documents cover the occupational safety and health standards associated with the management of mineral exploration, including drilling both remotely and on an existing mine site. It does not cover the environmental standards that also apply to exploration operations.

The three mineral exploration audit documents cover:

- overall safety and health management systems (Part 1),
- how these management systems are implemented on site and for operational activities in general (Part 2), and
- drilling and other field activities in particular (Part 3).

These are structured so that operators can select those aspects relevant to the size and complexity of their operations, and the activities undertaken, and tailor the audit accordingly. Not all standards may be applicable. Standards that are not applicable should be ignored as they will not influence audit outcomes. For example, an exploration company might conduct an audit using Parts 1 and 2 and some of Part 3, while its drilling contractors might audit against relevant sections of Part 2 and all of Part 3. Specific personnel may be assigned different sections to audit.

Some audit standards in Part 1 and 2 appear to be duplicated but the intent is that Part 1 covers the development of higher level management systems while Part 2 covers their implementation in the field. Where a Part 2 standard refers to the implementation of a system, a reference is included to the corresponding management standard in Part 1.

This part covers site-specific exploration hazards, including personnel and general activities and infrastructure associated with field exploration.

Where the term "verify" is used in the guideline intent, it implies there is a regulatory requirement for compliance with the standard. Where the term "ensure" is used, there is no mandatory requirement for compliance but the standard sets out a recommended practice, which, if followed, should minimise the risk of incidents.

The audit should be read and used in conjunction with Resources Safety's code of practice on mineral exploration drilling.

Exploration guidance material, including charts showing statutory appointments for exploration operations under the *Mines Safety and Inspection Act 1994* (MSIA) and Mines Safety and Inspection Regulations 1995 (MSIR), is available from the Department of Mines and Petroleum web site, www.dmp.wa.gov.au.

Other useful references include:

- Australian Emergency Management, em.gov.au
- Bureau of Meteorology, bom.gov.au
- Department of Health, health.wa.gov.au/services
- Department of Fire and Emergency Services (DFES, formerly FESA), dfes.wa.gov.au
- North Australian Fire Information, firenorth.org.au
- Royal Flying Doctor Service, flyingdoctor.org.au
- Safe Work Australia, safeworkaustralia.gov.au
- State Emergency Services, ses-wa.asn.au
- Western Australia Police, police.wa.gov.au

1 Safety management

Safety management

Point	Standard	Guideline	
1.1	There is a system in place to identify and address hazards associated with site-specific exploration activities (e.g. mapping, sampling, surveying, gridline preparation, costeaning, drilling, downhole logging), and the hazard register is reviewed and amended as required.	Intent: To verify exploration hazards are identified and controlled, and risks have been assessed. Personnel: Registered Manager and/or Exploration Manager and/or person in charge of site and/or other relevant employees. Method: Interview relevant employees. View documentation (e.g. hazard assessments). Refer to MSIA s. 9 and MSIR r. 4.1.	
1.2	Safe systems of work have been implemented for specific items identified in the hazard register.	Intent: To verify exploration hazards are controlled. Personnel: Registered Manager and/or Exploration Manager and/or person in charge of site and/or other relevant employees. Method: Interview relevant employees. View documentation. Refer to MSIA s. 9.	
1.3	The hierarchy of control has been applied to eliminate exploration hazards or reduce the exposure, and reduce reliance on administrative and personal protective clothing and equipment (PPE) controls.	 Intent: To verify measures are implemented to control exploration hazards and the actions taken are effective. Personnel: Registered Manager and/or Exploration Manager and/or person in charge of site and/or other relevant employees. Method: Interview relevant employees. View documentation. Inspect exploration operations and check measures in effect (e.g. communication schedule, dust suppression systems, noise enclosures). Inspect the measures implemented and gauge their effectiveness. Refer to MSIA ss. 3 and 9. 	

