DEPARTMENT OF MINERALS AND ENERGY
DEPARTEMENT VAN MINERALE EN ENERGIE

No. 1114 **1 October 2004**

Safety in Mines Research Advisory Committee (SIMRAC)

on behalf of

Mine Health and Safety Council (the Council)

Invitation to submit project proposals

SIMRAC, a permanent committee of the Mine Health and Safety Council, was established in terms of the Mine Health and Safety Act (29/1996) to conduct research and surveys regarding, and for the promotion of, health and safety in the South African mining industry. Suitably qualified agencies and/or persons are invited to submit proposals in response to the project specifications in this Notice. In soliciting research projects for the 2005/2006-research programme, the Council has the following goals:

- to indicate the current research needs for research to commence in the 2005/2006 cycle;
- to invite research proposals in response to these defined priority areas of research; and
- to invite applications for postgraduate funding[1] for research which will promote health and safety within the South African mining industry.

A consultative process has resulted in the Council formulating a co-ordinated, long-term health and safety research programme and identifying priority areas for research to commence in the 2005/2006 cycle. Researchers and agencies are invited to submit research proposals for the research projects indicated. Proposed research must be well designed with a detailed methods section, be ethical *and* must have the potential to add to existing knowledge, practice or technology, involve the end users and implement/transfer outputs. Research teams must have the specified skills.

Submission of Proposals

1. Proposals must be submitted in accordance with the prescribed format. **PLEASE NOTE THAT A NEW FORMAT FOR SUBMISSION OF PROPOSALS IS AVAILABLE FOR THE 2005/6 PROGRAMME.** Contact Cecile Gomes at telephone 011 358 9180, fax 011 403 1821, e-mail cgomes@simpross.co.za or visit the SIMRAC website www.simrac.co.za to download the submission template. A copy of the proposal template is attached to this Notice.

2. Queries regarding the aims and objectives of the thrusts listed in this notice can contact the following persons:
   Occupational Safety: Duncan Adams at dadams@simpross.co.za (011 358 9184)
   Occupational Health: Mary Ross at mross@simpross.co.za (011 358 9183)
   Organisational issues: Paul vd Heever at pvdheever@simpross.co.za (011 358 9180)
   SIMRAC Chairperson: Piet Botha at pieter.botha@dme.gov.za (012 317 9303)

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[1] Guidelines for the Council postgraduate research and Ethics Guidelines are obtainable from nwoods@simpross.co.za

3. Proposers are requested to take note of past work in the different thrust areas. (Details are available on website www.simrac.co.za.

4. The closing time and date for the receipt of the proposals is **12:00 on Monday 25 October 2004.** Late entries will not be considered.

5. A proposal in the correct format can be e-mailed to cgomes@simpross.co.za prior to the closing time and date. Alternatively, two copies of each proposal, in a form suitable for photocopying **plus** a disk or CD with the proposal in MS Word or Rich Text Format, should be deposited in the repository labeled "*Proposals*" at the Council's offices[2]. **PLEASE NOTE THAT A NEW FORMAT FOR SUBMISSION OF PROPOSALS IS AVAILABLE FOR THE 2005/6 PROGRAMME.**

6. The Council may at its sole discretion, decide to recommend the acceptance, rejection or amendment of any proposal and to commission the team to develop the proposal on the basis of which the contract is awarded. The Council shall not furnish any reasons for its decisions regarding proposals.

7. Every proposal accepted by the Council would be subject to a set of Terms and Conditions, which on acceptance of the final detailed proposal will form part of the contract applicable to the project. All prospective proposers should peruse a set of the standard terms and conditions prior to submitting a proposal. A copy of the draft standard terms and conditions is attached to this Notice. **PLEASE NOTE THAT SECTION 5.3 OF THE CONTRACT WILL BE AMMENDED.**

8. In compiling proposals, prospective proposers should provide details of methods, identifiable outputs and estimated costs as indicated.

9. The Council will endeavour to solicit the services of South African organisations to undertake projects, but will consider proposals from overseas-based organisations if expertise, cost considerations and local capacity building components compare favourably.

10. The Council requires full disclosure regarding all subcontracts included in the proposal.

11. Where an output includes a device, mechanism, procedure, or system capable of being applied in the mining environment, a prospective proposer shall include in the proposal an output which suggests how the outputs in question might best be applied in practice. In drafting proposals, all prospective proposers should bear in mind the potential for technology transfer and phasing the project as indicated.

12. Each successful proposer may, during the contract period or shortly after its completion, be required to provide:
    - A competent spokesperson with appropriate materials to make not more than two separate presentations, on an annual basis for the duration of the project, and
    - A technical paper on the project for publication and/or a poster presentation, without additional remuneration or reimbursement of costs.

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[2], 2nd Floor, Braamfontein Centre, 23 Jorrisen Street, Cnr. Bertha Street, Braamfontein

These activities must be detailed and costed within the project.

13. Where relevant, proposers may obtain copies of earlier project reports and other information from the website address or from contacts listed (See paragraph 1 and 2).

14. Proposers are advised that all Council projects should be submitted to language editing and may be subjected to technical and financial audits. Funding for editing and audits should be included in the proposal budget.

15. Proposers should substantiate and cost separately, all proposed travel outside the borders of South Africa in connection with the project, and provide details of all expenses such as travelling and subsistence.

16. All proposed project costs must be expressed in South African Rands. Fluctuations in the exchange rate and purchase of forward cover should be considered when costing the proposal.

17. The Council will take all reasonable steps to ensure that confidentiality of proposals is maintained during the adjudication process. If a proposal is not accepted within the programme, the Council may invite additional proposals on the topic.

18. No unsolicited proposals will be included in the programme for 2005/6.

Objectives of the Council research programme

The **objectives** of the Council in commissioning health and safety research, for both general and commodity-based projects, are to:

- Obtain and evaluate information to establish evidence-based risk assessment, standard setting and health and safety performance measurement;
- Develop techniques or guidelines to prevent, reduce, control or eliminate risks;
- Develop and pilot innovative ideas and procedures, where appropriate, to eliminate, reduce or control risk;
- Obtain information on the extent of work-related ill health;
- Identify, develop and improve sampling and measurement techniques to detect environmental hazards and assess personal exposure;
- Understand the aetiology and identify and evaluate best-practice screening, diagnostic and treatment interventions to reduce the impact of occupational disease;
- Evaluate the effectiveness of control interventions;
- Understand risk perception, attitudes and behaviour related to health and safety and promote best practices in hazard recognition and procedural conformance;
- Empower its statutory committees to formulate policy, expedite research aimed at improving the health and safety in the South African mining industry; and
- Collaborate with national and international initiatives and research to promote health and safety in the mining industry.

The **criteria** by which proposals will be evaluated include:

- **Added value and impact** – the Council supports research which can contribute significantly to the improvement in the health and safety of South African miners;
- **Value for money** – the Council supports cost-effective research;
- **Innovation** – the Council welcomes new approaches or new areas of focus for research leading to technologies or best practices to improve health and safety;
- **Excellence** – the Council demands excellence, particularly in the methods employed to conduct research, be it quantitative or qualitative, and hence will consider the track record of the proposer/s for expertise and delivery (quality, time and to budget);
- **Use and development of research skills** – the Council requires research teams to possess the skills relevant to the success of the project and also favours projects which assist in developing research capacity, particularly in previously disadvantaged groups;
- **Collaboration** - the Council places a high priority on collaboration between researchers and the "teams of excellence" approach. Thus, the means of soliciting research proposals is intended to stimulate collaboration between centres of excellence and individual experts in order to optimise the use of the Council funding and the research outcomes.
- **Development of key indicators** – the Council recognises the challenge in assessing performance and improvement in health, as opposed to safety, in the mining industry. There is a lack of suitable occupational health (OH) indicators and baseline data. Thus innovative and robust research to develop relevant OH indicators and baseline values will be favourably considered.

The Council's research and implementation programme consists of occupational health and safety, addresses occupational medicine and hygiene, rock engineering, engineering and machinery, behavioural issues and technology transfer processes.

Each proposal must:

- Address only the research topic advertised and this must be specified;
- Be in the format indicated and the template specified using Word or Rich Text format; and
- Be phased as indicated in the project scope.

MINE HEALTH AND SAFETY COUNCIL
PROPOSAL FOR A PROJECT TO BE FUNDED IN TERMS OF THE MINERALS ACT

MHSC REFERENCE NUMBER

(FOR OFFICE USE ONLY)

1. PROJECT SUMMARY:

PROJECT TITLE:	
PROJECT LEADER:	
ORGANIZATION:	
ADDRESS:	
TELEPHONE:	
TELEFAX:	
E-MAIL:	

PRIMARY OUTPUT[1]:	
HOW USED?[2]:	
BY WHOM?[3]:	
CRITERIA FOR USE[4]:	
POTENTIAL IMPACT[5]:	

	Total Cost (Rand) VAT inclusive		
FUNDING REQUIREMENTS[11 & 12]	**YEAR 1**	**YEAR 2**	**YEAR 3**
TOTAL PROJECT COST (excluding VAT)			
VAT			
TOTAL PROJECT COST (including VAT)			
TOTAL SUPPORT REQUESTED FROM SIMRAC			

DURATION (**YY/MM**) _____ TO _____

Date: 20 September 2004

EXPLANATORY NOTES:

The following explanatory notes provide definitions of key terms according to the superscript numbering this form.

1. PRIMARY OUTPUT — Indicate what product, service or information it is intended to deliver as a PRIMARY OUTPUT of the project.
2. HOW USED — Indicate how the PRIMARY OUTPUT would be used in practice.
3. BY WHOM — Indicates by whom the PRIMARY OUTPUT is expected to be used.
4. CRITERIA FOR USE — Indicates key characteristics of the PRIMARY OUTPUT which must be satisfied for it to be of value to the user.
5. POTENTIAL IMPACT — Indicate the extent of changes and benefits which would be achieved by use of the PRIMARY OUTPUT, in quantitative terms where possible.
6. OTHER OUTPUTS — OTHER OUTPUTS are outputs that would be of relevance for application by industry in the form of secondary or interim results which will be achieved as an integral part of the project and produced as part of the activity designed to produce the PRIMARY OUTPUT.
7. ENABLING OUTPUTS — ENABLING OUTPUTS are outputs which are necessary to enable production of the PRIMARY OUTPUT. An ENABLING OUTPUT may therefore be seen as an input to the next stage of the project and is not necessarily an output delivered to an end user.
8. METHODOLOGY — A list of steps outlining the methodology to be adopted to achieve each ENABLING OUTPUT. Where appropriate, comments on special equipment or procedures should be included.
9. Where an output includes a device, mechanism, procedure or system capable of being applied in the mining environment, suggest how the outputs in question might best be applied in practice.

11. All costs must be written in a full numeric formatted amount with two decimals i.e. R1 275 272.25 (one million two hundred and seventy five thousand two hundred and seventy two rand and twenty five cents)

12. All costs should be excluding VAT. VAT should only be added in on the Financial Summary (item 3.1 refers) and the Funding Requirements (page 1 refers), if a concern is VAT registered.

