

schools put on standby for use as Evacuation Centres. At 05:00, police received agreement that Erindale Secondary School would become the second major Evacuation Centre, 4 kilometres due west of the site, at Erin Mills Parkway and Dundas Street. Ambulances were dispatched to both centres in case of need.

Local Red Cross and St. John Ambulance groups also realised that the situation demanded reinforcement, and contacted their respective Ontario headquarters (see Section 4.3). At 05:00, Chief Burrows asked that Peel Regional Social Services be informed of the derailment. Attempts to reach the Social Services Commissioner failed because of a breakdown in both the Regional fan-out alert system and in communications between the Police and the Regional telephone answering service. Within an hour of the derailment, however, Metropolitan Toronto Social Services phoned and offered assistance. Their Director of Senior Citizens' Apartments, George Coleman, who was in charge of Metro emergency lodging, was alerted at 04:00 by Peel Police about the possible evacuation of several seniors' facilities in Mississauga.

By 05:58, evacuation stage 2 had been completed. Fumes were now trailing farther and farther downwind, and there were reports of thick smoke from various points to the south and southwest of the site. The stage was now set for a series of evacuations. At 06:20, evacuation stage 3 was ordered; and at 06:30, stages 4, 5 and 6. Approximately 8,000 people were scheduled for evacuation in an area roughly 2.4 kilometres in diameter around the derailment site, with the exception of an area to the extreme northwest.

In the initial and most hazardous zones, police had been careful about street-by-street and even house-by-house alert. With the expanding zones, however, the mixed group of Peel, Metro and Provincial Police began relying more and more on the sound trucks, which went through the streets warning of the danger, and giving out instructions (e.g. assembly points for those without automobiles). In addition, as it began to get lighter, the police were aware that getting people out of their homes would be substantially easier.

2.2.11. Evacuation of Mississauga Hospital

At the same time as the new evacuation stages were announced, Mississauga General Hospital - having been on alert all through the pre-dawn hours awaiting casualties - was informed at 06:50 that it might have to be evacuated. It was now becoming possible to see thick black smoke drifting straight towards the hospital on the edge of the now evacuated area (stage 6 at Queensway near Hurontario). At 06:41, Queensway, York-Finch, Etobicoke, Humber, St. Joseph's, Northwestern and Sick Children's Hospitals were canvassed by ambulance services for space for 500 patients including 50 babies.

The Dow Chemical CHLOREP team was now on-site, and in conjunction with the Fire Department, confirmed (by 07:22) that the chlorine car was in the wreck, and that there was a small leak in it at the bottom of the tank.

Sometime after 07:30, the first meeting of Emergency Operations Control Group was held at the Bell Canada site. Chief Burrows, Fire Chief Bentley (who came on scene for the meeting), Mayor McCallion and Chairman Bean were the key actors, with Ministry of the Environment officials, the Dow Chemical personnel and others being present.

According to the Peel Region Emergency Plan, the Emergency Operations Control Group should now have declared an emergency (Section 3.2.1). As it was, the Police Disaster Plan remained the plan in force. Chairman Bean has noted that they were under a quasi-military operation from the police and that the politicians fitted into that approach.

The decision to evacuate Mississauga General Hospital was perceived by most of the participants in that decision as a watershed (Section 3.3.4). What followed is a subject of some controversy, since the hospital report and the police transcripts do not mesh. It appears that Chief Burrows ordered the evacuation of the hospital at 08:30, and that the clearance of the evacuation routes and marshalling of ambulances began at 08:45. Senior ambulance staff

and ambulances converged on the hospital. However, the President of the hospital refused to evacuate the hospital until formal word had been received from the Police Chief. Although there are three reported announcements of evacuation events to the hospital in the police chronology, it seems that a formal call to the President of the hospital by the Police Chief was not made (in fact, the responsibility for confirmation had passed to the Police Executive officer and Deputy Chief).

At approximately 09:15, Al Duffin of Halton-Mississauga Ambulance Service, and John Dean of Metro Toronto Ambulance Service arrived at the hospital to help co-ordinate the evacuation.

The President of the hospital called the Command Post and discovered that the Police Chief had gone up in the OPP helicopter over the site and could not be reached (09:00-09:25). The Deputy Chief was located, and confirmed the evacuation. Evacuation then began of the 186 patients who had not been discharged out of an original 479. Red Cross and St. John Ambulance were called in to assist. The evacuation was completed by 13:30, or four hours after it began. At 10:00, 202 senior citizens from the nearby Extendicare Nursing Home were evacuated, and 237 were moved from the Chelsey Park Nursing Home an hour later. Residents were taken to facilities in Milton, Brampton, Streetsville, and Toronto (Table 4.3).

2.2.12. Provincial Alert

With over 10,000 people evacuated, more senior levels of government began to be alerted, occasionally through official channels, and occasionally through a more casual - and often more effective - network of working associates and colleagues. The senior levels of the provincial Solicitor General's office, and the Ministry of the Environment were alerted in various ways described in detail in Section 3.3.4

The Solicitor General (the Honourable Roy McMurtry) is the senior peace officer in the province, and as such has primary responsibility for the security of life and property. He was informed by his

Deputy Minister of the derailment between 06:00 and 07:00, and proceeded to the site, arriving at 09:28. According to the procedures under which the Ontario government operates, particular ministries with special expertise are tasked with emergencies (for instance, the Ministry of Health deals with epidemics), and each ministry becomes the "lead ministry" in any situation that has gone beyond the initial, local capacity to respond. In this case, although the Ministry of the Environment would seem to be the responsible ministry in the event of a chemical spill, the seriousness of the threat to life in the area made the emergency the responsibility of the Solicitor General (see Section 3.2.).

