Aims of this Module

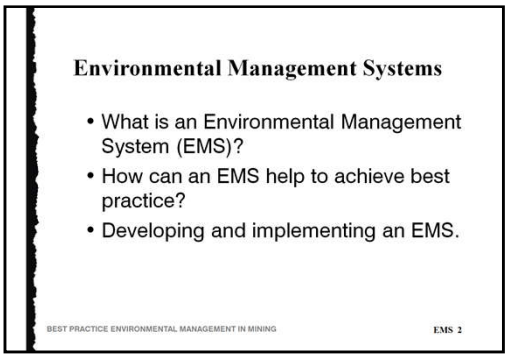
Refer booklet: Introduction

Inform the group that by the end of the training session they will be able to answer the questions on the first slide. In addition they will have an understanding of the process of developing and implementing an EMS.

State the aim for the training session. It may be simply familiarisation with the concept of using a systematic approach to environmental management. On the other hand you may aim to begin the actual EMS process through a workshop based on this module. Make this clear to participants at the outset.

Environmental management is a systematic approach to environmental care in all aspects of business. An environmental management system offers a structured and systematic method for incorporating environmental care into all aspects of the business.

It is difficult to obtain actual EMS documentation from other companies. Except for the corporate environmental policy, these documents are usually considered to be commercial in confidence. This is unfortunate, since a model system would be a useful teaching tool. There are many books that illustrate the development of an EMS for a mythical company. See Harrington and Knight (1999) and Woodside et al. (1998) in the References and Further Reading section of Volume 1.



TIPS

Copies of the international standards ISO 14001 and 14004 are essential references for understanding this module. These may be obtained from some national Standards organisations. The contact details for the International Organization for Standardization (ISO) is given in the References and Further Reading Resources section of the *General Trainers' Guide***.**

The ISO website includes contact details for the various national standards organisations.

What is an EMS?

Refer booklet: Introduction and ISO 14001 and 14004

What is ISO 14001? It is an international standard developed by the International Organization for Standardization and adopted by many countries as the template for environmental management systems. In Australia and New Zealand, the standard is known as AS/NZS 14001.

ISO 14000 comprises a series of more than 20 standards.

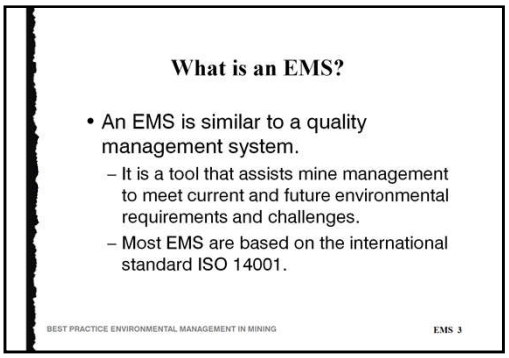
ISO 14001 sets the specifications for an EMS and ISO 14004 provides general guidance for its development.

ISO 14010 -14012 cover environmental auditing. These three standards are to be replaced by ISO 19011 covering audit principles common to quality, environment and safety. Other standards in the series cover life cycle assessment, environmental performance evaluation and environmental labelling and claims.

Note that the reference in the EMS booklet to BS 7750 is now out of date. This Standard was withdrawn in favour of the ISO Standard.

The environmental management standards and quality standards have much in common. Many organisations have built their EMS on an existing quality management system based on the ISO 9000 series of standards.

If some members of the the group are familiar with quality management, they will be able to use that experience in developing an EMS.



TIPS

Further information about ISO standards can be found on the International Organization for Standardization web site:
http://www.iso.ch/

and the Standards Australia web site:
http://www.standards.org.au/

The International Organization for Standardization site should provide links to your own country's Standards organisation.

The Standards most relevant to this module are:

ISO 14001:1996 Environmental management systems--Specification with guidance for use **(under review in 2001)**

ISO 14004:1996 Environmental management systems--General guidelines on principles, systems and supporting techniques

Why have an EMS?

Refer ISO 14004: Section 0.2

Legal compliance - This is the minimum goal of an EMS. Legal regulation is becoming more stringent. Exceeding the legal minimum will assist a company to "keep ahead of the game". This means that when regulations change, the organisation will be ready to meet the new requirements.

Integrated approach - An EMS reduces the chance of overlooking an important impact of your operation.

Systematic - If only one person is responsible for environmental management, the program may lapse if that person leaves the company or is distracted with other responsibilities. With a systematic approach, everyone is involved and documentation ensures that the program will continue even if personnel change.

Demonstrates due diligence - In case of an environmental incident, a properly implemented EMS can act as a defence that the organisation has taken all reasonable and practicable steps to control risks in an ensuing prosecution.

Waste reduction - Any system that reduces waste is likely to improve profits. This is achieved by reducing the cost of waste disposal, by increasing the amount of product and reducing the inputs to an operation.

Marketing advantage - Many organisations now require their suppliers to show evidence that they control their impacts on the environment. An EMS will meet this requirement.

Improves public relations - Evidence of good environmental management can overcome negative perceptions held by the local community. Environmental regulators have more confidence in the ability of the organisation to self-regulate if an operation has an EMS. It also improves shareholder satisfaction, and may increase acceptability to investors via ethical investment schemes.

