THE NORTH YORK GASOLINE LEAK
FEBRUARY 21, 1979
EMERGENCY RESPONSE AND IMPACT ASSESSMENT
Susan B. Hazen, Heather Myers
and Peter Timmerman
Institute for Environmental Studies
University of Toronto
Working Paper ERR-5

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Preface

This report is the second in a series devoted to examinations of particular emergencies, and the response of relevant agencies to those emergencies. Undertaken by the Emergency Planning Project of the Institute for Environmental Studies at the University of Toronto, this series was envisaged as providing material with which to critically evaluate existing emergency planning procedures and to generate - using data from situations as close to the "ground" as possible - relevant models for analytical research.

A previous report, "The Texaco Fire" by Susan B. Hazen, served as the model for this report; and similar techniques, including key actor interviews, were used in its creation. One new element added to this report is a complete section devoted to an impact assessment of the incident on the local community. This section, researched and written by Heather Myers, involved surveys and interviews among the area businesses and other participants.

We would like to thank all those people who allowed us to interview them, especially Staff Superintendent Coulis and Inspector Maywood of the Metropolitan Toronto Police Department, North York Deputy Fire Chief Jennings, Dennis O'Connor of the North York Public Works Department, and Jerry McManus of the Ontario Ministry of the Environment. In the private sector, we would also like to thank Terry Moynihan, Bill Mitchell, John MacDonald and John Oxley, all of Imperial Oil. The only major participant we were unable to talk to was the Energy Safety Branch of the Ministry of Consumer and Commercial Relations.

The funding for this project came from Emergency Planning Canada, as part of the Emergency Planning Project at the Institute for Environmental Studies in the University of Toronto.
Introduction

The North York Gasoline Leak occurred sometime between 5:00 and 6:00 a.m. on the morning of February 21, 1979, on the premises of Imperial Oil at 1150 Finch Avenue West. While originally it was believed that the leak had been trapped in a separator designed for just such an incident, it became apparent - some hours later - that some of the gasoline which had escaped had in fact gone into the sewer system underneath the industrial area bounded by Finch and Sheppard on the north and south, and by Keele and Dufferin (roughly) on the west and east. Estimates of the gasoline that eventually flowed into Dufferin Creek vary between 800 and 2,000 gallons.

Due to the hazardous nature of the fumes that percolated up through pipes and drains into industrial buildings, evacuation of up to 5,000 people took place during the day. The North York Fire Department, the North York Works Department, the Metro Toronto Police, and other agencies, including ministries of the Ontario government, became involved in the response procedures. It therefore provided a good case study of interagency emergency response in Ontario, where a centralised emergency preparedness agency no longer exists.

A little more than a week after the incident, members of the Project began interviewing the major participants on the scene. As some organisations were unavailable for comment, due to policy, or because some questions of liability still remain outstanding, this report does not pretend to give a complete overview; moreover, it does not purport to assign responsibility or liability to any particular parties. As the structure of the report indicates, we have described agencies' responses independently. While this has necessitated a certain amount of overlapping, it was felt that an analysis from each agency's viewpoint, as it were, would be most useful.
TIME LINE

(5:00 a.m., February 21 - 2:00 a.m., February 22, 1979)

5:00 a.m. Routine hourly check at Imperial Oil indicates all functioning satisfactorily

6:00 a.m. Loader notified office tower of hissing sound and strong smell of gas

6:01 a.m. Tank shut down

8:00 a.m. Plant officials checked to see if a separator had functioned properly. Officials were satisfied that any spilled oil had been caught.

8:00 - 8:30 Security personnel were telephoned and requested to report to the plant.

8:06 a.m. North York Fire Department received a call from 150 Toro Road (Vitafoam Plastics) reporting a smell of gasoline.

8:11 a.m. Consumers Gas gets first call from industry

8:30 a.m. North York Fire Department receive a second call from 4496 Chesswood Drive (Kawneer Ltd.)

C.F.B. Downsview detects fumes in a warehouse

9:15 - 9:45 Subsequent calls by public and checking of the area by the Fire Department and other agencies indicated raw gasoline running into the valley area south and east of Vanley Crescent.

9:15 a.m. (approx.) When checking with Imperial Oil, the North York Fire Department were informed that there had been a malfunction. Imperial Oil believed it "was contained within their property".

9:15 a.m. (approx.) Representatives of Imperial Oil, accompanied by the North York Fire Department, went down to the valley area and discovered the raw gasoline.
9:20 a.m. Imperial Oil contacts North York Public Works Department to advise of gas spill of approximately 2,000 gallons at the yard and Truck #236 dispatched.

9:25 a.m. Metro Toronto Police called in by North York Fire Department initially for traffic control.

Simultaneously, at approximately 9:25 a.m. police called by industry to respond to a strong smell of gasoline.

9:30 a.m. According to the North York Fire Department, by 9:30 a.m. Imperial Oil had informed the North York Public Works Department, Ministry of the Environment, Ministry of Consumer and Commercial Relations (Energy Safety Branch) and Imperial Oil Headquarters at St. Clair Avenue.

10:00 a.m. The Emergency Task Force Disposal Unit under Sgt. Booth was contacted.

Fire Chief Gibson advises North York Works Department (J.J. Marlow) that spill is of greater magnitude than originally reported.

10:15 a.m. Truck #236 of North York Works Department advised Works Department Office (J.M. Skinner) that Ministry of Environment representative (G.F. McMannis) would not allow their forces to flush the sewers on Chesswood Drive §

10:20 a.m. Sgt. Booth of Metro Toronto Police requests Mobile Command Unit #1 be brought to Champagne Drive.

10:30 a.m. Sgt. Booth of Metro Toronto Police started evacuation procedures.

O’Connor at Works department dispatched to scene re conflict with Ministry of Environment representative §

10:48 a.m. Traffic control taken off computer and done by officers

§ See appended section.
10:55 a.m. Inspector Maywood and Deputy Fire Chief Jennings at Imperial Oil to determine if leak was from earlier spill

11:00 a.m. Imperial Oil erecting outfall boom/dyke behind the Metro Incinerator on Vanley Crescent

11:10 a.m. Conservation authorities called by police to advise of situation and to request topographic maps of the area.