However, the Ministry of the Environment rapidly became involved in the response to the emergency, one of its early tasks being the checking and denial of a persistent rumour that polychlorinated biphenyls (PCBs) were in some of the wrecked tank cars. Mississauga Mayor Hazel McCallion and many others called the MOE 24 hour Emergency Service to ask about this rumour, which was denied first at 04:10 and again at 07:07.

The origin of the rumour is not known, but it is not difficult to see how it came about. Mississauga has been the scene of a protracted debate about the use of the kiln at the St. Lawrence Cement Plant to conduct trial experiments in the burning of PCBs.

The Ministry of the Environment's technical branches do not see themselves as primarily emergency services, and are geared towards slow laboratory analysis of environmental problems. Results from samples taken with their usual High Volume Sampling equipment take a week or more, and are therefore of limited use when time is of the essence. However, thanks to the development of a Trace Atmospheric Gas Analyzer (TAGA) by Sciex Ltd. of Toronto, MOE had a unique capability to provide virtually instantaneous monitoring in the Mississauga emergency. One TAGA vehicle was already in Mississauga to monitor experimental burning of PCBs. Another, at Sciex, had just been calibrated to detect chlorine. It was therefore possible to calibrate both vehicles rapidly. Even with these advantages, the TAGAs did not arrive on scene until Sunday afternoon.

Even with monitoring vehicles available, there were no gas masks available for the crews of the vehicles. Gregg Van Volkenburgh and Tom Cross of MOE spent much of the time between 08:00 and 10:00 organizing crews and trying to locate masks. Eventually, masks were located at the Sewage Treatment Plant at Lakeview, but permission from the supervisor was needed before they could be taken: and when they were finally taken, it was discovered that they were inadequate. Masks were eventually borrowed from the Fire Department.

In the meantime, Cross contacted Garnett Kay of the Contingency Planning Section of MOE, who immediately went to the site. He also contacted Dr. Max Fitch, of the Ministry of Labour's Special Studies and Services Branch. Dr. Fitch is on the inter-ministerial committee for emergency planning, and has expertise in industrial emergencies. He was asked whether he would be available to answer questions. Fitch in turn contacted his Deputy Minister and then tried to get in touch with the local Medical Officer of Health, Dr. Lillian Cherkas. She arrived at the site at 10:30, joining Clifford Clark, Director of the Environment for the Peel Regional Health Unit who had come to the site at 08:00. Liaison with the Ministry of Health was established by Dr. R. J. MacBride of Emergency Services Branch, who proceeded to the site in the early afternoon.

Peel Regional Police notified Halton Regional Police of the situation at 08:00. An open phone line was set up between the Command Post and Halton Regional Police Headquarters. Halton Police put local transit companies on standby to assist in evacuation, and contacted Jack Porter, President of Sheridan College, to ask that the Oakville campus be available to take evacuees if needed. They maintained contact with the Command Post throughout the day.

At 06:00, the Regional Director for Ontario Emergency Planning Canada, Denis Amyot, was advised by National Defence through the OPP that Ontario had made a request for manpower and for foam pumpers and respirators. One pumper was dispatched from Downsview,

and 32 Chemox respirators (oxygen masks) were obtained from Camps Borden and Downsview. He continued to maintain contacts with federal and provincial departments for the next few days, concerning himself with the location and supply of respirators and other equipment, should National Defence personnel have to be called in.

The Captain of the Regular Armed Forces at Downsview was called to the scene, and was asked if he could provide up to 250 personnel. He advised that there would be a substantial delay in getting troops from London and Petawawa (on a holiday weekend); and, moreover, that the use of regular forces in a peacekeeping or law-enforcement capacity in a non-war zone would require a declaration signed by the Federal Solicitor General. It was decided to use men from surrounding police forces instead. The Brampton Militia Unit (commanded by Lt. Col. L. H. Smith) was engaged in an exercise at the time, and volunteered their services to the OPP Headquarters in Port Credit. At 14:20, it was decided that the militia was not required, and the unit returned to Brampton.

2.2.13. Properties Of Chlorine

The main danger of chlorine derives from its properties as an oxidizing agent, reacting with the water on the moist linings of bronchial and lung tissue to form hydrochloric acid. Following a release of chlorine into the atmosphere, ground concentrations can become very high, since chlorine is 2.5 times heavier than air, and therefore creeps along the ground or forms low-lying pools in cavities or depressions in the land.

In Ontario, maximum acceptable exposure in the workplace (8 hour day) is 1 part per million (ppm). At 3 ppm (over 15 minutes) and above, irritation of the eyes begins, followed at higher doses by coughing, vomiting and tissue damage, until, at about 900 ppm, death occurs rapidly. The 1 ppm workplace hazard

level was divided by 100, which was thought sufficient to guarantee protection for the elderly, those with respiratory diseases and children. This level, equivalent to 30 micrograms per cubic meter (30 ug/m^3) was exceeded around the site on a number of occasions during the week. As we shall see, some of the week's events were based on the possibility that over $18,000 \text{ ug/m}^3$ (or 6 ppm) - which would cause "physical embarrassment" - might be found up to two miles from the site, following a rapid release of the remaining chlorine. In general, the following criteria were used as ambient air standards:

| | |
|--|---|
| Normal background | - less than 0.001 ppm or 3 ug/m^3 |
| Discomfort level | - 0.01 ppm or 30 ug/m^3 |
| Acceptable workplace exposure (8 hours) | - 1.0 ppm or 3000 ug/m^3 |
| Health threat threshold level (15 minutes) | - 3.0 ppm or 9000 ug/m^3 |
| Acute danger to human life | - 900 ppm |

2.2.14. The Command Post

By the time of the arrival of the Solicitor General at the Bell Centre north of the site at 09:28, most of the key actors and agencies were either at Mavis Road or alerted to the situation. In the parking lot of the Centre, the Peel Regional Police Mobile Command Trailer, the Metro Toronto Police Trailer and the OPP Trailer were set up and hooked into Hydro and telephone services. The early meetings of the Control Group before and after McMurtry's arrival, took place in the Peel Trailer.

