



**AN ANALYSIS OF THE EXITO
NATIONAL SURVEYS OF THE
NEW ZEALAND EXTRACTIVE
INDUSTRIES**

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**FOR EXITO
EXTRACTIVE INDUSTRIES
TRAINING ORGANISATION**

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EXECUTIVE SUMMARY

In order to identify and meet the future skill needs in the extractive industries EXITO conducted national surveys of seven mining industries. The purpose of this report is to provide an analytical synthesis of these reports to the EXITO board and staff to enable EXITO to improve its responsiveness to the extractive industries in terms of developing current and future skills needed.

This report closely follows the format of the original seven reports by beginning with examining the diversity of the extractive industries workforce, staff recruitment, staff retention and relevant qualifications /experience gained prior to entering the industries. These discussions provide a background to the following sections which examine the training currently undertaken by miners/operators, identifies barriers to training, the match between training delivered and existing training needs, and the type of training delivery preferred. The section identifying the gaps between training delivered and existing training needs, provides details on each industry. This is followed by sections on the match of professional development and needs of managers/professionals, and issues relating to the current EXITO provision of training to the extractive industries. The final section of this report examines the training implications of the forecast growth in the industries, and provides a breakdown by industry of future training needs identified, industry suggestions for remedying the forecast skills shortages, and issues the industries want EXITO industry training and skills development to address by 2010.

The original reports did not make prescriptive recommendations, rather it supplied a number of questions for EXITO to consider. In this executive summary I utilise this format to list questions for the EXITO Board and staff to consider when reading the body of the report.

Workforce diversity

All the industries surveyed were characterised by a lack of diversity in the workforces.

There are very few women working in the extractive industries.

1. Why are there not more women working in the extractive industries in New Zealand?
2. How could employers be encouraged to consider both genders when undertaking recruitment?
3. What additional recruitment methods may be needed to attract women?
4. What can be learned from the women who work in the industry?
5. What role could EXITO take to promote pan-industry knowledge about successful recruitment, promotion and advertising practices?

Maori and other ethnic groups are under represented in the extractive mining industries, particularly at management/professional levels.

1. Why aren't there more Maori and other ethnic groups working in the extractive industries in New Zealand?
2. How could employers be encouraged to consider selecting more widely when undertaking recruitment?
3. What can be learned from Maori and other ethnic minority groups who do work in the industries?
4. What role could EXITO take to promote pan-industry knowledge about successful recruitment, promotion and advertising practices?

The age of workforce was not a particular concern for most industries other than the Quarry Industry, but some other industries also identified recruiting young people into the workforce was an issue.

1. How are the knowledge and skills of very experienced miners and managers/professionals passed on to younger employees before they retire?
2. How can young people be encouraged to enter the extractive industries?
3. What role could EXITO take to promote pan-industry knowledge about successful recruitment, promotion and advertising practices?

Recruitment

Most of the industries reported that they did experience staff recruitment problems, particularly for workers with technical and trades skills because salary levels were lower in New Zealand than overseas.

1. How can job conditions rather than pay rates be used to attract professionals and new operators/miners into the industry?
2. How can the non-financial reasons for being attracted into the industry be promoted to those who may wish to take up employment in the extractive mining industries?
3. What can be learned from those coal mining managers who have in part addressed skill shortage by recruiting from other ethnic groups?
4. What can be learned from NZ companies who are recruiting other ethnic groups from overseas as a way to reduce skill shortages within their own industries?

Training and experience prior to entering the industry

Across industries just over half of respondents (54%) had no relevant qualifications or experience when entering the industry. In addition, some qualified staff lacked knowledge of practical application of their qualifications.

1. Could specialist pre-employment programmes speed up the process of becoming an operator/miner?
2. How could EXITO support more people to obtain appropriate licences?
3. What skills could be learnt in secondary school which would support careers in mining?

Encouragement to take onsite responsibility

One of the ways of providing a career path and increasing the skills of the workforce is to delegate on-site supervisory responsibility. This practice makes the best use of those working within the industry and ensures that skills and experience are gained by a range of people within the workforce.

1. How do companies identify who has supervisory/management potential and how do they support staff to train towards this role?
2. What support is needed from EXITO to assist the development of managers, supervisors?
3. What can be done to encourage those employees who are unclear about their future career direction so that they remain productive and committed miners/operators?

Training of miners/operators

Most of the miner/operators in the all industries surveyed had very positive attitudes towards training, which they saw as providing opportunities to improve their skills, expertise and qualifications. They also saw benefits for their industries from having a competent trained workforce.

The way training is 'sold' has a big impact on miners/operators willingness to participate in training and what they learn. There was a wide variety of ways training was sold to employees that ranged from being ordered to attend, and being consulted and invited to attend. Miners/operators who were told to attend training were less enthusiastic about participating in training than those who were able to participate in the decision.

If part of the consultation process for miners/operators included setting training goals, the participants found that the training outcomes were far more likely to meet their training needs, and the company's needs.

The major barrier to training in the extractive industries was maintaining production levels while employees were in training. Although this barrier affected all industries, it was particularly evident in smaller worksites.

The gaps between existing training accessed and training needs varied widely across industries (see p 19). Most commonly identified gaps were for computer training, communication skills, and apprenticeships.

1. What can be done to improve financial support for training?
2. How can companies be supported to provide more training?
3. How can training be made accessible to all extractive industry employees?
4. How can EXITO assist small companies to take advantage of training being offered?
5. What role should EXITO have in educating managers in the extractive industries about how to effectively sell training to staff?
6. How could companies be assisted to change from the 'telling' approach to the 'consultation' approach when trying to attract staff to do training?
7. How can EXITO assist with accurately identifying training needs?

