

DAY 12

NOVEMBER 27, 1995

**WESTRAY MINE**

**PUBLIC INQUIRY**

HEARD BEFORE: The Honourable Justice K. Peter Richard,  
Commissioner

PLACE: Stellarton, Nova Scotia

COUNSEL:

**Solicitor for the Commission:** Mr. J. Merrick, Q.C., and  
Ms. Ena MacDonald, document coordinator

**Solicitor for the Department of Justice Canada:** Ms. Lynn  
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**Solicitors for the Department of Justice Nova Scotia:**  
Messrs. R. Endres, Q.C., J. Traves, and Wm. Wilson, Q.C.

**Solicitor for the United Steelworkers of America and the  
Nova Scotia Federation of Labour:** Mr. David Roberts

**Solicitor for the Westray Families Group:** Mr. A. Ross

**Representing the Canadian Union of Public Employees:** Mr.  
Robert Wells

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1 November 27, 1995 - 9:31 a.m.

2 COMMISSIONER Good Morning.

3 ALL Good Morning.

4 COMMISSIONER Mr. Merrick?

5 MR. MERRICK Thank you, Mr. Commissioner. This morning  
6 we have Mr. Bossert who is going to take the stand.

7 **MR. JOHN A. BOSSERT**, sworn, testified as follows:

8 CLERK Please state your name.

9 A. John Bossert, B-O-S-S-E-R-T.

10 EXAMINATION BY MR. MERRICK

11 MR. MERRICK What is your occupation, Mr. Bossert?

12 A. I'm presently retired but acting as a consultant.

13 Q. Yes, and in what types of things?

14 A. In questions dealing with explosive atmospheres.

15 Q. Where do you reside?

16 A. Portland, Ontario.

17 Q. Now you've filed with us a report that you did for  
18 the Westray Inquiry dealing with certifications of  
19 equipment used by the Westray Mine. Let me first deal  
20 just quickly with your resume that's contained in the  
21 Exhibit 55.

22 Following your obtaining a Bachelor of Science in  
23 Electrical Engineering, you've listed here your previous  
24 employments. The ones that I want to just focus on for a  
25 minute, in 1954, you joined the CSA, Canadian Standards

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1 Association, and you were employed with them for about 17  
2 years, I guess. Tell me about the CSA. What is it and  
3 what does it do?

4 A. The CSA, the division I was concerned with, was what  
5 was known as the Certification Division. They also write  
6 standards but that was not my concern at the time. They  
7 certify that electrical equipment meets certain  
8 standards, safety standards. My responsibility was  
9 primarily in the field of what is known as Hazardous  
10 Locations Equipment, hazardous locations being explosive  
11 atmospheres, atmospheres containing gas, vapour, dust,  
12 and that sort of thing that are of an explosive nature.

13 Q. Would I be correct in assuming that the standards to  
14 be met by this equipment might also be set by the CSA by  
15 their Standards Division?

16 A. Yes, the Standards Division of CSA did write  
17 standards for this equipment.

18 Q. But your division, and particularly your  
19 responsibility, was to see that equipment to be used in  
20 hazardous environments met such standards.

21 A. That's correct.

22 Q. Now how would you go about doing that?

23 A. First of all, we would study the specifications and  
24 drawings for the equipment. Then we --

25 Q. I assume that this would be triggered by an

MR. BOSSERT, EXAM. BY MR. MERRICK

1 application by the manufacturer?

2 A. Oh, yes, yes. The manufacturer of such equipment  
3 would apply to CSA for certification of this equipment.  
4 The first task would be to analyze the drawings to see if  
5 it reasonably met the physical requirements. Then we  
6 request a sample, which had to be inspected and then  
7 tested, and this would be tests done with explosive gases  
8 or vapours. Following that, there would be other tests,  
9 temperature tests and so on. After all the requirements  
10 had been met, an approval was issued stating that the  
11 equipment did meet the applicable standard.

12 Q. This would be in the case of equipment that didn't  
13 already have some form of certification issued by some  
14 other certifying body.

15 A. Yes.

16 Q. There would be other certifying bodies for equipment  
17 manufactured in Britain or the United States or  
18 elsewhere.

19 A. Uh-huh.

20 Q. What would you do under those circumstances?

21 A. It would depend on the degree of investigation that  
22 went on in the other country. We quite regularly  
23 accepted test results from, say, United States and Great  
24 Britain. There were also some laboratories in other  
25 countries such as Germany and France that were later

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1 recognized. And if they had done tests which we  
2 considered equivalent to our own, that would eliminate  
3 the necessity for retesting.

4 Q. I see.

5 A. The rest of the investigation would be pretty much  
6 the same.

7 Q. Would you also be responsible for on occasion  
8 inspecting the manufacturer's processes or location to  
9 see that they were complying with the standards, I guess,  
10 required to maintain the certification?

11 A. Yes, I frequently visited factories, in North  
12 America at least, Canada and U.S.A. to insure that the  
13 equipment continued to meet the standard.

14 Q. All right, the equipment that you would be testing  
15 and certifying in your years of employment with the CSA,  
16 you say it was for equipment to be used in hazardous  
17 locations. Was it equipment to be used in mines or above  
18 ground?

19 A. CSA is only responsible for equipment used above  
20 ground.

21 Q. So this would not be equipment to be used in  
22 underground coal mines?

23 A. No, it would not.

24 Q. All right. During the years that you were there,  
25 how big an operation was the Canadian Standards

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1 Association? What size of work force would it employ,  
2 for example?

3 A. You mean the total or the certification?

4 Q. Total.

5 A. I think it grew to several hundred people. I'm not  
6 sure of the exact figure, but three or four hundred.

7 Q. All right.

8 A. Including standards and certification.

9 Q. Now in 1971 you left the Canadian Standards --  
10 Before I leave that, Canadian Standards Association, is  
11 that a private body or a government agency?

12 A. It's a private body operating under a Crown charter,  
13 non-profit organization.

14 Q. All right. In 1971, you left them and you went with  
15 the Department of Energy, Mines, and Resources, EMR.  
16 Explain to me that body and how it related to the CSA?

17 A. That body, it's known as the Canadian Explosive  
18 Atmospheres Laboratory, was set up under EMR to certify  
19 equipment and materials for use in underground coal  
20 mines. The work of certifying this equipment for coal  
21 mines was originally offered to CSA, but CSA refused on  
22 the basis that it would not be economically viable for  
23 them. So the federal government elected to set up their  
24 own certification laboratory in Ottawa.

25 They started their operations about 1955 and shortly

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1 thereafter, I think in 1956, CSA began using that  
2 laboratory for explosion testing. The reason being that  
3 there was no other facility in Canada. Up until that  
4 point, we had relied upon tests done in USA or Great  
5 Britain for this type of equipment and we saw this as an  
6 opportunity to have our tests done in Canada, and I was  
7 the chief liaison person between CSA and EMR which  
8 eventually resulted in a job offer from the federal  
9 government.

10 Q. So that when you were going actual testing for  
11 equipment above ground involving explosive testing, you  
12 would take it to the EMR lab or facilities to do that.

13 A. Yes. The same tests are applicable to both above  
14 ground and underground, and they were equipped to do  
15 these tests and so utilized their facilities.

16 Q. Now initially EMR was set to certify or approve  
17 equipment for use in underground mines. Was it just coal  
18 mines?

19 A. Initially it was just coal mines.

20 Q. Has that subsequently expanded?

21 A. To some degree. Non-flameproof diesels and fire-  
22 resistant materials are being certified for other  
23 underground environments at the present time.

24 Q. And the procedure to certify equipment for  
25 underground coal mines, to have it certified by EMR,

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1 would it be generally the same procedure that you  
2 described for CSA process?

3 A. Yes, pretty much the same.

4 Q. So that if it was equipment that had already been  
5 certified by a recognized lab in some other country, you  
6 might review the documentation and the testing that was  
7 done to determine if it was equivalent to what you would  
8 do.

9 A. Yes. In fact, I visited many laboratories in  
10 foreign countries to ensure that this -- that their tests  
11 were equivalent to ours.

12 Q. Now we're going to hear evidence in a few minutes  
13 about the fact that sometimes standards are different  
14 between Canada and the U.S. or Canada and England. What  
15 would you do in cases where it had been certified  
16 somewhere else but the certification standards were  
17 different?

18 A. After we developed our own Canadian standards, which  
19 occurred in the early sixties, I believe, we then would  
20 check to see that, in fact, the equipment met not only  
21 the standards of the country of origin but also the  
22 Canadian standard and if there were differences, we would  
23 ask them to make modifications. If the tests conducted  
24 in the other country were judged to be equivalent to what  
25 was in our standard, then they were accepted without

MR. BOSSERT, EXAM. BY MR. MERRICK

1 further testing.

2 Q. All right. Now during your years with EMR, you then  
3 would have been involved with certifying a wide range of  
4 equipment that we find today in coal mines.

5 A. Yes, everything from very large motors down to  
6 telephones and signal circuits.

7 Q. Can we take it from that that much of the equipment  
8 that may well have been in Westray probably was certified  
9 by EMR, perhaps by you, during the years that you were  
10 there?

11 A. Yes, I would say that much of the equipment in  
12 Westray had my signature on the certificate.

13 Q. Now you left EMR in 1988 and your resume shows that  
14 from that time on you've been president of your own  
15 consulting company and you're active in that today, I  
16 take it.

17 A. Yes.

18 Q. What kind of thing do you do in your consulting  
19 company?

20 A. There are several phases of work that I do. One is  
21 in training. I conduct training seminars for various  
22 companies and government agencies. Some of my clients  
23 include government agencies such as the Canadian and U.S.  
24 Coast Guard, the Mine Safety and Health Administration in  
25 the U.S.A., Shell Canada, Syncrude Limited, ICI America,

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1 just to mention a few.

2 Q. Do you still do some inspection and certification  
3 work of equipment?

4 A. Yes, I have on occasion done inspection and  
5 certification work on behalf of my former employer, the  
6 EMR. They recently, due to government cutbacks, have  
7 become short-handed and if they are unable to do an  
8 inspection themselves, they ask me to do it on their  
9 behalf.

10 Q. This would be to actually go out and look at  
11 equipment to see if it appears to be able to meet the  
12 standards for coal mine or hazardous locations.

13 A. Yes, that's correct.

14 Q. All right, have you also been involved in an  
15 investigation of a coal mine incident?

16 A. Yes, about 15 years ago, I was involved in the  
17 Elfstrom Inquiry of the No. 26 Colliery at Cape Breton.

18 Q. And your work for that Inquiry was to do what,  
19 generally?

20 A. To check the electrical equipment in that face and  
21 to report to, I think I reported through the Department  
22 of Labour, indirectly to the office of the Inquiry on the  
23 condition of the electrical equipment.

24 Q. All right. You refer in your resume to some  
25 committee work that you've done. I'm interested in that

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1 particularly because it also describes a little better  
2 for me the certification regime that operates and where  
3 these standards come from.

4 To begin with, you note that you're Chairman of the  
5 International Electrotechnical Commission, IEC, Technical  
6 Committee 31. Tell me about that. What is that?

7 A. Well, initially, I got started within CSA in  
8 standards work because the certification division worked  
9 with the standards department to write standards. In the  
10 early 1960s, we were in sort of a conundrum because we  
11 had recognized standards from two different countries,  
12 from U.S.A. and from the United Kingdom, and these were  
13 not completely compatible.

14 In 1964, I attended my first meeting of the IEC,  
15 actually Subcommittee 31A, which is a branch of Technical  
16 Committee 31, and we had a strong delegation from Canada  
17 at that meeting and we attempted to bring these two  
18 differing standards together. We succeeded to a certain  
19 degree and as a result re-wrote our Canadian standard.

20 Since that time -- I became very interested in  
21 international standards and since that time I've attended  
22 quite a number of IEC meetings, both the main committee  
23 and subcommittee. So I've been active in that committee  
24 work since 1964 and about 10 years ago, they nominated me  
25 as Chairman of 31. I have subsequently been Chairman of

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1 31A, which is the Flameproof Enclosure Standard. So I've  
2 been Chairman of two international committees.

3 Q. Now this is an international body?

4 A. Yes.

5 Q. I take it is it private or government supported?

6 A. It's a private organization. It's actually under  
7 the auspices of the U.N. IEC was formed in 1906 and  
8 Canada has been a member since 1908, I believe. In 1946,  
9 or thereabouts after World War II, the U.N. established  
10 the International Standards Organization, ISO, and they  
11 brought into this picture the IEC as the electrical  
12 branch of the ISO.

13 Q. So this is an attempt to coordinate and unify, if  
14 possible, I take it, standards that each country would be  
15 using as their certification standards.

16 A. Right. Now the financial support for the IEC work  
17 and the ISO work, of course, comes from the member  
18 countries. They pay their dues and they sell standards.

19 Q. All right.

20 A. So it is independent. It is not a government  
21 organization, but it is supported by governments of many  
22 countries.

23 Q. So Technical Committee 31 is the one responsible to  
24 try to develop a uniform set of standards for electrical  
25 equipment for use in explosive atmospheres.

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1 A. That's correct.

2 Q. Tell me about the ISA and what that committee work  
3 involved?

4 A. I joined the ISA Committee, this is the Standards  
5 and Practices Committee 12, SP12, it's called, in 1966.  
6 This was a result of a conversation I had with a  
7 secretary of that committee after attending my first IEC  
8 Committee, and it occurred to me that this committee were  
9 also very active in this field. They, of course, being  
10 the instrument society of America, they are slanted a bit  
11 more toward low-powered circuits, instrumentation  
12 aspects. But the principles of protection are the same,  
13 and they have pioneered a number of techniques in this  
14 Committee. So I was quite interested in joining it. It  
15 implies that it is a U.S. committee but it, in fact,  
16 includes many members from Canada and other countries.

17 Q. The Chairman of the Section 18, Hazardous Locations,  
18 Canadian Electrical Code, I take it that that's basically  
19 to develop the set of standards for that area?

20 A. The Canadian Electrical Code, Part 1, is the  
21 installation code. So this carries -- The equipment is  
22 certified to equipment standards. Then the application  
23 of the equipment actually in the field is governed by the  
24 Canadian Electrical Code, Part 1.

25 Q. So that would be the set of standards involving the

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1 application in the field, all right.

2 A. Yeah, the application, right.

3 Q. All right, and you're also a member of the CSA  
4 Committee 421. That is also, I take it, sort of an  
5 installation set of standards?

6 A. 421 is the installation code for mines, electricity,  
7 use of electricity in mines.

8 Q. Now you have published a book on standards?

9 A. Actually, two books. One is the -- The second  
10 edition is now out and has been for a year.

11 Q. What's the title of that?

12 A. It's called Hazardous Locations and sort of a  
13 subtitle is "The use of Electricity in Explosive  
14 Atmospheres."

15 Q. You've also written a number of technical reports?

16 A. Yes, quite a number. I haven't listed them there  
17 but there are dozens.

18 Q. And subsequent to your providing us with your  
19 resume, I understand that you've been the recipient of  
20 two awards.

21 A. Yes, last year I received an award from CSA called  
22 The Award of Merit. And another award from the ISA  
23 called The Standards and Practices Award.

24 Q. All right. Now let's come to your report itself.  
25 To begin with, as I understand the regime, in hazardous

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1 locations and, in particular, in coal mines, they fall  
2 under a regulatory regime. In this particular case, it's  
3 provincial regulatory jurisdiction. It is for the  
4 regulatory agency to determine what certification or what  
5 standards will be required to be met by equipment to be  
6 used in that location. Have I got that right?

7 A. Yes.

8 Q. So that, for example, the Department of Labour in  
9 Nova Scotia, it would be for them to decide and for the  
10 legislation that governs as to what set of standards  
11 would be the acceptable criteria for granting approvals  
12 under the legislation.

13 A. That's correct.

14 Q. All right. So that CSA and EMR don't dictate the  
15 qualifications. They are merely a testing and certifying  
16 agency whose certification may or may not be accepted by  
17 a regulatory agency.

18 A. That's correct.

19 Q. Now let's take a look at your report. In  
20 particular, you've set out a couple of definitions at the  
21 very beginning which I think are probably significant.

22 COMMISSIONER Which number is that?

23 MR. MERRICK This is Exhibit 55. It's a very thin  
24 volume and it's got three tabs. I'm now under Tab 2.  
25 Tab 2 is the main report and Tab 3 is the addendum that

MR. BOSSERT, EXAM. BY MR. MERRICK

1 you have filed. Is that right?

2 A. That's right.

3 Q. Okay, you make a point of drawing a distinction or  
4 making, setting out definitions of a couple of terms at  
5 the very beginning and they are important. I'll get you  
6 to just review those with us so that we know we are with  
7 you.

8 A. Right.

9 Q. Tell me about "intrinsically safe, flameproof and  
10 fire resistant"?

11 A. Well, "flameproof" is commonly known in some circles  
12 as "explosion proof." "Flameproof" is a more  
13 international type of term and is also used more  
14 frequently in the mining industry. What it means is that  
15 the equipment has -- Ordinary equipment is enclosed in a  
16 substantial metal or some form of enclosure such that an  
17 explosion can occur inside the enclosure without damage  
18 and without propagating the explosion to the external  
19 atmosphere. Basically, it is assumed that the gas or  
20 vapour or whatever will get into the enclosure and that  
21 the electrical equipment therein will ignite the gas or  
22 vapour. And the idea is to prevent an internal ignition  
23 from spreading to the external atmosphere. So that's  
24 flameproof.

25 Q. I take it that the primary criteria then for

MR. BOSSERT, EXAM. BY MR. MERRICK

1 equipment that would be called flameproof or explosion  
2 proof would be (a) it's got to be sealed sufficiently  
3 that no flame or ignition source can get out.

4 A. Right.

5 Q. And it's got to be strong enough that it won't  
6 rupture on the explosion occurring inside.

7 A. Yes.

8 Q. Okay.

9 A. Okay, and "intrinsically safe" is a term applied to  
10 low power equipment where any sparking that might occur  
11 under normal or abnormal conditions is incapable of  
12 igniting gas or vapour mixture. In the case of mining  
13 equipment, this means the sparking is too weak to ignite  
14 methane gas in its most easily ignitable form.

15 Q. So this may be equipment that admittedly would cause  
16 sparking in the open atmosphere.

17 A. Right.

18 Q. But the sparks would be of such weak power that they  
19 couldn't ignite anything.

20 A. That's right.

21 Q. All right.

22 A. An example would be telephones or signalling  
23 circuits. We're talking here mostly in milliamps,  
24 thousandths of an amp.

25 Q. All right.

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1 A. Now the third term is "fire resistant." That is  
2 applied to materials. In a mine, it would apply to  
3 things like conveyor belting, ventilation tubing,  
4 hydraulic fluids and so on. "Fire resistant," that means  
5 that under specified conditions, when the material is set  
6 on fire and the source of flame is removed, it will self  
7 extinguish. In other words, it will not propagate the  
8 fire.

9 Q. Okay. One last preliminary point before we get into  
10 the substance of your report. Some of the equipment that  
11 you are going to be looking at and talking about will  
12 have received certifications from some place other than  
13 EMR or even CSA, from other than a Canadian recognized  
14 certification standard.

15 A. Yes.

16 Q. In particular, some of this equipment may have been  
17 British and some of this equipment may have been  
18 American. In your report, toward the back I think it is,  
19 of Section 2 or Tab 2 you compare the certification  
20 standards that would have been applicable to that  
21 equipment of the American standard and the British  
22 standard. You note that there are some differences  
23 between the American standard and ours, for example, in  
24 some areas.

25 A. Uh huh.

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1 Q. For the purposes of this Inquiry though and the  
2 equipment that you have looked at, is there any  
3 distinction of any significance between the British and  
4 American standards and our own Canadian standards that we  
5 would have to direct our minds to?

6 A. These are all reasonable standards, and if they are  
7 followed, will probably result in safe equipment. We  
8 have some slight differences with USA and perhaps with  
9 UK, but there's nothing there that couldn't be resolved  
10 if we sat down together and worked it out. As I say, if  
11 you build to either British, American or Canadian  
12 standards faithfully, you will have a safe product.

13 Q. All right. So that the differences that you note  
14 between the criteria used in the States and in Canada in  
15 some areas, you do not consider to be of any particular  
16 significance for the purposes of this Inquiry?

17 A. We feel that our Canadian standards are safer than  
18 some of the US standards, but it's a degree of safety,  
19 it's not something you could say, yes, this will be  
20 unsafe and this will be safe.

21 Q. Just one last point there. I assume from your  
22 earlier description the work of the IEC, for example, I  
23 think it was the IEC --

24 A. Uhm.

25 Q. -- seems to be a consensual type of process. Is

MR. BOSSERT, EXAM. BY MR. MERRICK

1 this how standards are derived by consensus or are some  
2 of them imposed?

3 A. Most of the standards today are developed by  
4 consensus. The IEC standards, the European standards,  
5 which include the British now, and the Canadian standards  
6 are all developed by consensus.

7 Q. This would be all the stakeholders, if you will --

8 A. Yes.

9 Q. -- taking part in the body that --

10 A. All of the interested --

11 Q. -- develops the standards.

12 A. -- parties. The manufacturers, the users, the  
13 inspection authorities and other interests such as  
14 certification bodies get together and, by consensus, they  
15 develop a standard. Naturally, there are compromises on  
16 both sides but, what we arrive at is a safe and  
17 reasonable standard.

18 In the case of the USA, particularly in the mines,  
19 the standards are imposed unilaterally by the Mine Safety  
20 & Health Administration. They're published in the  
21 federal record. They do have a consultive process where  
22 they send out their proposed standards to industry,  
23 meaning manufacturers and users, and they get comments.  
24 Whether or not they accept these comments are entirely up  
25 to them. It's not a true consensus as we know it.

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1 Q. Okay. Now you were retained by the Inquiry to  
2 examine all equipment for which certification or  
3 approvals should have been required in Westray and to  
4 determine if, indeed, they had been approved and had, in  
5 fact, been certified. And to the extent that sampling  
6 was possible, whether the equipment appeared to be  
7 consistent with its certification requirements, is that  
8 right?

9 A. That's right.

10 Q. Okay. Now let me just get a description from you as  
11 to how you went about your task. I understand that the  
12 first thing that you did was review the approvals that  
13 had been issued by the Department, and this would be  
14 documentation that had been obtained by the Inquiry from  
15 the Department, indicating what equipment they had  
16 granted approvals on?

