



Australian Government

Australian Communications Authority

# Telstra's handling of calls to 000 on the morning of 3 December 2003

**February 2004**

## **Final Report**

Investigation into the delays experienced by callers to the national 000 emergency call service in the early morning of 3 December 2003 as a result of severe storms in Melbourne.

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## **I. Introduction**

This report is the result of the ACA's further investigation of certain outstanding issues relating to the operation of the 000 emergency call service on the morning of 3 December 2003 and supplements the ACA's preliminary report on *Telstra's handling of calls to 000 on the morning of 3 December 2003*.

On the 9 December 2003, the Minister for Communications, Information Technology and the Arts (the Minister) requested the ACA to investigate and report on delays experienced by 000 callers on 3 December 2003 during the time of a severe rain storm in Melbourne. A copy of the letter from the Minister is at Attachment C.

The Melbourne storm generated an extraordinary volume of calls to 000, which grew at a very rapid rate, and which led to delays in calls being answered by Emergency Communications Victoria (ECV) and also by Telstra. In its preliminary report the ACA reported that 5,827 calls were made to 000 between midnight and 3:00am on 3 December 2003. A subsequent revision of the call data for that night led Telstra to adjust its original assessment, to include data which was not previously available. The final records indicate that 6,381 calls were made nationally to 000 between midnight and 3:00am on 3 December. This is more than three times the expected number of calls for that time of day.

Telstra also reports that those 6,381 calls were made from a total of 3,549 distinct services – confirming ACA supposition in the preliminary report that a large number of callers to 000 that night made multiple calls, as a result of the delays in answering. On average, each caller made 1.8 calls to 000.

The ACA provided its preliminary report to the Minister on the 19 December 2003 with ten recommendations designed to improve the operation of the emergency call service during times of extraordinary call volumes. Due to time constraints, the ACA was unable to fully investigate three issues arising from the morning of 3 December 2003, viz:

- reports that some calls to 000 'rang out' before being answered;
- a discrepancy between the number of calls to 000 that a family recall making, and the number of calls recorded with Telstra's network traffic records; and
- the national failure of the X25 data link used by Telstra to provide emergency service organisations (ESOs) with information about 000 callers.

In investigating and reporting on these outstanding issues, the ACA has:

- obtained and analysed further network traffic data and other additional information from Telstra relating to the telephone services of particular end-users and the handling of emergency call traffic more broadly;
- met again with representatives of Telstra and representatives of ECV;
- convened a special meeting of the ACA's Emergency Services Advisory Committee (ESAC) to discuss and progress the recommendations of the preliminary report; and
- provided a draft copy of this report to Telstra and ECV for their comment, and considered the comments received.

This report contains the results of the ACA's investigation of these three outstanding issues and provides an update on the consideration and implementation of the recommendations of the preliminary report.

This report concludes the ACA's formal investigation into the events of 3 December 2003.

The ACA will continue to work with Telstra and the various ESOs of the states and territories to implement the recommendations of the ACA's preliminary report. The ACA will work to facilitate other improvements to the end-to-end emergency call process to ensure that all end-users are able to access assistance in life-threatening or time critical emergencies.

## 2. Executive Summary

### Progress on recommendations of the preliminary report

The ACA, in consultation with its ESAC, has considered and progressed all the recommendations of the preliminary report.

Recommendation	Progress
1 Notification procedures for changes in operational capability	Interim system implemented; more comprehensive system under consideration.
2 Sharing of severe weather warnings	Incorporated into recommendation 1.
3 Recorded voice announcement (RVA) for SES callers	Regulatory amendment in progress. To be completed in March.
4 National approach for calls to SES	Ongoing support and encouragement for adoption nationally.
5 Introductory announcement in place of ring tone	Implemented for one month trial, beginning 24/2/04.
6 Public education	ESAC working group to be established to develop consistent messages. ACA print campaign under development.
7 Automatic activation of RVA during delays	Implemented (12/12/03).
8 Pre-scripted RVA	Under detailed consideration by ESAC working group.
9 Continued investigation	Completed.
10 Alternate call-handling arrangements	Various initiatives have been identified for further consideration, as discussed in section 3.

### Reports of calls ‘ringing out’

In its investigation for the preliminary report, the ACA noted that some of those callers who were interviewed indicated that they had thought that their calls to 000 on the morning of 3 December 2003 had ‘rung out’. Some of these callers reported that the ring tone<sup>1</sup> changed while they were waiting to be answered, while others reported that the ring tone changed to a sound like an engaged signal.

<sup>1</sup> The tone that a caller hears when she or he is attempting a call to another service.

The ACA has investigated these reports extensively in order to determine whether any calls to 000 rang out and whether any change in ring tone could occur. However the ACA has not found any evidence to support these reports. The reports are discussed in section 4.

### **Discrepancies in the number of calls recalled and recorded**

The ACA's investigation of the 000 calls for a medical emergency in Conder, ACT, highlighted a marked discrepancy between the statements of the family involved and the Telstra call records.

Despite an extensive investigation into possible causes for this discrepancy, the ACA has not been able to determine a reason for these discrepancies. These matters are discussed in section 5.

