

# Maximising Effectiveness and Efficiency in a Mining Industry Funded Health and Safety Regulatory Regime

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## Abstract

The Mining Inspection Group (MIG) of Ministry of Commerce is a self funding government body delivering health and safety services to the mining industry in New Zealand. It is staffed by 17 highly experienced technical staff with multi-disciplinary skills. Comprehensive strategic planning processes and service delivery controls ensure that a high level of efficiency and effectiveness is maintained and resources are focused to achieving desired outcomes. Rating systems are used to identify high risk operations and monitor industry performance. A transparent and equitable funding system is in place along with full accrual accounting, time allocation and information database systems. Proposals to incorporate MIG operations within the Department of Labour will result in further adjustment of policy and enforcement functions.

## Introduction

New Zealand is located in the South Pacific and consists of two main islands covering a geographic area of about 260,000 km<sup>2</sup>. It has a population of 3.4 million of which about 50% live in five main centres. These are Auckland, Hamilton and Wellington in the North Island and Christchurch and Dunedin in the South Island.

The Mining Inspection Group (MIG) of the Ministry of Commerce delivers occupational health and safety services to the mining industry in New Zealand. Health and safety policy advice to government is also provided under a memorandum of understanding with the Occupational Safety and Health Service (OSH) of the Department of Labour. MIG is 97% self funding and has a staff of 23 including four, full time equivalent, support

staff. The total cost of regulatory services is NZ\$2.75 million which includes full overhead accounting, cost of legal and other services, accommodation, vehicles and the provision of policy advice.

Consideration is being given at present to the absorption of MIG within OSH. The basis for this is the reduced cost of programme delivery and a simplified funding mechanism.

MIG administers (Appendix 1. Summary of Operations) 1080 hard rock mining, 671 geothermal well and heating system sites, 75 petroleum well sites, three offshore petroleum installations and 3300 km of pipelines. Intermittent operations normally include five drilling rigs, a mobile offshore drilling unit and five pipeline modifications.

## **Regulatory Framework**

The regulation and delivery of occupational health and safety services across all occupational disciplines in New Zealand is the responsibility of OSH. MIG which is located within the Energy and Resources Division of the Ministry of Commerce and delivers these services to the mining industry under a memorandum of understanding with OSH. MIG's primary responsibility is to fulfil the functions specified or implied for occupational health and safety inspectors in the following pieces of legislation:

- Health and Safety in Employment Act 1992 in relation to all quarries, mines, coal mines, onshore petroleum exploration excluding seismic surveys and offshore petroleum exploration and production;
- Mining Act 1971 and Coal Mines Act 1979 in relation to health and safety conditions in licenses;
- Petroleum Act 1937 in relation to petroleum transmission pipelines;
- Geothermal Energy Act 1937 in relation to geothermal drilling exploration and pipelines containing geothermal fluids.

MIG also provides technical advice on permits and resource management to other groups within the Ministry of Commerce and to the policy section of OSH.

## **Service Delivery Framework**

In order to maximise effectiveness and efficiency a number of initial steps were required to consolidate systems.

1. Establish a Mission statement supported by strategic goals.
2. Rationalise funding base to ensure best equity and transparency in the delivery of services.
3. Assess the competencies of staff and provide training to ensure that required competencies are attained.
4. Provide effective human resource systems for remuneration and performance assessment.
5. Establish written procedures for quality assurance in essential services such as administration, education, inspection and enforcement.
6. Establish regular formal consultation with industry on the quality, quantity and timeliness of services delivered.
7. Establish information systems to monitor costs incurred and health and safety performance in the industry.
8. Establish performance parameters for a risk based field inspection regime.
9. Establish performance measures for MIG performance.

## **Mission And Strategic Goals**

In order to focus staff activity on core business a mission statement was agreed with staff:

"To help New Zealand prosper by promoting excellence in mining."

This statement recognises that while the focus of MIG is on health and safety this focus must also be "owned" by employers and be incorporated into broader business objectives. It also recognises that MIG's considerable professional expertise is available to a wide range of individuals and corporate bodies servicing the mining industry.