8. What can be done to include all staff in the process of training needs identification?
9. What mechanisms need to be put in place to ensure managers and staff always set training goals together before training?
10. What can be done to help managers understand the positive flow-on effects of jointly setting training goals?
11. What can EXITO do to increase literacy levels?
12. What type of training follow-up will best address whether pre- and post-training goals were congruent?
13. How could successful and experienced managers be encouraged and helped to provide mentoring to other staff?
14. What needs to be done to develop further unit standard qualifications for extractive mining industries?
15. What could be done to develop a group of unit standards to make up qualifications for geological field technicians, mine surveyors and samplers?
16. What can EXITO do to help support the need for tertiary trained specialists for the industries?
17. What can be done to develop new areas of specialist training for the extractive industries?
18. How can EXITO support further provision of training for qualified trades people?
19. What does EXITO need to do to identify the additional training required for major technological advances occurring over the next 5 years?

Professional Development

The number of managers and professionals surveyed as part of the reports was small, so caution needs to be taken interpreting these results. It was clear, however that most felt that their companies did not accurately perceive their needs for professional development.

Although a high percentage of managers/professionals felt encouraged to participate in professional development, very few actually thought that they received enough professional development. Reasons for this discrepancy were given as the demands of the job and lack of access to appropriate training. Most valued professional development highly and were keen for greater access.

Managers/professionals identified professional development deficits in both management and technical skills areas. The most frequently identified management skills included people management skills, financial management, planning and personnel processes.

1. How could training/professional development in management/leadership training and computer training be made more available?
2. What type of training and development will be most effective for managers/professionals – formal qualifications, on-the-job training, secondments, peer support, individual coaching or mentoring?

Training delivery

Most miners/operators showed a strong preference for practical on-site training that integrated theory and practice. Coal miners/operators and iron sands miners/operators preferred their training to be off-site so that they would experience fewer interruptions. Respondents working in the coal mining and gold mining industries wanted training to happen in their work time as part of their regular jobs.

Managers/professionals identified a wide range of delivery of professional development. It is interesting, that unlike the miners/operators, distance learning was one of the preferred options for half of the managers/professionals surveyed.

1. What can EXITO do to support the training of employees in small companies where the need to maintain production levels is a major barrier to participating in training
2. What can be done to provide training immediately a new employee enters the extractive mining industries?
3. How can practical on-the-job training be made more accessible to the industries?
4. How can theory and practical training be more integrated so that trainees reach acceptable levels of competence back on the job?
5. How can regular and on-going communication between EXITO and the extractive mining industries to ensure response levels are high?
6. What could be done to expedite EXITO funding to address literacy problems?
7. What can be done to improve the work practices and skills of more experienced employees?
8. What actions could be taken by EXITO to support companies to establish structured annual training plans which can be organised well in advance and with adequate advance notification to trainees?
9. How could EXITO use their knowledge of companies already doing the above to share their 'training organisation' competence with other companies?

Characteristics of good training

Overall, the characteristics of good training identified across industries were very similar. These included, a realistic training structure, an integration of theory and practice, and effective trainers.

Most industries identified characteristics of effective trainers as including professional up to date knowledge of the industry, having teaching skills/experience, being well organised, with good communication skills, and most importantly being respectful of learners.

1. How are effective trainers identified and recruited? What is done during the recruitment process to ascertain whether trainers have the relevant knowledge and experience?
2. What training and development is available for trainers to improve their teaching/training skills and knowledge?
3. How are trainers supported by EXITO and the industry when they are working across a range of companies?

4. How can EXITO ensure that trainers keep up to date with the latest developments in industry technologies and standards?

Future training delivery

The reports showed that there was a very wide range of levels of EXITO training across industries. For example, in the public sector of the coal mining industry 80% of training was delivered by EXITO, but less than 5% of training in the gold mining industry involved EXITO. These statistics indicate that there is considerable room for EXITO to expand its training to meet the existing needs of the extractive mining industries. All industries identified issues with current unit standards (see p 26), and made suggestions as to how EXITO could improve the delivery of training (see p 27).

All extractive industries surveyed expected to experience growth in the next five years. This growth, together with expected advances in technology, and anticipated recruitment problems, highlights the importance of training within the extractive industries to meet the expected skills shortages.

1. How could EXITO facilitate an improvement to how trainees experience their training system?
2. How can EXITO further promote extractive mining industry careers?
3. How could EXITO improve how it informs the extractive mining industries about what it has to offer?
4. How can regular and on-going communication between EXITO and the extractive industries be improved to ensure responsiveness is high and barriers to training are removed?
5. What consultation needs to take place with EXITO and the extractive industries to confirm the usefulness of qualifications for the technical roles of: Geological Field Technician, Mine Surveyor Technician and Sampling Technician?
6. What does EXITO need to do to identify the additional training required for major technological advances occurring in this industry over the next 5 years?

INTRODUCTION

The Tertiary Education Commission has charged all Industry Training Organisations to take a leadership role in identifying and meeting future skill needs in the industries they represent. In response, the Extractive Industry Training Organisation (EXITO) conducted national surveys of seven mining industries including:

- New Zealand Bentonite Mining Industry
- New Zealand Coal Mining Industry
- New Zealand China Clays Mining Industry
- New Zealand Gold Mining Industry
- New Zealand Iron Sands Mining Industry
- New Zealand Quarry Industry
- New Zealand Zeolite Mining Industry

The purpose of this report is to provide an analytical synthesis of these reports to the EXITO board and staff to enable EXITO to improve its responsiveness to the extractive industries in terms of developing current and future skills needs.

FINDINGS

Diversifying staff

All the industries surveyed were characterised by a lack of diversity in the workforces.

Gender

The extractive industries are very heavily male dominated. Significantly more women were employed as managers/professionals in the gold industry and to a lesser extent in the china clay industries than as miners/operators in any of the industries.

