

# SAFE PRODUCTION SYSTEMS IN MONKLAND MINE

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## My commitment

(Rowan Johnston, general manager [Site senior Executive])

This is a statement of my commitment to health and safety in the Gympie Eldorado Gold mines' Monkland mine project. In making this statement I am representing the corporation to the project employees. It is a duty of the site senior executive to demonstrate corporate commitment to health and safety. My commitment is best reflected in the organisation safety and health policy statement. I am committed to:

- 1 achieving safe production by ensuring worlds best practice in our mining operations and management systems
  - 2 complying with Queensland mining legislation and other relevant legislation, standards and codes of practice
  - 3 ensuring adequate resources including competent operators, plant, and equipment is available to achieve safe production
  - 4 through consultation with employees, contractors, suppliers, and other stake holders ensuring ongoing innovation and continual improvement
  - 5 maintaining a risk management system that will identify all hazards and establish controls before the risks can be realised.
- To demonstrate my commitment:
- I sit as chairperson of the site 12 person health and safety committee which meets once per month
  - I review and authorise all standard work practice documents on and for the site
  - I chair the weekly heads of departments meeting, a forum where heads of departments are held responsible and accountable for the safe production of their departments
  - I am a member of the corporate physical risk committee (meetings every two months approx).

## Our involvement

(Clive Hausmann, Human Resources Co-ordinator)

## Summary

Since the paper 'CHANGE MANAGEMENT' (Johnston & Hausmann 2000) was presented in this forum in August 2000 the Gympie Eldorado Gold mines' safety and health management programs and systems have continued to improve.

The system is developing into a mature safety management tool as demonstrated by the organisations much improved health and safety outcomes. In the year 1999/2000 the mine production was 130,000 tonnes of ore for 33,000ozs of gold at a health and safety cost of lost time injury frequency rate (note1) 63, duration rate (note2) 38 and an incident rate (note3) of 13.

The year 2001/2002 saw figures of 180,000 tones of ore for 55,000ozs of gold, lost time injury frequency rate 13.9, duration rate 11 and incident rate of 3.5.

The management structure of the operation has been revitalised with the introduction of two new senior management positions and the reorganisation of the human resources area. This revitalisation has been achieved while maintaining a flat management structure.

Training programs in place ensure all employees have access to relevant training both on-the-job and off-the-job. This standard applies equally to the non-mining section and the mining section of the work force. The training programs are based in a system of task and training needs analysis.

There has been a major and ongoing upgrade of plant and equipment. This upgrade is a move away from hand-held mining methods to a more mechanised operation. As well as improving the safety and production outcomes these changes have meant a major revision of project work procedures and standards has been necessary.

The level of work place environment monitoring has increased significantly. Both internal and external monitoring has increased. Air quality, water quality and noise levels are measured on a regular basis. Environment monitoring is conducted both by site employees and consultants and in the case of water quality the testing of site gathered samples by an independent laboratory.

## Introduction

We in the Monkland mine do not think of safety as an independent system to be managed separately to other systems, we now think in terms of safe production. This is not a new concept but it is a concept that requires managers to think outside the box, outside the scope of most new managers professional expertise.

To achieve safe production the four controlling influences must be targeted (Fig.1):

- controlled work environment
- fit for purpose equipment

- work procedures
- competent people.

This paper will review the GEGM management of these influences in the Monkland mine operations.

Monkland mine, a vertical shaft access gold mine, is located under the city of Gympie in south-east Queensland, on the Bruce Highway approximately 180 kilometres north of Brisbane. The mine employs 130 company operators and 30 contractors in Monkland mine and processing plant.

During the past three years the operation has undergone major re-organisation, the management structure has evolved, the hand-held mining methods have, in the main, given way to more modern mechanised methods. An award-winning training program (note 4) has been adopted and work procedures based in risk/hazard management developed

The organisation as well as mining and processing operates a regional exploration group. A second mine, the Lewis mine, is being developed by Roche Mining as a decline access operation. This paper will reflect the changes that have occurred in the two years since the Monkland mine operations were last reviewed in this forum (Johnston and Hausmann 2000).

We have still not achieved the industry (Queensland Underground Metalliferous) average for that sad old safety benchmark – the LTIFR. The LTIFR for the group during the 2001-2002 reporting year was 15.5, this being made up of the mining and processing figure of 13.9 and the exploration's 25.4. The overall figure is down from 229 in the 1997-1998 year and a peak of 292 early in the 1998-1999 reporting period. This same improvement is reflected in disabling injury frequency rate, lost time injury duration rate and severity rate.

### Operational Control

Without corporate direction a mining organisation is a lot like a headless dragon – hazardous by nature and dangerous by habit.