The mission statement is supported by the following six strategic goals which encompass the range of activities undertaken within the scope of

the mission statement:

- To be a key provider of high quality information and education to the mining industry.
- To establish an on-site inspection regime based on an operations risk analysis model.
- To achieve a high level of operational excellence in the provision of occupational safety and health services to the mining industry.
- To achieve a high level of transparency and equity in the process of full cost recovery for the provision of inspection, monitoring and related services.
- To achieve a high level of operational excellence in the provision and co-ordination of services to other Government bodies and territorial authorities.
- To develop a regulatory framework which will allow a control of industrial self management within a boundary of approved standards and codes of practice.

Each of the strategic goals is supported by outcomes and milestones as a focus for activity (refer Appendix 2. Strategic Plan for the Mining Inspection Group). The milestones form the basis for the formulation of MIG action plan (Appendix 3: Mining Inspection Group Action Plan 1997/98) and the action plans of each inspector (Appendix 4: Individual Inspector's Action Plan).

## **Program Formulation**

The inspectorate has identified the following activities as part of its core services.

### **Inspections**

Field inspection work is undertaken in relation to quarries, opencast and underground mines and coal mines, tunnels, drilling rigs, geothermal and petroleum wells, transmission pipelines, geothermal heating systems, offshore fixed and mobile petroleum installations. Improvement and prohibition notices can be issued to correct non-compliances.

### **Audits**

Structured assessment of work practices, equipment and safety management systems, either in whole or part, of two hours to three weeks in duration.

### **Tool Box Meetings**

Educational instruction of 10-15 minutes to 2-10 employees on site during work hours.

### **Safety Awareness Classes**

An educational safety presentation to 15-100 employees arranged by an inspector either during or after work hours and of 1-2 hours in duration. Series of classes may be held forming all or part of training for a qualification.

### **Certification**

Conducting oral and written assessment by examination of applicants seeking recognition of expertise for quarry, mine, coal mine and geothermal drilling management.

### **Industry Seminars**

Annual meetings with industry sector groups in which MIG discusses the budget and work program both for the current year and the year ahead.

### **Guidelines**

Statements of preferred work practices or arrangements established with limited industry consultation.

## **Codes of Practice and Standards**

Statements of preferred work practices or arrangements established with wide industry consultation and usually established through a recognised standards setting body such as Standards New Zealand.

## **Approved Codes of Practice**

Codes of practice "approved" by the Minister of Labour under the Health and Safety in Employment Act 1992.

## **Projects**

Data collection and analysis of potential high hazard factors in the work place to assess means of mitigation. Examples are noise, dust and roll-over protection and brake efficiency of off-road mobile plant.

## **Technical Evaluation and Field Testing**

Evaluation of work programs for resource extraction, well drilling, and modification and hydrostatic testing of petroleum transmission pipelines.

## **Human Resources**

Staff are recruited and located to fulfil the following criteria:

- Technical staff must be well respected by industry in their field of expertise.
- Technical staff must contribute skills that maintain the required competency of MIG to deliver high quality service.
- Staff must be geographically located to readily service New Zealand.
- Staff should be multi-disciplined and multi-functional where possible. That is staff who are suitably experienced and qualified may act as Inspectors of a number of different types of operations and may act simultaneously in management and inspection roles.

MIG staff are assigned as follows:

### **North Island**

#### **Auckland**

Mining Engineer, Quarry Manager, Clerk (part time)

#### **Hamilton**

Mining Engineer, Mining Engineer (Coal), Quarry Manager, Electrical Engineer, Geologist, Civil/Petroleum/ Geothermal Engineer (Regional Manager), Clerk

#### **Rotorua**

Petroleum Driller

#### **Palmerston North**

Quarry Manager, Clerk (part time)

#### **Wellington**

Mining Engineer (Manager), Technical Assistant, Clerk

## South Island

### Greymouth

Mining Engineer (Regional Manager), Mining Engineer (Coal), Mine Manager (Coal), Quarry Manager, one and a half clerks

### Dunedin

Two Mining Engineers, Clerk (part time)

## Education and Training

Field staff are expected to have a number of basic competencies across all disciplines. These include formal training in: inspection, investigation and reporting, prosecution, legislation, safety auditing, first aid, assessment of units for certificate/diploma/degree courses in safe mining practice, database operation, word processing, public speaking, communication, assertiveness, bicultural development, quality improvement, personal performance management, equal employment opportunities, negotiating and management of official information. Training is also undertaken in discipline specific areas to maintain necessary skills.