Figure 1 Industries by gender

Industry	Men %	Women %
Bentonite Mining Industry	94	6
China Clays Mining Industry – Operators/miners	97	3
Managers/professionals	87	13
Coal Mining Industry	92	8
Gold Mining Industry – Operators/miners	98	2
Managers/professionals	67	33
Iron Sands Mining Industry	91	9
Quarry Industry	91	9
Zeolite Mining Industry		

(figures not available)		
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The industries surveyed indicated that although the current workforces are predominantly male, there was little resistance to greater inclusion of women. The coal mining and gold mining industries were particularly keen to recruit more women into the industries. Many miners and managers who had worked in Australian mines which have a much greater gender balance, were positive about women working in the industry. For example, the report on the gold mining industry stated:

Mine managers made comments they would like to have many more women working in the industry particularly because they have an excellent reputation as drivers of heavy machinery. They reported that women drive more efficiently and quietly and take more care of the machinery (p 8).

Recruiting more women into the industries may be away of reducing recruitment difficulties, and ensuring continuity of skills within industries. A useful source of intelligence would be to ask those women already in the industries and to identify the reasons a greater proportion of Australian women work in the mining industries.

Ethnicity

Most of the extractive industries are under-represented by Maori and other ethnic groups, particularly at the management/professional levels.

Figure 2 Industries by ethnicity

Industry	Pakeha %	Maori %	Other %
Bentonite Mining Industry	94	6	
China Clays Mining Industry - Operators/miners/ Managers/professional	16 88	69 0	15 12
Coal Mining Industry - Public sector Private sector	81 89	13 7	6 4
Gold Mining Industry – Operators/miners/ Managers/professional	73 75	18 4	9 21*
Iron Sands Mining Industry	91	9	
Quarry Industry	70	24	6
Zeolite Mining Industry (figures not available)			

*This category includes 17% from Northern Europe and 4% from South East Asia.

Over the last 20 years Maori have made very significant changes to their educational achievement levels, particularly Maori women, but this is not reflected in the number of Maori working as managers/professionals in the extractive industries.

Ethnic diversity is not apparent in most of the extractive industries, which is surprising given the range of different ethnic groups now living in New Zealand. The

reputations of new migrants as conscientious and hardworking fits the profile needed for mining work. Given that new migrants often have difficulty finding work, how could they be encouraged into the extractive industries?

Age

The reports indicated that age of the workforces in the extractive industries is not a concern, except for the Quarry industry which is characterised by an ageing workforce, and difficulty in attracting younger people into the industry.

Figure 3 Industry by age of workers

Industry	Average age (n)
Bentonite Mining Industry	47
China Clays Mining Industry	46
Coal Mining Industry	40
Gold Mining Industry – Operators/miners	42
Managers/professionals	37
Iron Sands Mining Industry	42
Quarry Industry	*
Zeolite Mining Industry (figures not available)	

*The average age is not given in the report, but age is a significant issue for the Quarry industry. Approximately 53% of those surveyed were over 40 years old, and a substantial number of companies had a predominance of employees in this older age group. Respondents were concerned at their lack of ability to attract younger people into the industry.

Staff recruitment problems

Most of the industries reported that they did experience staff recruitment problems, particularly for workers with technical and trades skills because salary levels were lower in New Zealand than overseas.

Figure 4 Staff recruitment problems by industry

Industry	No	Yes	Reasons	Under supplied
Bentonite Mining		√	Isolated locations. Lower wages. Combination of managerial & technical.	Semi-skilled labour. Technical expertise.
China Clays Mining	√			Trade skills. Electronic skills.
Coal Mining		√	NZ salaries lower than overseas. Past industry downturns negatively affected skill levels. Lack of apprenticeships.	<i>Public sector:</i> Engineers, surveyors, geologists Health & safety officers, nurses. Accountants, clerks. Experienced miners, technical people.

				Fitters, electricians, mechanics. Supervisors, mine managers. <i>Private sector:</i> Experienced operators – mobile plant operators. Qualified foremen & supervisors. Managers. Safety co-ordinators. Diesel mechanics, fitters, electrical technicians. Coal mining engineers, project engineers.
Gold Mining		√	Need for higher skill level. Attitudes towards physical labour. Lack of career path. NZ salaries lower than overseas. Remoteness of mine sites. Long hours & shift work.	Skilled technical staff – mining engineers, geo-tech engineers, surveyors, field technicians, geologists, drillers, metallurgists. Entry level labourers. It & administrative staff.
Iron Sands Mining		√	NZ salaries lower than overseas	Senior technical roles
Quarry		√	Difficulty attracting people to industry. Some managers lack of skills in how to recruit & select staff.	Plant operators, loader drivers, machine operators & maintenance. Crushing operators and face team workers. Fitters, drillers, blasting, engineers.
Zeolite		√	Specific industry processes – few people are trained & knowledgeable in zeolite mining & its products.	Professional Zeolite experts. Managers.

Staff retention

Overall staff retention was not seen as a problem in the china clays mining, gold mining, iron sands mining, and the quarry industries, despite experiencing recruitment problems in the specific areas in Figure 4, above. Although the coal industry report states that there are no major problems with staff retention, it does note that:

A large proportion of miners/operators from both sectors do not know what work they want to do in the future. Perhaps they will remain within the coal mining industry through inertia but if not the industry will have a serious staff shortage (p 8).

If staff retention rates are within the industries are good, are the difficulties in recruiting staff due to growth in the industries?

Relevant experience qualifications before entering the industry

Across industries just over half of respondents (54%) had no relevant qualifications or experience when entering the industry. In addition, some qualified staff lacked knowledge of practical application of their qualifications.

Figure 5 Relevant experience and qualifications on entering industry

Industry	Relevant experience/qualifications %	No Relevant experience/qualifications %
Bentonite Mining Industry	87	13
China Clays Mining Industry Operators/miners/ Managers/professional	46 50	54 50
Coal Mining Industry Public sector Private sector	31 68	69 32
Gold Mining Industry Operators/miners/ Managers/professional	66 79	33 21
Iron Sands Mining Industry Operators/miners/ Managers/professional (sample = n2)	28 100	72 0
Zealand Quarry Industry	30% experience 17% qualifications	70% no experience 83% no qualifications
Zeolite Mining Industry (figures not available)		

Coal mining: Approximately twice as many private sector coal miner/operators had relevant qualifications or experience before entering the industry. This is in part due to miners/operators working in the private sector starting mining work as drivers with a range of heavy vehicle licenses. The skills sets required for underground miners (who work mostly in the public sector) are different and are learned once they start mining.