13. All Capital and Plant costs over R10 000.00 (item 3.4 refers) will be procured and controlled by the MHSC.

2. PROJECT DETAILS

2.1 PRIMARY OUTPUT[1]

2.2 OTHER OUTPUTS (deliverables)[6]

2.3 ENABLING OUTPUTS[7] (Table below to be completed in full)

NO.	ENABLING OUTPUT	MILE -STONE DATE (MM/YYYY)	MAN DAYS	COST per output

2.4 METHODOLOGY[3]

NO. OF ENABLING OUTPUT	STEP NO.	METHODOLOGY TO BE USED TO ACCOMPLISH THE ENABLING OUTPUT (INDICATE STEPS/ACTIVITIES)

Key Facilities and Procedures to be used in the Project:

2.5 TECHNOLOGY TRANSFER

3. FINANCIAL SUMMARY [11 & 12]

3.1 Financial Summary [11 & 12]

	YEAR 1	YEAR 2	YEAR 3
Project staff costs (from 3.2)			
Other costs:			
Operating costs (from 3.3)			
Capital & plant costs (from 3.4)			
Sub-contracted work (from 3.5)			
Presentations and Papers (from 3.6)			
Sub – Total			
Value added tax*			
TOTAL COST OF PROJECT			
Less funding from other sources (from 3.6)			
Support requested from SIMRAC			

* Only for VAT registered concerns

3.2 **Project Staff Costs** (Reflect Man-Days and Costs separately)

NAME AND DESIGNATION	YEAR 1		YEAR 2		YEAR 3	
	MD	COST	MD	COST	MD	COST
TOTAL						

3.3 **OPERATING COSTS (Running)**

ACTIVITY/EQUIPMENT (Items above R10 000)	YEAR 1	YEAR 2	YEAR 3
Other miscellaneous items			
TOTAL			

3.4 CAPITAL AND PLANT COSTS[13]

(i) ITEMS TO BE PURCHASED OR DEPRECIATED FOR MORE THAN R10 000 PER ITEM	YEAR 1	YEAR 2	YEAR 3
Other miscellaneous items			
TOTAL (I)			

(ii) ITEMS TO BE MANUFACTURED WITH ASSEMBLED COST OF MORE THAN R10 000 INCLUDING MATERIAL AND LABOUR	YEAR 1	YEAR 2	YEAR 3
Other miscellaneous items			
TOTAL (ii)			
TOTAL TOTAL (i) and (ii)			

3.5 SUB-CONTRACTED WORK

SUB-CONTRACTOR	ACTIVITY	YEAR 1	YEAR 2	YEAR 3
	TOTAL			

3.6 PRESENTATION AND PAPERS

ACTIVITY	YEAR 1	YEAR 2	YEAR 3
TOTAL			

3.7 OTHER FUNDING

ORGANISATION	NATURE OF SUPPORT/ COMMITMENT	AMOUNT

4. MOTIVATION

(Provide a clear and quantified motivation of justification for the proposal, as well as the main conclusions of a literature survey and the findings of related local and international research. The motivation should include a synthesis of previous work in the project area, both locally and overseas, why the project is proposed what the primary output will achieve and a cost benefit analysis, if applicable. Use continuation pages where necessary but in most cases it should be possible to clearly present the key data and arguments in the space provided.)

5. CURRICULA VITAE OF PROJECT LEADER AND RESEARCH STAFF

5.1 SUMMARY INFORMATION

Project Leader

NAME & INITIALS: _____ AGE: _____
QUALIFICATIONS (e.g. degree/diploma, issuing institution and date):
SPECIAL AWARDS: _____

Principal Project Team Members

NAME & INITIALS: _____ AGE: _____
QUALIFICATIONS (e.g. degree/diploma, issuing institution and date):
SPECIAL AWARDS: _____

NAME & INITIALS: _____ AGE: _____
QUALIFICATIONS (e.g. degree/diploma, issuing institution and date):
SPECIAL AWARDS: _____

NAME & INITIALS: _____ AGE: _____
QUALIFICATIONS (e.g. degree/diploma, issuing institution and date):
SPECIAL AWARDS: _____

USE A CONTINUATION SHEET IF NECESSARY

5.2 REVELANT EXPERIENCE AND PUBLICATIONS (one page for each individual listed in 5.1)

NAME: _____

RELEVANT EXPERIENCE:
RELEVANT PUBLICATIONS:

6. DECLARATION BY THE PROPOSING ORGANISATION

I, the undersigned, being duly authorised to sign this proposal, herewith declare that:

- The information given in this proposal is true and correct in every particular.
- This Organisation has the basic expertise and facilities required for satisfactory completion of the project and will adhere to the program of activities as set out in this proposal.
- The costs quoted are in accordance with the normal practice of this Organisation and can be substantiated by audit.

Signed on this _____ day of _____ 2005

for and behalf of

_____

SIGNATURE: _____

NAME: _____

DESIGNATION: _____

Date: 20 September 2004

AGREEMENT

between

THE CHIEF INSPECTOR OF MINES
("the Chief Inspector")

and

[INSERT]
("the Contractor")

TABLE OF CONTENTS

1. **Introduction**

1.1 The Chief Inspector, acting through the Committee, wishes to engage the Contractor to carry out the Project in accordance with the Proposal and the Contractor wishes to accept such engagement.

1.2 The Parties wish to record their agreement in writing.

2. **Definitions**

2.1 In this Agreement, unless inconsistent with the context, words referring to:

2.1.1 gender include a reference to the other genders;

2.1.2 the singular include the plural and vice versa;

2.1.3 natural persons include artificial persons and vice versa.

2.2 Clause headings are inserted for convenience only and shall not be used to interpret this Agreement.

2.3 If there is any conflict between the terms of the body of this Agreement and the terms of the Proposal or any other schedule hereto, the terms of the body of this Agreement shall prevail.

2.4 Phrases and words defined in a clause shall bear the meaning assigned to them in such clause only and the following terms bear the meanings assigned to them:

2.4.1 **"the Act"** - means the Mine Health and Safety Act 29 of 1996, as amended;

2.4.2 **"the Agreement"** - means this agreement, the Proposal and any schedules hereto;

2.4.3 **"Certificate of Completion"** - means the certificate issued by the Chief Inspector after the submission of the Final Project Report which certificate certifies the Chief Inspector's satisfaction that the Project is complete;

2.4.4	**"the Chief Inspector"**	-	means the Chief Inspector of Mines appointed by the Minister of Minerals and Energy in terms of section 48(1) of the Act or his authorised nominee;
2.4.5	**"the Committee"**	-	means the Safety in Mines Research Advisory Committee established as a permanent committee of the in terms of section 41(2)(c) of the Act;
2.4.6	**"the Contractor"**	-	means **[insert]**;
2.4.7	**"the Financial Statements"**	-	means the financial information submitted to the Committee by the Contractor as contemplated in clause 5.2.4.1;
2.4.8	**"the Invoices"**	-	means the invoices submitted to the Committee by the Contractor in terms of clause 5.2.4.2;
2.4.9	**"Party"**	-	means the Contractor on the one hand and the Chief Inspector on the other and **"Parties"** shall mean both of them;
2.4.10	**"the Progress Reports"**	-	means the reports prepared by the Contractor and submitted to the Committee as contemplated in clause 5.2.3;
2.4.11	**"the Project"**	-	means research into health and safety at mines conducted by the Contractor in accordance with this Agreement and within the parameters of the Proposal;
2.4.12	**"the Project Assets"**	-	means all assets with an initial value of R10 000,00 or more purchased by the Contractor and charged to the

Chief Inspector which assets include, amongst others, any equipment, instrumentation, computer programmes and software, patents and designs;

2.4.13 **"the Project Asset Register"** - means the record of the Project Assets prepared by the Contractor in accordance with clause 5.3;

2.4.14 **"the Project Commencement Date"** - means the date upon which the Contractor commences work on the Project as provided in the Project Schedule and agreed on by the Committee;

2.4.15 **"the Project End Date"** - means the date on which the Contractor finalises the Project as provided in the Project Schedule and agreed on by the Committee;

2.4.16 **"the Project Leader"** - means the team leader overseeing the Project as identified in the Proposal;

2.4.17 **"the Project Schedule"** - means the timetable of the Project submitted to the Committee as contemplated in clause 5.2.2;

2.4.18 **"the Proposal"** - means the proposal submitted by the Contractor to the Committee outlining the manner in which the Contractor proposes conducting the Project, specifying the deliverables of the Project and detailing dates on which Progress Reports, Financial Statements and Invoices shall be submitted to the Committee which

Proposal is attached hereto as Schedule A;

2.4.19 **"Signature Date"** - means the date of signature of this Agreement by the Party last signing; and

2.4.20 **"the Total Project Price"** - means the amount paid to the Contractor by the Chief Inspector in terms of clause 6 (Total Project Price).

3. **Engagement**

The Chief Inspector hereby engages the Contractor, which engagement the Contractor accepts, to carry out the Project in accordance with the Proposal.

4. **Duration**

This Agreement shall commence on the Signature Date and shall remain in full force and effect until each Party has performed its respective obligations in terms hereof unless terminated earlier either by mutual written agreement between the Parties or in terms of clause 10 (breach).

5. **Obligations of the Contractor**

5.1 **General**

The Contractor shall:

5.1.1 conduct and execute the Project with the highest professional conduct, standards and expertise;

5.1.2 procure that all strategic and key personnel and experts as are named in the Proposal remain, as far as possible, committed to the Project. In the event that the Contractor determines that it requires the replacement of strategic and key personnel and experts at any time during the currency of the Project, it must consult with the Committee in this regard and must obtain the Committee's written approval as to the identity of such replacements prior to their appointment;

5.1.3 strictly comply with all relevant provisions of legislation, regulations and ordinances with special regard to the provisions of the Employment Equity Act 55 of 1998, where applicable; and

5.1.4 endeavour to promote, to the best of its ability, the employment of previously disadvantaged persons as well as post-graduate students.

5.2 **The Project Schedule, the Progress Reports, Financial Statements, Invoices and the Final Project Report**

5.2.1 In the event of the Project involving human subjects, the Contractor must submit to the Committee a clearance certificate from an ethics committee prior to such human subjects becoming involved or being utilised in the Project. Where no human subjects are to be involved in the Project, submission of such clearance certificate is not required.

5.2.2 Although the Contractor shall include a timetable in its Proposal as to when it estimates Project completion levels to be attained during the currency of the Project, such timetable shall be confirmed, in writing, by the Contractor in the Project Schedule which shall be submitted to the Committee as soon as reasonably possible after the Signature Date but prior to any work being commenced on the Project. The Contractor may amend the original timetable in the Project Schedule but only with the express written agreement of the Committee. The Project Schedule shall confirm:

5.2.2.1 the Project Commencement Date;

5.2.2.2 the dates when the Contractor intends submitting to the Committee the required Progress Reports, Financial Statements and Invoices; and

5.2.2.3 the Project End Date.

5.2.3 The Contractor shall submit to the Committee each Progress Report on, (or within a reasonable period of time of) the dates indicated for their submission in the Project Schedule. Each Progress Report shall record the work completed on the Project up to and including the date of submission and shall provide sufficient details so as to allow a

quantitative assessment by the Committee of the actual progress made by the Contractor on the Project.

5.2.4 Each Progress Report shall be accompanied by:

5.2.4.1 a Financial Statement detailing all expenditures and costs incurred by the Contractor in connection with the carrying out of the Project; and

5.2.4.2 an Invoice.

5.2.5 Within six weeks of the Project End Date, the Contractor shall submit to the Committee:

5.2.5.1 a Final Project Report detailing an overall review of the Project;

5.2.5.2 a comprehensive and detailed Financial Statement in respect of the entire duration of the Project; and

5.2.5.3 the Project Asset Register.

5.2.6 The Progress Reports, Financial Statements, Invoices, Final Project Report and the Project Asset Register submitted to the Committee by the Contractor in terms of this Agreement shall comply to any format which the Committee may, from time to time, specify to the Contractor.

5.2.7 The Contractor shall, at all times, maintain a complete set of accounts relating to the Project which shall include, amongst others, full details of all disbursements made by the Contractor in connection with the Project. Such information shall be summarised by the Contractor in the Financial Statements.

