



Group Projects

Sustainable Development In Practice Mine Closure/Completion

Section 8 Risk Management





Overview

- **Sustainable development and mine closure – risk management model**
- **Mine closure risk topics – social responsibility, ecological balance, growth**
- **Some lessons learned**
- **Conclusions**



Closure Risk Management Model

Group Projects

Consult and Communicate



Establish
the
context



Identify
the
risks



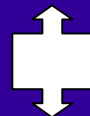
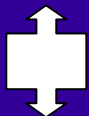
Analyse
the
risks



Evaluate
the
risks



Manage
the
risks



Monitor & Review



Risk Management Topics

Group Projects

“Social Responsibility” (Slide 1)

1. Consultation – community / stakeholders

- Social issues – land use, aspirations/concerns, heritage
- EHS risks – stakeholder & community point of view
- Emergency response/contingency plans – post-closure
- Performance feedback – operation and closure plans
 - Open communication channels - participation
 - Style – easily understandable by all
 - Transparent - all hazards whether high risk or not
 - Sincere – not just looking for closure sign-off



Risk Management Topics

Group Projects

“Social Responsibility” (Slide 2)

2. Commitments

- Statutory/regulatory obligations – NOI, Lease
- Outcomes of consultative process – land use, EHS commitments
- Land use – realistic, achievable commitments
- Closure criteria – moving goalposts
- Effective risk management – not just closure sign-off



Risk Management Topics

Group Projects

“Social Responsibility” (Slide 3)

3. Risk Management

- Identify all EHS risks to community
- “Life cycle” process
 - EHS risk registers - speed/effectiveness of actions
 - Corporate culture - commitment to commitments
 - Communication - ability to manage risks
- Transparent reporting – track effectiveness & sincerity of risk management



Risk Management Topics

Group Projects

“Ecological Balance” (Slide 1)

1. Corporate culture

- EHS standards – basis for culture
- Closure knowledge base – competence, R&D
- Data & information management – for future land users
- Communication & consultation – report progress
- EHS Commitments – achievable, financial provision
- Industry knowledge sharing – can’t achieve individually
- Corporate commitment to risk management – balance short & long term incentives



Risk Management Topics

Group Projects

“Ecological Balance” (Slide 2)

- **Risk Management**

- **Closure criteria – no detrimental impacts**
- **Risk assessment – all EHS hazards; prompt action**
- **Monitoring – all significant EHS risks**
- **Closure planning – workable, cost-effective, engineered**
- **Design – mimic natural “structures”**
- **Trials – R&D, continuous improvement**
- **Performance monitoring – confirm closure strategy**
- **Financial provision – include risk based process; trials**
- **Continuous improvement – iterate EHS risk process**



Risk Management Topics

Group Projects

“Growth” (Slide 1)

- **3rd aspect of triple bottom line**
 - **Sustainable growth is inextricably linked with “Social” and “Ecological” closure risks**
 - **Life cycle risk management provides real medium and long term financial benefits**
 - **correct financial provision – no shocks**
 - **opportunities - improvements & savings**
 - **sustainable growth - better ≠ higher cost**



Risk Management Topics

Group Projects

“Growth” (Slide 2)

- **Risk management approach:**
 - **Supports sustainable development culture**
 - **Ensures:**
 - **Stakeholders/community consultation**
 - **Required actions are carried out**
 - **Balanced short term/long term focus – balance growth with social and ecology**



Lessons Learned

Group Projects

- **Culture – eg standards and common approach; individual approach increases risk**
- **Commitments must be achievable eg availability of capping materials for defined land-use**
- **Act quickly on EHS issues – delay increases risk – eg major contaminant plume**
- **Competence – incorrect design increases risk eg failure of covers**
- **Consultation – regulators and stakeholders eg land use; participation in risk assessment**



Lessons Learned

Group Projects

- **Research & development – eg predictive capabilities**
- **Share knowledge – eg trials; performance**
- **Opportunities – eg covers**
- **Planning – eg progressive rehabilitation – positives and negatives**
- **Start early – late planning increases closure risks & costs – eg 5 to 10 years post closure maintenance**
- **Participative risk management approach – good feedback**



Conclusions

- **Risk Management approach supports Corporate sustainable development culture**
- **Simple measurable approach understandable by all stakeholders and interested and affected parties**
- **Clear definition and consistent management of all potential post closure issues**