11:15 a.m. Ministry of the Environment representative stops Works Department forces from proceeding with flushing and threatened to have Works Department personnel arrested if they proceeded before booms were in place

11:16 a.m. Traffic stopped West on Finch to Keele Street

11:17 a.m. North York Fire Department advised by Police to assist in evacuating down to Sheppard Avenue

11:20 a.m. Traffic stopped at Sheppard Avenue and Chesswood and Steeplechase and Dufferin Street

C.N. Police and T.T.C. representatives at M/C #1

Works Department met with Ministry of Environment representatives who could offer no alternative to flushing the sewers but stated that the Ministry of the Environment was not the "lead agency"

Works Department began flushing the sewers. Ministry of Environment representative suggests using exhaust fans - Fire Department agrees - Consumers Gas offers their fans

11:30 a.m. Police set up Command Post on Champagne Road for agency representatives and press

11:34 a.m. Canada Dry building evacuated

11:40 a.m. Traffic stopped eastbound on Finch from Keele Street

11:47 a.m. Vanley Crescent being evacuated

11:50 a.m. Chesswood Avenue to Sheppard to be evacuated
12:05 p.m. Evacuation of Chesswood down to Sheppard completed
12:10 p.m. Police received a call from 3710 Chesswood, Suite 215, re woman with broken leg. Ambulance requested and sent.
12:30 p.m. C.N. Police arrive at scene
12:39 p.m. Plaza Fibre Glass evacuated - 4420 Chesswood
12:45 p.m. Constable Phillby of C.N. Police advised to hold all trains using the line in question
Compressors start to arrive, set up at various storm sewer outlets. Works Department and Fire Department monitoring
Imperial Oil pumping gas from watercourse into drums at rear of Vanley Crescent
12:46 p.m. Steeprock to be evacuated
1:05 p.m. Staff Superintendent Coulis advised that evacuation had been completed: Sheppard to Steeprock
East side of Chesswood to Sheppard
West side of Chesswood to Sheppard
Tom Huntley, Red Cross Liaison Officer, arrived on scene
1:10 p.m. Information from Inspector Maywood that Imperial Oil believed that there was no more leakage of gasoline.
1:13 p.m. Communications set up in M/C Unit to make outside telephone calls.
1:17 p.m. Works Department notified to supply air compressors to pump fumes out of sewer system
1:43 p.m. Outside traffic routes reopened
1:55 p.m. Consumers Gas supplies exhaust fans to Works Department
2:27 p.m. Mr. MacDonald - Esso Imperial advised supervisory personnel of the loss of approximately 800 gallons.
2:47 p.m. Barricades set up to block off 1101 Finch Avenue to Chesswood.

2:50 Fire Department reports most readings are down in area

3:00 p.m. Three fans arrive from Consumers Gas

3:01 p.m. C.F.B. (Downsview) Fire Department reported that some areas of an 18 1/2 acre warehouse showed 60% readings on explosimeter at 11:00 a.m.

4:00 p.m. area reopened

4:00 p.m. to 2:00 a.m. Most teams leave the site after manhole testing at midnight. Works Department continues flushing sewers until 2:00 a.m. the following morning.

The incident between Works Department personnel and the MOE representative on the scene (see times 10:15 a.m. to 11:20 a.m.) was initially reconstructed from the Works Department's official chronological report on the Gasoline Leak. Mr. McManus of MOE has challenged the chronology and firmly denied that he either tried to impress anyone on the scene with pre-eminent authority or threatened to have anyone arrested. He reports that at 10:15 a.m., he requested the driver of truck No. 236 to hold off flushing the sewer until collection booms were installed by Imperial Oil, and then went to North York Works Department offices on Allness Road to talk with Mr. O'Connor. There was only the initial meeting with the driver at 10:15, and due to the fact that the Environmental Protection Act (1971) has no provision for measures such as arrest, no such threats could have been made in any case: there was no threat or implication that arrest would be made.
Area map showing flow of gasoline and location of operations
Imperial Oil

The Imperial Oil terminal on Finch Avenue West is only one of a number of oil and chemical company properties in the area. The terminal usually contains millions of gallons of gasoline and other oil products in storage tanks behind diked walls. Gasoline trucks drive in and fill up with product at a nearby loading area linked to the storage tanks by a pumping system. It was a malfunctioning valve in the pumping system that was the source of the leak, a leak which occurred outside the storage dikes, and spilled onto the catchment area around the loading racks. In order to upgrade their environmental protection and in response to the fact that North York had recently installed a large storm sewer running through the centre of their property, Imperial Oil had within the last year installed a new catchment system for their loading area, to ensure that any small spillage from their trucks (a common feature of a busy station) would find its way into a separator.

What was unfortunately not noticed on the approved plan for the new system was that one catchment drain did not, in fact, go through the separator system, but went into the sewer system directly. In the event, the smell of gasoline was reported to the overseeing tower at 6:00, the system was shut down almost immediately, and when the Terminal Manager checked the separator at 8:00, it was found to contain approximately 650 gallons of gasoline. The defect in the catchment drainage system was not discovered until the morning of the following day. 'As far as Imperial Oil were then concerned, there was no need for further action beyond internal clean-up. It was only when fire trucks began arriving at their offices complaining of reports of fumes that Imperial Oil were alerted to possible off-site spillage. Nevertheless, they could not determine - then - how they were at fault; nor what quantities of gasoline were involved. This complicated their relationship with the emergency response agencies seeking information.'
After the arrival of the fire trucks, the Terminal Manager John Oxley notified the North York Public Works Department, the Ministry of the Environment, the Energy Safety Branch of the Ministry of Consumer and Commercial Relations - as is required by law - and also notified Terry Moynihan, the Terminal Operations Manager at Imperial Oil's Central Office on Duncan Mill Road in Don Mills. This was done by 9:30 a.m. on 21 February. Clean-up on site continued, while Mr. McCrae of the Terminal Oil-Spill Team went down with a District Chief of the Fire Department to the outflow in Dufferin Creek.

Imperial Oil has both a Terminal Oil-Spill Team in each terminal and a Regional Oil-Spill Team which is called in to any major off-site oil-spill (overturned trucks, tanker spills, etc.). In this case, the Terminal Oil Spill Team was used, a group consisting of operations, supply, and containment personnel, and including John MacDonald, the Environmental Advisor for the Ontario Region of Imperial Oil. The joint on-scene commander was Bill Mitchell, the Regional Engineer.

At 10:55, Police and Fire Department officials returned to Imperial Oil. Imperial Oil had been getting explosive readings at the north end of their property which indicated that the spill might be coming from a refinery further up the drainage system. Later, of course, this turned out to be an incorrect hypothesis: at the time, Imperial Oil continued to deny responsibility. Their personnel mopped up on-site, unaware that residual gasoline was still flowing into the sewer system. General estimates of the size of the spill, including residual flow, indicate that the total spillage was about 2,000 gallons, of which 650 were caught by the separator, 650 were caught downstream by skimmers and booms, 250 were absorbed by snow around the pump-slab or mopped up, and the remaining 500 gallons evaporated.

By 11:30, Imperial Oil had set up booms at Dufferin Creek. These were placed in 3 locations: at the culvert outflow; about
20 yards downstream; and - later - below the Finch Avenue overpass where the creek enters the reservoir. These booms were left in place for two or three days, and according to Mr. Mitchell, gas detectors, "sniffers", were used periodically in the next few weeks to check for fumes in the area. Imperial Oil worked more or less on its own for the rest of the day of the incident, and were not contacted again by the Fire or Police Departments.