Current managers have received additional training totalling about 22 days in the areas of leadership, strategic thinking, teamwork, achieving results, human resource development, innovation and creativity, performance management, client satisfaction and communications.

## Funding

MIG funding is provided for under the Ministry of Energy (Abolition) Act 1989 although this could change to central funding from the health and safety component of the Accident Compensation Corporation (ACC) levy if MIG is absorbed into OSH.

Levies of about NZ\$3 million are collected using formulae which are designed to reflect the costs of services provided (Table 1).

MIG expenditure is approved by government and must not be exceeded without government approval even if the revenue obtained from levies is in excess of expenditure. Any surplus at the end of the financial year is rebated to industry.

Any levy payer may apply at any time for a rebate of all or part of a levy on the basis that the levy is excessive in relation to services provided. Each application is assessed on its merits.

Quarry Aggregate \$0.10/tonne \$6600

Coal \$0.15 cubic metre \$33,000 (opencast), \$44,000 (underground)

Gold \$145 per kg gold \$30,000

Tunnel excavation \$2.00 cubic metre

Geothermal wells \$1.50 per metre \$900

Petroleum pipelines\* \$10 per km

Offshore platform\* \$30,000 each

Mobile offshore drilling unit\* \$10,000 each

Onshore drilling\* \$2,000 each well

### **Table 1. Levy formulae used for different types of operation. \* under negotiation with industry.**

MIG operates a full accrual accounting system supported by time allocation information database systems. These systems enable accurate assessment of all usual parameters associated with sound business management.

## Operations Database

Field staff are issued with laptop computers with a specialist application database written in FOXPRO computer language on which field information including accident reports are recorded and any letters, reports or notices issued. Field staff also have mobile phones through which it is shortly expected that data can be downloaded via the Internet to a central server direct from site.

## **Effectiveness**

The effectiveness of MIG is reflected in the serious accident rate, the number of significant non-compliances being found at places of work and the number of claims against the Accident Compensation Scheme for work related injuries. Internal documentation audits and check inspections undertaken by Chief Inspectors along with formal bi-annual client feedback assists with improving the effectiveness of service delivery.

## **Efficiency**

The efficiency of MIG is monitored internally using the parameters of the numbers of operations and employees per Inspector, the unit cost of an Inspector and the number and type of improvements being registered by an Inspector.

The efficiency of field inspection is improved by being based on a risk assessment of each operation. Operations are rated on a normalised scale on various factors such as general work type, number of persons employed, employees with less than two years experience, type of shift work, number of non employees at risk of serious harm from site hazards, mechanical plant type, off-highway mobile plant use, explosive use, hazardous atmosphere and working at heights over 10 m. Operations are rated as high risk, significant risk, moderate risk and low risk. These factors along with the health and safety performance and client feedback as discussed in the previous section allow a compliance monitoring program to be efficiently formulated.

## **Future Developments**

The efficiency and effectiveness of MIG operations could be further developed with a number of options available.

One proposal which could proceed as early as July 1998 is to abolish MIG funding provided for under the Ministry of Energy (Abolition) Act 1989. This could be replaced by funding from the OSH allocation of the ACC levy which totals in excess of \$20 million. The advantages of this are muted as:

Reduced costs in levy collection and administration.

Reducing staff costs associated with the delivery of policy advice by restricting the activities of mining engineers to that of technical advisors.

Reducing the cost of services by providing a level of onsite inspection commensurate with other high risk activities inspected by OSH such as construction and forestry sites.

Another less likely but no less viable option is that more autonomy could be provided for decision and strategic planning by establishing MIG as or in an authority with a Board of Directors composed of industry, employee and government representatives.

