

# **Mining and Environmental Management**

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# Mining and EMS

- Certifying projects at an early stage
- De Beers Snap Lake Diamond Project
- EMS Development Process
- Fit of EMS with the Mine Life Cycle

# Snap Lake, NWT De Beers Canada Mining Advanced Exploration Project



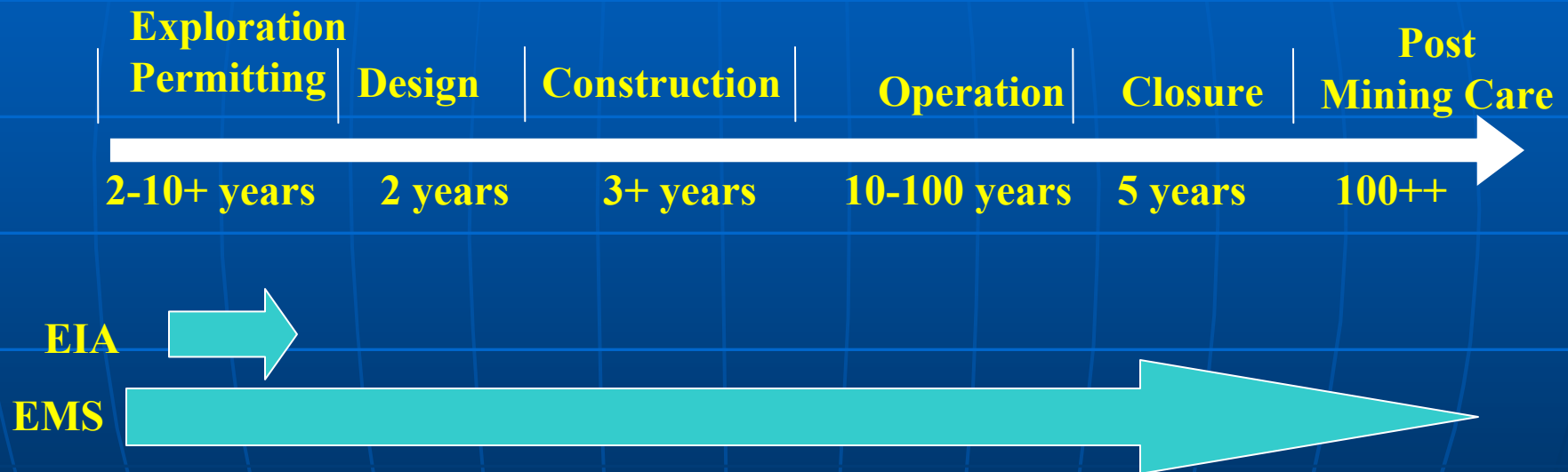
# Snap Lake, NWT

- De Beers Canada Mining Inc.
- Advanced Exploration Project – Snap Lake, 220 km NE of Yellowknife, NWT, Canada
- Diamond Property
- Licensing to Operation 7 years+