5.3 **Project Asset Register (UNDER REVISION)**

5.3.1 The Contractor shall properly and descriptively record all Project Assets in the Project Asset Register and shall, at all times, keep such Register up to date.

5.3.2 Ownership of the Project Assets shall, at all times, vest in the Chief Inspector. Nothing in this clause 5.3 shall preclude the Chief Inspector at any time during the currency of this Agreement or at any time thereafter,

from selling or otherwise disposing of the Project Assets, or any part thereof, to the Contractor on any terms agreeable to both Parties.

5.3.3 Risk of loss or damage of the Project Assets shall remain with the Contractor and, subject to the provisions of clause 5.3.5, the Contractor shall maintain and keep in good working order the Project Assets.

5.3.4 It is acknowledged by both Parties that a number of the Project Assets may be acquired by the Contractor in order to wholly or partially destroy them or to render them worthless during the conducting of the Project ("**the secondary Project Assets**"). The Contractor shall identify the secondary Project Assets, where possible, in the Project Proposal and subsequently in the Project Asset Register and note the date on which each of them was destroyed or rendered worthless. Where the secondary project assets were not identified in the project proposal, agreement from the Chief Inspector shall be obtained prior to such destruction occurring.

5.3.5 The Contractor shall procure that the Project Assets are, at all relevant times, adequately insured. The obligation to insure the Project Assets shall apply in respect of the secondary Project Assets (which the Contractor shall keep in a fit condition for the purposes they were intended). The Contractor shall procure that insurance in respect of the secondary Project Assets shall be discontinued with effect from the date on which each secondary Project Asset is destroyed or rendered worthless.

5.3.6 The Contractor shall ensure that the Chief Inspector's interests in the Project Assets are noted on any insurance policy.

5.3.7 The Contractor shall, on the written request by the Committee, provide the Committee with copies of the relevant insurance policies and/or documentary evidence that all premiums have been fully paid and are up to date.

5.4 **Inspections**

5.4.1 At any time during the undertaking of the Project, authorised Committee representatives shall be entitled, by prior arrangement with the

Contractor, to inspect work in progress on the Project and to request current, interim reports on the Project or any aspects thereof.

5.4.2 On the prior written request of the Committee and during ordinary business hours, the Contractor shall make available for inspection by authorised Committee representatives, any accounting documentation referred to in clause 5.2.7 above, the Project Asset Register and any other documentation pertaining to the Project.

5.5 **Research presentations**

5.5.1 At any time during the Project or within a reasonable period of time after the Project End Date, the Contractor shall, on the written request of the Committee, prepare a formal written paper on the subject matter of the Project and provide a knowledgeable and competent speaker to present the paper to an invited audience of persons employed in or associated with the South African mining industry.

5.5.2 The Contractor acknowledges that it will receive no payment for such service from the Chief Inspector.

5.5.3 Where the Contractor fails to comply with the request of the Committee as provided for in clause 5.5.1 and where final payment of the Total Project Price has not been made to the Contractor in accordance with clause 6 (Total Project Price), the Committee may, in his sole and absolute discretion, impose a penalty on the Contractor up to a maximum of 5% of the Total Project Price.

5.6 **Delays and Extensions**

5.6.1 At any time during the currency of the Project, the Contractor may, by way of written application timeously submitted, request of the Committee any extension it may reasonably require in respect of the Project End Date or any amendment to the Project Schedule.

5.6.2 The Committee shall consider each application and, in its discretion, may grant the application for any extension by notifying the Contractor in writing of the amended Project Schedule.

5.6.3 In the event of unsubstantiated delays in the Project or partial completion of the Project, the Committee may, in its sole and absolute discretion,

undertake an audit on the Project in order to determine the degree of its completion and may revise the payment schedule outlined in clause 6 (Total Project Price). To this end, the Contractor shall give authorised Committee representatives full access to the Project, the Project sites and all documentation pertaining thereto.

5.6.4 Where the Committee decides, in its sole and absolute discretion, that it shall not grant any extension to the Contractor:

5.6.4.1 the Committee shall forward a notice by registered post to the Project Leader demanding that a comprehensive Progress Report be submitted to the Committee within 30 days of receipt of the notice;

5.6.4.2 at any time during the 30 day period, the Project Leader shall have an opportunity to make representations to the Committee, either verbally or in writing;

5.6.4.3 should the Project Leader fail to respond to the notice within 30 days, the Committee shall issue a final demand allowing the Project Leader a further 30 days to submit the Progress Report. Failure on the part of the Project Leader to do so shall result in the Committee, at its option:

5.6.4.3.1 summarily cancelling the Agreement; and/or

5.6.4.3.2 instituting legal proceedings against the Contractor; or

5.6.4.3.3 imposing on the Contractor a penalty for late delivery of any part of the Project in accordance with the following scale:

5.6.4.3.3.1 in the event of a 3 to 6 months delay, up to 5%; or

5.6.4.3.3.2 in the event of a 6 to 12 months delay, up to 15%; or

5.6.4.3.3.3 in the event of more than a 12 month delay, up to 25%,

of that portion of the Total Project Price that would have been payable for that part of the Project had such part been delivered timeously.

5.6.5 All decisions, actions and discussions concerning late delivery will be fully documented by the Committee and forwarded to the Project Leader.

5.6.6 Where a Contractor and/or a Project Leader has fallen foul of the provisions of clause 5.6.4 above, the Committee may, in its sole discretion, refuse to accept any future proposal or award any future project to the Contractor or in respect of a such Project Leader.

5.7 **Sub-Contractors**

5.7.1 The Contractor may utilise the services of sub-contractors as identified in the Proposal and the Contractor shall ensure that each sub-contractor maintains, makes available and submits to the Contractor detailed financial information for inclusion in the Progress Reports, Financial Statements and the Final Project Report.

5.7.2 The Contractor may only replace a sub-contractor after it has consulted with and obtained the written approval of the Committee authorising the identity of the replacement sub-contractor.

6. **Total Project Price**

6.1 Subject to any adjustments which may be made to the Total Project Price or payment schedule of the Project in terms of clause 5.6.3, the Total Project Price payable to the Contractor by the Chief Inspector in respect of the Project shall be as provided for in the Proposal and which has hereby been accepted by the Chief Inspector.

6.2 The Chief Inspector shall be liable for the Total Project Price only and, in the event of the actual costs of the Project exceeding the Total Contract Price, such additional costs must be borne by the Contractor.

6.3 **Less than a 90 day Project**

6.3.1 In the event of the Project extending for a period of no more than 90 days commencing on the Project Commencement Date, the payment terms shall be negotiable between the Parties.

6.3.2 Whether the Parties agree that the Total Project Price be paid as a lump sum or in instalments, 30% of the Total Project Price shall be deferred and paid to the Contractor on the Certificate of Completion being issued.

6.3.3 Payments will only be made by the Chief Inspector on receipt by the Committee of the Progress Reports as provided for in the Project Schedule or any other report which the Committee may reasonably require, in acceptable written form, which reports evidence sufficient progress, in the opinion of the Committee, of the Project.

6.4 **Between 90 days and one year Project**

In the event of the Project extending for between 90 days and one year, the following payment terms shall apply:

6.4.1 10% of the Total Project Price shall be paid to the Contractor on the Project Commencement Date;

6.4.2 thereafter and subject to the terms of clause 7 (payment), the Chief Inspector shall pay the Contractor the amount reflected in each Invoice submitted to the Committee which Invoices cumulatively shall constitute 60% of the Total Project Price;

6.4.3 within six weeks of the Project End Date, the Contractor shall submit its Final Project Report to the Committee in the form specified by and acceptable to the Committee. Where the Final Project Report is acceptable to the Committee, it shall notify both the Chief Inspector and the Contractor accordingly within 60 days of its submission and the Chief Inspector shall pay the Contractor 15% of the Total Project Price;

6.4.4 the final 15% of the Total Project Price shall be paid to the Contractor by the Chief Inspector on the issuing of the Certificate of Completion.

6.5 **More than one year Project**

6.5.1 In the event of the Project extending for more than one year, the Total Project Price shall be apportioned between each year ("**the annual Total Project Price**"). Prior to each anniversary of the Project Commencement Date, the Committee shall review the Progress Reports of the previous year in order to satisfy itself that sufficient progress is being made in respect of the Project in accordance with the Proposal and shall notify the Contractor, in writing, as to whether is shall continue funding the Project. Should the Committee, in its sole and absolute discretion, determine that insufficient or no progress has been made on

the Project during the preceding year, the Committee shall exercise its right to terminate this Agreement in terms of clause 10 (breach) and the Contractor shall have no claim for damages in respect thereof.

6.5.2 The following payment terms shall apply to the first and subsequent years (excluding the final year) of the Project:

6.5.2.1 10% of the annual Total Project Price shall be paid to the Contractor on the Project Commencement Date or on the anniversary of the Project Commencement Date subject to the Committee approving of the continuation of the Project in writing;

6.5.2.2 subject to the terms of clause 7 (payment), the remaining 90% of the annual Total Project Price shall be paid by the Chief Inspector to the Contractor as reflected in each quarterly Invoice for that year.

6.5.3 The following payment terms shall apply to the final year of the Project:

6.5.3.1 10% of the annual Total Project Price shall be paid to the Contractor on the anniversary of the Project Commencement Date subject to the Committee approving of the continuation of the Project, in writing;

6.5.3.2 thereafter and subject to the terms of clause 7 (payment), the Chief Inspector shall pay the Contractor the amount reflected in each quarterly Invoice submitted that year to the Committee which Invoices shall cumulatively constitute 60% of the annual Total Project Price;

6.5.3.3 within six weeks of the Project End Date, the Contractor shall submit its Final Project Report to the Committee in the form specified by and acceptable to the Committee. Where the Final Project Report is acceptable to the Committee, it shall notify both the Chief Inspector and the Contractor accordingly within 60 days of its submission and the Chief Inspector shall pay the Contractor 15% of the annual Total Project Price;

6.5.3.4 the final 15% of the annual Total Project Price shall be paid to the Contractor by the Chief Inspector on the issuing of the Certificate of Completion.

7. **Payment**

7.1 The Committee shall, within 60 days of receipt by the Contractor of each Progress Report, Financial Statement and Invoice, inform both the Contractor and the Chief Inspector, in writing, either:

7.1.1 that the Progress Report and Financial Statement are acceptable to and approved by the Committee, in which case, the Chief Inspector shall, within 60 days, pay the Invoice in full; or

7.1.2 that the Progress Report and/or the Financial Statement are not approved, giving full reasons therefor, in which case the Committee shall grant the Contractor a reasonable extension in order to amend and re-submit the Progress Report and Financial Statement to the Committee.

7.2 No Invoice shall be paid by the Chief Inspector until such time as it has received written confirmation by the Committee that the relevant Progress Report and Financial Statement has been approved.

7.3 Where the Contractor is a person, agency or entity domiciled outside the Southern African Common Monetary Area, all amounts recorded in the Financial Statements and Progress Reports must be expressed in both the foreign currency and its equivalent in South African Rands converted in terms of the South African Statement of Generally Accepted Accounting Practice AC112 or, alternatively, the International Accounting Standard IAS21. The Chief Inspector shall not be responsible for changes in costs of the Project to the Contractor attributable to any changes in exchange rates.