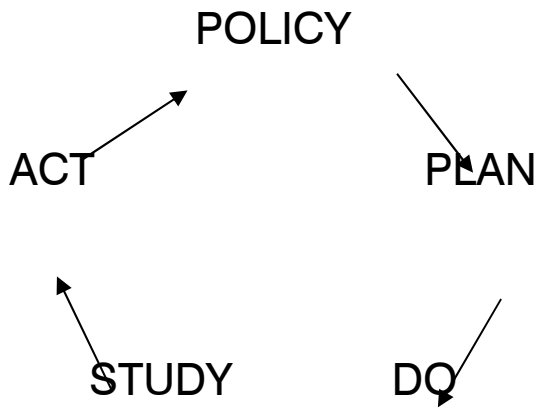
The EMS Cycle (i)

Refer ISO 14001: Introduction

EMS cycle

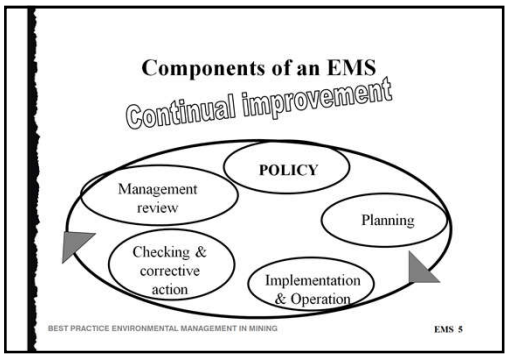
An EMS is closely related to a quality management system. The ISO 9000 series of standards defines requirements for quality management and may be familiar to participants in the training session.

The EMS cycle is based on the quality cycle, also known as the Deming cycle.



- **Planning:** identifying environmental aspects, impacts, legal requirements, setting objectives and targets and developing an environmental management program.
- **Implementation:** establishing structure and responsibility, training programs, setting up document control systems operational control and emergency plans.
- **Checking and corrective action** (**STUDY**): monitoring programs, strategies for corrective and preventive action, record keeping, system audits.
- **Management review:** periodic assessment of the system to ensure that any necessary changes are identified and improvements are made.

A commitment to continual improvement is an essential part of the EMS process. It is not necessary to show improvement in every area each year. Management should select specific areas to target for improvement. This could include training to improve workforce understanding and performance, housekeeping to reduce spills or investment to improve pollution control devices.



TIPS

Use ISO 14001 and 9001 standards as key tools for this training module.

Each of the topics in the diagram has a number of elements. These are expanded on in later slides.

H. Edwards Deming is known as a pioneer of quality management. The Deming or quality cycle also forms the basis of a systematic approach to environmental management. The article by Landesberg (1999) **provides a brief introduction.**

Exercise 1
If participants are familiar with quality management, ask them to discuss their experiences in their small groups. Ask them to identify benefits of using a systematic approach as well as barriers that were encountered in developing and implementing the system. Similar barriers may be encountered in the development of an EMS.

The EMS Cycle (ii)

Refer booklet: Section 1

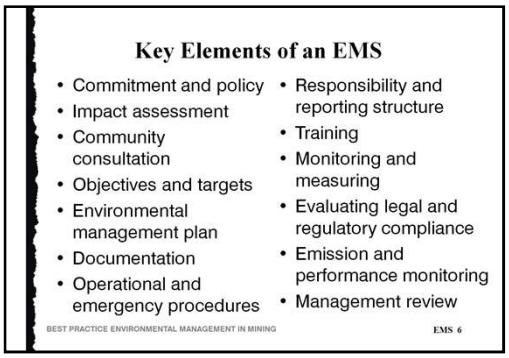
This slide introduces the elements required for developing an EMS. Explain to the group that you will go through the elements of building an EMS in the subsequent slides. These are divided into the sections given in ISO 14001.

- Policy;
- Planning (PLAN);
- Implementation and operation (DO);
- Checking and corrective action (STUDY AND IMPROVE); and
- Management review (ACT).

Each of these steps is discussed in detail in subsequent slides.

Emphasise again that a commitment to continual improvement is an important feature of an EMS.

Completing the development and implementation of an EMS is only the beginning of the job. The cyclic nature of the process, and the requirement for continual improvement, mean that using an environmental management system is an on-going process.



TIPS

Use ISO 14001 and 14004 as base references for this module. They provide the essential structure for understanding and developing an EMS.

Worksheet 1 provides an overview of the steps involved in developing an EMS. Use it to guide participants through the following steps.

Policy

Refer booklet: Sections 1.1 and 1.2 and Appendix 1– Sections 1 and 2; and ISO 14001 Section 4.2 and ISO 14004 Section 4.1.4

Organisational commitment from the CEO to line managers is essential for successful implementation of an EMS. In addition, the workforce must be (or become) enthusiastic. This may require considerable change in the "**culture**" of the organisation.

Remember that good environmental management is just good business. Community and government expectations demand that organisations must reduce their environmental impacts.

ISO 14001 sets out requirements for an **Environmental Policy**.

The environment policy should be a concise public statement of the company's intentions.

The policy should:

- Be defined by top management - this is usually demonstrated by the signature of the chief executive officer;
- Be appropriate to the nature, scale and impacts of the organisation;
- Provide a framework for setting environmental goals and targets;
- Show commitment to:
  - Continual improvement;
  - Prevention of pollution; and
  - Legal compliance.
- Be communicated to all employees; and
- Be available to the public.

Building an appropriate environmental culture is likely to be a long-term project. Strategies that will contribute to cultural change include evident commitment from management, workforce training programs, good communication and consulting with the work force about environmental impacts.

