# VIII. THE LESSONS OF MISSISSAUGA

## 1. ON THE RUNNING OF TRAINS

I have no quarrel with the general proposition that trains should be run by the railways. The railways have the knowledge, the experience and the interest to ensure that trains are run efficiently, and it appears to be axiomatic at least in the minds of railway men that a safe railway is an efficient railway. I have attached as Appendix 5 a reproduction of Exhibits 360 and 361 which are figures put together by the CTC specifically for this Inquiry. From these figures we see that there are in Canadian railways approximately one derailment per day and of those from one-sixth to one-ninth are attributable to journal failure. These are statistics that we probably could live with if the only questions were the efficient running of the railway and the safety of the persons running it. The railways would (and do) in the interest of efficiency take measures to reduce or control the number of derailments and they, together with the unions, are assuredly going to do all they can to reduce the injuries to crews. But a new element, a new concern of safety, is added when the railways transport dangerous goods. We have seen how Car 13 bleved 2222 feet and the scientific evidence is that it can bleve considerably farther. We have seen that there is danger to life

within several miles of a disabled Chlorine car. There was a great deal of dispute about the danger posed by this particular Chlorine car; there could be no dispute of the danger from adisabled Chlorine car from which all of the contents escaped. At Newton, Alabama, all of the Chlorine did escape and at Mississauga most of the Chlorine escaped in the first few minutes with little or no adverse effects perhaps because of the drawing-up effect of the explosion and the fire, but in Youngstown, Florida, much less was lost in the early minutes with devastating effect. The public has an interest in the running of trains when those trains are carrying dangerous goods and it is to that interest that I now address myself.

(a) THE CAUSE OF THE HOT BOX

It would certainly help us to determine the imperative remedies if we know what caused this particular hot box. We know, however, only that the cause could have been one of many. According to the AAR Quarterly Report (referred to ante p. 106) and according to certain posters displayed by CP Rail in car department areas, the main causes more or less in descending order of frequency are cut or pitted journals, dry journal boxes, displaced or damaged wedges

or bearings, water, ice or snow in the journal box and damaged lubricator pads. Any of these could have been the cause, but most of them require an inadequate inspection at Sarnia or Chatham or both. The bearing or wedge could have been displaced in the shunting or switching operations beginning at Chatham after the mechanical inspections were completed. Mr. Wright noted that the L1 brass found at the scene had a broken collar. He thought it to be an old break and he suspected that the R1 brass would be in similar condition because of the lateral movement of the journal, thus increasing that lateral movement. Neither broken collar would be discoverable on a carman's inspection. As the train went through the spring switch at Guelph Junction (so the theory went) there was an excessive side slap which disturbed the lubrication on the R1 journal sufficiently to create a hot box. CP Rail's theory is, as pointed out above, that the installation of the wrong sized lubricator pad caused some of the pad material to come between the brass and the journal and destroy the lubrication. Either theory and many others are possible. None, in my opinion, is demonstrated.

(b) THE STATE OF THE HOT BOX FROM WINSTON CHURCHILL BLVD. TO THE EAST.

Mr. Wright's theory involved the following progression in the development of the hot box -

(a) after leaving Guelph Junction there would be a small amount of smoke gradually increasing as the system got hotter;

(b) the babbit—the inner portion of the brass which is made of lead and rests upon the lubricated journal—would melt at 450 to 500° F. and the journal would start up into the brass;

(c) when the temperature reached 800° F. the combustible material would light up, that is enflame, and that would be coming out of Milton. At first there would be intermittent flame but by Winston Churchill Blvd. the seals in the journal box would have burnt out allowing more oxygen in and producing a steady flame.

CP Rail's theory is of a quick burn off, one that started many miles past Guelph Junction and was only in the intermittent flame stage at Derry Road. As I indicated earlier (p.59) I don't intend to determine which theory is correct on the basis of expert conjecture. I do, however, on the evidence of Mr. and Mrs. Houston find that there was smoke coming from the undercarriage of a tank car on the train and I conclude that that smoke was not brake smoke but rather was smoke emanating from the R1 journal of the 33rd car of that train and was the first sign visible to any witness of the hot box that caused the derailment. I also accept the evidence of Mr. Anthony that there was

nothing visible on the north side just west of Trafalgar Road and of Mr. and Mrs. McGregor (this evidence was hardly questioned) that there was a steady flame before, at and past the crossing at Derry Road. The distance between Winston Churchill Blvd. and Derry Road is 1.2 miles. At 50 miles per hour that train would traverse that distance in less than a minute and a half. As I have said I am not required to make findings of fact, but I am required to assess the adequacy of the existing practices of the railways and in assessing the adequacy of the running inspection of this train at this place, I think it is a reasonable if not an inescapable inference that there was some flame, perhaps not steady, to be seen at Winston Churchill Blvd. by those who could see and were looking. On the evidence of the McGregors at Derry Road, Mr. Siu at Eglinton and the other witnesses to the east, I conclude that there was fire or sparks or both emanating from Car 1 from Derry Road to the derailment. I do not accept the evidence of Miss Carter that she saw the undercarriage of the train and Miss Bota, Mr. Galvan and Mr. Correa make no pretence to having seen the whole train.

(c) THE INSPECTION PROCESS

As we have seen, there are many types of inspection. I cannot point to any appropriate rule but in practice there seem to be these distinctions, at least

in the area and on the railways with which we are concerned.

(a) There is a mechanical inspection when the train is initially marshalled, e.g. Windsor for Train 84 and Sarnia for Local 4. This involves for our purposes the lifting of the plain bearing journal box lid and the No. 1 brake test, i.e., testing the brakes on each car as well as ensuring that the air brake system generally works.

(b) There is an interchange inspection when a car passes from one railway to another, e.g. at the Chatham CP yard. This again for our purposes involves the lifting of the lid of the plain bearing journal box but only the No. 2 brake test, i.e. inspection of the brakes on the cars lifted and the caboose and ensuring that the air is passed from the engine to the caboose.

(c) There is a walk-by or pull-by inspection made by carmen at intermediate terminals when the crew is changed, e.g. at London for Train 84/54. This does not involve opening the lid of plain bearing journal boxes but did involve the No. 2 brake test in 84/54 because of the lifting of cars.

(d) There is an inspection done by passing trains. This can be a pull-by or standing inspection and will be one side or both sides depending on whether the train of the crew inspecting is still or moving.

This, of course, involves neither the lifting of the lid nor any kind of brake test.

(e) There is the running inspection performed by the crew of their own train in motion. It is required or at least encouraged at station mileboards and on curves. It is, of course, purely visual and involves neither lid-lifting nor brake test.

I have already made some comment about the inadequacy of the records or perhaps more aptly the indifference of the record-keepers of mechanical and interchange inspections. Other than that, I have nothing to say on the first four inspection procedures outlined above. All of those inspections took place before Guelph Junction and there is no evidence of any defects in the train apparent at the time. On the fifth, the running inspection from Guelph Junction, "the last defence" as it has been called, I can only say that either the crew or the system fell down badly. By that I mean either the crew or the system or both were not up to discovering the hot box in time to prevent the derailment. And yet I'm not sure what can be done with respect to either the crew or the system to prevent a repetition. I shall make some recommendations designed to improve the system and the performance of the crew but the real answer lies with neither but with the equipment. Mississauga

cries out for roller bearings and hot box detectors, the first to reduce the incidence of the cause of disaster, and the second to discover that cause before disaster overtakes the train.

(d) THE CREWS OF TRAINS

As we have seen, Train 54 had a reduced crew of 3. I have referred to the Hall report (p. 24) and the decision there made to authorize the elimination of the tail end brakeman on trains of 120 cars or less. Mr. Justice Hall made a very thorough investigation of all the pertinent circumstances including the paper work required of the conductor, the incidence of hot boxes, the need for manual flag protection, and reached the conclusion that the extra man at the rear was unnecessary. He did not, however, close the door. He said that his ruling was not to "be taken as the last word on this question of safety". He made specific reference to s. 227, particularly s-s. (i) (j) and (l) (supra, pp. 109 and 110). of the Railway Act which entitled the CTC to give continuing consideration to the number of men to be employed on trains in the interest of their safety and the safety of the public. It is now argued before me by the Unions and other interested parties that the reduced crew order should be rescinded in the interests of the

safety of the public. I can say only that the return to a full crew is not a lesson of Mississauga and I decline to make that recommendation. It was the front end that was nearest the hot box and Conductor Nichol in the rear did not indicate there was anything to block his opportunity to view. It is true that a rear end trainman would bring to the viewing an extra pair of eyes and the owner of those eyes might well see something missed by the conductor, but the position at the rear is quite different from that at the head end where the engineer regularly cannot look back because of his forward duties.

(e) THE SPEED OF THE TRAIN

We have seen that the CTC can regulate speed (Railway Act, s. 227(1)(a) supra) but rarely does and that in the absence of CTC regulations the railways can and do regulate speed (Railway Act, s. 230(a)). The limit set in the London Division timetable for this train at the point of derailment, indeed from Milton east, is 50 miles per hour.

The first question must, of course, be: does speed make a difference? However rhetorical that question may seem, it has been vigorously argued that the answer is "No" or at least "Not proven". The only figures tendered on the question were contained in a survey prepared in 1978

for the Interindustry Task Force Rail Transportation of Hazardous Materials in the United States under the direction of a steering committee of representatives of railways and chemical industries. The report is frank to say it cannot for lack of information draw any conclusion on the relationship between speed and the frequency of derailments but its preliminary figures seem to suggest that there is a levelling off of the danger of release of product after a derailment at about 30 miles per hour. I find this hard to accept. Whatever may be the relationship between speed and derailment, the damage suffered upon a derailment must increase with the speed. At any rate, it would take a report prepared by a much more disinterested body to persuade me to the contrary.

I certainly accept that speed is important to the railways and one should not force upon them uneconomic speeds except for good cause. I think, however, that we have here a very good cause at least in the absence of the employment of the other safety measures that will be recommended. This train with a cargo of dangerous goods, with some tank cars having plain bearings, with some tank cars not having completed or not being subject to a retrofit programme, with no hot box detectors en route,

proceeded through one of Canada's most populous areas where as we will see there is even some doubt that the whole of the train can be seen from one end to the other. To me, to proceed in such circumstances at 50 miles per hour, cannot be justified. I do not complain of the speed limit for some trains in some circumstances of 50 miles per hour or even more. I do complain of the application of that speed limit to this train in these circumstances.

It is unfortunate, in my view, that the CTC has not seen fit to regulate speed or at least review the speed set by the railways. The Railway Act, ss.230 to 233 provides that all by-laws and rules established by the railways "which affect the public generally" shall be approved by the Governor-in-Council. Speed rules established by the railways are not so approved apparently on the theory that they do not "affect the public generally". I should think it is debatable.

(f) LENGTH OF TRAINS

The length of trains is probably just as important to the railways as speed. Again I hesitate to make any recommendations for reduction in length. Nevertheless in some circumstances for the carriage of dangerous goods it may be necessary. Almost every regular or former crew member testifying was asked what number of

cars and what number of undercarriages he could see from the front or rear end. Inevitably the answers varied because much depended on the geography and topography of the track area but most indicated that the limit for viewing the undercarriage was under 20 cars on the straightaway and not more than 50 cars even on a good curve such as Winston Churchill Blvd. Of course, as the Cullen test showed us, one could see more if the fire extended out from the undercarriage, but even so it is clear that there are limitations of sight when the train is a long one. I am not sure that this means trains are too long for safety because in a fog or a blizzard one would probably be unable to see any undercarriages at all. What it does seem to indicate is that the running inspection—the last line of defence—is not very reliable.

(g) TRAIN MARSHALLING

The Red Book contains provision (see 74.589) for the separation of cars containing certain dangerous commodities from other cars and from the engine and the caboose. The object, of course, is to prevent injury to railwaymen and to prevent the interaction of two dangerous commodities upon each other in case of accident to the cars containing them. An example of the latter is the marshalling order of the CTC of December 18, 1979 following upon the Mavis Road derailment referred to at p. 123 supra.

I am certainly in no position to recommend the rescission of any marshalling orders now in effect. On the other hand I am not convinced that marshalling is the answer or any part of the answer to our problem. It is certainly common belief among the experts that the proximity of the Chlorine car to the bleveing Propane cars caused the escaping Chlorine to be funnelled up into the air where it was harmlessly dissipated. It is at least arguable that it is better to have dangerous commodity cars collected together in one train where special rules can apply. It is undeniable that the presence of 5 buffer non-placarded cars between the engine and the dangerous commodity cars will be more of a hindrance than a help if the burnt-off plain bearing journal on one of those buffer cars causes a derailment. I shall deal with marshalling again when we come to the many proposals put forward by the parties to the Inquiry.

## 2. THE RESPONSE

I am happy, of course, that the private sector, the manufacturers of the dangerous goods, are prepared in most cases on a 24-hour basis, to respond to a cry for help. I cannot, however, be happy that there is no

government control of the private response. Whatever may be one's views of the relative value of private and public enterprise, our concern here is with public safety. That surely is the ultimate responsibility of the state.

The Transportation of Dangerous Goods Act has given us the means of ensuring that control. It certainly is now and may well be always that the expertise must be left to the manufacturers. But government must ensure that that expertise is available and employed where needed.

There are enormous constitutional problems involved in the public response and most of them can be resolved only by agreement between governments. One thing, however, can be assured by the federal government and that is the availability of a knowledgeable and authoritative federal presence at the scene of a railway accident. Once again, the Transportation of Dangerous Goods Act makes that possible.

## 3. TANK CARS

As I have indicated there are problems demonstrated at Mississauga with tank cars which may or may not be soluble. These problems relate to the ability of the safety relief

valves to prevent or control release of product in a fire, the suitability of the present or proposed insulation for the same purpose, the adequacy of the bottom outlet protection and the timeliness of the present retrofit programmes. These problems are all being worked on but they are not being worked on in Canada. Their solution seems to be left to the AAR Tank Car Committee which may perhaps be affected by the recommendations of the National Transportation Safety Board. I have no doubt that the Canadian railways and the Canadian tank and car manufacturing companies and shippers contribute to the AAR deliberations, but it is not in my opinion enough to rely on private and American efforts. We are concerned with the transportation of dangerous goods in Canada. We must take advantage of all knowledge to be obtained from any source but we must also attack the problems from the viewpoint of the Canadian public and I am sure there is in Canada knowledge and talent available to help.