17 A. Yes.

18 Q. What did you once you had those approvals?

19 A. Well, I looked at the approvals and then I checked  
20 to see what was the basis of the approval. For example,  
21 in most cases, there was a certificate issued by EMR or  
22 MSHA in USA or the British authorities and this was the  
23 basis upon which they based their approval.

24 There were other pieces of equipment used in that  
25 mine for which approval is granted with no basis

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1       whatsoever. And, for example, some with the non-  
2       flameproof diesel equipment. They had no basis  
3       whatsoever for granting that approval insofar as  
4       certification was concerned.

5       Q.     All right. Let me just make sure I've understood  
6       it. Just by way of example and I'm turning this one up  
7       randomly. In front of you you have Exhibit No. 69-B --

8       A.     Right.

9       Q.     -- Which is a booklet containing a number of  
10      approvals. And I just flipped it to page 75.

11      COMMISSIONER   Which book is that, Mr. Merrick?

12      MR. MERRICK    This is 69-B. Have you got A too? Okay.

13      COMMISSIONER    Now I have it.

14      MR. MERRICK    Okay. And looking at page 75, that just  
15      is the covering letter from the Department of Labour  
16      enclosing approval documents.

17      A.     Right.

18      Q.     If you will look over to page 76 and that would be a  
19      typical approval document issued by the Department, I  
20      take it?

21      A.     That's correct.

22      Q.     This one happens to govern the environmental gas  
23      monitoring system.

24      A.     Yes.

25      Q.     When you look at page 77, that appears to be the

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1 application form that would have been sent in or filled  
2 out by the company, I assume?

3 A. That's what it appears, yes.

4 Q. Seeking approval for that particular equipment.

5 A. Uh huh.

6 Q. And the application document describes the equipment  
7 and also down at the bottom has a section that describes  
8 the conditions under which that equipment would operate.  
9 Is that right?

10 A. Yes, that's right.

11 Q. All right. So when you find this approval then  
12 issued by the Department at page 76, what would you check  
13 out or what have you checked out?

14 A. First of all, the certifying authority in this case  
15 is listed as "CMR."

16 Q. Yes.

17 A. Which is the Canadian Approval Laboratory.

18 Q. Yes?

19 A. And the certifying number is "899."

20 Q. Yes. So what would you do then?

21 A. Well, then I would take -- in this case I had a  
22 complete listing from the Department, and I checked  
23 through there to see if in fact this number was valid and  
24 what it was issued for.

25 Q. Yes?

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1 A. In this particular case I discovered that "899"  
2 covered a line of intrinsically safe monitoring  
3 equipment.

4 Q. Yes?

5 A. However, it was listed at the top as a gas-  
6 monitoring system. So I checked under another listing  
7 which covers gas-monitoring systems, and it was not  
8 listed there.

9 Q. Okay. I'll come back to that, actually, because  
10 this one I just inadvertently turned up, but I realized  
11 it was one we wanted to talk about specifically as well.

12 A. Right.

13 Q. But -- so you would check to see if the approval had  
14 referred to the certifying agency and number and you --

15 A. Yeah.

16 Q. -- would then check that certifying agency number to  
17 make sure that it corresponded with that type of  
18 equipment?

19 A. Yes.

20 Q. All right. Would you -- to the extent that you were  
21 able to, would you also have physically looked at a  
22 representative sample of the equipment?

23 A. If one was available. As you are aware, I wasn't  
24 allowed to enter the mine because of the conditions, but  
25 any equipment that was left on the surface, any samples

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1 that were left on the surface, I was able to inspect.

2 Q. All right.

3 A. In this particular case, the gas-monitoring system  
4 was down in the mine.

5 Q. Well, other kinds of things I would assume that to  
6 the extent that transformers might have been on the  
7 surface, would you have checked them to see if they still  
8 appeared intact or consistent with their condition when  
9 they were certified?

10 A. Yes.

11 Q. All right. So you would do a physical examination  
12 of them?

13 A. Right.

14 Q. Not of all of them but just a representative sample?

15 A. Yes, at least one of each.

16 Q. Okay. Now subsequent to doing your report, have you  
17 received additional documentation through the Inquiry of  
18 additional approvals for equipment?

19 A. Yes, I have.

20 Q. So that when we turn to your report under Tab 2 at  
21 page 2, you're talking there about electrical equipment  
22 for which you followed this procedure.

23 A. Yes.

24 Q. Since the preparation of your report there have been  
25 now additional approvals that are not shown in that list

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1 of equipment on page 2?

2 A. That's right.

3 Q. All right. And we'll come to those in a few minutes  
4 then. Now as a crosscheck, this investigation would show  
5 up any equipment for which there was an approval in  
6 existence. As a -- what have you done to cross check to  
7 see if there might have been equipment in that mine for  
8 which an approval should have been granted but which  
9 there was no approval on record or request for approval?

10 A. I was shown a list just recently of equipment lost  
11 in the explosion.

12 Q. Can you turn to Exhibit 73. That's your black ring  
13 binder right on the top of your pile. At Tab 11. It  
14 should be the last tab. This is the list of equipment  
15 prepared by Westray itself and submitted to its insurers  
16 as part of their insurance claim?

17 A. Yes.

18 Q. And on the basis that they would be claiming for  
19 everything that, reasonably so, that they would be  
20 claiming for everything that they had, have you then gone  
21 through this list of equipment that Westray claimed it  
22 had to see if anything showed up there for which  
23 approvals maybe should have been given and yet weren't?

24 A. Yes, I have checked that.

25 Q. And did you find some items?

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1 A. I found some pumps listed in their lost equipment  
2 list and also on the surface for which I could find no  
3 certificates of approval.

4 Q. All right. And I'm going to bring you back to those  
5 in a few minutes. So we've got, basically, three sets of  
6 equipment that we're going to go through here, the ones  
7 that you've listed in your report for which you had  
8 originally found approvals?

9 A. Yes.

10 Q. Ones for which you have just recently found  
11 additional approvals?

12 A. Right.

13 Q. And then a set of equipment that -- for which no  
14 approvals have been found but which appear on the list of  
15 inventory submitted by Westray itself?

16 A. Yes.

17 Q. Okay. Let's start with the first category. And  
18 that's equipment for which you had originally found  
19 approvals. And we're going to start with the electrical  
20 equipment listed on page 2. That was what initially you  
21 had been given documentation on?

22 A. That's correct.

23 Q. Now you've gone through each of these to find out if  
24 they had a proper approval and if they had any conditions  
25 attached which they appeared to be in compliance with, is

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1 that right?

2 A. Yes, that's right.

3 Q. And except for the items that you and I are about to  
4 identify and highlight specifically, except for those,  
5 all of this equipment seems to have been approved and  
6 seems to have been operated in compliance with the  
7 approval conditions? Is that correct?

8 A. That's correct.

9 Q. Let's go through the ones that stand out.

10 A. Okay.

11 Q. First off, you've got a correction to make on the  
12 cap lamps.

13 A. Yes, I incorrectly used an asterisk after "cap  
14 lamps" indicating it was used equipment.

15 Q. Yes.

16 A. This is not so, I discovered.

17 Q. All right.

18 A. They were all new.

19 Q. And they were flameproof?

20 A. Not strictly speaking. Cap lamps are approved under  
21 their own standard. They're not neither flameproof nor  
22 intrinsically safe. They have special requirements for  
23 cap lamps.

24 Q. In any event, they satisfied the certification?

25 A. They satisfied the requirements, yes.

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1 Q. And the approval appears to have been complied with?

2 A. Yes.

3 Q. Let's look at the first item that shows up as non-  
4 flameproof because that's something that we would be  
5 interested in, and that's the compressor. Can we turn to  
6 69-B at page 168. The preceding document, actually, at  
7 page 167 would be the covering letter. Tell me what  
8 we're looking at there and what the conditions are that  
9 are -- that that equipment is subject to?

10 A. Well, this is a 100-horsepower air compressor, non-  
11 flameproof. In other words, it is built for ordinary  
12 applications. And on page 170 you will see that there  
13 are some special conditions for its use and application.

14 Q. Yes?

15 A. A special room was built for the air compressor of  
16 fire-proof construction was required. "Adequate through  
17 ventilation shall be provided to maintain the air  
18 compressor at a safe working temperature. Provisions  
19 shall be made to close off the room in the event of a  
20 fire. Automatic suppression kits shall be installed." I  
21 presume that's fire suppression. "And the room shall be  
22 equipped with a monitoring system designed to isolate  
23 power to the compressor at .25 percent methane and 12  
24 parts per million of carbon monoxide.

25 Q. In fact, if we look on page 169, which is the

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1 application by the company for approval for that  
2 equipment, down in the condition section, they describe  
3 basically that that's how they intended to use it.

4 A. Right.

5 Q. Are you yourself aware of any information that would  
6 indicate that those conditions had been violated?

7 A. No, I'm not.

8 Q. All right. So that on that piece of equipment it  
9 was non-flameproof but we see where an approval was  
10 granted subject to certain conditions?

11 A. Yes.

12 Q. All right. Now let's come down the list on your  
13 report. The next non-flameproof item that we see are the  
14 Alfair fans. And if we can turn to page 154 in that same  
15 exhibit book, that's the approval --

16 COMMISSIONER 154?

17 MR. MERRICK 154. That's the approval for those fans?

18 A. Yes.

19 Q. Do you know if those were the main mine fans?

20 A. That's what I believe, yes.

21 Q. Yeah. On page 153, immediately preceding, that  
22 seems to be the application for those fans and they're  
23 described as "main mine ventilation fans?"

24 A. Yes. And they would be on the surface.

25 Q. All right.

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1 A. So they're not required to be flameproof.

2 Q. Okay. So on the evidence that's available to you  
3 you see no difficulty with that item?

4 A. No, none whatsoever.

5 Q. All right. Let's move down to the next non-  
6 flameproof item near the bottom of your list which are  
7 transformers. And if we can turn to page 115 in that  
8 same booklet, we see there the approval for that?

9 A. Yes, I see it.

10 Q. Now the application which is the following page,  
11 116, describes that equipment to be used for electrical  
12 high-tension distribution in the mine's main intake  
13 airways, switchgear to be housed in specially constructed  
14 substations constructed of non-flammable material, et  
15 cetera, et cetera. Substation equipped with methane and  
16 CO detectors designed to trip power to incoming switch.  
17 That was the application for which the approval was  
18 granted. Have you found any conditions sheet that goes  
19 with this equipment?

20 A. I don't see it in this document.

21 Q. We have had evidence that there was a transformer  
22 located in the No. 5 Crosscut that was protected by  
23 automatic cut-off sensing devices.

24 A. Yes.

25 Q. Is it your understanding that this is that

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1 equipment?

2 A. Yes.

3 Q. And if, indeed, that's the case, then it would  
4 appear that the conditions set out in the application had  
5 been complied with?

6 A. That's right.

7 Q. All right. So even though it's non-flameproof, it  
8 has been approved under those circumstances for being in  
9 the mine?

10 A. Yes, the same sort of exemption as we had for the  
11 air compressor.

12 Q. Okay. So those are the items off your list that are  
13 marked as non-flameproof. Let's go back up to find any  
14 others that we might make some particular comments on.  
15 You started to tell me a few minutes ago about the gas-  
16 monitoring Trolex system. This is the main environmental  
17 monitoring system that we've heard evidence about?

18 A. Yes.

19 Q. And we found at page 76 where it had had one  
20 certification number. Now tell me what the problem is  
21 with this equipment?

22 A. It's just that the equipment was approved as an  
23 intrinsically safe monitoring system. It was submitted  
24 to EMR originally as a system for monitoring various  
25 gasses and, I believe, air flow and a number of things.

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1 So it was not specifically targeted as a gas-detection  
2 device.

3 The problem as I see it is that it has not been  
4 subjected to the performance tests normally required for  
5 a gas-detection system used to protect equipment such as  
6 the air compressor and the transformer. Theoretically,  
7 it would have been preferable to have that equipment  
8 tested as a gas-detection system as well as an  
9 intrinsically safe monitoring system.

10 Q. So it's been certified as safe but it hasn't been  
11 certified as functional?

12 A. Right.

13 Q. And who --

14 A. Most of the safety standards do not guarantee  
15 functional --

16 Q. No.

17 A. -- performance.

18 Q. But performance standards do exist?

19 A. Performance standards exist for gas detection  
20 because they are critical to the protection of the mine.

21 Q. And who normally would issue, in Canada, a  
22 certification for performance?

23 A. EMR would issue that certificate for mines.

24 Q. And you checked to see if they had and they hadn't?

25 A. That's right.

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1 Q. Now how significant do you view this in the  
2 circumstances?

3 A. Well, the -- as I understand it, the system was  
4 never fully operational, so it probably did not affect  
5 the safety of the mine one way or the other. I have no  
6 doubt that it would function as a gas-detection system,  
7 but we don't know accurate it was because it had not been  
8 tested for that function.

9 Q. We've heard evidence already from witnesses who  
10 questioned whether it would have a certain degree of  
11 sensitivity and whether some of its readings of minor  
12 alterations in what it was purporting to have as gas  
13 readings may have been errors because they didn't think  
14 that it would be that sensitive. That's what you're  
15 talking about now?

16 A. Yeah. Yeah.

17 Q. All right. So we --

18 A. The gas monitors on the continuous mining machines  
19 had been tested for performance. We knew that they would  
20 register high gas when there was high gas. This system,  
21 we had no knowledge of its performance.

22 Q. And do I understand that this system is often used  
23 for other kinds of things as well other than methane?

24 A. Yes, it was intended for CO and it had several  
25 functions. It was not primarily -- it was not dedicated

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1 entirely to gas detection.

2 Q. It could be used in a variety of different kinds of  
3 applications --

4 A. Yes, that's correct.

5 Q. -- other than just coal mines?

6 A. Well, I don't know about that. It was, I think,  
7 designed for coal mines, but it could be used in other  
8 kinds of mines, yes.

9 Q. All right. All right, so we put that --

10 COMMISSIONER Excuse me. When you say for different  
11 applications, now would the system, you know, as  
12 installed at Westray, be able to monitor for things other  
13 than gas?

14 A. Yes.

15 COMMISSIONER Is that what you're saying?

16 A. That's right.

17 COMMISSIONER No adjustments or anything necessary, it  
18 was just something that it would do as a matter of  
19 course?

20 A. Yes, it was a multi-function system.

21 COMMISSIONER Okay, thank you.

22 MR. MERRICK Okay. So we would put that one caveat by  
23 that one piece of equipment?

24 A. Right.

25 Q. Let me come down the list on a couple of these other

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1 things that I think you wanted to note. Gate-end boxes  
2 that are listed in your list, you found one piece of  
3 information -- let me back up, the gate-end boxes that  
4 are found at Volume -- I think it's 69-B, let me just  
5 check this before I send everybody on a wild goose chase,  
6 yeah, same volume, page 35. 69-B, page 35. That's  
7 flameproof equipment and that's the approval. You have  
8 no difficulty with that, but what did you find relating  
9 to that piece of equipment that caused you some concern?

10 A. This particular piece?

11 Q. Shift -- can I direct you to a shift foreman's --  
12 electrician's report, I'm sorry --

13 A. Oh.

14 Q. -- that's in Volume 39-D --

15 A. Oh, yes.

16 Q. -- at page 164.

17 A. Is that the report of excessive gaps and missing  
18 bolts?

19 Q. I think so. Let's take a look at it.

20 A. Okay.

21 Q. 164 in Volume 39-D you should have. We're falling  
22 down today. 64 -- 164. What did you -- you went through  
23 the tradesmen's reports dealing with this equipment?

24 A. Yes, I did.

25 Q. What did you find that you noted?

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1 A. I noted on page 164, which was a report by Mr.  
2 Franks, toward the bottom it says, and starting three  
3 lines up at the end of this line, "Closed excessive gaps  
4 on LT and HT ends on Southwest boxes and added missing  
5 bolts."

6 Q. Why do you consider that significant?

7 A. Well, the theory of flame-proof enclosures is that  
8 they be tightly closed at all times when they are alive.  
9 This is to prevent propagation of an explosion, should it  
10 occur. If there were excessive gaps, and I presume by  
11 this he meant between the cover and the enclosure, this  
12 is where the gap is normally measured, if there were  
13 excessive gaps, it would no longer be flameproof. If  
14 there were missing bolts, it would no longer be strong  
15 enough to withstand an internal explosion. So had that  
16 box experienced -- had an explosive atmosphere entered  
17 that enclosure and a switch operated, it would not only  
18 blow the cover off, it would explode the external  
19 atmosphere. So this is a dangerous situation in a mine  
20 and one which should be carefully checked. This  
21 electrician apparently did make this check, but it's an  
22 indication of a certain degree of laxity in the  
23 maintenance of this equipment type of thing, I think,  
24 that he felt it necessary to tighten up the gap and  
25 replace missing bolts.

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1 Q. So that this particular equipment had been certified  
2 as flameproof, had been approved for use in this mine --

3 A. Yes.

4 Q. -- but this particular item appeared to have lost  
5 that -- had lost its flameproof ability?

6 A. Right.

7 Q. Okay.

8 A. Missing bolts and excessive gaps defeat the whole  
9 purpose of building a flameproof enclosure.

10 Q. And I would assume that a gate-end box, if indeed it  
11 had that excessive gap and it lost its strength to  
12 withstand an explosion, really would no longer be  
13 approved for or satisfying the certification requirements  
14 or the approval requirements?

15 A. No, it would not.

16 Q. All right. Let's come to the continuous miners for  
17 a moment, if I can find them on here, yes. If you can  
18 look in Volume 69-B, the one that we have been looking  
19 at, at page 44 and 46. There were four continuous miners  
20 in the mine?

21 A. Yes, that's right. There are certificates in this  
22 volume for two of them.

23 Q. All right.

24 A. The other two are in 69-A.

25 Q. Okay. Let's just take a quick look at them. At

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1 pages 44 and 46 we see the approvals then for those two  
2 particular miners. And they are to be -- I see on the  
3 application forms which follow each of those pages that  
4 each of them is to have a methanometer and a dust-  
5 collection system as an intricate part of the equipment?

6 A. That's correct.

7 Q. Now just to complete the record, if you can go to  
8 Volume 69-A and turn to page 165 and 170. Those are the  
9 approvals for the other two continuous miners?

10 A. That's right.

11 Q. And in each case, again, they were to be equipped  
12 with a methanometer and dust collection system according  
13 to the application?

14 A. Yes.

15 Q. Now what would be the case as to whether they  
16 continued to be certified and continued to be approved  
17 if, in fact, methanometers had been removed from those  
18 machines?

19 A. Well, the first line of defence in a coal mine is  
20 the ventilating system. The ventilating system should be  
21 designed to remove the methane gas as fast as it is  
22 produced. Bearing in mind that the continuous miner has  
23 steel picks which are cutting coal and occasionally  
24 cutting rock, there is always a danger of spark ignition  
25 by the picks. And, for that reason, these miners are

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1 equipped with a methane monitoring system which is  
2 designed to alarm at .75 percent methane and to shut down  
3 the cutter heads at 1.25 percent methane. This is a  
4 requirement in the Nova Scotia Coal Mining Act. Some  
5 jurisdictions allow as high as two percent methane, but  
6 in Nova Scotia the law is 1.25 percent.

7 Without the methane monitor, you've lost one of your  
8 safety devices, and you're not supposed to mine without  
9 the methanometer.

10 Q. In each of the approvals that we looked at in the  
11 two exhibit books, in the following pages to each of the  
12 approvals, there's a schedule of conditions. For  
13 example, in Exhibit Book 69-A, the first approval that we  
14 looked at was on page 165. And when you flip over two  
15 pages, we see a schedule of conditions that was attached  
16 as being the conditions that went with the approval. And  
17 we see there that the conditions where it was to be  
18 operated with a continuous methane monitoring device.  
19 The device is to be maintained and calibrated and the  
20 device shall be set to alarm at .75 and to shut down at  
21 1.25. So that was written into the conditions.

22 A. Yes, that was written into it, yes.

23 Q. And if anybody were to have tampered with it, to  
24 either have removed it or changed the calibration, that  
25 voids the conditions?

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1 A. That's correct.

2 Q. And that piece of equipment would then be in the  
3 mine in violation or without approval.

4 A. Yes, it would.

5 Q. Okay. You talk in your report and I think you talk  
6 about this a little bit in the addendum as well. You've  
7 read some of the evidence or have been aware of some of  
8 the allegations that have been made by individuals about  
9 tampering with the machines. In addition to tampering  
10 and changing the calibration, what other evidence have  
11 you seen as to how they can be operated in violation of  
12 the control system?

13 A. Well, in addition to tampering with the calibration  
14 and also the location of the heads, sensing gas, there  
15 have been allegations that it was possible to operate the  
16 cutting heads when the gas detection was in an alarm and  
17 shut-down condition. This was actually tested by Loby &  
18 Dainty at the Canadian Explosive Atmospheres Laboratory  
19 on the model taken from the mine and they found that by  
20 holding the reset button -- No, I'm sorry, the test  
21 button, by holding the test button in for several  
22 seconds, the gas detection system would go into sort of a  
23 calibration sequence and this would allow them to run the  
24 cutting heads, even though they were above the legal  
25 limit of gas. There were reports by some operators that

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1 they were able to take a complete cut without shutting  
2 down by using the test button as an override,  
3 essentially.

4 Q. All right.

5 A. I believe it's sort of -- It may be a design flaw in  
6 the system, but that's the way it operates.

7 Q. All right, we'll hear evidence later as to whether  
8 that, in fact, occurred.

9 A. Yeah.

10 Q. But, obviously, I assume that if a machine were  
11 operated in that fashion, it would again be in violation  
12 of its approval and its conditions and, therefore, be  
13 improperly operating in the mine.

14 A. Yes, that's correct.

15 Q. Let me come back. So we'll put an asterisk by that  
16 as well. Let me come back to --

17 A. Did you want to go into the calibration of the  
18 actual instrument?

19 Q. All right.

20 A. This was tested, the instrument taken off the  
21 machine in the Southwest district was sent to the  
22 laboratory in Ottawa and they checked and found that the  
23 setting was, indeed, 1.5 percent, .25 percent above the  
24 legal limit. So it was incorrectly set at the time of  
25 the explosion.