TIPS

Exercise 2

- **If your organisation has an environmental policy, examine it in the light of the requirements of ISO 14001.**
- **If your organisation does not have an environmental policy, you could examine the policies of other mining companies such as WMC, SANTOS or Newmont Group. These are available on the internet. The websites are:**
  http://www.wmc.com/sustain/environ
  http://www.santos.com.au
  http://www.newmont.com.au
- **As an alternative exercise ask the groups to try to draft an environmental policy for your organisation.**
- **Ask the groups to try to define your organisation's culture. Does your organisation comply with the minimum legal requirements? Are environmental issues a central consideration in decision making?**

Planning (i)

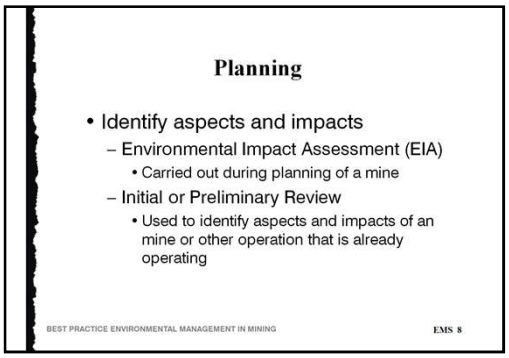
Refer booklet: Sections 1.3 and Appendix 1 – Section 3; ISO 14001 Section 4.3.1

Environmental impact assessment (EIA) is an assessment of the potential effects on the environment of a proposed activity or project. An EIA is carried out during the planning phase of a mining operation. See BPEM booklet *Environmental Impact Assessment*.

The report produced by an EIA is called an Environmental Impact Statement (EIS). An EIA is usually required when the activity is likely to have a significant impact on the environment. An EIS usually includes strategies to control or reduce adverse effects. If your organisation has an EIS, it can provide the initial objectives, targets and procedures for developing an EMS. It will form the nucleus of an environmental management program.

If an existing operation does not have an EIS, aspects and impacts may be identified using an audit called an initial or preliminary review.

This review is an essential first step to understanding the nature and scale of the operation's impacts. The auditors examine existing operations, systems and practices to identify actual and potential interactions with the environment. See the BPEM booklet *Environmental Auditing* for more details.



TIPS

BPEM booklets *Environmental Impact Assessment* **and** *Environmental Auditing* **will be useful resources.**

Exercise 3

If your organisation, or an operation you are familiar with, has an Environmental Impact Statement, use it as a resource for a workshop presentation of this module.

Questions to consider include:

- **What potential impacts were identified?**
- **Did those impacts happen?**
- **What strategies were identified to control the impacts?**
- **Were the strategies used?**
- **Were they successful?**

Planning (ii)

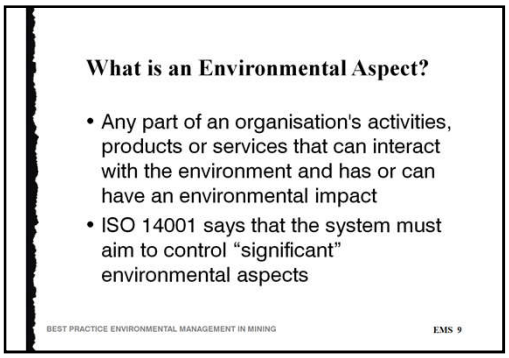
Refer ISO 14001 Sections 4.3.1 and A.3.1; ISO 14004 Section 4.1.3

"Environmental aspect" is the term used in ISO 14001 to mean an environmental issue. According to the standard, an aspect is any element of an organisation's activities, products or services that can interact with the environment. The term is neutral, since an aspect can be beneficial or harmful.

Packaging is an example of an **aspect;** the solid waste or litter from the packaging is an **impact**.

The relationship between an aspect and impact is one of cause and effect. The environmental impact is the change caused by the aspect. Impacts could include pollution or contamination of water or air.

Once the range of aspects has been identified, the significant impacts become the focus for developing the EMS. The significant aspects and impacts are identified by carrying out a risk assessment.



TIPS

Exercise 4

Ask the groups to list activities, products and services that are associated with their own jobs.

Use Worksheet 2 for Exercises 4 and 5

Planning (iii)

Refer ISO 14001 Section 4.1.3 and ISO 14004 Section 4.2.2

When identifying environmental aspects you should:

- Develop a process that is straightforward and repeatable; this process can then be developed into a procedure;
- Remember that the process must cover all inputs and outputs of activities, products and services of the organisation; and
- Consider beneficial as well as harmful impacts.

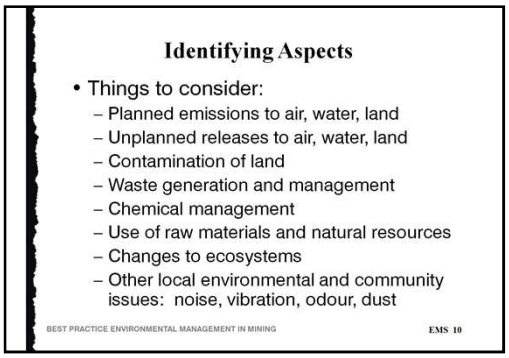
Any previous audits will provide useful information for identifying aspects and impacts. The most useful audits for this purpose are:

- Environmental impact assessment which identifies potential impacts; and
- Preliminary review which identifies existing impacts.

Both should:

- Identify legislative and regulatory requirements;
- Identify sensitive receiving environments; and
- Examine any existing practices and procedures with the potential to cause environmental impacts.

Feedback from investigations of previous environmental incidents may also provide useful information.



TIPS

Exercise 5

Ask the small groups to return to their lists of activities, products and services compiled in Exercise 4.

They should then try to identify aspects and impacts associated with them.