Gold mining: Although two thirds of the people in the gold mining industry indicated that they had relevant experience before entering the industry, this experience mostly involved having heavy trade licenses and previous work using heavy machinery. The specialist skills required for the gold mining industry were only taught once the workers entered the industry.

Continuing problems for the gold mining industry have been graduates obtaining technically focused degrees without understanding the business requirements of the industry, and a breakdown of New Zealand based tertiary training for mining engineers. A co-operative programme between the University of Canterbury Civil Engineering Department and the School of Mines at the University of New South Wales in Australia may overcome these two problems. This partnership is seen as an exciting development for the industry and the hope is graduates will move into mining

and mineral extraction work in New Zealand thereby reducing the need to recruit mining engineers from overseas.

TRAINING FOR MINERS/OPERATORS

On-site responsibility

One of the ways of providing a career path and increasing the skills of the workforce is to delegate on-site supervisory responsibility. This practice makes the best use of those working within the industry and ensures that skills and experience are gained by a range of people within the workforce.

Figure 6 Operators/miners encouraged to take on-site responsibility

Industry	On-site responsibility	No on-site responsibility
Bentonite Mining Industry	53	47
China Clays Mining Industry	53	47
Coal Mining Industry		
Public sector	31	69
Private sector	17	82
Gold Mining Industry –	28	72
Iron Sands Mining Industry	n/a	n/a
Quarry Industry	49	51
Zeolite Mining Industry (figures not available)		

Coal mining: Approximately twice as many public sector miners/operators reported being encouraged to take on-site responsibility compared to private sector miners. This could be related to the amount of training and development provided in the public sector, or it could be a function of fewer managers/supervisors required to work in open-cast work compared to underground work.

Quarry industry: The percentage of workers in the quarry industry who had been encouraged to take on on-site supervisory or management roles was similar to those of the bentonite and china clays mining industries, and was considerably higher than for some other industries. However, in the quarry industry respondents who had not taken on any on-site responsibilities were sometimes very critical of the succession planning which was either non-existent or very haphazard.

Attitudes towards training

Most of the miner/operators in the all industries surveyed had very positive attitudes towards training, which they saw as providing opportunities to improve their skills, expertise and qualifications. They also saw benefits for their industries from having a competent trained workforce.

Given the levels of enthusiasm towards training, it is interesting to note that the percentage of miners/operators who felt encouraged to undertake training varied widely between industries.

Figure 7 Miners/operators encouraged to undertake training

Industry	Encouraged %	Not encouraged %
Bentonite Mining Industry	92	8
China Clays Mining Industry	62	38
Coal Mining Industry		
Public sector	85	15
Private sector	62	38
Gold Mining Industry	70	30
Iron Sands Mining Industry	45	55
Quarry Industry*		
Zeolite Mining Industry (figures not available)		

* The Quarry Industry Report did not contain statistical information on the number of miners/operators who felt encouraged to take part in training, but did provide the following relevant information:

- ***Companies with 1 – 5 employees*** found it very difficult to release staff for training.
- ***Companies with 6 – 9 employees*** also found it difficult to release staff for training. There was a huge range of levels of encouragement. One company had half of its staff completing EXITO training, while miners/operators and managers of another company “were adamant that they were actively discouraged from undertaking any training” (p 17).
- ***Companies with 10 + employees*** were all involved in EXITO training, however a “number of employees indicated that they had to work extremely hard to convince supervisors to organise EXITO training for them” (p 17).

The way training is 'sold'

The way training is 'sold' has a big impact on miners/operators willingness to participate in training and what they learn. There was a wide variety of ways training was sold to employees that ranged from being ordered to attend, and being consulted and invited to attend. Miners/operators who were told to attend training were less enthusiastic about participating in training than those who were able to participate in the decision.

Setting training goals

If part of the consultation process for miners/operators included setting training goals, the participants found that the training outcomes were far more likely to meet their training needs, and the company's needs.

Figure 8 Setting training goals

Industry	Setting training goals	Not setting training goals
Bentonite Mining Industry	90	10
China Clays Mining Industry	53	47
Coal Mining Industry		
Public sector	64	36
Private sector	44	56
Gold Mining Industry	47	53
Iron Sands Mining Industry	64	36
Quarry Industry	n/a	n/a
Zeolite Mining Industry (figures not available)		

Barriers to training

The major barrier to training in the extractive industries was maintaining production levels while employees were in training. Although this barrier affected all industries, it was particularly evident in smaller worksites. This statement from the Coal Mining Industry Report is typical of those made by other industries:

Effective production rates are critical if the industry is to remain viable and it is this factor which appears to have a large bearing on whether training is done. Comments were made by both miners/operators and managers/professionals that training is abandoned regularly because of work pressure at the time. This is frustrating for everyone concerned (p 9).

Figure 9 Barriers to training

Industry	Barriers
Bentonite Mining Industry	Need to maintain production levels Unclear training paths Employee commitment Training delivery needs to be improved
China Clays Mining Industry	Need to maintain production levels
Coal Mining Industry	Need to maintain production levels
Gold Mining Industry	Need to maintain production levels Perception that training is not highly valued or seen as necessary Training delivery needs to be improved Lack of availability of appropriate training
Iron Sands Mining Industry	Need to maintain production levels
Quarry Industry	Need to maintain production levels

Zeolite Mining Industry (figures not available)	
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Match between training delivered and existing training needs

Where training goals had been set in consultation with the miners/operators prior to training, the reported match between the training delivered and training needs was consistently higher across all industries, than when training goals had not been set. The match of training to existing needs varied widely across industries.