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1 Q. And was, therefore, in violation of its conditions.

2 A. Yes.

3 Q. And you refer to the reports of that in the addendum  
4 to your report.

5 A. Yes, the report by Loby and Dainty.

6 Q. Yes, all right. Let me bring you to the next item  
7 of equipment that we want to look at that comes from your  
8 list on page two and that's the fans. We've already  
9 looked at the main mine fans which are the Alfair. The  
10 Engart fans, I assume, are then the auxiliary fans that  
11 were used in the auxiliary ventilation system.

12 A. Yes.

13 Q. To begin with, there's some allegation or there may  
14 be some allegation in the evidence that those were  
15 British fans and designed at a different cycle than  
16 equipment in Canada, 50 hertz as opposed to 60 hertz.  
17 Tell me about that. What does that mean?

18 A. Well, North America is all on 60 cycles or 60 hertz.  
19 The rest of the world is pretty well all on 50 hertz.  
20 This is the frequency of the alternating current. Using  
21 a 50-hertz motor on 60 cycles means that the motor will  
22 run correspondingly faster, 20 percent, because motors,  
23 induction motors, for examples, run at something slightly  
24 less than synchronous speed. The synchronous speed for a  
25 two-poled motor at 60 cycles is 3600 rpm and at 50 cycles

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1 is 3000 rpm. So there will be an increase in the speed  
2 of the fan if it is, indeed, a 50-hertz motor running on  
3 60 hertz.

4 Q. Now are you able to determine from the documentation  
5 that's been made available whether the auxiliary fans in  
6 the mine or whether some of them were of British  
7 manufacturer or, in particular, of 50 hertz?

8 A. The only evidence we have is that they were, indeed,  
9 used equipment and they did come from the U.K. So that  
10 would seem to indicate that they may have been 50-hertz  
11 motors.

12 Q. You've also looked through some repair orders where  
13 the motors for these fans were sent out for repairs here  
14 in Canada.

15 A. Yes.

16 Q. And on some of those repair orders, they were shown  
17 as 50 hertz?

18 A. One that we looked at was shown as having a speed of  
19 2900 rpm or thereabouts, which would seem to indicate  
20 that it was a 50-hertz motor because the synchronous  
21 speed for that motor would be 3000.

22 Q. Assuming for the moment that the auxiliary fans, or  
23 at least some of them, were in fact 50-hertz motors, you  
24 say that it would make the motor run faster. In an  
25 application such as auxiliary fan exhausting air from a

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1 heading through ducting, how significant a safety factor  
2 is that for the fan motor? These are built as  
3 flameproof, I take it?

4 A. Right. A motor driving a fan, the faster the motor  
5 runs, the more heavily loaded the motor would become. In  
6 other words, if it were on 50 hertz, for example, drawing  
7 25 amperes at 60 hertz, it might draw 30 or 35 amperes.  
8 In other words, it would be more heavily loaded. As far  
9 as the ventilation was concerned, it would improve the  
10 ventilation because a fan running faster moves more air.

11 We don't know exactly how close to the limit these  
12 motors were run. So there's no way of predicting exactly  
13 what would happen. A lot of it would depend on how long  
14 the ducting was because the resistance of the air affects  
15 the loading. The more resistance, the less the load.

16 However, all things being considered, I think you  
17 would get more frequent burnouts. This would not  
18 necessarily affect the safety of the mine because the  
19 motors being flameproof would burn out safely. However,  
20 the evidence of the number of re-winds on fan motors  
21 seems to indicate that they did have more frequent  
22 burnouts.

23 Q. And I assume that if your fan is running faster and  
24 is attached to a length of ducting, provided the ducting  
25 doesn't collapse, it might cause more air to come through

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1       thus increasing the ventilation.

2       A.     Yes.

3       Q.     But what tendency would it have on the potential for  
4       collapse of the ducting?

5       A.     There would be more tendency to collapse the ducting  
6       because the suction would be higher.

7       Q.     All right. Let me back up. The applications -- in  
8       fact, let's take a look at it. I think that this is in -  
9       - Just let me check my page reference here before I send  
10      you looking for it. Yeah, in Exhibit 69-B, at pages 156  
11      and 160.

12      COMMISSIONER     69-B?

13      MR. MERRICK     69-B, 156 and 160, are the two approvals  
14      for a series of auxiliary fans. And the documentation  
15      immediately around those pages would include the letters  
16      sending the approvals as well as the application  
17      documents for each approval submitted by the company. Do  
18      those documents indicate in any way whether these are, in  
19      fact, 50-hertz motors?

20      A.     There is no mention of the frequency of the motors.

21      Q.     Is that something that should be mentioned when an  
22      operator is making application for approval for use in a  
23      mine in light of the fact -- if it's a different hertz  
24      than the system that will be operating?

25      A.     Normally when ones gives the rating of a motor, the

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1 frequency of the hertz is mentioned. This form does not  
2 contain a line for frequency and it is conspicuous by its  
3 absence. There is no mention of frequency or speed or  
4 anything.

5 Q. But is it something that should be mentioned? Is it  
6 something that is of significance for the granting of  
7 these approvals?

8 A. I think if I were responsible for inspecting the  
9 machines, I would want to know this information and have  
10 some assurance that they would be running within their  
11 rating.

12 Q. All right. So it's something that should have been  
13 reported as part of the approval application?

14 A. I would think so, yes.

15 Q. And if it had been reported, it would be something  
16 that should be questioned?

17 A. Yes.

18 Q. Okay. Let me just talk about the electrical motors  
19 for a few minutes. Motors not only for the fans but for  
20 a variety of other things. You've expressed in your  
21 report a concern because you've identified repair orders  
22 indicating that some electric motors were being repaired  
23 by a non-certified shop. Tell me about that and tell me  
24 why that's important.

25 A. Well, the concern is that once an electric motor has

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1       been taken apart, re-wound and put back together that it  
2       may not be in a flameproof condition. It depends, of  
3       course, on the experience and the skill of the operators  
4       of the repair shop. There was enough concern about this  
5       that a Canadian standard was written for shops engaged in  
6       the repair of flameproof equipment. As a result, both  
7       CSA and EMR have set up a program whereby they actually  
8       certify shops for the repair of flameproof equipment.  
9       Most of these are motor re-wind shops. There are a few  
10      who are doing other repairs, say, for gate-end boxes or  
11      whatever.

12             The problem is there are many things about  
13      flameproof motors that unless the person doing the repair  
14      is aware of, he may inadvertently render it non-  
15      flameproof. And so it is advisable, in my opinion, to  
16      always use a certified repair shop.

17      Q.     What happens to your certification if you have a  
18      motor re-worked or re-built by a non-certified shop?

19      A.     The certification of a flameproof motor becomes void  
20      if it's repaired by a non-certified shop. It could be  
21      used as an ordinary motor in non-hazardous location, but  
22      it can no longer be considered flameproof.

23      Q.     And the purchase orders that you identified relating  
24      to some electric motors, I'm going to refer you to  
25      Exhibit 73, which is your black-ringed binder, Tab 10

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1 this time, and starting at page 24 under that tab. And  
2 I'll get you to just thumb through very briefly pages 24  
3 to page 66. All the rest of the pages right up to the  
4 start of a couple of photographs that appear there.

5 A. Right.

6 Q. Are they the purchase orders and invoices relating  
7 to repair work done on these motors?

8 A. Yes, they are.

9 Q. And they appear to be to Wright Brothers Industrial  
10 in Truro?

11 A. Yes.

12 Q. And did you check to determine if Wright Brothers  
13 was, in fact, a certified repair shop?

14 A. I checked the records of both EMR and CSA and they  
15 have no record of that. There are only two repair shops  
16 in the province of Nova Scotia certified by CSA or EMR  
17 and it does not include the Wright Brothers.

18 Q. Were you able to identify from a review of these  
19 purchase orders and including your shift foremen's or  
20 electrician's reports which motors these were and which  
21 pieces of equipment they may have come from?

22 A. Most of them were for either fans or water pumps and  
23 it was not possible to trace where these ended up. The  
24 reason for that is that there were a great many spares  
25 for this equipment and they could have gone into the

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1 warehouse after being re-wound or they could have gone  
2 into the mine; we don't know. There was one in  
3 particular which was a cutter head motor, and we were  
4 able to identify that motor and we know where it ended  
5 up.

6 Q. This would be a cutter head motor on one of the  
7 continuous miners?

8 A. That's right.

9 Q. Let me take you through the documentation that  
10 relates to that. We're going to go back to Exhibit 39-D  
11 that we had out a few moments ago. And at pages 64 and  
12 66 of 39-D, can you tell me what they are and where we  
13 find information on them that allows us to identify that  
14 one of the repaired electric motors is from a cutter head  
15 off a continuous miner?

16 A. Okay, on page 66, the electrician reports that he  
17 checked the motors on the continuous miner, left-hand  
18 side okay; right-hand side has oil in terminal chamber.  
19 Disconnected and started to remove motor.

20 Q. This is on continuous miner 2000, according to his  
21 report.

22 A. Where does it show the number?

23 Q. Checked head motors on CM-2000.

24 A. Oh, yes.

25 Q. Left-hand side okay.

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1 A. Yes, it's not too distinct on my copy.

2 Q. All right.

3 A. And the next shift, the electrician reported --

4 Q. This is on page 64 now?

5 A. Page 64, yes, "Worked on CM-2000 at No. 10 Crosscut.  
6 Unhooked right cutter head motor leads. Removed right  
7 cutter head motor with the machine and sent to surface  
8 because of oil in junction box." That's the same motor,  
9 the same problem.

10 Q. Okay.

11 A. So that motor was removed from Continuous Miner No.  
12 2000 and sent to the surface for repair.

13 Q. And do we know if it was one of the ones sent out to  
14 Wright Brothers?

15 A. Yes, it's in the purchase orders here.

16 Q. I don't have a page reference for you. Do you have  
17 the purchase order?

18 A. It's near the end.

19 Q. 52?

20 COMMISSIONER Same book?

21 MR. MERRICK Same book. This is 73 now, Exhibit 73.  
22 This is back in the purchase orders. Tab 10.

23 A. 52 and 53, it indicates clearly on this, repair and  
24 return cutting head motor, Joy part so-and-so, and in the  
25 second column, it indicates it's from the CM-2000

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1 machine.

2 Q. Just on that one on page --

3 A. And under "use" down below, it also says Continuous  
4 Miner 2000.

5 Q. Yes. On that page 52, I see in part of their  
6 description, the purchase order says "Explosion-proof  
7 Certificate number." Why would they be referring to an  
8 explosion-proof certificate on a repair purchase order?

9 A. I suppose it's to alert the shop that they are  
10 handling an explosion-proof motor.

11 Q. All right.

12 A. Hopefully, it would get some special attention.

13 Q. Now let me ask you. So we can track that one  
14 electrical motor. The rest of them appear to be  
15 basically in fans, pump motors, and we can't track where  
16 they went into the mine.

17 A. That's right.

18 Q. All right. Did you look to see if there had been  
19 any other electrical equipment farmed out for repair  
20 other than the invoices that we've looked at in Exhibit  
21 73, Tab 10? Did you check for this happening again in  
22 other situations?

23 A. We have only those purchase orders.

24 Q. So based on the documentation that we have, the only  
25 farm-out to a non-certified shop appears to be what we

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1 have in Exhibit 73?

2 A. That's right.

3 Q. How significant is it that these items were sent out  
4 for repair? You've told us that you can lose your  
5 certification, but leaving that aside for a moment, how  
6 risky is it? How dangerous? How significant? How much  
7 significance should we give it?

8 A. Well, I believe, although it's possible that they  
9 came back in a non-flameproof condition, the repair shop  
10 would have to be fairly incompetent in order to destroy  
11 the flameproof properties of a motor. So I would hope  
12 that they would come back in a reasonable condition.

13 The other saving factor is that most of these motors  
14 were induction-type motors and they are normally non-  
15 sparking. So the flameproof enclosure is its second line  
16 of defence.

17 Q. All right. So that while this may have been a  
18 technical violation, it may not have created a  
19 significant or substantial risk?

20 A. It's not a continual risk as, say, a motor starter  
21 with arcing contacts would be.

22 Q. Let me ask this though, from the perspective of  
23 management, if you have flameproof equipment that's been  
24 certified, particularly if you're operating an  
25 underground coal mine, how much care should you take to

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1 insure that your repair work is carried out by a  
2 certified shop? How much of a reflection is this on  
3 judgement, I guess, if any?

4 A. Well, it may be that they were acting in ignorance  
5 of the fact that there certified repair shops, but,  
6 basically, I think that if I was in charge of flameproof  
7 equipment, I would want to keep it in that condition.

8 Q. All right. Was Westray also doing repair work  
9 itself in its own shop?

10 A. As far as I could determine, the only work they did  
11 in their shop would be classified as maintenance, routine  
12 maintenance. There's a difference between maintenance  
13 and repair, particularly with flameproof equipment.  
14 Maintenance would include replacement of parts and work  
15 on the internal components of a device. Repair involves  
16 something more major, something that affects the  
17 enclosure. Because in flameproof equipment, the  
18 enclosure is the defence against explosion.

19 Q. All right.

20 COMMISSIONER Just one question, Mr. Bossert. With  
21 respect to the certified shops that you indicated that  
22 there were two in Nova Scotia certified by either EMR or  
23 CSA, in your investigation, did you find any evidence  
24 that these shops had been used for repair work at any  
25 time?

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1 A. None. No, there was no evidence that they had used  
2 a certified repair shop.

3 COMMISSIONER Okay, thank you.

4 MR. MERRICK Where were those shops located? I don't  
5 need their names, I just need --

6 A. One in Halifax, one in Cape Breton.

7 Q. All right. Now one other comment that you make  
8 following your review of the list of equipment that's  
9 contained in your report and based on the approvals that  
10 you then looked at is the comment about hydraulic fluid.  
11 Tell me about that?

12 COMMISSIONER Do you have a page there?

13 MR. MERRICK Let me find it. It's in his report. Let  
14 me find the section.

15 A. It would be under fire resistant materials. Page  
16 six?

17 Q. Page six? Page three, I think, is where I'm really  
18 referring to.

19 A. Oh, okay.

20 Q. Because that's the sequence that I'm following  
21 through your report. Let me just find it here now. Last  
22 paragraph, page three. You say:

23 "My only reservation is that some of the electrical  
24 machines, such as continuous miners, shuttle cars, and  
25 roof bolters, were designed to accept fire resistance

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1 hydraulic fluids but contained mineral oil-type hydraulic  
2 fluid, which is not fire resistant."

3 Explain to me the significance of that? To begin  
4 with, what pieces of equipment would this affect?

5 A. It would affect any piece of equipment containing  
6 hydraulics. For example, the continuous miner had  
7 hydraulic pistons for raising and lowering the cutting  
8 heads. I'm not sure whether the shuttle car had  
9 hydraulics, but it could have. The use of fire resistant  
10 hydraulic fluids is recommended for all underground  
11 mines.

12 Q. Just before you go on, I assume that would include,  
13 though, roof bolters would have hydraulics?

14 A. I believe so.

15 Q. Boom trucks?

16 A. Yes, definitely.

17 Q. And dozers.

18 A. Right.

19 Q. All right.

20 A. The use of hydraulic fluids is particularly  
21 important in locations where there may be hot surfaces  
22 because a leak of a hydraulic fluid striking a hot  
23 surface can immediately cause a flash fire. Now this is  
24 not particularly important in flameproof equipment  
25 because they are specifically designed so there are no

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1 exposed hot surfaces. For example, the continuous miner,  
2 all the motors are flameproof and they must have a  
3 surface temperature which is quite low, much lower than  
4 the ignition point of hydraulic fluid. However, when you  
5 have machines like, for example, boom trucks and dozers,  
6 which are not flameproof, a leak or a spill of hydraulic  
7 fluid on a hot manifold can immediately cause a fire  
8 which could be disastrous, particularly in a gassy mine.  
9 It's recommended, of course, for all underground mines to  
10 have fire-resistant materials because any fire in an  
11 underground environment can pollute the atmosphere very  
12 quickly, and fill the mine with smoke, asphyxiate the  
13 miners and so on.

14 So I personally don't consider it quite as important  
15 to have fire-resistant fluids in flameproof equipment,  
16 but non-flameproof equipment definitely is a must.

17 Q. How significant a breach of safety or safety  
18 thinking would that be, to put that kind of flammable  
19 hydraulics in equipment down in the mine?

20 A. Well, I've looked at the Nova Scotia Mining Act and  
21 there is no actual requirement there for fires and  
22 hydraulic fluids. It's highly recommended by most  
23 authorities. And leaving the Act aside, just as a matter  
24 of judgement, how bad a judgment would you consider that  
25 to put that kind of hydraulics and that kind of equipment

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1 down there?

2 A. In an unflameproof machine, it's very bad judgment,  
3 in my opinion. In a flameproof machine it's -- well, it  
4 would be preferable to have the hydraulic fluids fire  
5 resistant.

6 Q. All right. Mr. Commissioner, that may be an  
7 appropriate point to take a break.

8 COMMISSIONER Okay. Recess for 15 minutes then. Thank  
9 you.

10 INQUIRY RECESSED (TIME: 11:02 a.m.)

11 INQUIRY RESUMED (TIME: 11:19 a.m.)

12 COMMISSIONER Now, Mr. Merrick?

13 MR. MERRICK Thank you, Mr. Commissioner. Now, Mr.  
14 Bossert, I'm going to take you through just some other  
15 pieces of equipment that have not been referred to in  
16 your report because these now will be the items of  
17 equipment for which you have subsequently found approvals  
18 being issued by the Department for equipment that was in  
19 the mine. This would be part of the documentation that  
20 was subsequently received following the preparation of  
21 your report. I'm going to give you just a series of  
22 references to where this documentation is so that parties  
23 will have a record of it and know that it is additional  
24 equipment. I will then ask you only about a couple of  
25 particular items.

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1           But I take it that you found approvals for 10 gate-  
2           end boxes, did you?

3           A.    Yes.

4           Q.    And for the record, they are found at Exhibit 69-B  
5           at page 31. Was there anything unusual that you noted  
6           about those items, Mr. Bossert, or are you satisfied that  
7           an approval was granted and they appeared to be in  
8           compliance with any applicable conditions?

9           A.    They are shown as having an EMR certification  
10          number. And I haven't had an opportunity to check that  
11          to see if it's a valid number, but I have no reason to  
12          doubt it.

13          Q.    Okay. You've also found approvals for circuit  
14          breakers or circuit breaker. And for the record, that's  
15          found in 69-B at page 41. And again, is there anything  
16          unusual that you need to draw to our attention in  
17          relation to this particular item of equipment that you're  
18          aware of?

19          A.    No.

20          Q.    You have found approvals for telephones and these  
21          are found at 69-B, pages 84 and 86. Is there anything  
22          that seems out of the ordinary or unusual with those  
23          items of equipment?

24          A.    These are intrinsically safe telephones. They were  
25          approved on the basis of a British approval. There is no

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1 Canadian approval that I'm aware of.

2 Q. All right.

3 A. But I have no reason to question it.

4 Q. You have also found approvals for three conveyor  
5 drives that are found at 69-B, page 141. And, again, in  
6 looking at the documentation relating to those conveyor  
7 drives, is there anything that is of particular note that  
8 we should pay attention to?

9 A. No.

10 Q. All right. Now a couple of additional items that  
11 perhaps we should note something about. You've found an  
12 approval for a high-tension switch, and this time I'll  
13 get you to actually look at the exhibit. It's 69-B, page  
14 117. And you've got that?

15 A. Yes, I have it.

16 Q. If you look at page 118 you will see where the  
17 application form says it's to be used in a specially  
18 constructed substation of nonflammable material and is to  
19 be equipped with methane and CO detectors designed to  
20 trip power to oncoming switch. Did you find any  
21 conditions that might have been attached to the approval  
22 that's granted at page 117?

23 A. None other than what are listed on the application  
24 form.

25 Q. I'm assuming that when conditions -- a description

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1 is contained on the application form and then an approval  
2 form is granted without comment on it, that one can  
3 assume that the approval is granted on a condition set  
4 out in the application?

5 A. That would be a logical assumption, yes.

6 Q. Do you know if this high-tension switch may have  
7 been part of the electrical equipment that was located in  
8 the No. 5 Crosscut?

9 A. I don't know that for a certainty, no.

10 Q. All right. If indeed it was, then that was the  
11 crosscut that we know was protected by a remote censoring  
12 mechanism with cut-off provisions?

13 A. Yes.

14 Q. And if indeed it was in the No. 5 Crosscut, then it  
15 would appear that the description set out in the  
16 application would have been complied with?

17 A. Yes.

18 Q. All right. Let me take you to --

19 A. Just let me find -- excuse me, in the lost equipment  
20 list --

21 Q. Yeah. That's Exhibit 73.

22 A. Right.

23 Q. Tab 11.

24 A. Let me find it. Some of this equipment was in a  
25 different crosscut.

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1 Q. Yeah. In fact, you may want to double check that.  
2 I think we're about to look at that in a minute, the  
3 next --

4 A. Okay.

5 Q. -- piece of equipment.

6 A. Fine.

7 Q. In addition to the high-tension switch, you also  
8 found an approval for a substation and this is at --

9 A. Yes.

10 Q. -- Exhibit 69-B, page 134 and 135.

11 A. Right.

12 Q. Now if we look on page 134 we see where it says,  
13 "No. 5 Crosscut substation." The approval on page 135  
14 makes no reference to that, but the application form on  
15 page 136, again in the conditions, describes it as being  
16 located where there could be a power cutoff?

17 A. Yes.

18 Q. And we know there was a power cutoff in Crosscut No.  
19 5.

20 A. Right.

21 Q. Now according to the insurance claim, was this  
22 equipment found in Crosscut No. 5 or located in Crosscut  
23 No. 5? Can you take a quick look at that? I don't have  
24 a page reference to give you, unfortunately.

25 A. What page are we on?

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1 Q. Page 10 of Tab 11, Exhibit 73.

2 A. It's shown -- let me check the numbers. It shows  
3 some of this equipment in Crosscut No. 6.

4 Q. Now looking at page 10, lost equipment list, we're  
5 seeing "substation," second item, "substations." And  
6 then we see the serial numbers. They match some of the  
7 serial numbers on the approval we just looked at?