### **Fault in the X25 data link between Telstra and ESOs**

The ACA's preliminary report also noted that a technical fault occurred in the X25 data link between Telstra and ECV on 3 December, which prevented the delivery of calling line identification (CLI) and other caller data to other ESOs. The nature of the fault, which appears to have been beyond Telstra's immediate control, has been identified as an exhaustion of Telstra system resources when the data channels used to transfer information failed to release correctly.

The root cause of this fault has not yet been established, but procedures have been implemented to prevent a recurrence of the exhaustion of system resources until a more comprehensive solution can be identified. This issue is discussed in section 6.

### **3. Implementation of the recommendations of the preliminary report**

The ACA has implemented or progressed all ten recommendations of its preliminary report. The status of each recommendation is discussed below. All recommendations were considered in detail at a special meeting of the ACA's ESAC on 13 February 2004<sup>2</sup>. The membership of the ESAC is listed at Attachment B.

#### **Recommendation 1. Notification procedures**

Mutual notification procedures should be adopted between ESOs and the emergency call persons—Telstra and Australian Communication Exchange (ACE)—to provide sufficient advance notification prior to undertaking any activity (such as software upgrades or planned system outages) that have the potential to affect or alter the normal handling of emergency calls.

The investigation for the preliminary report indicated that Telstra was unaware that a software upgrade was being undertaken by ECV on the morning of 3 December 2003. The provision of advance notification to the emergency call persons (ECP) prior to such activities was not a standard procedure. The ACA considers that notification should be made a standard operating procedure in order to ensure that the ECPs are aware of any issues with the potential to affect normal call-taking arrangements.

The ACA wrote to all ESOs on 15 January 2004 to provide a copy of the preliminary report and request that prior notification be given to both emergency call persons prior to an ESO undertaking any activity that has the potential to affect or alter the normal handling of emergency calls. ESAC members fully supported the recommendation and undertook to provide advice to the emergency call persons in such circumstances.

Telstra has existing standing procedures in place to notify affected ESOs of any of its planned system or software upgrades. Although according to Telstra these procedures have operated effectively to date, the ACA will consider whether it is necessary to amend the *Telecommunications (Emergency Call Service) Determination 2002* (the Determination) to place a specific notification obligation on the emergency call persons.

The need for, and practicability of, a more sophisticated notification and information retention system for the ESO community will be given further consideration by the ESAC in April 2004.

#### **Recommendation 2. Sharing of severe weather warnings**

The benefits of introducing a system for sharing of weather information between ESOs and the emergency call persons (Telstra and ACE) should be examined in consultation with the ACA's ESAC, with a view to having a coordinated approach to expanding call-handling capacity between ESOs and the emergency call persons for predicted adverse weather conditions assessed as reaching threshold risk levels.

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<sup>2</sup> Members of the Victorian State Emergency Service (VSES) representing the Australian Council of State Emergency Services (ACSES) as well as representatives of ECV also participated in discussions as a number of issues were directly relevant to their respective organisations.

The need for the emergency call persons to be advised of severe weather warnings was raised in the preliminary report following the severe storms in Melbourne, and was considered by the ESAC. The receipt of weather information was not considered by ESAC to be necessary or useful to the operations of the emergency call persons, as the weather conditions experienced by the various states and territories does not alter the way in which the emergency call persons respond to emergency calls. Further, Telstra's staffing of its call centres is designed to accommodate unexpected increases in call volumes.

Most ESOs (and SES) already receive severe weather warnings from the Bureau of Meteorology. In line with the notification arrangements established under recommendation one, ESAC recommended that where an ESO receives a weather warning and consequently expects a substantial increase in call volumes, the ESO should notify the emergency call persons.

The ACA will seek the cooperation of all ESOs through the National Emergency Communications Working Group (NECWG) to improve the sharing of relevant information between ESOs and the emergency call persons.

### **Recommendation 3. An RVA for SES callers**

The *Telecommunications (Emergency Call Service) Determination 2002* should be amended to enable the emergency call person to connect callers seeking a State Emergency Service to an RVA that advises how callers can contact the SES in their particular state or territory.

This recommendation arose because Telstra reported that a large number of callers to 000 on 3 December 2003 were seeking assistance from the SES. This is a common occurrence in widespread emergencies, and means that call-taking resources are diverted from life-threatening or time critical calls.

The ACA has prepared a draft amendment to the Determination to enable the emergency call persons to connect to an RVA any caller to 000 that requires an SES. The proposed amendment provides for those callers from a state or territory that has adopted a single state-wide contact number for SES to be connected to a state-specific RVA advising the caller of the correct number to dial. However, if the caller is from a state or territory that does not have a single state-wide contact number for SES, the RVA will advise the caller to contact directory assistance to obtain the correct number for their area.

The ACA considers that this approach complements the efforts of the Australian Council of State Emergency Services (ACSES) and others to adopt a nationally consistent contact number for SES. It will also provide an additional incentive to the various SES to adopt a single state-wide contact number—if not a national number—to ensure that those callers that wish to contact the local SES can do so with relative ease.

The ACA initiated consultation on the proposed amendment with ESOs and the SES of each state and territory in January 2004. The proposed amendment is supported by ESAC and by the four SES that have responded to the ACA's request for comment (viz New South Wales, South Australia, Victoria and Tasmania).