The high level of expertise and nation-wide network of offices within MIG could be further utilised by establishing further Memoranda of Understanding with various central and local government resource management and safety focused operational units. MIG expertise could be used to consolidate on-site activities from various regulatory agencies associated with mining to minimise costs in areas such as enforcement of environmental and resource use permit conditions.

Continuing the development of a high level education and training role for MIG staff within a formal qualifications framework will ensure that best value is available to industry from MIG expertise

## **Conclusion**

MIG has established processes which ensure that a high level of efficiency and effectiveness is maintained by the 17 highly experienced technical staff with multi-disciplinary skills. Emphasis is placed on strategic planning processes which ensure that resources are focused to achieving desired outcomes.

Risk based rating systems are used to identify high risk operations and monitor industry performance.

Further developments in organisational structure and scope of work may enhance MIG operations in the future.

## Acknowledgements

The assistance of George Munro, MIG Manager and other MIG staff is gratefully acknowledged in the preparation of this paper. Any opinions expressed in this paper are those of the author and not necessarily those of the Ministry of Commerce or the Department of Labour.

## Author

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## Appendix 1. Summary of Operations

	SUMMARY OF OPERATIONS		
	Operations ( ) non producing	Employees (full time equivalents)	Persons at risk
<b>Coal Mines</b>			
Opencast	47 (6)	401	
Underground	26 (3)	324	
<b>Quarries</b>	855	1,688	5,000
<b>Mineral Mines</b>			
Opencast	5	667	
Underground	1	57	
<b>Alluvial gold</b>	66	60	
<b>Geothermal wells</b>			
-domestic	450	5	1000
-commercial	221	10	50
<b>Petroleum wells</b>	75	10	100
<b>Offshore petroleum installations</b>	3	90	
<b>Intermittent work</b>			
Tunnels	30	100	
Drilling rigs	5 (2 geo 3 pet)	60 (25 geo 35 pet)	
MODU's	1	20	
Prospecting	50	20	
Pipeline testing	5	10 (3300 km average 250 mm diameter)	20,000
<b>Summary</b>			
<b>Hard rock mining</b>	1080	3317	5000
<b>Petroleum &amp; geothermal</b>	760+ 3300 km pipelines	205	20,000
<b>TOTAL</b>	1840	3522	25,050
	<b>Operations</b>	<b>Employees</b>	<b>Affected persons</b>

## Appendix 2. Strategic Plan for the Mining Inspection Group

### MISSION STATEMENT

**To help New Zealand prosper by promoting excellence in mining**

## **Strategic Goal One**

To be a key provider of high quality information and education to the mining industry.

### **Outcomes**

- High degree of competence in the industry work-force
- Increased level of compliance with legislation
- Increased awareness of new technology and best practice
- Low accident/incident levels
- Increased awareness of risk by employers and employees

### **Targets/Milestones**

- Managers of all operations to hold appropriate certificate of competence by December 1998
- Increased number of personnel holding relevant certificate of competence
- Hold three educational seminars per year in each district
- All minerals and coal inspectors to be registered as assessors under the New Zealand Qualifications Authority (NZQA) by December 1997
- Higher compliance rating in audit reports
- Hold at least two safety awareness classes per annum in each district
- Facilitate industry forums at least once a year in each district
- Circulate safety alert notices to industry within three months of the occurrence
- Circulate accident analysis at least annually
- Publish safety posters at least six monthly
- Hold toolbox meetings at least monthly in each district
- Publish safety guidelines as required

## **Strategic Goal Two**

To establish an on-site inspection regime based on an operations risk analysis model.

### **Outcomes**

- Efficient use of resources available to the Group
- Appropriate emphasis placed on high risk operations
- Controlled degree of self management is available for employers
- An accurate up to date accident database for the New Zealand mining industry is available
- Accident trends are readily identified
- A targeted programme of reduced site surveillance is operating

### **Targets/Milestones**

- Initial benchmark risk assessment of all operations completed by 30 September 1997
- Inspection frequency for all operations is based on an annual review of risk assessment
- All accidents/incidents are recorded on database within one month of occurrence
- Reduced Site Surveillance Programme established by 31 December 1997
- 30% of all operations assessed by 30 June 1998
- 10% of all operations on low level site surveillance by 31 December 1998

## **Strategic Goal Three**

Achieve a recognised high level of operational excellence in the provision of occupational safety and health services to the mining industry.

