

# SPONTANEOUS COMBUSTION IS DEADLY IN UNDERGROUND COAL MINES!!!

Howard JONES.

B.Sc mining, F.I.M.E.(U.K.) F. Aus I.M.M. Chartered Eng.  
O.B.E. (Services to the mining industry 1983).

## ABSTRACT

The paper refers to the explosions at Box Flat, Kianga, Moura No. 4 and Moura No. 2 mines which have resulted in the deaths of 54 coal miners. It examines the 42 recommendations made by the inquiries and in particular those which refers to the common problems. Some of these important recommendations have not been effectively implemented and as such have contributed to the extent of the disasters.

It expresses concern and a feeling of *deja-vu* and urges all sections of the industry - particularly the government, the mining unions and the coal mining companies to ensure that a *REAL* commitment is made this time without compromise.

## INTRODUCTION

Some time ago, after the Box Flat and Kianga Disasters (1972 and 1975) I was asked if I would write two publications explaining the fundamentals of spontaneous combustion in underground coal mines, its detection and remedial measures which should be adopted in order to minimise the risks. Indeed hopefully to eliminate the possibility of further similar disasters in the Queensland coal mining industry.

These "Blue and Red books" which contained well established historical and fundamental information, were circulated throughout the industry. Also, accompanied by representatives of the Inspectorate, and the mining unions, I addressed mass meetings in all the coalfields of Queensland. This was some 4 years after the Box flat disaster and about a year after the Kianga Disaster. The total death toll from these two incidents was 31. Since then, two further disasters have occurred in Queensland. The Moura No.4 disaster of the 16 July 1986, in which 12 miners were killed and the Moura No.2 disaster of the 7 August 1994, when some 11 miners were killed - again because of spontaneous combustion in an underground coal mine. In the latter case the inquiry was completed and comments from the public inquiry were handed down on the 18 December 1995 - some 16 months after the incident! I would suggest that at least, this industry could be accused of being casual about this most dangerous aspect of underground mining.

I would also suggest that positive action is required from the State government, the mining companies, at an operating and corporate level, and last, but certainly not least, from the appropriate union if another disaster is to be avoided.

I first became directly aware of the risks of spontaneous combustion underground in Queensland early in 1975 when an incipient heating occurred at South Blackwater. The signs were the classic smell of "Gob stink" and the presence of blue haze on the return side of the pillars. It was apparent that a heating was taking place and that it was not necessarily confined to the visible pillar area. A decision was taken to seal the section and a sampling procedure was established. Analytical equipment for gas analysis was not available at the mine so a kerosene flare path was organised at the mine airstrip to ensure that samples were flown quickly to Brisbane for complete analysis with the results being telephoned to the mine office. During the initial briefing of management, union representatives and the inspectorate, arrangements were made for the results to be translated to CO/O<sub>2</sub> ratios and for them to be continuously plotted on a graphed Coward Triangle with specific reference to hydrogen content. These results indicated satisfactory working conditions for the men employed at the stoppings but after the seals were completed simultaneously, all men were withdrawn from the mine. The atmosphere in the sealed area moved through the explosive range, and when further sampling indicated an extinctive atmosphere behind the seals and after a complete inspection by management the mine was reopened. With the exception of the manager (who had considerable experience of such incidents in the U.K.) the workmen, deputies, junior management staff and the inspectorate appeared to have very limited knowledge of spontaneous combustion in coal mines. This incident was the subject of a report, and information was circulated to all personnel at the mine and presumably reports from the check inspector and the mine inspector were made to their organisations.

Unrelated to this, I was asked to deliver a paper to the AusIMM on accident prevention in October 1975. This paper was submitted to the Aus IMM before the Kianga explosion and was subsequently considered to be critical by some sections of the mining industry. The paper WAS critical of the standards of training, and the lack of mining engineering expertise in the trade union, and stressed the need for changes in the organisation of the inspectorate, the need for the recruitment of the best engineers in the industry to the ranks of the inspectorate, and the need for better research facilities and staff in the Mines Department. Judging by the Coroner's and Warden's report after the Moura No.2 mine inquiry, the research facility is now well established and performing well but a great deal remains to be done about the other matters!