#### **Recommendation 4. Adoption of a national approach for calls to the SES**

Consideration should be given by the ACA, Telstra and relevant state authorities to the development of a nationally consistent approach for contact with the respective SES, to raise public awareness about how and when to contact an SES for assistance in situations which are neither life-threatening nor time critical.

As outlined above, the preliminary investigation highlighted the problems caused by people calling 000 in an effort to contact an SES.

The emergency call service exists to enable the community to contact an ESO when urgent assistance is required in a life-threatening or time critical situation. Although the SES in some states play a role in assisting ESOs in potentially life-threatening situations (eg. rescues), the SES is generally not the lead agency responsible for responding to emergencies in the same way as the police, fire or ambulance services.

The ACA believes that it would be inappropriate and impracticable to make the SES contactable through 000 at least until the SES of every state and territory is:

- recognised within its respective state or territory as an agency responsible for responding to life-threatening or time critical emergencies; and
- appropriately resourced and funded to handle emergency calls 24 hours a day at a state (as opposed to local) level.

Although arrangements relating to the SES are not within the ACA's regulatory jurisdiction, the ACA believes that the adoption of a single nationally-consistent contact number for the various SES is a sensible strategy to ensure the community can contact the SES with relative ease. Further, the ACA believes that the adoption of a single number is a necessary precondition before any further consideration can be given to making the SES contactable through 000.

A well publicised and appropriately resourced national contact number for SES would ensure that all communities could contact the SES when required and avoid unnecessary strain being placed on the 000 emergency call service during times of storms and flooding. The ACA considers that given the importance of this strategy and the state-based issues involved in progressing it nationally, it may be appropriate for the issue to be progressed through an appropriate inter-governmental forum.

#### **Recommendation 5. An introductory RVA message to reassure 000 callers**

To avoid callers assuming they have dialled a wrong number when there is a delay in answering a call to 000, the ACA's ESAC should consider the benefits of providing a brief introductory RVA message for 000 calls as they enter the call queue, to advise callers that they have reached and been connected to the 000 emergency call service.

The interviews conducted with several people who attempted to call 000 on the morning of 3 December 2003 indicated that callers were confused when calls were not immediately answered, and questioned whether they had dialled the correct number. This led to some callers hanging up and redialling, thus placing themselves at the end of the 000 call queue.

ESAC considered the value and implementation of an introductory message and agreed to a one month trial which commenced on Tuesday 24 February 2004. A decision on whether to continue the initiative will be made at the ESAC meeting in April 2004.

The RVA message states ‘You have dialled emergency triple zero. Your call is being connected.’ and is four seconds in duration. Callers to 000 will hear the message once instead of the ring tone which is normally heard, ensuring that genuine emergency calls will not be unduly delayed.

In addition to confirming to callers that they have reached the emergency call service, this initiative is also likely to help reduce the number of non-genuine calls needing to be answered by Telstra call-takers by providing an early indication to those people who may have inadvertently dialled 000.<sup>3</sup>

#### **Recommendation 6. Public education**

Building on current 000 education initiatives, consideration should be given to introducing enhanced 000 education programs at both state and federal levels to educate the public about appropriate usage of the 000 service generally and in extreme emergency situations, particularly the need to maintain an existing call rather than hang up and make a new call.

The high number of 000 callers on 3 December who redialled and placed themselves at the end of the queue indicated that greater public awareness was required of the operation of the emergency call service.

The ACA is currently finalising a print advertising campaign aimed at reminding the community about the appropriate use of the 000 emergency call service and the importance of staying on the line when trying to contact an ESO.

The ACA has also written to all ESOs encouraging them to consider their own public education campaigns and strategies in light of this recommendation and the behaviour of callers on 3 December 2003.

An ESAC working group is being convened to help ensure that all stakeholders provide the public with consistent information and messages about the 000 emergency call service.

#### **Recommendation 7. Automatic activation of RVA when delays occur**

An RVA that advises 000 callers when delays are occurring as a result of high call volumes, and instructs callers to hold on the line (i.e. not to hang up), should be automatically activated by Telstra if a call is unable to be answered within 30 seconds.

The frequency with which the RVA is activated will be monitored by the ACA as part of its existing monitoring of Telstra’s performance as the emergency call person, with a view to determining the success of this initiative and the optimal call duration for activating the RVA.

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<sup>3</sup> In 2002–03, 702,540 (or 6.2 per cent) of the 11.3 million calls to 000 were abandoned by the caller prior to being answered by Telstra call-takers. Another 2,194,683 (or 19.37 per cent) were abandoned by the caller after being answered by Telstra call-takers.

The ACA interviewed a number of people who attempted to call 000 on 3 December 2003. Many of these people hung up and redialled when their calls were not immediately answered, most stated that they would have been more likely to stay on the line had they known whether or not their calls were being processed and would be attended to.

An RVA was activated on 3 December 2003, but due to the manual implementation process required at that time, it was not active until 2:50am – after the peak call volumes and wait times had passed.

As noted in the preliminary report, this recommendation was implemented on 12 December 2003 as a precaution against similar delays that may have arisen from additional forecast storms and the imminent fire season.

The ACA, through ESAC, will continue to monitor the effectiveness of this initiative and the frequency with which it is activated.

