

THE UNIVERSITY OF  
NEW SOUTH WALES  
SCHOOL OF MINING ENGINEERING

# BEST PRACTICE ENVIRONMENTAL MANAGEMENT

## - ENVIRONMENTAL EDUCATION & TRAINING

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## Outline of Presentation

- Employees
  - C.U.L.T.U.R.E.
  - Case study - Cannington
- Industry
- Community
- Government
- Students

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## Workforce

- Aim
  - To achieve an enduring and improving environmental culture
- Benefits
  - Ownership and commitment at all levels
  - Improved environmental performance
  - Minimise future environmental risks

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## Workforce

- Culture
  - “the way we do things around here”
  - Communication
  - Urge
  - Leadership
  - Teamwork
  - Understanding
  - Recognition
  - Empowerment

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## Communication

TABLE 2  
COMMUNICATION – ANALYSIS AND BENCHMARKING

PERFORMANCE INDICATOR	COMMON	BEST PRACTICE	PERFORMANCE REQUIREMENTS
Style	Little effort is made use of participatory.	Consensus based use of participatory. Clearer where necessary.	Frequency of regular activities and flexibility where necessary.
	Not sensitive to local circumstances.	Remaining sensitive to local circumstances.	Effort to make information to local communities.
Methods	Single media. Message lacking consistency and alignment to business strategy.	Tools developed to provide for each management level.	Degree of line manager involvement in environmental messaging.
Use of local language etc.	Prescriptive approach not accommodating local language etc.	Corporate focus using corporate language but sensitive to local language.	Use prescriptive/understanding. Use of local language. Evaluation of communication effectiveness.
Frequency	Low communication containing environmental information.	Ad hoc communication of environmental issues at various levels and organisational internal sources.	Frequency and mix of communication of environmental issues and organisational activities.

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## Communication

### CASE STUDY 1

**EXXON Coal & Minerals Australia Limited (ECMAL)**

Significant environmental and pollution control works have been enabled in recent years at the current main operation (Eneabba and Limestone Coal Mine) and at the Tindal Coal Lacks in NSW. However, it was recognised that the increased rehabilitation effort and associated engineering outlays provided only part of the solution towards achieving the desired low level of environmental risks and high environmental performance.

To address the “people factor” in environmental management in a structured way, ECMAL launched its Environmental Awareness Campaign in May 1992. The cornerstone of the campaign was the production of a series of 12 high quality posters and stickers covering all the key environmental management aspects of the operation. These included:

- environmental policy;
- environmental responsibilities;
- safety, and noise, fuel, air, water, greenhouse, noise, impact;
- rehabilitation; and
- the future.

A presentation/training module on each topic was presented by the site Environmental Committee to each shift at each operating location (Open Cut, Underground, Washing, Coal Preparation Plant and Administration). The posters and stickers were distributed to each employee after the bi-monthly presentations at the sites over a two-year campaign. The use of quality poster and sticker materials as the vehicle for verbal presentation across the program provided and added the elements of expectation and surprise. Both the posters and stickers link together to form a continuous panorama of message environmental issues. Flexibility in the program allowed for focusing on certain messages of particular relevance to the target audience, and for inclusion of information on current site and community affairs.

Employees were encouraged to discuss the relevance of the environmental issues to their daily activities and also to take the materials home to share and discuss with their families.

To complement the large group presentations by the site environmental specialists, a series of short instructional modules was prepared so that supervisors could continue the campaign by delivering “on-the-spot” talk during informal meetings – while arising in your toolboxes) presentations to small work teams at the coal face. Also the environmental messages in the program were coordinated by the regular dissemination of environmental messages in internal weekly newsletters and monthly publications.

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## Communication

The impact of the Environmental Awareness Campaign has been positive and has provided the following outcomes:

- heightened awareness that has led to improved environmental performance, as measured by qualitative-based audits of the implementation of the Environmental Management System;
- more cooperative attitude by all employees towards minimising environmental impacts and risks;
- broader application of issues and risks at the mine-site, enabling employees to incorporate environmental risk considerations into the various Risk Review, undertaken by teams for new projects and major changes to operating procedures or equipment;
- an understanding of each person's responsibility for site environmental management during their day-to-day work, and how this relates to the total environmental performance of the company;
- more constructive attitude by the workforce towards environmental management initiatives, such as inspection and reporting procedures;
- the structured campaign has provided a regular forum for feedback to raise issues of environmental concern and to suggest improvements; and
- raised corporate profile in the local community, with significant interest in the awareness campaign, and its posters and stickers, from schools and other organisations.

CASE STUDY 1

## Urge (= motivation)



CASE STUDY 2

### Kidston mine

At Fluor Pacific's Kidston Gold Mine Limited, located in central Queensland, senior management was struck by the poor visual amenity of the site. In an effort to improve the site's image, management approached the operators to ask what could be done. The result was surprising.