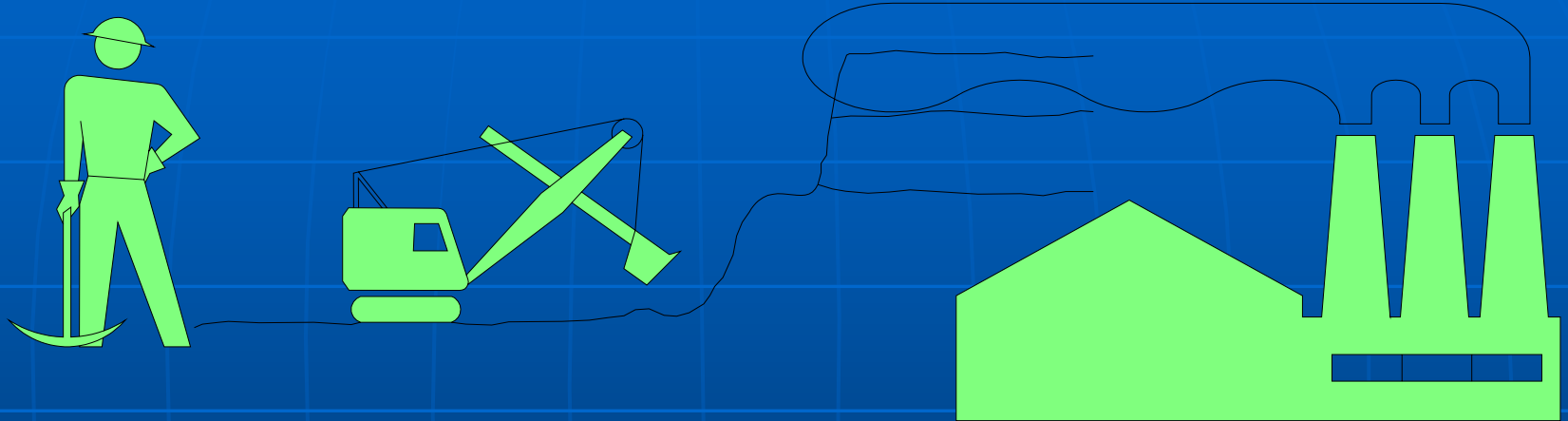
# De Beers and ISO 14001

- Corporate-wide commitment to certify all their operations to ISO 14001
- Commitments in approvals processes to develop and maintain a third-party accredited ISO 14001 system

# Stages of Mine Development: Exploration to Post-Closure



# Staging the EMS with Mining



Permits  
Public Approval  
Risk Management  
Pollution Reduction\Prevention  
Energy/Water Use Reduction  
Cost Reduction  
Due Diligence

Air  
Water  
Waste  
Noise  
Incidents



# Advantages of EMS at Early Stage

- Identified Aspects and Impacts from EA
- Regulatory Requirements
- Monitoring Requirements/Data
- Recognition by Regulators of Third Party Accredited/Audited System
- Clear Commitment to Environmental Performance
- Uniform Approach to Contractors and Future Stages of Development