Gympie Eldorado Gold mines corporate input to risk management increased with the establishment

in 2001 of the corporate physical risk committee. The first action of the physical risk committee was to commission a review of the catastrophic risks at Gympie Eldorado Gold mine's Monkland operation and the conduct of a major hazard risk assessment.

This process involved Professor Jim Joy of the Mining Industry safety and Health Centre at the University of Queensland and Safe Production Solutions (Peter Standish) reviewing GEGM's risk management procedures and facilitating the identification of catastrophic risks by a brainstorming session involving mine management and operators. 'One hundred and five (105) catastrophic loss scenarios were identified by the team' (Standish 2002).

The second action of the physical risk committee has been the drawing up of the corporate risk management policy document. This policy establishes safe production as the goal of the risk management system, confirms corporate commitment to the risk management process and details reporting standards.

The mine management structure has been revised to comply with the Queensland mining legislation. This was achieved by appointing the general manager as site senior executive, 10 safety and health representatives and a person to control winding operations.

All other statutory appointments were already in place—eg mine manager, electrical supervisor, shot firers etc. The six departments within the mine, underground operations, surface operations, human resources, geology, administration/finance and environment/tenements are headed managers/coordinators appointed by and reporting to the Site Senior Executive.

Two new senior management positions within the organisation are:

- 1 Underground operations manager who has responsibility for long term strategic planning for both the Monkland and Lewis mines, Budgeting and resourcing of both underground operations, co-ordinating short and medium term outputs to achieve corporate business plans, administration of the Lewis mine contractor and to manage mine maintenance.
- 2 Surface operations manager has responsibilities as project management of the treatment plant up grade and management of processing operations generally. This position will also take responsibility for special projects.

Responsibility for health and safety management systems hazardous substance control, injury rehabilitation, training and emergency response have been grouped together and placed within the responsibilities of the human resource co-ordinator.

To aid the mine manager, foreman and mine supervisors to better plan their work schedules targets, have been set to reflect the planning time frames. Under this system the mine manager has targets for the full year, the mine foreman's targets are for the next three months and the supervisors' targets are for the next seven days. The targets are based on safe production and include improving safety outcome and a fixed production target.

To ensure access to the best available people all recruiting for positions, other than senior managers and professional people, is conducted on behalf of

**WORK PROCESS MODEL**

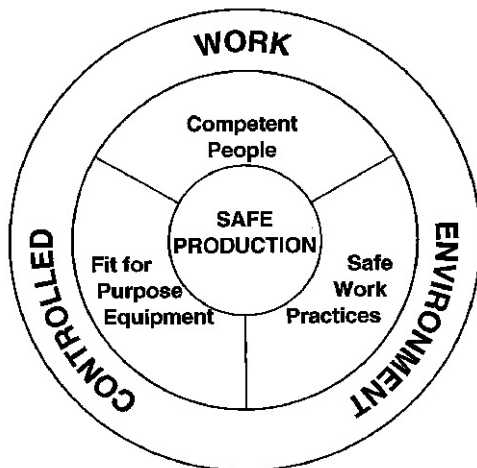


Fig. 1

the organisation by an employment agency. This process is designed to meet equity and affirmative action standards while being fair and just.

### **Work Environment**

The introduction of diesel plant has meant a major increase in the underground work place environmental monitoring program. An analysis of all diesel exhausts is conducted each month, after each exhaust system overhaul/replacement, after each motor overhaul and after each motor change out.

There is in place a work place environment monitoring program supported by annual surveys by both SIMTARS and Allhealth and safety Solutions. The surface work place environment is subject to site monitoring and monitoring by SIMTARS and Allhealth and safety Solutions. Particular attention is given to the surface workshops and the gold room. mine discharge water is tested by an independent NATA testing laboratory (ALS).

A continuing program of noise monitoring is in place and noise assessment is included in plant and process risk assessments. Noise surveys are conducted annually by SIMTARS and Allhealth and safety Solutions.

The ventilation of Monkland mine has been an ongoing area of concern with the mine in the past recording high wet bulb temperatures-rarely exceeding 32deg C.

A flow-on effect of the long hole stoping is the limited number of production units available and therefore a limited number of areas that can be worked simultaneously (Scargill & Kahler 2002). The mine now spreads 60m<sup>3</sup>/s across four working levels compared to 40m<sup>3</sup>/s across eight working in 1999. The need to wet our old timber shafts contributes the high humidity in the mine.

### **Work Procedures**

All work procedures are included in the Gympie Eldorado Gold mines occupational health, safety and environmental management Plan 1999 (GEGMSafe). This plan is available to all employees on the site net and on CD for computers not connected to the site net as well as for home computers. An updated CD is issued each month and loaded into those site computers not connected to the site net. This is seen as a much more effective means of ensuring up-to-date information is available to the workforce.