After the incident, Imperial Oil turned over all inquiries about compensation to their insurance company, Royal Insurance. There have been complaints - most notably from a North York alderman - that Imperial Oil is not processing the claims fast enough. Imperial Oil note that the proceedings are in the hands of an independent auditor. Imperial Oil has had all of its plants in the region checked for drainage faults, and are considering increasing the capacity of their separator facility.

As to the complaints from the Police and Fire Departments about difficulty of access to information, Imperial Oil officials expressed concern that their response should have been seen in that light. It was said to us that they would get in touch with the relevant people on the "other side" to straighten out the misunderstanding. The suggestion was also made that up-to-date information could have been relayed to the Police if a radio-car had been left at the Terminal.
In the course of the emergency, the Fire Department and Metro Police worked closely together along the lines of procedures agreed on in the last three years and which are soon to be officially implemented in the new Metro Toronto Emergency Plan. The role of the Fire Department was reconstructed from memoranda and an interview with the senior fire official on the scene, Deputy Fire Chief Jennings.

The first indication to the North York Fire Department of any problem came at 8:06 a.m., when Headquarters received a call from 150 Toro Road, reporting a heavy smell of gasoline fumes. Three pumpers, an aerial truck and a rescue van were sent to the scene. An explosive meter registered high readings (approaching 2000 ppm -- 2000-6000 ppm being the ignitable range). At 8:40, there was a second call, this time from 4496 Chesswood Avenue, regarding fumes. These, and subsequent calls, indicated that there was the likelihood of a substantial and widespread gasoline leak into the sewer system.

The Fire Department spent the next half hour attempting to discover the source of the leak by checking with local industries. At approximately 9:15, firemen arrived at the Imperial Oil "tank farm" at 1150 Finch Avenue West, and were informed that there had been a malfunction earlier that morning, but that Imperial believed it "was contained within their property". A District Chief of the Fire Department and Mr. McCrae from Imperial Oil went down to Dufferin Creek (east and south of Vanley Crescent), and discovered raw gasoline coming from the sewer outflow.

The Police Department and the North York Works Department were telephoned at 9:25 and 9:30 respectively. Jennings commented that by this time "fumes permeated the air" on Chesswood Drive. The fire-fighters met police at 9:35 and advised them regarding the situation. While Chesswood Avenue was being blocked off, firemen continued to take readings. By 10:00 a.m. the size of the affected area prompted the Fire Chief, J. Gibson to inform the Director, Operations Section of the
North York Public Works Department, that the spill was of greater magnitude than originally anticipated. Moreover, between 10:15 and 10:30 a.m., the Metro Police, having consulted with the Fire Department, decided to evacuate the area, including the closing off of railway lines. Members of the Fire Department assisted in the evacuation; while others continued to assess the situation at various locales in the area.

In attempting to quantify the extent and amount of the spillage, the Fire Department had gone up to the Imperial Oil property, and - according to police reports - they had difficulty in obtaining the necessary information. The Fire Department seems to have considered the difficulty as due to reluctance to give out the information (but see Imperial Oil section, this report), and requested police assistance. The police are now considering attaching an investigative sergeant to the Fire Department during incidents of this nature to facilitate inquiries.

At 11:00 a.m., the Fire Department, in consultation with the Works Department, decided to flush out the sewer system; and slightly later, they advised the Works Department to order compressors which would ventilate the sewer by blowing in fresh air.

For the next few hours, the Fire Department assisted the Works Department in checking and flushing sewers, while at the same time continuing to monitor explosive levels of fumes. They also helped the Police in the evacuation of the area. By 2:50 p.m., readings were down in all areas, and it was decided by 4:00 p.m. to open the area again. The Fire Department then left the area. It was generally satisfied with its response to the emergency, and were especially pleased at the co-operation they got from the Police.
Metropolitan Toronto Police Department

As the primary organisational component of the response to the Gasoline Leak, it may be helpful to sketch the responsibilities of the Metro Toronto Police in disasters. The material comes from the Metro Toronto Police Disaster Control Procedure Handbook (Revised January 1978); while the particular response to this emergency was reconstructed from interviews with Staff Superintendent Coulis, the overall supervisor on the scene, and Inspector Maywood, director of the Police forces on the scene.

The primary duty of the Metropolitan Toronto Police force is to protect life and property, and that duty takes precedence over all other competing responsibilities. This general mandate includes such duties as the rescue of injured persons, maintenance of order, prevention of looting, and coordination of response agencies at the scene of a Metro emergency. Out of this may derive the Emergency Task Force, whose role - according to the Disaster Control Procedure Handbook - is

in disaster...to establish initial command and control at a disaster site, stabilise the area, limit access to it and commence establishment of a Mobile Command Post (M/C #1) which will become the command centre for the District Disaster Control Officer as he assumes overall command of the incident.

At this point, if the type of incident permits it, the isolation of the area begins. An inner perimeter around the incident is set up, concentrating the active participants at the trouble spot: these participants are separated from the general public by a second, outer, perimeter, with controlled entrance and exit. At the edge of the outer perimeter the Command Unit is placed to oversee operations. This system enables emergency agencies to move unencumbered about the incident area, and allows for expansion and contraction of resources if required.
The city of North York is in the process of formulating a set of plans to deal with incidents similar to this gasoline leak. The plans seem to be taking shape rather like other Ontario Municipal Emergency Plans, with the Police acting as the primary response unit and coordinating agency. These plans will have to be integrated at some stage with the new consolidation of Police procedures released early in May 1979, but it is not expected that Police procedures will alter to any significant degree.

At approximately 9:25 a.m., 32 Division of the Metro Toronto Police Department received two calls: one was from the North York Fire Department, requesting assistance for traffic control; the other was from one of the businesses in the area. Upon arrival at the scene, the police were brought up to date on the situation. Chesswood Drive was immediately blocked to traffic. The Police radio dispatcher was contacted and advised to send more personnel. At 10:00 a.m., the Emergency Disposal Unit was called into action at 4496 Chesswood due to the risk of explosion. Sgt. Booth, of that unit, advised the Police Headquarters at 10:20 a.m. to send out their Mobile Command Unit and additional personnel. By 10:30 a.m., the Mobile Command Unit and the commanding officers, Staff Superintendent Coulis and Inspector Maywood left for the scene.

Evacuation of the area surrounding 4496 Chesswood began at approximately 10:30 a.m. At 10:48 a.m., the police took the traffic lights in the area off the computer. Meanwhile, the Mobile Command Unit had been set up on Champagne Drive, on the periphery of the endangered area. The Mobile Command Unit trailer – as per standard procedures – now became the control centre of the evacuation, and representatives from various agencies began reporting in, some with radio vehicles.
At this time, Staff Superintendent Coulis and Inspector Maywood were called by the Fire Department to assist at Imperial Oil. They went to Imperial Oil to help assess the nature of the leak at that time (see sections on Imperial Oil and the Fire Department). At 11:10 a.m. the police advised Metro Parks of the leakage onto their property, and asked them to send up a representative. Between 11:15 a.m. and 11:30 a.m., traffic was closed off on Finch, Dufferin, Chesswood, Sheppard, and Steeprock. This effectively created the "outer perimeter" - the area affected by the gasoline now surrounded by the agencies attempting to deal with it. Further, the Fire Department advised full evacuation down to Sheppard, which was carried out and completed by 1:05 p.m. At 11:50 a.m., CN stopped sending trains through the area. By 1:10 p.m., the advisement that the leak had stopped was relayed to Inspector Maywood from Imperial Oil. By 1:45 p.m., conditions had eased sufficiently for traffic to be allowed to move past on Finch. At about 4:00 p.m., acting under the advice of the Fire Department, the Officer-in-Command began to allow people to filter back into the area. Personnel started to return to their respective units, leaving only routine patrols in the area.

