The Auckland electricity supply disruption 1998: emergency management aspects

By Gareth Davis, Deputy Director, Victoria State Emergency Service, Melbourne

As with most agencies involved with emergency management planning, the Victoria State Emergency Service (VICSES) has participated in discussion and planning on 'lifelines'. When the power crisis occurred in Auckland it appeared to VICSES to be an opportunity to observe a lifeline failure and possibly identify some 'downstream effects' which may not have been anticipated in the planning process. In the same vein, it was an ideal opportunity to confirm the effects that had been identified in theory, and assess their impact on the community. Due to the excellent relationship between VICSES and the New Zealand Ministry of Civil Defence, permission was received for Deputy Director Gareth Davis to travel immediately to Auckland and join the Civil Defence office in that city. He subsequently reported on his trip to the peak emergency management body in Victoria, the Victorian Emergency Management Council (VEMC). Some time after the crisis, the New Zealand government directed that two inquiries take place:

- A ministerial inquiry instigated by the Minister of Energy and with terms of reference concerning why the failure occurred etc.
- A 'low-key debrief and review of the response activities', instigated by the Ministry of Civil Defence (MoCD), with terms of reference concentrating on the emergency management aspects of the event.

As one of the aims of the latter review was to analyse the performance of the MoCD, it was considered desirable to have 'an outsider' involved, and Gareth Davis was asked to participate. The report of the review was issued in June 1998 and was in a form dictated by the terms of reference: answers to five key questions. This article is Gareth's initial report supplemented by some information from the Ministerial review.

The scene

The city of Auckland, on the North Island of New Zealand, has a population of 350,000. Its central business district, a block of some three square kilometres, contains a residential population of approximately 5,000, mainly in high-rise apartments, and a business sector of 7,000 businesses, employing approximately 68,000 people, most of whom commute daily. Some of these business are large corporate bodies but there is a significant number of small businesses of a variety of types. Many of these involve food preparation and storage ranging from small sandwich shops to super markets.

The night population of the CBD can increase to approximately 7,000 because of the number of entertainment and accommodation premises. Two education institutions, Auckland University and the Auckland Institute of Technology, have a significant effect on the day population figures with combined student numbers of 35,000.

In employment terms, the CBD involves 28% of the city's employment, over 13% of Auckland regional employment and 5% of New Zealand's employment.

In summary, the city block under discussion is small in area but extremely significant in Auckland and New Zealand terms.

The problem

Electric power in Auckland is reticulated and sold by Mercury Energy.

In the main CBD, power is supplied via four main 110Kv feeder lines and a fifth 22Kv auxiliary line. Two of the main lines are gas filled and have capacities of 50 MW each and two are oil filled with a capacity of 60 MW each. The fifth line is able to carry approximately 40 MW loads and all the lines, combined with 'transfer power' have the ability to provide power to the level of 285MW. As the total CBD load is normally around 140 Megawatts it is obvious that when the load is evenly divided between the feeders, they are operating on a load approximately one half peak capacity.

The 40 Megawatts provided by the auxiliary line may appear insignificant. In the context of this event the ability to provide this power proved to be extremely important.

The first indication of any problems was a request by Mercury Energy, on Thursday 19th February 1998, for their CBD customers to conserve power 'otherwise drastic measures will have to be taken.' What was not explained was that three of the four main feeders had failed. On Friday afternoon, for whatever reason, the fourth feeder failed and left the power available to the CBD, at the maximum, 40 MW. This resulted in loss of power to most commercial premises and a significant number of residential premises during the day, and supplementary effects such as loss of some traffic lights and street lighting. The losses to various sectors was intermittent, random and unpredictable.

The direct effects

The physical effects where power was lost were many and varied, and in the main, predictable.

- *Multi-story office blocks*
  - lost main lighting, computer systems, air conditioning and lifts
  - automatic doors locked open or closed depending on the system and affected by fire and burglar alarm systems. With no 240V power, those systems went to battery operation
  - staff were trapped either in lifts, or in the building where doors were closed. Some office blocks had emergency (generator) power which provided limited facilities throughout the offices. It became apparent that connection to emergency power in some buildings was a matter of choice by the tenant and would be reflected in the monthly lease payment.
- *Residential apartments*
  - lost main lighting, and unlike office blocks, most did not have emergency lighting
  - had some residents trapped in lifts or access to apartments was compromised because of automatic door opening which was not battery backed up
  - had no emergency (generator) power, and
  - as would be expected, had no refrigeration which would result in the spoiling of food.
- *Retail businesses*
  - had very little emergency (generator) power
  - lost lighting which included advertising signs and the like
  - lost computers, including all modern cash registers

– lost refrigeration and the ability to safely store certain food, and
– lost electrical cooking facilities.