7.4 All payments made to the Contractor in terms of this clause 7 shall be made in South African Rands.

8. **Confidentiality**

8.1 For the purposes of this clause 8, the term "**confidential information**" shall include, but not be limited to, all secret knowledge, trade secrets, information including any and all technical, financial and marketing information, written instructions, drawings, notes, memoranda, samples, devices, demonstrations, know-how, manufacturing specifications or techniques, research and development work together with results, analysis, interpretation, conclusions and the applicability thereof that may be conducted by or on behalf of the

Chief Inspector, and any other materials of whatever description, in which the Chief Inspector has a proprietary, pecuniary or other interest in such information remaining confidential, but shall exclude any information which:

8.1.1 is or falls within the public domain or is, or otherwise becomes public knowledge by any means other than by breach by the Contractor or its representatives of any obligation contained herein;

8.1.2 was previously, or is at any time hereafter, disclosed to the Contractor by any third party having the right to disclose same;

8.1.3 is released from the provisions of this clause 8 by written consent given by the Chief Inspector or the Committee to the Contractor;

8.1.4 is or may in the future be lawfully in the Contractor's or its associates' possession and was not acquired directly or indirectly from the Chief Inspector or the Committee.

8.2 The Chief Inspector is willing to disclose its confidential information to the Contractor for the purposes of the Project.

8.3 The Contractor agrees that it will, at all times during the currency of this Agreement and at all times thereafter:

8.3.1 keep and safeguard the confidential information as private and confidential;

8.3.2 not make any use of the confidential information, nor at any time permit any other person to whom the confidential information may be disclosed in terms of this clause 8, to use the confidential information except for the purposes indicated in clause 8.2;

8.3.3 only disclose or reveal the confidential information to those persons who need to know the confidential information for the purpose indicated in clause 8.2;

8.3.4 inform every person to whom disclosure of any of the confidential information is permitted in terms of clause 8.3.3 prior to making such disclosure, of the confidential nature of the information and of the terms imposed by this clause 8 and require them to abide the same.

8.4 The Chief Inspector makes no representations or warranties, expressed or implied, as to the accuracy, reliability, reasonableness, suitableness or completeness of the confidential information. Accordingly, the Contractor must conduct its own independent analysis of the confidential information and shall rely solely on those investigations and analyses in relation to the purpose contemplated in clause 8.

8.5 The Contractor is precluded from making any copies of documents containing confidential information unless it has obtained the prior written consent of the Chief Inspector or the Committee.

8.6 Any documentation furnished to the Contractor by the Chief Inspector and/or the Committee containing confidential information shall remain the property of the Chief Inspector and shall, on termination of this Agreement for any reason whatsoever or as soon as reasonably possible after the Project End Date or on the written demand by the Chief Inspector or the Committee, be returned, with all copies thereof, to the Committee.

9. **Intellectual Property**

9.1 In the event of the Chief Inspector providing all the funding for the Project in terms of this Agreement, all intellectual property rights arising out thereof or derived therefrom shall vest in the Chief Inspector. Should both the Chief Inspector and the Contractor provide the funding for the Project, the intellectual property rights shall be owned jointly by them in proportion to their respective funding contributions.

9.2 Insofar as may be necessary in law, the Contractor hereby assigns and transfers to the Chief Inspector all such intellectual property rights or part thereof as the case may be.

9.3 The Contractor undertakes to sign all documents and to do all things that may be necessary to record and perfect the transfer of the intellectual property rights, or part thereof as the case may be, to the Chief Inspector and if it fails to do so the Chief Inspector, acting as agent of the Contractor, may do so.

9.4 The Chief Inspector may, upon written application by the Contractor and acting on the advice of the Committee, grant permission, in writing, authorising the Contractor, its nominee or any third party to publish, utilise or commercially exploit the intellectual property, subject to such terms and

conditions as the Chief Inspector, as the owner or joint owner, as the case may be, may specify.

9.5 The Contractor shall, on the written request of the Committee make available to the Committee, all information, including but not limited to, raw data, statistical analyses, formulae, plans, photographs, internal and external reports, and the like obtained, devised or developed by the Contractor or a sub-contractor of the Contractor in the course of performing the Project and shall, furthermore, assist the Chief Inspector, to the best of its ability, where the Chief Inspector, in its sole discretion, applies for the registration of a patent or design based on studies undertaken in terms of this Agreement. Such registration shall be at the expense of the Chief Inspector.

9.6 To the extent that the intellectual property rights arising out of or derived from the Project do not vest with either the Chief Inspector or jointly with the Contractor and the Chief Inspector but with some other third party, (for example, where the Chief Inspector funds or partly funds a bursary, in which case the intellectual property rights vest in the relevant university or institution of tertiary education) the Contractor shall use its reasonable endeavours in order to ensure that the intellectual property rights are commercially exploited by such third party.

10. **Breach**

10.1 Subject to the Committee's right to summarily cancel this Agreement as provided for in clause 5.6 (delays and extensions), should either Party commit a material breach of this Agreement and fail to remedy the breach within 14 days of receipt from the other Party of written notice calling upon it to do so, then the Party aggrieved by that breach shall be entitled, in addition to and without prejudice to any right it may have as a result of the breach, either to:

10.1.1 enforce the performance of the terms hereof; or

10.1.2 cancel this Agreement and recover such damages as it may have sustained.

10.2 Notwithstanding the provisions of clause 10.1. above, the Chief Inspector may cancel this Agreement if the Contractor:

10.2.1 is liquidated, placed under judicial management or is sequestrated;

10.2.2 effects a general compromise or any other arrangement with its creditors; or

10.2.3 suffers any judgement to be granted against it and fails to meet the judgment or take steps to set it aside or rescind it, within 30 days of it having been granted.

10.3 The Parties' remedy set out under this clause 10 shall not be exhaustive and shall be in addition to and without prejudice to any other remedies they may have, whether for damages or otherwise.

11. **Miscellaneous matters**

11.1 **addresses**

11.1.1 The Parties choose the following addresses to which notices may be given, and at which documents in legal proceedings may be served (ie their *domicilia citandi et executandi*), in connection with this Agreement :

11.1.1.1 in the case of the Chief Inspector to :

physical address	:	2nd Floor, Braamfontein Centre 23 Jorissen Street Braamfontein
Postal address	:	Private Bag X63 Braamfontein 2017
current fax number	:	(011) 403-1821
current telephone number	:	(011) 358-9180
e-mail address	:	cgomes@simpross.co.za

11.1.1.2 in the case of the Contractor to :

physical address	:	
current fax no	:	
current telephone number	:	
e-mail	:	

11.1.2 Notices given to the above addresses shall be deemed to have been duly given :

11.1.2.1 14 days after posting, if posted by registered post to the Party's postal address;

11.1.2.2 on delivery, if delivered to the Party's physical address;

11.1.2.3 on despatch, if sent to the Party's then fax number; and

11.1.2.4 on the date on which a "confirmation of delivery" e-mail is sent to the sender by the e-mail service provider, if sent to the Party's e-mail address.

11.1.3 A Party may change that Party's addresses for this purpose, by notice in writing to the other Parties, provided that the new addresses include a physical address in the Republic of South Africa.

11.2 **entire contract**

This Agreement contains all the express provisions agreed on by the Parties with regard to the subject matter of the Agreement and the Parties waive the right to rely on any alleged express provision not contained in this Agreement.

11.3 **variation, cancellation and waiver**

No contract varying, adding to, deleting from or cancelling this Agreement, and no waiver of any right under this Agreement, shall be effective unless reduced to writing and signed by or on behalf of the Parties.

11.4 **indulgences**

The grant of any indulgence by a Party under this Agreement shall not constitute a waiver of any right by the grantor or prevent or adversely affect the exercise by the grantor of any existing or future right of the grantor.

11.5 **Cession**

11.5.1 The Contractor may not cede or assign any of its rights or obligations under this Agreement without the prior written consent of the Chief Inspector;

11.5.2 It is hereby agreed that the Chief Inspector may, subject to the Act or any regulation in operation for the purposes of the Act, cede or assign to the Mine Health and Safety Council established under Section 41 of the Act, any right or obligation of the Chief Inspector under this Agreement.

11.6 **governing law**

This Agreement is governed in accordance with the laws of the Republic of South Africa, in its entirety ignoring any question of conflict of laws.

11.7 **counterparts**

This Agreement may be executed by facsimile and in counterparts, each of which will constitute one and the same document.

11.8 **warrant of authority**

The person signing the Proposal on behalf of the Contractor warrants that he is duly authorised to do so.

11.9 **costs**

Each Party shall bear its own costs of and incidental to the negotiation, preparation, settling, signing and implementation of this Agreement.

Signed at on this the day of 2004.

.....
for the **CHIEF INSPECTOR**

Signed at on this the day of 2004.

.....
for the **CONTRACTOR**
Duly authorised

PROPOSED PROJECT SCOPES FOR THE 2005/6 PROGRAMME

SIM 04 09 06

Project title
A survey to assess the appropriateness and effectiveness of outcomes-based occupational health and safety legislation in the South African mining industry.

Motivation
Since the Mine Health and Safety Act was promulgated in 1996, the nature of the mining industry has changed significantly. Examples of these changes are the entrance of small, medium and micro enterprises to the industry, increased outsourcing by the larger mining houses and changes to employer organisations and the re-structuring of major mining houses. These changes in the industry have had an impact on existing legislation and the drafting of new legislation. An assessment of whether the mining industry's response to these developments has been appropriate is required. An Inspectorate and reviewers' view expressed during a review of the drafting of legislation carried out by the Mine Health and Safety Inspectorate is that outcomes-based legislation requires greater guidance from the State, particularly in relation to smaller operations. Due consideration should therefore be given to assess the appropriateness and practicability of implementation of new legislation in all mining sectors in light of the changes that have taken place, with a view to improving the development process and applicability of new legislation.

Primary outputs
A report that summarises:

- The composition and needs of the various target groups and stakeholders within the major and small mining sectors.
- Whether the outcomes-based formulation of legislation is useful and practicable
- The availability and access to current legislation, Codes of Practise, Guidelines and Instructions, etc
- The benefits and difficulties associated with the Codes of Practice, Guidelines and Instructions.
- The usefulness of various legislative mechanisms, such as regulations, to promote good health and safety practices. (including typical examples)
- Problematic legislation that is difficult to comply with (including examples and reasons for non-compliance)
- Recommendations to improve the appropriateness, effectiveness, and enforceability of legislation for different occupational categories and mines.

Scope
The survey must cover a representative sample of large, medium and small mines within the main mining sectors and targeted to include occupational categories such as safety managers, occupational health practitioners, production and technical support personnel, such as management, Inspectors of mines and employers. Questionnaires, focus group interviews and workshops should be used to solicit information and opinions to ensure that the quantitative survey is supplemented with a qualitative assessment. The survey design, target population and details of the questionnaires must be ratified by Council prior to implementation.

Estimated duration
The project must be completed within six months of the commencement date.

Typical recipients of the Report
Members of the Mine Health and Safety Council and its committees, occupational health and safety practitioners and representatives, employers, management and workers.

Requirement for technology transfer
- A reader-friendly report with accompanying graphics, where applicable, and a project launch to communicate the findings.
- A workshop with the various stakeholders present

Special skills and facilities required by project team
Knowledge of appropriate legislation, proven research experience, survey methods and communication skills.

SIM 04 09 07

Project title
Recommendations for improvements in the reliability, accessibility and usefulness of OHS data and statistics.

Motivation
Council requires accurate, timeous information and data for the evaluation of OHS performance to provide appropriate advice to affected and interested parties on policy, legislation, OHS research priorities and the promotion of a culture of health and safety and to effectively liaise with other bodies on OHS matters. OHS performance data is captured on the SAMRASS and SAMODD databases, which are administered by the MHSI of the DME, while autopsy data are captured on the PATHAUT database, which is maintained by the NIOH. Information from the Compensation Commissioner, MBOD and the RMA is used to supplement database information. The Minerals Bureau of the DME captures data on the number of persons employed at mines. Data submitted by employers on occupational accidents and diseases are extensive, and it requires significant resources within the DME to capture and analyse the data and to make information and statistics available timeously in a form that is useful. Issues surrounding the management and integration of databases are being investigated by the MHSI. Health 706, a SIMRAC project on the comparison of different databases involved in the compensation of occupational diseases, demonstrated several problems in the integration of the system and recommended the implementation of an integrated computer-based information system.