North York Public Works Department

The Public Works Department played a supportive role during the emergency, concentrating on assisting the Police and Fire Departments, both with personnel, and with maps as to the configurations of the sewer system. The misalignment of the system which caused the spill to go into the sewers was overlooked, not by the Works Department, but by the Building Department (Plumbing Section) which gives out decision permits for all drains and plumbing installations or alterations.

In accordance with its obligations, Imperial Oil telephoned the Works Department at 9:20 a.m. to advise of a spill at their yard. Truck No. 236 was dispatched. At 9:30 a.m., the Fire Department called thr
Works Department as well, advising them of the situation on Chesswood Drive. By 10:00 a.m., the Fire Department was advising the Operations Manager (J.J. Marlow) that the spill was of greater magnitude than originally anticipated.

It was at 10:15 a.m. that the Works Department office was advised that the Ministry of the Environment official on the scene was preventing Works Department personnel from flushing the sewers on Chesswood Drive. In response to this, Dennis O'Connor of the Works Department office went to the scene. In the meantime, the Works Department had contacted its colleagues in the Metro Works Department (Water Pollution Control Division).

In agreement with the Deputy Fire Chief on the scene, O'Connor advised Works Department personnel to flush the sewers. According to the Works Department chronology, there was a delay at this point, as the MOE official on the scene said he would have one of their personnel arrested if he opened a hydrant. Flushing eventually began at 11:30 a.m. (See MOE section, this report).

At 11:30 a.m., either the Fire Department or the MOE official contacted Mr. Marlow at the North Yorks Works Department offices with a request to obtain as many air compressors as possible to ventilate the sewer system. Compressors were in place and operational by 12:45 p.m. At the same time, fans were brought to the scene by Consumers Gas. These ventilator fans were attached to the compressors (approximately 3:00 p.m.) and extracted the gas fumes from the sewers.

For the remainder of the afternoon, Works Department personnel assisted the Fire Department in monitoring the spread of the fumes, in determining the possible trajectory of the contaminants, and continuing to flush the sewers. By 3:30 p.m., the gas fumes and gas product had started to diminish in the storm sewers; and at 4:00 p.m. O'Connor and other Works Department personnel returned to their office. In our later interview with them, the Works Department noted that the ventilator fans had worked so well that they were obtaining two of them for their own use.
Ministry of the Environment

Gerald McManus is an Environmental Officer-Technician for the Central Region Office of the Ministry of the Environment, and an interview with him formed the basis of this part of the report. Mr. McManus was at the scene of the gasoline leak as a representative of the MOE to offer technical assistance and to report on the environmental clean-up procedures.

The mandate of the Ministry of the Environment is to protect the environment from contamination (land, air, water). This directive takes second place to the protection of life and health – the responsibility of the Police; however, there are many instances where the two objectives can be achieved by mutual consideration and coordination. In the event that an emergency involves both these possibilities, and time is of the utmost importance, the police mandate clearly supersedes that of MOE. Otherwise, MOE has been designated the "lead ministry" – the ministry that has primary responsibility – in the event of a threat to the environment. In this case, however, the Ministry of Consumer and Commercial Relations (Energy Safety Branch) was considered to be the "party of first resort", due to the fact that the leak was an industrial problem. In fact, the Energy Safety Branch is only the investigative arm of the Ministry of Consumer and Commercial Relations, coming to the scene of an incident to determine if there have been any mechanical faults.

Imperial Oil is obliged to notify the Ministry of the Environment of any spills or leakages, which they did at approximately 8:30 a.m. Initially, they believed that the leak had been stopped, and that something like 2000 gallons of gasoline had been caught in their separator; in other words, they believed the problem had been contained within their premises. By the time the gasoline was discovered to be
pouring into Dufferin Creek, and the fumes had begun to reach danger levels in several areas, McManus arrived on the scene. The North York Works Department had decided to use hoses to flush the gasoline out of the sewer system. McManus requested the driver of truck No. 236 to hold off flushing the sewers until Imperial Oil's booms were in place. He then went to the Works Department offices to speak with his superior, Mr. O'Connor. He was requested to ask his man to hold off flushing for an additional few minutes. Mr. O'Connor and Mr. McManus returned to the scene. It was at this point (11:15 a.m.) that the Fire Department and Works Department suggest there was a jurisdictional conflict with the MOE, and Mr. McManus was asked if he was taking charge as the representative of the provincial "lead agency". When Mr. McManus said that he was not, flushing of the sewers began (11:30 a.m.). (But see appendix to initial chronology).

The efficacy of using flushing to rid the area of fumes has been called into question, but at this stage of the incident, the washing of as much gasoline as possible out into the open cut section of the creek where it could vaporize harmlessly appears to have been the best strategy. Mr. McManus suggested that gasoline fume evacuation units be procured, and either he or the Fire Department contacted the Works Department for units.

After these events, Mr. McManus remained for some time on the scene to monitor the activities surrounding the clean-up, and to be available for advice.
Consumers Gas is a member of the borough and city of Toronto Public Utilities Coordinating Committees which plan and coordinate installation and mutual assistance between utilities, and is also involved in the creation of the new Metro Toronto Emergency Plan. In the event of a large scale emergency involving provincial ministries, Consumers Gas would work through the legislative "arm", the Ministry of Consumer and Commercial Relations (Energy Safety Branch), or informally with other ministry representatives on the scene. Consumers Gas also talks to the Ministry of the Environment when it does environmental impact analyses.

Internally, Consumers Gas divides its response "upstream" or "downstream" of the meter. The Construction and Maintenance men upstream, and the Field Servicemen downstream both work under the Operations Manager (William Smith).

In this emergency, as it is Consumers Gas' policy to answer any call, field servicemen were on-scene soon after the first call to them at 8:11 a.m. Although not specifically their problem, even after it was decided that a gasoline spill was to blame, Consumers Gas maintained a presence in the area, simply because the public cannot readily tell the difference between types of fumes. Consumers Gas telephones rang all morning with inquiries and complaints about the fumes.

At the same time, its expertise relating to underground distribution of public utility corridors constrained it to remain as a presence on the scene.