Ask them to report back on:

1. **The aspects and impacts; and**
2. **The process that they went through.**

Planning (iv)

Refer *Environmental Risk Management* booklet; ISO 14004 Section 4.2.2 Step 3

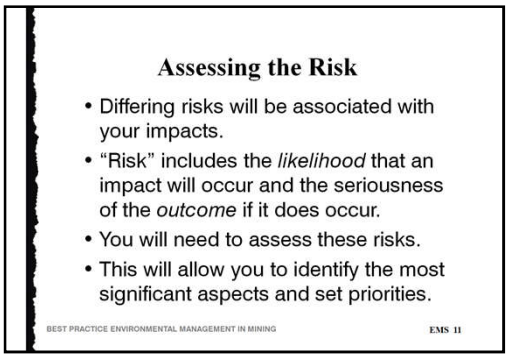
Consider the following questions when assessing environmental risk.

Environmental concerns:

- What is the scale of the impact?
- What is the severity of the impact?
- What is the likelihood that the impact will occur (or how frequently has it occurred in the past)?
- What is the duration of the impact?

Business concerns:

- What is the potential for prosecution?
- What is the cost of repairing the impact?
- How would the impact affect other activities or processes of your operation?
- What effect would the impact have on the public image of your organisation?



TIPS

Exercise 6

Ask each small group to choose three or four of the aspects and impacts that they have identified.

They should consider the outcome of the impact and the likelihood that it will occur. They should attempt to rank the three impacts from the highest to the lowest risk.

Have them report back on their risk assessment exercise. Encourage discussion of the outcomes of this exercise.

People often have differing opinions about the likelihood of an impact based on different experience in the work place.

Planning (v)

Refer ISO 14004: Section 4.2.3

ISO 14001 requires that the organisation must establish and maintain a procedure for identifying and providing access to legal requirements that apply to its activities, products or services.

Legal requirements vary from country to country. Areas likely to be covered by environmental legislation include:

- Protection of the environment
  - Air;
  - Waterways and oceans; and
  - Land and landscape.
- Protection of flora and fauna
  - Forests;
  - Wilderness;
  - Fisheries;
  - Endangered species;
  - Marine mammals; and
  - Wetlands.
- Environmental management issues
  - Toxic substances;
  - Hazardous waste;
  - Pollution prevention; and
  - Energy.
- Communication and planning issues
  - Hazard information;
  - Emergency planning; and
  - Environmental liability.

TIPS

The Australian Legal Information Institute web site provides links to Australasian and world sources of legal information. The web address is:

http://www.austlii.edu.au

Legal requirements are not static. An organisation must ensure that it has procedures that will allow it to keep up to date with current legal requirements.

Sources of information include all levels of government, industry associations, commercial databases and professional legal services.

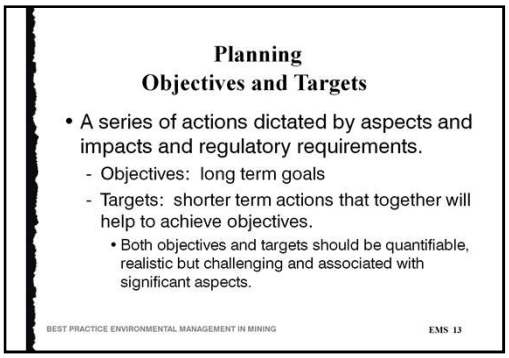
Your country or region may have similar sources of legal information.

Planning (vi)

Refer booklet: Section 1.5 and Appendix section 5; ISO 14004 Section 4.2.5

Objectives are goals that are set to achieve the organisation's environmental policy. When setting objectives, findings from the EIS, environmental reviews and the identified significant aspects and impacts must be considered.

Targets are set to achieve the objectives within a set time period. An objective may have more than one target. A target must be measurable and define a completion date. Environmental performance indicators can be set to help measure progress.



TIPS

Exercise 8

Practice setting objectives and targets. Remember that objectives are more general while targets provide specific ways of achieving the objectives.

Performance indicators allow measurement of progress toward meeting the objective.

Example 1

Objective: Reduce energy used in mineral extraction.

Target: Reduce fuel and energy consumption in 2002 by 10% compared with the previous year.

Performance indicator: Amount of fuel and electricity used per unit of production.

Example 2

Objective: Reduce water use.

Target: Reduce water used in ore treatment by 5% in 2002 compared with the previous year at XYZ site.

Performance indicator: Kilolitres of water used per tonne of ore treated.

Planning (vii)

Refer booklet: Appendix 1: Section 6; ISO 14004 Section 4.2.6

Environmental management programs (or plans) form a key part of an EMS. If your organisation has an EIS, it should contain all (or most) of the elements of an environmental management program (EMP). The EMP should address all the objectives and targets that you have set. Since it includes strategies, it will work best if it is integrated into the organisation's strategic plan.

The EMP includes specific actions required to achieve the organisation's objectives and targets. This should include responsibilities and completion date. When assigning responsibilities be sure that adequate resources are provided. These resources can include human resources, technology, knowledge and finances.

The EMP is the product of the "planning" part of developing an EMS.

TIPS

Discuss what you would need to do to develop your objectives and targets into an Environmental Management Program.

This is likely to require assigning responsibilities, including actions in the budget process, developing strategies and setting realistic completion dates.