Improvements in the notification, recording and reporting of occupational accidents and diseases in the mining industry should take into account national and international developments that impact on these issues, such as South Africa's initiative to integrate OHS legislation and inspectorates, ILO initiatives and sustainability reporting initiatives.

Scope
The project is aimed at delivering outputs that will enable the MHSC to give advice to the Minister. The primary focus should therefore be on those databases under State control. All sources, databases and users of OHS data and information, such as mines and mining groups, research institutions, the Chamber of Mines, NIOH, MiningTek, MBOD, DME, Rand Mutual, the Compensation Commissioner, the DME, TEBA, the Inspectorate, Labour and Council must, however, be assessed. Surveys and workshops that cover a representative sample of big, medium and small mines within the main mining sectors must be undertaken. Targeted occupational categories such as safety managers, occupational health practitioners, production and technical support personnel, such as engineers, and management must be covered. Questionnaires, focus group interviews and workshops should be used to solicit information and opinions to ensure that the qualitative survey is supplemented with a qualitative assessment. Data capturing processes, verification and reporting systems must be assessed. The survey design, target population and details of the questionnaires must be ratified by Council prior to implementation.

Primary outputs

1 Advise on improving the reliability of OHS data and statistics

1. Phase 1

1.1. Determination of user needs to assist the review, assessment and recommendations process

1.2. Review of processes and controls in place by mines and the DME to populate and maintain databases required to meet user needs

1.3. Determination of difficulties that exist in populating and maintaining relevant databases.

1.4. Determination what difficulties exist in arrangements for the recording and notification of occupational accidents and diseases.

1.5. Investigate the way in which other countries, particularly those against which South Africa will benchmark its OHS performance (US, Canada, Australia) populate and maintain similar databases.

Phase 2

- Develop recommendations on improving the reliability of OHS data and statistics, including ensuring the accuracy of labour statistics.

2 Advise on improving the accessibility and usefulness of reported data and statistics.

Phase 3

- Develop recommendations on improving the accessibility and usefulness of reported data and statistics.

Estimated duration

Phase 1: 6 Months

Phase 2: 6 Months

Phase 3: 6 Months

Typical recipients of the Report

OHS information centres, Council committees, the DME and occupational health and safety practitioners and representatives and mine management.

Requirement for technology transfer

A reader-friendly report that provides details and guidance for data and information centres and industry users. The report must include details of resources, schedules, strategies and action plans. Two presentations must be given, by March 2005 and March 2006, on the key findings and recommendations.

Special skills and facilities required by project team

Knowledge of appropriate OHS data and information systems in the SA mining industry; recording, notification capture of occupational accidents and diseases and a working knowledge of state-of-the-art information capture and dissemination technologies. Requirement for auditing skills in the research team.

SIM 04 09 08

Project title
A pilot investigation to determine the extent to which illegal mining operations effect OHS (Phase 1)

Motivation
Council requires information on the extent, locality and nature of mining operations that are carried out without the knowledge and permission of mine owners and mine management ('criminal mining') and operations that are carried out without a valid prospecting or mining permit ('illegal mining') on previously unmined areas and abandoned mines. Accidents that result from such activities present a problem of unknown proportions to the industry in terms of reporting, accountability and compensation and increases the OHS risk for legitimate mining operations due to non-recording and mapping of excavations that are created during such mining activities. In addition, such operations may undermine the promotion of the culture of health and safety and lead to intimidation of workers who are employed to carry out legitimate mining operations.

Scope
All mining sectors should be included, but the focus of illegal mining should be on small scale mines especially diamonds, sand and sandstone, gravel and coal mines. Alleged criminal mining within the Free-State gold mines must be investigated. Surveys and workshops, that cover a representative sample of mines within the main mining sectors, and targeted to include occupational categories such as safety managers, occupational health practitioners, production and technical support personnel, such as engineers and management, must be held to obtain information prior to planning possible inspections and site visits. Underground inspections, questionnaires, focus group interviews and workshops should be used to solicit information and opinions to ensure that the quantitative survey is supplemented with a qualitative assessment. The survey design, target population and details of the envisaged nature of the investigative aspects, must be ratified by Council prior to commencement of the project. Clearance must be obtained from a nationally accredited ethics committee. Council will obtain legal opinion concerning the way forward. The names of mines that participate in the project must be coded and not be revealed in the final report. Anonymity of interviewees is essential.

Note: the scope must be limited to a confidential and discreet situational analyses and likely impacts on OHS. An attempt must not be made to uncover illegal mining operations or expose individuals or groups who are seemingly guilty of such activities

A distinction must be made between criminal mining and unauthorised mining.

Primary outputs
Phase 1

1. Recommendations on the approach and scope of how to conduct the pilot project with a view to extending the scope to cater for possible further investigative aspects that may be considered necessary. (as outlined in Phase 2)

Estimated duration
Phase 1:

6 Months

Typical recipients of the Report
Council committees, the DME, selected health and safety practitioners and representatives and mine management.

Requirement for technology transfer
A confidential, reader-friendly report with non-disclosure of mines' names and identification details. A presentation to Council-selected attendees must be given after the final report has been accepted.

Special skills and facilities required by project team
Working knowledge of mining operations and OHS indicators, relevant mining-related Acts and experience in sensitive and confidential investigative techniques. The safety of the investigative team will be an issue.

SIM 04 09 09

Project title
The influence of production and safety incentive systems, management practices, organisational restructuring and supervision systems on OHS performance

Motivation
Council strives to foster and promote a preventative OHS culture in the South African mining industry. which includes increasing the general awareness, knowledge and understanding of hazards and risks and how they may be prevented or controlled. Two projects are currently in progress to profile the current organisational culture and to formulate possible intervention programmes. Production-based bonus schemes and safety reward schemes are components of, and therefore influence, organisational culture and climate. Council recognises the achievement of high standards of health and safety performance through its Safety Achievement Award scheme in a drive to motivate and challenge mines to improve OHS performance. The influence of safety award and production-based schemes, management practices, organisational restructuring and supervision systems on OHS performance needs to be established in order to provide a rational basis for managing such schemes to optimise potential positive influences on OHS performance.

Scope
A representative and appropriate sample of mines from different commodities, OHS performance, size of operation and mining companies must be selected. If practicable, mines that are participating in the two current projects (03 01 01 and 03 01 02) on organisational culture, should be included in the sample. A critical review of the Council's Safety Achievement Award scheme must be conducted with a view to assessing its effectiveness in promoting OHS awareness, knowledge and understanding of hazards and risks and how it should be managed. Production-based bonus systems and safety award systems must be assessed to establish their influence on OHS performance. Surveys, workshops and focus group interviews must be used to solicit the opinions of tripartite stakeholder groups and safety managers, occupational health practitioners, production and technical support personnel and mine management.
These schemes should include production and OHS incentive schemes and also distinguish among schemes for the mining sector (e.g. the MHSC award), an entire operation (e.g. a single mine), specific production teams (e.g. underground teams) or specific individuals (e.g. senior management)
An assessment of the influence and effectiveness of management practices, organisational restructuring and supervision and shift systems to improve long-term OHS performance and to promote OHS best practice

Primary outputs

- A literature survey and assessment of the influence of production-based bonus systems on OHS performance. In evaluating the influence of the schemes, other actions taken to influence OHS performance when incentive schemes were implemented, should be highlighted
- A survey and assessment of the influence and effectiveness of OHS incentive schemes on OHS performance. In evaluating the influence of the schemes, other actions taken to influence OHS performance when incentive schemes were implemented, should be highlighted
- An assessment of the influence and effectiveness of the Council's award scheme as well as other stakeholder schemes to improve long-term OHS performance and to promote OHS best practice
- Recommend the adoption and integration of OHS criteria that are set by Council within its reward scheme.

- Evaluate the extent to which various mines (sectors and size) comply with the ILO OHS Management System Guidelines
- An assessment of the influence and effectiveness of management practices, organisational restructuring and supervision and shift systems to improve long-term OHS performance and to promote OHS best practice

Estimated duration t
12 Months

Typical recipients of the Report
Council committees, the DME, Labour, mine management and OHS practitioners and representatives.

Requirement for technology transfer
A reader-friendly report with non-disclose of mines' names and identification details. A presentation to Council-selected attendees, including management of mines that are implicated in the study, must be given after the final report has been accepted.

Special skills and facilities required by project team
Working knowledge of mining operations and OHS indicators, organisional / individual behavior, relevant mining-related Acts and experience in research techniques.

SIM 04 09 11

Project title
A survey to determine the needs of small scale mines to improve their occupational health and safety (with a focus on work to be introduced in Council's legislative programme).

Motivation
During 2000, a study was undertaken to assess the OHS research needs of small mines, (less than 300 employees) in the 'other' mining sector (Project OTH 605). Site visits to 23 mines were made and several workshops and group interviews were held. One of the conclusions of the report was that:

...'*there are no major health or safety hazards specific to this sector of the industry that require additional research to that already undertaken or presently being addressed within the SIMRAC research programme, although further development work, e.g. dust is indicated.*'

Project Health 809 (in progress) will report on the level and adequacy of occupational health services in small mines and quarries.

These two surveys concluded that there is a lack of reliable OHS information on small-scale mines and a lack of awareness regarding legislated requirements for ensuring workers' health and safety.

Scope
A survey to determine needs of small scale mines beyond research needs, that include needs on technical guidance, capacity-building, technology, monitoring, management training, etc. Junior mines must be included in the scope

Primary outputs
Phase 1
A critical review and assessment of previous work by the DME, CoM, SIMRAC, MEETI, MEPC, Mintek, Miningtek, SAMDA and their international equivalents and recommendations on the need to conduct further surveys.

Phase 2
To be scoped following the recommendations from Phase 1

Estimated duration and cost
Phase1: 6-12 months.

SIM 05 02 01

DESCRIPTION OF RISK
Rockfalls

TITLE OF RESEARCH TOPIC
Investigation into solutions for the protection of coal workers in high risk roof fall areas

PRIMARY OUTPUT/S OF RESEARCH:
1. Identify main problem areas
2. A list of possible solutions to protect workers from roof falls in high risk areas
3. Recommendations on the most suitable solution
4. Develop an experimental demonstrator model
5. Build a prototype
6. Run underground trials on the recommended prototype

MOTIVATION
Rock related injuries and fatalities on coal mines have improved substantially over the past decade due to improvements in support design and installation. However, there are still a number of situations underground where employees are at greater risk than normal. One such situation applies to the operators of continuous miners using remote controls. Previously such operators had the protection of the machines cabin. Removing the operators from the high health risks at the coal face has been exchanged for a generally more dangerous rockfall condition which has the potential for deaths and injuries. Other situations exist that expose workers to higher rockfall risks. Occupations that are most at risk include cable handlers and support crews. Anomalous geologic conditions such as burnt coal, dykes and faults are areas where the risk is increased. A device that can be deployed quickly and which can offer protection to the worker or workers would improve the rock-related safety on collieries. If such a device/system works on coal mines then it may find application in other mining sectors.

POTENTIAL IMPACT OF RESEARCH
If a cost effective, simple to operate solution is found and it is accepted by the industry, then the rockfall accidents associated with higher risk areas could reduce substantially.

SCOPE OF RESEARCH

Focus areas:
Phase 1
Determine the **current methods** of ensuring worker safety in areas of high rockfall risk, locally and internationally

Phase 2
Produce a number of alternative ideas for consideration, building on current ideas and by introducing new concepts. Involve the industry in evaluating the different schemes through workshops

Phase 3
Expand the chosen idea or ideas for further discussion and evaluation

Phase 4
Build a proto-type of the device or give detailed drawing/instructions regarding the chosen solution or solutions. Computer generated animation showing the concept or equipment will be required.