Bentonite Mining Industry

The miners/operators in the bentonite mining industry reported zero training gaps. They reported that they were receiving training for all the skills needed.

China Clays Mining Industry

The majority of miners/operators in the china clays mining industry reported very few training gaps. Gaps identified included:

- Computer training
- Service vehicle operation
- Next step repercussions (what customers receive and how they use it).

Coal Mining Industry

In both the public and private sectors most respondents reported very few training gaps i.e. areas that are not covered by training. However in both sectors trades people consistently indicated a strong need for training. They wanted refresher and advanced trade training. Their identified training needs were:

- Further development of skills which branch out from trades
- Trade based training
- NZCE advanced trade
- Electrical/Electronics/Instruments
- Welding
- Mechanics
- Engineering

A considerable number of respondents from both sectors wanted the opportunity to do training which focuses on the skills needed to work well and communicate well with others.

Gaps identified by individuals working in the public sector included:

- Road header skills
- Computer skills
- Hydraulics
- Ventilation
- Apprentice training
- More underground training
- Work place practices and hazards

Gaps identified by individuals working in the private sector included:

- PLC controls
- Fire crew training
- Being able to 'read' coal
- Machine operation
- Pneumatics
- More first aid
- Use of W.S. equipment – torque multiplier etc
- Great need for real apprenticeship training

Gold Mining Industry

The most common kinds of training that had been undertaken by the respondents were in operating machinery, safety and first aid, and general site-induction training.

The main areas in which respondents felt there was insufficient training available were

- People skills/relationship skills
- Computer skills.

The following specific areas were also identified by individual respondents:

- Lifting and rigging
- Process control
- Drill training programme

It was also suggested that training needed to be designed as complete courses with NZQA accreditation, so that a qualification was attained.

Iron Sands Mining Industry

Miners/operators in the Iron Sands Mining Industry reported the following gaps in their training:

- Mining safety
- Fire and first aid training
- Plant operator training

Quarry Industry

The match between training received and training needed by miners/operators was not directly addressed in the quarry industry report. However, the report did identify that there was an urgent need for more skilled workers:

- Plant operators
- Loader drivers
- Machine operators
- Maintenance

Skilled workers in the following areas were also identified as lesser priorities:

- Crushing operators
- Face team workers
- Fitting and drilling
- Blasting

- Engineering

As the quarry industry reported difficulty recruiting skilled workers, upskilling existing staff to take on the responsibilities listed above could be met by additional training.

Miner/operators did identify competencies requiring greater skills levels that included:

- Team leadership skills
- Beginning level skills
- Health and safety
- Environmental skills
- Geology
- Community
- Supervisory skills
- People who respect gear
- Technical skills to undertake ground testing

Small numbers of respondents wanted more skilled workers in:

- Rigging
- Welding
- Trades
- Mechanics
- Mobile plant operators
- Truck driving
- Process workers
- Trained foremen

Zeolite Mining Industry

Only two operator/miners were included in the Zeolite Mining Industry Report. At the time the survey was done neither respondent had been involved in external training. They had both received on-the-job training from their manager. They had only been in the job for 1 month and 6 months respectively, which made it difficult for them to answer questions related to training.

Type of training delivery preferred

Most Miners/operator showed a strong preference for practical on-site training that integrated theory and practice. Coal miners/operators and iron sands miners/operators preferred their training to be off-site so that they would experience fewer interruptions to the training. People working in the coal mining and gold mining industry wanted training to happen in their work time as part of their regular jobs.

Figure 10 Type of training delivery preferred

Industry	On-site	Off-site	Distance	Practical	Self paced	Presentations	Integrated theory & practice	In work time
Bentonite	√		√	√	√	√		
China Clays	√			√	√			
Coal Mining								
Public sector	√	√		√			√	√
Private sector	√			√				√
Gold Mining	√			√	√		√	√
Iron Sands		√		√			√*	
Quarry	√			√				
Zeolite	√			√		√	√	

*About half of the miner/operators surveyed for the Iron Sands Mining Industry Report identified that there is very little time gap between receiving training and using the new learning in the workplace, but the other half said that it often took 6 – 8 months before they were using the new learning back in the workplace. The opportunity to apply new learning is critical to retention and overall effectiveness of training.

Characteristics of good training

Overall, the characteristics of good training identified across industries were very similar. These included, a realistic training structure, and integration of theory and practice, and effective trainers. Most industries identified characteristics of effective trainers.

Realistic training structure

- Adequate advance notice of training
- Appropriately paced training
- Realistic amount of training within a given time-frame

Integration of theory and practice

- Opportunities for integration of new learning into workplace within a short timeframe

Qualities of an effective trainer

- Has professional up-to-date knowledge of industry
- Has teaching skills/experience
- Is well organised
- Has good communication skills

- Is respectful of learners
- Ability to make training a valuable experience for learners

PROFESSIONAL DEVELOPMENT FOR MANAGERS /PROFESSIONALS

Match of professional development with needs

The number of managers and professionals surveyed as part of the reports was small, so caution needs to be taken interpreting these results. It was clear, however that most felt that their companies did not accurately perceive their needs for professional development.

Figure 11 Match of professional development needs

Industry	Yes	No
Bentonite Mining Industry		√
China Clays Mining Industry	50%	50%
Coal Mining Industry	√	
Gold Mining Industry	50%	50%
Iron Sands Mining Industry		√
Quarry Industry		√
Zeolite Mining Industry	√	

Across the extractive mining industries approximately two thirds of managers/professionals stated that they were encouraged to participate in professional development.