Planning (viii)

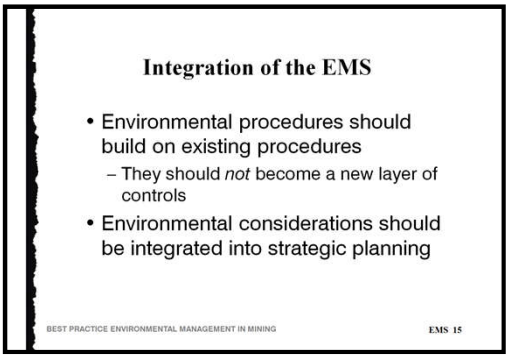
Refer booklet: Section 2.1; ISO 14004: Section 4.3.2.2

The EMS will operate most effectively if it is aligned with other existing systems and policies. It should not become just another layer of controls and requirements separated from the "core business" of the operation.

To work effectively the EMS must be a normal part of the company's routine.

The elements of the EMS should be designed or so that they can be aligned and integrated with existing management system elements. These could include:

- Organisational policies;
- Allocation of resources;
- Operational procedures and work instructions;
- Training and development;
- Communication and reporting;
- Reward and appraisal systems;
- Organisation and accountability structure;
- Information and support systems; and
- Measuring and monitoring systems.



TIPS

Exercise 14

Questions for Discussion

How can the EMS be integrated into the overall business management process?

How can you achieve balance and resolve conflicts between environmental and other business objectives and priorities such as production targets?

Can you use and build on existing systems such as emergency response plans, occupational health and safety systems or quality systems?

Implementation and Operation (i)

Refer ISO 14004: Section 4.3

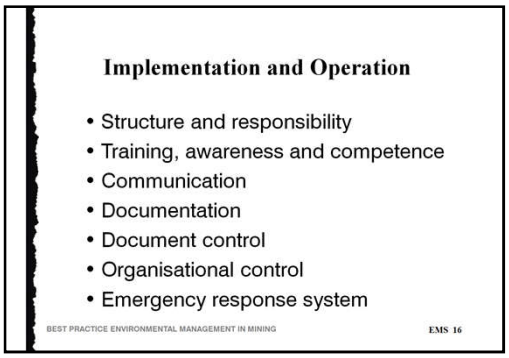
Implementation means putting your plans into action. This is the "DO" phase of the Deming cycle. To be successful in implementing an EMS, an organisation will need to make resources available to ensure capability.

Inputs needed include human, physical and financial resources.

- Human: Personnel may require training and will need to be allocated the time to carry out new environmental functions.
- Physical: New facilities and equipment may be required to carry out monitoring and pollution reduction activities.
- Financial: Budgets will need to include the costs of the resources listed above.

Implementation of an EMS can be approached in stages. This will allow time for proper planning of budgets, for training and cultural change.

Remember that an important part of an EMS is the commitment to continual improvement.



TIPS

These headings will be expanded in the subsequent slides.

The issue of resources provides a useful topic for discussion. Ask the group to identify the resources required for implementing an EMS. What barriers does this present? How could the barriers be overcome?

Implementation and Operation (ii)

Refer booklet Appendix 1: Section 9; ISO 14001 Section 4.3.2.3

An effective organisational structure is essential for successful implementation of an EMS. This structure will ensure that people know their responsibilities in the system.

Responsibilities to be assigned include:

- Identifying processes and procedures that may affect the environment;
- Identifying managers and operators who have responsibility for areas that may affect the environment;
- Setting out the environmental responsibilities for these positions;
- Assigning responsibilities to appropriate people;
- Ensuring that all site personnel know their own responsibilities for environmental performance in their work area; and
- Ensuring that all site personnel know who the *other* responsible person/s are for environmental issues in their own and other relevant work areas.

Reporting structure:

- Management must establish which personnel need to receive various types of information;
- Management must identify lines of reporting that require feedback;
- Management must formalise the reporting structure; and
- Information flow is an essential component of a successful EMS.

TIPS

Formal assignment and documentation of responsibilities are necessary to ensure that someone carries out key procedures.

Implementation and Operation (iii)

Refer booklet Section 1.10 and Appendix 1 Section 10; ISO 14004 Section 4.3.2.5

General training

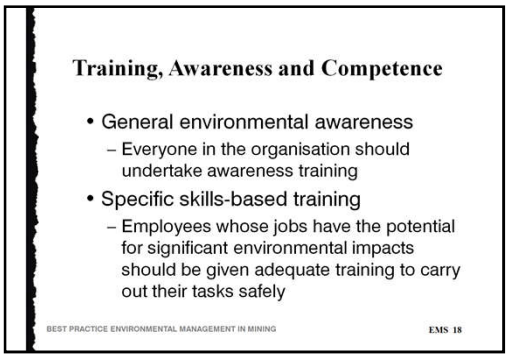
Environmental awareness training is an important tool in improving a company's culture. General awareness training should be implemented throughout the organisation since decisions made by head office staff, purchasing officers and senior management can have significant environmental impacts.

Topics that should be covered include environmental issues, community expectations, the company's environmental policy, effects of pollution on soil, water and air, legal responsibilities and strategies for improving environmental performance.

Specific skills-based training

This type of training should be provided to relevant personnel. The aim here is to make sure that personnel whose work has the potential for significant impact on the environment have the necessary skills and knowledge

Topics that may need to be covered include spill response, operation and maintenance of pollution control equipment, storage and handling of dangerous goods and specific site procedures.



TIPS

Exercise 8

Examine an organisation's current training programs. Are environmental issues included? Who receives training? Who should receive training? What topics should be covered?

Consider induction processes for new workers and contractors, as well as specific training for personnel whose jobs have the potential for significant impacts on the environment.

Ask the groups to develop lists of topics for general awareness training or for specific skills-based training. If there is an existing induction program, use it as a basis for adding information about environmental protection.