8 A. Yeah.

9 Q. And three of those items are shown as being No. 6  
10 Crosscut. There is no evidence that the 6 Crosscut was  
11 protected by any kind of cut-off devices. If, indeed,  
12 they were located in No. 6 Crosscut, were they in  
13 violation of the conditions on the application?

14 A. Perhaps they were. I have no knowledge of whether  
15 or not No. 6 was equipped with this cutoff.

16 Q. All right. The last piece of electrical equipment  
17 that you have located an approval for which is not  
18 contained in your report is a transient recorder  
19 instrumentation. And for the record, that's found in  
20 Exhibit 69-B, 165. And perhaps we could turn that up for  
21 a moment because there is one item on that we should  
22 note. Do you have that?

23 A. Yes.

24 Q. All right. And what condition was attached to that,  
25 according to the application which is on 166?

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1 A. It was to be recharged in fresh air only and it was  
2 to survey and identify old Allan Mine workings for a  
3 maximum of five days.

4 Q. So that had --

5 A. It was a very short-term approval.

6 Q. That was to be used only for a short period of time?

7 A. Yes, five days maximum.

8 Q. All right. To the best of your information, based  
9 on the documentation given to you, is that all of the  
10 electrical equipment for which you've been able to find  
11 any approvals --

12 A. Yes.

13 Q. -- for use in the mine? Now were you able to locate  
14 additional equipment that appeared to be in the mine,  
15 electrical equipment that appeared to be in the mine, for  
16 which there had been no approval documentation in the  
17 records shown to you? And I'm thinking now of pumps?

18 A. Yes, there were a number of pumps shown on the lost  
19 equipment list for which I could find no approval record.

20 Q. Can you find those for us on the lost equipment  
21 list? This is Exhibit 73, Tab 11. And, again, I'm  
22 without a page.

23 A. Page six, the second item. There are three pumps  
24 shown there --

25 Q. Yes?

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1 A. -- for which there are no approval records.

2 Q. A Gardner Denver 50 horsepower?

3 A. Yes.

4 Q. A grout pump and a hydraulic wash pump. And the  
5 location as being shown that they were in the mine --

6 A. In crosscuts.

7 Q. -- including No. 11 Crosscut and No. 10 Crosscut.

8 A. Right.

9 Q. Do you know if they are electrical equipment or  
10 diesel equipment?

11 A. I would assume they're electrical equipment, but I  
12 have no basis on which to make that statement.

13 Q. I suppose if they were either electrical or diesel,  
14 they should have approvals?

15 A. Yes, either way.

16 Q. Have you found any documentation at all that the  
17 company reported these or sought approval from the  
18 Department for them?

19 A. No. I checked the applications for approvals and  
20 the approvals.

21 Q. Are you aware of any other equipment that the  
22 company had in the mine for which approvals should have  
23 been obtained but for which we have no documentation?

24 A. Yes, there were some sump pumps made by Flygt and  
25 Gorman Rupp which I know were in the mine. They were not

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1 in the lost equipment list. Most of them were on the  
2 surface at the time under available equipment.

3 Q. Yes.

4 A. But they were used in the mine, I believe.

5 Q. Do you know of any -- so you saw these on surface?

6 A. Yes.

7 Q. Do you know if any of them were in the mine at the  
8 time of the explosion?

9 A. No, I don't. They're not on the lost equipment  
10 list, but they were used infrequently, I suppose, to  
11 drain portions of the mine.

12 Q. Uh huh. And these would be electrical?

13 A. Yes.

14 Q. And you've got no reference of any applications for  
15 permission being filed by the company?

16 A. No. We have --

17 Q. And no approvals?

18 A. We have frequent requests for repair of these pumps,  
19 so they must have been used.

20 Q. And the request for repair would be included in  
21 those repair invoices to Wright Brothers?

22 A. Yes.

23 Q. Okay. Any other equipment that you're aware of from  
24 any source that might have been in the mine for which  
25 approval should have been obtained?

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1 A. That's all that I am aware of.

2 Q. Okay. Now let's turn to diesel equipment. And you  
3 refer to this on page 4 of your report. And you identify  
4 the diesel equipment that you're aware of being used by  
5 the mine, some of which were in the mine at the time of  
6 the explosion.

7 Since preparing your report, have you become aware  
8 of additional information relating to the numbers of  
9 these items? For example, you show one boom truck on  
10 your report. Are you aware now of more boom trucks?

11 A. I've been told there is a second boom truck, and I  
12 have no idea what its condition is. There have claims  
13 that it was a flameproof truck.

14 Q. All right.

15 A. But I have no evidence to support that.

16 Q. Well, we know from the information, and we'll hear  
17 evidence on this later, that equipment in the mine at the  
18 time included two boom trucks, one in the Southwest and  
19 one in the North Mains.

20 A. Yes.

21 Q. Let's take them one at a time. We are able to  
22 identify one of these boom trucks by its serial number,  
23 "0141," are we?

24 A. Right.

25 Q. Let's call the first boom truck "0141." And looking

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1 at that boom truck first, did you find an approval issued  
2 to it for use when this mine was first being developed?

3 And I'm going to refer you to Exhibit 69-A, page 52.

4 A. What was that page number?

5 Q. 52. In 69-A. We're switching exhibit books now.

6 A. Okay.

7 Q. Do you have that?

8 A. Yes.

9 Q. That's an application by Canadian Mine Development.  
10 That was the company that was actually driving the main  
11 tunnels.

12 A. That's what I understand, yes.

13 Q. And they refer there to an Imco [sic] or Eimco 975  
14 boom truck. And if we look at the next page, page 53,  
15 this appears to be the permit issued by the Department of  
16 Mines and Energy on July 5th, 1989?

17 A. Yeah.

18 Q. And we see there that it's referring to a Model 970  
19 Eimco, and we see just below that the frame number,  
20 "0141." So that's the truck we're tracking?

21 A. That's right.

22 Q. Okay. Were there any other conditions attached to  
23 that approval?

24 A. Not at that time. I understand it was used strictly  
25 for driving the tunnel and there was no coal present.

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1 Q. Uh huh. And are we able to determine if Westray  
2 subsequently took over that truck and applied for  
3 approval?

4 A. And I'm going to refer you to Exhibit 69-B at page  
5 96.

6 COMMISSIONER Page?

7 MR. MERRICK 96.

8 COMMISSIONER 96.

9 A. Yes, this is a certificate for the same boom truck.

10 MR. MERRICK We see there on the machine serial,  
11 "0141."

12 A. Right.

13 Q. It's a non-flameproof vehicle?

14 A. Yes.

15 Q. And the next page, page --

16 COMMISSIONER Am I in the wrong book, Mr. Merrick?

17 MR. MERRICK 69-B.

18 COMMISSIONER 69? Oh, I'm sorry. Yes, I am --

19 MR. MERRICK We switched.

20 COMMISSIONER -- in the wrong book.

21 MR. MERRICK We switched exhibits.

22 COMMISSIONER At 96.

23 MR. MERRICK So now we have an approval being issued by  
24 the Department of Labour for the same truck for which had  
25 previously obviously been owned by Canadian Mine

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1 Development or certainly Canadian Mine Development had  
2 applied for approval in the development of the mine?

3 A. Yes.

4 Q. There now Westray is now applying to use that same  
5 truck in the mine. And on page 97 we see a schedule of  
6 conditions that were attached. So that truck was to be  
7 used by Westray subject to these conditions being met, is  
8 that right?

9 A. That's right. Yes.

10 Q. Can you identify for us the most salient or most  
11 relevant conditions for the purposes of our Inquiry?

12 A. Number 11, "Vehicle shall not be used in return air  
13 in air containing more than 2.5 percent methane past the  
14 last open crosscut or within 300 feet of the face."

15 Q. To the best of our information this is the truck  
16 that was found in the crosscut in the Southwest district?

17 A. Yes.

18 Q. All right.

19 A. Also item 13 is pertinent.

20 Q. Uh huh.

21 A. "The floor, roof and sides of every roadway this  
22 vehicle is used shall be treated with stone dust to  
23 insure the combustibile matter does not exceed 15  
24 percent."

25 Q. So you'd have to have 85 percent incombustible?

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1 A. 85 percent incombustible.

2 Q. All right.

3 A. Coal dust by itself is probably 85 percent  
4 combustibile. So a considerable amount of stone dust is  
5 required.

6 Q. So if that machine is sitting in that last crosscut  
7 in the Southwest district, if it's within 300 feet of one  
8 of those faces, it's in violation of a condition?

9 A. Yes.

10 Q. And if it's sitting where there is not 85 percent  
11 incombustible material, it's in violation of its  
12 condition?

13 A. Yes.

14 Q. If it's in air that exceeds .25 percent methane,  
15 it's in violation of its condition?

16 A. Yes.

17 Q. And the ventilation in the airway where the  
18 equipment operates is less than 200 cubic feet per minute  
19 per brake horsepower, it's in violation of its condition?

20 A. Right.

21 Q. Okay. Did you find another approval for this --  
22 COMMISSIONER What's that mean, "200 cubic feet per  
23 minute per brake horsepower"? Could you explain that?

24 A. Yes, you would have to multiply the brake  
25 horsepower, which in this case, I believe, was 100. Yes,

MR. BOSSERT, EXAM. BY MR. MERRICK

1 100 horsepower. Multiply 100 times 200 would give you  
2 20,000 cubic feet per minute.

3 COMMISSIONER So that was the minimum amount of air in  
4 order for this vehicle to be in --

5 A. Yes, those figures are based upon the health safety,  
6 not the safety hazard.

7 COMMISSIONER I see, okay.

8 A. If the dilution of the exhaust emissions is not  
9 sufficient, there is a danger of lung damage.

10 COMMISSIONER Thank you.

11 MR. MERRICK Just while we're on those conditions on  
12 page 97, I notice No. 14, too, that says: "The manager's  
13 environmental scheme shall ensure that methane detectors  
14 and devices for measuring air flow shall be located  
15 outbye the last open crosscut." I just draw that to your  
16 attention at this point. We can debate later what that  
17 means and whether there was compliance with that.

18 A. Also No. 15 is pertinent.

19 Q. Yes. Now did you find another approval sought for  
20 this piece of equipment that caused some confusion later  
21 in trying to identify the number of tractors that were in  
22 the mine?

23 A. Oh, yes.

24 Q. In particular, I'm going to refer you back to  
25 Exhibit 69-A, this time at page 193.

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1 A. Yes, this certificate of approval caused some  
2 confusion because the name of the equipment was a Massey  
3 Ferguson utility vehicle and yet the machine serial  
4 number corresponded with this boom truck, 9750141.

5 Q. And in counting up the number of tractors that we  
6 can account for, was there a discrepancy of one?

7 A. Yes, because of this certificate, I had listed five  
8 Massey Ferguson tractors but, in fact, there were only  
9 four.

10 Q. But there's some --

11 A. This certificate was issued in error.

12 Q. So it looks like possibly they were applying now to  
13 get approval for this tractor or this boom truck as a  
14 personnel carrier.

15 A. I don't think it was intentional. I think it was  
16 issued in error.

17 Q. In any event --

18 A. I believe there's a letter somewhere in this file  
19 apologizing for the error from the Department of Labour.

20 Q. Oh, is that right?

21 A. Yeah.

22 Q. All right, I'm not aware of that letter. In any  
23 event, this approval, when issued, had basically the same  
24 conditions attached to it and we see those at pages 194  
25 and 195.

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1 A. Yes, it's on two pages but the same 15 conditions.

2 Q. Yeah, the only difference being in the ventilation  
3 condition, and I would assume that was because they  
4 thought they were dealing with a tractor and not a truck.  
5 Now so we have boom truck 0141 subject to those  
6 conditions. We know or we have evidence that there was a  
7 second boom truck located in the North Mains at the time  
8 of the explosion.

9 A. Right.

10 Q. At the No. 11 Crosscut. In fact, if we look on that  
11 map at the very top, I believe it is one of the vehicles  
12 that is shown at the very top of the North Mains,  
13 obviously well within 300 feet of the face or whatever,  
14 of faces. Were you able to find any approvals for that  
15 boom truck?

16 A. No.

17 Q. Were you able to find any documentation indicating  
18 that the company reported that they were going to be  
19 using that boom truck or seeking approval for the use of  
20 that boom truck?

21 A. No, I found nothing.

22 Q. Are you able to determine from the evidence that has  
23 been made available to you, some of the testimony or  
24 transcript evidence, whether that boom truck may or may  
25 not have been a flameproof boom truck?

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1 A. There was some anecdotal evidence in one of the  
2 interviews that indicated it could have been flameproof,  
3 that it was an air-start machine, for example, which  
4 would indicate flameproof construction.

5 Q. All right.

6 A. And possibly that it had a flame arrester.

7 Q. The boom truck 0141 was an electric start.

8 A. As far as I'm aware, yes.

9 Q. All right, but even if the second boom truck was a  
10 flameproof vehicle, I assume it should have, the company  
11 should have sought approval for its use in the mine.

12 A. Yes.

13 Q. And before it was used, approval should have been  
14 granted?

15 A. Right.

16 Q. And we have no record of that?

17 A. No.

18 Q. All right. Let me take you to the next item that  
19 you show on your list on page four of your report and  
20 that's the bulldozers. You show two, one of which you  
21 identify as having been in the mine.

22 A. Yes.

23 Q. The other one was on the surface?

24 A. Yes, I believe it was.

25 Q. Both of them were non-flameproof?

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1 A. Yes.

2 Q. Are these your standard run-of-the-mill off-the-road  
3 dozers?

4 A. Yes.

5 Q. Diesel operated, electric start?

6 A. Yes.

7 Q. Do we know -- One of them was a -- We know there was  
8 a dozer found in the Southwest district. Were you able  
9 to find approvals for one of those dozers? You identify  
10 one as a Caterpillar, one as a Jeffrey Dresser.

11 A. I found a number for the Jeffrey Dresser, but it's  
12 in question because apparently the certificate of  
13 approval was never issued. There was a record of a  
14 number having been given, I believe, verbally, and noted,  
15 but no actual document appeared.

16 Q. So you haven't found any appli --

17 A. No, I haven't actually found the -- I think there  
18 was an application, but no document was issued.

19 Q. You don't have any documents you can refer us to  
20 today to indicate either an application or an approval on  
21 the Dresser bulldozer?

22 A. No, just that a number was given, possibly verbally,  
23 to Westray, and I have a record of that number but the  
24 approval document is missing.

25 Q. Are you aware of any document that would contain

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1 conditions under which that approval might have been  
2 granted?

3 A. No, but I would assume that they would be the same  
4 as any other non-flameproof diesel.

5 Q. So that would be having to operate in the return air  
6 methane levels --

7 A. Intake air.

8 Q. Intake air, sorry.

9 A. Yes.

10 Q. A certain distance away from the face?

11 A. Right.

12 Q. And with that percentage of incombustibles?

13 A. Right.

14 Q. We know that this dozer was located in the crosscut,  
15 I believe, in the Southwest, the first crosscut.

16 A. This is the dozer.

17 Q. Okay. So that assuming that those conditions are  
18 applicable, we can determine for ourselves whether its  
19 location puts it in violation of any of those conditions.

20 A. Yes.

21 Q. All right. The Caterpillar approval, just give me a  
22 second while I look up a page reference.

23 A. 69-A of 055.

24 Q. Yes, Exhibit 69-A, page 54 and 55. This is the  
25 Caterpillar that was on the surface. There was an

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1 approval initially sought for it by Canadian Mine  
2 Development, and the following page 55, an approval  
3 granted by the Department of Mines and Energy, no special  
4 conditions as far as you're aware?

5 A. No.

6 Q. Are you aware of any documentation indicating that  
7 Westray ever applied for approval to use that piece of  
8 equipment underground?

9 A. No.

10 Q. Are you aware of any evidence as to whether they  
11 did, in fact, use it underground?

12 A. No, I have no evidence.

13 Q. So that may well be a machine for which no approval  
14 was ever needed.

15 A. Possibly.

16 Q. Okay. Now let's come to the utility vehicles that  
17 are referred to in your report. The tractors. You  
18 initially identified, and I'm just looking for it here, a  
19 number of tractors. Just give a second here now. Yes,  
20 in your report at the bottom of page four, the last  
21 paragraph, you say that there were five tractor utility  
22 vehicles. That was based on the documentation that was  
23 available to you at that time. You had five Massey  
24 Ferguson and then six Landinis.

25 A. Yes, that's right.

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1 Q. And now that we've corrected or apparently clarified  
2 that overlap in the one approval relating to the boom  
3 truck, so that's now four Massey Fergusons and six  
4 Landinis. How many were underground at the time from the  
5 records you've been able to locate? You're looking now  
6 at Exhibit 73, Tab 11.

7 A. Right.

8 Q. This is the insurance claim.

9 A. According to this, there were two Massey --

10 Q. What page are you on?

11 A. Sorry, page three. There were two Massey Ferguson  
12 tractors underground and five Landini tractors  
13 underground. One of the Massey Ferguson tractors was  
14 known as "an ambulance" and it was at No. 10 Crosscut.

15 Q. Yes, so that according to that insurance claim on  
16 page 3, one of the Massey Fergusons is identified as  
17 underground. It doesn't say where. One is identified at  
18 the No. 10 Crosscut. And that would be the ambulance.  
19 And then the 5 Landinis are just identified as being  
20 underground without knowledge of location.

21 A. Right. No, they're mobile machines and they had no  
22 idea which machine was where.

23 Q. But we know from evidence, at least the evidence  
24 that's gone into the map that's at Exhibit 45, Tab 6,  
25 it's the small version of what we see up there, that

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1 there were at least three tractors down in the North  
2 Mains.

3 A. Yes.

4 Q. All clustered very close together near those working  
5 faces. We know that there was one in the Southwest  
6 district. That must have been a Massey Ferguson. We see  
7 it just past Southwest 1-2 Crosscut inbye. And then  
8 there was one in the No. 10 Crosscut. Do you know where  
9 the other two went?

10 A. I had no idea. They could have been in the buried  
11 portion of the mine to which access was not possible.

12 Q. All we know is that according to the insurance  
13 claim, there were two other tractors down there at the  
14 time.

15 A. Right.

16 Q. We have no information at this time as to where they  
17 might have been?

18 A. No.

19 Q. Okay. Are these standard-type tractors?

20 A. They've been modified to carry personnel. They have  
21 been equipped with catalytic converters on the exhaust  
22 system. Otherwise, they're fairly standard diesel  
23 tractors.

24 Q. Electric start?

25 A. Yes.

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1 Q. Non-flameproof?

2 A. Right.

3 Q. Okay. Were you able to locate approvals for some of  
4 these tractors? And let's take a look first for the four  
5 Massey Fergusons. Let's look at Exhibit 69-A, pages 177.

6 A. Yes, they all had approvals from the Department.  
7 And they all had a Schedule of Conditions, 15 conditions.

8 Q. So starting, for example, at page 177, we see a  
9 series of applications, approvals and conditions for each  
10 of the Massey Fergusons.

11 A. Yeah.

12 Q. And when we look at the conditions that would be  
13 attached, again these appear to be the standard  
14 conditions that we have seen earlier.

15 A. Yes.

16 Q. Must be operated with cutoffs. Can't be within 300  
17 feet of the last face. And the surface and roadway of  
18 the mine must be treated with incombustibles.

19 A. Right.

20 Q. If, indeed, those three Landinis were right down  
21 there in the North Mains, they would appear to be in  
22 violation of their conditions.

23 A. That's right.

24 Q. Let's look just for a moment to complete the record  
25 at the approvals that were granted to the Landinis. I'm

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1 going to ask you to switch exhibit books, to go to 69-B  
2 this time, at page 172 and the following pages there that  
3 cover the five of them. When we look at page 173, it's  
4 the same set of conditions that they were to operate  
5 under.

6 A. That's right.

7 Q. Let ask you this: Taking these tractors for what  
8 they were, how dangerous was it to have them down there  
9 that close to the face as we see them in the North Mains?

10 A. Well, a non-flameproof diesel is an obvious ignition  
11 source, almost a constant ignition source because of the  
12 hot exhaust gases. And the addition of a catalytic  
13 converter simply adds to the heat generated by the  
14 exhaust system because the purpose of the catalytic  
15 converter is to burn off any excess hydrocarbons and  
16 carbon monoxide. And they get very hot at times,  
17 especially if these were exposed to methane gas.

18 Q. We've heard from other evidence that you get a mine  
19 explosion once you've got an ignition source and a fuel.

20 A. Right.

21 Q. And we've heard that methane gas can be a fuel, and  
22 we've heard that coal dust can be a fuel.

23 A. Uh-huh.

24 Q. What you're telling us that these tractors were  
25 mobile ignition points wandering around that mine looking

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1 for fuel.

2 A. That's right.

3 Q. In a mine that had coal dust and methane in it?

4 A. Yes.

5 Q. It would strike me as being pretty dangerous.

6 A. I agree.

7 Q. Okay. Let me come back to your report, if I can  
8 keep myself from getting confused among these books here.  
9 In the section dealing with diesel equipment, you also  
10 refer to a diesel-powered generator, and you make the  
11 comment about it in the text of your report that this was  
12 a generator that could be towed behind a continuous  
13 miner.

14 A. Yes.

15 Q. Were you able to find an approval for that machine?

16 A. Yes, I was.

17 Q. And I'll refer you this time to Exhibit 69-B at page  
18 90. Have you got that?

19 A. Yes, I have.

20 Q. Now page 90 is the approval. Page 91 is, of course,  
21 the application. And then on page 92, we see the  
22 conditions which were imposed. And I assume those  
23 conditions as I read them suggested to me that it was, in  
24 fact, contemplated that that generator would be permitted  
25 to go underground and to be towed behind a continuous

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1 miner when it was being moved from one location to  
2 another.

3 A. Yes, as I understand it, the purpose of this  
4 generator was so that it was to move an electrical mining  
5 machine into the mine, say, a cutter or continuous miner  
6 or a shuttle car. It would not be necessary to hook up  
7 to the electrical system. This would require great  
8 lengths of trailing cable. So the generator was  
9 purchased and used to move these machines down into the  
10 mine to a point where they could conveniently hook up an  
11 electrical cable and continue moving it into the mine.

12 Q. I notice from the conditions that are set out that  
13 it's obviously the intent that that generator is not to  
14 be used up close to any working face or whatever.

15 A. Yes.

16 Q. And as long as it was operated in compliance with  
17 the conditions, then it would in compliance with the  
18 approval?