The other agencies found room in the ground floor of the Bell building itself, once the door was jimmied open. There were three available phone lines, and the rapidly growing army of officials were forced to take turns reporting to their officers. On Sunday morning, groups of two and three people would hold meetings in various corners. The Solicitor-General would start talking to one or two people, whereupon hordes of people would gather, following which he would escape, only to be confronted by the next group.

On the east side of the road, across from the Bell Centre, the media were set up in a truck depot. Through Superintendent Barnhart, media releases and information were given out to the media at various intervals. Well over 100 reporters and cameramen had converged on the scene by Sunday noon, and more media liaison was required. Enough information was given out to make sure that residents tuned into their radios and televisions, and the information was designed to leave the impression that the boundaries of the evacuated area would be extended, if at all, in graduated sections.

McMurtry had scarcely arrived when a new BLEVE occurred at 09:50. It confirmed the need for the three further evacuation stages that had already been ordered at 07:29, 08:30 and 09:40: stages 7, 8 and 9, involving 30,000 people in an area bounded on the east by the Credit River, on the south by the Queen Elizabeth Way (QEW), on the north by Burnhamthorpe Road and on the east by Camilla Road and Cooksville Creek, were now officially evacuated.

2.2.15. Evacuation Centres

Nearly 45,000 people were now on the move, and the need for new Evacuation Centres became apparent. In addition, Holy Name of Mary Secondary School had to be closed down as a Centre when the boundaries of the evacuation expanded, at 06:39. Sherway Gardens Shopping Mall in Etobicoke was opened as an Evacuation Centre by noon. The Peel Board of Education opened Streetsville Secondary School at 13:00, to receive evacuees from Square One and elsewhere. By 15:00, the Board of Education's Superintendent of Business Affairs opened an Operations Centre at the Board's Kennedy Road field office in Brampton. By Sunday evening, the Board had opened three more schools in Brampton and two in Malton, in response to the expanding boundaries and the evacuation of Sherway Gardens and Erindale Secondary School early Sunday evening.

Both campuses of Sheridan College, in Oakville and Brampton, were also opened by Sunday night, as was the International Centre in Malton, which sheltered the largest number of evacuees. In addition, a number of smaller Centres opened throughout the day on their own initiative and, in most cases, alerted Peel Regional Police of their availability. Other places were offered as centres, but were never needed (for a listing of the Evacuation Centres and their location, the times of their opening and closing, and the numbers of evacuees they handled, see Table 4.1 and Figures 4.1 and 4.2).

Many evacuees came to the Centres as a temporary stopping place en route to stay with relatives or friends; others stayed for the duration. It is estimated that 14,000 passed through or stayed in the centres during the week (See Section 5.10). The opening of the Centres created a rapidly growing demand for organisation, registration of evacuees, health care, food, and general assistance to evacuees. Numerous volunteer agencies and community groups, as well as Peel Regional Social Services and the Peel Regional Health Unit, responded to this need, as documented in Section 4.3. The Red Cross had 14 branches from Cobourg to Hamilton in service at Evacuation Centres by the end of the emergency, and another 14 on stand-by. Bell Telephone established lines to many of the centres, and the Amateur Radio Emergency Service (ARES) network provided radio communications to ease the burden on overloaded phone lines. St. John Ambulance, the Salvation Army, and the Boy Scouts and Girl Guides were joined by numerous local service clubs and churches in providing much needed assistance and support at the Centres.

2.2.16. Monitoring at the Site

At the site, the officials responsible for the exodus were still, for the most part, working from their judgment of the obvious hazard. Environmental monitoring was at a rudimentary level; testing and sampling of air and water near the site

continued through the morning. The first mobile sampling unit arrived at 10:00 and was immediately sent out for a first sampling of total hydrocarbons, oxides of nitrogen and sulphur dioxide.

The last hours of Sunday morning and the first of the afternoon were an unsettling period: first, a wind change imperiled the Command Post itself, and plans were made to move to 12 Division Headquarters at Dixie Road and Eglinton Avenue. Second, it was realised that Square One Evacuation Centre was much too close to the site. The same scare that nearly forced the shifting of the Command Post, caused an advisory warning to be given to the evacuees at Square One to stay indoors. At 11:00, a call went out from Metro Police to the public for breathing equipment - a call which was later rescinded when Fire Department officials found they had enough to handle the existing situation.

2.2.17 Further Evacuations

At about 11:00, the decision to evacuate Square One Shopping Centre was made, and buses began arriving at 11:35.

Although Square One was evacuated between 12:00 and 14:00, with evacuees being sent to Sherway Gardens and Streetsville Secondary School, the residential areas around Square One were not evacuated, either then or later; in fact, the boundary of the evacuation zone never extended north of Burnhamthorpe Road.

Two further evacuation zones, 10 and 11, were announced, at 11:10 and 13:10 respectively. Mississauga east of the Credit River and west of Cawthra Road was now evacuated, adding another 45,000 evacuees to the ever-growing list. As the afternoon progressed, the evacuation boundaries moved eastward to Dixie Road (evacuation 12) and finally to Etobicoke Creek (evacuation 13) at 17:00 and 17:10. This put the evacuated population over the 150,000 mark, and brought the area evacuated to over 60 square kilometres. At 15:45, the decision was made to evacuate Queensway General Hospital, 8 kilometres away in Etobicoke, although the hospital's Executive Director, Kenneth Box, was

reluctant to carry out an evacuation. However, he was advised, partly on the basis of models of potential gas dispersion that in the event of a further explosion, there would be only 15 to 20 minutes to evacuate. The evacuation took slightly over four hours, being completed at 20:00 Sunday night.