Phase 5
Run an underground trial with the concept/equipment and monitor all aspects of its success or

otherwise for inclusion in the final project report.

Phase 6
Write up final report and prepare technology transfer strategy

Suggested Duration:

Phase 1	1 month
Phase 2	1 month
Phase 3	2 month
Phase 4	5 month
Phase 5	2 month
Phase 6	1 month

Potential for application:
Many mines are using standoff controls to operate equipment close to the coal face. Such workers are at risk of rock falls and a device that is easy to use and is not to expensive may provide an attractive option for coal mines to ensure their employees safety. Similarly in anomalous geological conditions such a device may be readily adopted into the standard work practices.

REQUIREMENTS FOR TECHNOLOGY TRANSFER:
The solution will have to be simple and easy to apply. It will have to be relatively inexpensive and depending on its design may have to be mobile.

Special skills required from project team:

- Rock engineering knowledge, coal mining experience, mechanical engineering expertise, manufacturing and marketing partner

SIM 05 02 03

DESCRIPTION OF RISK
Rockfall

TITLE OF RESEARCH TOPIC
Assessment of instrumentation on drilling equipment to gain geotechnical knowledge

PRIMARY OUTPUT/S OF RESEARCH

1. Evaluation of instrumented drilling equipment to predict the geotechnical conditions of the rock being drilled
2. The benefits of instrumentation on drilling machinery for evaluating the geotechnical conditions of the rock and predictions of the efficacy of installed support

MOTIVATION

Work in the USA's coal mines is being carried out to gather information during the drilling process of roofbolt holes. The work suggests that there may be significant and critical information that can be obtained about the geotechnical environment into which support is installed before the support is installed. This could have important safety implications because the type and approach to the support installed may vary according to the conditions. Clearly the work has been carried out in the geotechnical environment of the USA mines. It may be applicable to South African collieries but the technology needs to be tested in the South African situation in order to transfer this international knowledge with or without modification. Real time visual display is possible. This work may be applicable in the platinum industry as well and a further phase of the work may be to conduct trials in this environment in the future.

POTENTIAL IMPACT OF RESEARCH

Advanced knowledge of the geotechnical conditions, in real time, in which support is installed will ensure that the correct, safe support is installed. This will reduce the incidence of massive roof falls and improve safety. It will also do away with the need for reinstallation of support, thus saving costs.

SCOPE OF RESEARCH

Focus areas:

Phase 1

1. Design the final project scope with industry experts including any further phases for work in the platinum industry

Phase 2

Drilling equipment instrumentation

1. Gather data from overseas experience and review any local experience
2. Consult with local drilling machine suppliers
3. Investigate the type of data that should be collected and the instrumentation required to achieve this
4. Lease/loan of monitoring equipment
5. Design underground trials with interested mines
6. Collect data
7. Analyse findings
8. Report to the industry

Phase 3

1. Investigate the possibility of retro-fitting present South African colliery equipment with instrumentation to determine geotechnical conditions
2. Write up final report and produce guidebook on the findings for use by industry

Suggested Duration

Phase 1 1 month
Phase 2 6months
Phase 3 1 months

Potential for application

The instrumentation of drilling equipment may show that a benefit is derived from knowing certain information while drilling. This will require that mines spend money on instrumentation or purchase machines that can measure appropriate parameters. However, the safety benefit will hopefully off-set the additional cost.

Requirements for Technology Transfer

Workshops with the coal experts and coal industry.
The production of a comprehensive, comprehendible final report.

Special skills required from project team

Rock engineering coal experience, instrumentation and research experience.

SIM 05 03 02

DESCRIPTION OF RISK
Rockbursts

TITLE OF RESEARCH TOPIC
Managing Rockburst Risk

PRIMARY OUTPUT/S OF RESEARCH:
1. Data driven simulation of rockmass response to mining
2. A review of stability criteria for use in numerical models with special reference to seismic integration
3. Understanding and designing to cope with rockburst damage
4. Building capacity in and transfer of mine seismology to the mining industry
5. Seismic prediction

MOTIVATION
Output 1
It is postulated that the usefulness of stress modeling techniques used for mine design will be enhanced if greater efforts are made using a series of laboratory experiments where large (25 cm), intensively instrumented rock cubes which are loaded to failure. The measurements will be used to develop and test simple and robust improvements to existing numerical modeling codes (e.g. FLAC, ELVEN, DIGS) and to gain insights into underground behaviour, particularly in dynamic failure of the rock.

Output 2
SIMRAC project SIM020301 produced advanced models for evaluating stability based on models of explicit fracturing, culminating in a proposed new criterion called generalised energy release based on actual energy release due to failure on cracks. The integration of this criterion with the necessarily simplified mine-wide integration models need further research.
It is envisaged that high seismicity areas from the mine-wide models can be refined through localised complex models which permit actual energy release, giving a more realistic assessment of the local stability.
Work in SIMRAC project 020306 suggests that during fault ruptures vibrations may play an overriding role in the mechanisms of failure, which calls into question a value of friction of 30 degrees which is often used to establish the ESS criteria used in numerical modeling. Should this value be substantially lower then the stress drops anticipated could be far higher than planned for in current simulations.
This output of the project will provide a more advanced and scientific method for mine design.

Output 3
A missing aspect in rock engineering design capacity is the ability to project the effect of rockbursts and to predict the distribution (probability) of ground motion and the extent of damage caused by rockbursts. Such a capability would aid in improved layout design and more intelligent determination of support requirements.
Wave propagation models have been developed which are capable of projecting complex effects on ground motion. Laboratory-scale back-analysis has been extremely successful but fundamental and numerical advances are required before such tools can be used directly in the design process. This output will use back-analysis to motivate the more wide-spread use of dynamic models in mine design. This should include field experiments such as the stiff versus yielding excavation supports systems used in mines.

Output 4
There is a deficiency in practicing seismologists and knowledge in seismology in the South African mining industry. It is proposed that SIMRAC play a role in ensuring that new capacity is built and present resources are maintained in the mining industry by transferring seismological knowledge

through institutions of higher learning. This would involve funding a suitably qualified person(s) for a period of, say, 8 weeks per annum (not necessarily in a continuous block). During this time, training on the state of the art of seismology in South Africa and internationally will be given to undergraduate students studying mining engineering, rock mechanics, geophysics and geology at Witwatersrand and Pretoria Universities, as well as to graduate practitioners through the Continuing Engineering Education programme or some similar scheme. SIMRAC day schools highlighting rockburst thrust outputs will be arranged for employees of the SIMRAC structures. Post graduate research work in the field of mine seismology could also be supervised.

Output 5

Seismicity and rockburst prediction remains a goal that needs to be pursued. Advances are being made with seismic monitoring equipment and the ability to cope with large data sets more rapidly has improved with advances in computer technology. A review of what has been achieved to date with seismic prediction and what is possible, needs to be investigated and peer reviewed. The current best practice should be documented for use in the industry and the way forward for further work in seismic prediction and rockbursts mapped out.

SCOPE OF RESEARCH

Focus areas:

Phase 1

Appointed contractor to scope the full project in detail:

(Prospective research agencies should supply proposals showing their capabilities to conduct the work detailed in this project. The staff that will be involved (including sub-contractors) should be shown. A proposed project leader should be clearly indicated).

Phase 2

Proceed with the scoped project. Each output should be phased over the life of the project with clear opportunities to stop and evaluate progress and to give new direction.

Output 1

This part of the project must:

(i) detail the laboratory work that will be pursued
(ii) indicate the equipment necessary for carrying out tests and monitoring
(iii) Show how the outputs from the laboratory tests will be used in numerical modeling and
(iv) design appropriate underground tests to check the outputs of the modeling

Output 2

This part of the project requires:

(i) advances in the mine-wide models and the refinement of the integration approach
(ii) advances in fracture modeling and methods to couple global and local solutions
(iii) evaluation of current stability criteria and their appropriateness for numerical simulations.
(iv) Laboratory work will be used to test the progress made before field testing

Output 3

This output should concentrate on:

(i) sources of dynamic fault slip
(ii) accurate distribution of ground motion including the effects of interaction with excavations and geological structures and surface wave formation
(iii) the relationship between ground motion and damage
(iv) the interaction of waves with different support types.
(v) stiff versus yielding support experiment
(vi) extensive laboratory testing will be pursued as the first approach to gaining understanding

Output 4
To enhance the building, retention and transfer of seismological knowledge:

(i) prepare appropriate course content for different mining personnel
(ii) liaise with mines and tertiary institutions
(iii) keep abreast of latest seismic and rockburst knowledge and distill this into appropriate useful tools for the industry
(iv) identify useful post graduate topics for research, recruit students, help with project scoping and supervision of the work

Output 5
The following is important in this part of the project:

(i) design laboratory experiments to gain greater understanding of the onset of rock failure under load and explore the possibility of "prediction" of failure in the laboratory
(ii) report on success or failure of the current techniques to predict seismicity and/or rockbursts by analysis of past data
(iii) refinement and optimization of the current seismic risk systems that are used in one form or another across the industry (gold and platinum). This should include an assessment for different geotechnical areas (VCR, CLR, VR, platinum etc), influence of network sensitivity, optimum polygon size, parameter settings etc. A clear definition of what would be considered a success in terms of prediction is needed.
(iv) international peer review of the findings of the investigation in ii & iii above
(v) translate the current knowledge into a useful seismic tool box that represents best practice
(vi) scope the future work that is required beyond year 1 of the project

Suggested Duration:
Phase 1 1 months

Phase 2 59 months

Potential for application:
Seismicity and rockbursts remain a problem with deep level mining, particularly in the gold sector. However, the platinum sector may experience increased seismicity as operations increase in depth. For both these sectors, any technology that is able to give a clearer understanding of the seismic risk and an increased ability to understand when and where rockbursts may be anticipated, will be accepted and applied

REQUIREMENTS FOR TECHNOLOGY TRANSFER:
Interaction with end users on mines throughout the project

Special skills required from project team:

Management, seismology, numerical modeling, instrumentation, rock engineering and a track record of delivery. Ability to engage international collaboration if required.

SIM 04 04 03

Project title

Role of static electricity in the ignition of flammable gases and cause of mine explosions

Motivation

Static electricity is suspected to be a cause for of the flammable gas explosions the industry has experienced. There is no evidence directly linking static electricity to any of these in the SA industry. In the 60's and 70's, static electricity was said to have caused about 4% of explosions in the British collieries. Causes to some explosions in this industry have never been fully explained. This exploratory project aims to assess the extent of this apparent problem, through a HIRA process. The outcome will be some quantitative rating of the risk, its significance and a guidance of what research could be done to eliminate/minimise the risk. If this phase indicated viable research areas, phase 2 would pursue some of these.

Primary outputs

Document quantifying risk and guidance on further research

Scope

The study should review all situations likely to generate static electricity, and provide guidance on ways to reduce the likelihood of generating static electricity, as well as suggesting further areas of research aimed at minimizing or eliminating this risk. Other areas of focus must include the earthing of compressed air plants and the effects of the compressed air moisture content on the enhancement of the generation of static electricity sparks.

Potential impact on significant health and safety risks

Minimize the risk of an underground fire and gas ignition from occurring.

Special skills and facilities required by project team

- Occupational/Environmental engineering with strong experience in flammable gas in hard rock and coal mines
- Electric engineer

Rated "A" as a student bursary at M. Sc. level.