19 A. Yes, I don't know whether they mentioned anything  
20 about coal dust here but --

21 Q. I don't think so.

22 A. That would be one of my concerns.

23 Q. So that was perhaps a condition that should have  
24 been attached to this approval. Is that what you're  
25 saying?

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1 A. I would think so. They mentioned the methane, but  
2 they didn't mention the coal dust. To be consistent with  
3 other non-flameproof diesels, they should have mentioned  
4 the non-combustible content of the coal dust.

5 Q. I notice on the application, the previous page 91,  
6 this is a non-flameproof machine.

7 A. Right.

8 Q. But it's to be housed in a flameproof structure.  
9 Does that help at all?

10 A. I don't think that's the use of the word  
11 "flameproof" as I have defined it.

12 Q. All right.

13 A. They talk here about the dry chemical fire  
14 extinguishing system.

15 Q. Okay. All right, so that's the diesel-powered  
16 generator.

17 A. As I recall it, it did not have a flameproof  
18 enclosure. I looked at this generator.

19 Q. You saw it.

20 A. Yes.

21 Q. That was above ground.

22 A. Yes.

23 Q. In your report when you're dealing with diesel  
24 equipment, you make one other comment that I just want to  
25 elaborate on today and that's the fact that you saw some

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1 reference to jumper cables suggesting to you that they  
2 may have been doing jump starts of some of this diesel  
3 equipment down in the mine. Can you turn to Exhibit 73  
4 at -- just let me find it for you here, just a second  
5 now. Now Exhibit 73, Tab 10, the last two pages under  
6 that tab, pages 70 and 71. That's a material purchase  
7 requisition on page 70?

8 A. Yes.

9 Q. For booster cables?

10 A. Right.

11 Q. Take a look down on the bottom right-hand side  
12 where, apparently, somebody has written what they're  
13 going to use them for.

14 A. Yes, under the title of "end use"?

15 Q. Yes.

16 A. Jump-start underground, "U G" that is, which stands  
17 for "underground," and surface machines.

18 Q. And we know that they got some of these because the  
19 next invoice is a clamp that, I assume, goes with the  
20 cable. How significant is it to you that they would be  
21 doing jump-starts in the mine?

22 A. Well, this is just another obvious ignition source  
23 when you connect two machines together with jumper cables  
24 you will see sparks and if there is a problem starting a  
25 diesel machine underground, the only thing they can do,

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1       apart from towing it out with another machine, is to  
2       jump-start it.

3               Now with a flameproof machine, you have air start,  
4       an air-start feature, which allows you to connect an air  
5       hose from one machine to another and start the machine  
6       quite safely.

7               In the case of electric start machines, it would be  
8       necessary to use these jumper cables with these clamps.  
9       And as soon as you connect the jumper cable to the  
10      battery, there would be a spark. And then when you start  
11      again, unless the clamp is extremely tight, there may be  
12      sparking at the terminal. So it's a very dangerous  
13      procedure in an underground coal mine. Now there's no  
14      guarantee that they were actually doing this underground  
15      but having purchased six sets of jumper cable clamps, it  
16      leads one to suspect that this might have been going on.

17      Q.     And as you say, any of that diesel-powered equipment  
18      that was non-flameproof, like the tractors, the bull  
19      dozer, the only other way to get it started down there if  
20      it stalled was either tow it out or jump-start it?

21      A.     Yeah.

22      Q.     The air start on flameproof equipment, that's a  
23      compressed air-start mechanism?

24      A.     Yes. There's a compressed air tank on each machine,  
25      and you will get two or three starts out of the air tank

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1 and it's recharged every time the machine is running.

2 Q. All right.

3 A. And if there's difficulty starting an air-start  
4 machine, you can connect an air hose from one machine to  
5 another and start it with a running machine using their  
6 compressor.

7 Q. All right. Now those are the comments that you want  
8 to make about the diesel equipment that you're aware of  
9 being in the mine.

10 A. Yeah.

11 Q. And which ones had approvals, didn't have approvals  
12 and what the conditions were. Now let me ask you this:  
13 fairly significant items of this diesel equipment were  
14 non-flameproof for which approvals were sought by the  
15 company and granted by the Department under conditions.  
16 What is your view as to whether non-flameproof equipment  
17 should be permitted in the mine at all.

18 A. My personal view is that it should not have been  
19 permitted. My reason for this is that I know of no other  
20 jurisdiction in Canada where it is permitted. I do know  
21 of tunnels that have been driven in hard rock for  
22 accessing coal seams and even that was required to be  
23 flameproof. There's only one country in the world that I  
24 am aware of that uses non-flameproof diesels in coal  
25 mines and that's the USA. However, the USA have very

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1 strict regulations about rock dusting and the limitations  
2 on these machines. So there's a danger in copying the --  
3 copying a procedure used in another country unless you  
4 copy the entire procedure. In other words, the  
5 enforcement must be very strict. My personal view  
6 remains that it is not a safe procedure.

7 Q. Even with conditions attached?

8 A. Well, they attached conditions, but you can see that  
9 they were not adhered to.

10 Q. If you do, as you say, if you do allow them into the  
11 mine on conditions, then you have to rely completely on  
12 mine management and mine personnel --

13 A. And inspection.

14 Q. All right. But initially, the only way you will  
15 know for sure where those machines are wandering around  
16 in that mine is the sincerity and safety-consciousness of  
17 mine personnel?

18 A. That's right.

19 Q. It's pretty hard to police that.

20 A. But the conditions should have been imposed on the  
21 mine before the machines went in, for example, the coal  
22 dust issue. That should have been resolved before any of  
23 these diesels were allowed to go into the mine.

24 Q. What do you mean by that? Just elaborate on that  
25 for a moment?

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1 A. Well, the rock dusting should have been done  
2 thoroughly and testing should have been done of the  
3 resultant dust before they permitted any non-flameproof  
4 machines to enter. And in fact, as I understand, the  
5 testing was done just perhaps a few days before the  
6 explosion occurred.

7 Q. How significant would it be to monitor and ensure  
8 that rock dusting was being properly done? I'm talking  
9 here about both mine management and regulatory  
10 inspectors, in light of the fact that you do have non-  
11 flameproof vehicles wandering around down there. Does  
12 that make an additional reason for being strict on rock  
13 dusting?

14 A. Absolutely. It should be done in any case, but with  
15 non-flameproof machines in the mine, there should have  
16 been routine testing of the dust.

17 Q. Okay. Let me ask you this. We've heard evidence  
18 and we will hear evidence that some of this equipment  
19 that we've just been talking about was used equipment and  
20 was perhaps purchased from a previous company or user.  
21 What effect does that have on certifications that may  
22 have originally been granted to that equipment? Does  
23 transfer of ownership void the certification?

24 A. Not as far as I'm aware. In my experience, the  
25 certification is granted for the life of the equipment as

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1 long as it is not modified or repaired by a non-certified  
2 shop.

3 Q. So the fact that some of this may have been British  
4 equipment or even American equipment bought used does not  
5 itself affect the certification?

6 A. Does not invalidate the certificate, no.

7 Q. All right.

8 A. Unlike a used car, transfer of ownership does not  
9 require recertification --

10 Q. Okay.

11 A. -- not for mining machines.

12 Q. Let me bring you to another topic in your report,  
13 and that is the sort of mechanism of the explosion  
14 itself. I want to talk just for a few moments about how  
15 methane and coal dust may ignite. We've heard evidence  
16 that methane ignites easier than coal dust, but I've  
17 heard evidence as to a distinction being made between  
18 heat and energy levels. Can you describe that to me and  
19 tell me what the difference is and how it relates to the  
20 possible way by which you would ignite methane as opposed  
21 to coal dust?

22 A. Well, methane gas is ignited most easily by spark or  
23 flame, so that to ignite methane requires very little  
24 energy in form of a spark or a flame. However, methane  
25 has a high spontaneous ignition temperature, so it is

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1 difficult to ignite by hot surfaces.

2 Q. Methane?

3 A. Methane. it has a high --

4 Q. Now when you say "hot surfaces," you're not talking  
5 about red hot?

6 A. It would -- the surface would have to be red hot in  
7 order to ignite methane.

8 Q. Yes, that's --

9 A. Yes.

10 Q. -- my point. All right.

11 A. Coal dust is just the opposite. Because it is  
12 larger particles, the gasses being molecular in size,  
13 because it's larger particles, it's more difficult to  
14 ignite with a spark. Something like 200 times more  
15 difficult. A very large spark is required, and the coal  
16 dust has to be in suspension which means a cloud.  
17 However, coal dust is very easily ignited by hot  
18 surfaces. It has a low spontaneous ignition temperature.  
19 Some figures quote temperatures as low as 150 degrees  
20 Celsius as the ignition point of coal dust. That's coal  
21 dust in layers. There is a difference between the layer  
22 ignition temperature and the cloud ignition temperature,  
23 but that's not too significant here. The point is coal  
24 dust is more easily ignited than methane by a hot  
25 surface. Methane is more easily ignited by a spark or a

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1 flame.

2 Q. Let me see if I've got it.

3 A. So you've got the worst -- you've got the worst of  
4 both worlds here. You have a substance which is easily  
5 ignited by a hot surface in the form of coal dust, and  
6 you have a substance which is easily ignited by sparks or  
7 flames in the form of methane gas.

8 Q. But I want to make sure I understood a distinction  
9 that I think you just made, that in an ignition source,  
10 whether it be a hot surface or a spark or whatever, the  
11 distinction has to be made between the temperature of  
12 that source and its energy level.

13 A. Yes.

14 Q. So that methane requires a very high temperature --

15 A. Right.

16 Q. -- but a low energy?

17 A. Yes.

18 Q. So that you may have a spark but the spark must be  
19 hot enough to ignite methane?

20 A. Right.

21 Q. But it doesn't have to have a tremendous amount of  
22 energy?

23 A. Yes.

24 Q. Coal dust, on the other hand, is the opposite. It  
25 does not require much heat -- Let me make sure I'm

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1 getting this.

2 A. Much energy.

3 Q. Yeah, doesn't --

4 A. No, it requires a lot of energy.

5 Q. But it requires a lot of energy. I follow you.

6 A. Yeah.

7 Q. So that --

8 A. But not --

9 Q. So that a spark to ignite coal dust may well be a  
10 much lower temperature spark.

11 A. Uh huh.

12 Q. But it would need an awful lot of energy in that  
13 spark?

14 A. Yeah.

15 Q. Okay. And, in fact, we've heard evidence that the  
16 temperature that would be required to be generated by a  
17 spark or a hot surface to ignite methane was, I think,  
18 somewhere around 500 degrees Celsius?

19 A. Uh huh.

20 Q. Whereas you're saying coal dust could be ignited by  
21 that same hot surface or spark if it was about 150  
22 degrees Celsius?

23 A. That's right.

24 Q. All right.

25 A. This is particularly important in the case of a non-

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1 flameproof diesel because the manifold of an non-  
2 flameproof diesel, the manifold, the catalytic converter  
3 and, in fact, the exhaust gases coming out of the non-  
4 flameproof diesel would be at a high enough temperature  
5 to ignite the coal dust.

6 Q. Okay. And we'll come to the diesels in a minute. I  
7 would like to discuss with you each of the possible  
8 sources of ignition that you've identified as existing in  
9 that Southwest district where it appears that this  
10 explosion began.

11 Let me start with the miner. And in the addendum to  
12 your report under Tab 3 you refer to correspondence that  
13 you had with the manufacturer of that miner, Joy  
14 Technologies. And the real question, I guess, is what  
15 evidence do we have as to whether that miner was, in  
16 fact, operating or not?

17 A. We have some photographs.

18 Q. Uh huh. And this would be in Exhibit 73 and, I'm  
19 told, 59. So we're going to look at Exhibit 73 and 59.  
20 And Tab 10, at the very back of Tab 10 --

21 A. I think you're looking at 67, 68 --

22 Q. Yes.

23 A. -- 69.

24 Q. Okay. Now what do you understand as far as all the  
25 switches for the continuous miner to make it operate were

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1 in the "on" or "off" position, based on those  
2 photographs?

3 A. Well, based on page 67, Photograph 247, the Joy  
4 company were able to report --

5 Q. Just so nobody is confused, that top photograph is  
6 not of the miner.

7 A. No.

8 Q. That's of the boom truck.

9 A. That's the boom truck.

10 Q. Yeah, okay.

11 A. So from Photographs 247 and 248 which is on the next  
12 page, 68, the Joy company said the pump motor control  
13 switch, the cutter motor control switch and the conveyor  
14 motor gathering-head switch are set in the "on" position.

15 Q. And in the photograph where do you understand those  
16 switches to be?

17 A. They would be the left of the driver's seat. We see  
18 right down in the middle of the photograph near the  
19 bottom, just to the right of that sort of tube that --

20 A. There are a number of flameproof switches there.

21 Q. Yeah. And they're all turned to the right or  
22 switched to the right, pointing to the right? All three  
23 of them? Is that what I should be looking at?

24 A. Yes.

25 Q. Okay.

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1 A. According to the experts at the Joy company who know  
2 this machine --

3 COMMISSIONER These are the long handles, are they, with  
4 the knobs?

5 A. No, no.

6 MR. MERRICK No. No.

7 COMMISSIONER No?

8 MR. MERRICK Below that there's a -- right in the  
9 bottom of the photograph there is a --

10 COMMISSIONER 247?

11 MR. MERRICK In 247 --

12 COMMISSIONER Yeah?

13 MR. MERRICK -- there's a plate right in the middle of  
14 the photograph about half an inch up.

15 COMMISSIONER Uh huh. Okay, I see them. Like toggles?

16 MR. MERRICK That's it.

17 COMMISSIONER Yeah, right.

18 A. According to the engineers at Joy Manufacturing  
19 Company, those three switches were in the "on" position.

20 MR. MERRICK And they govern what again?

21 A. They govern the front motor control switch, the  
22 cutter motor control switch, and the conveyor motor  
23 gathering-head switch.

24 Q. All right.

25 A. They're all set in the "on" position. Now they go

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1 on to say that this does not necessarily mean the  
2 continuous miner was operating at the time of or just  
3 prior to the explosion. The reasons they give for this  
4 is the operator could turn off the motors by striking the  
5 panic bar on the emergency stop button. The methane  
6 monitor control could have shut down the cutter motors.  
7 And the last quotation said that the continuous miner  
8 could not operate with the hydraulic controls in the  
9 locations shown in these two pictures. You will notice  
10 the hydraulic controls are those long handles with the  
11 knobs, and they have been pushed over to the left which  
12 is an abnormal position in 247 and 248. We see there --

13 Q. We see it most clearly on page 68, Photograph 248.

14 A. Yeah, there are a number of --

15 Q. There are no --

16 A. -- hydraulic controls there and the handles are  
17 pushed over to the left-hand side.

18 Q. So the manufacturer gave three reasons that may have  
19 indicated the miner was --

20 A. Yeah.

21 Q. -- not running at the time, panic bar might --

22 A. Panic bar.

23 Q. -- have been pushed. Or a stop button.

24 A. Monitor might have shut down the cutters. And the  
25 hydraulic controls could not operate in that position.

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1 Q. Yes. As far as that last reason, the position of  
2 the hydraulic controls, what is your opinion as to  
3 whether in fact those hydraulic controls were pushed to  
4 the left like that at the time.

5 A. Well, if you notice on page 69, Photograph 246 --

6 Q. Yes?

7 A. -- the left-hand side -- the left-hand lower side  
8 you can see a square-faced instrument there. This is the  
9 gas monitor.

10 Q. Now just let me slow down. This is that same  
11 photograph of the same cockpit from a little further  
12 back --

13 COMMISSIONER 246?

14 MR. MERRICK 246.

15 A. 246, right. There is a gas monitor there.

16 MR. MERRICK In fact, if we'll just compare Photographs  
17 248 and 246 and let me -- we see -- let me begin on 248.  
18 If you look up to the top of the picture on the left-hand  
19 side, there's a yellow can. What do they call those? It  
20 looks like aerosol can --

21 A. Aerosol.

22 Q. -- or something. Do you see that?

23 A. Yes.

24 Q. And just in front of it on Photograph 248 is a plate  
25 with four screws in the corners.

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- 1 A. Yes.
- 2 Q. Which has nothing in it?
- 3 A. That's right.
- 4 Q. Now let's look over at page 246. We find that same
- 5 can --
- 6 A. Same can.
- 7 Q. -- and in front of it we see the plate, but this
- 8 time it's got something bolted to it.
- 9 A. Right.
- 10 Q. What is it that's bolted to it?
- 11 A. That's the gas monitor.
- 12 Q. That's the methanometer?
- 13 A. Methanometer.
- 14 Q. Okay. Now so it's between the pictures 246 and 248,
- 15 the methanometer has been removed?
- 16 A. Yes. And this was the methanometer that was removed
- 17 by the RCMP and taken to Ottawa for testing.
- 18 Q. Okay. Let me take you to one more photograph. If
- 19 you can turn to Exhibit 59. That's the book of the
- 20 photographs that are shown on the wall. Just a second,
- 21 we'll grab it for you. Photograph 24.
- 22 A. Yes.
- 23 Q. Just now --
- 24 A. Yes.
- 25 Q. -- we're looking at Exhibit 59, Photograph 24.

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1 We'll keep both sets open.

2 COMMISSIONER 59?

3 MR. MERRICK Exhibit 59. It's the small book of  
4 photographs.

5 COMMISSIONER Okay.

6 MR. MERRICK And it's Photograph No. 24.

7 A. I've got it.

8 Q. A photograph of the continuous miner. And if we  
9 take a look down through the cab we can see the knobs on  
10 those levers. And they would appear to be coming  
11 straight out.

12 A. Yeah, just behind the post for the roof support you  
13 can see --

14 Q. The methanometer?

15 A. -- a part of the methanometer.

16 Q. So we have a photograph of the miner before the  
17 methanometer was removed with, as far as we can tell from  
18 the detail, the hydraulic levels in a neutral position or  
19 in a straight-out position?

20 A. Yes. That would, I assume, be the normal operating  
21 condition.

22 Q. And when we look at the photograph in Exhibit 73,  
23 Tab 10, page 68, Photograph 248, the one that shows them  
24 all pushed over, that's the one where the methanometer --  
25 that's after the methanometer has been removed?

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1 A. Right.

2 Q. So what conclusion do you draw?

3 A. My conclusion would be that the person who removed  
4 the methanometer found these hydraulic controls to be in  
5 his way and he pushed them to the side.

6 Q. And that would be the way you would tend to push  
7 them if you were trying to get in --

8 A. Yes.

9 Q. -- to remove the methanometer?

10 A. He would enter from the right-hand side, I believe.  
11 Yes, that's the entry point. And if the knobs were  
12 sticking out, the natural tendency would be to push them  
13 to the side to work on the methanometer.

14 Q. Either intentionally or inadvertently?

15 A. Yes.

16 Q. So that if, in fact, that is a valid hypothesis,  
17 then every bit of information we have from the Joy  
18 Company is that the miner was operating unless the  
19 methanometer had shut it off or unless the operator hit a  
20 panic button or stop button to stop it?

21 A. Uh huh.

22 Q. Okay. Mr. Commissioner, that's a convenient break  
23 point if you're ready to take the noon --

24 COMMISSIONER Sure, that's fine. We'll recess until two  
25 o'clock.

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1 INQUIRY RECESSED (TIME: 12:29 p.m.)

2 INQUIRY RESUMES (TIME: 2:00 p.m.)

3 COMMISSIONER Mr. Merrick?

4 MR. MERRICK Thank you.

5 Q. Mr. Bossert, just before the noon break, we had  
6 been talking about the comments in your report as to the  
7 possible sources of ignition in the Southwest district,  
8 and we had talked about the miner and the evidence both  
9 pro and con at being on at the time. I didn't ask you  
10 just before we broke, based on everything that you have  
11 seen and all of the information that you obtained from  
12 the company, what's your opinion as to whether that miner  
13 was at least in the operating mode? Leave aside for a  
14 moment that it may have been shut off by an emergency  
15 shutoff, that it was at least in the operating mode at  
16 the time of the incident?

17 A. I think there's a very good chance it was in the  
18 operating mode.

19 Q. All right. I notice from your report, and I'm  
20 looking at the appendix under Tab 3 where you've included  
21 the response of Joy Technologies Inc. to the various  
22 questions that you posed. Was this document, in fact,  
23 provided by them to you?

24 A. Yes, it was.

25 Q. That you asked them about the water sprays on the

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1 continuous miner and, in particular, whether it was pick  
2 point flooding. What do you understand was the nature of  
3 the water spray on that machine?

4 A. According to their answer, the nature of the water  
5 spray that it was what they call a deluge system. They  
6 simply sprayed the water at the coal face, not at any  
7 particular location, but simply to suppress dust  
8 generated by the picks. It was not intended to suppress  
9 sparking. It might have had that effect, but it was not  
10 the intent of the water spray.

11 Q. All right. You talk in your report about the  
12 bolters and whether they are a potential source of  
13 ignition.

14 A. Yes.

15 Q. How highly do you rate them as a possible source of  
16 ignition?

17 A. Well, in view of the fact that we have found some  
18 evidence that there was no drilling steel nor nut runners  
19 in any of the bolter heads, it's very unlikely that they  
20 would be the source of ignition.

21 Q. Apart from possibly electrical faults for which --

22 A. Yes, but the machines were fully flameproofed and  
23 the electrical fault would be an unlikely event, I think.

24 Q. What about the fans?

25 A. Well, the fans have an induction motor. It's a

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1 nonsparking component. They were also, the motors were  
2 flameproof. There was some question about friction or  
3 sparking of the fans blades, but I think that's unlikely.  
4 Any material getting into the fan would have to be drawn  
5 through several hundred feet of tubing before it reached  
6 the fan. It isn't likely that any articles that would be  
7 heavy enough and hard enough to cause a spark would be  
8 drawn that far through a vent tube.

9 Q. Let's talk about the boom truck, and to begin with,  
10 and again this is Boom Truck 0414, I think we were  
11 referring to it.

12 A. Yes.

13 Q. That has a little bit of a history to it that you  
14 tracked down for us. Can you give me the history on that  
15 boom truck?