At about the same time Queensway Hospital was finally evacuated, the decision was made to evacuate three homes for the aged scattered throughout Mississauga. The Sheridan Villa, Pines, and Carmel Heights homes for the Aged had 357 people evacuated by 23:00; the Taara Nursing Home was also evacuated that evening.

The winds continued changeable. Late in the afternoon (18:15), the Federal Atmospheric Service (AES) put a weather balloon centre on-site to take measurements of vertical wind and temperature profiles. Much of Sunday was spent by AES attempting to put together the material for this emergency unit from various sources. Weather data could finally be delivered every two hours to the Command Post.

At 18:40, Evacuation Centres were advised by the Command Post that evacuees would not return home Sunday night. The Control Group made two more large scale evacuation decisions in the evening, based on a weather forecast predicting a wind shift to the east (that is, blowing from east to west). This meant that areas far to the west of the site might have to be evacuated at night. To forestall this possibility, the Command Post ordered evacuations stages 14 and 15 at 18:45, and 20:16, taking in the rest of Mississauga south of Burnhamthorpe Road.

The evacuation boundary was now at the edge of Oakville. At 18:00, the Halton Regional Police Chief, James Harding, had been advised by Peel Police that part of Oakville might have to be evacuated. He had called a senior management executive meeting, after which he ordered in police reinforcements. Four high schools in Burlington had been alerted, through the Halton Board of Education, to be on standby to receive possible evacuees.

(Sheridan College, Oakville, was already receiving evacuees from Mississauga.) Burlington Red Cross had been notified of these plans. At approximately 20:00, a meeting was held in Mayor Barrett's office in Oakville with the Police Chief, the Hospital Administrator of Oakville-Trafalgar Memorial Hospital, John Dean and Robert Armstrong of the ambulance services, and Dr. MacBride to decide on the evacuation of the hospital and the Oakville Extendicare Nursing Home. It was felt that unfavourable winds and a BLEVE could cause excessive concentrations of chlorine within a 30 kilometre radius (i.e. including the facilities).

Orders were subsequently issued to evacuate Oakville-Trafalgar Memorial Hospital and the Oakville Extendicare Nursing Home. M.M. Robinson School in Burlington was asked to be prepared as an evacuation centre. At 23:30, the Chief ordered the evacuation of that part of Oakville bounded by Winston Churchill Blvd. on the east, Highway 5 on the north, Maple Grove Avenue on the west, and the lake on the south. People requiring shelter were directed to M.M. Robinson School; Sheridan College, Oakville, was full by this time. At 01:30, the Syl Apps Training Centre (50 children), the Oaklands Centre (150 retarded people), and the home and apartments of the Oakville Association for the Mentally Retarded (31 people) were advised to evacuate by Halton Police. They did so, even though they were outside the evacuated area. All evacuations were complete, and the QEW and Highway closed eastbound through the evacuated portion of Oakville, by 04:10 Monday.

By the end of Sunday, approximately 226,000 people had been safely evacuated out of Mississauga and environs. Late in the evening, a contingency plan for the possible evacuation of Malton Airport was devised; it called for the evacuation of all travellers and staff within one hour. Ground transportation vehicles and the RCMP stood by. The airport tower was prepared to close down at 15 minutes notice. Airport officials scheduled a morning meeting (08:30 Monday) to decide whether evacuation would be warranted by a predicted mid-morning wind shift. In the event, there was no evacuation.

2.3 MONDAY

The evacuated area was declared closed by Mayor McCallion at 00:30, so that no school, factory or business would open in the morning. At 01:30, Chief Burrows put the western part of Toronto and Hamilton on the alert for possible evacuation. Schools had already been advised of closure at 08:30, by the Peel Board of Education. Road closures, including the Queen Elizabeth Way, were implemented gradually after midnight. GO trains were cancelled through Mississauga. Regular police patrols moved through the streets, and an OPP helicopter stood by to search for looters. Approximately 500 police were on duty; Metro, OPP and RCMP officers assisted Peel Regional Police. Two hundred and twelve of these manned cordon posts at every intersection. The police sent in plainclothes officers to test the effectiveness of the cordon. Two out of four succeeded and the holes were closed. Superintendent Barnhart warned that anyone caught inside the City without authorization would be arrested.

Although firefighters and local medical officers of health have statutory powers of evacuation, police do not (that is, their power may derive from common law): at this stage, they relied on their powers of arrest for obstruction and interfering with an officer in the pursuit of his duty. It was thus a use of "de-evacuation" power, since once residents were out, they were not allowed to return.

2.3.1. The Holding Operation

Through Sunday night and into Monday morning, the Fire Department strategy remained the maintenance of a controlled burn on the propane tanks, to ensure that as much liquid product as possible was eliminated. At 08:00 Monday, two propane tank cars were still burning near the chlorine car, which was now discovered to be upright and slightly tilted to one side. Chlorine readings 500 metres downwind from the site were 20 to 30 ug/m³.

The MOE representatives on-site gave a weather forecast update to the police command at 08:20 - winds from the north at 6 km/hour, swinging to the east and south during the day.

Two gas-masked members of the Dow CHLOREP team, Greenwood and Jones, went down to the chlorine car at about 10:00 in the morning. While the chlorine rolled out past them, they put their heads into a jagged hole 1 metre in diameter. Using a stick to poke around, they discovered that there was 10-20 tons of chlorine left in the tank, 1.5 metres below the leak opening. The chlorine was covered by a layer of 15-30 centimetres of ice, formed by the self-refrigeration of chlorine (-34°C under normal pressure) and a slushy layer of water from the fire hoses. Around the edges of this ice layer, the green chlorine was vaporising at a rate of 23-45 kg/hour. The Dow team took photographs of the configuration of the hole, which extended over the lip of the car edge and down the side. Greenwood then went to Procor Ltd. in Oakville to get a 1.3 x 1 metre steel patch prepared to cover the hole.