## 4. GOVERNMENT PARTICIPATION

Tank car research is only one way in which government can help. The investigation of railway transportatio particularly of dangerous goods must be a continuing process. As I have indicated the CTC is charged with that task and

has done much valuable work to date. I am sure the Commissioners will agree that there is much more to be done. There is the limiting problem of staff and funding to which I referred. There is also, in my respectful view, a need for a change of emphasis from economics to safety and a policy that the problems of safety must be attacked immediately.

## IX. THE PROPOSALS

As will be seen from the attached Appendix 6 we were favoured with more than 40 formal briefs, almost all of which contained proposals and recommendations to enhance safety in the transportation of dangerous goods. (I prefer the word "proposals" to "recommendations" reserving the latter for the recommendations of this or other Inquiries.) But besides these briefs we had more than 150 witnesses, many of whom made proposals, and 18 (increasing to 20) interested parties who, in the course of argument, generally through counsel, made proposals and made comments on the proposals of others. In this chapter I shall attempt to gather together those proposals and express my views on them.

Before I proceed, however, I must state that I do not intend to deal with all of the proposals. Some of them seemed to me to relate more to the pending litigation between the parties and some, while very relevant to the transportation of dangerous goods, were not suggested by the Mississauga experience. There was a natural tendency to transform this Inquiry into one of general rail safety but that is not the way I perceived my mandate. I welcomed the advice of witnesses gained from their experience elsewhere but did not permit any investigation

of disputed facts of accidents other than the one in Mississauga. The problems of those accidents can be left to the agencies charged with their investigation and the recommendations flowing therefrom must be left to them. Mine is a Report on the Mississauga Railway Accident of November 10, 1979. These then are the proposals classified according to broad subject-matter.

## 1. TRAIN OPERATION

### (a) HOT BOX DETECTORS

There is unanimous agreement that hot box detectors are needed and should be installed. Canadian National began its programme in 1967 and says that today there are 186 detectors on its main lines and more are planned for immediate installation. CP Rail was at first skeptical of the merits of hot box detectors—see the evidence of Mr. Pike of CP before the General Safety Inquiry of 1971—but has now become a complete convert and plans to have them fully installed by 1985. Some indeed have recently been installed in the London Division. The C&O which has two hot box detectors in Ontario also agrees on their value and is considering installation on the Sarnia-Chatham line. The unions also support—indeed urge—a speed-up in installation.

There is no agreement on the kind of hot box detector which should be installed. The CN's, as I have said, sends its signal to a central monitoring office whereas CP Rail's is read by the crew. We also heard evidence of the existence of train-mounted hot box detectors and one was studied by CP for some years and finally rejected. The detectors in use appear to be effective. The only suggestion to the contrary was that while the hearing was on there were reports in the press indicating that the train which derailed near McGregor, Manitoba, had passed several hot box detectors without detection of trouble, but the cause of that accident as appears from the CTC's report was a fractured axle, not a hot box. There was no evidence before us justifying an interference in the railways' choice of type of detector. Nevertheless government could be of assistance in examining the kinds available, including the train-mounted ones and advising the railways. If one is found to be more effective the public will benefit as well.

In one area, however, I think it is essential that government interfere in the interests of public safety. There is no unanimity in the proper spacing of detectors. CN places them 25 to 30 miles apart, C&O considers 22 miles the proper interval, and as I have indicated (supra, p. 116) in the United States some railroads think 20 miles apart is

appropriate. The latter figure would appear to be closer to the lesson of Mississauga. Nothing was seen—although there could have been heat—at Guelph Junction, mileage 39; the first indication was at Campbellville, mileage 38, and the train derailed at mileage 16.5.

One cannot lay down a precise interval because the detectors cannot be placed anywhere on the track as they are subject to local conditions such as grades and switches, but the government can and should lay down a maximum interval. There is certainly little merit in having hot box detectors unless they will detect substantially all hot boxes. In the interests of public safety, government should determine the limits of hot box detector utility and regulate their installation accordingly. A detector at Guelph Junction might well have detected Train 54's hot box, but I doubt that it would have been adequate to prevent a burn-off that might have occurred 10 miles further on deep into Metropolitan Toronto.

And that brings me to what I consider important, viz. the protection of built-up areas. I believe that any dangerous goods train that passes through any built-up area without hot box detector protection during the whole of its passage must be subject to special rules.

(b) REAR VIEW MIRRORS

As we have seen, Train 54 being propelled by a GO Unit had rear view mirrors available but they were not used by the crew and the crew were not authorized to use them. Once again I do not want to tell CP Rail how to run its railway, but I find it difficult to understand the rationale behind this approach. True, there may be trouble with reverse image on switching, but I should certainly think that could be overcome by training. The C&O has had rear view mirrors on all new equipment since 1966 and some of the older equipment has been retrofitted. Mr. Ernest Jack Davies, the Canadian Director of the Brotherhood of Locomotive Engineers said that the feeling among the members of his union was that rear view mirrors would be a valuable complement to running inspections.

That brings me to CP Rail's real objection. It is that the head end crew will use the mirrors in place of actually looking back with their heads out the window. I don't know whether this is a real or phantom fear, but I suggest to CP Rail that they can always try them out. If they find that the mirrors are given a substitutional rather than a complementary use, they can remove them. I believe CP Rail has to date decided on principle relating

only to safety that the rear view mirrors are undesirable but it is not a belief that I share. I have a feeling reasonably close to conviction that had Engineman Pruss looked in his rear view mirror at any time after Derry Road, or had Trainman Krupa looked in his at any time from McConnell Road, this Report would never have had to be written. In any event I shall recommend that rear view mirrors be tried.

(c) INSPECTIONS

(i) RECORDS

We have already seen that the records kept by carmen are inaccurate; indeed the carmen are indifferent to accuracy and their superiors seem no less unconcerned. Commission counsel have proposed that there be "complete and sensible records of maintenance repair and mechanical inspection of all rolling stock" and that the form of those records should be established by the CTC. I should hope that the railways in their own interest would do something about the records and I shall recommend that the CTC require that such action be taken. It might, as well, be of assistance in the CTC's Monitoring of Train Operations Programme.

(ii) MECHANICAL INSPECTION

By whatever name the derailed cars, and in particular Car 1, had a full mechanical inspection at Sarnia and again at Chatham only 53 miles away.

Thereafter there was no mechanical inspection and none was intended until the train reached Agincourt over 180 miles from Chatham. The carmen's inspection at London and the inspection of the crews of the "meets" at Nissouri, Puslinch and Guelph Junction all helped, but none would solve our problem unless the hot box had already reached the smoking stage. Commission counsel proposed a complete mechanical inspection at least every 500 miles and that the CTC should be advised of and approve the location of inspection points. CP Rail now performs mechanical inspections on a "nominal 500 miles basis". Mr. Jean Paul Raymond, the Vice-President of the Brotherhood of Railway Carmen, suggests on behalf of his membership that 200 miles or "300 miles at the very most" would be the appropriate interval. None of these figures is related to the Mississauga experience. Mechanical inspections in order to catch a hot box would be at prohibitively short intervals. The solution to our problem appears to lie in hot box detectors.

A brief presented by the Brotherhood of Railway Carmen expressed concern over the reduction in the number of qualified carmen employed by the railways and the reduction in the number of locations across Canada where mechanical inspections are carried out. It was also suggested that there had grown up a fairly prevalent practice of railway supervisors removing bad order cards from rolling stock in order to permit a car to continue in service. A bad order card indicates that a car requires repair and therefore should be removed from a train to effect

such repair. I did not conduct any specific inquiry into the allegation concerning bad order cards and I therefore will not make a recommendation in that regard. However, I will recommend that the railways be required to set forth rules for inspection and the location of the inspection points at which inspections are made, all to be approved by the CTC.

(iii) RUNNING INSPECTIONS

As we have seen there are 2 basic flaws in the performance of running inspections. The first is that there is no consistency in where the inspection on curves takes place, and the second is that there is no consistency in the language of communication during and after inspection on curves. Mr. Davies of the Brotherhood of Locomotive Engineers seemed of the opinion that the procedure adopted (leaving it to the discretion of engineers) resulted in every engineer and every head end trainman inspecting at the same place on a given run. As we have seen (ante, p. 46) this is not so, at least in the Mississauga area. There is also the conflict of view (pp.56-7 ante) as to the primary obligation of the head end trainman when the train is encountering problems in front which engage the engineer's attention. I do not think all discretion should be removed from the engineer and the head end trainman (or for that matter from the conductor) but I do think they are entitled to some guidance. So far as I can determine the only guidance they get at CP Rail is in the initial training and that is very subjective depending on the views of the teacher.

A more difficult problem is that of consistency of the language of communication. Commission counsel propose a standardized vocabulary. The purpose of communication is only to be understood. If the only communicants are the head and tail end it is good enough if they understand each other. If it is proposed that the communication be monitored by a third party to determine whether the proper running inspections are being carried out, then standard language is essential. I shall recommend the adoption of such a standardized vocabulary but only for the time being in association with the trial of radio equipment and the recording of communications infra.

(d) RADIO COMMUNICATIONS AND RECORDING

There was no suggestion before us that communication between head and tail end was unsatisfactory. There was much evidence that the record of those communications at the London dispatcher's office was incomplete. It seems that the recording device at the time could only pick up those conversations if (1) the dispatcher's set was tuned to the main line frequency (as opposed to the yard frequency), (2) the conversation was within range, and (3) the conversation was not overridden by a transmission from another train on the same frequency that was more powerful. It seems that it was not intended that the transcript

should be complete, only that it should provide what help it could within its limitations. The reason that intra-crew communications could be picked up in London from Mississauga and not at places along the way is that a repeater station was installed in mid-1979 in Streetsville. Commission counsel have proposed the installation of radio equipment that would allow both head and tail end communication to be heard in the dispatcher's office and recording equipment there to record all such communications. It is a good idea and worthy of trial. It would be of no use unless it is monitored regularly. It would not have prevented the Mississauga derailment, but it might well have told us how well the crew were performing the running inspections.

(e) EVENT RECORDERS

Commission counsel have proposed the installation of locomotive event recorders to monitor braking, throttle movement and speed. CP Rail is opposed largely because of labour resistance. The question I think is now academic. As I have noted (ante, p. 122) as a result of the investigation of a derailment near Glacier (sometimes the derailment is stated to have occurred at Flat Creek), British Columbia, the investigating officer has recommended the installation of such a device in all locomotives and the CTC has accepted and is about to implement the recommendation. It could only promote safety and I can only approve.

(f) TRAINING OF ENGINEERS AND CONDUCTORS

The same investigation (Glacier, B.C.) resulted in another recommendation that the RTC, through its committee of representatives of railway, labour and the RTC, draft a regulation outlining standards for engineers and conductors and requiring that engineers and conductors pass an examination based upon those standards as a condition of employment or continued employment. The railways, both CP and CN, have now training programmes. It can do no harm to set a minimum standard. Again the problem is academic. The recommendation of the Glacier, B.C. report has been accepted by the CTC and is in the process of being implemented.

(g) TRAINING OF CARMEN

Commission counsel propose that formal programmes for training be adopted and implemented, monitored by the CTC. The carmen's union is happy to have its members subjected to further training and is happy to have the CTC or the RTC adopt and implement "more rigid rules and regulations governing the inspection, repairs and maintenance of rolling stock on the railways". I should

think that the results of the CTC's Monitoring of Train Operations Programme would dictate not only the further training but the adoption and implementation and enforcement of such rules. CP Rail has an impressive document entitled "Training Manual of Basic Freight Car Inspections and Repairs" which calls for extensive training programmes, but the evidence before us both from CP Rail and C&O personnel was to the effect that the carmen who inspected the Mississauga train got their training on the job without supervision except from their immediate supervisors.

(h) VANS OR CABOOSES

Commission counsel propose that vans should be equipped with speedometers, windshield wipers and window defrosters and this proposal is supported by (perhaps promoted by) the United Transportation Union. It was not a problem at Mississauga but on general principles one can only wonder why this equipment has not been installed before. CP Rail questions only the rationale for speedometers. I think the rationale is obvious. The

conductor who is in charge of the train is required as are all employees—see Uniform Code General Rules - E—to report any violation of the rules. If he is to be blamed for excessive speed on the part of the engineer, he must have a ready, fast method of determining that speed so that he can take immediate steps by radio (or in extreme cases application of the emergency brake) to ensure that the violation does not continue.

Mr. McLeod of the United Transportation Union also proposed that the cupola be extended beyond the sides of the caboose for better viewing as it appears to have been in some of the newer models and the Union and Commission counsel propose that a low, unloaded car be marshalled immediately in front of the caboose to give greater visibility. Both proposals seem sensible but CP Rail claims both propositions are impractical and the C&O agrees at least as far as the low, unloaded car is concerned. I think the practicality should be judged immediately and if the judgment is affirmative, an appropriate regulation or reglations promulgated.

## 2. CARRIAGE OF DANGEROUS GOODS

### (a) ROLLER BEARINGS

Commission counsel propose that trains carrying

dangerous goods should not include cars with plain bearings, i.e. they should all have roller bearings, and that an appropriate lead time for conversion to roller bearings be established. I agree with the first proposition; I disagree with the second. Roller bearings have been with us for decades. The conversion among tank cars is almost complete, that among railway-owned box cars in Canada not yet 50 per cent complete. We know that journal failure with roller bearings is only a small fraction of that with friction bearings. We also know that a train is only as safe as its weakest car. As Mr. Jones, the former chairman of the RTC, put it in the General Safety Inquiry:

> "There is no guarantee that the car ahead of this vehicle on which so much time and money is being spent will not be some car that is old and decides to become a cripple at the wrong time and create a derailment which has the chain reaction effect...".

It seems to me that the railways have had sufficient time for conversion. No further time should be given in the transportation of dangerous goods. No cars in a dangerous goods train should be equipped with plain bearings.

