TOPIC 5
Isolation, Tagging, Permits and Defect Reports

Quick Find

Isolation, tagging, permits, defect reporting, and incident/ accident reporting procedures are in place on all mine sites as fundamental methods of protecting mine workers from accident and injury. It is essential that you become familiar with each process to ensure your own personal safety, the safety of your workmates, and the safety of plant and equipment. The procedures will vary slightly from mine to mine.

You will be instructed in the site tagging and isolation procedures during the site specific induction at each mine.

1. ISOLATION

Isolation refers to the process of ensuring that there is **no possibility** of any energy source being present which could cause injury to personnel as they are carrying out tasks on plant and equipment. This does not mean simply switching off the source of energy – it includes making sure that the energy source cannot be turned on again until the work is finished.

As discussed in Topic 4, the types of energy that may need to be isolated include:

- electrical energy
- mechanical energy
- gravitational energy
- stored pressure
- chemical energy
- thermal energy.

Isolation procedures always involve the use of **Personal Danger Tags** used in combination with **personal isolation locks**. The tag directs all personnel that the equipment is not to be started or operated – the lock makes absolutely sure that the equipment is not started. The Personal Danger Tag and lock is your own insurance against injury.

ISOLATION LOCKS

Isolation locks are used to lock an isolation switch or device in the isolated (off) position. Each worker has the only key to their lock. They should attach their own lock at the commencement of the job and remove it at the completion of the job or at the end of the shift.

Group Lock

Scissor Lock

Lock Box

Valve Lockout

Group Lockouts

Group lockouts are used when more than one person is working on a piece of equipment or on multiple pieces of interrelated equipment. As for normal lockouts, all personnel working on the equipment should have **their own lock and tag** in place. It would be physically impossible to attach each person's lock to the same isolation point or switch. In addition, if a number of isolation points are involved, a very large number of locks would be needed.

Group lockouts use systems that enable fewer locks to be used but still guarantee protection to each worker. Below are three examples of group lockout systems that are used on mines.

- **Scissor Lock**

As can be seen from the diagram, this device enables a number of workers to lock out a single isolation point. The isolation point cannot be turned on again until the last person's lock is removed.

- **Lock box**

A lock box enables the supervisor of the work to lock out and tag all of the isolation points. The keys from these locks are then placed into the lock box. The other people working on the equipment each lock and tag the lock box using their own personal isolation lock. Every person must remove their own lock before the box can be reopened to gain access to the keys to the locks on the isolation points   This prevents the equipment being re-energised while anyone is still working on it.

- **Isolation Board**

Similar to a lock box, the isolation board has the keys to the locks on the equipment placed inside. Once the keys are inside people are able to apply their personal lock and tag to the lock points on the board which prevents access to the key/s.

By using any of these methods, none of the isolated equipment is able to be re-energised until all locks have been removed from the device.

Specialised locks are available to lockout devices such as power plugs and valves.

GENERAL ISOLATION PROCEDURES

Every mine site will have its own particular isolation system in place. It is important that you become familiar with your mine site's lockout system and ensure you follow it precisely.

The following general procedures regarding isolation provide a basis to which you can add site-specific information.

The basic steps of safe isolation are:

1. **Identify** the equipment to be worked on and the isolation requirements.

2. **Isolate** - Ensure that the intended isolation will not cause injury or damage and that all points are isolated. Be aware that the equipment may require the isolation of several energy sources.

3. **Lock & Tag** - Apply your personal isolation lock and personal danger tag to the isolation point/s.

4. **Dissipate** - Check and remove all stored energy

5. **Verify** - Check and ensure that the equipment is correctly isolated and cannot be re energised

This requires you to:

1. Identify all of the locations from which the equipment may be started eg at the plant, from a control room

2. Identify any associated equipment which could present a danger during any operation or maintenance work. This should also be isolated.

   For example, when working on a vibratory screen in a bin bottom, it would be necessary to isolate, tag and lock:

   o   the conveyor below the bin (03)

   o   the conveyor feeding the bin (02)

   o   the vibratory screen itself.