1.4	The exploration area has been assessed and hazardous ground conditions delineated and effectively managed.	 Intent: To verify that there are adequate controls to prevent ingress into hazardous areas. Personnel: Registered Manager and/or Exploration Manager and/or person in charge of site and/or other relevant employees. Method: Interview relevant employees. View documentation and historical data and records (e.g. existing workings, plugged drill holes). Barricade high-risk areas, forbid entry into old workings and, if necessary, rehabilitate existing drill holes. Refer to MSIR r. 3.8.
1.5	The camp and associated facilities and amenities should be located to reduce exposure to natural and drilling hazards, and ensure hygienic conditions are maintained.	Intent: To ensure the camp is safe and hygienic. Personnel: Registered Manager and/or Exploration Manager and/or person in charge of site and/or other relevant employees. Method: Interview relevant employees. View documentation. Natural hazards include fuel load and flood plains.
1.6	There is an up-to-date contact list for management, supervisors and other relevant persons available on site.	Intent: To ensure communication is possible between onsite and management personnel. Personnel: Registered Manager and/or Exploration Manager and/or person in charge of site and/or other relevant employees. Method: Interview relevant employees. View documentation.
1.7	A competent person regularly checks all storage and handling systems for dangerous goods and hazardous substances.	Intent: To ensure the integrity and suitability of containers and transfer systems for dangerous goods and hazardous substances. Personnel: Registered Manager and/or Exploration Manager and/or person in charge of site and/or other relevant employees. Method: Interview relevant employees. View storage and handling systems, sight licence documentation and inspection records.

1.8	Where necessary, appropriate PPE is provided and used to reduce exposure to safety and health hazards.	Intent: To verify PPE is available and used by employees where it is necessary to reduce occupational exposure to safety and health hazards.
		Personnel:
		Registered Manager and/or Exploration Manager and/or person in charge of site and/or other relevant employees.
		Method:
		Interview relevant employees. View documentation. View range of PPE made available. During site inspection, observe employees to determine if PPE is appropriate and worn correctly. Refer to MSIR r. 4.1.

2 Personnel

Personnel

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Point	Standard	Guideline
2.1	All personnel have received adequate information, instruction and training relating to the hazards identified for the site and safe systems of work for the tasks required of them. [see Part 1, 3.1]	Intent: To verify personnel are adequately informed, instructed and trained in safety procedures and safe systems of work to manage risks associated with the hazards of exploration operations in remote sites. Personnel: Registered Manager and/or Exploration Manager and/or person in charge of site and/or other relevant employees. Method: Interview relevant employees. Sight training, assessment and verification records. Refer to MSIA s. 9(1) and MSIR rr. 3.6 and 4.13.
2.2	Before commencing work, all personnel have been assessed as competent to perform the tasks they have been assigned. [see Part 1, 3.2]	Intent: To verify personnel have been assessed as competent to perform their assigned tasks. Personnel: Registered Manager and/or Exploration Manager and/or person in charge of site and/or other relevant employees. Method: Interview relevant employees, asking about assessment practices. Sight training, assessment and verification records. Refer to MSIR r. 4.13.
2.3	All personnel have received adequate information, instruction and training relating to the risk factors affecting fitness-for-work.	 Intent: To verify personnel are adequately informed, instructed and trained to manage risks associated with fitness-forwork. Personnel: Registered Manager and/or Exploration Manager and/or person in charge of site and/or other relevant employees. Method: Interview relevant employees. Sight training, assessment and verification records. Refer to MSIA ss. 9(1) and 10(1) and MSIR rr. 3.6, 4.7 and 4.13.