#### **Recommendation 8. Pre-recorded or pre-scripted RVA messages**

An assessment should be made of the potential benefits of developing pre-recorded or pre-scripted RVAs that can be tailored for specific crisis events, for rapid activation or utilisation when such events occur, in order to advise callers of appropriate non-emergency numbers to call as appropriate for the particular event. The purpose of such RVAs would be to assist in removing non-emergency calls from the 000 call queue.

In the early morning of 3 December 2003, many calls were made to 000 for incidents in Victoria which were not life-threatening or time critical. Many callers would have been better advised to contact the SES, rather than 000.

Potential scenarios, including widespread emergency situations that could benefit from the pre-recording or pre-scripting of RVA messages have been identified to help remove non-emergency call traffic from the 000 call queues. An ESAC working group is being convened to discuss the implementation of this recommendation in greater detail with the wider ESO community.

#### **Recommendation 9. Continued investigation**

The ACA's ESAC should examine any procedural or systemic issues which may have contributed to the delays in the handling of emergency calls on 3 December 2003, with a view to identifying any improvements which could be made to the end-to-end 000 emergency call process, with a particular focus on minimising the impact of localised events on the handling of emergency calls from other states and territories.

The ESAC has considered in detail the circumstances which lead to the call delays on 3 December 2003 and the findings and recommendations of the ACA's preliminary report. No additional areas have been identified as requiring further review or attention (other than those discussed below under recommendation 10).

### **Recommendation 10. Alternate call-handling arrangements**

In consultation with the ACA and its ESAC, Telstra should review its current policy in regard to the appropriate circumstances for activating alternate call-handling arrangements to enable calls from states or territories that are not affected by a specific emergency event to proceed rapidly to the respective ESOs in the unaffected states or territories, while not significantly degrading the efficiency of call-handling in the affected state or territory.

Among other things, this review should address the following matters:

- ensuring appropriate redundancy and disaster management arrangements are in place in the event of the failure of one or both Telstra 000 call centres (which may require re-direction of calls to a nominated ESO, such as the Police in each state or territory);
- whether state-based call-handling should only be initiated when a specified level of call-takers are available; and
- other threshold measures that may need to apply before a state-based queue is activated, such as the number of calls that have received the standard RVA (refer recommendation 7) over a pre-defined period.

It is proposed this procedure, once developed, should be reviewed by the ACA, in consultation with its ESAC on a regular basis or after it is used in any major emergency event.

Much of the media attention on the events of 3 December 2003 focussed on the effect the storm in Melbourne had on the answering times of Canberra calls. This recommendation sought to review certain existing procedures in an effort to better ensure calls to 000 nationally are not unduly affected by a significant emergency specific to one state or territory.

Telstra's existing network redundancy and call overflow contingency arrangements currently provide for 000 calls to automatically divert to the police answering point in the state of call origin if both Telstra answering points should ever become unable to receive calls. However, the ESAC did not consider the use of similar arrangements to be appropriate for times of extraordinary call volumes, extended call answering delays, or where the at least one Telstra answering point remains capable of answering calls.

The ESAC also considered the use of state-based call queues by the emergency call person. The use of state-based call queues enables Telstra to dedicate certain call-takers to calls originating from a specific state or territory. This enables Telstra to limit the pool of operators answering calls from a state or territory affected by a significant emergency, allowing other operators to remain free to deal with calls from the rest of the country.

This functionality already exists in the Telstra systems, and has been used in the past during periods of longer term localised emergencies, such as the Canberra bushfires, floods in Sydney, and the more recent Brisbane floods. It was not applied on 3 December 2003 as the activation of an RVA advising callers of the delays usually decreases call volumes to manageable levels. Further, the call volumes arising from short duration emergencies such as storms can normally be more efficiently handled using all available call-taking rather than just a limited pool.

The ACA's ESAC did not support the use of state-based call queues as a standard or immediate response to widespread emergencies or extraordinary high call volumes because of efficiency concerns. However, it did recognise that Telstra should retain and utilise the capability to institute state-based call queues where it considers it appropriate and necessary to maintain effective overall call taking arrangements.

In an effort to safeguard against the national emergency call taking arrangements being affected by emergencies limited to particular states or territories, Telstra has identified a number of initiatives for further consideration by ESAC. These include:

- examination of the potential for Telstra to transfer calls to ESOs by transferring calls to the requested ESO's automatic call distributor (ACD) where it will be queued for an answer by the next available ESO call-taker, avoiding the need for Telstra call-takers to remain physically on the line with caller until connection;
- review of the current standard practice of Telstra call-takers remaining on the line to wait for an ESO call-taker answer a call when the caller has hung up, including consideration of the technical capacity of ESOs to receive CLI and other data without interaction with a Telstra call-taker; and
- consideration of service level agreements between the emergency call persons and ESOs.

These initiatives are subject to ongoing consideration by the ESAC.

## 4. Reports of ‘ring out’ and changes in ring tone

As noted in the preliminary report, two of the six Gilmore residents that attempted calls to 000 to report a house fire around 2:00am on 3 December 2003 reported that they had hung up and redialled because they believed that their calls had ‘rang out’ after the ring tone reportedly changed. In Conder, ACT, a family reported that two of its calls to 000 rang out around 2:20am.