All organisational work standards are developed as a product of a system of risk assessment. Risk assessment within the GEGM organisation takes three forms.

These are firstly the catastrophic risk management system that, as the name implies, addresses those risks that, were they realised, would have the most adverse effect, to the extent of destroying the organisation. This process is driven by the corporate physical risk committee.

The second risk assessment system is applied to all plant, equipment, planning, substances, environment and processes. These risk assessments are conducted by a project team. A typical GEGM risk assessment team would be:

- facilitator
- area manager

- area supervisor
- maintenance person
- operator
- safety and health representative
- consultants and other experts as required by the team.

To ensure quality and consistency in our risk assessment procedures risk assessment facilitators will have completed the minerals Industry Risk management plan of the University of Queensland Graduate Certificate in mineral Resources program. We have two persons currently enrolled in this program.

The third site risk management procedure is a system of job safety analysis (JSA). The site JSA system addresses the operators' 'apply local risk control processes' competencies. This process requires supervisors and operators to be involvement in a formal process of hazard identification and risk assessments including identification and application of controls.

A safety and health committee has been formed and meets on the fifth working day of each month. The committee is made up of the 10 site safety and health representatives and the general manager as chairperson with the human resources co-ordinator as minutes secretary. Having the site senior executive and the human resources co-ordinator at the safety and health committee meetings permits fast tracking of complex items brought before the committee.

### **Fit for Purpose Equipment**

Monkland mine has been undergoing a metamorphosis during the past two years. The mine spent the years from 1987 until 2000 as an ugly handheld operation dependant upon rock drills, jacklegs, pneumatic rail boggers and a battery electric rail haulage system. The mine is emerging from its metamorphosis as a pretty little diesel operation.

Toro diesel LHD units have replaced many of the Atlas Copco LM56/57 rail shovels, a diesel electric jumbo now does 75 percent of the development work while long hole drills have replaced the rock drills in production work.

Diesel Locos are replacing the battery locos. The use of 8 kilogram spawling hammers has given way to hydraulic rock breakers. It should be noted at this point that all of this plant and equipment must fit through a 1.1 metre X 1.1 metre opening, as these are the cross section dimensions of the compartments of the Scottish Gympie Number 2 shaft and the only current access to the underground workings for this plant and equipment.

The Toro 151s (already very small), the jumbo, the rock breakers, locos, drill rigs needed to be reduced to bite size pieces on the surface and reassembled underground. While it is possible to cut the Toro buckets in half it was necessary to alter the shape of the tyres, as ovals they fit but in their normal donut shape they do not fit. This disassembly and reassembly adds considerably to the cost of the plant.

New plant introduced in the past two years includes:

- 5 Toro 150/151 LHD units
- 1 Baldwin Diesel Loco (two more planned for this fiscal year)

- 1 Quasar electric/hydraulic long hole drill rig
- Hydraulic rock breakers
- 2 Valpadana 9565 underground service vehicles (tractors)
- 1 Quasar H104 Jumbo

Two of the Toro LHD units are fitted with line of sight remote operation controls.

While these changes may appear as small potatoes to some they represent major change to the Monkland mine and Monkland mine workers.

#### Consultation

The management-operator consultation process is aided by a system of meetings and risk assessment processes:

- safety and health committee
- Supervisors production meeting
- Weekly team meetings
- Pre-shift meetings
- Risk assessment
- Job safety analysis.

We have, with the aid of a consultant and with workplace consultation, developed and introduced a system of supervisor/operator review of performance. This program, known as the 'Individual Development & Performance Plan 2002', is a system designed to identify shortages in performance and to determine both training and non-training solutions for those shortages. Having identified the shortages and determined the solutions an action plan is developed, implemented and review at the next 6 monthly meeting.

#### Competent People

Gympie Eldorado Gold mines has established a training system that addresses both vocational and workplace training as well as professional development.

All mine training and assessment is conducted on site. A partnership has been established with TQ Mining Services (Central Queensland Institute of TAFE) under which GEGM resources the training and TQ Mining Services provide administrative services and quality control.

The training agreement with TQ Mining Services covers certificate II to Certificate IV in Underground Metalliferous Mining, Certificate II to IV in Metalliferous Processing and Exploration.

All new employees who are also new to the industry are enrolled in trainee ships that are

adminstrated by Queensland Apprenticeship Services. All new employees must complete the Queensland generic induction program (surface or surface and underground) before commencing employment with Gympie Eldorado Gold mines.