Implementation (iv)

Refer ISO 14004: Section 4.3.3.1

Communication, especially within the company, is a very important factor in ensuring the success of an EMS.

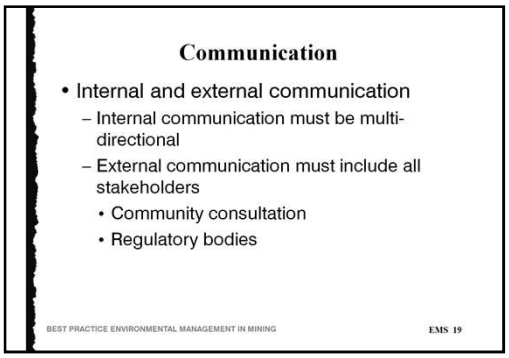
Internal communications

Some strategies that may be used are:

- Including environment on the agenda for all departmental meetings;
- Providing an internal phone number for employees to give feedback or recommendations for improvements;
- Exhibiting charts that show environmental measurements; and
- Developing employee communications such as newsletters, internal web sites and notice boards. Posters and stickers can be useful reminders for employees.

External communications

- Including environmental performance in company annual reports;
- External web site;
- Presentations to industry associations, governmental meetings and community groups about the company's environmental performance;
- Articles in local newspapers; and
- Public open days or site access for public tours.



TIPS

Exercise 9

Questions for Group Discussion

What mechanisms are currently used to provide environmental information internally and externally?

How could these be improved?

Implementation and Operation (v)

Refer ISO 14004: 4.3.3.2

ISO 14001 requires that an EMS be documented to allow easy access to all parts of the system.

These documents form what is often called the EMS manual.

This manual may be integrated with documents from other systems such as quality and occupational health and safety.

The EMS manual does need not be in the form of a single manual. It may include references to other documents such as:

- Organisational charts;
- Internal standards; and
- Operational procedures.

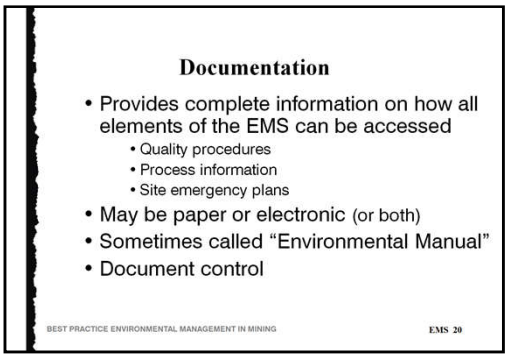
Don't reinvent the wheel! If relevant procedures exist, incorporate them into the EMS. There is no need to write new procedures if good ones already exist.

Document control refers to mechanisms that ensure the documents are:

- Kept up-to-date;
- Accessible; and
- Reviewed and updated.

Consideration should be given to the following types of information:

- Permits and legal or regulatory requirements;
- Aspects and impacts;
- Risk assessments;
- Monitoring records;
- Audit reports; and
- Environmental training records.



TIPS

Environmental documentation is likely to include the following elements. These are listed from the general to the specific.

EMS Manual

- Top level overview of EMS

Operating Procedures

- Wide scope—may be across sites or functions

Work Instructions

- Site or task specific

Environmental Records

- Monitoring, audits, incident reports, training, communications, nonconformance and corrective actions.

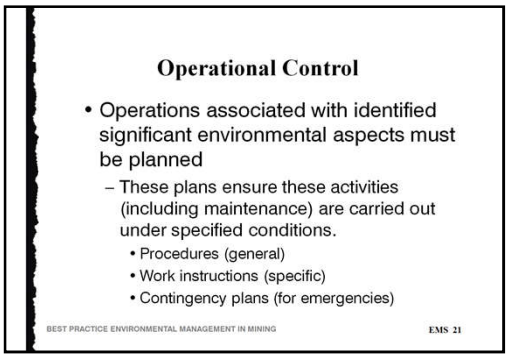
Implementation and Operation (vi)

Refer booklet: Appendix 1: Section 8; ISO 14001: Section 4.4.6; ISO 14004: Section 4.3.3.3

Operations and activities that are associated with your significant environmental aspects must be planned. These plans will help to ensure that the operations are carried out in the correct way. These procedures, work instructions and contingency plans help to ensure consistency, improve performance and provide tools for training, as well as protecting the environment.

Operations and activities that may require operational controls and procedures may include:

- Purchasing and contracting;
- Production and maintenance;
- Transport;
- Management of tailings facilities; and
- Storage of raw materials and products.



TIPS

Discuss operations and activities in your organisation that require operational procedures.

What operational procedures are already in place? Have they been documented? Are the documents readily available?

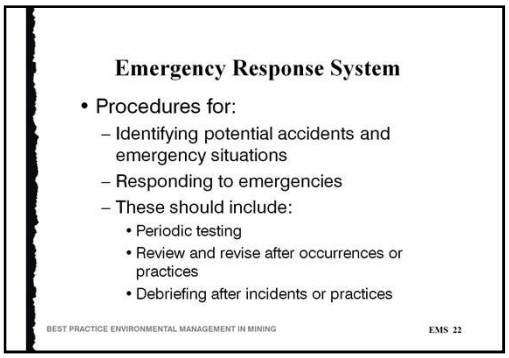
Implementation and Operation (vii)

Refer ISO 14001: Section 4.4.7

Emergency plans can include the following components:

- Site maps, evacuation routes, location of spill equipment;
- Responsibilities and organisation for responding to emergencies such as fire, chemical spills or explosion;
- Details of emergency services;
- Lists of key personnel;
- Communication plans (internal and external);
- Manifests of dangerous substances including each material's potential impact on the environment and actions to be taken in case of release of these materials; and
- Training and drills.