(b) TANK CAR EQUIPMENT

Commission counsel propose that all cars carrying dangerous goods should be equipped with double

shelf couplers, head shields, thermal protection and bottom outlet valve protection, again with an appropriate lead time provided. I agree that double shelf couplers should be on all tank cars and bottom outlet valve protection should be provided for all tank cars carrying dangerous goods. I agree that all 112 and 114 cars should have head shields and thermal protection. I don't know whether the same should apply to 105's. The matter is still under consideration in the United States. There is as I have noted no independent consideration in Canada.

I may say that the provision of double shelf couplers, head shields and thermal protection for 112 and 114 tank cars is more or less academic. The CTC regulation requires double shelf couplers by March 31st, 1979 and head shields and thermal protection (the latter only for cars loaded with flammable gases) by June 30th, 1981.

(c) SPEED

Commission counsel propose that dangerous goods trains be required to travel at reduced speeds, particularly in heavily populated areas and in this they are supported by many individuals and by almost every municipality which submitted a brief. Not surprisingly it is vigorously opposed by the railways.

I am satisfied that a case is made out for review of speed limits based on particular circumstances. I am not satisfied even on the reverse onus which I have suggested should apply in the transportation of dangerous goods that a case is made out for a general reduction of speed. I fully appreciate that speed alone can create discomfort in adjoining properties and that is a legitimate municipal concern, but it is no part as I see it of my terms of reference. To order a reduced speed in the interests of safety is tantamount to an admission that we cannot produce a safe train. In my view a reduced speed should only be required if the other safety measures are not in place.

I have already referred to the problems in the setting of speed limits and I will refer to them again in the recommendations.

(d) LENGTH OF TRAIN

I need not repeat how a long train may reduce the effectiveness of the running inspection. Commission counsel suggested a limit on length of 3,000 feet and Mr. Rodger O'Brien, the vice-president of the United Transportation Union, suggests 4,000 feet which would reduce a dangerous goods train to something between 50 and 70 cars. There is certainly attraction in either proposal because it would make the undercarriage of all cars visible from one end or the other on a reasonable curve and in clear weather. Where the running inspection is all we have, I would agree with the proposal. But where the other safety measures are in place,

I do not believe that such a restriction having so obvious and so enormous an effect on the efficiency of the railway is necessary.

(e) MARSHALLING

CP Rail in the course of argument presented some very comprehensive proposals of which marshalling was the keystone.

The proposals started with an appreciation that there was before the Inquiry Exhibit 425 entitled a "List of Special Dangerous Commodities", a list which was prepared for the Dangerous Commodities Technical Review Committee in the course of consideration by the CTC of "solid trains" (i.e. trains carrying only dangerous goods), re-routing of dangerous goods trains out of densely populated areas and controlling the speed of dangerous goods trains. The list includes over 30 commodities most of which are poisonous, but some of which are flammable or non-flammable compressed gases. The list includes Chlorine but none of the other dangerous goods involved at Mississauga. Mr. Ellison doubted that many of the products listed had significance in commerce. The list by its very nature had to be tentative but it was nevertheless a starting point for delineating the most dangerous of dangerous goods.

With this list as a basis Mr. Shibley, for CP Rail, proposed that all tank cars carrying the listed goods ("the 425 goods") be marshalled in the front of the train. These cars would need to be separated by 5 non-placarded cars from the locomotive by Red Book regulation, (74.589) and by the marshalling order after Mississauga (ante, p.123) there would have to be a separation of the "425 cars" from those containing flammable compressed gases by another 5 non-placarded cars.

The proposal went on to require that all tank cars containing the 425 goods be completely equipped with roller bearings forthwith and be retrofitted with double shelf couplers, head shields, and thermal protection and bottom fitting protection by December, 1982, and that until the route was protected by hot box detectors there would be a standing inspection every 75 miles of the portion of the train containing the 425 goods. Finally, none of the LPG's marshalled to the rear of the 425 goods could be shipped without having been completely retrofitted.

The merits of the proposal are that the most dangerous commodities would be in cars inspected more often and those cars would be closer to the view of the head end for running inspection; moreover those commodities would be unlikely to be affected by a derailment further back

on the train. It was suggested also that the completion of the retrofit programme for LPG tank cars would at least minimize the danger of spill in a derailment.

The merits of the proposal are, however, in my view, overridden by one glaring flaw. The 5 buffer cars before the 425 goods and the additional 5 buffer cars before the remaining LPG tank cars (to say nothing of the non-dangerous goods cars in the latter portion of the train) are not necessarily to have roller bearings, and the incidence of derailments from hot boxes not only at the back but at the front as well is bound to remain high. In a memorandum from Mr. Lucas, the director of the Centre of Forensic Science to Mr. Blenus Wright, counsel for the Attorney General, he doubted that if all derailed cars had had double shelf couplers and head shields, there would have been significant change in the circumstances of the Mississauga accident. He agreed that bottom fitting protection might have lessened the severity of the fire resulting from the loss of product (Toluene) in Car 1, and the loss of product (Caustic Soda) in Cars, 3, 4, 5 and 6. He conceded that thermal protection is potentially very valuable particularly in avoiding explosion, but doubted that the type of coating or jacket now available is of demonstrable help.

There were other proposals involving marshalling, many involving the separation of Chlorine tank cars from other dangerous goods, some involving the separation of Chlorine tank cars from any train carrying other dangerous goods. As I have said, I am not sure that Mississauga demonstrated any merit in the separation of Chlorine from other dangerous commodities.

Nor am I convinced of the merits of the marshalling regulations now in force from the CTC. I would not, however, interfere with any of them. There is doubtless some benefit to the crew in the event of a derailment. These regulations do not reduce the likelihood of derailment and I am far from sure that they benefit the public in the neighbourhood of a derailed train.

Before I leave the subject, I do not wish to discourage the further study and classification of dangerous goods to separate the most dangerous from the others and attaching to the former special, more rigid rules. I am not yet convinced of the sufficiency of a list which does not include Propane or most other LPG's or other goods such as ammonium nitrate which is not only toxic but transported in large quantities.

(f) RE-ROUTING

I have much the same reaction to re-routing.

The major proposal to that end came in a comprehensive brief from the Municipality of Metropolitan Toronto. That brief points out that the CP Rail track from southwestern Ontario travels through the heart of Metropolitan Toronto to reach the yards at Agincourt where much of it is then dispatched to western Canada and much of the traffic from western Canada follows the same route in reverse. This brief suggests that all dangerous commodity trains of CP Rail be re-routed either along the present CN freight line, or along a new CP line both to the north of Metropolitan Toronto through such municipalities as Brampton, Vaughan and Markham, much of which route in either case would be in the Province of Ontario's transportation/communication/utility corridor.

I need hardly state that the proposal was not endorsed enthusiastically by Brampton, Vaughan and Markham, but I do not wish to appear to dismiss the proposal as frivolous. Certainly re-routing is possible and certainly it can have advantages in safety. So long as we have derailments of dangerous commodity trains it is better that they take place in sparsely populated areas. But the magnitude of re-routing track outside populated areas is staggering. It also does nothing at all for the delivery of dangerous commodities to populated areas. The subject should, of course, be studied (or perhaps should continue to be studied—it has from Mr. Gray's evidence already been considered for 2 years) and where it can be done it should be.

I need hardly point out that there is no merit in re-routing if the municipal authorities in an expanding area permit (as they have in the greater Toronto area) building, both commercial and residential, up to the edge of the right-of-way.

Re-routing, like marshalling, can be of assistance and should always be considered in long-term planning. But neither re-routing nor marshalling is the answer we seek now. That answer, in my view, lies in safer trains.

(g) THE FOUR-MAN CREW

Commission counsel supported the Union's request for the return of the 4-man crew on dangerous commodity trains. For the reasons given ante (pp.145-6) I cannot accept the proposal. That of course does not mean that safety and the number of the crew necessary to support that safety should not be a continuing concern of the CTC.

(h) TRAINING OF CREWS

The Unions were unanimous that more training was needed for crews in the transportation of dangerous goods. Such training is needed in marshalling, emergency

response, inspection and first aid and in the nature of the product handled and at least at the time of the derailment such training was quite inadequate. There is no real opposition to these proposals. I at first had thought there should be specially trained crews for dangerous goods trains but I now think that is unworkable and the only solution is universal training. The important thing is that the training be comprehensive and compulsory. The trainees would, of course, have to be paid for the time spent in the training.

(i) THE CONSIST

I don't think there is any real argument about the absolute necessity for the immediate provision of information of the make-up of a derailed dangerous commodity train.

Some municipalities and services have gone so far as to suggest that prior notice be given by the railways of the intended passage of each train carrying dangerous goods. Bearing in mind the myriad number of municipalities through which a train would pass in an average train run, I consider this an unnecessary burden to place upon the railways for little real benefit. What is needed is an accurate, intelligible consist available on request immediately. It

should be available from the conductor on the scene and from the Division Headquarters of the railway and from or through CANUTEC on a 24-hour basis.

(j) TRANSPORT CANADA'S "MANAGEMENT PLAN"

Counsel for Transport Canada has proposed that railways file a "management plan" setting forth among other matters the persons having responsibility for inspection of dangerous goods cars and their qualifications, the routes of transportation, an inspection programme, including the distances between mechanical inspections, the availability of hot box detectors and the speed restrictions established with the criteria for their establishment.

In so far as this demonstrates a deepening concern by government in the transportation of dangerous goods, I commend the initiative of Transport Canada. It can proceed with its proposal without any recommendation from me; indeed much of the proposal is covered within other sections of this Report. I should just like to add the obvious. There is no merit in requiring the submission of a plan unless that plan is critically examined and when approved, enforced.

3. RESPONSE

(a) THE RAILWAYS

As we have seen the railways have response plans to dangerous commodity spills. I have made reference

to the flow chart of CP Rail; the same railway also has a manual setting forth in great detail the agencies that can assist in a dangerous goods spill. The initial burden of a derailment will always fall upon the railways and often that burden will go no further. When the accident is confined to the right-of-way and the results do not affect the health or safety of the adjacent citizens, there is no need to consider measures to be taken by others. We must appreciate however that in a dangerous spill the crews and the railways can have only a limited function. The only proposal for improvement of the railway response other than the proposals for improved training of crews (ante, p.175) was one put forth by Dow; it called for response programmes on the part of railways as well as shippers with emphasis on cooperation between railways and shippers, both in the initial response and in the operation of the command centre. Mr. Francis, however, specifically disclaimed any wish to see the proposal translated into law.

I have no complaint of the railways' well-developed plans for response to accidents. I have no recommendations for improvement. I do think however that these plans should be published in the sense that they will be known to CANUTEC and the other agencies, private and public, who will be involved in a dangerous goods spill.

(b) THE PRIVATE SECTOR

As I have said we are largely dependent upon the private sector in the event of a chemical spill. As I have also said for that very reason the private sector

must be dependable. I here refer not only to their competence in the performance of the response, but also to their competence to respond at all.

As counsel for the Canadian Chemical Producers Association was frank to point out, there may be many small producers who manufacture at only one site in Canada and many foreign manufacturers who may not have any connection with Canada except as an exporter to this country of the product. With the best will in the world these producers will not have a response team available unless they are required to do so or unless the industry supplies the team for them.

CP Rail has proposed that the producer/shipper be compelled to supply a response team and has outlined in considerable detail what personnel that team should be composed of and what should be their qualifications and duties. Transport Canada, as I understand it, is prepared to require the private sector to have a response plan in place as a condition of shipment.

I agree with CP Rail that a response team must be compulsory and I agree with Transport Canada that the only assured method is to require a plan as a condition of shipment. I realize that this may impose a hardship on small or foreign producers, but very simply put that is the

price they must pay for the delivery of dangerous goods. I suspect that the difficulty can be worked out within the industry and, if not, any obvious injustice can be ameliorated by government negotiation or regulation.

Many of the briefs were concerned with the question of legal liability both criminal and civil for the private response team. Some industries are themselves, not surprisingly, in favour of complete immunity and this position is supported by both Mississauga and the Province of Ontario. The Transportation of Dangerous Goods Act provides (in s. 17(6)) that "Any person requested to act (see p. 128 ante) is not personally liable either civilly or criminally in respect of any act or omission in the course of complying with the request unless it is shown that he did not act reasonably in the circumstances." I do not know what that provision adds to the common law.

Like CP Rail I can see no reason for granting immunity to the private response teams or their employers, whether or not they are a "person requested to act". True, to a certain extent they have been volunteers in the past, but it must always be remembered that they are the producers of dangerous goods and the beneficiaries of their transportation. I can think of many circumstances where they should not be liable but many where they should; it is a very complex problem. Speaking perhaps from an understandable bias I would leave the problem like most other tort problems

to the courts. In this I will not have the support of the Canadian Environmental Law Association who would prefer some form of absolute liability together with a compensation fund so that the public would not have to "fall back on the discredited common law actions". Certainly those who have been affected in Mississauga have had no hesitation in seeking their remedy in the courts.

(i) ENVIRONMENTAL CONSIDERATIONS

The Canadian Environmental Law Association was not unnaturally concerned with the effect of a spill on the environment; it found many defects in the Transportation of Dangerous Goods Act particularly in its failure to concern itself with "hazardous waste". However that may be, I do not consider that the very complex environmental problems were within my terms of reference.

(c) THE PUBLIC RESPONSE

In this area CP Rail proposes the establishment of a command team composed of fire, police, railway officials, the response teams of industry and a non-elected government (presumably federal government) emergency commander together with independent experts appointed by him.

I agree that fire and police should always be part of the team where required and railway officials should always be part of any team—indeed as I have said they may often and perhaps generally comprise the whole team. In my view the proposal for a non-elected emergency commander is probably unconstitutional and wholly unrealistic. Where a spill is within a province and does not take on the proportion of a national emergency, the municipal or provincial governments are not only the lawful but the natural authorities and those governments are composed of elected politicians. Not only would those politicians expect to be in charge, they would be expected by the people they represent to take charge. Strangely enough (or so it seemed to me) the City of Mississauga proposed "that the Ministry of Transport be responsible for coordinating the on-site activities of the various response groups and assume ultimate responsibility for the clean-up operation". At the same time they proposed that the municipal government be given "clear authority to take all emergency measures... to prevent...the danger to life, health and property of its citizens". I don't think you can separate clean-up from command. Nor do I think you can dissociate command from ultimate responsibility.