You may wonder why I chose the title for this paper! Let me again remind you of some pertinent facts. Some 17 men were killed at Box Flat on the 31 July 1972. The mine was sealed and further detailed inspections were not possible. 99 days after the inquiry started the report was issued. A fire caused by spontaneous combustion was clearly the initiator of the explosion. 12 men were killed after the Kianga explosion on the 20 September 1975. The mine was sealed and further detailed inspection was not possible. 87 days elapsed from the start of the warden's inquiry and the issue of a report which identifies the cause of the explosion as a fire caused by spontaneous combustion and that the men who were killed were attempting to place stoppings to control the fire. 12 men were killed after an explosion at Moura No.4 mine. The bodies of the deceased were recovered. Evidence failed to indicate any spontaneous combustion and on the evidence presented the most likely initiation cause was considered to be a flame safety lamp. 331 days elapsed between the start of the inquiry and the issue of the report. 11 men were killed after an explosion at the Moura No.2 mine on the 7 August 1994. The mine was sealed after a second explosion and further inspection was not possible. The inquiry considered that a spontaneous combustion initiated the explosion. 499 days elapsed between the start of the official inquiry and the issue of a report.

In total 54 men were killed, 42 as a direct result of the development of a fire caused by spontaneous combustion of coal. Some 1,100 days were spent on the four inquiries to frame four reports containing some 42 recommendations plus numerous pertinent comments. These facts seem to suggest a somewhat relaxed attitude to the implementation of the recommendations of the enquiries which preceded Moura No.2! Hence the need to remind everyone that *SPONTANEOUS COMBUSTION REALLY IS DEADLY IN UNDERGROUND COAL MINES.*

Some of these recommendations have common threads and even though the implementation of *ALL* the recommendations are essential these common threads should have received *IMMEDIATE* action as they highlight fundamental problems in the Queensland coal mining industry. These are in substance:

- ◆ Education Training and the Maintenance of Standards;
- ◆ Research into Spontaneous Combustion and Matters associated with Explosions in Coal Mines;
- ◆ The Mines Inspectorate;
- ◆ The Inquiry Process.

## **EDUCATION TRAINING AND THE MAINTENANCE OF STANDARDS**

It is a real indictment of our Queensland industry that after four disasters, proper consideration and action has not taken place to ensure that general training is improved and that the technical competence of mine management and the Inspectorate is raised. Concern over management level of competence has been questioned in all the inquiries and the first industry training session on spontaneous combustion *Training of Officials for the Underground Coal Mining Industry*, was organised under a NERRDC grant in September 1989. This was some 2 years after the explosion at Moura No. 4!

It is now nearly 2 years since the explosion at Moura No. 2 and except for the setting up of this conference and the establishment of steering committee to implement the most recent recommendations, 2 years have elapsed since the explosion. Why do we have explosion after explosion, inquiry after inquiry without fast positive action to deal with a problem which has been emphasised over and over again? Indeed, in this regard please read the preamble to the recommendations of the Moura No.2 inquiry which pleads with our industry to deal with this matter on an *URGENT* and *CONTINUOUS* basis.

It is essential that our industry institutes a system where *EXPERT* technical help will be available to mine managers as soon as a major incident happens. That way, managers in isolated locations are not left to bear the brunt of responsibility. Do we have to reinvent a wheel? No! Use the SIMTARS facility as a base and continually build on

it! Why SIMTARS? I would suggest that our coal industry has demonstrated *INDUSTRY TRAINING* does not occupy a high position in its strategic thinking. I have great concern that some may think such training can be achieved in a de-regulated system. I would urge everyone not to accept such a concept. Please remember that the last three disasters occurred in the same general location and that the largest Australian mining company with a high capitalisation operated both the Moura mines. The cooperation of all sections of the industry is essential but until industry demonstrates a real commitment I would suggest the Government should accept the leading role. SIMTARS has demonstrated its capability in this field. It should provide the lead and facilities. Changes in the law may be necessary and it may involve a possible levy on the industry.

## **RESEARCH INTO SPONTANEOUS COMBUSTION AND MATTERS ASSOCIATED WITH EXPLOSIONS IN COAL MINES**

After Box Flat and Kianga, the industry paid lip service to these matters. After the Moura No.4 disaster special funds were allocated by the federal government in addition to the 5 cent levy funding for research in the coal mining industry. Grants were given to applicants with projects which were considered a high priority by a committee consisting of high level executives from the industry. At the close of the previously mentioned SIMTARS seminar (September 1989), I informed the participants of 45 projects which were underway. All were related to spontaneous combustion, explosions, methane drainage, remote monitoring, the development of rapid seals, and the development of a manless mine exploration vehicle (Numbat) which was being developed with the aim of minimising the risks to rescue team member etc. The main object of the seminar was to establish a training regime which would develop into a continuous annual seminar to ensure that the operating managers of the industry were kept abreast of research and development in the industry.