SIM 04 04 05

Project title

Temperature at which coal dust ignites on exhaust manifolds of larger vehicles

Motivation

The DME's specification in the Code of Practice for use of non-flameproof vehicles in collieries states the maximum permissible exhaust manifold temperature as 200 deg. Celsius. What is unclear is the basis of this figure, as the work done during project GEN 702 (Criteria for the safe use of commercial vehicles in fiery mines) showed. SABS 868 of 1997 stated the maximum temperature as 150 deg. Celsius, again no experimental work could be found on which this may have been based. Some work was done on Derner coal, where experiments showed that fine coal dust would ignite at a variety of temperatures depending on the layer thickness, ranging from 260 deg. Celsius for a 5 mm layer, to 170 deg. Celsius for a 50 mm layer. Quite how local coals would react is open to debate. SACMA requested SIMRAC to investigate this issue, as generally, the industry believes this could be set too high. This project aims to conduct work that may vindicate, or question the level of this limit, and also to provide guidance on the recommended position of the manifold where the measurement should be done.

Primary outputs

1. Document giving ignition temperatures of the dust from all the coal varieties mined in SA
2. Recommended maximum temperature permissible on exhaust manifolds of vehicles used in coal mines, and measuring position for the maximum temperature on the exhaust manifolds

Scope

The study should conduct experimental work to determine the above. Reference should be made to the SIMRAC project GEN702, and any other literature worldwide that could be of relevance. Target machines to include diesel LHD's, light vehicles, and any other diesel vehicles used underground in SA collieries.

Potential impact on significant health and safety risks

Minimize the risk of an underground fire and gas ignition from occurring.

Special skills and facilities required by project team

- Ideally, suited for an M. Sc. Student enrolled at a recognized higher education institution, or
- Occupational/Environmental engineering with strong experience in flammable gas in hard rock and coal mines

Rated "A" as a student bursary at M. Sc. level.

SIM 05 04 01

Project title

Development, evaluation and testing of an alternative to onboard continuous miner scrubbers and force fan in-heading ventilation systems for continuous miner headings in South African coal mines

Primary outputs

Noise analyses performed in continuous miner sections identified the scrubber as one of the major noise sources, with noise levels in excess of 100 dB having been determined. Unfortunately the current section and in-heading ventilation systems can not operate without on board CM scrubbers as it forms a vital part of the current flammable gas and dust control system.

Another shortcoming of the current on board scrubber and force ventilation systems is that it has a limited effective distance to which it can control flammable gas and airborne dust. This makes it unsuitable for the mining of long narrow single heading entries which could be used for alternative more efficient mining methods.

For these reasons the role of in-section and, more specifically in-heading ventilation systems would need to be re-assessed. This project hopes to address these shortcomings by improving the highest compensated occupational hygiene injury in the section and heading (NIHL), and improve the efficiency and penetration ability of the flammable gas and dust control system and even further reduce the risk pneumoconiosis and coal dust explosions.

An alternative ventilation system to on board CM scrubbers and force ventilation systems for continuous miner headings in SA coal mines, that would result in a reduction in the high noise levels emitted by scrubbers and increase the effectiveness of in-heading ventilation systems to lower flammable gas and airborne dust concentrations. The alternative system will also potentially allow CMs to mine long, narrow single entry headings.

Scope

1. Critically scope project and identify appropriate methodology.
2. Workshop: Identify and rank potential components and systems.
3. Evaluate selected system's efficacy with CFD techniques.
4. Evaluate most effective system in surface test gallery) and refine.
5. Install and evaluate proposed system in underground application.
6. Prepare final report and operating guidelines and submit to committee.

Potential impact on significant health and safety risks

Reduction in NIHL and flammable gas related explosion hazards

Special skills and facilities required by project team

- Occupational/Environmental engineering with strong experience in flammable gas and ventilation systems in collieries

SIM 05 04 02

Project title

Evaluating the effectiveness of a triggered barrier system intended to suppress explosions and limit explosion propagation in single- and multiple entry mine configurations

Motivation

The coal mining industry has to deal with the constant threat of gas and coal dust explosions in underground operations. Underground explosions are usually multiple fatality incidents. The 1993 incident at Middelbult colliery, for instance, claimed the lives of more than 50 people. Every effort to decrease the risk presented by such events or to limit the extent of such incidents should therefore be made.

The current practice of installing stone dust explosion barriers can prevent explosion propagation along roadways is installed correctly. Such a passive barrier system does, however, have a number of shortcomings. These include:

- Passive barriers are normally only effective when placed 60 m away from the working face, leaving the personnel closer to the face (usually a significant amount of people) exposed to explosion risks.
- Low pressures (below 5 kPa) do not activate the barriers.
- These barriers present some difficulty in low seams (less than 1,5 m high) and are currently not used in thin-seam operations.
- The use of these systems in high-seam applications (more than 6 m high) require a significant increase in the quantity of suppressant required. Top and bottom coaling can also lead to such systems being ineffective in very high seam applications.
- The reliability of trickle dusters is also questionable.

It has been shown that machine-mounted explosion suppression systems could effectively prevent explosion propagation from a face ignition. It is therefore a natural deduction that the use of active explosion suppression systems as roadway barriers may address some of the shortcomings listed above.

It is, however, essential that the effectiveness of such a system as a roadway barrier be verified under various envisaged conditions before it can be considered feasible for underground use.

Primary output

A triggered explosion suppression barrier system intended for use in single-and multiple entry mine configurations. The system will have been evaluated for effectiveness in accordance with internationally accepted test protocols.

Scope

1. Detail scoping, planning and scheduling of overall project.
2. Quantitative performance comparison between proposed triggered barrier system and current stone dust bag barriers in a test gallery at Kloppersbos.
3. Optimization of the powder dispersion configuration for the triggered barrier system for rectangular roadways in the 20-m test gallery at Kloppersbos.
4. Evaluation and approval testing of the proposed triggered roadway barrier system at the 90-m multiple entry NIOSH test facility at Lake Lynn.

Potential impact on significant health and safety risks
Reduction in risk posed by explosive gas and dust

Requirement for technology transfer
Workshops and demonstrations of system at Kloppersbos

Special skills and facilities required by project team

- Occupational/Environmental engineering with strong experience in flammable gas in hard rock and coal mines
- Electrical control engineering expertise as well as expertise in machine mounted explosion suppression systems

SIM 03 06 03

Project title

SIMRAC Silicosis Control Programme – Phase 2

Motivation

SIMRAC is a partner in the WHO/ILO initiative for the global elimination of silicosis. Since its establishment in 1994, SIMRAC has funded projects in dust measurement and control, but silica exposure, with related silicosis and tuberculosis, remains a priority challenge for the mining industry. It is essential to evaluate the existing practice in relation to control requirements, set exposure reduction targets and established best practice to meet these targets for silica exposure. In addition, new technologies for preventing or allaying dust pollution should be reviewed and research conducted, if necessary. This project is to research the containment/elimination of silicosis in the South African mining industry as identified in regional and national workshops.

Proposals for the tracks are NOT being sought at this stage. SIMRAC is seeking an overall Project leader and 3 project track leaders who will form a team to collaborate with the Mine Health and Safety Council in managing and shaping this important project. An invitation is extended to experienced research managers to apply for these 4 positions by submitting a detailed curriculum vitae with a covering letter explaining which position is being sought, with which research institution they are or will be affiliated, their relevant personal experience and an indication of the anticipated number of working days required and daily remuneration rate sought. In addition, researchers interested in specific components of any of the three tracks should submit a curriculum vitae and covering letter detailing the component/s in which they have a specific interest. These contributors will be contacted and considered by SIMRAC and the management team once the 4 individuals have been appointed.

Part A: Dust Measurements and Reporting

Previous SIMRAC research and the lack of progress in eliminating silicosis highlighted the problem of measurement, analysis and reporting of respirable dust exposures. SIMRAC has prioritised dust measurement and reporting as an area for research in the Silicosis Control Programme.

Primary outputs

- Evaluate the techniques used in South African mines for determination of exposure to respirable crystalline silica. This includes the sampling instrumentation; sampling strategies, sample analysis, quality assurance/control and reporting which will be compared with best practice.
- Review and assess techniques used in South African laboratories for respirable silica analysis on filter samples and the implementation of an international quality control check with standard samples on the laboratory analysis performance.
- Develop standard samples for instrument calibration for quartz analysis.
- Develop a manual of best practice for the assessment of exposure to respirable crystalline silica. Will include but not be limited to appropriate air sampling equipment, air sampling equipment preparation, field survey procedures including filter handling, sampling strategies, gravimetric determination, analytical methodologies for crystalline silica, laboratory quality assurance and reporting.
- Develop a manual of best practice to assess the engineering and other control measures in place to minimise exposure to crystalline silica.
- Review inspection/enforcement around the world with regard to silicosis prevention.
- Develop a manual of best practice for the inspectorate to assess worker exposure to respirable crystalline silica and the verification of mine data.

Year 1 (April 2005 – March 2006)

- Assessment of current practice of measurement and analysis for respirable crystalline silica. (Including collection characteristics of samplers operated according to the JHB criteria and the ISO/CEN criteria)
- Polley Dust Duct Refurbishment and Upgrading to Perform Research on Direct on Filter Analysis (DOF) and most appropriate analytical methodologies to determine crystalline silica content of mine respirable dust filter samples. Duct to include real-time particle size distribution instrumentation.
- Review inspection/enforcement around the world with regard to silicosis prevention.

Year 2 (April 2006 – March 2007)

- Polley Dust Duct Refurbishment (Continued)
- Conduct research to determine most appropriate analytical methodologies for crystalline silica in mine respirable dust samples. Assess the validity of the direct on filter (DOF) analysis for XRD and IR. Determine the abilities of the recommended methods in terms of detection limit, working range, precision and accuracy. Assess effects of particle deposition on filter, particle layers and compare the DOF method with the redispersion method. Assess the effect of movement of sample deposition during transport. Prepare standards using aerosol generation in the Polley Dust Duct. Assess the most appropriate cyclones for optimum filter deposition for DOF analysis, minimal sidewall deposition and minimum effects of air inlet orientation to air movement.
- Characterisation of the particle size of airborne mine dust from various dust sources. Assessment of the crystalline silica content in the various size fractions. *(Link to filtration efficiency and general control techniques in Part B)*

Year 3 (April 2007 – March 2008)

- Implement International quality control testing and standardisation for crystalline silica on filter analysis.
- Piloting of real-time respirable dust measurement instrument (TEOM).
- Comparison of South African practice with international best practice including linkage of exposure and medical surveillance.
- Develop manuals on best practice:
    - to assess exposure to airborne respirable crystalline silica.
    - for the inspectorate to assess the exposure of workers to airborne respirable crystalline silica and to verify mine dust exposure data.

Year 4 (April 2008 – March 2009)

- Develop manuals on best practice with which to assess the engineering and other control measures in place to minimise exposure to crystalline silica. (Linked to project on engineering controls).
- Piloting and evaluation of real-time dust measurement instrument (Continued).
- Technology transfer of best practice materials for dust measurement.

Year 5 (April 2009 – March 2010)

- Technology transfer of best practice materials for dust measurement (continued).

Scope

Requires the research team to obtain information on the current practice for the determination of exposure to respirable silica dust through visits to a selected sample of mines and to all laboratories in South Africa conducting quartz on filter analysis.

Assessment of current practice in developed mining countries compared to South African practice. The compilation of best practice manuals, which would guide the mining industry to work towards the elimination of silicosis in the mining industry.

Estimated duration
5 years

Potential impact on significant health and safety risks
Very high potential impact by producing implementable best practice manuals for the assessment of respirable silica exposures. Real time monitoring capability.

Requirement for technology transfer
Assessment of effectiveness of legislation and current practices.
Best practice manuals to assess exposure to respirable crystalline silica.