2.4	All personnel are assessed as fit-for-work before commencing work.	Intent: To verify personnel are fit-for-work. Personnel: Registered Manager and/or Exploration Manager and/or person in charge of site and/or other relevant employees. Method: Interview relevant employees. View documentation. Sight assessment records. Refer to MSIA s. 9 and MSIR r. 4.7.
2.5	Any personnel undergoing instruction and training are supervised in such a manner that they are not exposed to hazards.	Intent: To verify personnel undergoing instruction and training are supervised. Personnel: Registered Manager and/or Exploration Manager and/or person in charge of site and/or other relevant employees. Method: Interview relevant employees, asking about supervision practices when training. View documentation. Refer to MSIA s. 9(1).
2.6	Relevant personnel have been retrained and reassessed whenever systems of work or plant and equipment changed, or new systems of work or plant and equipment were introduced. [see Part 1, 3.3]	 Intent: To verify personnel are competent for the systems of work or plant and equipment they are using. Personnel: Registered Manager and/or Exploration Manager and/or person in charge of site and/or other relevant employees. Method: Interview relevant employees who undertake high-risk work, asking about assessment practices. Sight records and documentation. Refer to MSIA ss. 9 and 60(4), and MSIR rr. 4.13 and 6.37(1)(a).

2.7	Any personnel undertaking high-risk work have been assessed as competent on each item of plant or equipment they are using, and have the required licence, where applicable. [see Part 1, 3.5]	Intent: To verify personnel undertaking high-risk work are competent on each item of plant or equipment they are using, and have the required licence, where applicable. Personnel: Registered Manager and/or Exploration Manager and/or person in charge of site and/or other relevant employees. Method: Interview relevant employees. Sight training, assessment, verification and licence records. Sight licences, where applicable. Refer to MSIR rr. 4.13 and 6.37(1)(a).
2.8	Personnel are adequately supervised to allow them to carry out their tasks safely. [see Part1, 3.6]	Intent: To verify personnel are sufficiently supervised, where required, to reduce exposure to hazards. Personnel: Registered Manager and/or Exploration Manager and/or person in charge of site and/or other relevant employees. Method: Interview relevant employees. View documentation. Refer to MSIA s. 9(1).
2.9	Records of instruction, training, retraining, assessment or reassessment given are accessible by site personnel, when required.	Intent: To ensure records are accessible when ascertaining a person's training and competency. Personnel: Registered Manager and/or Exploration Manager and/or person in charge of site and/or other relevant employees. Method: Interview relevant employees. Sight training documentation and records.

3 Emergency response

Emergency response

Point	Standard	Guideline
3.1	The emergency response plan is accessible on site to all personnel.	Intent: To verify site personnel have access to the emergency response plan. Personnel: Registered Manager and/or Exploration Manager and/or person in charge of site and/or other relevant employees. Method: Interview relevant employees. Assess their familiarity with the location of the site's emergency response plan. View documentation. Refer to MSIA 9(1).
3.2	All personnel are familiar with the emergency response plan and their responsibilities. [see Part 1, 4.3]	 Intent: To verify site personnel are aware of their responsibilities. Personnel: Registered Manager and/or Exploration Manager and/or person in charge of site and/or other relevant employees. Method: Interview relevant employees. Sight training records. Assess their familiarity with the emergency response plan and their responsibilities in an emergency. Refer to MSIR r. 4.30(2).
3.3	Emergency communication systems are accessible to all personnel. [see Part1, 4.4]	 Intent: To verify effective means of communication are provided to all personnel. Personnel: Registered Manager and/or Exploration Manager and/or person in charge of site and/or other relevant employees. Method: Interview relevant employees. View communication systems and procedures. Inspect communication equipment provided at exploration sites and in vehicles, and assess if accessible to all personnel. Refer to MSIR r. 4.30(2).