By Monday afternoon, relationships between the police, media and emergency services assisting the evacuees had stabilized, and the first indications of a longer term siege operation began to appear. There was an erroneous report on CBC at noon Monday that Etobicoke was now being evacuated; but, in general, reporting was accurate and responsible. Regularly scheduled press conferences and 2 tours of the "ghost town" were provided for the greatly expanded news corps - now including American and European representatives of television and newspapers.

The agencies on the scene moved into a holding operation while they waited for the fires to go out and for the patching of the chlorine tank to begin; Peel Regional Police consolidated their operation by moving from their 11 Division station in the evacuated area (leaving staff-sergeant and duty constable behind) to 12 Division, northeast of the zones. Peel, Metro and RCMP operations used this as their staging area.

At this time also, lachrymators ("tear gas") were forming from the interaction of the pool of water, chemicals and sunlight around the site. Witnesses report that the effects began to be felt at the Command Post, and there was talk of moving back. The first relief of staff who had been working for 24 hours was made, and a new series of higher level officials began touring the site, including OPP Commissioners, Chief Adamson of Metro Toronto Police and provincial politicians. For MOE and AES, the second day was also a period of consolidation and relief, with monitoring continuing throughout. A duty officer and shift system were set up, with wind forecasts to come every three hours. Regional and provincial MOE personnel reviewed various strategies for containment of the chlorine.

The Command Post was itself re-organized, as the second floor of the Bell Building was finally opened. Telephone lines were opened through the building. Monday saw the formation of a more structured Emergency Operations Control Group. Certain people were requested to be available for meetings - for instance, Dr. Fitch from MOL to answer questions on implications of chlorine and other chemical exposures. The Bell boardroom became the home of the Control Group "think tank". Chief Burrows and others had complained about the mass of officials who were beginning to clog up the meetings, and it was decided to limit the size of the think tank group. A list of a new, smaller group was read out at a meeting Monday afternoon. (See Appendix 8).

For evacuees in the Evacuation Centre, Monday marked the beginning of their long wait. At the International Centre, Sunday night and Monday morning had brought two scares: late Sunday evening, a baby with a possible case of scarlet fever was discovered, resulting in a 90-minute quarantine order; and at 08:30 Monday, an announcement was made that no one was to be allowed to leave the building due to the danger of a sudden explosion of the tank car.

At 15:45 Monday, the Assistant Deputy Solicitor General confirmed that Canadian Forces troops would not be requested, but did call for additional air pack respirators. At 16:45, the military advised that 85 respirators and 65 spare canisters were available in Halifax; they were airlifted to the site by early Tuesday morning. Late on Monday afternoon, a standby warning to residents of Streetsville and Meadowvale to the northwest of Mississauga was issued.

CP Rail announced Monday that it would, as a gesture of goodwill, pay the out-of-pocket expenses of the evacuees (Section 8.5). The Ontario Legislature opened its Monday session with a motion commending the authorities in Mississauga for their handling of the evacuation. In Ottawa, Transport Minister Don Mazankowski announced that he would introduce new legislation in 10 days to regulate the transportation of hazardous materials.

2.4 TUESDAY

2.4.1. Applying the Patch

Tuesday morning at 03:47, the remaining fires were finally extinguished. The CHLOREP team arrived on the site at 06:10, preparing to patch the tank. Their initial plan was to place the patch over the hole to achieve enough of a vacuum seal to make it possible to pump out the chlorine into tank trucks of caustic soda (neutralizing the chlorine). Through the day the team worked, first ripping away obstructions and insulation, then applying the patch, and finally trying to eliminate leaks around the edges.

At 08:20 Tuesday morning, the Control Group began a session to determine whether some of the evacuees might be allowed to return home. It has been reported that this was one of the most difficult sessions of the entire emergency, first because political pressure was mounting on the participants;

second, because evacuees who had assumed they were leaving for 24 hours or less (see Table 5.3) were beginning to harrass police at barricades. Monday night had seen problems, according to Superintendent Barnhart, and although no one had been arrested, those who tried to re-enter could have been charged with obstructing police. A further complication was the number of residents who wanted to return to feed pets. After 17:00 Monday, police allowed residents who checked in and out to go in for their pets. The Humane Society began taking names and addresses of those who wished their pets fed, and the Humane Society's 10 vehicles were in operation beginning on Tuesday. This replaced the system of allowing residents access to the area.

The feeling in the Tuesday morning Control Group meeting was that the problem would be solved by the end of the day. Outside the meeting, Van Volkenburgh of MOE, in light of the revelation that much of the chlorine had been ejected in the initial explosion, asked his modellers to do some back-casting about the possible characteristics of that initial plume. An eyewitness fireman had already reported that he had seen green smoke at the top of a 3,000 to 4,000 foot flame.

The results of the modelling suggest that the situation in the first few minutes after the derailment may have been as follows: the derailed chlorine car slowly heated up, to the point where it blew open, and the pillar of fire and heat sucked the majority of the chlorine in the car to a high altitude, dispersing it over a wide area. Reactions to something in the air had been reported outside the evacuated zone at various points in the circumference. Ultimately, at about 100 kilometres from the site, concentrations would return to background level. As the fire died down, the escaping chlorine would have descended, This would account for the reports 4 to 5 hours after the derailment of problems from personnel near the scene.

2.4.2. First Re-entry

At 13:15 and 15:00 Tuesday, it was decided to let approximately 125,000 evacuees return to two areas (Dixie Road to Cawthra; Cawthra to Highway 10) outside the boundaries marked by Highway 10 (east) and Erin Mills Parkway (west) (Figure 2.6). Police hoped that there would be an orderly return, but erroneous media reports (even though quickly corrected by media relations officers) resulted in a massive seven-hour traffic jam of evacuees who were allowed to return and other evacuees who erroneously believed that they could return.

