Safety In Mines Research Advisory Committee
Project Summary: HEALTH 805

Project Title:	**HEALTH 805:** Development of percentile charts for semi-quantitative tracking of lung functions over time in the South African mining industry (1 volume, 28 pages)

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Category:	Occupational Health	**Applied Research**	Occupational Medicine

Summary

HEALTH 610, entitled "Development of lung function reference tables suitable for use in the South African mining industry", made far-reaching recommendations pertinent to the practice of spirometric surveillance in SA mines. It recommended *inter alia* that the optimally valid reference equations it identified be used and be operationally implemented. Health 805 was envisaged as a first step towards achieving better spirometric practice in the mining industry.

The principal aim was the development of percentile charts for semi-quantitative tracking of lung functions over time. It was intended to optimise medical surveillance by graphing successive spirometric measurements. Optimisation would take place in two ways: maximal use of existing historical lung function data for a particular worker, and early identification of lung function loss by examination of the graphical trajectory over time. Three innovative computer-based products were developed for use in small (tens of workers), medium (hundreds of workers) and large (thousands of workers) mines, respectively. SpiroCharter was developed for small mines for hardcopy use, although generated by computer. The other products are computer-based: SpiroTracker for medium mines was developed in Microsoft Excel, and SpiroAccess for large mines is under development in Microsoft Access.

Development methods for the products are outlined, including discussion of iterative methods, development of algorithms for calculating expected values, and change in these values. The utility of the underlying equations and algorithms was examined both conceptually and operationally. The products were piloted in appropriate mining facilities across the country. The products are then illustrated, and are also attached to this report in CD-ROM format.

Intellectual property considerations are yet to be fully sorted out. SpiroCharter is easily copyrighted. SpiroTracker has proved impossible to protect due to the nature of the Excel program. SpiroAccess is still under development and the programming requires finalisation as well as copy protection, which is feasible for Access programs.

The project took an unexpected direction in that what was originally intended as a chart-based tracking system developed into a multi-level computer-based set of products. This developmental work, which included piloting and iterative feedback from potential end-users took up most of the time allotted. However, the main aim of the project has been achieved with the production of SpiroCharter, which is available for immediate use and is submitted in both hardcopy and electronic format in this report. Subject to intellectual property concerns, SpiroTracker is similarly available, while SpiroAccess requires some additional development.

What remains to be done includes marketing of the products and training in product use within the mining industry.

It is hoped that these products will contribute towards an improved surveillance culture on the mines. It is intended that these products be accessible and affordable to operate. Improved surveillance in the final analysis will depend on the will of mine management to engage in meaningful and effective monitoring of occupational hazards and the health of mineworkers. Specifically, this will depend on making full use of all available occupational hygiene and medical data.