Environmental Management Systems

- What is an Environmental Management System (EMS)?
- How can an EMS help to achieve best practice?
- Developing and implementing an EMS.

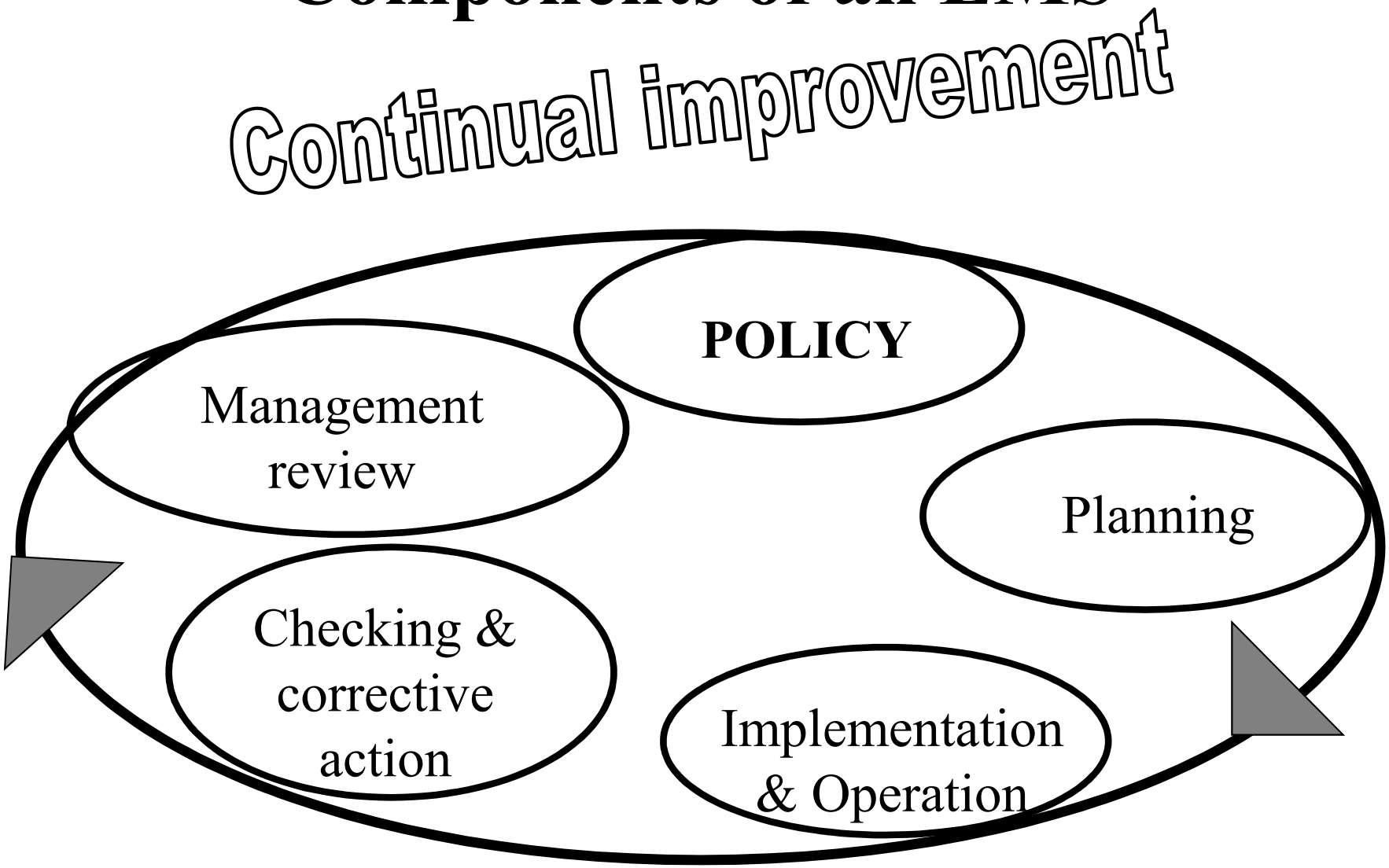
What is an EMS?

- An EMS is similar to a quality management system.
  - It is a tool that assists mine management to meet current and future environmental requirements and challenges.
  - Most EMS are based on the international standard ISO 14001.

Why Have an EMS?

- Legal compliance
- Provides an integrated approach
- Depends on the system, not on an individual
- Demonstrates environmental leadership
- Demonstrates due diligence
- Reduces waste (and improves profit)
- Improves customer and investor satisfaction
- Gives a marketing advantage
- Improves local and global environment
- Improves the company's image
- Improves relations with the local community, regulatory authorities and employees

Components of an EMS



Key Elements of an EMS

- Commitment and policy
- Impact assessment
- Community consultation
- Objectives and targets
- Environmental management plan
- Documentation
- Operational and emergency procedures
- Responsibility and reporting structure
- Training
- Monitoring and measuring
- Evaluating legal and regulatory compliance
- Emission and performance monitoring
- Management review

Keys to Success

- Organisational commitment
- Environmental policy
- Development of an appropriate "culture" in your organisation

Planning

- Identify aspects and impacts
  - Environmental Impact Assessment (EIA)
    - Carried out during planning of a mine
  - Initial or Preliminary Review
    - Used to identify aspects and impacts of an mine or other operation that is already operating

What is an Environmental Aspect?