It is important to integrate planning for environmental emergencies with any existing emergency systems. It will be easier for the mine control room to respond to an environmental emergency if it seen as part of the mainstream response system.



TIPS

Exercise 10

Review existing emergency response plans. Consider if the plans take into account environmental impacts. Suggest any changes or additions that should be made to minimise environmental impact in case of an emergency.

Checking and Corrective Action (i)

Refer booklet: Appendix 1: Sections 11 and 12; ISO 14001: Section 4.5

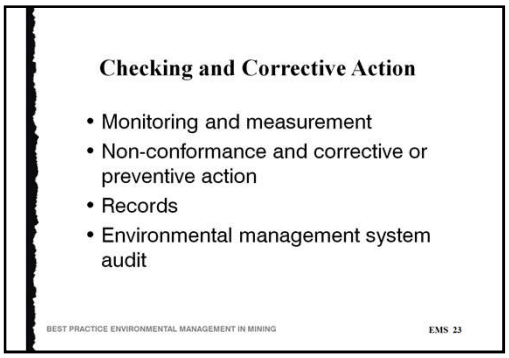
Checking and corrective action are essential activities for making sure the mine meets its legal requirements as well as being a tool for continual improvement.

Checking and corrective action usually require auditing of the management system and its implementation.

Areas to be audited include environmental monitoring programs and resulting data, records of environmental incidents and non-conformances and progress towards meeting environmental objectives and targets.

Issues covered in the audit may include:

- Compliance with regulatory limits such as effluent emissions and internal waste production;
- Implementation of parts of the EMS;
- Protection of wildlife and their habitats;
- Records of complaints from the public;
- Records of responses to any such complaints; and
- Projects involving specific targets such as installation of settling ponds or improvement of storage areas.



TIPS

The following slides expand on these topics.

Checking and Corrective Action (ii)

Refer to *Environmental Monitoring and Performance* **booklet.**

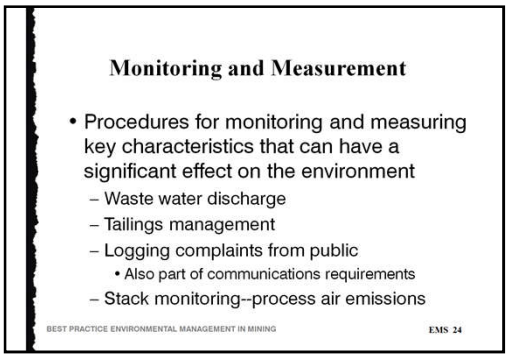
This function can be called environmental performance monitoring. The aim may be to ensure compliance with limits set by an environmental licence or to meet requirements of the organisation's own EMS.

When setting up a monitoring program, you should consider:

- What to monitor?
- How often to monitor?
- Who does the monitoring?
- The monitoring technique and the quality of the data produced;
- Calibration and maintenance of monitoring equipment; and
- Any requirements for communicating monitoring data to relevant government departments.

An important question that is often overlooked is "What will you do with the monitoring data?" The data should be used to identify opportunities for continual improvement.

Make sure you review monitoring data to evaluate compliance. Use the information as a tool for improving performance.



TIPS

Exercise 11

Questions for Discussion

What monitoring is currently carried out at your site? Is the monitoring part of a planned program or merely ad hoc? Is the monitoring program adequate? How are the monitoring data used?

Checking and Corrective Action (iii)

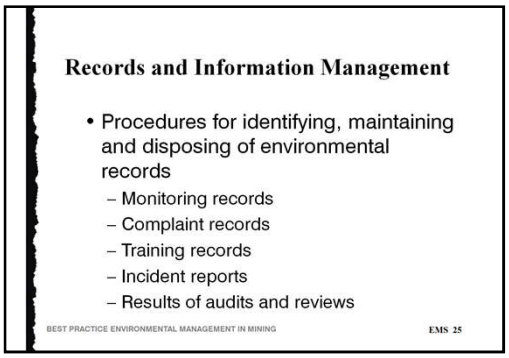
Refer ISO 14001: Section 4.5.3

Records provide evidence of the success of the operation of the EMS and can help demonstrate due diligence in the event of accidental environmental impact. Key records include:

- Legal requirements;
- Permits and licences;
- Aspects and impacts register;
- Training register;
- Monitoring data;
- Non-conformance reports; and
- Audits and management reviews.

Other records that may be included:

- Process information;
- Product information;
- Inspection, maintenance and calibration records;
- Pertinent contractor and supplier information;
- Information on emergency preparedness and response; and
- Management reviews.



TIPS

Exercise 12

Questions for Discussion

What environmental information does your organisation keep?

How does the organisation's information management system make information available to employees who need it?

How could this be done better?

Checking and Corrective Action (iv)

Refer to BPEM *Environmental Auditing* booklet; ISO 14001 Section 4.5.4

An EMS audit is a review of the system to make sure it continues to be suitable and effective.

An audit is usually carried out by a team of people with an understanding of:

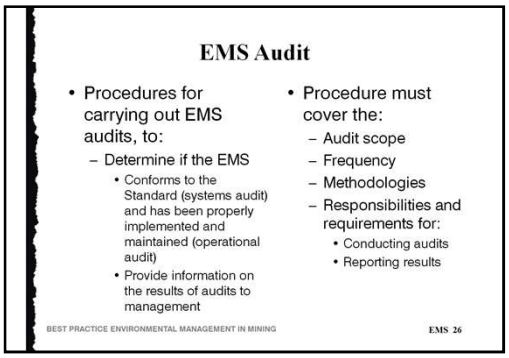
- Operational processes and pollution control facilities;
- Licence conditions;
- Monitoring programs;
- Site history; and
- Local environmental issues.