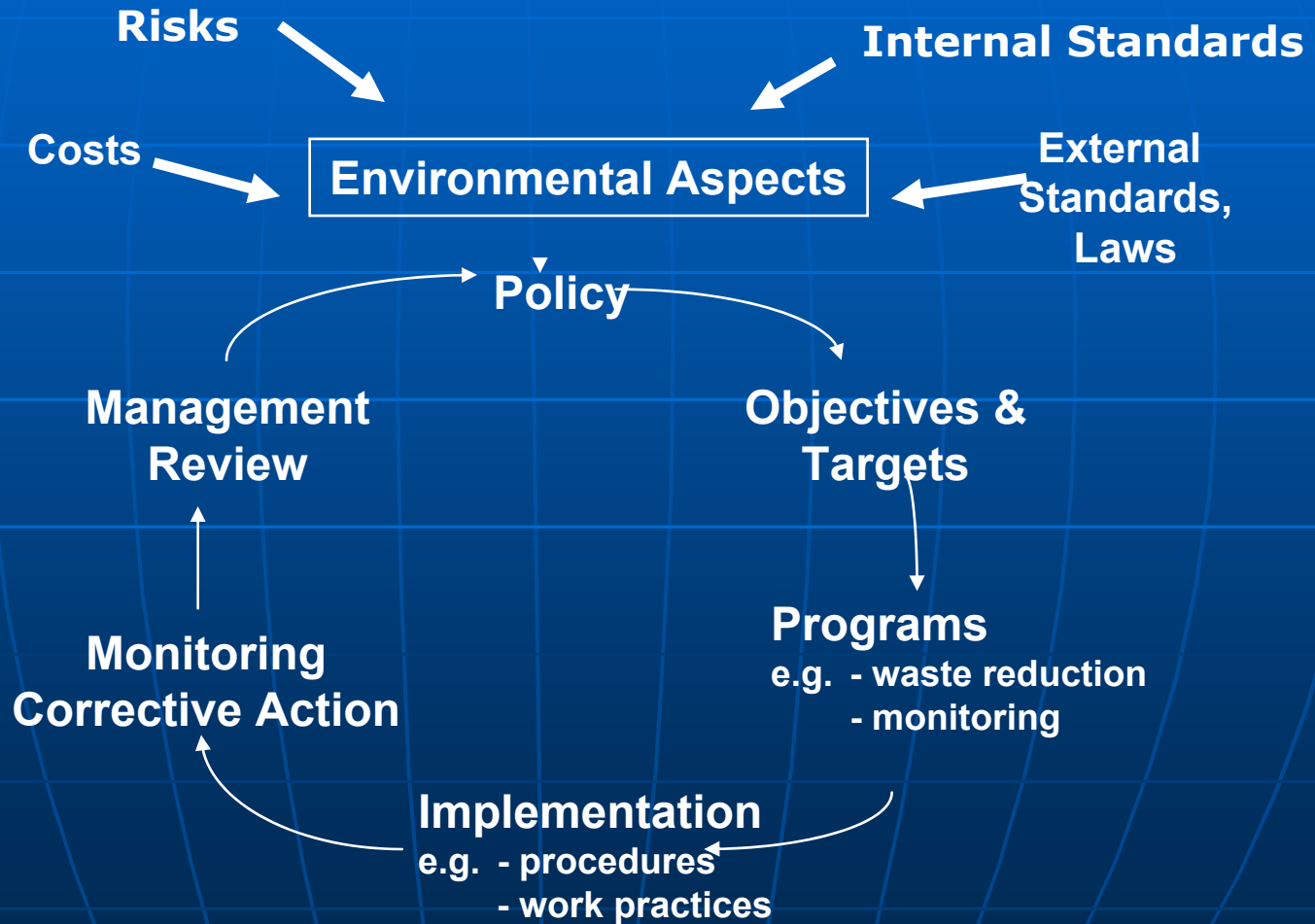


# Snap Lake EMS - Schedule



Environmental Assessment and Approvals

# Developing the EMS ...



# Risk Assessment a Core Component

- Risk Rating: Probability & Consequences
- Different kinds of consequences -
  - Environmental
  - Public and Employees
  - Cost
  - Public and Stakeholder Concerns
  - Socio-economic
  - Regulatory

# Aspects & Impacts - Scope

- All Activities, Products and Services
- Within Defined boundaries
  - Minesite, Winter Road, Office
- For Defined areas and departments
  - Facilities - purchasing/administration/operations/maintenance
- For Operation, Shut-down, Start-up
- For Normal, Abnormal, Emergency Situations

# Significant Activities & Aspects

- Fuel Storage and Handling – Spills
- Tailings Management – Spills, Leaks
- Water Use/Management/Sewage Disposal
- Electricity Generation – Air Emissions
- Air and Ground Traffic, Food Wastes - Wildlife Interaction
- Hazardous Chemicals Storage and Handling - Spills

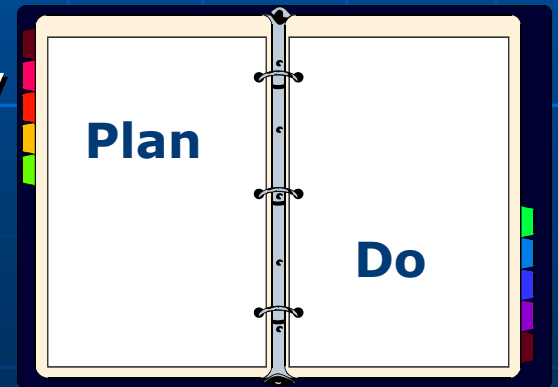
# Process Flow Approach

Track flows through site as a whole

- Raw Materials
- Water
- Air Emissions
- Waste Water
- Liquid Waste
- Solid Waste
- Chemicals
- Fuel/Oil
- Traffic

# Control -- Minimizing Risk, Creating Benefits

- Develop objectives
- Set measurable targets
- Define plan or program
- Assign responsibility