I do not, however, believe there is any reason or any justification for the federal government abandoning

responsibility in all but national emergencies. I think the obligation remains to have a person or persons available and knowledgeable to attend at every accident where required, to assist and advise the municipal and provincial authorities, to coordinate the railway's and the private response and to take charge in a vacuum. I think also that that is precisely what is contemplated under s. 17 of the Transportation of Dangerous Goods Act.

As I have said, I do not consider that the conduct of the municipal or provincial authorities are within my terms of reference. I might just point out though that the Province of Ontario already contemplates an "Emergency Plans Act" providing for municipal and provincial response to an emergency.

## 4. OWNERS AND SHIPPERS

I have already dealt with the proposals for improvement of tank car equipment (ante, pp.167-8) and I intend in the recommendations to ensure that trains carrying dangerous goods have the benefit of that improvement. I also intend to recommend more Canadian research into tank car safety and more Canadian consideration of the speed of

implementation of the retrofit programme. There are, however, two subjects that might conveniently be considered here.

(a) PLACARDING AND COLOUR-CODING

One of the problems of Mississauga was the inability of the emergency services to identify the contents of the derailed cars immediately. The consist will, of course, help but it can be readily seen from Appendix 2 that the cars on a derailment do not necessarily maintain the same order. At the moment, the chief identification (dictated by the Red Book) is a cardboard placard usually about a footsquare placed in a bracket on the tank car by the shipper at the time of loading. We were told (it was hardly necessary) that these placards suffer great damage from exposure and often are destroyed in transit. While the carriers are compelled to carry replacements and doubtless make the replacements when the loss is discovered, it is not a very satisfactory system and many proposals were made to correct it.

Some of these proposals such as Commission counsel's that the placards be made of non-flammable material reasonably able to withstand our weather conditions should clearly be implemented. Another proposal is that the car

numbers be raised so as to be more readily identifiable and more impervious to fire. Some proposals such as colour-coding of the tank cars are much more difficult to implement because of the many uses to which a tank car can be put, and the host of dangerous goods now on the market. Nevertheless there does appear to be a movement towards dedication of a tank car to transportation of a particular commodity and the number of dangerous goods regularly transported is not so great. It seems to me that a system of colour-coding, not necessarily involving painting the whole car, could be worked out for tank cars regularly carrying the more dangerous and more commonly transported commodities. I fully appreciate that in a conflagration like Mississauga any colour-coding would be destroyed. Nevertheless it is easy to visualize situations where colour-coding (which will have to be well publicized) would be of great assistance.

(b) INSPECTION OF THE LOADED CAR

The inspection of the tank portion of the tank car is, of course, part of the loader's duties and is readily accepted by him. The difficulty however arises in the undercarriage where the locations of the loading point and the location of the first mechanical inspection point are well separated. According to figures supplied to us by CP Rail that distance can be up to 100 miles.

The Red Book (s.74.596) requires that placarded, loaded tank cars "be inspected by the carrier before acceptance at the originating point and when received in interchanges to see that they are not leaking and the air and handbrakes, journal boxes and trucks are in proper condition for service".

The difficulty is that the crew who go to pick up the tank cars are not qualified to make a full mechanical inspection (which the required inspection appears to be) and CP Rail proposes that the inspection be made at the shippers' premises by shippers' personnel. The shippers are opposed, pointing out that none of their personnel is qualified for the task to which CP counters that it is willing to supply the necessary training free of charge.

I do not think that there is justification for changing the present rule, and the burden should remain with the one most qualified, viz. the carrier. If the crew cannot be trained, a qualified carman must be sent, but I see no reason why the shipper cannot be made to bear the cost.

I might just point out that there was no evidence of mechanical inspection by the C&O of any of the cars at any of the "originating points" prior to Mr. Nethercott's inspection of Local 4 while it was being made up. It appears also that Dow does do an inspection of the undercarriage but that inspection is before loading and does not involve a

full mechanical inspection and did not, at least up to the time of this derailment, include the lifting of the journal box lids.

## 5. THE GOVERNMENT

### (a) INSPECTORS

I have already referred to the need for a federal presence where required at the scene of the accident. Presumably he will be an inspector under s. 17 of the Transportation of Dangerous Goods Act and he will, of course, be knowledgeable about dangerous goods, their properties and the emergency response. There is little, if any, opposition to the proposal. The only problem will be to train men and women to the knowledge and competence required.

### (b) ROLE AND DIRECTION OF THE CTC AND TRANSPORT CANADA IN THE CARRIAGE OF DANGEROUS GOODS

It is obvious from the Transportation of Dangerous Goods Act that henceforth Transport Canada will take a direct interest in the subject that concerns us. It seems equally clear (see ante, p..128) that the CTC will continue

to be concerned. I do not know how their competing or complementing roles will be resolved and that is not my problem. What is of concern to us and was to many of the parties appearing at the Inquiry is the direction of government and the extent of its involvement in the solution to our problem.

I have mentioned earlier the lack of funds that has hampered CTC to some extent. I have mentioned also the philosophy of restraint based largely on economic principles. Perhaps Mr. Gray put it best or at least most directly. After describing the need to consider the economic effect on railways, he said "If you impose by force a programme on the railway companies and they don't have enough money to implement, all you have done is issue an order to increase freight rates...It is too important a subject-matter to take any great big initiate (initiative) that is going to cost a great big amount of money unless you know what you are doing ahead of time because you can do more harm than good" and again "But I think that the type of examination that I have described to you has to be done and that to implement recommendations without doing it would border on the irresponsible."

These words might be contrasted with those in the Canadian Railway Labour Association brief. In discussing

what was alleged to be the policy of CTC "to permit the railways to police their own operations and write their own rules via the Railway Association of Canada and accept standards set by the AAR..." it said: "In our opinion, as in the case of hot box detectors and roller bearings where the economics of the railway companies naturally become an obvious consideration, the balance must tip in favour of safety."

I think it is a difference in philosophy but whether it is that or just a difference in emphasis I side with the Unions. Where there is a major danger such as exists in the absence of roller bearings and hot box detectors, one needs very little evidence of economic feasibility to justify an order. The evidence is that a conversion to roller bearings costs from $3,350 per car to $15,000 per car depending upon whether one accomplishes the task merely by modifying the existing bearing or by replacement of the whole truck. The cost estimate to CP Rail of the installation of a hot box detector including a dragging equipment detector in 1978 was $73,800. On these figures, I have no difficulty in tipping the balance in favour of safety. The benefit to the public is clear. And if the detriment to the railways is insupportable, the public might well condone a subsidy.

These observations may perhaps be regarded as designed at least in part to justify my recommendations. They are designed however also to support further initiative by government in the direction of safety in line with the proposals of many municipalities, associations and individuals. The Monitoring of Train Operations Programme has given us valuable information and cannot help but improve the inspection system. It should as Commission counsel propose be continued and expanded as funds for more inspections become available. The CTC should also expand its accident investigation process perhaps along the lines of the National Transportation Safety Board in the United States and should publish reports of its investigations. I do not know what fruits the McGregor Report will bring forth because essentially it asks for a plan of improved safety from Canadian National, but in my opinion the very publication of that report and the consideration that the public and CN will give to it must improve safety.

There has been considerable adverse comment on the deliberate policy of the CTC against prosecution of breaches of the Railway Act or of the regulations. There are numerous sections of the Railway Act—see s. 343 et seq. setting out offences, and a general penalty section is found in s. 395. But access to the public in prosecuting for

these offences is very limited. Under ss. 343, 361 and 376-381, no prosecution for specific offences can be undertaken without leave of the CTC, and s. 399(4) provides that no prosecution for any offence can proceed against a railway where the penalty might exceed $100 without that leave. As I understand it, the CTC has not of its own prosecuted at least since 1967; there may have been one prosecution brought at the instance of private citizens during that period.

Again it is a question of philosophy, the CTC's being to persuade rather than prosecute. For a different view, one might quote from the reasons of Riddell J. in R. v. Michigan Central Railroad Co. (1907), 10 O.W.N. 660 at pp. 668-9:

> "I reiterate that it is my firm, well considered opinion that the best way to prevent similar occurrences, accidents or crimes, whichever word may be selected, is to make it more costly for railway companies to violate the law than to observe it. The great defect in our system is the want of some officer whose duty it is to watch for offences against the law and cause offenders to be prosecuted. Substantive law and legislation we have enough and to spare, but we have always failed to provide prompt and sure methods for the detection of offences. The practice of shipping explosives in the manner disclosed in this case has apparently been going on for years without detection, and it would not even now have been discovered had not the explosion happened. Neither does it always follow that, when an offence against the law does become obvious, it is prosecuted."

Mr. Justice Riddell's view found considerable support among the non-railway parties at the Inquiry. I do not think it necessary or perhaps desirable for me to make a specific recommendation in this regard. However, when Parliament has legislated an offence and a penalty, the enforcement agency should be slow to adopt a policy of no prosecution for that offence. To the extent that the Minister of Transport or the CTC believe that the existing offence and penalty sections are out-dated or inadequate to achieve reasonable enforcement of the Railway Act, the Minister should consider placing before Parliament appropriate amending legislation.

I have already expressed my view that there should be Canadian sponsored research on the safety of tank cars and the transportation of dangerous goods by rail. As Commission counsel expressed their proposal, we should seek to develop -

(a) a device which is capable of measuring what amount of product remains in a tank car or a container after an accident;

(b) a computer program that will be capable of predicting the risk of any danger posed at the accident site, especially dispersion of clouds of dangerous goods that are harmful to life;

(c) safety valves or other devices that will operate in catastrophic conditions so as to minimize the rupturing of tank cars and containers.

Success in any one of these endeavours would perhaps have overcome the problems of Mississauga and would perhaps overcome the problems of any similar derailment.

A tank car manufacturing company (the Canadian General Transit Company) expresses it thus: "A trade association or a branch of the CTC ought to be created to re-evaluate performance standards of all safety devices and analyze all retrofit proposals on a cost/benefit/risk basis. This body ought to have the research capability and liaise with the DOT, FRA (Federal Railroad Administration), RPI (the Railway Progress Institute—suppliers of equipment to railways), AAR and appropriate trade associations such as the Chlorine Institute." I approve the sentiment.

These proposals, in my view, are dictated by the experience of Mississauga. All that stands in their way is the will (and the financial backing) of government.

## X. THE RECOMMENDATIONS

### RECOMMENDATION ONE

Subject to Recommendation Three, trains transporting dangerous goods of any kind should be equipped as follows:

(a) all cars whether dangerous goods cars or not should have roller bearings;

(b) all tank cars should have double shelf couplers;

(c) all 112 and 114 tank cars should have head shields and thermal protection;

(d) all 111 and 114 tank cars which have bottom fittings should have bottom fitting protection.

### RECOMMENDATION TWO

Subject to Recommendation Three, the routes of any trains carrying dangerous goods through built-up areas should be protected by hot box detectors. No point within the built-up area should be more than 20 miles from hot box detector protection.

RECOMMENDATION THREE

If a dangerous goods train does not comply with Recommendation One, it should not exceed 4,000 feet in length regardless of the hot box detector protection provided.

If the dangerous goods train does not comply with Recommendation One, or if the route of the dangerous goods train passing through a built-up area does not comply with Recommendation Two, the train in passing through the built-up area should not exceed 25 miles per hour.

COMMENT

The object of these first three recommendations is to ensure that any dangerous goods train without the accepted technical safety improvements will not exceed the 4,000 foot length over which the crew would have a reasonable opportunity of viewing the undercarriage, and also to ensure that any dangerous goods train passing through a built-up area without hot box detector protection will proceed at a safe speed. It is possible under these recommendations for a longer dangerous goods train to pass through an urban area without hot box detector protection, but only at the slower speed and only if all technical improvements have been effected.

Lest there be any doubt about it, I am not recommending any lead time for the technical improvements or the installation of hot box detectors. That time has already run and the recommendation should be implemented immediately. I am not unmindful that the limitation on length and speed may hasten the retrofit programme and the installation of hot box detectors, but that is not the reason for immediacy. It is, in my opinion, in the words of Term 2 of the Terms of Reference guiding me, one of "the steps which can be reasonably taken to reduce the risk of recurrence of such an accident anywhere in Canada".

There may be a need to define "built-up area". I have in mind any concentrated centre of population in the proximity of the track containing 500 or more people. It need hardly be said that the railways should work towards the installation of hot box detectors on all routes but the immediate need relates to the transportation of dangerous goods through urban centres.

The imposition of the 20 mile interval for hot box detectors is indicated by the practices in North America and the experience of Mississauga (see ante, pp.116 and 156). If a train-mounted device could be perfected the whole question of interval would, of course, disappear.

It has been suggested that no recommendation involving a change in equipment can be effected without United States cooperation because of the great international traffic in rail cars across the United States border. I do not think the problem is insuperable. The recommendations I have made are in line with United States trends—in many ways, such as roller bearings, they are ahead of us—and Recommendation Three takes effect if the first two recommendations cannot be complied with because of international traffic.

It must also be noted that I have made no distinction among dangerous goods. I appreciate that many of the goods that are transported are so classified but are only marginally dangerous. The time may come when a reliable classification has been made enabling the less dangerous goods to be exempted from these rules. That time, however, is not now. I am not satisfied for the reasons given (ante, p. 173) with the 425 goods list and no other list has been offered.

RECOMMENDATION FOUR

As a condition of shipment anywhere in Canada of dangerous goods by rail, the shipper should have in

effect a plan for control of the escape of his product in an accident and that plan should be submitted to and approved by the Minister or such agency or person as he may designate. The right to ship may be revoked at any time the plan, either in concept or operation, is deemed inadequate.

COMMENT

This recommendation which is basic to the reliance upon the private sector will take a little time to implement but I do not intend that the implementation be long delayed. Most of the shippers already have plans in effect and I should think all shippers could submit their plans within three months. The nature of the plans will, of course, vary with the product and the response may, by arrangement, be made by others than the shippers themselves. The important thing however is that the plan be in place and be acceptable. Nothing should be shipped unless we are able to deal with its escape. If private industry cannot do it, then the government must supply the protection, something government at this time is quite unable to do. What government must do is examine the plan critically and keep it under constant surveillance.