When discussions began as to the best means of removing the gasoline and the fumes from the sewer system, Consumers Gas offered the use of its exhaust fans which can suck fumes back up through manholes. The fans are carried on the field vans, and stored at various points in Toronto. As a result of the performance of the fans during the emergency, the North York Public Works Department is considering purchasing some for its own use.
Metropolitan Toronto Ambulance Services

Ambulance Services sees its primary role as "treating and transporting" emergency casualties, and expects to be in attendance during almost any kind of emergency. It functions as part of the Metro Toronto Disaster Plan, under the supervision of the Police. Toronto is divided up into four quadrants, based on Yonge-Eglinton, each with its District Supervisor and support equipment.

At 8:10 a.m., almost at the outset of the incident, Ambulance Services was notified by the Fire Department of the strong smell report. This notification was cancelled at 8:17 a.m. At about 10:17 a.m., ambulance 1620, which was going through the area, checked the scene. At 10:37 a.m., the Fire Chief, Gibson, asked the Ambulance Services to attend; and approximately ten minutes later, Robert E. Scott, the Field Superintendent, was on the scene. He was followed by the District Supervisor of the North-west quadrant, along with three ambulances and the emergency support unit bus (ESU-5). The ambulances were stationed at the north, south, and west of the incident perimeter, while supervisory personnel and the emergency support unit bus went to the Control Centre. The emergency support unit bus is a patient transfer centre (when a disaster is large enough to require doctors and on-site triage procedures), and also contains supplies of a general kind - not specifically medical. In this incident, it was parked behind a nearby warehouse, in case of explosion.

The only actual ambulance case during the incident was a woman who broke her leg while being evacuated, and the ambulance attended to her between 12:10 p.m. and 12:30 p.m. Ambulance Services left the scene between 3:30 p.m. and 4:00 p.m., but one ambulance remained behind in case of possible accident among the clean-up crews.

The Red Cross unit on the scene worked under the Ambulance Services, providing coffee and food throughout the afternoon.
Metropolitan Toronto Parks and Recreation

Although capable of providing some equipment and personnel upon request, Metro Parks was on the scene solely as the administrators of the land owned by the Metropolitan Toronto and Region Conservation Authority into which the effluent eventually poured. At 11:10 a.m. the Metro Toronto Police telephoned Metro Parks, requesting that someone else sent to the scene "to give whatever assistance he could"; Mr. Tom Ray responded, arriving on-scene at 12:30 p.m. Bringing with him topographic maps of the area, Ray went to the command trailer, where officials were attempting to determine the possible extent of the outflow. There was some concern expressed about the Charles H. Best Secondary School across Dufferin.

Ray walked up the creek towards Dufferin, and found that there was some gasoline creeping through, with definite discoloration of the water and a distinct smell in the air. He reported back, and then went out with Imperial Oil technicians to set up a third boom. He then went to a Parks yard near Finch; finally making a car check before going back to the office at 2:30 p.m.

Metropolitan Toronto Works Department (Water Pollution Control Division)

The Metro Works Department’s Water Pollution Control Division monitors water quality and has basic spill equipment; it also contains within it an Industrial Water Department, concerned with containing and removing explosive materials. Information was received from Mr. Don Young, Senior Engineer.

They were first contacted by the Borough Works Department at 10:25 a.m., and sent up an inspector. The Borough Works Department and Imperial Oil were concerned with clearing up of the spill, and Mr. Young commented that it was fortunate that Imperial Oil was so close to the "downstream" end of the spill so that they were able to put up their spill booms rapidly.

The Metro Works Department worked with the Borough Works Department in tracing the source of the break through the sewer system, and assisted in checking during the next few days for residual pollution. This checking is still going on.
The Survey Questionnaire

Because of the size of the evacuated area, and the willingness of people to respond to some sample telephone interviews, it was decided that a survey of economic and social impacts of the evacuation would be conducted by phone. Sixty-six businesses were surveyed, as representative of the various area enterprises (see Table 1). The respondents were encouraged to be conversational and to bring out interesting facts or personal observations of the incident. The following questions provided a basic guideline to the interviews:

1. Were you evacuated on Wednesday the 21st (of February)? How? When? By whom? ....and this meant shutting down your office or factory?
2. How many people are employed there?
3. Do you have any idea of what the impact of this will be on your business?
4. Does your company have an emergency procedure?
5. Where did you go when you were evacuated?
6. When did you return to work?
7. What were your feelings about returning to the area?
8. Does the presence of the tank farm there bother you now? ....Do you ever think about it? Did you, before the incident?
9. Do you think the tank farm should be moved?
10. Considering that the tanks have been there the longest, do you think commercial development should have been allowed so close to them?

The following report is divided into economic, social and environmental impact sections.
<table>
<thead>
<tr>
<th>Table 1: Businesses Contacted and Persons Interviewed</th>
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<tbody>
<tr>
<td>Finch Ave.</td>
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<tr>
<td>Petrofina Terminal, Finch W. (approx. 1100 Finch), Mr. Clark.</td>
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<td>Weaver Fuels, approx. 1117 Finch W., Mr. G. Soper.</td>
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<td>Harvey’s Hamburgers, 1115 Finch W., Joe Anfelmo.</td>
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<td>Swiss Chalet, 1113 Finch W., Louis Cabral.</td>
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<td>Stan’s Restaurant, 1101 Finch W., Mrs. Pasojevic.</td>
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<td>Open Window Bakery, 1125 Finch W., Max Feig.</td>
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<td>Charlie C Restaurant, 1111 Finch W., C. Coleman.</td>
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<td>Toro Rd.</td>
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<tr>
<td>Vita Foam Products, 150 Toro Rd., Mr. Chalmers.</td>
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<td>Pre-Fab Cushioning Products, 150 Toro Rd.</td>
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<tr>
<td>Champagne Dr.</td>
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<tr>
<td>Canada Dry Ginger Ale, 2 Champagne Dr., Mr. W. Russell.</td>
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<td>Research Foods, 77 Champagne Dr.</td>
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<td>Dalo Corporation, 472 Champagne Dr.</td>
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<td>Stylecraft Decorative Hardware, 478 Champagne Dr., Mrs. Edna Kay.</td>
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<td>Mascot Graphics, 489 Champagne Dr., Mr. Matthews.</td>
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<td>Metro Gift Service, 492 Champagne Dr., Mrs. Magder.</td>
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<td>Nordex Laboratories Ltd., 493 Champagne Dr., Mrs. Conroy.</td>
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<td>Electrorep Ltd., 496 Champagne Dr., Alice Jonkman.</td>
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<td>AMS Shoe Mfg. Ltd., 499 Champagne Dr., Mrs. Petrella.</td>
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<td>NDL Laboratory LTD., 500 Champagne Dr., Mrs. Petrella.</td>
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<td>Hold-tite Fasteners Ltd., 503 Champagne Dr., Mr. Albert Penrose</td>
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<td>Chemelex (Canada) Ltd., 510 Champagne Dr., Mrs. Conroy.</td>
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<td>Fremor Engineering Co., 528 Champagne Dr., Mrs. Conroy.</td>
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<td>Chestwood Stationery Co., 532 Champagne Dr., Mrs. Conroy.</td>
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<td>Imperial Coffee Services, 534 Champagne Dr., Mrs. Conroy.</td>
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<td>Selkirk Street Sales Ltd., 540 Champagne Dr., Mrs. Conroy.</td>
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<td>ETA Products of Canada Ltd., 586 Champagne Dr., Mrs. Conroy.</td>
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<td>Black &amp; Decker Mfg., 588-92 Champagne Dr., Mrs. Conroy.</td>
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<td>Commonwealth Curtain Co. 596 Champagne Dr., Mrs. Conroy.</td>
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<td>Chesswood Dr.</td>
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<td>Alamo Restaurant, 3705 Chesswood, Mrs. Membry.</td>
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<td>All Form Roller and Die,</td>
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<td>Tornado Mfg., 3715 Chesswood, Mrs. Warton.</td>
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<td>Adriatic Glass and Mirror, 3727 Chesswood, Mrs. Goodman.</td>
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<td>Carpet Villa, 3737 Chesswood, Mr. Joseph Ber.</td>
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<td>Gauvreau - Beaudry Ltd., 3765 Chesswood, Carol Young.</td>
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<td>Mayfair West Tennis Club, 3855 Chesswood, Irwin Tobias.</td>
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<td>Norvalie Cold Lighting Ltd., 3871 Chesswood Dr., Dr. Wright.</td>
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<td>Stein L Real Estate, 3873 Chesswood, Mrs. Obst.</td>
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<td>Visage Cosmetics, 3875 Chesswood, Carol Baker.</td>
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<tr>
<td>De Graff Trailers, Ms. Pat De Graff.</td>
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<tr>
<td>Petroleum Recycling Services, 3893 Chesswood, Mr. Mel Ash.</td>
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<tr>
<td>Chesswood Custom Woodworking, 3909 Chesswood, Roger Iqbal.</td>
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</table>
Chesswood Dr., cont.