The ACA has investigated these reports and the potential circumstances in which a 000 call could ever ring out or be perceived to have rung out due to a change in ring tone. Among other things, this has involved the analysis of the network traffic records for the relevant callers. Network traffic records are produced automatically by the exchange for each call attempt made by a caller except where a caller dials a number that the network does not recognise (eg. 008). The network traffic records are used to produce the billing records for customer accounts. They contain such information as the calling party’s number; the called party’s number; time of answer by the called party; duration of the call; and the reason the call was ‘cleared down’<sup>4</sup>.

The first Gilmore caller reported making two calls to 000, the first of which “rang till it cut off”, at which point the caller reported hearing a tone “like an engaged signal: beep, beep, beep”. The caller reported that the first call lasted about a minute and that the second call was shorter than the first and had normal ring tone until the caller hung-up.

The ACA’s analysis of Telstra’s network traffic records relating to this caller’s telephone service show that two calls to 000 originated from that service between 1:30 and 2:30am on 3 December 2003. This is shown in Table 1.

**Table 1: Calls made by Gilmore caller 1**

Time <sup>5</sup>	Number dialled	Duration of call <sup>6</sup>	Outcome
02:04:34	000	2.4 seconds	Terminated by caller
02:04:52	000	68 seconds	Terminated by caller
02:07:47	Local fire station	20 seconds	Terminated by caller

There is a clear inconsistency between the caller’s recollection of the duration of their first call to 000, and the duration of the call as recorded in Telstra network traffic records. The Telstra network traffic records, which include the reason for the call’s termination, does not match the caller’s recollection that the ring tone changed from a ring tone to an engaged signal after about one minute as the network traffic data shows the duration of the first call was only 2.4 seconds.

The second Gilmore caller reported making three calls to 000, all of which reportedly “rang out”. The caller advised that, while waiting for the calls to be answered, the ring tone changed from a normal ring tone to a ‘quieter or duller’ tone which was very faint

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<sup>4</sup> For example, the calling or called party hanging up, called party busy, congestion, or time supervision expiration.

<sup>5</sup> Time refers to either the time that the answer signal was received from the 000 call centre (for 000 calls) or the time the answer signal was received on a chargeable call (for other calls).

<sup>6</sup> Duration of call, measured from time of answer signal to termination of call.

compared to normal ring tone. The caller believed that the perceived change in ring tone indicated that the call had rung out, leading the caller to hang up and redial 000. The caller advised that each call lasted about three minutes.

The Telstra network traffic data, shown in Table 2, shows that four calls were made from the caller’s telephone service between 1:30 and 2:30am on 3 December 2003.

Table 2: Calls made by Gilmore caller 2

Time	Number dialled	Duration of call	Outcome
a) 01:59:43	000	17 seconds	Terminated by caller
b) 02:00:09	000	80 seconds	Terminated by caller
c) 02:01:39	000	56 seconds	Terminated by caller
d) 02:03:00	[Neighbour]	23 seconds	Terminated by caller

As with the first Gilmore caller, the network traffic records show an inconsistency between the caller’s recollection and the network traffic records. In particular, all calls were considerably shorter than the three minutes per call reported by the caller. Further, in the interview with ACA representatives, the caller believed that the call to the neighbour (ie. call (d)) was made between calls (b) and (c).

The Conder callers reported making between five and six calls to 000, two of which ‘dropped out,’ with the ring tone changing to an engaged tone “beep, beep, beep” after about 90 seconds. The family felt certain about the 90 seconds because the phone being used to make the calls had an in-built timer.

The Telstra network traffic data shows a total of only two calls being made from the family’s telephone service between 2:00 and 2:45am on 3 December 2003.

Table 3: Calls made by Conder family

Time	Number dialled	Duration of call	Outcome
02:19:52	000	52 seconds	Terminated by caller
02:20:50	000	226 seconds	Connected to ESO

The Telstra data does not support the report of ring tone changing to an engaged signal after about 90 seconds. The Telstra traffic data shows only two calls being made, with the first call lasting for 52 seconds rather than the 90 seconds that the caller remembered. (The discrepancy in the number of calls is discussed in section 5). While the advice that the two calls “dropped out” after about 90 seconds would, *prima facie*, seem to suggest that the 90 second time supervision (explained below) was not cancelled, there is no evidence to support this in the Telstra network traffic records.

In addition to analysis of Telstra’s network traffic data and call records, the ACA has also investigated the potential circumstances that could cause changes to occur in ring tone, calls to 000 to ring out, or calls to 000 to be perceived to have rung out.

To ensure a high quality and reliable emergency call services, calls to 000 are treated differently to non-emergency call traffic. All calls receive ring tone generated by the originating exchange and are subject to a 90 second time supervision which causes calls to time out if the call is not answered within 90 seconds.

This 90 second time supervision is immediately cancelled for calls to 000 once the call reaches one of the four terminating exchanges that are dedicated to the handling of emergency call traffic. This typically occurs within a few seconds of the caller dialling 000.

For calls to 000, the terminating exchange sends an answer signal to the originating exchange that cancels the time supervision. Once the time supervision is cancelled, the originating exchange ceases to provide the caller with ring tone. From this point the terminating exchange is responsible for providing the caller with ring tone until the call is answered by a Telstra call-taker.