16 A. Yes, it's an interesting history. The machine  
17 itself was built for the Eimco Company by another company  
18 called K&K Manufacturing. K&K Manufacturing has since  
19 changed its name to SISU Logging. They still build  
20 trucks, mostly for the logging industry. In this  
21 particular instance, we were fortunate in finding Mr.  
22 Westland, I think his name was, who had worked for the  
23 company when the machine was actually built. Mr.  
24 Westlund. Mr. Westlund had been working for the K&K  
25 Manufacturing Company back in 1975. This machine was

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1 quite old. It was built in 1975, and according to Mr.  
2 Westlund's information, it was originally built as a  
3 flameproof machine to Schedule 31. That's the U.S.  
4 standard for flameproof machines, diesel machines. It  
5 was sold originally through Wajax, which is a distributor  
6 of mining equipment, to Kaiser Resources and, apparently,  
7 was used in their hydraulic mine in British Columbia.

8 Q. Was this a hydraulic coal mine?

9 A. Hydraulic coal mine, yes. The only difference there  
10 being because of the height of the seams, they use water  
11 jets to mine the coal rather than cutters, the continuous  
12 miners. I think the seams are 50 feet high.

13 Because of the fact that they were using high  
14 pressure water jets, they had to have a lot of pipe. So  
15 they ordered three of these trucks. They were originally  
16 called pipe trucks rather than boom trucks. They were  
17 used for carrying this high pressure water pipe into the  
18 mine. That mine has since gone out of business and, for  
19 some reason, I don't know, I haven't been able to trace  
20 the history since then, it was converted from a  
21 flameproof machine to a non-flameproof machine and the  
22 modifications to it are quite extensive, as you can see  
23 from Mr. Westlund's letter.

24 Q. Did you provide him with a photograph of the truck?

25 A. Yes, I did. I provided him with two photographs.

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1 Q. All right, which two photographs did you provide him  
2 with? In one exhibit, Exhibit 59, Photograph 27, is a  
3 photograph taken by the RCMP of the truck as it's located  
4 -- Photograph 27.

5 A. No, that was not one of the photographs I sent.

6 Q. All right. Was it one of the ones in Exhibit 73,  
7 the ring binder?

8 A. Yes, I believe it was. Actually, I sent him two.

9 Q. Under tab 10?

10 A. Tab 10, right.

11 Q. Last couple of pages. Actually, page 66-A and 67.

12 A. Yes, I guess they would be the ones labelled 200 and  
13 201.

14 Q. Yes.

15 A. Yes, those photographs were sent to him and  
16 specifically I was interested in what the function and  
17 the position of the switches shown in 201, what they  
18 meant.

19 Q. Those are the switches that we see right in the  
20 middle of that photograph, are they?

21 A. Right.

22 Q. Yes.

23 A. He told me that he didn't recognize those switches.  
24 They were not original equipment and had been added by  
25 someone else.

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1 Q. All right.

2 A. He did not know the function, but he suspected they  
3 might have controlled the battery circuit for the  
4 electric start.

5 Q. Was he able to describe to you from those  
6 photographs changes that had been made to that vehicle,  
7 particularly changes that would have affected its  
8 flameproof status?

9 A. Yes, he did.

10 Q. Can you tell me what they were?

11 A. I'm just going through his letter. The shipped unit  
12 had a Farr air cleaner, Schedule 31 approved, and that  
13 has been removed because it was not shown in the  
14 photograph.

15 Q. We're looking at Schedule now to Tab 3 of your  
16 report.

17 A. Right, Appendix C.

18 Q. This is the letter from Mr. Westlund, is it?

19 A. Westlund.

20 Q. Westlund, in response to your questions.

21 A. He indicated also that the shipped unit had an  
22 intake flame arrester and an intake emergency shutoff,  
23 which would be an air shutoff valve, and he indicated  
24 those also had been removed.

25 Q. Now he says, "Removed or relocated."

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1 A. Yes.

2 Q. From any of the photographs that you've seen, can  
3 you see where it may have been put in another place?

4 A. No, I can't. I can't imagine it being relocated  
5 because the intake manifold is in a certain spot on the  
6 engine and it wouldn't be too convenient to locate it  
7 elsewhere.

8 Q. Okay.

9 A. Item 3 of his letter, he indicated that a larger  
10 fuel tank had been installed.

11 Q. How might that affect its -- or would that affect in  
12 any way its flameproof --

13 A. Not necessarily, no.

14 Q. All right.

15 A. Item 4, he indicated the engine hood tapered to one  
16 side with no side controls. He indicated the engine hood  
17 was completely modified and control switches had been  
18 added to the side panel. Those are the ones you see in  
19 Photograph 201.

20 Q. And I assume that when he refers to Photograph 975-  
21 0139, we see a photograph two pages further on of the  
22 truck in its original condition.

23 A. Yes, that's correct.

24 Q. And that's a photograph --

25 A. That's a similar truck built at the same time for

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1 the same company.

2 Q. All right, we don't know that it's the exact same  
3 truck.

4 A. No, it's not the exact same truck, but he said the  
5 three trucks were shipped at the same time and they were  
6 identical. So he felt this photograph, which was the  
7 only one he could find, would be representative.

8 Q. And I take it that the numbers drawn on that  
9 photograph, he drew those numbers?

10 A. I believe so.

11 Q. Do I assume correctly that they are referring to  
12 some of the numbered comments that he's got in his  
13 letter?

14 A. That would be my assumption, yes.

15 Q. All right, keep going.

16 A. They seem to correspond. Okay, now he's referencing  
17 Photograph 202. Do we have a copy of that? It's not in  
18 this file.

19 Q. I don't have it for you. Just a minute now. He  
20 indicated that there was open space at Item 5 on this  
21 photograph and the involved unit had a small reservoir  
22 and a fire extinguisher mounted in that space.

23 Q. You sent him, in addition to the photographs we're  
24 looking at, you also sent him photographs 201 and 202?

25 A. Yes.

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1 Q. All right, we'll have those in a minute. Okay, keep  
2 going.

3 A. His comment there is: "The hood area was left  
4 unobstructed for operator visibility on the original  
5 equipment." Item 6, exhaust scrubber. You can see that  
6 in his photograph.

7 Q. This is important, I assume.

8 A. Yes.

9 Q. Because this would go to its flameproofability.

10 A. The exhaust scrubber is essential to a flameproof  
11 machine. What it does is cool the exhaust gases coming  
12 from the engine.

13 Q. Did you say you can see it from his photograph?

14 A. You can see it in his photograph. It's not very  
15 clear, but it's obviously been removed.

16 Q. Well, can you direct me to it in his photograph?  
17 This is two pages on in your report.

18 A. Yes, it would be Item 5 in his photograph, just  
19 behind the steering wheel.

20 Q. All right, that's not very distinct.

21 A. And behind the steering wheel in this 201, there's  
22 open space.

23 COMMISSIONER That number refers to the open hood space,  
24 Mr. Bossert.

25 A. I'm sorry.

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1 COMMISSIONER Six.

2 A. Six, yes, six is the exhaust scrubber. I don't see  
3 No. 6.

4 COMMISSIONER The six is not shown as a number there.

5 A. Okay, right.

6 MR. MERRICK Do you know where they would have mounted  
7 their exhaust scrubber?

8 A. Well, it would have been on the exhaust side, and I  
9 think we have to refer to 202 to see that. Perhaps  
10 looking at 200 temporarily, you can see where it would  
11 have been.

12 Q. Where would it have been?

13 A. You can see an exhaust pipe coming across and down.

14 Q. Yes, coming out of the engine block?

15 A. Coming out of the engine block and down to what  
16 looks like a step. At the bottom there, you see a  
17 catalytic converter.

18 Q. Is that that bulge in the pipe?

19 A. The bulge in the pipe is a catalytic converter.  
20 That was not there originally and in its place would be  
21 the scrubber box. It's a water bath scrubber, and it  
22 also had flame traps. And I believe there's photographs  
23 in my report, a couple of pages back. There is a page  
24 showing the exhaust group.

25 Q. I'm sorry, you're in your report now?

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1 A. In my report, yes, two pages beyond the photograph,  
2 there's a diagram; it's a parts list.

3 Q. Yes, I see it.

4 A. For the scrubber. They call it the exhaust group.  
5 The box there is the scrubber. The exhaust pipe is up  
6 above. It goes into the scrubber and on the exhaust side  
7 of the scrubber you will see two flame traps, Item 7.

8 Q. Those are those vents with handles on them?

9 A. Flame arresters, yes. Those are spaced plate flame  
10 arresters. They consist of plates approximately two  
11 inches wide spaced something in the order of 20/1000ths  
12 of an inch apart.

13 COMMISSIONER You're saying that that whole exhaust  
14 group unit was the one removed and replaced with a cat.  
15 converter.

16 A. Right.

17 COMMISSIONER Okay, thank you.

18 MR. BOSSERT So the exhaust scrubber which serves the  
19 function of cooling the exhaust and arresting any flames  
20 through those flame traps, that was completely removed.

21 MR. MERRICK Okay.

22 A. And Item 7 is the hydraulic tank. The original  
23 equipment hydraulic tank was mounted behind the engine in  
24 the centre section of the machine, and here we see it  
25 quite clearly in Photograph 200. It's actually marked

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1 "Hyd" tank, H-Y-D- tank.

2 Q. Oh, yes, right at the front of it.

3 A. It's mounted at the front and it's much larger,  
4 according to Mr. Westlund, it's much larger than the  
5 original equipment.

6 Q. Okay.

7 A. So those are the modifications that had been made to  
8 that machine over the years. We don't know who did them  
9 or why they did them. Presumably, it was for a time used  
10 in a non-coal mine environment, and they felt that this  
11 extra baggage was just adding weight and cutting down the  
12 efficiency so they removed it.

13 Q. What information did you -- You initially wrote to  
14 him asking, in addition to the other things, to determine  
15 the meaning of the switches and whether they were in the  
16 on position.

17 A. Right.

18 Q. What information have you received as to whether  
19 that vehicle was switched on at the time?

20 A. Just what he said in the bottom of page two of his  
21 letter, and I'm quoting:

22 "It is difficult to say that this machine was  
23 running when the accident occurred. The switches, et  
24 cetera, are not original equipment. In my opinion, they  
25 look like a typical non-schedule 31 approved electrical

MR. BOSSERT, EXAM. BY MR. MERRICK

1 switches. The fact alone that the switches are turned to  
2 the run position only implies that the unit may have been  
3 running. The reason I say this is because you don't have  
4 to turn the switch off to shut the machine off. Quite  
5 often when the machine is temporarily shut down, the  
6 switches are left in the run position. Other factors  
7 must be involved to determine if the machine was actually  
8 running."

9 Q. All right. So that, in his opinion at least, it  
10 appears to him that the switches are in the on position,  
11 but that that is not determinative of whether it was  
12 actually running.

13 A. That's right.

14 Q. Your report makes a point of the fact that it was  
15 sitting in a crosscut blocking access, knowing that there  
16 was a shuttle car just up that heading that was about  
17 three-quarters full and would have to come out of that  
18 heading.

19 A. Yes.

20 Q. And the implication then is that it must have been  
21 left in the running position because it was going to be  
22 moved very quickly.

23 A. It wouldn't make much sense to shut it down, only to  
24 have to restart it minutes later.

25 Q. Okay. Looking at that machine or that boom truck,

MR. BOSSERT, EXAM. BY MR. MERRICK

1 and I'm going to draw a distinction here in my questions  
2 because I think this is a distinction you draw in your  
3 report, what is your assessment as to this being a  
4 possible source of ignition? I'm not suggesting here how  
5 possible it may have been that it caused this ignition,  
6 but that it was an ignition source looking for fuel?

7 A. Well, there are numerous ways it could have caused  
8 an ignition. If we assume that it was running, we could  
9 rule out, and there was no operator on board, we can  
10 assume that it was not being started. So that rules out  
11 the starting circuit. However, when a diesel engine is  
12 running, the exhaust manifold is hot and the exhaust  
13 gases which were, in this case you can see from  
14 Photograph 200, the exhaust gases were expelled at the  
15 floor level.

16 Q. Now just looking at Photograph 200, I see where that  
17 exhaust pipe coming down, it goes into the catalytic  
18 converter.

19 A. Right.

20 Q. And then I see what looks like the step with a vent  
21 coming out the side.

22 A. Yes. Now I understand that that is where the  
23 exhaust gases actually are emitted.

24 Q. All right, so they were coming out pretty close to  
25 the floor of the roadway.

MR. BOSSERT, EXAM. BY MR. MERRICK

1 A. Right. Now there are several things that can  
2 happen. The exhaust pipe itself is quite hot, I think I  
3 explained earlier. Probably above the spontaneous  
4 ignition temperature of coal dust and the exhaust gases  
5 are also above that temperature.

6 The presence of the catalytic converter enhances the  
7 heat in the exhaust because the catalytic converter is  
8 designed to burn catalytically any unburned hydrocarbons  
9 or whatever. It's intended to reduce the carbon  
10 monoxide. So that heats up the exhaust even further. It  
11 itself can get very hot. So there is, I think, a danger  
12 of flames, sparks or hot gases coming out of that exhaust  
13 opening igniting coal dust on the floor.

14 Q. I assume that if we hear evidence later on,  
15 anecdotal evidence of witnesses saying that they saw the  
16 exhaust of one or more of these diesel-powered units  
17 causing sparking in this coal dust and what looked like a  
18 sparkler shooting out from it, that's what you're talking  
19 about.

20 A. Yes.

21 Q. That's consistent with what you're saying.

22 A. Yes, that would be the hot exhaust gases igniting  
23 small particles of coal dust which happen to be blown  
24 into suspension by the force of the exhaust gas. That  
25 could cause quite a nice spark.

MR. BOSSERT, EXAM. BY MR. MERRICK

1 Q. All right.

2 Q. Other dangers of a diesel engine non-flameproofed.  
3 First of all, you have the intake flame arrester. The  
4 intake flame arrester is intended to prevent backfires  
5 from coming out, flames actually coming out of the  
6 cylinders due to something like perhaps a faulty exhaust  
7 or intake valve. The intake valves on this machine, we  
8 don't know what condition they were in, but the machine  
9 was built in '75 and this happened in '92. So it was  
10 getting up in years. Probably had a lot of hours on it.  
11 If any one of those intake valves were leaking, flames  
12 could be shot back into the intake. If there happened to  
13 be methane gas in the intake, of course, that would  
14 immediately cause an explosion.

15 Another possibility is a leaky exhaust valve could  
16 shoot flames down the exhaust pipe, which was unprotected  
17 as well. There is an additional hazard if these machines  
18 happen to -- if the intakes happens to bring in some  
19 methane gas. Now diesel engine, the timing of a diesel  
20 engine is governed by the injection of the fuel. It's  
21 injected at the precise moment that it reaches close to  
22 top dead centre.

23 If there is already fuel in the air, such as methane  
24 gas, this can ignite before the normal timing, causing  
25 the engine to run very rough and causing it to run very

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1 rich. And this can enhance any of these problems. The  
2 leaky intake or exhaust valves would be more prone to  
3 spewing out flames and, of course, having methane in the  
4 intake means it could go back out through the intake  
5 pipe.

6 It would also throw a lot of unburned hydrocarbon  
7 material at the catalytic converter which would tend to  
8 try and combust it catalytically and heat up. It would  
9 mean that the catalytic converter and the exhaust gases  
10 would be very much hotter than if it was running strictly  
11 on diesel fuel.

12 Q. And this would happen if there was methane in the  
13 air that was being used in the intake.

14 A. Yes.

15 Q. Now would that have to be methane in the explosive  
16 range of five to 15 percent?

17 A. Not necessarily. Even below the explosive limit  
18 would contribute to this factor. Of course, it has been  
19 demonstrated, and I think I referred to a report by  
20 Messrs. Stewart and Kallio, which proved conclusively  
21 that a diesel engine could run on methane gas alone once  
22 it was running. You could shut off the diesel fuel  
23 entirely and it would run very roughly, but it would  
24 continue to run on methane gas. There it had to be  
25 within the flammable limit, of course.

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1 Q. So whatever the degree of possibility or probability  
2 that this truck may have, in fact, set off this ignition,  
3 because of all these factors, it was a highly possible  
4 potential ignition point.

5 A. Yes.

6 Q. All right. Bearing all that in mind, how  
7 significant is it to you from a safety perspective; in  
8 other words, how much of a violation of safety common  
9 sense would it be to park that truck in that  
10 intersection?

11 A. I think it's a very great violation of safety.

12 Q. All right.

13 A. Anyone who knew what the machine was capable of  
14 would be crazy to park it there; that's my opinion. Of  
15 course, the miners were not aware of the hazards. So  
16 they were not to blame.

17 Q. Well, we'll see. Surely anybody who is operating  
18 that truck would have a pretty good idea that it wasn't  
19 flameproof and that it had a hot exhaust.

20 A. I think that would probably become apparent after  
21 using it.

22 Q. Sure. You wouldn't have to be a mines inspector or  
23 anything to know that.

24 A. Yeah. But, on the other hand, if they were told it  
25 was safe to use by their superiors, they --

MR. BOSSERT, EXAM. BY MR. MERRICK

1 Q. But you don't know that.

2 A. Wouldn't have the knowledge to dispute.

3 Q. But you don't know that.

4 A. No.

5 Q. It would seem to me that anybody reasonably familiar  
6 with that equipment would realize that it is a potential  
7 flame hazard and that you shouldn't put it anywhere where  
8 it might come into contact with fuel. Isn't that fair to  
9 say?

10 A. Yes, if they knew that, yes.

11 Q. All right. Well, we'll hear evidence as to the  
12 state of knowledge on the part of the miners themselves.

13 Just before I move on to the recommendations that  
14 you may want to make to the Commissioner, there are a  
15 couple of minor details I just want to clear up from this  
16 morning's evidence.

17 You indicated that the mine environmental system,  
18 the approval number that had been issued to it.

19 A. Yes.

20 Q. Were you able to clarify over the noon break whether  
21 that was the correct number that was being cited on the  
22 approval documents?

23 A. Yes, the number was incorrect. The numbers I was  
24 given by my friend at the EMR are approval No. 851 for  
25 the methane detector and 850 for the CO detector.

MR. BOSSERT, EXAM. BY MR. MERRICK

1 Q. So, just for the record, in order that nobody gets  
2 confused by this down the road, just give me a second  
3 while I look up the original page reference to make sure  
4 I've got the right one. In Exhibit 69-B, at page 76,  
5 this is a document we looked at this morning, it's the  
6 approval for the environmental monitoring system. The  
7 approval cites a certifying number, EMR No. 899. You're  
8 saying that that is an incorrect number?

9 A. That's a number assigned to the Joy Manufacturing  
10 Company for their shuttle cars and continuous miners.

11 Q. Okay.

12 A. It should have read 850 and 851.

13 Q. Okay. In fact, I notice over on page 78, which  
14 appears to be a supplementary page for the application  
15 because the application document says -- in a place  
16 marked certificate number, it says "See attached list,"  
17 and then this is an attached list, they include 850 and  
18 851.

19 A. Do they?

20 Q. Yes.

21 A. Okay. What page is that?

22 Q. 78. Do you see the application --

23 A. Yes.

24 Q. Page on 77.

25 A. There are some other numbers there as well.

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1 Q. Yeah.

2 A. But the methane sensor and the CO sensor are 850 and  
3 851.

4 Q. So the certifying number on the approval document  
5 appears maybe to have been a typographical error.

6 A. That would appear to be, yes.

7 Q. Okay. So in case anybody comes across that in the  
8 middle of the night sometime, there's an answer for that.

9 A. Uh-huh.

10 Q. We talked this morning about pumps and how there was  
11 no record of the company having had applied for approval  
12 for any of the pumps nor having obtained any approvals  
13 for any of the pumps being used underground. You  
14 determined that they had those pumps, both from the  
15 repair records, sending the motors out to be rewound, and  
16 from the insurance listing.

17 A. Yes.

18 Q. Were you able to check to see if any of those pumps  
19 referred to on those documents had, in fact, been issued  
20 a certificate number by EMR?

21 A. Yes, I checked at noon and none of those pumps were  
22 certified by EMR. They may have been certified by the  
23 British authorities, but we have no knowledge of that.

24 Q. All right. The fans that we talked about his  
25 morning. And let me just find the page reference for

MR. BOSSERT, EXAM. BY MR. MERRICK

1 those. Again, in Exhibit 69-B, pages 156 and 160, we  
2 looked at those this morning. At page 156 and 160 we see  
3 approvals issued for the sets of auxiliary fans. The  
4 numbers that are shown on those two approvals, the number  
5 "5833," that's a Buxton number?

6 A. I'm sorry, where is that number? Certified number,  
7 right. Okay. Yes, that would be a Buxton number.

8 Q. So that --

9 A. Because the certifying authority above there is  
10 shown as Buxton.

11 COMMISSIONER That's the lab that Mr. Brooks is  
12 referring to in his evidence, eh, Buxton?

13 A. Yes. Yes.

14 COMMISSIONER Okay, the British certifying agency?

15 A. Yes.

16 MR. MERRICK Right.

17 COMMISSIONER Okay, thanks.

18 A. And the letters after that, "BSS229 1957," that's  
19 the standard to which they were certified.

20 MR. MERRICK All right.

21 A. The old British standard, 229, dated 1957.

22 Q. But that would certainly indicate to you that this  
23 was British equipment that was referred to?

24 A. Yes, and that it was quite old because it's 1957.  
25 That's the standard.

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1 Q. I suppose that if you were thinking, it would also  
2 indicate to you that this may have meant a 50-hertz motor  
3 as opposed to a 60-hertz motor?

4 A. Yes, I don't think they use 60 hertz in the U.K.  
5 These were used motors, according to the next page, 157.

6 Q. Do you have any information to indicate what check  
7 the Department of Labour would make when they receive an  
8 application form which would certify -- which would refer  
9 to a British certification number? What check would the  
10 Department of Labour make to see if it was equipment that  
11 was, in fact, electrically compatible in Canada?