- Any part of an organisation's activities, products or services that can interact with the environment and has or can have an environmental impact
- ISO 14001 says that the system must aim to control “significant” environmental aspects

Identifying Aspects

- Things to consider:
  - Planned emissions to air, water, land
  - Unplanned releases to air, water, land
  - Contamination of land
  - Waste generation and management
  - Chemical management
  - Use of raw materials and natural resources
  - Changes to ecosystems
  - Other local environmental and community issues: noise, vibration, odour, dust

Assessing the Risk

- Differing risks will be associated with your impacts.
- “Risk” includes the *likelihood* that an impact will occur and the seriousness of the *outcome* if it does occur.
- You will need to assess these risks.
- This will allow you to identify the most significant aspects and set priorities.

Planning
Identify Regulatory Requirements

- Each site is subject to various legal requirements. These may include:
  - International conventions
  - National legislation
  - State legislation
  - Local regulations
  - Company policies

Planning
Objectives and Targets

- A series of actions dictated by aspects and impacts and regulatory requirements.
  - Objectives: long term goals
  - Targets: shorter term actions that together will help to achieve objectives.
    - Both objectives and targets should be quantifiable, realistic but challenging and associated with significant aspects.

Planning
Environmental Management Program

- Objectives
- Targets
- Performance indicators
- Strategies
- Responsibilities
  - Department and person
- Completion Date

Integration of the EMS

- Environmental procedures should build on existing procedures
  - They should *not* become a new layer of controls
- Environmental considerations should be integrated into strategic planning

Implementation and Operation

- Structure and responsibility
- Training, awareness and competence
- Communication
- Documentation
- Document control
- Organisational control
- Emergency response system

Structure and Responsibility

- Management must appoint a person who is responsible for overseeing the EMS
- Defined roles, responsibilities and authorities
- Resources provided: People, skills, technology, finance

Training, Awareness and Competence

- General environmental awareness
  - Everyone in the organisation should undertake awareness training
- Specific skills-based training
  - Employees whose jobs have the potential for significant environmental impacts should be given adequate training to carry out their tasks safely

Communication

- Internal and external communication
  - Internal communication must be multi-directional
  - External communication must include all stakeholders
    - Community consultation
    - Regulatory bodies

Documentation

- Provides complete information on how all elements of the EMS can be accessed
  - Quality procedures
  - Process information
  - Site emergency plans
- May be paper or electronic (or both)
- Sometimes called “Environmental Manual”
- Document control

Operational Control

- Operations associated with identified significant environmental aspects must be planned
  - These plans ensure these activities (including maintenance) are carried out under specified conditions.
    - Procedures (general)
    - Work instructions (specific)
    - Contingency plans (for emergencies)

Emergency Response System

- Procedures for:
  - Identifying potential accidents and emergency situations
  - Responding to emergencies
  - These should include:
    - Periodic testing
    - Review and revise after occurrences or practices
    - Debriefing after incidents or practices

Checking and Corrective Action

- Monitoring and measurement
- Non-conformance and corrective or preventive action
- Records
- Environmental management system audit

Monitoring and Measurement

- Procedures for monitoring and measuring key characteristics that can have a significant effect on the environment
  - Waste water discharge
  - Tailings management
  - Logging complaints from public
    - Also part of communications requirements
  - Stack monitoring--process air emissions

Records and Information Management

- Procedures for identifying, maintaining and disposing of environmental records
  - Monitoring records
  - Complaint records
  - Training records
  - Incident reports
  - Results of audits and reviews

EMS Audit

- Procedures for carrying out EMS audits, to:
  - Determine if the EMS
    - Conforms to the Standard (systems audit) and has been properly implemented and maintained (operational audit)
    - Provide information on the results of audits to management
- Procedure must cover the:
  - Audit scope
  - Frequency
  - Methodologies
  - Responsibilities and requirements for:
    - Conducting audits
    - Reporting results

Maintenance of the EMS

- Management review
  - Top management must periodically review the EMS
    - To ensure its continuing suitability, adequacy and effectiveness
  - To do this there must be
    - Adequate information
    - Documentation of the review

Maintenance of the EMS (con't)

- Do the policy, objectives or other elements of the EMS need to be changed? Taking into account:
  - EMS audit results
  - Changing circumstances
  - Commitment to continual improvement
- Revise the EMS in light of the review
- Strive for continual improvement

Components of an EMS