# Set Objectives and Targets for Most Significant Aspects and Impacts

<u>Aspect</u>	<u>Objective</u>	<u>EPI</u>	<u>EPM</u>	<u>Target</u>
<b>Water use</b>	Minimize Water Use	Ave. Monthly Water Use	Ave. gallons per month	Reduce ave. mo. use by 10% in 12 mos.
<b>Energy Use</b>	Conserve Energy	Energy Use in Plant	Total Energy Use per Year	Reduce total energy use by 20% in two years

# Core of the EMS

System Procedures



Operational Procedures



Monitoring & Measurement

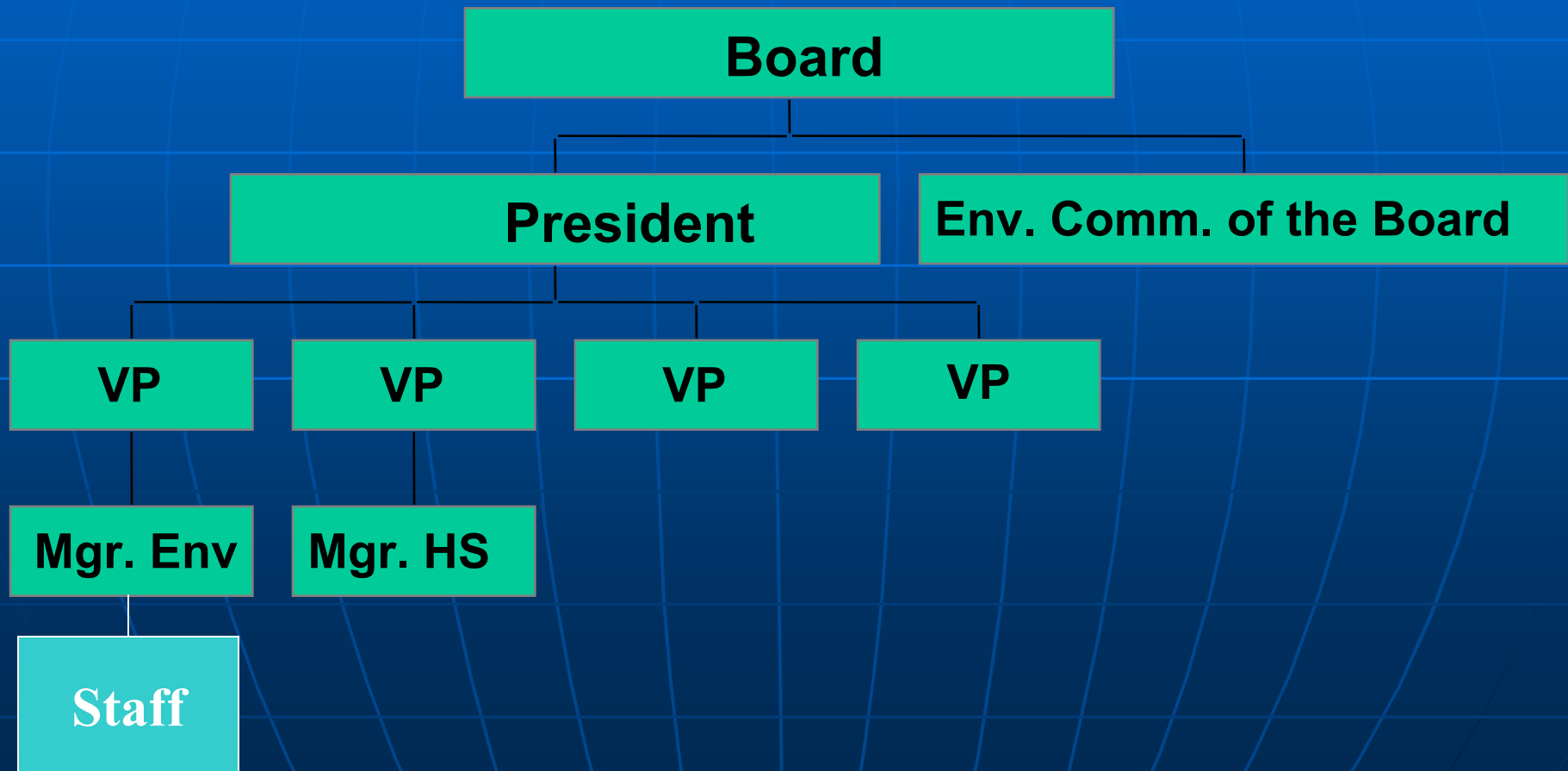
# EMS Fits with Other System Components



# Responsibilities Clarified, Embedded In..

- EMS Guidance Document
- Job Descriptions
- Contracts
- Employee Performance  
Management & Evaluation
- Procedures
- Programs

# Environmental Roles and Responsibilities ID'd at All levels



# Responsibilities – Top Management

## ■ CEO - *Examples*

- Approve Policy
- Approve responsibilities of top management
- Provide resources for EMS
- Review EMS
- Review Audits, Objectives & Targets for Continual Improvement

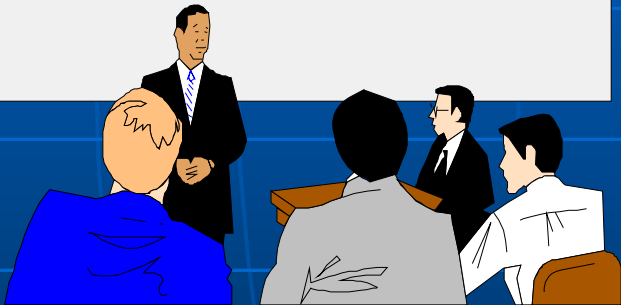
# Responsibilities – Sr. Management

- Senior Management
  - **Approve all system procedures**
  - **Approve register of aspects & impacts annually**
  - **Approve objectives & targets and programs - reports on progress to Top Management annually or more frequently as significant issues arise**
  - **Recommend responsibilities of top management**
  - **Reports on items of significant concern to Sr. Env. Committee**



# Training & Awareness

*The right information  
for the right people*



- Board
- Top Management
- Senior Managers
- Supervisors
- Staff
- Contractors
- Suppliers
- Public

*Training Needs → Plan → Hire or Develop → Deliver → Track*