Ace Communications & Electronics, 3913 Chesswood, Gary Smith.
Typro Typesetters, 3957 Chesswood, Mrs. Moosa
Jolean Contracting, 4033 Chesswood, K. Chamberlain.
Hampstead Marketing, 3963 Chesswood, Jack Lane.
Nails 'N' Lashes, 3965 Chesswood, Pearl Altman.
Mr. Graphics, 3969 Chesswood,
Melvin Satok, (architect), 3975 Chesswood, Mrs. Federman.
ITT Canada (Components Div.), 4001 Chesswood, Mr. McGinnis.
Globe Spring & Cushion, 4040 Chesswood, Mr. Marcus.
Herbert Construction, 4045 Chesswood, Jack Cunningham.
Mister G Restaurant, 4069 Chesswood,
Ministry of the Environment, resource recovery, 4375 Chesswood,
Mr. Boyko.
Plaza Fibreglass Mfg., 4420 Chesswood,
Allied Plastic Fabricators, 4461a Chesswood, Bob Moore.
Nu-Dell Plastics of Canada Ltd., 4476 unit 6, Chesswood, Linda Hart.
J & J Diversified Plastics Ltd. 4490 Chesswood, Unit 11, Mr. Solmon.
Kawneer Co of Canada, 4496 Chesswood, Rick Herbert.
Factory Tire and Rubber Co., 4512 Chesswood, Mr. Noonam.

Vanley Cres.
Coleman Metal Products, 15 Vanley, Ken Beechner.
Metropolitan Toronto Incinerator, 75 Vanley, Mr. McKerracher or
Mr. Timmins (plant mger.)

Steeprock Rd.,
Arc Industries, 150 Steeprock, Brian Ennis.
Dominion Candy, 160 Steeprock, Mr. Rosenberg.
Custom Glass, 590 Steeprock, Carol Taylor.
General Transformers, Acme Dunbar, American Louver & Exel Plastics,
650 Steeprock, Paul Molyneaux.
Idomo Furniture International, 4250 Dufferin (Dufferin & Steeprock),
Howard Smith.
Location of some major industries, and types of development in the area

MAP 2
Economic Impact

The commercial area that was evacuated during the Imperial Oil leak is populated, in general, by small industries, warehouses, and sales offices employing less than five persons. Some larger industries, such as Canada Dry, Vita Foam Products, Plaza Fibreglass, Kawneer of Canada and Globe Spring were also affected. There are in addition several restaurants and one bakery in the area, and these may have suffered the greatest losses proportionate to their size.

The restaurants were evacuated at, or just after, their opening time, and food that had been prepared for the day was lost to spoilage. Max Feig, of the Open Window Bakery, estimated a loss for his company of about $4000, which included spoilage of all doughs that had been mixed. However, he pointed out that things could have been worse. Had the evacuation occurred two hours earlier, before the morning goods had been baked and delivered, the loss could have been as high as $20,000.

Two companies in the area were preparing for a gift show and the evacuation severely complicated their already rushed schedule. In both cases, employees and owners returned that evening to catch up on missed time. A few businesses felt that they may have lost profitable calls during their time away - Visage Cosmetics, for instance, may have missed calls from prospective students, at $600 tuition each. There is no way of knowing for sure, and the general feeling among all those interviewed was that customers would call back. One woman reported that frustrated callers had spoken to the operator who informed them of the situation.

Both Canada Dry and Plaza Fibreglass incurred costs because of the emergency shut-down. The syrup used at Canada Dry had to be left in the bottling machinery overnight where it spoiled, and fibreglass in process at Plaza Fibreglass had to be thrown away. In both cases, further costs would be incurred by time spent on clean-up and maintenance the next day.
The majority of businesses paid their employees for the lost time with the general feeling that "it wasn't their fault". Two paid only their salaried workers, or some of their wage paid employees, but the criteria for payment were not outlined.

Two companies had their employees make up the time later in the week, so they were effectively not paid for lost time. Two companies are awaiting compensation from insurance, in which case workers will be paid (most have paid employees and now wait compensation). One business reported that it was told by the "Ministry of Trade and Labour" not to pay their employees.

Twenty-eight of the sixty-six companies surveyed had suffered a significant loss because of the evacuation, yet only three were aware (March) of the possibility of making a claim to Imperial Oil. Compensation would certainly help the companies involved to defray the costs of paying workers and overhead during a time of non-production. Many of the small businesses probably have only a small cushion against such losses. Unfortunately, according to one small-businessman, general business insurance does not cover business interruption, especially for a short time, so that claims to Imperial Oil are the only possibility.

By the end of April, according to Imperial Oil, at least fifty-two claims had been filed by local businessmen for losses. However, claims can only be made for losses to property or spoilage of goods.