12 A. I don't know whether they did check. There's no  
13 indication on the application that it is, in fact, 50  
14 hertz. But the fact that it is imported as in used  
15 condition would indicate that it must have been --

16 Q. All right.

17 A. -- built for that frequency.

18 Q. One other question on this equipment, the Coal Mines  
19 Regulation Act in the section dealing with diesel, and  
20 I'm looking now at under the rules relating to diesel  
21 locomotives, and we can argue about whether that's  
22 applicable to any of these diesel vehicles that we had in  
23 here, but assuming for the moment that the rules would be  
24 applicable to these diesel equipment, Rule 7 says, "The  
25 exhaust from the engine of every diesel locomotive shall

MR. BOSSERT, EXAM. BY MR. MERRICK

1 be fitted with a flameproof trap to prevent the emission  
2 of sparks or flames and the emission of smoke or pungent  
3 fumes." Are you aware of any flameproof trap that was on  
4 the tractors, the boom trucks or the dozers that are  
5 referred to in the equipment that we went over this  
6 morning?

7 A. No, they did not have flameproof traps. The exhaust  
8 system described in Mr. Westlund's letter shows a typical  
9 flame trap or flame arrester as --

10 Q. And that's what you showed us a minute ago?

11 A. Yes. And that was removed from the boom truck and  
12 none of the other machines had such a trap.

13 Q. All right. Now let me come to the last topic I want  
14 to address with you. Having looked at all of the  
15 information that you have over the last few years in  
16 assisting the Inquiry and reviewing the certification and  
17 appropriateness of -- no, let me back up.

18 There's one other thing I want to do. I just want  
19 you to help us with one further report that has been  
20 distributed to the parties and that's the report of a Mr.  
21 Rogers who went down to look at three switches. It's in  
22 Exhibit 53, I'm told. And I will have it for you  
23 shortly. It was an investigation of three switches  
24 maintained in the No. 1 intake --

25 A. Uh huh.

MR. BOSSERT, EXAM. BY MR. MERRICK

1 Q. -- for which --

2 COMMISSIONER Page 5 of Exhibit 53.

3 MR. MERRICK Okay.

4 COMMISSIONER Page 5. I'm sorry, Tab 5, yeah. Yeah.

5 MR. MERRICK All right, do you have that?

6 A. Yes.

7 Q. I'm going to ask your assistance on this. For the  
8 record I'll indicate that the Inquiry retained Mr. Rogers  
9 to go down and take a look at those pieces of electrical  
10 equipment because there was some anecdotal evidence  
11 indicating that they may have been tampered with. The  
12 report has been filed, and it's not the intention at this  
13 point to call Mr. Rogers as a witness. His report speaks  
14 for itself. But it's a very technical report. I reread  
15 it again last night. I had some difficulty in fully  
16 understanding it. Let me ask you the basic question.  
17 You've read it. Does his report indicate any evidence of  
18 tampering with those pieces of equipment?

19 A. No, it does not.

20 Q. He does refer to the fact that there was an overload  
21 control or something removed?

22 A. There were three overloads in this switch, one for  
23 the incoming line and two for the outgoing lines. Only  
24 one of these overloads was used, just the incoming line.  
25 And -- but it was not due to tampering, it was just -- it

MR. BOSSERT, EXAM. BY MR. MERRICK

1 was a deliberate decision that they needed only the one  
2 overload.

3 Q. Would you consider that a proper decision to be  
4 made?

5 A. Yes, I think so. If the incoming overload was  
6 sufficient to protect the outgoing lines, there's no need  
7 for the other two.

8 Q. All right.

9 A. It would only be necessary if the -- for some reason  
10 the outgoing lines were a smaller gauge or whatever and  
11 they needed protection at a lower level.

12 Q. All right. Well, unless --

13 A. I think it was a conscious decision on the part of  
14 the installer --

15 Q. All right.

16 A. -- to not use those overloads.

17 Q. It's not the intention of Commission counsel at this  
18 point to call Mr. Rogers unless we receive a request from  
19 anybody else that they wish to examine him on that  
20 report. You're satisfied that there's no evidence he  
21 found, according to his report?

22 A. No, nothing --

23 Q. All right.

24 A. -- that would point to tampering.

25 Q. Okay. Let me now bring you to the last topic I want

MR. BOSSERT, EXAM. BY MR. MERRICK

1 to address with you. Having done all of your review on  
2 the appropriateness of equipment and the certification of  
3 equipment in the Westray Mine, what recommendations would  
4 you make to the Commissioner that might be suggestions  
5 for improvement in the future?

6 A. Well, first of all, I would say the Nova Scotia Coal  
7 Mining Act or the legislation needs to be updated. For  
8 example, it refers to the chief engineer which would mean  
9 the -- in this case, would mean the person in charge of  
10 the steam boilers. Now steam power has not been used in  
11 underground coal mines for many, many years so that  
12 indicates how old and how ancient the code is. Instead  
13 of referring to the engineer, they should refer to the  
14 chief electrician and the chief mechanic because  
15 electrical power and diesel power are the two main movers  
16 in the -- in coal mines.

17 There are a number of other things. They refer to  
18 wire armoured cable when, in fact, there are other  
19 armoured cables in use today which are equally acceptable  
20 in underground mines. The steel -- the flat steel  
21 armoured cable is quite common. I believe I've mentioned  
22 these in my report. Just refresh my memory here.

23 It means different testing agencies, but the names  
24 have been changed, and I don't know whether it's  
25 worthwhile keeping up to date because the name of my

MR. BOSSERT, EXAM. BY MR. MERRICK

1 department has been changed three times, in my memory.  
2 It started out as Mines & Technical Surveys. Then it was  
3 changed to Energy Mines & Resources. And today it's  
4 known as National Resources Canada.

5 The diesel regulations definitely need updating  
6 because they refer only to locomotives. And locomotives  
7 are not used very much in coal mines anymore. The more  
8 popular machine in underground coal mines is the rubber-  
9 tired vehicle. There are also some tracked vehicles, but  
10 I only know of one application where a diesel locomotive,  
11 that's in Cape Breton, where a diesel locomotive is  
12 actually used. So that has to be broadened.

13 And I think it would be wise since we have developed  
14 Canadian standards for much of this equipment, the  
15 definition of the term "permissible" should refer to the  
16 Canadian standard for this type of equipment. For  
17 example, there is a Canadian standard for flameproof  
18 electrical equipment. There's a standard for flameproof  
19 diesel equipment. There's a standard for fire-resistant  
20 materials, conveyor belting, and so on, and hydraulic  
21 fluids. These standards could be referenced in a  
22 provincial code.

23 Q. I take it that as it's presently worded, it's  
24 discretionary in the regulator -- in the Department or  
25 the province as to what, if any, certifying body they

MR. BOSSERT, EXAM. BY MR. MERRICK

1 wish to use as setting the standards and establishing  
2 whether those standards have been met.

3 A. Right.

4 Q. For example, in here we see where some equipment has  
5 been approved based on British certification.

6 A. Uh huh.

7 Q. You're suggesting that where applicable that now  
8 should be permissible equipment should be based on  
9 Canadian standards?

10 A. I think that would be a desirable thing. Of  
11 course, if the province wished to retain the option of  
12 using offshore or foreign certificates, then that's up to  
13 them.

14 Q. That kind of a change though, I assume, would have  
15 covered off the situation where we're getting possibly  
16 British electric motors in here that may have different  
17 running characteristics in the Canadian environment.

18 A. Running at the wrong frequency, yes.

19 Q. Had those motors been required to be certified by a  
20 Canadian authority, that difference would have been noted  
21 and changed or accommodated?

22 A. Yes.

23 Q. All right. What other recommendations?

24 A. Let me see. Well, I did recommend that fire-  
25 resistant materials should be used throughout the mines

MR. BOSSERT, EXAM. BY MR. MERRICK

1 and that should be mandatory in the code. And in this  
2 particular case some of the materials, for example, the  
3 conveyor belting, I believe the ventilating tubing and  
4 the trailing cables were all fire resistant and met the  
5 standards. But then you have the problem of the  
6 hydraulic fluids which were not. I think that should be  
7 mandated. Even in a coal mine a spill of hydraulic fluid  
8 can be ignited and cause a fire. You have enough  
9 combustible material in a coal mine without adding  
10 combustible hydraulic fluid.

11 Q. All right.

12 A. Basically, without going into great detail of the  
13 clause by clause, those were my recommendations --

14 Q. In general?

15 A. -- in general.

16 Q. All right. Those are all the questions I have for  
17 you.

18 A. Thank you.

19 COMMISSIONER Mr. Roberts?

20 EXAMINATION BY MR. ROBERTS

21 Q. Mr. Bossert, I'm going to return to the diesel  
22 equipment and the issue of the permissions and conditions  
23 upon -- were applied to its operation. I think your  
24 evidence is pretty clear that you consider this to be  
25 very dangerous equipment in the context of a coal mine?

MR. BOSSERT, EXAM. BY MR. ROBERTS

1 A. Yes.

2 Q. And that it's -- first of all, I suppose it's very  
3 important that if it's going to be used at all  
4 underground that proper conditions -- the appropriate  
5 conditions be set for its use?

6 A. Yes, that's right.

7 Q. And that those conditions be complied with once  
8 they're set?

9 A. Yes.

10 Q. And would you agree as well that it would be  
11 important that the body that sets the conditions, in this  
12 case the Department of Labour, take some effort to ensure  
13 that they in fact are being complied with?

14 A. Yes, I think the conditions -- as I stated earlier,  
15 the conditions should have been met before the machines  
16 were allowed into the mine. That is, the machines should  
17 be prohibited from entering the mine without first  
18 testing the dust to see that it was, in fact,  
19 incombustible.

20 Q. So that's one thing that should have been done  
21 before the machines got in, the dust itself. Now you  
22 also, I believe made reference in your report to physical  
23 modifications of some of this equipment that was  
24 required. I'm thinking of the battery protections and  
25 the protections for electrical wiring?

MR. BOSSERT, EXAM. BY MR. ROBERTS

1 A. Yes, those were laid down in the conditions and to -  
2 - from my observations they were not performed. The  
3 battery boxes were not lined with rubber. They were not  
4 properly -- they --

5 Q. And these are conditions, would it be fair to say,  
6 that should also have been -- that efforts should have  
7 been made to see that these conditions were complied with  
8 before the equipment was allowed in the mine?

9 A. Yes.

10 Q. And whether or not these conditions had been  
11 complied with would be obvious to anyone who was  
12 knowledgeable of the conditions and the equipment, I take  
13 it?

14 A. I would hope so, yes.

15 Q. Now in terms -- you mentioned that the only  
16 jurisdiction other than Nova Scotia that you're aware of  
17 where this equipment is allowed underground is the United  
18 States --

19 A. Yes.

20 Q. -- and you talked about a very strict enforcement  
21 regime in place there?

22 A. Yes.

23 Q. What would you expect to see by way of enforcement  
24 if, in fact, conditions such as these are set for the use  
25 of diesel equipment underground?

MR. BOSSERT, EXAM. BY MR. ROBERTS

1 A. Well, I would expect to see inspection of the  
2 equipment to ensure that all of the conditions were met,  
3 testing of the dust, the coal dust in the mine, to see  
4 that it was incombustible, and also a strict set of rules  
5 made very clear to the operators how far they could go  
6 with these machines.

7 Q. What about unannounced visits to the mine to check  
8 and see how the equipment is actually being operated?

9 A. That would be worthwhile, yes.

10 Q. Now from your review of the record, have you seen  
11 any evidence that the Department of Labour took any steps  
12 at all to see that these conditions were being complied  
13 with at Westray?

14 A. The one thing that comes to mind is that the testing  
15 was done only a few weeks before or at least the samples  
16 for the testing were only taken a few weeks before the  
17 actual explosion. But the machines were used many, many  
18 months before that.

19 Q. Other than these dust samples which, in fact, I  
20 think, were taken a few days before the explosion --

21 A. Yeah.

22 Q. -- have you seen any other evidence that any effort  
23 was made on the Department -- on behalf of the Department  
24 to see if these conditions were complied with?

25 A. I believe that there were letters written to the

MR. BOSSERT, EXAM. BY MR. ROBERTS

1 company asking to perform the stone dusting and to have  
2 the samples tested. I have seen --

3 Q. Okay. That's all you've seen though?

4 A. All I've seen, yes.

5 Q. All right. Now there's also been reference to the  
6 role that mine employees have in seeing that conditions  
7 such as these were complied with. You'll agree with me  
8 that among the conditions -- what was missing from the  
9 conditions imposed by the Department of Labour was any  
10 requirement that these rules be posted somewhere in the  
11 mine?

12 A. I'm not aware of any postings.

13 Q. And, in fact, I can point you to them if you wish,  
14 we look at 69-B, page 87.

15 COMMISSIONER 69-B?

16 MR. ROBERTS Yes.

17 COMMISSIONER Page 87.

18 MR. ROBERTS If you look, that's a letter -- this is in  
19 reference to the boom truck and the last paragraph of the  
20 letter from the Mines Inspection Branch says, "A copy of  
21 the approval shall be made available to the Health &  
22 Safety Committee which did include both management and  
23 employee representatives and to employees on request."  
24 Now --

25 A. On request.

MR. BOSSERT, EXAM. BY MR. ROBERTS

1 Q. Yes.

2 A. Yes, okay.

3 Q. You'll agree with me that that puts the onus on the  
4 employee to seek out the conditions that have been  
5 imposed on the use of these devices?

6 A. Well, the word "on request" kind of troubles me  
7 because how does the employee know these are available.  
8 In order to be able to request them, he has to know  
9 they're available.

10 Q. Right. So would you agree that it would be more  
11 appropriate under these circumstances to require that the  
12 conditions of operation of this equipment in fact be put  
13 somewhere where the workforce as a whole would have  
14 access to it?

15 A. Yes.

16 Q. And if this was done, obviously then employees such  
17 as the people driving the boom truck in question would --  
18 there would be a better chance that they would be aware  
19 of these conditions?

20 A. Yes. An even better solution would be to have a  
21 training program in which they were given specific  
22 instructions.

23 Q. On the operation of diesel --

24 A. On the operation --

25 Q. -- equipment in particular?

MR. BOSSERT, EXAM. BY MR. ROBERTS

1 A. -- and the conditions of use.

2 Q. Well, that -- I guess that brings another question.  
3 Would you have expected, as part of the regime of  
4 conditions for the use of this equipment that, in fact,  
5 employees be trained on its safe use underground?

6 A. Certainly.

7 Q. Now as I read your report and the documents you  
8 submitted, the diesel equipment was just one part of  
9 actually a long list of non-flameproof equipment of one  
10 kind or another that was approved for use in this mine.  
11 Is that a fair impression?

12 A. The diesel equipment was -- I think the majority of  
13 the non-flameproof equipment was diesel.

14 Q. Is, in fact, the attractiveness of non-flameproof  
15 equipment such as this at least partly because it's  
16 cheaper than the fully flameproofed or Schedule 31  
17 equipment?

18 A. Yes, there is a big cost difference.

19 Q. It's a substantial cost difference, isn't it?

20 A. Yes.

21 Q. And that if a mine operator was concerned about its  
22 overall financial picture, that would be a fairly  
23 substantial inducement to use off-the-street equipment as  
24 opposed to specially designed Schedule 31 equipment?

25 A. Yes, it certainly would. The difference, of course,

MR. BOSSERT, EXAM. BY MR. ROBERTS

1 between the diesel equipment -- the non-flameproof diesel  
2 equipment and the non-flameproof electrical equipment is  
3 that the electrical equipment, I think, for the most  
4 part, was stationary.

5 Q. Yes.

6 A. And so that the conditions could be set and met  
7 without any discretion on the part of the operators. The  
8 diesel equipment is all mobile and could be moved to any  
9 part of the mine.

10 Q. Okay. Now I don't know if you're able to answer  
11 this question, but you're perhaps the only one I'll be  
12 able to put it to, at least in this phase of the Inquiry,  
13 there's been a lot of evidence about the picks on the  
14 miner's head and the composition of it and also the need  
15 to replace the picks when they become worn. Do you have  
16 any knowledge yourself as to how extensive an operation  
17 the removal and replacement of those picks is and whether  
18 in fact -- how much time it would take the continuous  
19 miner out of production?

20 A. Well, I've never performed this operation myself. I  
21 have read some of the foremen's reports and apparently  
22 it's done within a couple of hours. That's all I know  
23 about it.

24 Q. Thank you. Did you ever, in your review of the  
25 permitting documentation, did you come across any permits

MR. BOSSERT, EXAM. BY MR. ROBERTS

1 that the Department of Labour provided which would have  
2 allowed the use of welding or cutting torches underground  
3 at Westray?

4 A. I didn't see any documentation to that effect.

5 Q. Would you agree with me that such permissions are  
6 required by the Coal Mines Regulations Act of Nova  
7 Scotia?

8 A. Oh, yes.

9 Q. And that if in fact the evidence is that such  
10 equipment, welding equipment and cutting torches, was  
11 being used underground, that you would have expected to  
12 find such permissions in your review of the  
13 documentation?

14 A. No, my review concerned only the equipment, not  
15 other functions.

16 Q. Okay, fair enough. One piece of equipment you did  
17 look at was the miners' lamps. You made reference to  
18 them this morning.

19 A. Yes.

20 Q. And according to the documents you provided, these  
21 were approved by the Department of Labour in February of  
22 1992? I can refer you to the document, if you wish.  
23 It's 69-B, page 148.

24 A. 48. Right. Yes, February --

25 Q. Do you have that?

MR. BOSSERT, EXAM. BY MR. ROBERTS

1 A. -- '92. Okay.

2 Q. And the pages that follow include the application  
3 and the approval as we've seen with other equipment. And  
4 then a series of pages dealing with the actual  
5 specifications, the characteristics of these lamps.

6 A. Yes.

7 Q. Now according to the specifications, these lamps  
8 have a total burning time of 13 hours. And that's  
9 actually -- if you want to look with me, that's on page  
10 52.

11 A. Right. Yes, 13-plus hours.

12 Q. 13-plus hours. And then it has a voltage drop over  
13 10 hours plus what I read as a fairly significant, almost  
14 40 percent drop in illumination after 10 hours.

15 A. Okay.

16 Q. Would you agree that these specifications make this  
17 lamp inappropriate in a mine where they work underground  
18 for 12-hour shifts?

19 A. Yes, that never occurred to me, but it would mean  
20 their illumination would be somewhat reduced after 12  
21 hours.

22 Q. Well, after 10 hours in fact it would be --

23 A. Yeah.

24 Q. -- reduced by about 40 percent by my calculations.

25 A. Yeah.

MR. BOSSERT, EXAM. BY MR. ROBERTS

1 Q. That's a safety concern, is it not?

2 A. Yes. A person without light -- without proper  
3 illumination is in --

4 Q. Are you --

5 A. -- danger.

6 Q. Are you surprised -- would you be surprised, I  
7 should say, that if the Department of Labour knew that  
8 these shifts were being worked, these 12-hour shifts,  
9 that in fact they approved these lamps with these  
10 specifications?

11 A. I don't know whether -- it would be a concern, but I  
12 don't know whether I'm qualified to pass judgement on  
13 that.

14 Q. Thank you.

15 COMMISSIONER Mr. Ross?

16 EXAMINATION BY MR. ROSS

17 Q. Thank you, Mr. Commissioner. Mr. Bossert, I would  
18 like to refer you to page 9 of your original report, the  
19 top paragraph. You are referring to the methane gas as  
20 part of the mining industry. Is it fair to say that this  
21 is a typical condition of coal mining that there will be  
22 a presence of methane?

23 A. Yes, the methane gas is absorbed into the pores of  
24 the coal and it is normally released when the coal is  
25 cut. And this release is not immediate. It, as they

MR. BOSSERT, EXAM. BY MR. ROSS

1 call it, "desorbs" from the coal over a period of several  
2 weeks. In fact, the average desorption time is estimated  
3 at 1,000 hours, which is about a month. Of course, it  
4 comes out much faster initially. So most of the gas is  
5 desorbed within the first few hours, then it tapers off  
6 to a trickle. In addition to that, many coal mines have  
7 cracks in the seam and when these are opened up, the  
8 methane gas comes out. It's called an outburst or a --  
9 I've forgotten the term, but it comes out more quickly so  
10 that you not only have the desorption but you also have  
11 these feeders of methane gas.

12 Q. So I take it then that this is something which is so  
13 very typical and so very notorious in a mining industry  
14 that the technology has been developed.

15 A. Right.

16 Q. Really to incorporate these from a design and a mine  
17 management perspective?

18 A. That's right. Now I'm not an expert on ventilation.  
19 I believe you had a ventilation expert here earlier.

20 Q. Oh, I wouldn't get into that.

21 COMMISSIONER Dr. MacPherson from last week, yes.

22 MR. BOSSERT And the first line of defence against the  
23 explosion hazard in coal mines is your ventilation. The  
24 ventilation is designed to -- should be designed to  
25 remove the methane gas as fast as it's produced. After

MR. BOSSERT, EXAM. BY MR. ROSS

1 that, you look at other things like gas detection, such  
2 as the methanometer on the cutting heads of the  
3 continuous miners and flameproofing whatever equipment is  
4 ignition capable.

5 So your first line of defence is your ventilation.  
6 Then you have your flameproofness and your gas detection  
7 to back it up.

8 Q. From your pre-engineering work, when one understands  
9 the extent of the gaseousness of this mine, one can put a  
10 testing regime in place to properly produce [sic] it  
11 during production, am I correct with that?

12 A. To?

13 Q. To police the mine during production.

14 A. Yes. Yes, you can do that.

15 Q. Speaking about the methanometers, refer to page one  
16 of your addendum, you're referring to the addendum by  
17 Loby and Dainty.

18 A. Yes.

19 Q. Now the screws which had been removed from the  
20 methanometer system, you indicated that of the four  
21 screws which should be present, only two were in place.

22 A. That's correct.

23 Q. I take you back for a minute a little over 10 years.  
24 Do you recall the Elfstrom Inquiry?

25 A. Yes, I do.

MR. BOSSERT, EXAM. BY MR. ROSS

1 Q. And you recall they had problems at that time also  
2 with respect to methanometers.

3 A. Yes.

4 Q. And one of the things that appeared to have happened  
5 there, and I'm not going to stray too far into that, but  
6 there had been some tampering with methanometers back in  
7 the 1970s which caused that one explosion.

8 A. Yes, there were reports of stemming compound being  
9 used to desensitize the heads, of plastic bags being tied  
10 over them and so on.

11 Q. Sure. And here one of the concerns I had is that  
12 you indicated in this page one that of the four screws,  
13 only two of the four screws remained after the explosion  
14 suggesting that the methanometer had been adjusted, and  
15 two of the screws had either been lost or discarded. Is  
16 there another theory that the two screws would have been  
17 left in so that it gave you easier access to the innards  
18 of the methanometer if you wanted to go back at any time?

