**NOTICE 323 0 F** *2007*

# Safety in Mines Research Advisory Committee (SIMRAC) on behalf of the 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 2006/2007and 2007/2008research programme, the Council has the following goals:

- to indicate the current research needs for research to commence in the 2006/2007 or 2007/2008 cycle;
- to invite research proposals in response to these defined priority areas of research; and
- to invite applications for postgraduate funding" 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 2006/2007 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. Contact Cheryl Jones at telephone 011 358 9180, fax 01 ▮403 1821, e-mail cjones@mhsc.org.za or visit the SIMRAC website www.simrac.co.za to download the submission template. PLEASE NOTE THAT THE **NEW** FORMAT **NEEDS** TO **BE** USED.

2. Queries regarding the aims and objectives of the thrusts listed in this notice can contact the following persons:
   Engineering and Machinery: Dragan Amidzic at damidzic@mhsc.org.za (011 358 **91**09)
   Rock Engineering: Duncan Adams at dadams@mhsc.org.za (011 358 9193)
   Occupational Health: Audrey Banyini at abanyini@mhsc.org.za (011 358 9183)
   SIMRAC Chairperson: Tabo Gazi at thabo.gazi@dme.gov.za (012 317 8461)
   Proposal Submission: Cheryl Jones at cjones@mhsc.org.za (011 358 9190)

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

[1] Guidelines for the Council postgraduate research and Ethics Guidelines are obtainable *from* nwoods@mhsc.org. za

**4.** The closing time and date for the receipt of the proposals is **12:00 on Friday 13th April 2007.** Late entries will not be considered.

*5.* Two copies of each proposal, in a sealed envelope, in a form suitable for photocopying **plus** a disk or CD with the proposal in **MS** Word, should be deposited in the repository labeled *"Proposals"* at the Council's offices'.

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 available on the SIMRAC website www,simrac.co.za.

**8. Charge-out rates have to be in accordance with the rates specified by the Science Council, ACSA and SACNAPS**

**9. Preference will be given to proposals that composes of a project team with HDI's.**

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

11. 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.

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

13. The proposer and any of its affiliates shall be disqualified from providing other goods, works, or services under the project if, in the Council's judgment, such activities constitute a conflict of interest with the services provided under the assignment/project.

14. 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.

15. The period for which the proposals should be held valid is 150 days.

16. During this period the proposal must undertake to maintain, without change, the proposed key staff; and must hold to both the rates and total price proposed: in case of extension of the proposal validity period, it is the right of the proposer not to maintain their proposal

17. The anticipated commencement date of the projects is 1 April 2007

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

18. Each proposer have to submit a TAX Clearance Certificate with the proposal

19. A **BEE** Questionnaire has to be completed by each proposer. The questionnaire can be obtained from Cheryl Jones at cjones@mhsc.org.za

20. 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.

    These activities must be detailed and costed within the project.

**14.** 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).

15. 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.

16. 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.

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

18. 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.

19. No unsolicited proposals will be included in the programme for 2006/7.

20. The following three-stage evaluation procedure will be followed:

    a. A technical evaluation of the proposal that will consist of the following items and weight allocations:

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|---|---|---|
| 1. | **Capability and capacity of the project team** | |
| 1.1 | Relevant formal qualifications | 5 |
| 1.2 | Knowledge of relevant OHS issues in mining industry | 5 |
| 1.3 | Experience in conducting research in this area | 5 |
| 1.4 | Balance of team composition and competencies | 5 |
| 1.5 | Resources and facilities available | 5 |
| 1.6 | Track record: quality, on-time and within budget | 5 |
| 2. | **Research design and methods** | |

| | | |
|---|---|---|
| 2.1 | Appropriate study design and proptocol | 5 |
| 2.2 | Representivity, sample, strategy and size | 5 |
| 2.3 | Technical methods (tests etc) | 5 |
| 2.4 | Intended analysis of results | 5 |
| 2.5 | Ethics, risks and limitations | 5 |
| 3. | **Research outputs** | |
| 3.1 | Appropriate format | 5 |
| 3.2 | Usefulness | 5 |
| 3.3 | Potential impact | 5 |
| 3.4 | Technology transfer | 5 |
| | **Total Score – Technical** | **75** |

b. A price evaluation that will be calculated as follows:

Ps = (Pmin/Pt) * Ap

Where

Ps = % scored for price by proposal being evaluated

Pmin = price of lowest bidder

Pt = price of proposal being evaluated

Ap = % allocated for price aspect of proposal (15%)

c. A preferential procurement purposes using the following criteria and weightings:

- The proposals will each be given a score out of 100 that will be converted to a score out of 10 for the SIMRAC evaluation process
- Commercial Entities will be evaluated against the following criteria and weightings:
  - Ownership - 20%
  - Management - 10%
  - Employment Equity & Skills development – 30%
  - Preferential Procurement – 30%
  - SMME Status – 10%
- National Institutions and Public Entities will be evaluated against the following criteria and weightings:
  - Ownership - 0%
  - Management - 30%
  - Employment Equity & Skills development – 40%
  - Preferential Procurement – 30%

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 format; and
- Be phased as indicated in the project scope.