Specialist Skills and Facilities
Occupational Hygiene
Laboratory quality control and crystalline silica on filter analysis techniques
Instrumentation and Electronics Engineering
Aerosol Physics

Part B: Environmental Engineering/ Dust Control

Motivation

The most important intervention for any silicosis control programme is to eliminate or reduce dust at source and to prevent exposure. SIMRAC has targeted feasible or cost-effective environmental control engineering and dust control technology as a research priority area for the silicosis control programme.

Primary outputs
- Risk assessment to identify the priority dust sources and the applicable control technologies.
- Assess the filtration efficiency for respirable dust of the current filter media used for dust control.
- Compile internationally accepted best practice materials, including manuals, for dust control.

Year 1 (April 2005 – March 2006)
- Assess dust sources and determine the contribution of each source to the overall exposure. *(Incorporate use of PIMEX)*

Year 2 (April 2006 – March 2007)
- Assess and prioritise dust sources and determine the contribution of each source to the overall exposure. Includes developing collection of video and PIMEX clips and other visual aid material.
- Review new technologies for breaking and moving rock with regards to potential for dust exposure minimisation.
- Identify and assess the different control technologies (existing and new) used for each identified dust source for a range of commodities and size of mine. *(Link to particle size distribution research in Part A of Phase 2)*
- Develop an industry standard for assessing filtration efficiency. Assess the filtration efficiency for respirable dust of the current filter media used for dust control. *(Link to assessment of crystalline silica content in various size fractions in Part A of Phase 2).*
- Comparison with international experience to determine best practice for controlling the various identified dust sources. (*To include dust control methods evaluation workshop with national and international experts)*

Year 3 (April 2007 – March 2008)

- Assess the filtration efficiency for respirable dust of the current filter media used for dust control (Continued).
- Assess the different control technologies (existing and new).
- Pilot and evaluate potentially cost effective new and existing dust control methods.
- Develop draft best practice manuals for South African mines including design component for new mines. This should be commodity based and include manuals for gold, coal and quarries.

Year 4 (April 2008 – March 2009)

- Finalise best practice materials, including manuals, to control exposures to respirable crystalline silica.
- Design, pilot and evaluate comprehensive dust control programme.

Year 5 (April 2009 – March 2010)

- Determine worker exposures with best practice implemented.
- Technology transfer of best practice materials for dust control.

Scope

Requires the research team to obtain information on current local and international practice for dust control through visits to selected sample of mines and communication with dust control experts. Assessment of current practice in developed mining countries compared to South African practice. Pilot potentially cost effective dust control methods. The implementation of the recommendations of the best practice manuals on pilot mines and the assessment of workers exposures. The compilation of best practice materials, including manuals, which would guide the mining industry to work towards the elimination of silicosis in the mining industry.

Estimated duration

5 years

Potential impact on significant health and safety risks

Extremely high potential impact by producing implementable best practice for the control of exposure to respirable crystalline silica.

Requirement for technology transfer

Assessment of effectiveness of legislation and current practices.
Best practice manuals specific to mining commodities for the control of exposure to respirable crystalline silica, covering surface and underground mines and mineral processing plants.

Specialist Skills and Facilities

Occupational Hygiene, Mechanical and Mining Engineering
Aerosol Physics and Dust Control Expertise
International Collaboration

Part C: Human Resources Training and Management

Motivation

In the 1960's the South African mining industry held a leading position in research on dust exposure and control and also in education and training about dust. This needs to be re-established using current educational methods and technology, which have developed in the intervening years, to raise awareness about dust exposure and health effects. SIMRAC has targeted the area of human resources training/ technology transfer as one of the priority areas for the Silicosis control programme.

Close collaboration is required with the dust measurement and dust control projects on silicosis elimination.

Primary outputs

- Development and the evaluation of a range of training and educational material to promote the elimination of silicosis in the mining industry.
- Technology transfer using material of such a standard that it could be adopted internationally.

Year 1 (April 2005 – March 2006)

- Develop silicosis prevention programme slogan, logo and strategy to promote programme.
- Review and evaluation of existing training and educational material, on airborne dust, locally and internationally.
- Publish interim silicosis prevention material.

Year 2 (April 2006 – March 2007)

- Review and evaluation of existing training and educational material, on airborne dust, locally and internationally (Continued).
- Assessment of end user awareness and solicit input.
- Compilation/Development of targeted training materials for:
    - Management
    - Trade unions / health and safety representatives.
    - Workers
    - Workplace teams.

Year 3 (April 2007 – March 2008)

- Development targeted of training materials (Continued).
- Create virtual mines for gold, coal (surface and underground) and quarries to indicate by video clips general mining activities and also by video clips and PIMEX clips dust sources and controls. Will consist of simple mine layout graphics with links or hot spots to activate spoken voice, video clips, PIMEX clips and further info through launching PDF or Word docs. Similarly virtual Mineral Processing Plants to be created to indicate dust and airborne silica sources. Include links or hot spots to activate video clips, PIMEX clips, PDF and/or Word doc information.
- Use pilot mines to evaluate training and educational material.
- Plan comprehensive commodity specific technology transfer programme.

Year 4 (April 2008 – March 2009)

- *Use feedback to update and finalise technology transfer material including material from the two parallel projects on dust measurement and control.*
- Conduct regional technology transfer sessions.

Year 5 (April 2009 – March 2010)

- Conduct regional technology transfer sessions (Continued).

Scope

Requires the research group to obtain and evaluate current local and international practice for dust minimisation campaigns. The development of the appropriate training and educational material for dust minimisation for a range of personnel. The training material will include booklets, manuals, posters, and multimedia software (such as PIMEX) which will illustrate *inter alia* the health effects, dust measurement and control.

Estimated duration

5 years

Potential impact on significant health and safety risks
Very high potential impact by producing implementable training and educational best practice for the minimisation of exposure to respirable silica.

Requirement for technology transfer
Assessment of effectiveness of legislation and current practices.
Best practice resources to control exposure to respirable crystalline silica, covering surface and underground mines and mineral processing plants.

Specialist Skills and Facilities
Occupational Hygiene and Engineering
International Collaboration
Adult Education Expertise
Multimedia Developers

Phase 2: Parts A, B and C:

- Annual National Feedback/Progress Workshops.
- Attend international workshops as appropriate to keep abreast of international developments.

SIM 03-06-03 SIMRAC Silicosis Control Programme – Phase 2 Summary			
	Part A **Dust Measurements and Reporting**	**Part B** **Environmental Engineering/ Dust Control**	**Part C** **Human Resources Training and Management**
Year 1 Apr 05 to Mar 06	Assessment of current measurement practice and recommendations for improvement	Assess dust sources and determine the contribution of each source to the overall exposure. Includes developing collection of video and PIMEX clips and other visual aid material.	Develop silicosis prevention programme slogan, logo and strategy to promote programme
	Polley Dust Duct Refurbishment plus addition of real time particle size distribution measurement instrumentation		Review and evaluation of existing training and educational material
	Review inspection/enforcement around the world		Publish interim silicosis prevention material
Year 2 Apr 06 to Mar 07	Assessment of current measurement practice and recommendations for improvement (Continued)	Assess and prioritise dust sources and determine the contribution of each source to the overall exposure (Continued)	Review and evaluation of existing training and educational material (Continued)
	Polley Dust Duct Refurbishment (Continued)		
	Determine most appropriate analytical methods. Assess the validity of the direct on filter (DOF) analysis for XRD and IR. Assess effects of particle deposition on filter. Assess the effect of movement of sample deposition during transport. Prepare DOF standards. Assess the most appropriate cyclones for use with DOF analysis.	Review new technologies for breaking and moving rock with regards to potential for minimisation of dust exposure	Assessment of end user awareness and solicit input
		Identify the different control technologies (existing and new)	Compilation/Development of targeted training materials for: Management, Trade unions/ health and safety representatives, Workers, Workplace teams
		Develop an industry standard for assessing filtration efficiency. Assess filtration efficiency of current filter media	
	Characterisation of the particle size of airborne mine dust	Comparison with International experience. Workshop with national and International experts.	
Year 3 Apr 07 to Mar 08	Implement International quality control testing for labs conducting crystalline silica on filter analysis	Assess filtration efficiency of current filter media (Continued)	Development of targeted training materials (Continued). To include library of video clips of dust sources and controls.
	Piloting of real-time respirable dust measurement instrument (TEOM)	Assess the different control technologies (existing and new)	Create virtual mines and minerals processing plants
	Comparison of SA practice with international best practice including linkage of exposure and medical surveillance and recommendations for improvement	Pilot and evaluate potentially cost effective new and existing dust control methods	Use pilot mines to evaluate training and educational material
	Develop manuals on best practice to assess exposure and for use by the Inspectorate	Develop draft best practice manuals for dust control	Plan comprehensive commodity specific technology transfer programme
Year 4 Apr 08 to Mar 09	Develop manuals on best practice with which to assess the engineering and other control measures	Finalise best practice materials, including manuals for dust control	Update and finalise technology transfer material
	Piloting and evaluation of real-time dust measurement instrument (Continued)	Design, pilot and evaluate comprehensive dust control programme	Conduct regional technology transfer sessions
	Technology transfer of best practice materials for dust measurement		
Year 5 Apr 09 to Mar 10	Technology transfer of best practice materials for dust measurement (Continued)	Determine worker exposures with best practice implemented	Conduct regional technology transfer sessions (Continued)
		Technology transfer of best practice materials for dust control	

SIM 05 09 05

DESCRIPTION OF RISK
Health and safety needs

TITLE OF RESEARCH TOPIC
Annual survey of industry specific OHS research needs

PRIMARY OUTPUT/S OF RESEARCH:
A comprehensive list of significant OHS needs from a cross-section of mines from all the sectors classified in determining the SIMRAC levy, and other stakeholders. (This will include technology transfer requirements and cover the open pit operations and small mines)

MOTIVATION
SIMRAC work has generally been focused on finding generic solutions for the different mining industry sectors. There is some concern that the generic nature of the solutions may have resulted in the solutions seldom being implemented because they were not appropriate or specific enough. An attempt to identify mine specific problems and to link these to the generic SIMRAC work completed previously may see greater use of SIMRAC research.
In addition SIMRAC research has focused on the larger mines, particularly gold platinum and coal mines, where the higher risks are known to be. Yet, significant risks are present in diamond mines, open pit mines, and other smaller operations employing less than 300 people. This project aims to investigate the specific needs that SIMRAC could address in order to assist this group of mines to improve their safety and health performance. It is important to obtain information from smaller mines and from sectors that are not well represented within the council structures.

POTENTIAL IMPACT OF RESEARCH
Homing in on mine's specific OHS related problems may result in more appropriate SIMRAC research being carried out. It will also assist in focusing future SIMRAC research. This will result in improved health and safety on the mines in the future.

SCOPE OF RESEARCH

Focus areas:
Design a survey instrument to assist mines and other stakeholders to identify their health and safety needs
Work with ASPASA in surveying the industry, particularly the open pit and small mines
Visit mines and distribute survey for mine personnel (including production personnel) to complete.
Arrange workshop/s to report back on findings before the new SIMRAC cycle begins in August
Write up results

Recommended Duration:
6 Months

Potential for application:
The results will help in guiding the research programme in 2006

REQUIREMENTS FOR TECHNOLOGY TRANSFER:
A well designed survey instrument for gathering the appropriate needs of all stakeholders and mining sectors
A workshop/s for SIMRAC stakeholders to report back on needs
Simple documentation of research findings with conclusions clearly indicated

Special skills required from project team:
Rock engineering, engineering, mining and occupational health expertise.
Knowledge of health and safety issues in the South African mining industry
Knowledge of the quarrying, open pit and small mining sectors