3. Stop the operation of the equipment using the normal shutdown procedures and controls.

4. Isolate the energy sources by either moving the main isolation switch/es to the off position or by making a mechanical disconnection.

5. Lock the isolation switch/es or device/s in the off position using an isolation lock.

6. Complete a Personal Danger Tag for each isolation point and sign it. All of the required information **must** be legibly printed on the tag.

Work to be carried out in this section

Conveyor 02

Crusher

Vibrating Screen
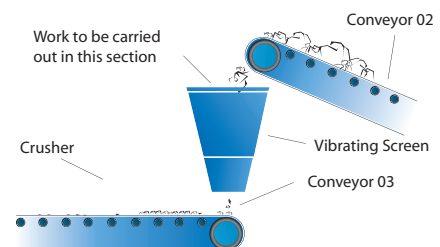
Conveyor 03

Conveyor 02   Conveyor 03   Vibrating Screen

CORRECTLY TAG ALL
ASSOCIATED EQUIPMENT

7. Attach the completed Personal Danger Tag to the locked isolation point.

8. Test the isolation. If a number of people are working on the equipment, the first person to isolate it should always attempt to restart the isolated equipment using any alternative un-isolated controls (eg push buttons) to ensure that it is actually isolated.

9. Each and every additional coal mine worker working on the equipment should attach their own completed Personal Danger Tag and isolation lock to the isolation point. Each individual should be certain that the switches, valves or other isolation devices to be tagged and locked are the correct items and that they are in the correct position to make the equipment safe. If in doubt, the person supervising the work should be consulted before proceeding.

10. Individuals may only remove their own Personal Danger Tag and lock from the isolation point.

Tagged and locked switch

Special conditions:

- If the equipment is connected to a power source by a removable plug, switch off the power and remove the plug. Attach a safety lockout device and Personal Danger Tag and lock securely to the plug.

- Compressed air and pressurised systems should be isolated at the valves as close as possible to the job. Ensure that the system is bled before starting work.

Tagged and locked 3 pin plug

- On pressurised systems, tag the bleed valve in the open position.

- On compressed air systems which are connected to the supply by a removable hose, turn off the valve, bleed the air from the system and disconnect the hose. Attach your Personal Danger Tag and lock to the hose coupling.

- When isolating mechanical equipment, ensure that your isolation is effective against any stored or potential energy which the system may have. In some cases, it may be necessary to disconnect drive shafts or insert pins, chocks, props, or other blocking devices. Attach your Personal Danger Tag and lock at the most appropriate place in the drive system. For example, at the control isolation point and at any drive system disconnection you have made.

- When working on mobile equipment you should turn the ignition switch off and attach your Personal Danger Tag to the ignition switch/key. Also, isolate/disconnect the battery and attach a Personal Danger Tag and lock to the isolation switch or disconnected battery lead.

> *Caution:*
>
> **If you are unfamiliar with the isolation procedures for a given task or work area or if you are not certain about the procedure's effectiveness, do not proceed with the job. Consult your supervisor to obtain clarification.**

If the machinery must be moved or operated before the job is complete (eg to inch a conveyor forward, to partly rotate a ball mill, to hydraulically raise a component to gain access):

1. all coal mine workers working on the job are to remove their Personal Danger Tags and isolation locks and stand clear.

2. Only then can the isolation switch/es or devices be set to the operational position and the equipment operated.

3. when the movement or operation is complete, the isolation device must be reset to the isolated position and all coal mine workers working on the equipment must replace their Personal Danger Tags and locks before recommencing work.

Removing Personal Danger Tags

The following procedures for the removal of Personal Danger Tags should be obeyed at all times.

- Each coal mine worker must remove his/her own Personal Danger Tag and lock when the job is finished or at the end of a shift.

- If the equipment is not serviceable at the completion of a job or shift, an Out of Service Tag should be attached to the isolation device before all Personal Danger Tags and locks are removed.

- Disposable Personal Danger Tags should be destroyed and disposed of properly once they have been removed.

- No coal mine worker may remove another coal mine worker's Personal Danger Tag or lock except in the circumstances detailed below.