19 A. That's a possibility, yes.

20 Q. Okay, thank you. Sorry for flipping back and  
21 forward. Now I go back to page three of your original  
22 report and in the second complete paragraph, you said  
23 according to reports of the shift foremen prior to the  
24 accident, the methane monitoring device was set above the  
25 1.25 percent limit. Now this is a safety number that has

MR. BOSSERT, EXAM. BY MR. ROSS

1       been incorporated in the mining industry. Am I correct  
2       with that?

3       A.    That's right.

4       Q.    The 1.25?

5       A.    Yes.

6       Q.    And by setting the methanometer at higher levels,  
7       what you're assured of is less shutdowns. Am I correct  
8       with that?

9       A.    Yes, that would follow.

10      Q.    And less shutdowns means more continuous mining.

11      A.    Yes.

12      Q.    Which means more production.

13      A.    Right.

14      Q.    At the risk of safety.

15      A.    Yes.

16      Q.    Tell me, in your experience, has the settings on a  
17      methanometer ever appeared to be changed by vibration or  
18      is it a deliberate act?

19      A.    I would say it was a deliberate act.

20      Q.    So that the finding that the methanometer had been  
21      set above 1.25 is consistent with a deliberate act. Is  
22      it consistent with any other thing that you know in the  
23      mining industry?

24      A.    I'm sorry, would you rephrase that question?

25      Q.    Yes. I'm saying that the methanometer setting was

MR. BOSSERT, EXAM. BY MR. ROSS

1 found in excess of the 1.25 general setting.

2 A. Right, okay.

3 Q. And I'm saying to you, yes, it is consistent with a  
4 deliberate act.

5 A. Yes, you mentioned vibration and it came to mind  
6 just a moment ago that in the testing of these methane  
7 monitors, there is a vibration test and, of course,  
8 nothing must change drastically during that test.

9 Q. Absolutely.

10 A. So the machine-mounted methanometers are subjected  
11 to two tests. One is a vibration test and the other is a  
12 -- they call it a packaged test. It actually is bounced  
13 and the tests actually, I was partly responsible for  
14 deriving these tests. The tests were taken from a  
15 military standard which is used for electronic equipment  
16 on army tanks. So you can see that it is a substantial  
17 vibration test.

18 Q. Quite rigorous, yes. Now as far as the -- Just to  
19 go back for a minute, to take you back for a minute to  
20 the four screws that should have been in the housing for  
21 the methanometer and only two were found. I take it that  
22 this is a fairly easy thing to spot by any inspector?

23 A. Oh, yes, it should be quite obvious.

24 Q. Sure. And if it is spotted, it should be noted.

25 A. Yes.

MR. BOSSERT, EXAM. BY MR. ROSS

1 Q. And corrected.

2 A. Yes.

3 Q. Or perhaps an underground manager should be able to  
4 observe these things also.

5 A. I would think so, yes.

6 Q. And I will just refer now to page three of your  
7 addendum, and it's a very short thing I just want to draw  
8 something to your attention. In the last paragraph, it  
9 reads: "However, the electrical controls indicate that  
10 the machine could have been running unless it had been  
11 shut down by the panic bar, the methanometer or the  
12 emergency button."

13 Now I understand that the methanometer referred to  
14 here is the one that was taken off by the RCMP?

15 A. Yes.

16 Q. Do you know whether or not that was tested where it  
17 was sent?

18 A. It was sent to Ottawa and tested there by Dainty and  
19 Loby. They determined that the setting was, indeed, at  
20 1.5 percent.

21 Q. Exactly my point.

22 A. Yes.

23 Q. Exactly my point. So that when we've got these  
24 three conditions, that it was either shut down by the  
25 panic bar, or the methanometer, or the emergency stop

MR. BOSSERT, EXAM. BY MR. ROSS

1 button, we should really be hoping that it was either the  
2 stop button or the panic bar because you would have had  
3 methane at such a very high level.

4 A. Uh-huh. Also the methanometer, the sensing hits of  
5 the methanometer are on the cutting boom of the  
6 continuous miner and they are not necessarily at the  
7 level of highest methane content, which would be at the  
8 ceiling. And I understand the ceiling in this mine was  
9 quite high.

10 There was another test done by Loby and Dainty to  
11 see whether the calibration of the instrument could be  
12 altered by adjusting the span adjustment. This is  
13 another adjustment accessible by removing this cover and  
14 they found that, yes, indeed, it could be. In fact, they  
15 were able to adjust it so that it wouldn't alarm until  
16 something like three and a half percent instead of one  
17 and a half. So not only was the higher level cutoff set,  
18 but it was possible if someone had the ingenuity to  
19 fiddle with the controls and make it read much lower than  
20 it should have.

21 Q. And we do know from testing that it had been set at  
22 1.5.

23 A. Yes.

24 Q. Which is 40 percent above the cutoff level of 1.25.

25 A. Yeah, they were unable to determine whether the

MR. BOSSERT, EXAM. BY MR. ROSS

1 sensitivity had been adjusted because they did not have  
2 the original sensing heads from the machine. The RCMP  
3 removed the instrument but not the sensing heads. When  
4 they hooked up another sensing head, they did find,  
5 indeed, it was set. It was desensitized. There are  
6 variations between sensing heads, so that's not proof  
7 that it was set that way.

8 Q. Finally, sir, would you agree that then that all of  
9 the departures from good housekeeping and good mining  
10 practice was really inviting disaster in this mine?

11 A. I think you could say that, yes.

12 MR. ROSS Thank you very much, sir. No more questions.

13 COMMISSIONER Ms. Gillis?

14 MS. GILLIS No questions, Mr. Commissioner.

15 COMMISSIONER Mr. Wells?

16 MR. WELLS Thank you.

17 EXAMINATION BY MR. WELLS

18 MR. WELLS I'd like to ask you to turn to Document 69-B  
19 again. I'm looking on page 88 at the application.

20 COMMISSIONER Page 18?

21 MR. WELLS 88.

22 COMMISSIONER 88, I'm sorry.

23 MR. WELLS The application is the same as we've seen.

24 About half-way down, it talks about the additional safety  
25 equipment and, specifically, over on the right-hand side,

MR. BOSSERT, EXAM. BY MR. WELLS

1 it talks about catalytic converters. I assume we're  
2 talking water catalytic type diluter? Are you with me?

3 A. Yes.

4 Q. Now there's an "x" there. So is that a wet type or  
5 a cooling system of some sort on a catalytic converter?  
6 Can you explain that to us?

7 A. There are three items listed there and the "x" is on  
8 the centre one.

9 Q. Oh, I'm sorry, yes.

10 A. The water conditioner, explosionproof water  
11 conditioner, would be the top one. The catalytic  
12 conditioner is the second and the diluter is the third.  
13 Now this machine had the catalytic converter, but it did  
14 not have a water bath scrubber.

15 Q. Thank you. That explains that one. You've told us  
16 about the catalytic converters and the heat that they  
17 give off though. You talked this morning about the  
18 potential of coal dust being more explosive than methane  
19 when it came to being in contact with a heat source, a  
20 steady heat source.

21 A. Yes, it's more readily ignited by heat than methane.

22 Q. So thinking of the picture we saw of the catalytic  
23 converter on the boom truck, if coal dust were to settle  
24 on that surface, or even the manifold or whatever, that  
25 would be one instance where you would have the potential

MR. BOSSERT, EXAM. BY MR. WELLS

1 of the coal dust being quite explosive.

2 A. Yes.

3 Q. I'd like to take you back to the tractors and  
4 somewhere yesterday in my reading I read the list of  
5 conditions that the Department of Labour put on the use  
6 of these non-flameproof type equipment. Two of them  
7 struck me as being rather onerous for somebody that was  
8 going to take a production-type tractor. One of them was  
9 the use of a special rubberized, a rubber contained  
10 battery box. I believe you had an opportunity to view  
11 some of these on surface. Would you agree that that  
12 would be quite an operation on these tractors to have a  
13 special battery box lined in rubber?

14 A. Would I agree that it was or would be?

15 Q. Would be a significant job to build a battery box  
16 and have it all lined with rubber on these production-  
17 type tractors?

18 A. I don't think it would be a very big job to do it.  
19 It was not done, in my observation, but --

20 Q. Right. It would certainly be something you could  
21 easily see?

22 A. Yes.

23 Q. The reason I say that, and past history of myself  
24 being a mechanic, some of these batteries come out very,  
25 you know, have been very difficult to get out of some of

MR. BOSSERT, EXAM. BY MR. WELLS

1 these tractors, and often you have to remove a fair  
2 amount of things to get them. And being a diesel, they  
3 put as big a battery as possible in a small box usually.

4 A. Uh-huh.

5 Q. The other thing I saw that would be quite onerous, I  
6 felt, for somebody to change on a production-type tractor  
7 would be the grounding system. I forget how you've  
8 referred to it in your report, but I would say they were  
9 looking for an insulated grounding system as opposed to  
10 using the frame?

11 A. That's my interpretation of the requirement, yes.

12 Q. Could you explain to us what's involved, what would  
13 be involved in doing that to a production type machine?

14 A. That would be a difficult one to do. You would  
15 have to insulate your starter and your alternator and run  
16 separate wiring for the ground return. It would mean re-  
17 wiring the machine, essentially.

18 Q. Correct. Could you explain the value in doing that?

19 A. Well, the frame of the machine is exposed and it's  
20 not insulated and the potential for sparking on a machine  
21 with frame ground is much greater, I would think, than  
22 one that had an insulated wiring system. I believe  
23 that's the reason.

24 Q. In fact, if a wire broke on any lighting circuit or  
25 anything at all on one of these machines with the frame

MR. BOSSERT, EXAM. BY MR. WELLS

1 being used as a ground, wherever that wire would have  
2 touched the frame, there would be a spark?

3 A. That's right.

4 Q. As opposed in an insulated system, it would have to  
5 also find a broken or an open portion of the ground wire,  
6 which would be rather remote.

7 A. Yes, that's right. It's a safety feature.

8 Q. This would be something that I would think would be  
9 very easily detected by somebody who wanted to view the  
10 equipment to see whether it had been carried out?

11 A. Oh, yes. A casual observation would tell you if it  
12 was grounded.

13 Q. Do you have any sense where these conditions that  
14 they had written up came from?

15 A. I believe they were copied from the U.S.  
16 Regulations.

17 Q. It strikes me, though, that where they were quite  
18 onerous that the authors or the people who decided on  
19 those conditions must have felt that they were very  
20 warranted?

21 A. I'm sure they did.

22 Q. So would you assume, I'm putting you in a dangerous  
23 position, I guess, to ask you to assume anything, but if  
24 it were you, would you not want to actually view the  
25 equipment to ensure that the modifications were made?

MR. BOSSERT, EXAM. BY MR. WELLS

1 A. Certainly.

2 Q. I'd like to ask you a question about static  
3 electricity and the potential of a static charge being  
4 able to ignite methane.

5 A. Okay.

6 Q. Did you believe that static could build up enough of  
7 a charge to cause enough spark to ignite methane?

8 A. Yes, static electricity can ignite methane. That's  
9 been demonstrated many times.

10 Q. So in the case of rubber-tired vehicles, especially  
11 these non-flameproof equipment with belts and one thing  
12 and another running, would they not have a tendency to  
13 build up a static charge?

14 A. Yes, they would.

15 Q. Should they be grounded at all times into ground  
16 with a chain or something to prevent it?

17 A. Well, we have special requirements in the diesel,  
18 flameproof diesel code or standard for just such a thing.  
19 For example, V-belts must be conductive. In other words,  
20 they must have sufficient conductivity to drain off any  
21 static generated. Conveyor belting that is approved as  
22 fire resistant is also tested for anti-static properties.  
23 So it must also be conductive. There are a number of  
24 regulations like that for flameproof equipment to deal  
25 with the static electricity problem.

MR. BOSSERT, EXAM. BY MR. WELLS

1 Q. What about the use --

2 A. And also at least two of the wheels must have  
3 conductive tires.

4 Q. Okay. Thinking of static still and the pouring of  
5 liquids, when you're using liquids in an explosive  
6 environment, would you take steps to ground your  
7 containers?

8 A. I don't know anything about that particular aspect.  
9 I can't answer that.

10 MR. WELLS Okay, thank you. No further questions.

11 COMMISSIONER We'll take 10 minutes before we get to the  
12 Department of Labour. Thank you.

13 INQUIRY RECESSED (TIME: 3:20 p.m.)

14 INQUIRY RESUMED (TIME: 3:34 p.m.)

15 COMMISSIONER Mr. Endres?

16 EXAMINATION BY MR. WILSON

17 Q. Mr. Bossert, your report indicates that you were  
18 asked to do three things and that is examination the  
19 certification approval documentation and determine  
20 whether each item was suitable for intended use, inspect  
21 purchasing records, and I'm reading from your report on  
22 page 1, under Tab 2 of Exhibit 55?

23 A. Yeah.

24 Q. Inspect the purchasing records and interview the  
25 maintenance personnel to determine whether anything was

MR. BOSSERT, EXAM. BY MR. WILSON

1 done to render the equipment unsafe after it was  
2 purchased by the mine, inspect samples of the equipment  
3 to determine if it was still suitable for underground  
4 use.

5 A. Okay.

6 Q. Was that extent of your assignment?

7 A. Yes.

8 Q. Were you asked to review the documentation with  
9 respect to the issue of safety communications to mine  
10 staff and personnel and that sort of thing?

11 A. No.

12 Q. So when you're asked -- when you're responding to  
13 Mr. Robert's question about posting of notices and  
14 bringing safety matters to the attention of miners, you  
15 didn't review the documents for that purpose?

16 A. No, I did not.

17 Q. Now we have heard that non-flameproof diesel  
18 equipment was permitted in the Westray Mine.

19 A. Yes.

20 Q. And you have indicated that in the United States --  
21 non-flameproof diesel equipment is also permitted for use  
22 in the mine, in mines in the United States under their  
23 jurisdiction?

24 A. Under certain conditions, yes.

25 Q. And in terms of coal production, how does the

MR. BOSSERT, EXAM. BY MR. WILSON

1 American market rate in terms of coal production compared  
2 to other countries?

3 A. I don't have any figures on that.

4 Q. Now the non-flameproof diesel equipment that was  
5 allowed to operate in the Westray Mine was allowed to  
6 operate under conditions?

7 A. Yes, 15 conditions.

8 Q. And perhaps we could turn to page 173, 69-B.

9 A. That's 173?

10 Q. Yes.

11 A. Okay.

12 Q. 69-B?

13 A. Yes, I have it.

14 Q. That's a schedule of conditions?

15 A. Right.

16 Q. That's a fairly extensive schedule of conditions?

17 A. Yes, it is.

18 Q. It covers a large variety of things including the  
19 places where in the mine the vehicle can be situated?

20 A. That's right.

21 Q. And it specifically states in return air containing  
22 -- can't contain more than .25 -- it can't operate in  
23 return air, sorry. It can't operate in more than .25  
24 percent methane.

25 A. Uh huh.

MR. BOSSERT, EXAM. BY MR. WILSON

1 Q. It can't operate past the last open crosscut.

2 A. Right.

3 Q. Or within 300 feet of the face?

4 A. That's right.

5 Q. And it has a number of other conditions associated  
6 with the operation of diesel equipment underground?

7 A. Yes, it does.

8 Q. It also makes reference to the, in 15, the manager's  
9 transport rules shall contain provision to ensure that  
10 the vehicle shall not proceed past the limitation  
11 specified in Item 11. Have you examined the manager's  
12 transport rules?

13 A. No, I have not.

14 Q. No?

15 A. I wasn't aware that he had any.

16 Q. Or the codes of practice or --

17 A. No.

18 Q. -- that sort of thing? Contained within Exhibit No.  
19 69-B, if you would look at page 3. That's a letter  
20 transferring the codes of practice. On page 4 it says  
21 "non-flameproof diesel equipment," do you have that?

22 A. Yes, I see it.

23 Q. And within those codes of practice it requires  
24 operators to be trained and authorized to operate a non-  
25 flameproof --

MR. BOSSERT, EXAM. BY MR. WILSON

1 A. Right.

2 Q. -- diesel equipment? It states that the manager  
3 shall be -- ensure that no person appointed to operate  
4 any diesel vehicle unless he's competent to do so?

5 A. Right.

6 Q. And they shall all only be operated in intake  
7 airways and not past the last open crosscut?

8 A. Uh huh.

9 Q. The maximum speed of 10 kilometers per hour?  
10 Correct?

11 A. Yes, I see it.

12 Q. And only fuelled on the surface. And number 6 of  
13 that code of practice would have effect on your  
14 speculation with respect to the boom truck, would it not,  
15 where it says that no person, when in charge of a  
16 vehicle, shall leave the vehicle unattended with the  
17 engine running or leave the engine running for extended  
18 periods of time while parked. And that's covered in the  
19 codes of practice?

20 A. What was the question?

21 Q. You -- the requirement that a vehicle be turned off  
22 when it's unattended is covered by Rule 6 in the codes of  
23 practice?

24 A. Yes.

25 Q. And would that -- you had speculated earlier that

MR. BOSSERT, EXAM. BY MR. WILSON

1 perhaps the boom truck at the intersection was left  
2 running while it was unattended as a possible ignition  
3 source. That would be contrary to the codes of practice?

4 A. It would, yes.

5 Q. Yes. And on page 2 there are further other items.

6 COMMISSIONER That would be page 5 then of the --

7 MR. WILSON That would be page 5 of the exhibit.

8 COMMISSIONER -- of the exhibit, yeah.

9 MR. WILSON You hadn't had an opportunity to review  
10 these -- this code of practice with respect to the  
11 operation of non-flameproof diesels in the mine?

12 A. I have seen this document. It doesn't differ  
13 substantially from the other documents. But this is a  
14 code of practice written by the Department of Labour, is  
15 it not? It is not the --

16 COMMISSIONER I think it's by the company.

17 MR. WILSON By the company's --

18 A. Is it written by the company?

19 COMMISSIONER The covering letter is at page 3. It's --

20 A. It was sent from -- oh, I see. It was sent from  
21 Westray Coal to the Department. All right, I see.

22 MR. WILSON That's the company telling the --

23 A. Okay.

24 Q. -- telling the Department what they will be doing --

25 A. Yeah.

MR. BOSSERT, EXAM. BY MR. WILSON

1 Q. -- in terms of training and --

2 A. Okay.

3 Q. -- communications to their operators in the  
4 operation of the diesel non-flameproof equipment  
5 underground?

6 A. Uh huh.

7 COMMISSIONER What they'll be doing or what they're  
8 saying, one of the two.

9 A. Yeah.

10 MR. WILSON Correct? That's what it would be  
11 indicating.

12 A. That's what they're saying, yes. There seems to be  
13 a discrepancy between what they were saying and what they  
14 were doing is the problem.

15 Q. Now that, coupled with the conditions, on the  
16 schedule of conditions with -- that we looked at on page  
17 173 --

18 A. Uh huh.

19 Q. -- if adhered to, would be a complete and rather  
20 stringent set of conditions to the operation of non-  
21 flameproof diesel engines underground?

22 A. It looks good on paper.

23 Q. Thank you, Mr. Bossert.

24 EXAMINATION BY THE COMMISSIONER

25 Q. Mr. Bossert, before you step down, I would like to

MR. BOSSERT, EXAM. BY COMMISSIONER

1 just pick up on something that Mr. Ross was questioning  
2 you about. Now and I don't know the basis for where I  
3 have this understanding, but somewhere I got the  
4 impression that if you set a methanometer, if you reset a  
5 methanometer from -- to take the example here on the  
6 continuous miner, if it was reset from 1.25 to 1.50, that  
7 you can't reset it without it being recalibrated, am I  
8 correct or wrong on that?

9 A. I think you --

10 Q. You can't just turn the dial?

11 A. I think you can just turn the dial --

12 Q. Oh, you can?

13 A. -- to reset it, yes.

14 Q. Okay. Well, I was under the impression that you  
15 couldn't. That's fine.

16 A. Yes.

17 Q. Thank you for clearing that up. Okay.

18 MR. MERRICK Just one last point.

19 COMMISSIONER Re-direct, yeah.

20 EXAMINATION BY MR. MERRICK

21 Q. Just one last point and this is more for the record,  
22 I guess, than by way of a formal question to you, Mr.  
23 Bossert. One of the machines that we were looking at  
24 this morning for which we didn't have an approval number  
25 and we were a little confused by this was the Dresser

MR. BOSSERT, EXAM. BY MR. MERRICK

1 bulldozer. Dresser bulldozer? I think so. And I will  
2 indicate to the Commission and to counsel present that  
3 over the noon hour we did locate some documentation that  
4 would indicate that there was an approval granted for  
5 that machine. And we'll file it as an exhibit tomorrow  
6 so that counsel will have it. There was a list of  
7 conditions attached to it that were equivalent to the  
8 other lists of conditions. Now there was some indication  
9 that while the approval had been granted, it may not have  
10 been actually sent or issued to the company. But there is  
11 an approval number granted by the Department for that  
12 machine.

13 A. Is that the same number as I have in my report?

14 Q. Good question. Let me see if I can find it. Yes,  
15 it is. I'm told on reliable authority. I have no other  
16 questions on re-direct, Mr. Commissioner.

17 COMMISSIONER Thank you. You may step down, sir. Thank  
18 you very much.

19 A. Thank you.

20 WITNESS WITHDRAWS

21 MR. MERRICK Now, Mr. Commissioner, the next witness is  
22 Mr. Amyotte who was not scheduled to be here until the  
23 morning. I would suggest that perhaps at that stage we  
24 might break today and reconvene with him first thing in  
25 the morning.

MR. BOSSERT, EXAM. BY MR. MERRICK

1 COMMISSIONER You leave me no choice.

2 MR. MERRICK All right.

3 COMMISSIONER We will adjourn until 9:30. Thank you.

4 INQUIRY ADJOURNED (TIME: 3:47 p.m.)

## REPORTER'S CERTIFICATE

I, Margaret E. Graham, Court Reporter, certify that the foregoing is a true and accurate transcript of the evidence taken by way of recording and reduced to typewritten copy.

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Margaret E. Graham

DATED this 27th day of November, 1995, at Stellarton,  
Nova Scotia.