The power to implement this recommendation seems clear from the Transportation of Dangerous Goods Act,

s. 21 giving the Governor in Council power to make regulations in s-s. (i) and (k) thereof as follows:

> "(i) prescribing circumstances in which the handling, offering for transport or transporting of dangerous goods is prohibited;"
>
> "(k) prescribing safety marks, safety requirements and safety standards of general or particular application;"

Section 17 of the Transportation of Dangerous Goods Act as pointed out (ante, p. 128) provides in effect that an inspector may "request" the shipper to put the plan into effect. Although s. 14(5) makes the failure to comply with a reasonable request an offence, I would have preferred the use of the more imperative word "require".

RECOMMENDATION FIVE

Transport Canada should make available through CANUTEC or otherwise the advice and direction needed upon a rail accident involving dangerous goods. In particular it should make available at the scene of, and within hours of, an accident, a person capable of directing the clean-up of that accident and of protecting the populace. He will lend all assistance to the local or provincial authorities and will take charge of the scene if no such authorities

are evident. This person, no doubt an inspector under the Transportation of Dangerous Goods Act, should report in writing after every accident to which he is summoned.

COMMENT

This, as I see it, is the major contribution by the Federal Government to the response to an accident, but it is no more than would be expected. The importance of the training of the federal representative at the scene cannot be overemphasized and there must be an adequate number of such representatives so distributed that any part of the country covered by rail will be able to obtain their assistance in person within a few hours. The 24-hour telephone number of CANUTEC should be in every police and fire station in the land and Transport Canada should prepare and provide to local emergency forces educational programmes in response to a dangerous goods spill.

RECOMMENDATION SIX

The railways should be required either by the CTC or by Transport Canada as appropriate to take action forthwith as follows:

(a) to publish for their crews guides for inspection by head end and tail end personnel of the train including the appropriate places for such inspection with particular reference to curves and stations in each division;

(b) to provide adequate paid instruction for their crews involved in the transportation of dangerous goods;

(c) to provide a formal training programme for carmen;

(d) to set forth rules for mechanical inspections;

(e) to set forth rules for record-keeping;

(f) to file with the CTC a list of their mechanical inspection points for approval;

(g) to publish to Transport Canada and any private or public response agencies their response plans which will include a 24-hour emergency telephone number where information as to the contents of trains may be obtained;

(h) to have available on all dangerous goods trains and at all division offices an accurate intelligible consist containing at least the car number and the name of

the dangerous commodity carried and to provide such consist to CANUTEC and to any municipal or provincial official forthwith on request, whether or not there has been an accident; the railways should also provide municipalities or communities having response personnel with information on the types of dangerous goods normally transported through them;

(i) to equip every caboose with speedometers, windshield wipers and window defrosters;

RECOMMENDATION SEVEN

The CTC should require the immediate trial by the railways of the following:

1. The installation of rear view mirrors on locomotives and their use in running inspections.
2. The installation of front and rear radio equipment capable of being received at some central point or points in the railway system and the maintenance of

a record of all communications between head and rear end. To this end the trial should impose upon the crew a standardized vocabulary.

COMMENT

As I have said, it is my belief that rear view mirrors would be of value in running inspections and that the record of communications would be of value both to the railways and the CTC in ensuring that all running inspections (and other operations) are properly conducted. I cannot be sure, however, until the experiment is undertaken and the results are assessed. If the assessment justifies the effort and expense (as I fully expect it will) the recommendation should become a regulation affecting all trains, or at least all trains transporting dangerous goods.

RECOMMENDATION EIGHT

The CTC should implement its intention expressed in the Glacier, B.C. report to impose upon the railways event recorders and operating standards for engineers and conductors.

RECOMMENDATION NINE

The CTC should require the railways to submit a table of the speed limits set by them for all trains on all routes as well as the criteria relied upon in the setting of them and information as to whether the trains may or may not be carrying dangerous goods. This information should be critically examined by the CTC and when the speed limits are found inappropriate the railways should be required to alter them.

COMMENT

The setting of speed limits for trains is no easy task. It depends on the nature of the train, of the track and of the topography. It is not intended by this recommendation to transfer the speed-setting process from the railways to the CTC. What is intended is that that process will come under scrutiny on behalf of the public. This recommendation is, of course, not intended to derogate from the specific regulation of speed set forth in Recommendation Three. It may also be that the control of the speed of dangerous goods trains will be taken over by Transport Canada—see Transport Canada's Management Plan (ante, p.177). As I said in dealing with that matter and it applies to many of the recommendations herein, critical examination of the information supplied is essential. Indeed

without it there is no point in getting the information at all.

RECOMMENDATION TEN

The CTC or Transport Canada should require shippers and carriers to replace all present dangerous goods placards with ones as nearly as possible impervious to fire and weather conditions.

RECOMMENDATION ELEVEN

Transport Canada should forthwith establish a permanent body to consider with research assistance -

(a) the adequacy of present safety devices in tank cars;

(b) the adequacy of all present government and AAR retrofit programmes;

(c) the relative merits of all hot box detectors including train-mounted devices and the appropriate interval on installation of any trackside detectors; in conjunction therewith the relative

merits of all dragging equipment detectors;

(d) the means of measurement of the amount of product remaining after a spill;

(e) the means of determining the risk posed by an escaping product;

(f) the most effective design of the cupola;

(g) the merits or demerits of the low, unloaded car immediately in front of the van;

(h) the colour-coding of dangerous goods tank cars;

(i) the raising of the numbers or other means of clear identification of the numbers of tank cars;

(j) the marshalling of a dangerous goods train;

(k) the re-routing of dangerous goods trains around urban areas.

COMMENT

I can only regret that I am here doing what I have complained of in others, i.e. making recommendations for further study. The matters listed are,however, real problems to which I do not have the answers. I can only hope that these answers will be forthcoming shortly and where the answers dictate affirmative action that such action will be taken immediately.

RECOMMENDATION TWELVE

Transport Canada or the CTC should be required to simplify the Red Book or the Dangerous Goods Code, whichever should be the current applicable dangerous goods regulation authority, so as to be intelligible to the general personnel of railways, manufacturers, producers and shippers.

COMMENT

It is to be hoped that this revision can be accomplished so as to produce an official document, but at the very least there should be a semi-official simplified version of the rules relating to the transport of dangerous goods by rail.

RECOMMENDATION THIRTEEN

The CTC should continue and expand its Monitoring of Train Operations Programme

COMMENT

The results of the programme to date (ante p. 123) have demonstrated to me that the supervision

of train repairs and train inspections cannot be left entirely to the railways. If the CTC is to take a more active position it may well require funding for additional personnel, but if the monitoring is followed by corrective measures by the railways and vigorous enforcement, including where necessary prosecution for breach, it will, in my opinion, be money well spent.

RECOMMENDATION FOURTEEN

The CTC should continue and expand its independent investigations of accidents and should report thereon regularly to the public.

COMMENT

The word "independent" is controlling here. I do not mean that the CTC should not continue to receive reports from the railways and in minor accidents perhaps accept those reports as final. In all major accidents, however, there should be a CTC authorized and controlled investigation followed by a public report. Again there may be need for additional financing.

It appears that the responsibility for

investigation of an accident involving dangerous goods may now fall upon Transport Canada under s. 20(1) of the new Act, although I understand that it is intended to use the CTC or the RTC officials for the purpose. The reports under the new Act are required to be published.

RECOMMENDATION FIFTEEN

Transport Canada should be required to publish annually or as they occur -

1. The reports of the inspector called to the scene of an accident under Recommendation Five.
2. The results of the investigations under Recommendation Eleven.

## EPILOGUE

The time has now come to thank all the people who helped so greatly throughout this Inquiry. They are:

- the investigators, Supt. Desmond Rowland, Det. Sgt. Edmund Kelly, Det. Sgt. James Bertram, Det. Boyd Brown and Det. Fred Lemieux, all of the Peel Regional Police Force who had begun their investigations long before this Inquiry was conceived and who continued to assist us throughout the Inquiry. I would be surprised if any fact escaped their detection.

- the railway experts, George Masters, Frank King and William Cant, who so patiently explained to us at the beginning just what a hot box was and which end was which of a tank car and indeed of a train, and as we became more educated took us on more and more trips into railway mystery.

- Zigi Vitols, our office manager, Kersi Chesson, our office assistant, Florence Gordon, our charming receptionist, and Arthur Savage, our hearing room usher, who were so helpful not only to us but to everyone who dealt with us.

- our secretaries, Dorothy Kosonic, Judy Darke, Carol Smith and Hope Brown, who so cheerfully handled the truly fearful amount of paper work involved in this Inquiry.

- the court reporters, Dorothy Marchant, Erma Thorburn, Pat Grainger, Barbara Maclauchlan and Rufus Dickinson who were so accurate and so industrious and who never seemed to mind the terrible hours we imposed upon them.

- my own secretary at Osgoode Hall, Lyn Archbold, who, while the hearing was on, typed up my illegible notes and after it was over masterminded me through the myriad drafts of this Report.

- the young lawyers, Richard Hay and Patricia Olasker, both already learned in the law, who helped us through most of the Inquiry but then left because of still further academic commitments.

- a still younger, not-quite-lawyer, Donald M. Cameron, who left us, after much assistance, for the Bar Admission Course but came back to make some very pointed critical comments on the Report.

- Thomas B. Millar, our executive director, who was rudely dragged from a well earned retirement as Deputy Local Registrar of the Supreme Court of Ontario, to run the whole administrative side. He not only was an excellent Registrar for the Inquiry but he must have done well as Administrator for I assisted him not at all and I have heard nothing but praise for his efforts.

- and finally the two gentlemen who, if this Inquiry has fulfilled its task, are most responsible: Robert P. Armstrong, Q.C of Toronto, Commission Counsel, and Willson A. McTavish, Q.C. of Mississauga, Associate Counsel. They were indefatigable in their pursuit of evidence and intelligent in its presentation. They were solicitous of the witnesses (the vast majority) who were endeavouring as best they could to tell their stories with truth in a strange environment; they were probing when the witness seemed reluctant or evasive or false. They were everything that counsel should be. I cannot say that they made my task easy. I can and do say that without them it would have been well-nigh impossible.

P.C. 1979-3286

APPENDIX 1

CANADA

PRIVY COUNCIL

Certified to be a true copy of a Minute of a Meeting of the Committee of the Privy Council, approved by His Excellency the Governor General on the 4 December, 1979.

WHEREAS concern has been expressed

(a) about a derailment of a Canadian Pacific train that occurred in Mississauga, Ontario, November 10, 1979, involving the carriage of dangerous goods and the subsequent evacuation of the entire City of Mississauga; and

(b) in consequence, the level and adequacy of existing federal laws, regulations, rules and standards pertaining to safety and the enforcement thereof.

AND WHEREAS the Committee is of the opinion that it would be in the public interest and for the good government of Canada for the said concerns to be investigated.

Therefore, the Committee of the Privy Council, on the recommendation of the Minister of Transport, advise that Mr. Justice Samuel G.M. Grange, of Toronto, in the Province of Ontario, be appointed under Part I of the Inquiries Act and report upon the existing state of railway safety as it relates to the handling and carriage of dangerous goods with particular reference to:

1. the contributing factors and causes of the derailment at Mississauga, Ontario, on November 10, 1979 and the subsequent accident;

/2

2. the steps which can be reasonably taken to reduce the risk of recurrence of such an accident anywhere in Canada;

3. the level and adequacy of existing federal law, regulations, rules and standards and of the practices and procedures governing railway safety with respect to this accident and the prevention of future similar accidents involving the handling and carriage of dangerous goods by rail;

4. the adequacy of the existing practices, procedures and maintenance standards followed by the railways and the frequency of maintenance to ensure that the standards related to the handling and carriage of dangerous goods by rail are complied with;

5. the sufficiency of enforcement of existing railway safety legislation and standards related to the handling and carriage of dangerous goods by rail, including the training, qualification and number of federal inspectors;

6. how best investigative and corrective operations in response to an accident involving dangerous goods can be coordinated between various agencies, governmental and private, bearing in mind the existing jurisdictional and constitutional framework;

7. the distribution of functions concerning the safety, maintenance and inspection of railway roadbeds, tracks, equipment and signals;

8. any matters incidental or relating to any of the matters referred to in paragraphs 1 to 7;

The Committee of the Privy Council further advise

(i) that the Commissioner be authorized to adopt such procedures and methods as he may from time to time deem expedient for the proper conduct of the inquiry; including public hearings, and sit at such times and at such places in Canada as he may decide from time to time;

(ii) that the Commissioner be authorized to engage the services of such counsel, staff and technical advisers as he may require at rates of remuneration and reimbursement to be approved by the Treasury Board;

(iii) that the Commissioner be required to report to His Excellency the Governor in Council within six months on

(a) the safety of railway transport as it relates to the handling and carriage of dangerous goods;

(b) what steps can be taken to reduce the risk of recurrence of an accident such as occurred in Mississauga on November 10, 1979,

taking into account the matters referred to in paragraphs (1) to (8);

(iv) that the Commissioner be required, if requested by the Minister of Transport, by interim report to His Excellency the Governor General in Council, to report on any matter referred to in paragraphs (1) to (8) above, as well as the adequacy of the proposed Transportation of Dangerous Goods Act together with recommendations, if necessary, for the improvement thereof; and

(v) that the Commissioner be required to file with the Public Archives of Canada the papers and records of the Commission as soon as reasonably may be after the conclusion of the Inquiry.

CERTIFIED TO BE A TRUE COPY - COPIE CERTIFIÉE CONFORME

Marcel Massé

CLERK OF THE PRIVY COUNCIL - LE GREFFIER DU CONSEIL PRIVÉ

C.P. 1979-3286

CANADA

CONSEIL PRIVÉ

Copie certifiée conforme au procès-verbal d'une réunion du Comité du Conseil privé, approuvé par Son Excellence le Gouverneur général le

4 décembre 1979

Attendu que

(a) l'émotion soulevée par le déraillement d'un train du Candien Pacifique chargé de marchandises dangereuses à Mississauga (Ontario) le 10 novembre 1979 et l'évacuation complète de la ville; et

(b) les inquiétudes suscitées quant aux lois, règlementations et normes fédérales de sécurité en vigueur, ou à leur application.