The general feeling among small businessmen was that the principal loss was time. A few conducted business from other or temporary headquarters, while some could continue their mobile business - sales or service - for the time being. A few made up for lost production in overtime (which could add to costs, through extra wages). Most seemed to feel that their business had actually suffered little damage because of the incident - small staffs and overhead can be thanked for this in the majority of cases. The real losers were those enterprises with many employees, or which suffered shut-down costs.

Some innovative last-minute manoeuvres were made to continue business - one company redirected their telephone to the nearby house
of an employee, and operations continued from that location. Some took time, before leaving, to call major clients, informing them of the temporary disruption of business. Those who did not contact customers generally found them understanding, or at least mollified, the next day, by an explanation of rushed evacuation.

While only one company, Globe Spring, has an organized emergency plan for its premises, several commented that they were now considering drawing one up. Most people left their premises immediately (emergency procedures consisted of "grabbing our coats and getting the hell out of there") but some took time to call customers or to close down plants and processes - the area was never completely clear of people.

At the Metro Incinerator, some men stayed behind to activate the regular week-end shut-down procedure, which takes about two hours. By five o'clock, some people still remained, including the weigh scale attendants who had never been evacuated; and at this time, the police returned to force everybody out. It is odd that those workers remained so long after evacuation notice, but also strange is their forced evacuation at 5 p.m., just shortly before the area was declared safe. Was there still a high enough gas reading in this area - near the storm sewer outfall - that police considered it unsafe?

The manager of the Idomo Furniture store also remained in his store during the incident, although his employees were sent home. At Dufferin and Steeprock, the store was fairly removed from the gas; Mr. Smith noticed no smell, so he negotiated with police every hour or so for permission to stay. Although he felt that the authorities were perhaps too cautious in his case, he said this was probably for the best. The store opened again for the evening, around 6 p.m.

At Arc Industries, a workshop for the mentally retarded, personnel remained until 3 p.m.. Brian Ennis complained of the length of time between the spill, and their evacuation notice at 12:45 p.m. - he felt that some prior warning, or notice to be ready, would have permitted greater organization. Mr. Ennis commented that there should have been greater communication between himself and the police or fire departments, about the special needs of the plant personnel in case of emergency. He
said that the seriousness of the situation was not passed on to them. Some awareness should have existed, however, since they had called in the Fire Department at 12:15 p.m. because of fumes. In any case, fourteen of the workers go home by taxi, and it wasn't until 3 p.m. that the second (and last) cab arrived. It would seem that an adequate sense of emergency was also not passed on to the taxi company. Mr. Ennis did say that the incident had made him painfully aware that an adequate emergency or evacuation plan was needed for the plant.

It is interesting to note that many businesses knew of the situation beforehand: drivers, employees or customers outside the area called to say that their entrance was blocked; some picked up radio reports; and many simply noticed the heavy volume of traffic, or "people running away", from their windows.

Some assessment was attempted, of the dangerous chemicals etc. which could have escalated the size or nature of the incident. Since most of the affected businesses were offices or small distribution centres, they contribute little to the scenario, other than flammability. Warehoused materials seem to include many plastics, so there exists the possibility of dangerous fumes in case of fire. At the Kawneer Aluminum plant, explosive chemicals are used for processing and cleaning. The fumes at the Metro Incinerator could have combined with fires to cause a serious explosion - care was taken there to open windows and cover drains until the fires were out. Mr. McKerracher felt that the controlled air combustion of the incinerators may have been a possible way to burn off gas fumes. His suggestion was not followed by the fire department, however. The MOE resource recovery plant has bundles of paper lying around outside, which may have presented a fire hazard, but an external explosion, according to Mr. Boyko, would have caused little damage to the solid structure of the building, or the heavy mining machinery inside.

Some indirect impacts may have occurred to nearby businesses, but these were not researched. Nearby restaurants may have enjoyed an increase in business, as people waited for news of the possibility of return. As well, several warehouses or factories are under construction in the area, and must have been evacuated. The impact on contractors is unknown.

The CNR could also have been affected by the closing of the area, but the tracks were reopened in time for the Trans Canada train to pass.
Social Impact

The surprising finding of the social impact part of the North York survey, was that few people were actually concerned about the presence of the Imperial Oil tanks. Only fifteen people out of sixty-six reported that they thought or worried about the tanks now, while eight had been concerned about them before the incident. The majority don't think about them now and never did. It seems to be a manifestation of "out of sight, out of mind" with many respondents saying "I never drove by that way, so I never saw the tanks". Since this incident, some said that they were more aware of other spills, like the large one in Edmonton that occurred a few days afterward. Some did say that news of tank explosions or fires elsewhere made them consider the possible dangers of those nearby. Generally, however, it was felt that the area must be safe - either because development had been allowed or because "someone" was looking after the tanks.

A comment that was made or implied several times, was that it was better to have businesses and industries in the area, than homes. Workers preferred to have the tanks, or any possible danger, near their offices, not their homes.

A slight minority - 17 - wished to see the tanks moved away, while 20 felt that they should stay. Eight people volunteered that there should be greater regulation or control of the tanks, for the safety of the area.

There was also a slim majority who were against commercial development in the area ( knowing that the tanks were there first). Among those who were in favour of development in spite of the tanks, the feeling was expressed that "progress" could not be halted, that the land could not be wasted.

There seemed to be little fear or concern generated by the incident. Most people interviewed were quite nonchalant about it, considering it as a day off, and few had thought about any of the implications or issues posed by the spill. In general, people relied on other agencies - fire, police or public works - to look after any problem that might arise.
Environmental Impact

Potential environmental damage from a gasoline spill is quite high - the volatility of gasoline makes it very toxic to living organisms. In the case of the North York spill, the gasoline drained into a storm sewer, and was then flushed into Dufferin Creek. This is a small, relatively shallow creek, subject to continual pollution from the storm sewer outflow. Such pollution would be likely to include traces of motor oil and gasoline, with high mineral content and silt loads, as well as occasional traces of chemicals from nearby industrial sites.

In studies on the impacts of oil spills, it has been found that gasoline, and the more volatile elements of petroleum hydrocarbons, are the most toxic to living things, although their volatility makes contamination rather short-lived. By the time of an inspection of the creek on March 12th, it was expected that much of the gasoline would have been collected, washed or evaporated from the system. This was not the case, however, for several possible reasons. Pools of gasoline may still be trapped in pockets in the sewer to be liberated at peaks of storm or spring thaw flow. Silts also adsorb hydrocarbons which may then remain or be released over a period of time. As well, a considerable amount of debris - garbage, litter and weedy material - has collected in the screen at the mouth of the storm sewer. It is possible that this has trapped some of the spilled gasoline, to release it over a longer period of time. On March 12th, the creek water was a murky grey colour with some gas sheens evident in eddies of the creek, and there was a fairly strong smell of gasoline around the creek. While one might assume that these are related to the Imperial gas spill, proof would be difficult. Traces of hydrocarbons are probably a common pollutant of the Dufferin Creek, and it is doubtful that the water is ever clear. The provocative evidence, however, is the smell of gasoline, which is likely to be related to the gasoline spill in some way. According to Bill Mitchell of Imperial Oil, gas "sniffers" were used to test the area until there was no trace of fumes for several days.
One effect of gasoline is that it would act as a solvent in the sewer system, dissolving and carrying out other pollutants. These could have other unanticipated effects on the creek environment.