"Cars were all over the place and across the boulevard and everything."

Police said,

"People were giving us a rough time. Motorists were losing their tempers."

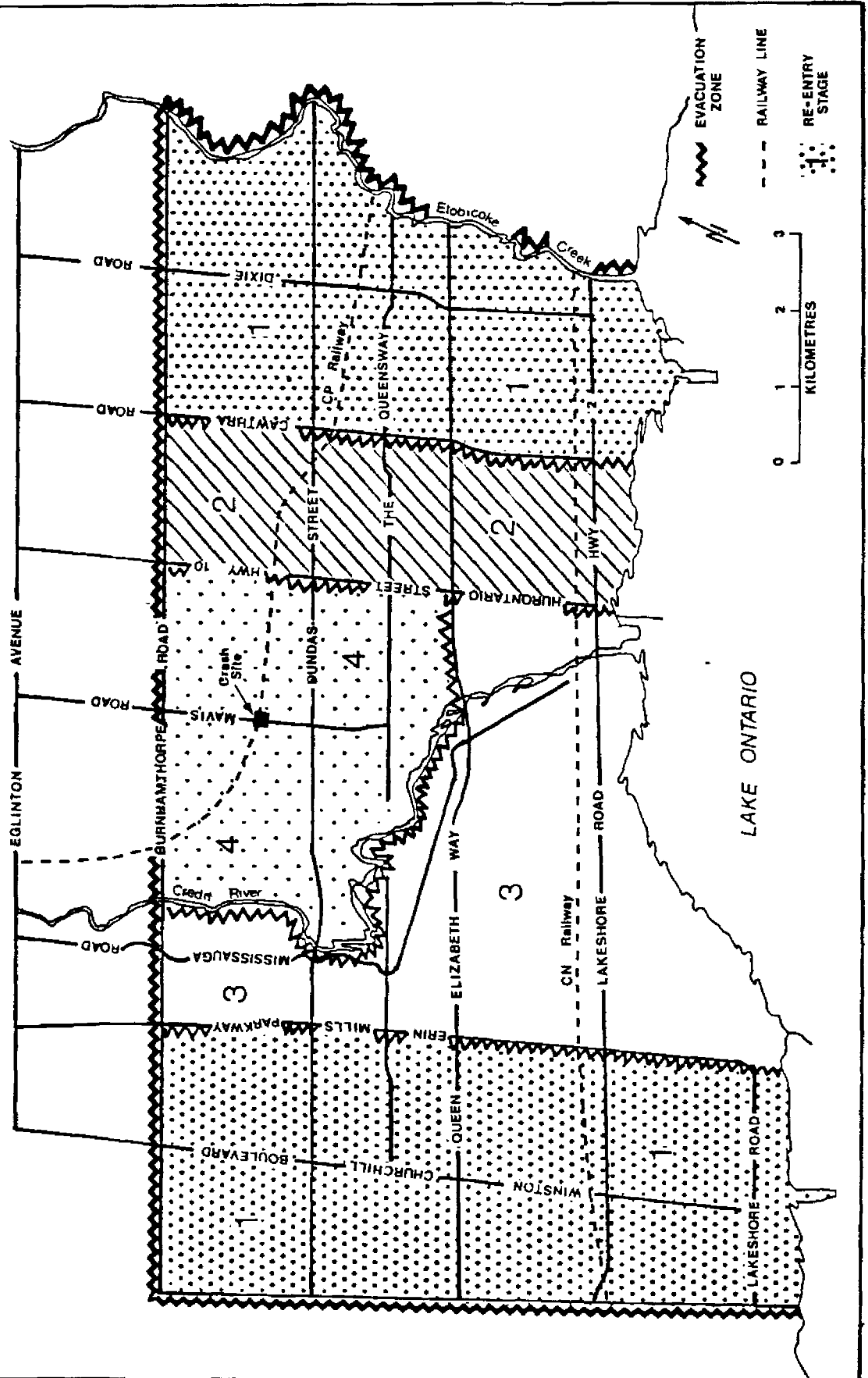
Patients were also allowed to return to Queensway General Hospital and Oakville-Trafalgar Hospital. During the re-entry, it was reported that concentrations of gas were found in certain areas, and Fire Chief Bentley told all returnees to open their windows for 15 minutes upon their return home.

With the re-opening of part of the evacuated area, the numbers of people in evacuation centres declined, and it was decided to consolidate them by sending evacuees from a school in Brampton, the two schools in Malton, and Vic Johnston Arena in Streetsville, to Streetsville Secondary School on Tuesday afternoon and evening. M.M. Robinson School was closed later on Tuesday evening, as its evacuees all could return home (see Figure 4.1 and Table 4.1).

On Tuesday evening, John Magee, Chairman of the Rail Safety Advisory Committee of the Canadian Transport Committee (CTC), told the House of Commons Transport Committee that it had been an overheated axle bearing which had caused the accident. It was also announced by the Minister that the CTC would hold an inquiry beginning December 4, 1979.

THE RE-ENTRY ZONES

FIGURE 2.6



Meanwhile, all was not well at the chlorine car. When a vacuum of 34 kPa was applied, the patch leaked. Work was also complicated by the presence of an adjacent car. The CHLOREP team began to apply air bags, caulking with putty, and jamming wedges at leak points. Since propane cars nearby were going to be moved away Wednesday at 08:00, the CHLOREP team decided to work through Tuesday night trying to fix the leak. The patch was reworked, using a hot saw, and reapplied. Air bags, neoprene, blocks of timber and putty were arranged in various configurations. At 08:00 Wednesday, the patch was still leaking slightly, but was stabilised. Exhausted, the team went to bed, leaving behind a crew member to watch the continuing transfer of vapours into the tank truck. Before they left the site, a request for more manpower was made to Dow head office.