Et attendu que le Comité estime de l'intérêt public et de saine administration qu'une enquête soit en conséquence instituée.

A ces causes, sur avis conforme du ministre des Transports, le Comité du Conseil privé conseille la nomination de Monsieur le Juge Samuel G.M. Grange de Toronto (Ontario), en vertu de la Partie I de la Loi sur les enquêtes, en vue de rendre compte des conditions actuelles de sécurité dans la manutention et le transport par rail de marchandises dangereuses et de rapporter plus précisement:

1. les causes et circonstances du déraillement survenu à Mississauga (Ontario) le 10 novembre 1979 ainsi que ses effets;

/2

2. les mesures que l'on peut raisonnablement envisager afin de prévenir, à l'avenir, la répétition de semblables accidents au Canada;

3. dans quelle mesure les lois, réglementations et normes fédérales en vigueur ainsi que les procédures et routines de travail observées dans ce cas, garantissent la sécurité de la manutention et du transport par rail des marchandises dangereuses;

4. dans quelle mesure les procédures et méthodes d'entretien aux chemins de fer et la fréquence des visites permettent d'assurer le respect des normes applicables à la manutention et au transport des marchandises dangereuses;

5. dans quelle mesure les moyens de faire appliquer les normes et règlements de sécurité relatifs à la manutention et au transport par rail de marchandises dangereuses sont suffisants, notamment en ce qui concerne la formation, la qualification et le nombre des inspecteurs fédéraux;

6. comment les enquêtes lancées et les mesures correctives introduites à la suite de tels accidents peuvent être coordonnées entre divers organismes officiels et privés, dans le cadre constitutionnel et juridictionnel existant;

7. les conditions de partage des responsabilités quant à la sécurité, l'entretien et l'inspection des plates-formes, voies, équipements et signaux;

8. toute observation pertinente ou se rapportant aux points 1 à 7 ci-dessus.

Le Comité du Conseil privé conseille en outre de donner mandat audit Commissaire

i) d'adopter telle procédure ou méthode jugée opportune, en son heure, à la bonne conduite de l'enquête, notamment la convocation d'audiences publiques où il siègera en temps et lieux choisis;

ii) d'engager les conseillers, personnels et experts techniques requis aux conditions pécuniaires approuvés par le conseil du Trésor;

iii) de présenter dans les six mois un rapport sur

a) la sécurité de la manutention et du transport par rail des articles dangereux;

b) les mesures destinées à prévenir toute répétition de l'accident survenu à Mississauga le 10 novembre 1979;

iv) de produire à la requête du ministre des Transports des rapports intérimaires sur toute question relative à ces points et au projet de loi sur le transport des articles dangereux et aux recommandations éventuelles en vue d'améliorer ce projet;

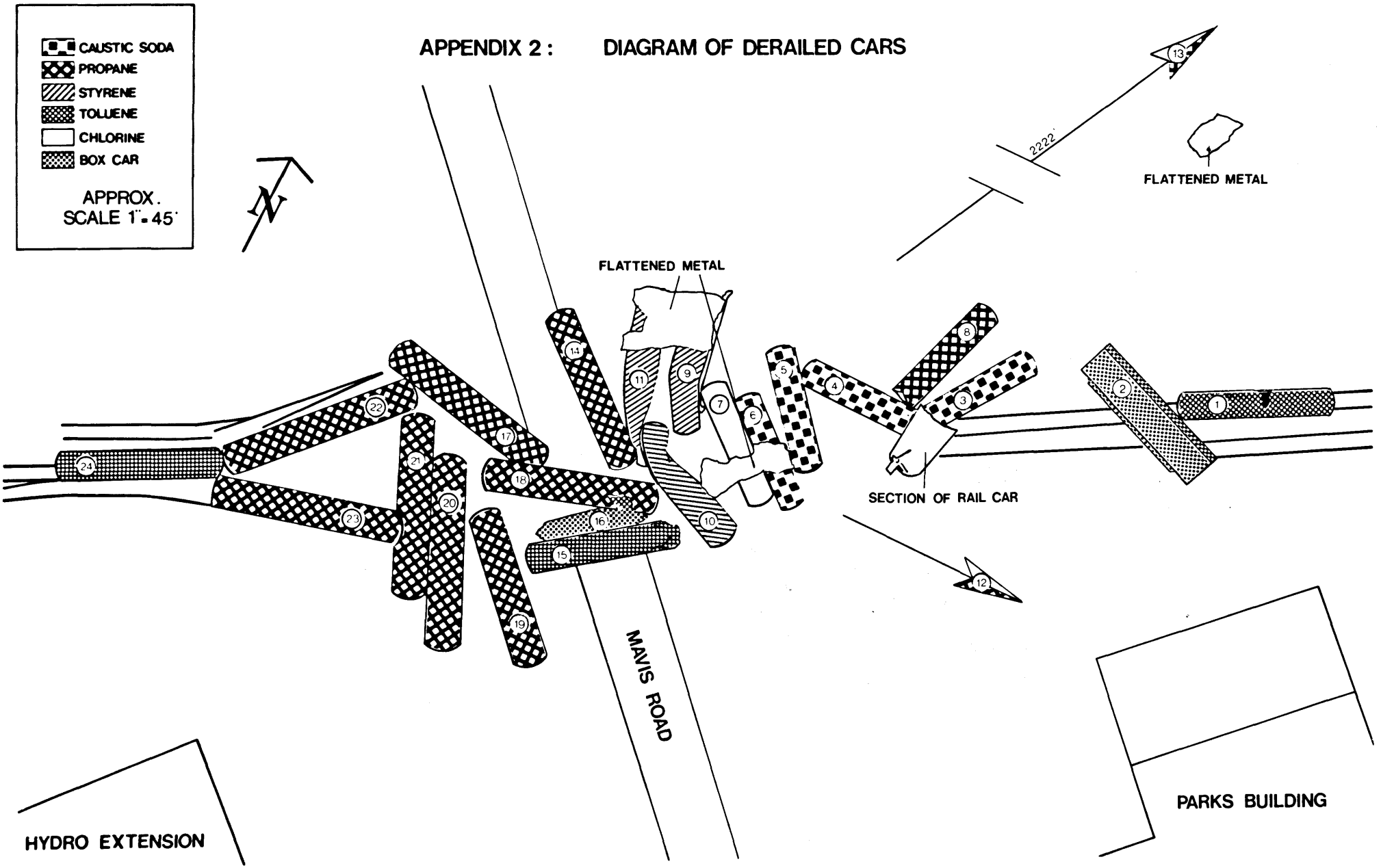
v) de déposer aux Archives publiques les textes et documents de la Commission dans un délai raisonnable après conclusion de l'enquête.

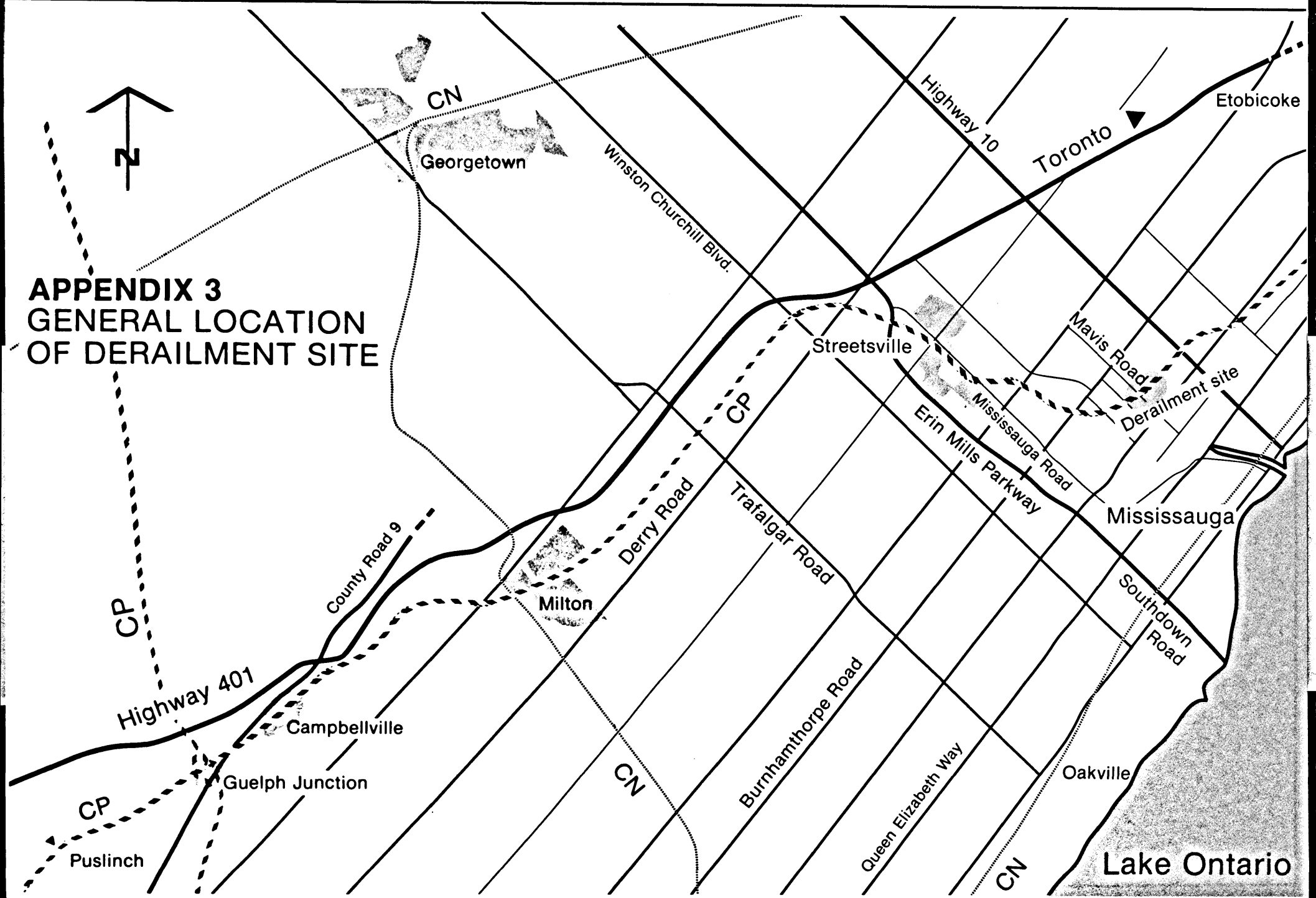
CERTIFIED TO BE A TRUE COPY - COPIE CERTIFIÉE CONFORME

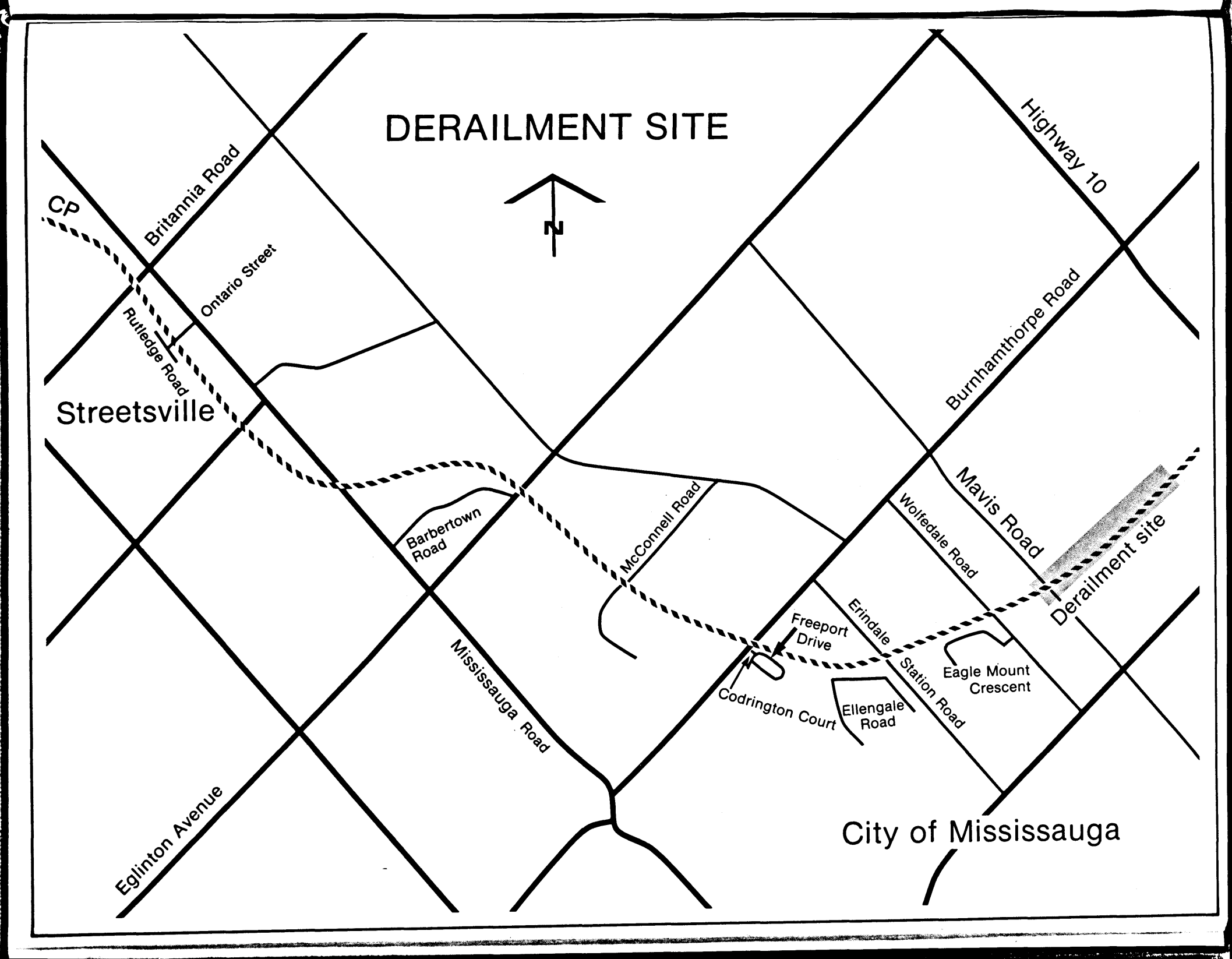
Marcel Massé

CLERK OF THE PRIVY COUNCIL - LE GREFFIER DU CONSEIL PRIVÉ

# APPENDIX 2 : DIAGRAM OF DERAILED CARS




APPENDIX 3
GENERAL LOCATION
OF DERAILMENT SITE
N
CN
Georgetown
Winston Churchill Blvd.
Highway 10
Toronto
Etobicoke
Streetsville
Mavis Road
Derailment site
Mississauga Road
Erin Mills Parkway
Mississauga
CP
Derry Road
Trafalgar Road
Southdown Road
County Road 9
Milton
CP
Highway 401
Campbellville
Guelph Junction
CP
Puslinch
CN
Burnhamthorpe Road
Queen Elizabeth Way
Oakville
CN
Lake Ontario


DERAILMENT SITE
N
Britannia Road
CP
Ontario Street
Rutledge Road
Streetsville
Barbertown Road
McConnell Road
Mississauga Road
Eglinton Avenue
Highway 10
Burnhamthorpe Road
Mavis Road
Wolfedale Road
Erindale Station Road
Freeport Drive
Codrington Court
Ellengale Road
Eagle Mount Crescent
Derailment site
City of Mississauga

EX115 (retyped)

MEMORANDUM

TORONTO, December 3, 1979.