At this time of year, the impact of spilled gasoline may be expected to be minimal. Much of the fish population (if, in fact, one does exist) should be in Lake Ontario or in deeper waters downstream where they overwinter. Fish could be affected indirectly if their food sources were damaged—organisms which overwinter in the creek bed or nearby habitats. Since gasoline would be confined to the top water layers, except where mixing occurred, damage would be limited to areas along the water line. Little vegetation damage is expected unless pollution continues. Gasoline is toxic to plant life, but vegetation would either be dead or dormant in the cold temperatures at that time and thus relatively immune to harm. It is fortunate that the spill happened during the winter season—most or all of the gasoline should have evaporated by Spring.

According to provincial regulation (Environmental Protection Act, SO 1971), Imperial Oil was responsible for the containment and clean-up of their spill; although they felt—at the time—more responsibility for the spill on their own property, at about 11:00 or 11:30 p.m., they put booms in place on Dufferin Creek. The booms were a series of steel members with snow fencing braced in front, and bales of straw with "sorbent C" in front of that. This should be an effective trap for spilled material, even though, due to its lightness, some gasoline would make it through the booms. It was for this reason that further booms were set up downstream.

Don Young, Senior Engineer with the Industrial Waste Department of Metro Works, Water Pollution Control Division, felt that it was fortunate that Imperial Oil was so close by. This meant that their equipment and expert manpower was more easily and quickly available. The Works Department took a standby role, acting as a back-up to Imperial Oil's operations. The Works Department was later involved with the North York borough, in daily checks of the area. After
the sewer had been flushed, cleaned and decaled safe, the creek and reservoir were checked for residuals. The Industrial Waste Department has some basic equipment for handling spills, and it also monitors water quality.

The Ministry of the Environment was relatively uninvolved. There has been little attempt on their part to monitor or trace the pollution of Dufferin Creek. At the time of the incident, Mr. McManus was more concerned about the danger of the explosion and with the containment of the spill than with sampling, and monitoring was pure'y visual. Later, samples of the creek inflow were taken for analysis by the Ministry's oil lab, but these were discontinued once visual observation found the water to be clear, and therefore, "clean"—although on March 12th, the creek was again murky.

A short distance downstream of the storm sewer outflow is the G. Ross Lord Reservoir. The dam serves as a control, although it is intended for eventual recreation use. Should the reservoir have had greater importance as a storage unit, serious damage might have been envisaged. However, Dufferin Creek has already deteriorated so much through continual pollution that little additional environmental damage is likely to occur because of this spill. Two factors favour this diagnosis: the season; and the nature and behaviour of gasoline in an open environment. In this case, the timely deployment of booms by Imperial Oil and the Works Department were a positive aspect of the incident.
Table 2. Results of Questionnaire

<table>
<thead>
<tr>
<th>ECONOMIC IMPACT</th>
<th>SOCIAL IMPACT</th>
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<tr>
<td></td>
<td>Tanks moved</td>
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<td>Tanks regulated?</td>
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<td></td>
<td>Key: F - Fire department; P - Police department; B - Both; Y - Yes; N - No; I - waiting for insurance; O - owners; C - commissioned employees; S - salaried employees; AS - Answering service took calls; red - Calls redirected</td>
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Shut-down loss is the dollar loss estimate made by a respondent and should not be taken as an accurate measure. It might also be safely assumed that estimates tend to be higher than actual losses.

1 - denotes a loss that the respondent felt to be significant.
Table 2. Continued

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<td><strong>EFFECTIVE IMPACT</strong></td>
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Key: F - Fire department; P - Police department; B - both; Y - Yes; N - No; I - waiting for insurance; O - owners; C - commissioned employees; S - Salaried employees; AS - Answering service took calls; red - Calls redirected

Shutdown loss is the dollar loss estimate made by a respondent and should not be taken as an accurate measure. It might also be safely assumed that estimates tend to be higher than actual losses.

1 - denotes a loss that the respondent felt to be significant.
Conclusions

It is reasonable to conclude that the emergency response procedures of the primary response agencies at the municipal level worked well. The only criticism the Police laid at their own door was that there was an occasional vagueness as to the whereabouts of their own personnel during the course of evacuation and perimeter duties. These procedural difficulties are scheduled to be cleared up. The Fire Department and the Police Department worked quite efficiently in tandem, and it has been decided to appoint a Police Investigator to the Fire Department team in similar future emergencies, so that perceived difficulties in obtaining information can be eased.

The two areas of concern at this level are, first, and most obviously, the fact that neither the Building Department nor Imperial Oil were able to catch the badly designed drainage system during the plan approval stage. It is to be hoped that such plan approval procedures are being re-examined. Second, and not so obviously, it took nearly an hour for the Fire Department to locate the possible origin of the leak, and, even at that, there remained belief in the minds of Imperial Oil personnel that they were not to blame at all. There are a large number of tank farms in the area, and it was by dint of "phoning around" that the trouble spot was located. Due to the curious nature of this incident, an initial report by Imperial Oil to public agencies was not made until 9:20 a.m. (since they believed there was no escape of gasoline off their property). There seems to be a place here for either a more detailed reporting of spills on the part of private agencies to public agencies, or some greater liaison between private and public sectors in emergency response. As it was, suspicions were built up that Imperial Oil was attempting to "cover up" their spill, suspicions which came as a shock to Imperial Oil when our interviewers brought them up in discussion.

At a higher level, the major area of concern is the lack of understanding and co-operation between the municipal and provincial response agencies. Whatever the facts of the Works Department-MOE incident as reported, it is clear that serious confusion on the part
of the municipal personnel as to the responsibilities and jurisdictions of the provincial "lead agency" exists. In the event, the dispute or the confusion caused some slight—possibly beneficial—delay in the elimination of the gasoline from the sewers. But it is clear that a great deal more understanding needs to be fostered between the provincial and municipal agencies: for instance, what would have been the consequences if the Ministry of the Environment had taken over the clean-up? Would there have been a clean transfer of power? Or is the concept of the "lead agency" irrelevant to the actual functioning of a ministry such as Environment?

Mr. McManus has made the point that a spillage of this kind brings up the question of a spillage at a more central location, e.g. what would happen if a tractor trailer overturned at Bloor and Yonge Streets in central Toronto? Would there be enough air/fume evacuators available to handle a sewer line which probably stretches all the way to Lake Ontario?

In terms of economic and social impact, it is fortunate that there was so little real damage caused, the risk of explosion being so great for so long. There were few complaints, as it was supposed that "the powers that be" were looking after the interests of the local population. The environmental impact could have been much worse, but Dufferin Creek appears to be the victim of continuous pollution in any case.