The site operators set out to improve their area by planting trees. Management provided the financial resources, the employees supplied the labour. Over these years began to improve, there was a noticeable change in attitude; people were becoming proud of their achievements. Elaborate tree irrigation systems began to be installed — applied by the company and installed by the workers. People began to stay over on weekends to ensure that the watering programs were maintained, and would purchase their own equipment because they were impatient for change. Soon groups were competing to have the most improved area. They became focal points for work social gatherings. Areas were renamed with grandiose titles, for example the '91 Golf Club'.

## Leadership

- An environmental policy
- Integrated EMS



- Understanding and awareness of board members
- Commitment from top management
- Environment as part of performance indicators

## Teamwork

- Increased commitment and motivation
- Lifting of morale
- Raising job performance
- New ideas



CASE STUDY 4

### Apple Diamond Mine

Apple Diamond Mine, the largest VMS (volcanic massive sulphide) deposit ever and almost entirely owned by Fluor Pacific, is located in the northern region of Western Australia. The mine is a 100% owned Fluor Pacific operation. The mine's success has been attributed to the following factors:

- positive through integration of all aspects of environmental impact and
- successful and consistent environmental management
- environmental excellence in a competitive market and leader of the field
- consistent and
- consistent and
- consistent and

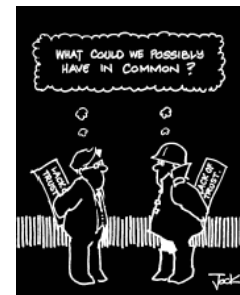
As a result of their early focus, Apple Diamond established a reputation for environmental excellence in the industry. The mine has been named as the 'most responsible' in the world by the Environmental Protection Authority (EPA) in 2004.

The EPA has awarded Apple Diamond the highest environmental award in the world, the 'most responsible' award, for its commitment to environmental excellence. The mine has been named as the 'most responsible' in the world by the Environmental Protection Authority (EPA) in 2004.

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## Understanding

- Consider using supervisors for training (with environmental experts)



## Recognition

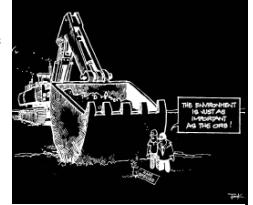
- “put away incentives, bonuses and other...get on with ensuring the conditions for effective managers to recognise good work, encourage it, pay fairly for it, and provide management leadership that lets everyone get on with their work”
- Avoid:
  - Insincerity
  - Financial rewards
  - Singling out the individual

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## Empowerment

- Higher morale
- Lower staff turnover
- Employee initiatives
- Improved environmental performance



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## COMMUNITY EDUCATION

- Open days
- Media

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## SMALL SCALE MINER EDUCATION

- DME South Africa - a steering committee formed to provide guidance and advice to small-scale miner on:
  - geological information
  - policies, research and training
  - appropriate mining methods
  - appropriate mineral processing methods
  - business planning and promotion
  - financing

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## Examples of Assistance Programs

- Ministry of Mines Zimbabwe
  - formal small-scale gold mining - quartz reefs
  - cooperatives
  - illegal/artisanal
  - provision of surveyors, geologists, mining and metallurgical engineers
  - plant hire scheme
  - loan funds

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## Examples of Assistance Programs

- Donor assistance - Zimbabwe
  - loan funds at concessional rates
  - building institutional capacity in Ministry of Mines and Small Scale Miners Association
  - establishing a gold processing plant for toll-treatment
  - establishing a model alluvial mining and rehabilitation project

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## GOVERNMENT OFFICIALS

- Mines inspectors

## Characteristics of Key Officials

- in a very good position to influence
  - positions of power
  - location
  - mobility
- lack of resources
- lack of qualifications and experience
- need to speak on equal terms with management

## Training of Key Officials - the Path to a Solution

- Education and Training in:
  - mine safety and health
  - environment
  - resource utilisation
  - business and management
  - “pegging” skills
  - entrepreneurship

## Case studies

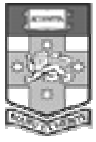
- UNSW - Centre for Mining Research
  - short courses on:
    - environmental management
    - mining law
    - mine safety
    - mine geology
    - safe drilling and blasting
    - mine management
    - export marketing
    - ground support
    - mine ventilation

## Case studies

- New South Wales Department of Mineral Resources
  - workshops for opal miners
  - handbook on best practice in opal mining
- Zimbabwe
  - institutional capacity building in Ministry of Mines
  - workshops for mines inspectors in environmental management
- Fiji
  - workshop on best practice environmental management - key officials from government, industry and NGOs

## Other Initiatives

- Papua New Guinea
  - Commonwealth Knowledge Network
    - Workshop on Sustainable Mining Practices in early 2000 for Pac Rim officials
  - Train the trainer
    - KCMI - a short course for government officials, small mine managers, community leaders, prospectors and others
    - participants would be expected to run similar courses in their home setting
    - focus on health (particularly mercury), safety and environmental management



## STUDENT EDUCATION

- Schools
- Universities
  - Undergraduate
  - Postgraduate
    - Face to face
    - Online