The following are excerpts of transcript of radio conversations taken from the Dictaphone 4000 tape recording unit housed in the Chief Train Dispatcher's Office - Toronto Union Station from 23:20 hours, November 10, 1979.

| | |
|---|---|
| 23.20.00 | Commence |
| 23.26.32 | "high ball 54" Engineman to Conductor (reply from head end to tail end train 54 leaving Guelph Jct). |
| 23.34.51 | "Guelph Jct. to the Terminal Dispatcher". (Operator Guelph Jct. to Toronto) |
| 23.35.14 | "Guelph Jct. to the Terminal Dispatcher". (Operator Guelph Jct. to Toronto) |
| 23.35.56 | "Guelph Jct. to the Terminal Dispatcher". (Operator Guelph Jct. to Toronto) |
| 23.36.33 | "Guelph Jct. to Terminal Dispatcher". (Operator Guelph Jct. to Toronto) |
| 23.36.35 | "High ball Milton 54" (Engineman to Conductor) |
| *23.56.50 | "Does 54 require a push" (Communication between Operator Guelph Jct. and Toronto Terminal Dispatcher.) |
| 23.37.05 | "Did you call a push engine Terminal Dispatcher". |
| 23.37.08 | (Unclear communication concerning 54) |
| 23.46.12 | "Tail end of 54" - Streetsville mile board" (Engineman to Conductor) "Roger" (Conductor to Engineman) |
| 23.47.19 | "High ball Streetsville 54" (Conductor to Engineman) |

* It was suggested in the evidence that this reference should have read "23.36.50".

23.47.22 "High ball Streetsville". (Engineman to Conductor)

23.53.53 "CP 54 to CP Terminal Dispatcher" (Engineman to Dispatcher)

23.54.06 "CP 54 to CP Terminal Dispatcher" (Engineman to Dispatcher)

23.54.27 "We're in the big hole Ted, but still moving". (Engineman #54 to Conductor #54)

23.54.47 "Jesus Christ Ted, one of them tank cars blew up. Tail end of 54. (Garbled) "CP 54 to CP Terminal Dispatcher." "CP 54 to CP Terminal Dispatcher." "CP 54 CP Terminal Dispatcher." "CP 54 CP Terminal Dispatcher." "CP 54 to Lambton - can anyone hear this radio. We've got a tank car that exploded on Cooksville hill. I'm getting the hell off of here". (Engineman to Conductor)

23.55.42 "What's that again." (Co-ordinator Toronto Yard to #54)

23.55.46 "Just by the - engines stopped at mileage 16.8" (Engineman #54)

23.55.52 "Will you keep quiet on the radio for a minute. Go ahead 2/54." (Co-ordinator Toronto Yard)

23.55.53 2/54, we've got a tank car on fire. It exploded on Cooksville hill." "Right OK get off." "We're getting off." (reference to 2/54 was an error by Engineman (excited))

23.56.19 "CP 54 to Terminal Dispatcher. "Terminal Dispatcher." "Tank car is derailed over the north side. I think by the lumber company." "Just by Dundas bridge there. The engine is stopped at the board on Cooksville. What is it 16.8 or 16.2." "Yeah thanks." "In that train (Coordinator) better get off there." "I think we better pull this head end." "You can see a light in the sky from here." (Co-Ordinator) "Yeah I know", I better call the fire department. (T.T.T. Dispatcher.)

23.57.52 "Hello Ted Nichol." "Guelph Jct." "54 to the tail end." "Yeah" "Where are you Ted." "Where abouts are you Ted." "I'm going to try and get the angle cock and pull the other cars down. It's a hell of a mess."

23.58.46 "How far are you from the tail end Larry?" (Engineman Pruss to head end Trainman Krupa)

23.59.02 "CP 54 to London Dispatcher." (Pruss to London Dispatcher)

23.59.05 "CP London Dispatcher Keith." (London Dispatcher to Engineman 54)

23.59.08 "You got that, did you Merv?" (Pruss to London)

23.59.10 "Yeah we heard a bit of it there, right - what is it - the Rocket Lumber Co. there at Cooksville (London Dispatcher Wallace to Pruss)

23.59.12 "Yeah, I think it is up on the hill, the top of the hill." (Pruss to London Dispatcher.)

23.59.16 "Yeah, the Toronto Chiefs trying to look after it from that end there, I'm just trying to get some information from you off the radio, just keeping an ear." (London to Engineman 54)

23.59.22 "Yeah we're going to go back and try to (garbled) tank cars down. I don't know how far from it." (Pruss to Wallace)

23.59.28 "You have quite a bunch of them on the head end. You don't know how far back it is by chance." (Wallace to Pruss)

23.59.31 "Larrys gone back - back about 10 about 30 cars. I believe (garbled)" (Pruss to Wallace.)

23.59.37 "Yeah OK what are you going to do, try to make a cut as close as you can to it, and pull them ahead eh?" (Wallace to Pruss)

23.59.47 "All right." (Wallace to Pruss)

23.59.50 "We're going to pull these cars down to the station." (Pruss to Wallace)

23.59.52 "You'd better get them away from you. There's quite a bunch there. OK, if you get to it, you give me the last one that you got with you there, if you can find out what that is, and we'll try to eliminate and see what it could be." (Wallace to Pruss)

November 11, 1979

00.00.03 "Yeah OK Merv." (Pruss to Wallace)

00.00.06 "Give me the number of the last 54, you've got chlorine on that train." "I sure wouldn't go anywhere near that." (Wallace to Pruss)

00.00.18 "How far do you figure the last car is from the fire Larry." (Pruss to Krupa)

00.00.26 "Oh well then we're alright. Get it when we pull down. We better pull down - let me know when you get it." (Pruss to Krupa)

Crew of 54-10

Conductor - E. Nichol
Engineman - K. Pruss
Head-End Trainman - . Krupa
London Train Dispatcher - M. Wallace
Co-Ordinator - C. Sims, Toronto

M.S. ANDREWS
Deputy Superintendent

APPENDIX 5

EX 360

# DERAILMENTS (ALL RAILWAYS) BY CAUSES

| YEAR | TRACK CONDITIONS | ROLLING STOCK | TRACK CARS | MISC. | TOTAL |
|---|---|---|---|---|---|
| 1973 | 121 | 107 | 15 | 71 | 314 |
| 1974 | 179 | 147 | 22 | 104 | 452 |
| 1975 | 144 | 115 | 14 | 99 | 372 |
| 1976 | 142 | 97 | 9 | 94 | 342 |
| 1977 | 128 | 128 | 10 | 67 | 333 |
| 1978 | 119 | 110 | 2 | 74 | 305 |
| 1979 | 134 | 132 | 16 | 86 | 368 |

SERVICES BRANCH
T.T.C. 80-06-03

APPENDIX 5.

EX 361

# DERAILMENTS
## (ALL RAILWAYS)
## CAUSED BY EQUIPMENT

| YEAR | JOURNAL FAILURES | | | OTHER COMPONENTS * | TOTAL |
|---|---|---|---|---|---|
| | FRICTION | ROLLER | NOT IDENT. | | |
| 1973 | 28 | 6 | - | 73 | 107 |
| 1974 | 44 | 8 | 5 | 90 | 147 |
| 1975 | 36 | 9 | 3 | 63 | 115 |
| 1976 | 36 | 2 | 8 | 51 | 97 |
| 1977 | 39 | 9 | 1 | 79 | 128 |
| 1978 | 23 | 5 | 13 | 69 | 110 |
| 1979 | 41 | 18 | 2 | 71 | 132 |

* OTHER COMPONENTS INCLUDE WHEELS, AXLES, BRAKE GEAR, DRAFT GEAR AND SILLS.

( CTC SERVICES BRANCH
R.T.C. 80-06-03

LIST OF BRIEFS FILED BY GROUPS OR PERSONS

Attorney General for Province of Ontario

Dr. James D. Bricker for a group of concerned citizens from Windsor

Brotherhood of Locomotive Engineers

Brotherhood of Maintenance of Way Employees

Brotherhood of Railroad Signalmen

Brotherhood of Railway Carmen of the United States and Canada

CN Rail

Canadian Association of Fire Chiefs

Canadian Association of Chiefs of Police

The Canadian Chemical Producer's Association

Canadian Environmental Law Association

Canadian General Transit Co. Ltd. and Hawker Siddeley (Canada) Ltd.

Canadian Railway Labour Association

Canadian Transport Commission

Professor E. Farkas

Basil Gerol

The City of Hamilton and the Regional Municipality of Hamilton Wentworth

Dr. G.L. Henderson for a group of concerned citizens from Windsor

Professor Julius Lukasiewicz

The Town of Markham

The City of Mississauga

The Municipality of Metropolitan Toronto

M-TRAC (Metro Toronto Residents' Action Committee)

The Town of Oakville

LIST OF BRIEFS FILED BY GROUPS OR PERSONS cont'd.

Ontario Association of Fire Chiefs

Frank Paul

Railway Transport Committee

Regional Transportation Safety Council - CN Rail - Great Lakes Division

North Rosedale Ratepayers Association - Toronto

The Toronto Section of the Chemical Institute of Canada

Transportation of Dangerous Goods Branch - Transport Canada

Alfred Tjernstrom (Malton Ratepayers' Association)

United Transportation Union
United Transportation Union, Local 344, Sarnia
United Transportation Union, Local 700, Ottawa
United Transportation Union, Local 1874, Winnipeg

Vancouver Island E & N Steering Committee

Dr. Gheorjhe Vasilca, G. Vasilca, P. Eng, and D. Vasilca, P. Eng.

The Town of Vaughan

The City of Windsor

Provincial Riding of York Centre

# LIST OF WITNESSES APPEARING BEFORE THE INQUIRY

| | |
|---|---|
| ABBOT, E.G. | Executive Secretary, Canadian Railway Labour Association |
| ALLEN, H.M. | C.N. Locomotive Engineer |
| ANTHONY, F. | Witness - Trafalgar Road |
| ANTLE, N.L. | Director, Rules & Inspection, Mechanical Div. of the Association of American Railroads |
| BABCOCK, J. | Chesapeake & Ohio Railway Brakeman |
| BACH, G. | C.P. Conductor on Train #84 |
| BAILLIE, K. | C.P. Operator at Woodstock |
| BATHGATE, G. | C.P. Road Foreman / Trainmaster at London |
| BEGG, J.S. | Chesapeake & Ohio Railway Terminal Trainmaster |
| BEHREND, H. | Co-chairman - M-TRAC |
| BERTRAM, J. | Detective Sergeant, Peel Regional Police Force |
| BILLINGSLEY, R. | C.P. Engineer - Met Train #54 at Nissouri |
| BOTA, N. | Witness - Streetsville |
| BRICKER, Dr. J.D. | Re Powell Siding, Windsor |
| BROUWER, J. | Captain - Mississauga Fire Dept. |
| BROWN, A.B. | Detective - Peel Regional Police Force |
| CANIFF, W.L. | Technical Director, TEAP |
| CAREW, C.W. | Representative of United Transportation Union, Local 344 |
| CAREY, Dr. J. | Witness - Burnhamthorpe & Erindale Station Road. |
| CARTER, C.A. | Witness - Barbertown Rd. north west of Eglinton |

LIST OF WITNESSES cont'd.