# Operational Performance Indicators

(Process, activity, output monitoring)

- Levels of use (fuel, water, chemicals)
- Eco-efficiency - reduction in water, materials, energy intensity
- Reduction in GHG Emissions
- Reduction in contaminant discharge achieved per investment in cleaner technology

# Environmental Condition Indicators

- Concentrations of contaminants in air, water, soil, fauna and flora
- Status of wildlife and fish populations and habitats
- Turbidity in surface water



# Reporting - Internal & External

- Governance
- Management
- Operational

*Transparency*

- Public
- Stakeholders  
& Partners
- Regulatory



# Monitoring and Measurement

- **Procedures** to monitor and measure key characteristics that can have significant environmental impact
- Record information in databases
- Necessary monitoring equipment must be calibrated and maintained
- **Procedure** to evaluate compliance

# Verification Processes

- Audits (EMS/EMS-Compliance/Compliance)
- Gap Analyses
- Monitoring

# Management Review

- Continual Improvement - Review by Management at defined intervals – yearly at least
- Policy, objectives and targets reviewed by level of Management that defined them
- Audits, success of meeting objectives & targets, suitability of EMS and concerns of interested parties



# Registration Process

**Pre-Registration Audit**

Does EMS exist  
on paper?



**Registration Audit**

Verify EMS has been  
implemented as planned



**Surveillance Audits**

Verify continual  
improvement and  
maintenance of EMS

# Snap Lake Update

- SHE System – OHSAS 18001 and 14001
- Energy Use Reduction through Fixture Replacement
- Final Stages of Approvals to Proceed with Construction
- EMS applied to all licensing and permitting
- EMS applied to all contracting