These arrangements are designed to ensure that calls to 000 do not time out and extends the time that a call to 000 can potentially wait to be answered from 90 seconds to more than 30 minutes<sup>7</sup>.

Although it may be possible for the change in the provision of ring tone (from the originating exchange to the terminating exchange) to be perceptible to an attentive caller, as this change-over occurs within the initial seconds of a call to 000, it is unlikely that this would have been the change in ring tone that callers reported that they heard on 3 December 2003.

If a wrong number was dialled instead of 000, that call would be subject to the normal time supervision limitation and would 'ring out' if unanswered after 90 seconds. While this would have explained the reports of calls 'ringing out' on 3 December 2003, the Telstra network traffic records in Tables 1, 2 and 3, show that no wrong numbers were dialled by these callers.

Despite the extraordinary volume of calls to 000 on 3 December 2003, the volume was not great enough to overload the terminating exchange, to cause a failure in the cancellation of the 90 second time supervision or to create any change to the consistency of the ring tone. Telstra noted that the 000 call traffic load levels on the night of 2/3 December 2003 were modest compared to the 000 call traffic loads associated with the recent Canberra bushfires and severe Sydney hailstorms. Telstra advised that there were no complaints about ring tone performance or instances of calls "dropping out" or "ringing out" during those severe events.

During the peak of call activity on 3 December 2003, there were 1,472 calls to 000 over the course of half an hour. The emergency call service is dimensioned to accommodate up to 1,240 calls to be made to 000 *simultaneously*. Such dimensioning makes it extremely unlikely that a call to 000 would ever receive an engaged signal unless there was a network fault causing the signal.

The potential for a network fault to have caused the reported changes in ring tone has also been examined. Both Telstra and the vendor of the special emergency call exchanges have confirmed that there are no known fault conditions or circumstances that might have led to the changes in ring tone that the callers reported that they heard on the 3 December 2003.

The ACA has not found any evidence to support the reports made by callers on 3 December 2003 that the ring tone changed significantly or that calls to 000 'rang out'.

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<sup>7</sup> If a call had been waiting for more than 30 minutes, it would be automatically rerouted to the alternate 000 call centre to circumvent any node-dependent queue congestion.

The ACA notes that the Telstra network is designed to safeguard against such occurrences.

The ACA does not propose to investigate these events any further, but will monitor future events related to the 000 service to examine whether there are any reports of a similar nature. Should there be a recurrence of these reports, the ACA will, as appropriate, investigate the reports at that time.

## **5. Discrepancies in the number of calls recalled and recorded**

As reported in the preliminary report, a family in Conder, ACT reported making between five and six calls to 000 around 2:20am on 3 December 2003 in an effort to request an ambulance. One call was answered and successfully connected to the ACT Ambulance Service.

When interviewed by ACA representatives, the mother recalled making two or three calls to 000 which she terminated when they were not answered after 'many rings'. The father recalled making three calls, two of which 'dropped out' and the third of which was answered in 'about 10 seconds'. The reported drop outs are discussed in section 4.

As shown in Table 3 on page 14, the network traffic data provided by Telstra shows a total of two calls, both to 000, made from the family's telephone service between 2:00 and 2:45am. The first call, at 2:19am, lasted 52 seconds before being terminated by the caller. The second call, at 2:20am, was answered by Telstra after a wait of 1 minute and 12 seconds, and successfully connected to the ACT Ambulance Service.<sup>8</sup>

The ACA has investigated the discrepancies between the callers' recollections and the Telstra network traffic data but is unable to reconcile these discrepancies.

The telephone used by the family to make the calls was a cordless phone that carried the A-tick. This tick *prima facie* indicates that this model complies with relevant ACA technical standards, and should function correctly with the telephone network, including accessing the 000 service.

While it is very unlikely that the phone itself was the cause of the discrepancies, particularly as the callers heard ring tone, the possibility cannot be completely ruled out. For example, low batteries in cordless handsets can cause problems communicating with the base unit, leading to calls failing or misdials. However, evidence from the callers suggests the handset was in good working order and no other problems associated with handset performance were apparent.

The Telstra network records, shown in Table 3, indicate that there were no calls to any other numbers besides two calls to 000. However it is worth noting that network traffic records are not produced where a caller inadvertently dials # or \* when dialling 000 (eg. #00, 0#0, or, 00\*). Nor are records produced for other misdialled numbers which the network does not recognise (eg. 008).

Such misdials on most exchanges are recognised as invalid numbers and the call is connected to an RVA: "Your call did not go through. Please try again." This message is generally played twice and then followed by congestion tone ie. beep, beep, beep. However, some older exchanges, including some System 12 exchanges, do not provide the RVA and instead simply provide the congestion tone.

The ACA notes that on a telephone keypad the \* key is on the left side of the 0 key and the # key on the right side of the 0 key. It is thus not inconceivable that a caller misdialled 000 by inadvertently pressing the \* or the # key and received congestion

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<sup>8</sup> Total call duration, including the time spent talking with the ACT Ambulance Service, was 226 seconds (3 minutes, 46 seconds).

tone. The exchange would not have a traffic record for this misdialled call case. However given that the caller stated that the ring tone changed only after 90 seconds, this would not seem to be the cause of the discrepancies.