3.4	The communication system is tested and maintained in accordance with the management schedule. [see Part 1, 4.4]	 Intent: To verify communications are assured in the event of an emergency. Personnel: Registered Manager and/or Exploration Manager and/or person in charge of site and/or other relevant employees. Method: Interview relevant employees. View documentation regarding testing and maintenance of communication equipment. Inspect communication equipment are provided at exploration sites and in vehicles, and assess if operable. Refer to MSIR r. 4.30(2).
3.5	All personnel have been trained in the use of the emergency communication equipment and procedures.	 Intent: To verify communication can be made in an effective and timely manner. Personnel: Registered Manager and/or Exploration Manager and/or person in charge of site and/or other relevant employees. Method: Interview relevant employees. View documentation regarding training of personnel in the use of the emergency communication equipment. Refer to MSIR r. 4.30(2).
3.6	A person qualified in first aid is available at the site at all times when personnel are present. [see Part 1, 4.5]	 Intent: To verify a person qualified in first aid is available at the site at all times when personnel are present. Personnel: Registered Manager and/or Exploration Manager and/or person in charge of site and/or other relevant employees. Method: Interview relevant employees. Sight training records and first aid qualifications. Refer to MSIR r. 4.26.

3.7	Where practicable, a person qualified in appropriate advanced first aid is present or available on call.	Intent: To verify a person qualified in appropriate advanced first aid is on site or available on call. Personnel: Registered Manager and/or Exploration Manager and/or person in charge of site and/or other relevant employees. Method: Interview relevant employees. Sight training records and first aid qualifications, or service provider arrangements. Refer to MSIR r. 4.26.
3.8	First aid and emergency equipment provided is adequate to respond to the types of incidents that may occur as identified in the hazard register.	 Intent: To verify adequate first aid and emergency equipment is provided at site. Personnel: Registered Manager and/or Exploration Manager and/or person in charge of site and/or other relevant employees. Method: Interview relevant employees. View documentation regarding provision of first aid and emergency equipment. Inspect first aid and emergency equipment. Inspect first aid and emergency equipment provided at exploration sites, in vehicles and for personnel on foot. Refer to MSIR r. 4.24.
3.9	The management plan to transport injured personnel to medical treatment is accessible on site to relevant personnel and can be implemented. [see Part 1, 4.6]	 Intent: To verify a management plan for the evacuation or transport of injured personnel to medical treatment is available. Personnel: Registered Manager and/or Exploration Manager and/or person in charge of site and/or other relevant employees. Method: Interview relevant employees. View documentation regarding escort and transport arrangements, including mutual aid, MOUs and third party agreements. Inspect resources (e.g. helipad or landing strip, vehicle suitable for spine board and rough terrain). Refer to MSIR r. 4.27.

3.10	The emergency response contact list, including qualified first aiders, is accessible on site to all personnel.	Intent: To verify all essential persons are contactable. Personnel: Registered Manager and/or Exploration Manager and/or person in charge of site and/or other relevant employees. Method: Interview relevant employees. Assess their familiarity with the location of the site's emergency response contact list. View documentation. Refer to MSIA 9(1).
3.11	Fire extinguishers and/or fire suppression systems are provided for all plant and equipment.	 Intent: To verify fire extinguishers and/or fire suppression systems are provided to deal with fires on plant and equipment. Personnel: Registered Manager and/or Exploration Manager and/or person in charge of site and/or other relevant employees. Method: Interview relevant employees. View available fire extinguishers and/or fire suppression systems on all plant and equipment during inspections. Refer to MSIR r. 4.30.
3.12	Personnel have been trained and assessed in fire prevention and the use of fire- fighting equipment.	Intent: To verify personnel are competent to use fire-fighting equipment. Personnel: Registered Manager and/or Exploration Manager and/or person in charge of site and/or other relevant employees. Method: Interview relevant employees. Sight training records. Refer to MSIR r. 4.30(2).