> *Warning:*
>
> **The only circumstances under which a Personal Danger Tag may be removed by a person other than the individual who placed it, is when it has been proven that the coal mine worker who placed the tag is unavailable. Site specific procedures will apply to this situation.**

Generally in this situation, the site's senior manager or a person nominated to act on their behalf will fully investigate the situation, personally satisfy themselves that the coal mine worker is in fact definitely unavailable, and that no dangerous condition exists. Only after such full investigation and satisfactory proof that no danger exists, may the site's senior manager or the nominated person remove the tag and lock.

If the coal mine worker concerned can be contacted, then they should return to the site and personally remove the tag and lock. In all cases, the site's senior manager will make a detailed report of the incident and record it in the Mine Record.

> *Warning:*
>
> **It is your personal responsibility to ensure that your Personal Danger Tag and isolation lock are placed and removed in accordance with these procedures.**

ELECTRICAL ISOLATION

Some devices/switches do not provide isolation and therefore will not provide sufficient protection. Examples of such devices are:

Emergency stop button

- Push button controls
- Emergency stop buttons or trip wires
- Switches or control switches
- Levers in control rooms or operating panels
- Controls or shut-off valves that are operated by pneumatic or hydraulic energy or by an electrical solenoid

These switches and devices are NOT to be used as isolation switches and are NOT to be tagged with Personal Danger Tags. In these cases, when isolation devices are not available at the equipment, the relevant power isolation switch inside the substation or switch room must be isolated by an authorised mine electrician and tagged by all members of the work crew. A permit will be required for some electrical isolations.

The following general procedure should be observed when requiring an electrical isolation.

1. Identify the areas where electrical isolation is required and request an authorized mine electrician to carry out the isolation.
2. Shut down the equipment in the correct sequence and have the electrician carry out the isolation/s.
3. When the mine electrician has completed and tested the isolation, each member of the work crew should attach their fully completed Personal Danger Tag and isolation lock to the isolation device/s.
4. Carry out any other isolations (e.g. mechanical) that are necessary to allow the job to proceed.
5. Complete the job.

6. Request electrical personnel to remove the isolation. When the mine electrician is ready, ensure that all members of the work crew have removed their Personal Danger Tags.

7. Ensure all coal mine workers are clear of any danger areas and have the mine electrician restore supply.

Every mine site will have its own particular electrical isolation system in place. It is important that you become familiar with your mine site's system and ensure you follow it precisely.

> *Caution:*
>
> *Electrical equipment and conductors may only be accessed by authorised electrical personnel.*

2. OTHER TAGGING PROCEDURES

Most mines operate a tagging system which uses other types of tags, the main ones being:

- **Out of Service Tags** – are placed on the isolation point/s of defective equipment which, if operated, could cause injury, equipment damage or adversely affect some part of the operation.

- **Information Tags** – are used to pass on a message or instruction to personnel operating or working on a particular item of equipment or machinery.

The following information about tagging is generally applicable but tagging procedures will vary from mine to mine. Ensure you familiarise yourself with the system at your mine.

> *Danger:*
>
> *When there is a tag on an item of equipment that you wish to use or work on, read the tag before you do anything. Failure to read and follow the instructions on a tag attached to any equipment could result in the death or injury of yourself or workmates.*

OUT OF SERVICE TAGS

Out of Service Tags are placed on the isolation point/s of defective equipment which, if operated, could cause personal injury, equipment damage, or adversely affect some part of the operation.

> *Warning:*
>
> *Do not use Out of Service Tags in place of Personal Danger Tags.*

Attaching Out of Service Tags

The following procedures for attaching Out of Service Tags should be obeyed at all times.

- Any coal mine worker may attach Out of Service Tags to the isolation point/s and appropriate switch or control of items of equipment which they have identified as being hazardous to coal mine workers, equipment, or the operation, if it were to be started up or operated.

- All of the required information must be legibly printed on the tag.

- The coal mine worker attaching the tag should ensure that:
  - the tag is signed
  - the tag is securely attached to the appropriate switch or control
  - the coal mine worker responsible for the equipment is notified of the defect.

- At the end of a shift or job, any equipment that remains unserviceable should have an Out of Service Tag attached.