The ACA also examined whether a member of the family could have attempted to dial 000 before clearing an existing call (ie. while still connected to the 000 call queue). However, the time and duration of the calls recorded in the network traffic records do not seem to support such a theory.

Ultimately, the ACA's investigation has not found any evidence to substantiate that more than two calls were made to 000 from the telephone service in question between 2:00 and 2:45am on 3 December 2003. No technical or physical causes for the discrepancy have been identified.

## **6. Provision of caller information to ESOs**

Telstra is obliged under section 34 of the Determination to provide to ESOs information about the location of the caller, the customer of the service being used to make the call and the service CLI, in conjunction with any transferred emergency call. Telstra delivers this information to ESOs using an X25 data link.

This system provides ESOs with a number to call if the 000 caller is disconnected for some reason, and a physical location to which an emergency response may be sent. Although ESOs always attempt verify these details manually with callers, it is a very useful safeguard to have the information available in case a caller becomes unable to communicate.

While ECV performed its software upgrade on the night of 2/3 December 2003, a problem occurred with the X25 data link between Telstra and ECV. Due to a fault condition the data channels used to transfer information failed to release correctly, eventually causing an exhaustion of system resources within the Telstra 000 X25 node. This affected the delivery of CLI and other information to all ESOs in all states and territories but did not further delay the answering or transfer of calls by Telstra or the responses of any ESOs.

At the time that the preliminary report was prepared the circumstances of this fault were still being investigated by Telstra and ECV. It is now understood that CLI data associated with calls transferred to ECV initially experienced rejection by ECV systems at 11:39pm on 2 December 2003, when ECV took the X25 data link off-line during its planned software upgrade.

Data is transferred to ESOs via virtual connections (X25 logical channels), which are established using standard protocol sessions. These connections rely on temporary allocation of logical channels IDs. The rejection by ECV systems from 11:39pm had no material effect on the operation of Telstra's 000 service, as logical channels are terminated and returned to the resource pool upon receipt of three rejections.

Telstra claims that at 12:41am on 3 December, ECV systems resumed acceptance of CLI data from the Telstra 000 service, but did not issue 'channel release' signals acknowledging receipt of data in accordance with the standard X25 protocol procedure. According to Telstra, this meant that the ECV system held on to the allocated logical channels, but the Telstra 000 systems continued to transfer further CLI data, continually allocating additional logical channels to virtual connections until approximately 1:39am on 3 December when the Telstra 000 X25 node resources finally became exhausted.

ECV advised that it is not yet certain what caused the fault, but that its CLI interface was not re-started until 05:47am, four hours after Telstra had stopped sending CLI data.

The exhaustion of system resources meant that CLI and associated data for emergency calls could no longer be transferred to any ESO in Australia until 6:40am, when Telstra reset the X25 data link between Telstra and ESOs.

The ACA has consulted with all Australian ESOs, and has received no indication that the X25 data link failure adversely affected the operations of emergency call centres. All ESOs were required to rely on manual data collection from callers, which is gathered in almost all scenarios as a back-up to the electronic data.

ECV advised that on previous occasions, taking the X25 data link off-line and subsequently reactivating the data link had not caused any problems with the transfer of CLI data. Further, its software upgrade on 2/3 December 2003 did not involve any upgrade to the X25 data link. According to ECV, no changes were made to the X25 data link to fix the fault on 3 December 2003. ECV noted that the X25 data link interface was changed during October 2003 when a software upgrade provided a new format for Mobile Location Information (MoLI). At the time of preparation of this final report the root cause of the problem has still not been identified.

Telstra has suggested that it is possible that this problem could have been identified in advance by specific pre-launch software testing, however, given the root cause of the fault remains unknown, the ACA is not aware of any evidence which would support this claim. ECV have been unable to identify any fault within the ECV environment in isolation. Telstra and ECV are in the process of arranging for end to end testing to identify any points of failure or error.

As a short term measure Telstra has introduced manual checking of the 000 X25 nodes on a daily basis to assess memory usage, and if necessary resetting the logical channels should memory near exhaustion.

To prevent future occurrences of systems faults causing failure of the X25 data links between Telstra and other ESOs, Telstra continues to investigate technical options with relevant vendors. These options include an alarm which could be triggered when over 60 per cent of X25 logical channels are being utilised and a function which would automatically clear down a channel that is held for greater than a preset time period.

Telstra has also recommended the following:

- i. ESOs to provide Telstra with an early warning prior to any proposed technical work being undertaken that may affect the transfer of calls and/or CLI data between Telstra and ESO centres;
- ii. procedures to be developed to manage the process of taking systems off-line, or otherwise altering a system status that may impact on the transfer of calls and/or CLI data between Telstra and ESO centres;
- iii. development of formal protocols for agreement, for prior consultation and pre-launch end-to-end testing, in the case of system upgrades or configuration changes that may impact on the transfer of calls and/or CLI data between Telstra and ESO centres; and
- iv. development of real-time technical co-ordination and notification procedures to be followed in the event of any planned or unplanned events that may affect the transfer of calls and/or CLI data between Telstra and ESO centres.

The ACA has considered the Telstra recommendations and notes that Recommendation 1 of the preliminary report covers part (i) of the Telstra suggestions. With respect to the other Telstra recommendations, the ACA believes that these improvements are sensible and prudent, and the ACA will work with Telstra, ACE and the ESOs toward their implementation.