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|---|---|
| CHANDLER, W. | Witness - Erindale Station Road. |
| CHRISTIAN, K. | C.P. Train Dispatcher - London |
| COOK, C. | C.P. Rear End Trainman on Train #84 |
| CORREA, G. | Witness - near Erindale Station Road. |
| CROSBIE, D.T. | Chairman, Traffic Committee, Canadian Association of Chiefs of Police |
| CULLEN, Dr. A. | Associate Professor of Optometry at University of Waterloo |
| DABOR, R.W. (Mr. & Mrs.) | Witnesses at Mavis Road intersection |
| DAGELMAN, G. | C.P. Trainman - Met Train #54 at Nissouri |
| DAVIES, E.J. | Vice-President and Canadian Director and Chairman of National Legislation Board of Brotherhood of Locomotive Engineers |
| DEADMAN, R. | C.P. Brakeman/Yardman - observed Train #54 at Jellicoe |
| DECKERT, A. | Inspector - Bureau of Explosives |
| DIONNE, N. | C.P. Trainman - Met Train #54 at Guelph Junction |
| DOUGLAS, P. | Shell Shipping Clerk |
| DOWNEY, V. | Representative of Canadian National Locomotive Engineers |
| DRAIMIN, B. (Mrs.) | Represented Moore Park Ratepayers - M-TRAC |
| DRONICK, M. | C.P. Operator at Guelph Junction |
| DUKE, J.A. | Witness at Wolfedale Road |
| ELLISON, T.D. | Director of Transportation of Dangerous Goods Branch - Federal Government, Ottawa |

LIST OF WITNESSES cont'd.

| | |
|---|---|
| ENGLISH, G. | Canadian Institute of Guided Ground Transport - Queen's University |
| FAULKNER, D.C. | C. & O. Engineer |
| FISHER, C.E. | Dome (Sarnia) Tank Car Loader |
| FISHER, I. | Re Powell Siding, Windsor |
| FICHTER, F. | C. & O. Labourer, Sarnia |
| FOSTER, B.W. | C.P. Trainman - Met Train #54 at Puslinch |
| FLETCHER, J. | C.P. Trainman - Met Train #54 at Guelph Junction |
| GALVAN, A. | Witness - near Burnhamthorpe Road |
| GIRARD, R. | Re Powell Siding, Windsor |
| GODFREY, P. | Metro Toronto Chairman |
| GOWDEY, G. | Mechanical Dept. Foreman - C. & O. Sarnia |
| GRAY, J.,Q.C. | Chairman, Rail Transport Committee, C.T.C. |
| GREENWOOD, S.T. | Supervisor, Production Services Dept. - Dow Chemical |
| HAGGITH, J. | C.P. Trainman - Met Train #54 at Nissouri |
| HALL, G. | Shell Supervisor, Rail Equipment |
| HAMLIN, F. | Production Manager, Chloralkali Products, Dow Chemical |
| HARWOOD, P.J.R. | Witness at Wolfedale Road |
| HAYES, C. | Representative of Scarborough Ratepayers' Assoc. - M-TRAC |
| HENDERSON, Dr. G.L. | Re Powell Siding, Windsor |
| HENDERSON, P.J. | C. & O. Operator Clerk |
| HENNESSY, J. | President, Hennessy Products Corporation |

LIST OF WITNESSES con'td.

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|---|---|
| HICKS, D. | Dome Tank Car Loading Trainee |
| HILL, L.A. | C.P. General Manager |
| HLADY, G. | System General Chairman, Brotherhood of Railway and Airline Clerks |
| HOGAN, K. | Shell Refinery Superintendent |
| HOLLOWAY, C.E. | Professor, York University |
| HOPPER, K.J. | C.P. Carman in London |
| HOPE, Ying | Alderman, Ward IV, Toronto |
| HINKLEY, B. | Alderman and Chairman of Railway Safety Committee - City of Hamilton |
| HOUSTON, A.J. (Mr. & Mrs.) | Witnesses at Campbellville |
| HUNT, S. | Representative - M-TRAC |
| HUTCHINSON, C. | Witness at Burnhamthorpe Road |
| HYDE, T.H. | Witness at Wolfedale Road |
| JAMIESON, A. | C. & O. Yard Foreman |
| JOHNSON, D. | Divisional Manager - Superior Propane Ltd. |
| JOHNSON, R.W. | Marine Operations Manager - Eastern Canada - Dow Chemical |
| JONES, A. | C.P. Carman at Chatham |
| JONES, D.H., Q.C. | Commissioner, C.T.C. |
| KARASKEWICH, W.F. | Manager - Dangerous Commodities Assessment, Railway Transport Committee, C.T.C. |
| KELLY, B. | Constable - Peel Regional Police |
| KELLY, R. | Mississauga District Fire Chief |
| KELSALL, J.P. | C.P. Superintendent in Sudbury Division |
| KEYES, G. | C. & O. Sarnia Carman |

LIST OF WITNESSES cont'd.

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|---|---|
| KING, A.W. | Queen's University, Kingston |
| KING, B.V. | Inspector - Peel Regional Police |
| KINGSWOOD, R. | C. & O. Trainman/Yardman |
| KRUPA, L. | C.P. Trainman on Train #54 |
| KUNZ, E.L. | Engineering Consultant |
| LASSONDE, F. | Manager, Mechanical Operations, North American Car |
| LEE, Dr. J. | Professor of Mechanical Engineering - McGill University |
| LEMON, E. | C.P. Engineer - Met #54 at Puslinch |
| LEPAGE, G. | Supervisor, Air Brakes and Director of Dangerous Commodities - C.P. Rail |
| LEROY, M. | C.P. Assistant Signal Supervisor |
| LUCAS, D.M. MSc | Director - Centre of Forensic Sciences, Ministry of Solicitor General, Ontario |
| LUKASIEWICZ, J. | Professor, Carleton University |
| LYDEN, M.E. | Senior Staff Engineer, Chlorine Institute |
| MAHONEY, W. | C.P. Front End Trainman on Train #84 |
| MALCOLM, S. | Constable - Peel Regional Police |
| MANN, A.E. | C.P. Conductor - Met #54 at Guelph Junction |
| MARCHETTI, A. | Alderman, Borough of Etobicoke |
| MASTERS, G. | Research Consultant, M.R.A.I. |
| McCONNELL, E.C. | Constable - Peel Regional Police |
| McDONALD, J. | C. & O. Trainman |
| McDONNELL, G. | C.P. Operator at Galt |
| McDUFFE, D.V. | Representative of the United Transportation Union |

LIST OF WITNESSES cont'd.

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|---|---|
| McGREGOR, D. (Mr. & Mrs.) | Witnesses at Derry Road |
| McLEOD, J.H. | Acting General Chairman - Canadian Pacific Lines West |
| McLEOD, R. | C.P. Trainman on train that met #54 at Puslinch |
| McLUSKEY, P.N.C. | Representative - M-TRAC |
| McRAE, G. | Shell Dispatching Shift Foreman |
| MILLAR, C. | Reporter/Photographer with Toronto Sun |
| MITCHELL, R.L., Jr. | Executive Director, Chlorine Institute |
| MOORE, L. | C.P. Engineer - Met #54 at Guelph Junction |
| MOYAR, G. | Consultant for Chesapeake & Ohio Railway |
| MYERS, R.H.H. | M.P.H.A. Topographics Ltd. (Constructed model of train wreck) |
| NETHERCOTT, R. | C. & O. Carman |
| NICHOL, W.E. | C.P. Conductor on Train #54 |
| NUTKINS, G.A. | C.P. Superintendent, London Division |
| O'BRIEN, R.T. | Vice President - United Transportation Union |
| OXENHAM, S. (Mrs.) | President - A.B.C. Residents' Association |
| PAIGE, S. | Witness at Erindale Station Road |
| PARET, A. | Sergeant - Peel Regional Police |
| PAROIAN, L. | Re Powell Siding, Windsor |
| PARSONS, C. | C.P. Conductor - Met #54 at Nissouri |
| PAUL, F. | Re CN bridge, Etobicoke |
| PELLARIN, D. | Re Powell Siding, Windsor |

LIST OF WITNESSES cont'd.

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|---|---|
| PICCOLO, M. | C.P. Carman in London |
| PLATT, J. | Vice President - Brotherood of Railroad Signalmen |
| PRUSS, K. | C.P. Engineer on Train #54 |
| RAYMOND, J.P. | General Vice President, Administrator-Brotherhood of Railway Carmen |
| RICHMOND, T. | Sergeant - Peel Regional Police |
| RIDDELL, J. (Mr. & Mrs.) | Owners of property at 1437 Freeport Drive on which wheels landed |
| READY, T. | C.P. Engineer on Train #84 |
| REYNOLDS, J. | C. & O. Conductor Local 4 |
| REYNOLDS, L. | Shell Staff Engineer |
| RYAN, G. | Shell Loader (Loaded NCTX 22541) |
| ROBINSON, R.B. | Counsel for Metro Toronto |
| ROSS, C. | Witness at Wolfedale Road |
| SCOTT, D.A. | Vice-President, South Hill Home Owners' Association |
| SIU, H. | Witness at Eglinton Avenue |
| STRINGER, W. | Constable - Peel Regional Police |
| SMITH, R.G.W. | Representative of E. & N. Steering Committee |
| SMITH, R.W. | Professor - Metallurgical Engineering, Queen's University |
| SWINDELLS, R.W. | Captain - Mississauga Fire Dept. |
| TANDY, E. | Representative of Brotherhood of Railway Carmen |
| TEGGART, J. | Shell Fire and Safety Supervisor |
| TRUCKLE, T. (Mr. & Mrs.) | Witnesses -Burnhamthorpe Road |
| TYNDALL, B. | Dow Process Operator |

LIST OF WITNESSES cont'd.

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|---|---|
| TJERNSTROM, A.D. | Representative of Malton Ratepayers' Association |
| VASILCA, G. | Inventor |
| VIGOD, T. | Counsel, Canadian Environmental Law Association |
| WALLACE, M. | C.P. Train Dispatcher in London |
| WINTRINGHAM, H. | General Manager and Vice-President - Southland Mfg. Co., Norfolk, Va. |
| WOOD, B. | C.N. Dispatcher |
| WOOD, T.R. | Ontario Research Foundation |
| WRIGHT, E.H. | Retired Chief Mechanical Superintendent New York Central |
| WYROSTOK, R.Y. | General Chairman - Canadian Pacific Systems Federation |

# LIST OF COUNSEL AND REPRESENTATIVES WHO APPEARED BEFORE THE INQUIRY

| | |
|---|---|
| R.P. Armstrong, Q.C.<br>W.A. McTavish, Q.C.<br>Richard Hay<br>Patricia Olasker<br>D.M. Cameron | For the Commission |
| Blenus Wright, Q.C.<br>D.W. Burtnick<br>J. Zarudny<br>B. Fox<br>L. Lowla | For the Attorney General for Ontario |
| W.J.A. Hobson, Q.C.<br>Ann R. Johnstone<br>D. Olsen<br>B.R. Evernden<br>Walter Jancewicz | For Transport Canada |
| K.M. Bloodworth<br>J. Desjardins<br>D. Silverstone<br>S. Manion | For the Canadian Transport Commission |
| R.M. Robinson, Q.C.<br>A.M. Austin<br>W.T. McGrenere, Q.C.<br>L.W. Stewart, Q.C.<br>J. Lax<br>J. Menet | For the City of Mississauga and Metropolitan Toronto |
| J.G. Parkinson, Q.C.<br>J. Brian Casey<br>E.A. Cronk<br>H.M. McGillivray<br>P.Weiss<br>D.E. Milner<br>D. Garbig<br>I. Kyer<br>B. Salvatore<br>M. Merocchi | For the Region of Peel |
| M.E. Weir, Q.C.<br>S. Braithwaite<br>E. Trafford | For Hydro Mississauga |

LIST OF COUNSEL AND REPRESENTATIVES WHO APPEARED BEFORE THE INQUIRY cont'd.

| | |
|---|---|
| Gordon Bentley | Fire Chief of the City of Mississauga |
| Dennis Lane, Q.C.<br>W.M. Bryden, Q.C.<br>Brian Morgan<br>D. Hodgson<br>Mark Edwards<br>Linda Currie | For the Chesapeake & Ohio Railway Co. |
| G.D. Finlayson, Q.C.<br>John H. Francis, Q.C.<br>Brian J.E. Brock<br>Glenn A. Smith<br>D.L. Weldon<br>M. Weizman | For Dow Chemical Canada Limited |
| J.P. Bassel, Q.C.<br>T.B.O. McKeag, Q.C.<br>J. Murray Davison<br>B.I. MacTaggart<br>Stanley Tick<br>R.M. Zarnett<br>J. Temple<br>R.B. Thibodeau<br>Robert Lee<br>G. Ludlow<br>I. Wismer<br>B. Irwin<br>L. Vandor | For Shell Canada Limited |
| J.W. O'Brien, Q.C.<br>W. Pepall<br>C. Diamond<br>Michael O'Brien<br>D. McGhee<br>A. Conant<br>W. Kumbert<br>P. Rekai<br>B. Waldron | For North American Car Limited |
| R.E. Shibley, Q.C.<br>W.L.N. Sommerville, Q.C.<br>N.A. Chalmers, Q.C.<br>J.L. Bowles, Q.C.<br>D.A.L. Britnell, Q.C. | For Canadian Pacific Limited |

LIST OF COUNSEL AND REPRESENTATIVES WHO APPEARED BEFORE THE INQUIRY cont'd.

| | |
|---|---|
| R.M. McLean<br>B. McGarva<br>J.P. Malette<br>G. Sparrow<br>V. Kololian<br>S.F. Waque | |
| H.G.J. Pye, Q.C.<br>M. Beaulieu<br>T.E. Dolphin<br>M.E. Hancock<br>R.W. Bowman<br>L.I. Brisbin<br>R.L. Boileau<br>Serge Cantin<br>W.D. Connon<br>George P. Bouchey<br>J. Stratton<br>Francis S. Hutton | For the Canadian National Railway Company |
| John Cannings<br>J. MacDonald<br>F. Fyles<br>L. Endross<br>M.S. Panicali<br>Donald G.M. Brown | For C.G.T.X. and Hawker Siddeley (Canada) Ltd. |
| John D. Richard, Q.C.<br>R. Dearden<br>R. Nelson<br>M. Young | For the Canadian Chemical Producers Association and Wilburt Caniff |
| D.V. McDuffe<br>Leo Breen<br>M. Marcolini | For the United Transportation Union |
| E.G. Abbot | For the Canadian Railway Labour Association |
| Grace Patterson | For the Canadian Environmental Law Association |
| L.H. Mandel, Q.C.<br>Frederick Sagel<br>A. Brands<br>J. Bradley<br>D. Dunnet<br>James Norton<br>A. Farrar | For 350 businesses and individuals in Mississauga |

LIST OF COUNSEL AND REPRESENTATIVES WHO APPEARED BEFORE THE INQUIRY cont'd.

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|---|---|
| Anthony H. Speciale<br>P. Friedlan | For 70 businesses and individuals in Mississauga |
| Samuel H. Moerman | For Robert L. Mitchell, Jr. and Michael E. Lyden of the Chlorine Institute |
| Charles F. McKeon, Q.C. | For David Johnson of Superior Propane Ltd. |