### **Outcomes**

- Wide spread acceptance by industry of services provided and costs incurred
- High level of morale within the Group
- Improved communications with industry on safety and health issues
- Consistency in service delivery across industry groups

### **Targets/Milestones**

- Service Level Commitments in place for three major industry groups by 30 June 1997, with remainder by 30 June 1998
- Operational guidelines developed by 30 June 1997, reviewed annually
- Provision of tailored employer assistance programmes available by 31 December 1997
- Client surveys to gauge satisfaction levels servicing and cost issues carried out every two years
- Focused staff training programme reviewed annually by 31 May

## **Strategic Goal Four**

To achieve a high level of transparency and equity in the process of full cost recovery for the provision of inspection, monitoring and related services.

### **Outcomes**

- Adequate funding for the work of the Group
- General industry acceptance of the cost recovery system

### **Targets/Milestones**

Industry meetings on funding issues held at least annually

Client surveys to gauge satisfaction levels with funding issues to be carried out every two years

## **Strategic Goal Five**

To achieve a high level of operational excellence in the provision and co-ordination of services to other government bodies and territorial authorities.

### **Outcomes**

- Widespread acceptance of the services provided
- Cost efficient provision of field services required in the administration of the Crown Minerals Estate
- High level of client satisfaction with accessibility to information on the management and allocation of mineral resources

### **Targets/Milestones**

- All support staff trained in response procedures relating to the Crown Minerals Estate by December 1997, with annual reviews
- Protocols and memoranda of understanding are reviewed annually by 30 June

- Work programme applications are processed within 10 working days
- Requests made under the protocols or memoranda of understanding are delivered on time
- Mining privilege maps, archives and other information relevant to the Crown Minerals Estate are available in all District offices by 30 June 1997
- Information on all OSH services available in all District offices by 30 September 1997
- Protocol developed with Energy Inspection by 31 December 1997

## Strategic Goal Six

To develop a regulatory framework which will allow a controlled degree of industrial self management within a boundary of approved standards and codes of practice.

## Outcomes

- Increased certainty in industry of compliance requirements
- Reduced compliance costs
- Effective level of information available for policy decision making
- Consistency of legislation with international standards

## Targets/Milestones

- Promulgate final three sets of industry specific regulations by 31 December 1997
- Develop Codes of Practice for minerals and coal by 31 March 1998
- Retain high level of Inspectorate expertise
- Monitor international regimes and developments
- Participate in the development of joint standards with Australia where appropriate

## Appendix 3: Mining Inspection Group Action Plan 1997/98

(This table shows an allocation of the MIG work to 16 Inspectors)

### DRAFT GROUP ACTION PLAN 1997/98

	Number	Time (hrs)	Total Time	Cost (NZ\$) NZ\$1=US\$0.70
<b>Operational (Site Inspections)</b>				
Minerals and Coal (Educational, Follow-up and Surveillance inspections)	2100	3	6300	\$541,217
Maui A & B	6	40	240	\$20,618
Geothermal Commercial	220	6	1320	\$113,398
Geothermal Domestic	370	2	740	\$63,571
P & G Drilling	30	16	480	\$41,236
Pipeline Hydrostatic Tests	20	6	120	\$10,309
A Class Audits / M&C	12	16	192	\$16,494
A Class Audits / P&G	4	16	64	\$5,498
B Class Audits / M&C	80	12	960	\$82,471
B Class Audits / P&G	4	8	32	\$2,749
			10448	\$897,560
<b>Operational (General)</b>				
Ministerials / OI Requests	12	16	192	\$16,494
Prosecutions	10	80	800	\$68,726
			992	\$85,220
<b>Educational</b>				
Safety Awareness Classes	30	30	900	\$77,317
Toolbox Meetings	140	3	420	\$36,081
STEP Classes	16	72	1152	\$98,965