As the fault arising in the X25 data link between Telstra and ECV appears to have occurred as a result of circumstances beyond Telstra's immediate control, and given that Telstra is taking positive steps to safeguard against a recurrence of a similar failure, the

ACA does not propose to initiate any formal remedial action against Telstra for the X25 failure on 2/3 December 2003. However, the ACA will continue to monitor the development of procedures and protocols referenced in points (ii) to (iv) to ensure that efficiency in the delivery of caller information is maintained.

## **7. Conclusion**

The ACA, in consultation with its ESAC, has made significant progress in the implementation of the recommendations of the ACA's preliminary report. In particular, the automatic activation of an RVA if there are delays in answering calls, the improvement in the sharing of information between ESOs and the emergency call persons, and providing Telstra with the ability to connect SES calls to a special RVA has improved the ability of the emergency call service to operate during periods of extraordinary call activity.

The ACA has not found any evidence to substantiate the reports made by three Canberra callers that some of their calls to 000 on 3 December 2003 'rang out' before being answered. A satisfactory explanation for a discrepancy between the number of 000 calls that a Canberra family recall making, and the number of calls shown in the network traffic records, has also not been identified.

Overall, the ACA considers that the current emergency call service arrangements are functioning well. The implementation of the recommendations from the ACA's preliminary report has reduced the potential for localised events to similarly affect the national emergency call service. However, to ensure the emergency call service continues to meet the needs of the community, the ACA will continue to fulfil the responsibilities it shares with state and territory agencies through its ESAC and the NECWG, with the ongoing support of ESOs.

## **Attachment A: List of acronyms**

ACE	Australian Communication Exchange Ltd
ACA	Australian Communications Authority
ACD	automatic call distributor
ACSES	Australian Council of State Emergency Services
ACT	Australian Capital Territory
CLI	calling line identification
ECV	Emergency Communications Victoria
ESAC	(ACA's) Emergency Services Advisory Committee
MoLI	Mobile Location Information
NECWG	National Emergency Communications Working Group
RVA	recorded voice announcement
SES	State Emergency Service
VSES	Victorian State Emergency Service

## **Attachment B: Membership of ESAC**

- AAPT
- Australian Communications Authority
- Australian Communications Exchange
- Australian Telecommunications Users' Group
- Bureau of Emergency Services Telecommunications (Vic)
- Consumers Telecommunications Network
- Department of Communications, Information Technology and the Arts
- Emergency Management Australia
- NSW Fire Brigades
- NSW Police
- Optus
- Queensland Police
- South Australia Fire
- Telstra
- Victoria Police
- Vodafone
- Western Australia Ambulance

## Attachment C: Request from the Minister for investigation



MINISTER FOR COMMUNICATIONS  
INFORMATION TECHNOLOGY AND THE ARTS  
THE HON DARYL WILLIAMS AM QC MP

Dr Bob Horton  
Acting Chairman  
Australian Communications Authority  
15th Floor  
200 Queen Street  
MELBOURNE VIC 3000

- 9 DEC 2003

Dear Dr Horton

I am writing in relation to concerns expressed about the effectiveness of the operation of Telstra's 000 emergency call service on the evening of 2 December 2003 and into the following morning. As you will be aware there have been claims of significant delays, and even an inability of the public being able to access the 000 service during that period.

Accordingly, I am requesting that the Australian Communications Authority (ACA) undertake an investigation into the circumstances surrounding calls to the 000 emergency call service during that period and provide a report to me.

The report should identify whether the ACA has concerns about Telstra's compliance with its regulatory obligations under the Telecommunications (Emergency Call Service) Determination.

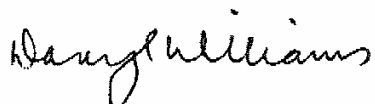
The report should also include an assessment of the adequacy of Telstra's handling of calls from the general public to its 000 emergency call service. The report should address claims of delays, and call ring-out, in relation to attempts to access 000 to report a house fire in the Canberra suburb of Gilmore in the early hours of 3 December 2003. I recognise that the emergency service organisations' call handling arrangements are the responsibility State and Territory Governments but would, nevertheless, welcome comment on whether these arrangements contributed to the delays experienced by people trying to ring the 000 service.

I would also welcome any recommendations that the ACA might wish to make into improving Telstra's 000 call service including the call handling procedures and the ability of the service to respond to extreme circumstances such as those experienced in Melbourne on the evening of 2 December 2003. Clearly the severe weather in Melbourne on 2 December was an extremely rare event, however I am concerned that one extreme weather event in one capital city appears to significantly disrupt the operation of the 000 service nationally.

Parliament House, Canberra ACT 2600 • Telephone (02) 6277 7480 • Fax (02) 6273 4154

I would appreciate receiving a preliminary report by 19 December 2003 and would expect that any reports would be made public. I realise that some of the issues raised in this letter may require more thorough investigation and that the ACA may not be able to report on them until early 2004. It would be useful to have an indication of possible timing of a final report when a preliminary report is provided.

Yours sincerely

A handwritten signature in cursive script that reads "Daryl Williams".

DARYL WILLIAMS