**Thrust**

Thrust 9 Special Projects

**Proiect title**

**SIM 05 09** 03 Design and develop a personal safety device for U/G use (phase 2)

**Motivation**

Recently MHSC finalized phase 1 (SIM 050903) of the development of a laboratory prototype system designed to enhance the safety of mine personnel. The system, termed the Personnel Safety Device (PSD) system, integrates the following areas of functionality into one device to enhance the safety of the miner carrying it. The areas of functionality integrated are:

1. *Collision warning* – This includes the dual warning of both the miner and driver of a vehicle of the miner's dangerous proximity to the vehicle. In addition to this, the collision warning function allows the driver of the vehicle *to* identify the location of miners around their vehicle.
2. *Gas warning* – Detection of dangerous levels of toxic and / or flammable gases such as methane and CO.
3. *RFID* – Radio-frequency identification (RFID) and tracking of personnel across zones.
4. *Evacuation* – Emergency mine and zone evacuation via RF electromagnetic signalling.

The workshop conducted with industry and governmental representatives as well as with safety & cap lamp system manufacturers showed definite industry interest in the **PSD** system. It was felt, particularly with regard to collision warning, that the PSD system offered significant benefits to both the underground and surface mining industries.

Since the **PSD** system has only been developed to a laboratory prototype level, phase II of this project aims to further develop and industrialize the PSD system to a stage where it is able to be manufactured in the required volumes, marketed and sold.

In order to leverage the IP generated in the first phase of the project to maximum benefit for the mining industry, this process should be undertaken rapidly.

***Primary outputs***

1. **A** commercially ready product - further develop the PSD laboratory prototype system
2. industry presentations
3. Detailed report

**Scope**

*Underground proof of concept*

The PSD system needs to be tested in an underground environment in order to validate the results obtained during laboratory testing and to provide feedback into the design modification stage of industrialization.

*Improving design robustness*

The robustness of the PSD system design needs to be improved from the following standpoints:

1. *Gas sensor stability* – The cross sensitivity and stability of the gas sensors on the PSD transponder device needs to be improved in accordance with SANS-1515 requirements.
2. *High load conditions* – Both the collision warning subsystem and the active tagging subsystem need to be evaluated under conditions of high load (i.e. many transponders communicating with the collision warning or active tagging readers).
3. *User interface enhancement* – Both the user interface on the PSD transponder (i.e. buzzer, device LEDs and flashing cap lamp) and the driver's terminal collision warning need to be revised for different working environments & potential scenarios.
4. *Interfacing to existing mine communication infrastructure* – The interoperability of the active tagging readers with the existing mine communication infrastructure needs to be investigated.
5. *Device housing & mounting locations* – The packaging of the PSD system components needs to be designed and their mounting locations on the vehicle and miner need to be determined, as these may have an influence on the design.
6. *Certification* – The devices in the PSD system need to be certified to be in accordance with EMC, environmental & intrinsic safety requirements. In addition the transponder needs SABS-1515-1 certification as a type C battery operated portable device. Further certification as to the safety of the transponder when used in close proximity to electric and electronic detonators needs to be obtained.

*Industrialization*

The devices in the system need to be made ready for manufacturing. This involves the Following processes:

1. *Pilot testing* – The system needs to be tested in its intended environment to allow any problems and required modifications to be determined before the final industrialization phase. This usually involves a pilot testing phase in which the device is deployed in a test location for a period of a few months, and any issues raised by users of the system feed back into the industrialization process.
2. *Component audit* – A component audit needs to be conducted to ensure that the components meet the cost and performance requirements for large scale manufacturing.
3. *Automatic testing* – This includes making changes to the design and layout for automatic testing, the design of test jigs, etc.
4. *Housings* – Jigs and moulds for the housings for the devices need to be manufactured.

**Estimated duration and cost**

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| 9 Months at R700k |

**Typical recipients of the Report**

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| MHSC stakeholders |

***Requirement for technology transfer***

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| industry ready PSD device |

***Special skills and facilities required by project team***

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| Embedded |