4 Isolation and tagging

Isolation and tagging

Point	Standard	Guideline
4.1	Isolation and lock-out/tag-out systems are implemented in accordance with the site procedures. [see Part 1, 5.1]	Intent: To verify documented isolation and lock-out/tag-out systems are established. Personnel: Registered Manager and/or Exploration Manager and/or person in charge of site and/or other relevant employees. Method: Interview relevant employees. View documentation. Refer to MSIR r. 6.21.
4.2	Relevant personnel have been trained and assessed in the use of isolation and the lock- out/tag-out systems. [see Part 1, 5.2]	Intent: To verify relevant personnel have been trained in the use of isolation and lock-out/tag-out systems. Personnel: Registered Manager and/or Exploration Manager and/or person in charge of site and/or other relevant employees. Method: Interview relevant employees. View documentation. Refer to MSIR rr. 6.21 and 6.29(2).
4.3	Completed OUT OF SERVICE tags are used to warn against the use of plant or equipment that is unsafe to use, may be damaged if used, or is being repaired or maintained.	Intent: To verify OUT OF SERVICE tags are being used when required. Personnel: Registered Manager and/or Exploration Manager and/or person in charge of site and/or other relevant employees. Method: Interview relevant employees. View documentation. During inspections observe the presence of tags at drilling and other exploration operations. Refer to MSIR r. 6.21.

4.4	PERSONAL DANGER tags and locks are used on plant or equipment on which work is undertaken.	Intent: To verify PERSONAL DANGER tags are being used when required. Personnel: Registered Manager and/or Exploration Manager and/or person in charge of site and/or other relevant employees. Method: Interview relevant employees. View documentation. Sight documentation. Refer to MSIR r. 6.21.
4.5	The effectiveness of the isolation of plant or equipment is tested prior to commencement of work.	Intent: To verify the effectiveness of isolation and lock-out/tag- out systems. Personnel: Registered Manager and/or Exploration Manager and/or person in charge of site and/or other relevant employees. Method: Interview relevant employees. View documentation. Sight documentation. Refer to MSIR r. 6.21.

5 Plant and equipment

Plant and equipment

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Point	Standard	Guideline
5.1	Plant and equipment are inspected and maintained in accordance with the management schedule. [see Part 1, 7.2 and 8.1]	Intent: To verify plant and equipment are inspected and maintained in accordance with the management schedule. Personnel: Registered Manager and/or Exploration Manager and/or person in charge of site and/or other relevant employees. Method: Interview relevant employees. View documentation.
5.2	Records are kept for maintenance of plant and equipment. [see Part 1, 8.8]	Intent: To verify maintenance has been carried out according to the schedules and records are maintained. Personnel: Registered Manager and/or Exploration Manager and/or person in charge of site and/or other relevant employees. Method: Interview relevant employees. View documentation. Refer to MSIR r. 6.25.
5.3	Electrical equipment and cables are periodically inspected and tagged or removed from service if unsafe. [see Part 1, 6.2]	 Intent: To verify electrical equipment and installations are maintained in a safe working condition. Personnel: Registered Manager and/or Exploration Manager and/or person in charge of site and/or other relevant employees. Method: Interview relevant employees. View documentation. Refer to MSIR r. 5.27.

5.4	Electrical welding equipment is maintained in safe condition. [see Part 1, 6.3]	 Intent: To verify electric welding equipment is regularly tested and inspected. Personnel: Registered Manager and/or Exploration Manager and/or person in charge of site and/or other relevant employees. Method: Interview relevant employees. Sight maintenance records. Inspect welding machines to check if tagging is attached and current. Check for welding leads and accessories for visible damage/defects. Refer to MSIR r. 5.27 and AS 1674.
5.5	Pre-start checks are conducted for plant and equipment used on site. [see Part 1, 8.4]	Intent: To ensure plant and equipment are checked prior to use. Personnel: Registered Manager and/or Exploration Manager and/or person in charge of site and/or other relevant employees. Method: Interview relevant employees. View pre-start check documentation to verify existence and adherence to system.
5.6	Operational faults are reported in accordance with the site procedures. [see Part 1, 8.5]	Intent: To ensure operational faults on plant and equipment are identified and reported. Personnel: Registered Manager and/or Exploration Manager and/or person in charge of site and/or other relevant employees. Method: Interview relevant employees. View documentation verifying existence of procedure. Sight sample of records of reported faults and remedial action. During site inspection check for visible defects and determine if procedure is being observed.