- *Police and Emergency Services*
  – received a significant number of calls for assistance
  – initially had difficulty handling calls because the '111 system' failed due to power surges. The equipment for the whole of New Zealand is located at Auckland and calls were diverted to Wellington and Christchurch.

The secondary effects

- Most of the government departments and corporations in the high rise office blocks re-located to suburban or regional offices if available. Others hired temporary premises outside the affected area. Many had difficulties in re-location because of inflexible computer systems which required the network wiring in the building. It would appear that business continuity plans did not exist.
- The University of Auckland and the Auckland Institute of Technology cancelled 'enrollment day' and advised all students not to attend. This had a dramatic effect on a number of businesses that rely on students as their customer base.
- Tourists to Auckland, particularly those arriving by sea, were significantly affected as many of the main tourist facilities are within the area in question. One large tourist ship cancelled a three day visit and moved on to the next port of call.
- Virtually no commuters to the CBD from offices and other businesses, removing the day time lifeblood of some retail businesses.
- Virtually no customers, day and night, for the retailing, hospitality and entertainment industry.
- Fire department received unusual number of fire and rescue calls all related to generators. The calls ranged from people being overcome by fumes because they had generators running in areas without ventilation, to fires with people refuelling generators whilst they are still running, through to generators catching on fire because of running for periods far above that for which they were designed.
- The Health Department was concerned at attempts by a minority of food outlets to retain food which is suspect due to intermittent refrigeration.
- Some government departments were unable to carry out normal business which has downstream effects. The Lands Title Office, for example, had thousands of transactions that are unable to be processed. The Auckland District Court was forced to relocate to temporary premises. The New Zealand Reserve Bank was affected.
- Traffic control was extremely difficult due to intermittent operation of traffic lights. Because they were not on the one separate circuit, they were unable to be continually provided with emergency power and operated intermittently as power was provided to the geographic sector in which they were located.

The initial actions

- Mercury Power requested all relevant authorities and agencies assemble for a briefing.
- City of Auckland issued release that included 'keep out of CBD area because of safety' statement by Mayor.
- City of Auckland activated municipal Civil Defence (CD) organisation, despite not declaring a CD emergency.

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- Ambulance, Police, Fire Authority and Civil Defence consulted and drew up a priority list of installations and buildings that should receive either a constant share of the power available, or emergency generators.
- Health authorities consulted with City of Auckland on refuse disposal, food storage etc.
- Using Supermap software and data from the last census, the demographics of the area in question were defined precisely and distributed to all agencies.

Next actions

- Mercury Power arrange for morning and afternoon briefings at their offices, including all the agencies involved. Progress on the power situation is reported, other actions discussed, emergency power priorities reviewed and media releases formulated. An updated street map of the affected area is distributed.
- The Auckland City Council CD organisation arranges an afternoon briefing for all interested at which they report types of assistance requested and that which has been provided. They table an 'Auckland CBD Energy Crisis Emergency Management Plan'
- The fire authorities arrange a meeting with companies that specialise in building lift maintenance and arrange for them to keep a check on their customers and 'rescue' anyone trapped in the lifts. This reduces the load on the fire department for direct checking of all lifts.
- In a similar vein, the fire department calls a meeting of companies dealing with fire and burglar alarm systems and requests they contact all their customers and check the condition of system backup batteries.
- The fire authorities locate a manned educational caravan within the CBD to emphasise the need for fire safety with generators and candles etc.
- The 40MW power available from the fifth line is rotated around various sectors during the day and the whole area of the CBD at nighttime, which allows batteries to re-charge, high rise water pumps fill header tanks and sewerage pumps to operate.
- The health and fire authorities combine their resources for checking premises, with fire inspectors and health inspectors travelling together to check the various safety aspects.
- Extra refuse pickups are organised and skip bins for food disposal are provided. Some food from commercial premises is seized by health inspectors after being found suspect.
- Mercury Energy compile a list of locations of emergency generators and import large generators from other parts of New Zealand and Australia. Many commercial premises buy or lease generators and Mercury Energy facilitates connection of same.
- Regulations are 'relaxed' to allow generators and extension cords on foot paths etc.
- Auckland City Council compiles a list of building managers and includes them on distributed information bulletins.
- Because 109 accommodation units owned by the Auckland City Council and capable of housing 400 people were vacant, emergency accommodation was offered to all residents within the affected area. Despite many people temporarily moving out of the affected area, only two families accepted the Council offer. Most people moved to friends and families.

Subsequent actions

- Mayor of Auckland calls a public meeting to address concerns of residents and businesses. Mercury Energy decides not to attend. Majority of attendance and

discussion from business sector and main concerns focus on lack of customers and uncertainty of power supply. Some business people express the view that if they knew when the power was going to be available during a 24 hour period, they could plan their business around it.