Removing Out of Service Tags

- Out Of Service Tags may only be removed by a coal mine worker competent and authorised to do so.

- The tag must not be removed until the equipment is safe and its correct operation will not cause injury to coal mine workers or damage to equipment.

- After removal, the Out Of Service Tag should be destroyed and disposed of in an appropriate manner.

INFORMATION TAGS

Information Tags provide a means of conveying a message or instruction to coal mine workers operating or working on a particular item of equipment or machinery. The tag will highlight information that should be brought to the attention of all coal mine workers who work with or around the particular equipment item. For example:

- restrictions placed upon equipment that is nonetheless safe to use

- changes in operational sequences

- identification of equipment that requires maintenance

- variations to operational speeds.

Equipment or machinery to which an information tag has been attached may be used and operated after taking the information into account. Coal mine workers should not operate any equipment to which an Information Tag is attached until they have read and understood its written advice.

Attaching Information Tags

- Information Tags should be attached to isolation devices or in locations where they will be readily seen (e.g. on a steering wheel).

- The coal mine worker attaching the information tag is to complete all informational boxes.

- It is important that the operator inspects the condition of the tag regularly and replaces it if it shows signs of deterioration.

Removing Information Tags

When the reason for the information tag no longer exists the tag may be removed by the:

- coal mine worker who attached it

- maintenance person responsible for repair/inspection of the item of equipment

- operator responsible for the use of the item of equipment.

Note:

Attachment of an information tag will not prevent the operation of equipment. It is not to be used in place of an Out of Service or Personal Danger Tag and lock.

Warning:

During pre-start inspections, you must always check if there are any tags attached to the equipment. When a tag is attached, read the tag before you do anything else – failure to do this could endanger your own or someone else's life, or cause damage to the equipment.

OTHER TAGS

Mines may use other tags that are unique to that site or Company. You will be told about these during your on-site induction.

3. PERMITS

Permit systems are used extensively on mine sites to:

- provide site management with control of certain activities on site

- ensure that these activities are planned and carried out safely

- ensure that coal mine workers who carry out these functions are provided with instructions that are specific to the job in question.

The responsible officer must complete a risk assessment and put all appropriate controls in place prior to issuing a permit.

For each type of permit, a person is appointed with the responsibility of ensuring that all procedures and conditions are carried out in accordance with the permit. They must carry a copy of the permit at all times.

All persons working on the job must be given detailed instructions on how the job is to be carried out, and what is authorized and what is prohibited.

All persons are required to sign on to the permit as they come on to the job, and sign off the permit as they go off the job no matter for how long. Each person may also be required to attach their Personal Danger Tag and lock to the relevant isolation device/s.

Prior to cancelling the permit, all Personal Danger Tags are to be removed in accordance with tagging procedures and each individual should sign off the permit.

You can expect that on any given mine site the following permits may be required.

Isolation Permit

Isolation Permits may be required for certain isolation tasks usually involving high voltage installations. In these cases, an authorised mine electrician will carry out the isolation. A site specific isolation permit system will be in place on each mine site.

Confined Space Permits

A Confined Space Permit will be required before coal mine workers may enter a work area designated as a confined space. Australian Standard AS2865 defines a confined space, but in general terms it includes an enclosed or partially enclosed space that:

- may be difficult to enter and leave
- is not intended primarily as a place of work except for repair or maintenance
- presents potential hazards such as engulfment, mechanical hazards,
- has a toxic, oxygen deficient or flammable atmosphere.

Examples of confined spaces include:

- storage tanks, process vessels, pressure vessels, storage silos
- open-topped spaces such as pits or degreasers
- pipes, sewers, shafts, ducts
- any spaces entered through a small hatch or access point

Example of confined space

Any person who is required to perform work activities in a confined space must be trained and assessed as competent to carry out those activities as per AS2865. Each coal mine worker required to enter the area, should ensure that equipment has been isolated and that they understand the safe work practices specified in the permit.

A site specific confined space permit system will be in place on each mine site.

Flame Clearance/Hot Work Permit

A Flame Clearance or Hot Work Permit will be required when hot work is to be carried out in certain areas on site. 'Hot Work' can be defined as any work or procedure that involves the use of:

- oxy/acetylene cutting equipment
- welding equipment
- grinding equipment
- any naked flame or mechanical friction process.