As far as I can ascertain, no such follow up took place. Discussions with engineers in operations and the Mines Department suggest that to a large degree people are unaware of the end results of the 45 projects. Indeed the event has tended to slip into obscurity. Again I would remind everyone that in spite of its initial slow development SIMTARS now has an enviable reputation as a research centre but it is still not developed to its full potential. We are today talking of Queensland disasters and Queensland problems. It should be the object of everyone to develop SIMTARS as the leading research centre in Australia. After all we are the largest producers and our mines are the most modern in the world. The future is in underground, our mines are getting deeper, gassier and underground temperatures higher. Research is essential if we are to preserve our premier position. SIMTARS has deserved its reputation in the coal industry. The industry and the Queensland government and the coal industry must support it technically and financially to preserve and enlarge its international position. The Queensland coal industry and its employees deserve a superb research centre and it must be developed without further delay.

## **THE MINES INSPECTORATE**

One of the common features of the last four inquiries has been a general criticism of the Mines Inspectorate in Queensland. Whether this type of criticism applies elsewhere is of no consequence. Anyone reading the inquiry reports and the transcripts must come to the conclusion that the present organisation and quality of this essential body is well below par. Again let me stress that some sections of the industry will call for deregulation and I would suggest that such action should be adopted at their peril. Four disasters have emphasised a lack of technical competence in managing engineers. In this regard I should remind everyone that the principles of corporate governance require that the highest management level of a company ensure that there are competent engineering managers who operate and are controlled within the corporate system. Again the last two disastrous events have occurred in mines controlled by the largest public company in Australia. It must be stressed that this company controlled the safety administration of these mines.

Whether we like to admit it or not the quality in the inspectorate is considered inadequate by the operating section of the industry. Inspectors who have to deal with mine managers and their seniors, are recruited at salary levels well below junior undermanagers, deputies, and check inspectors. Indeed as was pointed out during the Moura No.4 inquiry, the salary levels were incapable of encouraging applications for vacancies before the disaster and this has been the case since. Inspectors of mines at entry level must be capable of enforcing the law in mines and giving advice to mine managers. As such they should have the necessary experience as a mine manager or be capable of being appointed to such a position. With salary levels at about half the package of operating mine managers this is obviously impossible. Any objective assessment of an inspectors job description would indicate that the present

salary structure for inspectors makes it impossible to recruit satisfactory candidates. I believe the present structure with an unnatural division between metalliferous, coal mines and quarries inspectors, inhibits career development and promotion prospects within the present narrow structure.

A broader based structure would provide a better model and would require the appointment of a Chief Inspector of Mines and Quarries with two deputy chief inspectors controlling the organisation with a senior administration appointment providing administrative services to these senior inspectors. Such a chief inspector must be directly responsible to the Director General of the Department. As such the chief inspector's salary would be at a level that would provide scope for adequate salary levels in the inspectorial ranks. If such an organisation was instituted it would require all inspectorial positions to be advertised within and outside Australia so that existing staff is considered for appropriate appointments.

I also believe that in the most modern mines in the world the union should provide better safety advice to its underground members. Check inspectors appointments in Queensland are based on the requirements of the 1911 Act in the U.K. when hand mining was the norm. This industry has moved on from that technical base! Check inspectors have provided a vital service in the past and will continue to do so. I would however again urge the unions to provide backup to these officials and that they obtain the services of a mining engineer with at least the same qualification and experience required to become a mine manager. Such a person would be invaluable in disaster circumstances and as would be the case with a reformed Inspectorate would be in an excellent position to advise on the formulation of new laws etc.

### **THE INQUIRY PROCESS.**

The inquiry and coroners report into the Moura No.2 disaster referred to the length of time and administrative problems encountered at the inquiry and a committee has been organised within the implementation structure to look at this. At the beginning of this paper I deliberately referred to the 1100 days devoted to the past four disaster inquiries (449 days in the case of Moura No.2.). Section 74 of the Coal Mining Act 1925-81 requires the convening of an inquiry into the nature and cause of the accident. On each occasion the Warden has drawn attention to the fact that the inquiry is not organised to apportion blame but to determine the nature and cause, and make recommendations to minimise or eliminate such accidents in the future. The conduct of such inquiries places great strain on witnesses and immediate relatives of the deceased. The past four inquiries have been attended by involved parties together with their appointed counsels and their instructing solicitors.

Having attended inquiries and read some of the transcripts I believe that the majority of the time has been spent by counsels probing witnesses not only with a view to determining the basic nature and cause of the accident but possibly to protecting their clients position in any future legal process. The probable cause and nature were quickly established at Box Flat, Kianga and Moura No.2 by examination of critical witnesses and the time devoted to cross examination of witnesses exposed the families of the deceased to unnecessary trauma. I do not believe that the presence of so many barristers and solicitors who are representing separate unions, management, the government department, the owning company and manufacturing companies (Moura No.4) necessarily helps to determine the nature and cause of accidents. This has been accepted elsewhere in such inquiries and I sincerely hope that the review of the inquiry process which has been instituted by the Minister considers this aspect.

Unfortunately time does not permit me to consider additional recommendations but I thank you for allowing me to address you.