- As it appeared that the repair of one main cable was imminent, authorities were faced with the dilemma of how that limited power would be shared equitably. A meeting is arranged between Auckland City Council, Mercury Energy and representatives of business and resident groups. The meeting determined to divide the CBD into four zones with two of the zones receiving power between 7 am and 12 midday and the other two between 12.30 pm and 6 pm. All zones would receive power during the night.

The expected repair did not materalise on time, but the zone system was implemented anyway. It was advertised in the local media and used by businesses to plan their return to work for staff.

Points to ponder

Emergency management systems

In the New Zealand Civil Defence system, 'declarations' play a significant part when an emergency occurs. Emergencies can be 'declared' at local government, Commissioner and Director level. Whether a particular event is declared or not has many ramifications for funding, control etc., and it is important to note that the Auckland power crisis was not 'declared' at any level. In other words, in the context of their traditional emergency management, it was not considered an emergency.

The 'declaration or not' question was one of those addressed by the Ministerial review, with the conclusion that

'In view of the requirements of the Civil Defence Act, the decision not to declare was the correct one.'

The conclusion was the only one that could be reached, *because of the Act*, but one must ask the question as to whether the New Zealand Civil Defence Act is properly structured to deal with this type of event? The review also identified as requiring improvement

'Response agencies' understanding of each others' roles and limitations in events requiring a multi-agency response, but not warranting a declaration of emergency, and a mechanism by which leadership is established and promulgated in such cases;"

Not that New Zealand is isolated in having an emergency management system that may not address properly lifelines events. How many of us have? We (emergency managers) are continually faced with the dilemma of 'when is an emergency an emergency?' As we follow the risk management path we continually debate 'how far do we go?' when discussing threats to the community. If people are not dying or being injured and property not being destroyed or damaged; is it our business? I would suggest that the Auckland situation, and others like it, have confirmed that emergency managers can no longer confine themselves in a comfortable box. They can not isolate themselves from the event which has none of the normally associated emergency dramatics, but because of economic or sociological effects, is disastrous for the community or the nation.

In a similar vein it is too much to expect that every organisation and business has comprehensive continuity plans. However, some simple contingency planning can make a huge difference when the event occurs and can mean the difference of business continuing or not.

Lifelines planning

Many emergency management planners believe that inadequate attention and resources have been devoted to a study of the integrity of those lifelines on which the community is so dependent. The failure of one or more lifelines at any one time can be catastrophic to the community in terms of social, economic and personal hardship and loss. The Y2K issue creates another dimension to the possibility of lifelines failures.

New Zealand has been ahead of most in putting lifelines planning on the agenda. The lifelines studies on Wellington and Christchurch are documented proof of that. And yet, in Auckland, where stage one report of the Auckland Engineering Lifelines Project was printed in July 1997 there has been difficulty in completing the next phase because of lack of commitment by some of the participants. One of those? Mercury Energy!

Tasmania has shown, with their lifelines projects on Launceston, Hobart and the North West Region, that different techniques in a 'horses for courses' strategy, can produce a worthwhile result.

It is obvious that lifelines considerations have to be included in local government emergency management planning, and if the risk management path is followed, they will. What is not so obvious is the coordination required when significant urban areas transcend local government areas.

Special cases

What was obvious in the Auckland situation, and in other events where critical supplies have been lost, is the need to have decided *before the event* those installations, institutions etc. that will receive special treatment during a lifelines crisis. Not that it can be expected to precisely list building by building. However, if people are aware beforehand, and have been able to plan for such an event, the response is more effective and, importantly, the community aggravation is minimised.

Resource lists

Although resource lists are generally part of local emergency management plans, there needs to be a broader approach when considering lifelines aspects. A registry of building managers, for example, would not normally be one of the lists recorded, and yet will be invaluable in a lifelines crisis in urban areas.

In most cases, the lists in question need not be kept per se, but the plan should identify where they can be accessed. professional associations, trade groups, institutes etc. can be the source of essential information when a category of person is required.

Preparedness and continuity planning

Organisations, public and private, need to carry out some preparedness activities with lifelines losses in mind. With electricity supply, for example, it is not practical to expect all agencies to have emergency generators for all facilities, but it could be expected that at the least they have:

- worked out what of their equipment, systems etc. are essential for business to continue
- calculated the load of those essential items
- had facilities pre-wired to plug in a suitable generator.

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Gareth Davis has been with the Victorian State Emergency Service since 1974 and has extensive experience in the operational and planning sides of emergency management. He has a particular interest in 'lifelines'.