Figure 12 Encouraged to participate in professional development

Industry	Yes %	No %
Bentonite Mining Industry	50	50
China Clays Mining Industry	75	25
Coal Mining Industry		
Public sector	88	12
Private sector	63	37
Gold Mining Industry	60	40
Iron Sands Mining Industry*	100	
Quarry Industry		√
Zeolite Mining Industry	√	

Although a high percentage of managers/professionals felt encouraged to participate in professional development, very few actually thought that they received enough professional development. Reasons for this discrepancy were given as the demands of

the job and lack of access to appropriate training. Most valued professional development highly and were keen for greater access.

Figure 13 Do managers/professionals get enough professional development?

Industry	Yes %	No %
Bentonite Mining Industry		100 (n=2)
China Clays Mining Industry	25	75
Coal Mining Industry	50	50
Gold Mining	minority	majority
Iron Sands Mining Industry		100 (n=2)
Quarry Industry		
Zeolite Mining Industry	100 (n=1)	

Managers/professionals identified a wide range of delivery of professional development. It is interesting to note, that unlike the miners/operators, distance learning was one of the preferred options for half of the managers/professionals surveyed.

Figure 14 Type of professional development delivery preferred

Industry	Off site	Distance	Mentoring	Practical	Self paced	Integrate theory & practice	Out of work time	In work time	Intensive -block
Bentonite			√	√	√				
China Clays		√					most	some	
Coal Mining	√	√				√	partly	partly	
Gold Mining								√	√
Iron Sands		√				√			√
Quarry									
Zeolite	√					√			

Managers/professionals identified professional development deficits in both management and technical skills areas. The most frequently identified management skills included people management skills, financial management, planning and personnel processes.

Figure 15 Professional development deficits

Industry	Management	Technical
Bentonite	Higher strategic management Financial management Human resources Sales & marketing	
China Clays	Financial management	Mine Manager Certificate A/B grade Ceramics & mineral processing
Coal Mining	People management skills Communication skills Planning, organising, performance management Financial management Motivation & decision making	Computer training including CAD Coal quality Operation of water treatment plants Health & Safety Act Industry regulations
Gold Mining	Leadership Financial planning Conflict management Project management Employment law	Safety courses Computer skills New technologies Health & Safety Act
Iron Sands	Leadership People management Management	Chemistry Geology
Quarry	Recruitment practices Financial management People management Business skills Stress & workers Communication skills	
Zeolite		

EXITO PROVISION OF TRAINING

EXITO's current provision of training to the extractive industries

The reports showed that there was a very wide range of levels of EXITO training across industries. For example, in the public sector of the coal mining industry 80% of training was delivered by EXITO, but less than 5% of training in the gold mining industry involved EXITO.

Figure 16 Current providers of training to industries

Industry	EXITO training %	Non EXITO – run by own staff %	Non EXITO – run by external consultants %
Bentonite Mining Industry	40	50	10
China Clays Mining Industry	25	10	65
Coal Mining Industry			
Public Sector	80	5	15
Private Sector	37	43	20
Gold Mining Industry	Less than 5%	60+	35
Iron Sands Mining Industry	50	20	30
Quarry Industry			
Companies 1-5 employees	No companies		
Companies 6-9 employees	Some companies		
Companies 10+ employees	All companies		
Zeolite Mining Industry	20	35	45

Issues relating to Unit Standards

Respondents identified a number of issues relating to unit standards specific to their particular industries. A common theme across industries was the need for better links between unit standards and real on-the-job work, and the need for unit standards to be regularly revised to keep up to date with changes in technology.

Figure 17 Issues relating to unit standards

Industry	Issues relating to unit standards	New unit standards needed
Bentonite	Better links needed between unit standards and real on-the-job work. Unit standards need to be revised because of changes in technology every 12 – 24 months.	Geological field technician* Mine surveyor* Sampling technician*
China Clays	Better links needed between unit standards and real on-the-job work. Unit standards need to be revised regularly.	Geological field technician* Mine surveyor* Sampling technician*
Coal Mining	Better links needed between unit standards and	Unit standards wanted to

	<p>real on-the-job work.</p> <p>Unit standards need to be revised at least annually.</p> <p>Unit standards are needed for all areas of coal mining.</p> <p>Insufficient rigour in how unit standards are assessed.</p> <p>Lack of practical training means trainee can pass a unit but not adequately perform on job.</p> <p>Dissatisfaction with the moderation process particularly around integration of theory and practice.</p> <p>Difficulty identifying correct unit standard to match with specific training need.</p>	<p>cover all aspect of coal mining including:</p> <p>Geological field technician*</p> <p>Mine Ventilation*</p> <p>Mine surveyor*</p> <p>Sampling technician*</p>
Gold Mining	<p>Little knowledge in industry of unit standards.</p> <p>Limited correlation between unit standards and skills needed on the job.</p> <p>Unit standards need to be revised annually.</p> <p>Unit standards are not specific enough.</p>	<p>Geological field technician*</p> <p>Mine surveyor*</p> <p>Sampling technician*</p>
Iron Sands	<p>Imbalance in the number of credits awarded in various unit standards.</p>	<p>Geological field technician*</p> <p>Sampling technician*</p> <p>Legal & technical aspects of environmental management.</p>
Quarry		
Zeolite	<p>Unit standards need to be flexible to need specific industry requirement.</p> <p>Unit standards must keep up to date with changes in technology.</p>	<p>Geological field technician*</p> <p>Mine surveyor*</p> <p>Drying & processing zeolite.</p>

* Groups of unit standards are needed to provide training/qualifications for these positions.

Issues relating specifically to existing EXITO training

All industries had suggestions for how the existing EXITO training offered could better meet their needs.

