AGENCY/DEPARTMENT: COMMONWEALTH SCIENTIFIC AND INDUSTRIAL
RESEARCH ORGANISATION

TOPIC: Longwall mining - employment

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QUESTION No.: BI-44

Senator CAMERON—I am not sure about that because I do not know how that works. Does it mean less employment in longwall mining in Australia?...
Senator CAMERON—On notice could you try and get a more detailed response to me in terms of the implications of this for employment in the longwall mining activities in Australia?
Dr Clark—It is not a focus of our research. We can certainly provide you where we have increased the productivity and how we are doing that. We can certainly provide you with additional information on the improvement of safety.
Senator CAMERON—It means less cost if you are going to increase productivity, and one of the areas of cost is human involvement.
Dr Clark—The deep analysis of that particular aspect that you delve into is not an area of our research.
Senator CAMERON—What company are you doing the work with?
Dr Clark—The work has been funded by ACARP. We want to check whether the naming of the company was commercially sensitive, and we will need to take that off-line. I can confirm that the work is being sponsored by many of the operators in this area.
Senator CAMERON—I am not sure what you mean. Are you going to take it on notice?
Dr Clark—Before answering with the name of the individual company which we are working for, we need to confirm whether that is commercially sensitive. What I can say to you is that the research has been funded by ACARP, which is a consortium of the coal companies.
Senator CAMERON—I am still not sure what this actually means. Can you provide on notice a more detailed response to some of the questions I have asked so that I can get an idea of what you are actually doing with this?

ANSWER

CSIRO has been conducting research into longwall mining automation since 2001, with the support of the Australian Coal Association Research Program (ACARP), which provided approximately $7.5million in funding over 6 years. We continue with research as well as technology transfer to the industry through commercialisation. The level of on going research in this area is about $2.0m over the next 2 years funded approximately 70% from industry (Australian Coal Association Research Program and royalties from Longwall Equipment Manufacturers) and approximately 30% from CSIRO's appropriation.

The mining industry had noted that longwall mining performance was not achieving expected levels of productivity and, through ACARP, provided significant research funding to examine technology-based ways to improve industry return on investment by improving both equipment productivity and safety performance. The scope of CSIRO's research has not considered productivity improvement in the wider context of labour costs, but rather was restricted solely to issues of equipment performance and hazards in operation.

Equipment productivity improvements have been targeted through automation of the longwall mining process. Inconsistencies and lower performance inherent in manual equipment operation, especially in harsh conditions, were targeted for removal. Automation was also expected to deliver enhanced safety by removing operators, where possible, from the hazardous face area in the mine where risks of occupational injury due to machinery movement, falling coal and rock, and exposure to dust are high.

Initial CSIRO research showed that the major barrier to longwall automation was an inability to accurately locate the position of the mining equipment. In order to automate the motion of equipment it is first necessary to know the location and environment of the equipment, before subsequent motion can be planned and executed.

Consequently our subsequent research has concentrated on:
- developing new sensor technologies to accurately measure the 3D location of elements of the longwall system

- advanced communications systems and standards to allow communication of this information between the various items of longwall equipment, particularly the shearer and powered roof supports and

- improvements to existing equipment manufacturers' control systems.

During the research, the following mines acted as test and demonstration sites.
- Beltana Mine (Xstrata Coal) – Hunter Valley

- Broadmeadow Mine (BMA Coal) – Bowen Basin

- Grasstree Mine (Anglo Coal) – Bowen Basin

This research program has been highly successful. During the trials consistent, measurable productivity improvements were achieved. While safety benefits are more difficult to quantify and will require longer term studies to do so, operator acceptance of the technology has been high and the automation technology is now in day-to-day use at the above mines.

While mine workforces have been vitally interested in the potential effects of longwall automation on their employment throughout the trials, there has been no adverse reaction, to date, to the research process or outcomes. However, it is clear that longwall automation will be unlikely to reach the levels of factory automation where significant changes in labour requirements have occurred, as the roles of longwall operators will change from hands-on at the coal-face to supervisory ones from positions of relative safety. The dynamic nature of the face environment is such that there will always be a need for manual operation to manage conditions by exception.

Industry uptake of this technology is occurring. Technology licensing agreements have been finalised with four longwall equipment manufacturers to market the CSIRO automation technology. The first commercial applications are on track at Carborough Downs (Vale Australia) and Moranbah North (Anglo Coal). There are several further longwall automation systems in prototype waiting for commercialisation, and our plan is to reinvest a proportion of Intellectual Property revenue arising from these licensing agreements to further develop these research outcomes.