5.7	Operational faults are dealt with in a timely manner, based on the risk they present.	Intent: To ensure operational faults are dealt with in a timely manner. Personnel: Registered Manager and/or Exploration Manager and/or person in charge of site and/or other relevant employees. Method: Interview relevant employees. View documentation verifying existence of procedure. Sight sample of records of reported faults and remedial action.
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5.8	ROPS/FOPS is installed as necessary and maintained. [see Part 1, 7.5]	Intent: To verify earth-moving equipment is equipped with operator protective devices to manage rollover and falling object dangers.
		Personnel:
		Registered Manager and/or Exploration Manager and/or person in charge of site and/or other relevant employees.
		Method:
		Interview relevant employees. View documentation. Inspect plant and equipment. Refer to MSIR rr. 4.15 and 6.4(2).

6 Facilities and amenities

Facilities and amenities

Point	Standard	Guideline
6.1	The facilities provided for maintenance and storage are appropriate for the tasks undertaken. [see Part 1, 9.1]	 Intent: To ensure suitable maintenance and storage facilities are provided for plant, vehicles and supplies. Personnel: Registered Manager and/or Exploration Manager and/or person in charge of site and/or other relevant employees. Method: Interview relevant employees. View facilities. Consideration must be given to the location of the exploration site and scope of work in terms of the facilities provided.
6.2	The facilities provided for sample handling are designed to eliminate or mitigate hazardous manual tasks.	Intent: To ensure sample handling facilities minimise exposure to hazardous manual tasks. Personnel: Registered Manager and/or Exploration Manager and/or person in charge of site and/or other relevant employees. Method: Interview relevant employees. View facilities.
6.3	The plant and equipment maintenance and storage facilities are maintained in good condition.	Intent: To ensure maintenance and storage facilities are maintained in a safe working condition. Personnel: Registered Manager and/or Exploration Manager and/or person in charge of site and/or other relevant employees. Method: Interview relevant employees. View documentation. Inspect facilities.

6.4	Fire-fighting and suppression equipment appropriate for the facilities is readily accessible.	 Intent: To verify fire-fighting and suppression equipment is available. Personnel: Registered Manager and/or Exploration Manager and/or person in charge of site and/or other relevant employees. Method: Interview relevant employees. View documentation. Inspect facilities for fire control equipment. Refer to MSIR r. 4.30.
6.5	Signs are displayed to warn of hazards and the required control measures.	 Intent: To verify warning signs are displayed to notify personnel of hazards. Personnel: Registered Manager and/or Exploration Manager and/or person in charge of site and/or other relevant employees. Method: Interview relevant employees. View hazard signage and sight documentation. Inspect workshop. Refer to MSIR r. 4.10.
6.6	Dangerous goods and hazardous substances are clearly identified and properly labelled.	Intent: To verify all dangerous goods and hazardous substances are clearly marked and labelled. Personnel: Registered Manager and/or Exploration Manager and/or person in charge of site and/or other relevant employees. Method: Interview relevant employees. View hazardous materials and assess all labelling. Refer to MSIR r. 7.24.
6.7	Material safety data sheets are available for substances used at site.	 Intent: To verify critical information on all substances used on site is available. Personnel: Registered Manager and/or Exploration Manager and/or person in charge of site and/or other relevant employees. Method: Interview relevant employees. View documentation. At a minimum material data sheets should be available for all substances located on site. Refer to MSIR r. 7.21.

6.8	Adequate eating and ablution facilities are provided.	Intent: To verify hygienic eating and ablution facilities are available.
		Personnel:
		Registered Manager and/or Exploration Manager and/or person in charge of site and/or other relevant employees.
		Method:
		Interview relevant employees. View facilities. Adequate facilities for all site personnel should be available. Refer to MSIR rr. 7.17, 7.12 7.13, 7.17 and 7.19.