Figure 18 Issues relating specifically to existing EXITO training

Industry	Issue
Bentonite	<p>Operators/miners respondents want improvements made to the current EXITO industry training system particularly improvements to the organisation of training, trainee record keeping, setting training goals and trainee follow up.</p>
China Clays	<p>Ensure theory and practical learning is done within a closer time frame so that new learning does not get forgotten.</p> <p>Develop more practical training modules.</p> <p>Encourage a greater uptake of apprenticeships in all trades areas now.</p> <p>Being more accessible and available to mine sites and more frequent on-site visits.</p>
Coal Mining	<p>Practical on-the-job training is highly valued but not enough is done.</p> <p>There is a need for more refresher courses.</p> <p>Need for greater number of apprentices.</p>

Gold Mining	Promotion and advocacy were the major areas that EXITO needs to focus on. Many in the gold mining industry did not know what EXITO was. It is clear EXITO's profile needs to be substantially developed within the gold mining industry.
Iron Sands	Respondents report they need more frequent visits by EXITO.
Quarry	EXITO to promote the value of training within the industry to encourage companies to commit to training. EXITO staff to visit the work-sites more frequently. Review and streamline EXITO training folders (materials)
Zeolite	The respondent felt that EXITO needs to be offering the best training by identifying and mapping out a training and development plan for each trainee.

TRAINING IMPLICATIONS OF FORECAST GROWTH IN INDUSTRIES

All industries surveyed anticipated growth over the next five year period. In addition to expanded production, industries anticipated the growth of new technologies within their industries. Both areas of growth had implications for skill shortages and training needed.

Bentonite Mining Industry

Growth is forecast at 10 % per year over the next 5 to 10 years for existing professional occupations.

Figure 19 Bentonite Industry future training needs identified

General	Technical
Management skills for staff moving into supervisory or management positions. Greater cross-functional skills sets. Literacy.	Computer skills Intranet Technology Environmental Management Health & Safety

Remedying forecast skill shortages

- Develop unit standards that make up qualifications for positions of geological field technician, mine surveyor, and sampling technician.
- Provide computer and intranet training to existing staff.
- Working with schools to promote a positive view of the bentonite mining industry, including careers options.
- Providing a simplified structure of qualifications that can be easily transferred and recognised.

By 2010 EXITO industry training and skills development needs to:

By 2010 respondents working in the bentonite industry want:

- Internationally recognised qualifications that are transportable.
- A link between EXITO training and tertiary education to allow smooth transition into traditional education systems thus giving school-leavers a second chance learning once some maturity has been gained in the workplace.

China Clay Mining Industry

The China Clay Mining Industry has anticipated its production growth requirements for the next five years. A significant proportion of respondents agreed that there will be major technological advances during this period that will require additional

training resources. Of particular concern was the critical need for electronic and instrument staff and programme logic controllers who are difficult to recruit.

Figure 20 China Clay Mining future training needs identified

General	Technical
Management Literacy	Processing technology Automation and bagging automation Mineral process design Electronic and instrument staff Programme logic controllers Environmental management

Remedying forecast skill shortages

Both internal and external education were seen as the key to meeting forecast skills shortages. Key strategies identified included:

- The ability to take technical courses extramurally without it impacting negatively on work.
- Encouraging apprenticeships.
- Developing creative strategies to enable small companies to train staff including: consolidating and combining training programmes, training one company member to do their own training, making sure that technical courses are available with a 3-4 year gap, and using skilled and experienced staff from other companies.

By 2010 EXITO industry training and skills development needs to:

- Produce professional NZ trained mining engineers/planners and 'economic geologists'.
- Offer employer subsidies to internal trainees and/or apprentices.
- Provide up to date professional courses extramurally.
- Provide a consultancy service relating to current law and standards.

Coal Mining Industry

Within the next five years all public sector and 75% of private sector managers/professionals expected the coal mining industry to double production.

Solid Energy is currently carrying out a workforce planning exercise. The results from this exercise could be used in conjunction with EXITO forecasts to establish further training and development requirements. Respondents to the EXITO survey anticipated the following growth in existing professional occupations.

Figure 21 Coal Mining forecast growth: Public sector

Likely Growth %	Occupation
10 - 20	Environmental compliance, Environmental technician, Environmental restoration, Resource consents
20	Fitters
30	Electrical, Technical
40	Miners

50	Surveyors
100	Geologists, Coal mining engineers

Figure 22 Coal Mining forecast growth: Private sector

Likely Growth %	Occupation
10	Managers
15	Safety co-ordinators, Trainers, Health & Safety Officers, IT professionals
20	Assistant managers,
50	Operators, Supervisors, Geologists, Surveyors
100	Project managers, Project engineers, Coal mining engineers, All-round plant operators,

In addition to identifying training/education and recruitment to meet the forecast growth needs of the occupations identified above, respondents from both public and private sectors identified non-existent skill sets or occupations needed in the future.

Figure 23 Coal Mining future training needs identified

Technical
Robotics
New electronic technologies and their associated jobs
The control and extinguishing of underground fires (contractors)
PLC software engineers
Process control workers
New computing software technicians
More remote-controlled machinery operators
Jobs related to gas emission and using coal for electricity stations
Jobs related to more efficient mobile equipment
Major developments in the utilisation of coal and their associated jobs
Specialist safety co-ordinators
Environmental and communication management skills

Remedying Forecast Skills Shortages

In response to the question - how effective is the match between forecast industry needs for unskilled and skilled labour and what the education and training system currently delivers, most respondents thought the match was poor. They indicated that the education and training system lags behind industry needs for labour and there continues to be a shortage of skilled labour. Given the expected growth, this is an important issue. Respondents suggested strategies to overcome these problems.

- A major idea was for companies to focus on recruitment now, so staff can enter the industry, receive training, and later be developed into specialist areas.
- Working with schools to promote a positive view of the coal mining industry, including careers options, and providing some form of work experience.
- Apprenticeships: Ensuring that apprentices, for example electricians, are aware of the career path within the coal mining industry.

- Introducing basic coal mining skills in tertiary level training.
- Provision of training was identified as a problem with some small companies, and solutions included combining training with other companies, taking up training provided by industry training organisations, and tax rebates on staff training.