To address the requirements of the *Mining and Quarrying safety and Health Act 1999* section 86 as well as supervisor risk assessment, investigation and communications competencies QLD39065 Certificate III in site safety and health representative has been included in the agreement with TQ Mining Services for delivery on site.

To date all safety and health representatives plus 25 company managers and supervisors and six contractor managers and supervisors have completed this training.

A front line management training program conducted by a private provider ensures all supervisors have adequate management skills. This program is at the AQF4 level and is designed to address five of the FMI units of competency at this level. An extension of this program, with the same provider, provides middle managers with the Diploma of Front Line management competency.

All GEGM employees are currently competent in unit MNMCCCOO005A 'Apply local risk control processes' of the National Underground Metalliferous Training Package. It is planed to run a training program to lift this competency level to QMS1 for all employees.

Auditing, of both safety and environmental systems, is conducted internally by employees with the appropriate competencies as well as by outside experts. Our nomination in the 2001 MINEX Awards provided very useful feedback on the status of our management systems.

#### Conclusion

These past two years have seen Monkland mine achieve a 38 percent increase in ore production for a 66 percent increase in gold while reducing the lost time injury frequency rate(LTIFR) by 78 percent, the duration rate (DR) 48 percent and the incident rate (IR) by 68 percent. (fig. 2).

For a much more detailed overview of the Monkland mine production operations and details of changes to the mining methods I recommend you refer to a paper presented at the Underground

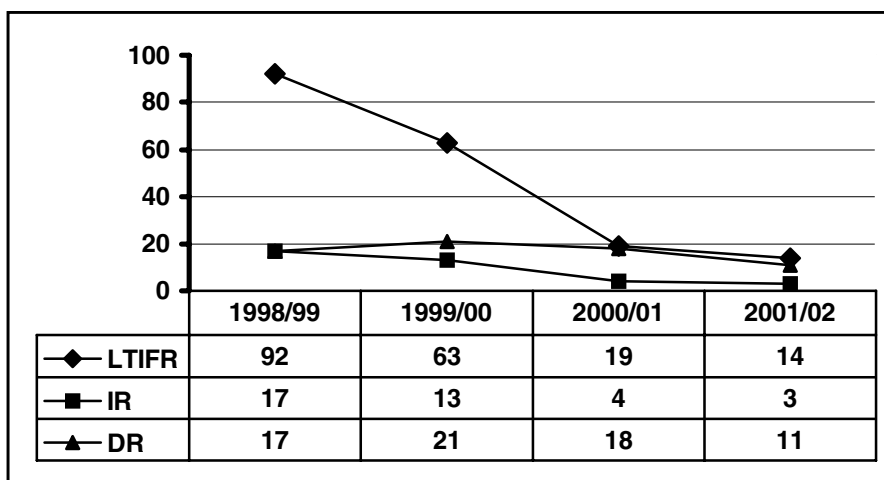


Fig. 2

Operators Conference 'Gympie Gold – The Revival of the Monkland mine'. This paper is the work of Gympie Eldorado Gold mines' underground operations manager Rob Scargill and Monkland mines' planing engineer Daniel Kahler.

We believe that programs and systems planted three years ago are now bearing fruit. We believe that the options we chose have been proven the correct options and although the rate of improvement has slowed improvement is continuing.

It is not possible to separate work procedure, training, safety and health. These issues must be addressed as one if they are to be addressed in an effective manner.

This is by no means a comprehensive review of Gympie Eldorado Gold mines safe production programs and systems. However, it does give some indication of our involvement in addressing the complex issues of modern mine operations. While it is evident that Gympie Eldorado Gold mines has made significant improvement in safety and production in the past two years there is still a long way to go. We believe that with the continual improvement systems we have in place our safe production targets will be met.

## References

- 1 Johnston, R. J. & Hausmann, C. 2000 Change management *From Prescriptive to Participative management at GEGM*, QMIH&SC 2000.
- 2 Scargill, R. & Kahler, D. 2002 *Gympie Gold – The Revival of the Monkland mine*, Underground Operators Conference 2002.
- 3 Standish, P. 2002. Review of the Catastrophic Risks at Gympie Eldorado Gold mines and the Conduct of a Major Hazard Risk Assessment, Safe Production Solutions, Dubbo East NSW.

## Notes

- 1 Lost time injury frequency rate (LTIFR): Number of injuries/million hours worked
- 2 Duration rate (DR): Number of days lost/Lost time injury
- 3 Incident rate (IR): Number of injuries/100 employees
- 4 (i) QMITAB excellence in Metalliferous Training 2001  
(ii) Wide Bay Sunshine Coast Large Employer of the Year 2002 (Queensland Training Awards presented by the Training and Employment Board and the Department of Employment and Training).