Publications	16	12	192	\$16,494
Newsletter	4	128	512	\$43,985
			3176	\$272,842
<b>Projects</b>				
Industry Seminars	8	64	512	\$43,985
Accident Reports / Investigation	20	80	1600	\$137,452
Codes of Practice / Completions	1	200	200	\$17,181
Guidelines / Completions	2	80	160	\$13,745
Accident Publications	4	120	480	\$41,236
Noise Project	24	6	144	\$12,371
Standards Committee	3	120	360	\$30,927
Brake Testing Project	50	6	300	\$25,772
Dust Project	10	6	60	\$5,154
Legislation Phase 2/3	4	160	640	\$54,981
Certification	320	2	640	\$54,981
HO Projects	16	24	384	\$32,988
			5480	\$470,773
<b>Administration</b>				
Monthly Reports	192	4	768	\$65,977
Annual Reports	16	24	384	\$32,988
Levy Administration	16	80	1280	\$109,961
Check Inspections	12	16	192	\$16,494
Staff Meetings	4	128	512	\$43,985
Other Administration	16	80	1280	\$109,961
			4416	\$379,367
<b>Training</b>				
As required in Training Plan	16	110	1760	\$151,197
Crown Minerals Group				
As per contract			350	\$30,068
<b>Others</b>				
Annual Leave	16	160	2560	\$219,923
L/S Leave	1	160	160	\$13,745
Statutory Holidays	16	88	1408	\$120,958
S/L & others	16	32	512	\$43,985
Overseas work	10	40	400	\$34,363
			5040	\$432,973
<b>Summary</b>				
Operational			11440	\$982,781
Educational			3176	\$272,842
Projects			5480	\$470,773
Administration			4416	\$379,367
Training			1760	\$151,197
Crown Minerals			350	\$30,068
Others			5040	\$432,973
Total expenses for MIG			31662	\$2,720,000
Cost per hour for MIG				\$85.91
Head Office overhead (24.1%)				\$20.70
Charge out rate for cost recovery				\$100.34
<b>Overheads Mining Inspection</b>				
Manager			39%	\$288,000
Computer Services			17%	\$124,000
Finance			13%	\$98,000
Human Resources			9%	\$62,500
General Manager			9%	\$63,000
Chief Executive			6%	\$44,000

Information Centre (excl. Library)	2%	\$15,500
Legal	2%	\$13,000
Corporate Development	1%	\$8,000
Library	0%	\$6,000
Administration	0%	\$5,000
Cafeteria administration	0%	\$4,500
Pool Car Parks	0%	\$3,500
<b>TOTAL</b>	<b>100.00%</b>	<b>\$735,000</b>

## Appendix 4: Individual Inspector's Action Plan

### ACTION PLAN 1996/97

	Number	Comment
<b>Operational</b>		
Surveillance	250	complete 50% by 31 Jan
Audit (Class B)	15	complete 50% by 28 Feb
Audit (Class A)	5	complete by 31 Dec
Electrical Inspections	10	arrange
Accid/incid invest report		as reqd
<b>Educational</b>		
Safety awareness class	4	50% by 31 March
Site safety meetings	12	50% by 31 Jan
Seminars	2	industry meetings
Summary of books, videos etc		to Tuiti by 31 Oct
Safety Training Education Program	2	
<b>Projects</b>		
Bulletin/Safety Alerts	4	provide information as reqd
Noise (SD assist by JW,MB)	2	results by 28 Feb, final report 30 April
Brakes(AL assist by AR)	35	results 31/3, draft report 31/5,final 30/6
Procedures manuals	1	as per action plan
Licence reports	1	by 31 Oct
<b>Guideline Drafts</b>		
Brakes (AL)	1	hold AS/NZS standards meeting by 31/3
<b>Training</b>		
Inskill investigations	1	JL to arrange
Powerpoint	1	as required
Word 6	1	as required
NZQA Assessors	1	as required
Interpersonal		as required
Negotiations	1	as required
<b>Administration</b>		
Monthly report	12	to Tuiti by 7th
Annual report	1	to JL by 31 Mar
Levies	2	returns out by 15/12 and 15/6