By 2010 EXITO industry training and skills development needs to:

Work with the industry to action the findings of the EXITO and Solid Energy reports. Strategies identified in the EXITO report included the following:

- Work with school to create a positive view of the industry.
- Have all aspects of coal mining covered by unit standards.
- EXITO to communicate regularly with the industry by talking to industry leaders.
- EXITO to be flexible and able to respond quickly to changing conditions in the industry.

Gold Mining Industry

Opinions varied as to how much growth the gold mining industry would experience in the coming years. A number of respondents felt that growth would be considerable; several expected it to double in the near future.

It was commonly stated that automation and remote control technology would impact upon the industry's human resource needs. Operators, field technicians, samplers, drillers and drivers were the most likely to be affected.

Forecasted growth of professional occupations varied widely. Where opinions varied widely, the figures given in the following table include the range.

Figure 24 Gold mining forecast growth

Likely Growth %	Occupation
10	Mechanical engineers,
10 – 100	Electrical engineers
20 - 70	Geologists
30	Surveyors
30 – 70	Process engineers
40 – 80	Mining engineers
70	Metallurgists, Environmental scientists, Maintenance planners, IT, Data management, Automation
100	Health & safety, Electricians

Figure 25 Gold Mining future training needs identified

General	Technical
Data management/processing Career development	Automation and remote control technology training for: Operators, field technicians, samplers, drillers and drivers

	including IT, communications (electronic), Real-time GPS, exploration & mining techniques, control systems (process), hard-rock design engineering, under-sea mining.
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Remedying Forecast Skills Shortages

Respondents felt overwhelmingly that the education system was failing to adequately meet the industry's skilled and unskilled labour needs. This is of critical importance given the expected growth in the gold mining industry. Suggestions made for improving this problem included:

- Introducing mining engineering courses at tertiary levels.
- Working with schools to promote a positive view of the gold mining industry, including careers options, and providing some form of work experience.
- Encouraging match of training for trades, manual jobs and niche professional skills.
- An industry-wide forum for planning to meet industry skills shortages.
- Provision of training was identified as a problem with some small companies, and solutions included combining training with other companies, taking up training provided by industry training organisations and Polytechnics, on-line self-paced training packages, and more opportunities for young people to take part in work experience.

By 2010 EXITO industry training and skills development needs to:

The respondents identified a number of areas they felt EXITO needed to develop further by 2010. One of the roles they felt EXITO needed to develop was promotion and advocacy. As a large number of respondents didn't know what EXITO was before undertaking the questionnaire process. The following needs were also identified within the area of promotion and advocacy:

- Having mining as a recognised qualification.
- Promoting mining as a career in schools.
- Developing an apprenticeship scheme to get people into mining.

The second area in which respondents felt EXITO could develop a role was as a liaison between operational staff and management staff, both to determine training needs and provide training.

Iron Sands Mining Industry

Respondents report that over the next 5 years there will be technological advances which will mean additional training resources will be required. The areas particularly affected will be information technology and the use of computers by all levels of employees.

Remedying forecast skill shortages

Respondents suggest remedying skill shortages by:

- Working with secondary school students to encourage them into the mining professions and give financial help to get their qualifications.
- Smaller mining companies offering work to University and Polytechnic students. If students worked over the summer holiday period this would also benefit the companies holiday roster.
- Including business knowledge and expertise in mine manager training.

By 2010 EXITO industry training and skills development needs to:

- Develop a closer relationship with the industry, including more frequent visits to worksites.

Quarry Industry

The Quarry Industry report does not include information on growth forecasts or forecast skills shortages.

By 2010 EXITO industry training and skills development needs to:

- Develop a closer relationship with the industry, including more frequent visits to worksites.
- Promote a positive image of quarry work in schools.
- Provide a range of unit standards that cover all the aspects of quarry work.
- Develop certificates for technicians – civil engineer, quality control, management.
- Promote training within the industry.
- Fund more scholarships.
- Organise training that integrates theory and practice.
- Provide training documents/folders that are easier to follow.

Zeolite Mining Industry

The Zeolite Mining Industry Report indicated a very bright outlook for the zeolite industry with respondents estimating a doubling of output every year for the next 5 years. Production would then plateau, but would continue to grow in smaller increments. Respondents stated that it would be likely that new types of machinery would be developed and training would need to keep up to date with these technological advances.

Figure 26 Zeolite Mining Industry forecast growth

Likely Growth %	Occupation
10	Technical staff, Managers
30	Operators
50	Professional experts

Remedying forecast skill shortages

The Zeolite Mining Industry is a very small industry in New Zealand, and respondents had a number of suggestions as to how an increase in public awareness of the industry may assist with meeting future skill shortages:

- Increase public awareness about the usefulness of zeolite as an environmental issues in New Zealand. This may attract people into the industry because they would be working directly with environmental benefits.
- Provide more training on-site rather than in classrooms away from the site. This would make more time available for training.
- Encourage staff to connect with leading zeolite scientists around the world as a way to extend their knowledge and expertise given that the industry in New Zealand is small.

By 2010 EXITO industry training and skills development needs to:

- Offering the best training by identifying and mapping out a training and development plan for each trainee.

CONCLUSION

The EXITO reports analysed identify that the extractive mining industries are currently characterised by recruitment problems, skills gaps, and barriers to participation in training. The reports also identify that miners/operators and managers/professionals are keen to participate in training and professional development that improves their skills and benefits the industry by having a skilled competent trained workforce.

The reports showed that there was a very wide range of levels of EXITO training across industries. For example, in the public sector of the coal mining industry 80% of training was delivered by EXITO, but less than 5% of training in the gold mining industry involved EXITO. These statistics indicate that there is considerable room for EXITO to expand its training to meet the existing needs of the extractive mining industries.

All extractive industries surveyed expected to experience growth in the next five years. This growth, together with expected advances in technology, and anticipated recruitment problems, highlights the importance of training within the extractive industries to meet the expected skills shortages. The challenge is for EXITO to work with the industries to provide training that meets the existing and future needs of the extractive mining industries.