2.5 WEDNESDAY

2.5.1. Revising Tactics

By Wednesday morning, the failure of the patch, and the pressure of the remaining 70,000 evacuees, had begun to erode the prevailing spirit of teamwork. At this point, an accident occurred which intensified the growing concern of the Control Group about on-site procedures. Because the chlorine team was not on site, a Superior Propane team (which was trying to drain and remove an adjacent propane tank car) instructed the fire fighters to play their hoses on or near the chlorine car. A large puff of water vapour or chlorine mixed with water vapour was given off at 12:25. The Fire Chief ordered all work at the site stopped:

"I was concerned because everybody was just doing their own thing. The CP Rail people were pulling out cars, the propane people were doing something. All the chemical people were in there and they were going to roll the chlorine tank over and that could have caused sparks."

As a result of these concerns, the Dow CHLOREP team came in for some tough questioning at the Wednesday afternoon Control Group meeting, the upshot of which was that the team's activities would be subject to vetting by the Ministry of the Environment, and a team member would be on-site 24 hours a day. The meeting did, however, agree to allow the continued removal of propane cars, satisfied that the patch on the chlorine tanker had not been damaged.

The CHLOREP team had now been augmented by three new Dow experts. Out of the technical meetings, there evolved the idea of reverting to the standard industry technique of evacuating the chlorine from the tank car. In addition to the vapour lines already working, Hamlin suggested using an adapted septic truck, which would be partially filled with caustic soda, to suck on the vapour connection. It would also be possible to do the same for a liquid transfer - pumping out the remaining chlorine in liquid form.

There was still a leakage of approximately 14-45 kg. of chlorine per hour from the tank car, and the team was scheduled for a work period through Wednesday night and Thursday morning. Whenever there was a work period, the concentration of chlorine gas leaking from the car went up. The Control Group had received a forecast from Malton that the winds were going to shift from the northwest to the southwest at approximately sunrise Thursday morning. It is a sign of the change in attitude at the Command Centre that it was determined that the Ministry of the Environment officials would take responsibility for ensuring that the CHLOREP team stopped work if the winds shifted; also, there would be a meeting of members of the Control Group at 05:00 Thursday, so evacuation procedures for the re-entry zones (those zones where people had already been allowed to return home) could be readied and implemented if required.

On Wednesday afternoon, arrangements were made by Mayor McCallion with CP Rail to move those remaining in Evacuation

Centres to hotels in Toronto and Oshawa at the company's expense. Evacuees were pre-registered, and taken by bus on Wednesday evening to the hotels. Unfortunately, this arrangement was made public, and many evacuees left the houses in which they were billeted, to return to the evacuation centres (primarily the International Centre) to get hotel accommodation. They were not permitted to go to hotels, but the International Centre was kept open until Friday to shelter these people and others who, running short of money, had to give up hotel accommodations.

The early Thursday morning meeting (05:00) was concerned, not so much about the concentration of chlorine (37 ug/m^3 were reported at 03:50 at Highway 10 and Fairview Road) but that residual amounts released by the work of the CHLOREP team might cause panic when smelled. It was decided to ask the Fire Department to spray water over the chlorine car, to form a curtain which would knock down substantial amounts of escaping gas. While setting up their apparatus - without wearing gas masks - eight firemen walked into a depression filled with chlorine, 65 metres from the chlorine car, and inhaled the fumes. They were sent to Queensway Hospital; seven were subsequently released, the eighth, John Engel, was kept under observation with suspected damage to his lung tissue.

2.6 THURSDAY

2.6.1. Draining the Tank

On this, the fifth day of the evacuation, displaced residents began to harass police and public officials so vehemently that Mississauga Mayor McCallion was forced to broadcast an appeal for cooperation from the evacuees. Six police "circulation teams" were at work at various perimeter points, deciding whether or not people had sufficient reason to be escorted in and out of the area. Hospitals in Metro and elsewhere that had accepted evacuated patients extended temporary privileges to Mississauga doctors. Four special medical centres for those whose doctors' offices were in the evacuated area were established at Apple Hills Medical Centre, Dixie Road

Medical Associates, Applewood Medical Associates and Streetsville Medical Centre. Apple Hills was set up as a mini-emergency service as long as Mississauga Hospital remained closed (see Section 4.2.3.).

The main Thursday meeting of the Control Group was the most technical of all the recorded meetings. The meeting began at 11:45, and primarily concerned the possibility of removing the remaining chlorine while assuring that there would be no more sudden releases (Section 3.5.1.).

The wind was blowing from the west; it was forecast to shift to the north at 22:00 Thursday, for a period of seven hours. After extensive discussion of the risks involved, it was decided to postpone the draining of the tank car until after 22:00 Thursday evening. It could then proceed, provided that no pumping began without the express authorisation of Tom Cross of MOE. A new emergency plan was set up by the police department and other agencies to rush out those people who had refused to evacuate or who had returned unofficially to the two-to-three kilometre danger zone around the site. The most worrisome area was the area south of the Queensway and east of Highway 10, where people had been allowed back in but which was perceived by the police and fire personnel as being too close to the danger zone.

The OPP brought up to 60 extra vehicles into the area; 303 police from all forces were put on alert and vehicles were stationed throughout the area as the hour to begin pumping approached.

At 22:00, the wind had not yet shifted to the north; nor had it shifted at 22:30. There was a further postponement until 23:00. It was then reported that one of the TAGA vehicles was inoperative. There was a further delay until 23:30, but the Fire Chief, who was concerned about his fire crews downwind of the scene, did not receive word of the postponement, and complained.