The EMS audit should include:

- A review of how well the organisation has met its objectives and targets;
- Checking the implementation of recommendations of previous audits;
- An evaluation of the effectiveness of the system; and
- An evaluation of the system and the need for changes taking into account:
  - Changes in legislation;
  - Changes in requirements and expectations of interested parties;
  - Changes in activities or products of the organisation;
  - Technological improvements; and
  - Environmental incidents.

The aim of the EMS is to make sure the system meets the planned arrangements for environmental management such as those set out in ISO 14001, and to ensure it has been properly implemented and maintained.

The information gained in the audit will allow management to plan for improvement of the EMS.



TIPS

Exercise 13

Questions for Discussion

How will the EMS be reviewed?

Who are the appropriate personnel to carry out an internal review?

How can the views of interested parties be included in the review of the EMS?

The points in Worksheet 1 could be used to guide an audit process.

Management Review (i)

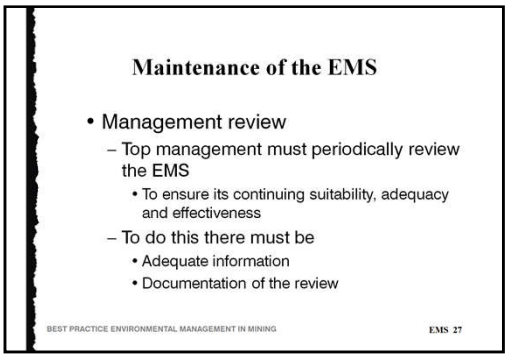
Refer booklet: Section 3

An EMS will change and evolve over time. After an EMS is implemented, problems may be found that require changes. In addition, technology and operations may change. Questions that should be asked when maintaining the EMS include:

- Are the procedures still relevant and applicable?
- Are the delegated responsibilities appropriate? and
- Does the reporting system function well?

Problems that may be exposed include:

- The procedures are difficult to apply in unforeseen situations;
- New or changed processes may have exposed gaps in procedures;
- Procedures may not be carried out properly due to lack of authority, resources, time or knowledge; and
- Reporting problems such as:
  - Reports provide too little or too much information;
  - Reports duplicate information unnecessarily;
  - Unnecessary reports;
  - Time required to produce reports is excessive; and
  - Reports that are not acted upon.



TIPS

If members of the group have experience in quality management systems, ask them to describe the issues they have encountered in system reviews.

Management Review (ii)

Refer booklet: Section 3; ISO 14001: Section 4.5.3

Reviews should include:

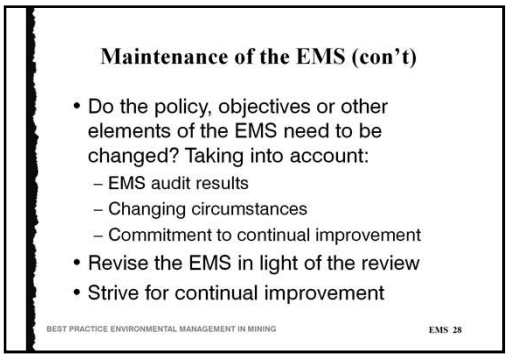
- Results from audits;
- The extent to which objectives and targets have been met;
- Continuing suitability of the EMS; and
- Concerns from relevant interested parties.

The key aim of the review process is to make sure that the system and the mine's environmental performance continue to improve.

When considering opportunities for improvement, you could ask the following questions:

- Have objectives and targets been met?
- Should procedures be changed in light of improvement to processes? and
- What are the underlying causes of environmental incidents?

It is useful to have an external expert regularly audit the site's operations and the EMS.



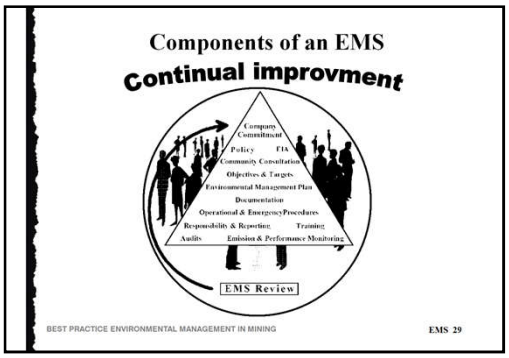
TIPS

Continue to relate these ideas to any existing experience such as quality management.

Summary

Refer booklet: Conclusion and Appendix 3

Use this diagram to summarise the presentation. It shows the components of an EMS in the mining industry and the cyclic nature of the system. Refer back to the Quality or Deming cycle (slide 5). If you have carried out the exercises suggested during the training sessions, you will have the skeleton of an EMS. While there will be much further work required to complete developing and implementing the system, you will have helped to achieve an understanding of the basis for systematic environmental management for the organisation.



TIPS

Print out this this slide and use it as a handout. Invite questions or comments from the participants.

An important question is "where to from here"?

Will the organisation proceed with the development of an EMS?

Who will drive the process of developing and implementing the EMS?

Is there adequate support from top management?

This is a big project, but one that can bear fruit in both environmental protection and in more efficient mine operation.

Feedback

Use the feedback form in the *General Trainers' Guide* **to record reactions of the group.**