Areas where permits will be required would include: workshops, in a coal dust environment, in tunnels, near fuel or flammable substances, near explosives, in or on any container or tank that contains or has contained fuel or flammable substances, underground (- additional requirements are mandated by Legislation), and in any confined space.

The following special procedures apply to flame clearance/hot work permits:

- the supervisor responsible for the work area is to raise the Flame Clearance/Hot Work Permit
- all details requested on the Flame Clearance/Hot Work Permit are to be completed prior to the job commencing

> *Note:*
>
> *The following is required under the legislation:*
> - *A risk assessment must be carried out*
> - *The Inspectorate is to be notified*
> - *Atmospheric testing must be carried out*
> - *Fire controls are to be put in place.*

Excavation Permit

On some mine sites, a 'Permit to Dig' will be required before any excavation can take place in any area other than the main pit.

Familiarise yourself with any such requirements on your mine site. In most cases, an individual will be appointed as the responsible coal mine worker for the excavation. It is their responsibility to ensure that the requirements of the permit are fully complied with at all times.

Land/Vegetation Disturbance Permit

On some mine sites, a Land/Vegetation Disturbance Permit will be required before any land or vegetation disturbance can take place.

Ensure that you are familiar with your mine site's environmental policy and make yourself aware of any environmental permit requirements.

Permit to Move High/Wide Loads

On some mine sites a permit to move will be required before high/wide loads can be transported. Information on the planned route and potential obstacles may be included on the permit. Particular attention and care should be exercised when the route passes under overhead equipment and power lines.

Breaches of the Permit System

Where permit systems are in place, they carry the same weight as other procedures under the Safety and Health Management System. Not following the procedures that cover the permit system may cause personal injury or equipment damage.

4. REPORTING SYSTEM

Defect Reports

All mine sites will have a Defect Reporting System in place. The system will vary from site to site, so familiarise yourself with the system used on your mine site and ensure that you follow the correct procedures.

Whatever system is in place, it is important to ensure that any defect is dealt with in the following manner:

- the defect is rectified immediately, or

- the defective equipment is tagged Out of Service, replaced with an operational item, and returned to the workshops for later repair, or

- the defective equipment is tagged Out of Service and reported for repair through the appropriate channels.

> *Note:*
>
> *If the equipment is tagged Out of Service, it will need to be correctly isolated to prevent it being inadvertently operated.*

> *Note:*
>
> *Defective equipment can be hazardous to coal mine workers and to the equipment itself. Ensure all defects are promptly rectified or reported.*

Accident/Incident Reports

Most mine sites will have a means by which incidents or accidents can be reported. The purpose of these reports is not primarily to attach blame to individuals.

Rather, they are in place to determine the cause and severity of the accident/incident and thus take action to ensure that a similar problem does not recur.

Do your part in improving the safety of the mine site by ensuring that all accidents/incidents are reported through the correct channels.

Serious reportable events, incidents and accidents must be reported to the mines inspectorate and an Industry Safety and Health Representative / Industry Check Inspector. The site of the incident or accident must be secured until an investigation has been completed and the mines inspector has released the site.

Industry-Generated Significant Incident Reports & Safety Alerts

Significant Incident Reports and Safety Alerts are generated within the mining industry and circulated to all mine sites. These reports contain details of incidents that have occurred on mine sites from around the country. They are provided to ensure that coal mine workers are made aware of the causes of incidents.

You are urged to read Significant Incident Reports and Safety Alerts that are relevant to your work area. You are also urged to raise any issues that arise from Significant Incident Reports and Safety Alerts that seem relevant to your work area with your supervisor.

In most cases, the mine's management will have adopted new procedures which take into account new information raised in Significant Incident Reports and Safety Alerts.

SUMMARY

This topic has provided general information on tagging, isolation, permits, and reports. You should remember that the information provided here is only of a general nature and as such does not provide in-depth detail. It is your responsibility to familiarise yourself with the procedures that are in place on the mine site where you are working. Once you have learned the site-specific procedures, ensure that you follow them.