Finally, pumping operations began; and had no serious consequences. Negative reports were received from the monitoring units.

2.7 FRIDAY AND AFTERWARD

2.7.1. The Final Re-entry

Early Friday morning, November 16, it was believed that up to 10 tons of chlorine had been transferred as a result of the night's operations. Four tank cars of caustic soda were now being used to neutralize the chlorine. The wind had died down, and ambient readings were in the .002 ppm range, still above normal background level, but well below the discomfort level of .01 ppm.

A long Control Group meeting was held between 10:05 and 15:00 to determine the possibility of allowing full re-entry to the site. A gamma-ray detector had provided a rough estimate that two tons of liquid chlorine now remained in the car. A substantially increased number of backup vacuum lines had also been installed in the car, in addition to the working lines.

It was agreed that in light of the substantially decreased danger, the 25.8 square kilometre area south and west of the site (beyond the Credit River and the Queensway) would be declared safe. Police would be stationed downwind to alert those north of Burnhamthorpe, should any puff occur. At 14:55, an announcement was made allowing for the re-entry of approximately 40,000 evacuees to homes between the Credit River and Highway 10, and south of the Queen Elizabeth Way (see Figure 2.6). Approximately 30,000 evacuees were still barred from re-entry. It was also announced that the QEW would be opened for the Friday evening rush hour. Notes of caution were still sounded by officials worried about shifting winds. Police with loudhailers went through areas to which residents had returned advising people to close windows, in case of leakage during the transferral process. It was expected that there would be residual liquid remaining in the tank car following the pumping, but that the signal of almost complete elimination would be that the liquid line began draining vapour, meaning the level of liquid remaining was too low to be

sucked into the tanker truck. This occurred at 18:00. For the next hour and a half, MOE vehicles made a series of checks in the area for chlorine. The checks proved negative.

At 16:00, Van Volkenburgh of MOE had told reporters that 18 tons of chlorine had now been removed (revised from earlier estimates). Although 4,000 to 5,000 gallons of chlorine remained in the tank, it was the unanimous decision of all experts present that everyone could return home. Leaks of minute amounts would continue through the rest of the chlorine transfer, but monitoring would continue and Peel Regional Police and OPP would stand by in case of unusual developments in the last phase of the pumping.

At 19:42, Solicitor General McMurtry, flanked by McCallion, Burrows and Bentley, announced that all remaining residents could return home. People were asked to keep their windows open for 10 or 15 minutes upon their return, and they were advised by MOE officials that slight gas odors would linger for some time to come. At 21:00, the last of the evacuation centres, the International Centre, closed its doors.

With the return of residents to all areas, police and other agencies resumed normal activities. Peel Police patrols returned to regular service. Late Friday night, Metro Police, the OPP, and R.C.M.P. completed their support of the Peel Region Police. It was reported that between 45 and 50 break-ins had occurred during the week-long evacuation. On Friday, before the final announcement, one man was charged with assault and criminal negligence as he tried to run a police roadblock.

For the Ministry of the Environment, the end of the evacuation merely meant the continuation of their monitoring and sampling efforts, as well as an intensification of a program begun on Wednesday, which sent out teams to investigate residents' complaints about possible concentrations of chlorine. By Friday, 61 complaints had been checked, and a number of new complaints came in which were checked - with negative results - late in the evening. The TAGA units were now monitoring less than 1 ug/m^3 of chlorine on Dundas Street. MOE also continued its water

sampling, especially a reported greenish-white discharge into the Credit River (which turned out to be from a water main breakage). Due to the immense amounts of water used, and the run-off of chemicals, the Wolfedale Creek drainage course had pH readings of 11 or more through the week, and high levels of toluene and styrene at the north of Wolfedale Creek, with lower levels recorded downstream in the Credit River.

2.7.2. The Clean-up

On Saturday, approximately 30 cm. of liquid remained in the bottom of the tank car. Four of the Dow team returned to Sarnia. The last of the evacuees had returned from hotels. The Ontario Division Red Cross Command and Control closed down. The Media Centre was closed at 18:00. The immediate area around the site remained off limits, and fire and police personnel were still required to be present.

On Sunday, November 18, the final Control Group meeting was held. Considering the back-up of rail traffic, CP Rail had decided to put a "shoe-fly" track around the site, which caused the Control Group some concern about possible vibrations. It was decided to reduce the MOE contingent on-site from five persons to three, but MOE liaison with Dow would continue for the remaining period. The AES weather monitoring unit left the scene at 19:00 Sunday. The Red Cross left the site.

At 04:30 Monday, November 19, the chlorine car was finally emptied of liquid, but was still giving off vapour. On Monday, CP Rail opened its claim office, and St. John Ambulance set up a first aid post there. The tank car was filled with water in the morning, and was finally lifted onto a gondola car at 09:50 Tuesday morning and moved off to Sarnia, where it would remain until an inquiry into the derailment began. The Dow Chemical team returned to Sarnia the same morning.

On Wednesday, November 21, the Police Command Post was closed and the last piece of fire equipment left Mavis Road. Most of the Fire Department hose was ruined, and brass couplings

were corroded. Every vehicle was steam cleaned and washed at home stations.

Contaminated soil from the site was trucked away, beginning Friday, 23 November, to the Chinguacousy landfill site in the north of Peel Region, until protests from local residents forced a halt. After some delay, final disposal was arranged at a special landfill site in Mississauga.

On Tuesday, November 27, the Peel Region Mobile Command Trailer was removed from the site. All businesses were open along Mavis Road, and the CP Rail tracks were fully repaired.

On the 4th of December, 1979, the Privy Council of Canada, by Order-In-Council, set in motion the Mississauga Railway Accident Inquiry under the Honourable Mr. Justice Grange, Commissioner of the Supreme Court of Canada.