

Network Outage Report

Issue Date	30/7/01 UTC	Report No.	Issue 1
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Segment A Cable Break

Time of Outage	21:54UTC, Saturday 28 July 2001
Restoration Time	10:00-13:00UTC, Sunday 29 July 2001 for protected circuits
Outage duration	Between 12-15 hours for protected traffic. Unprotected traffic up to 20 hours
Outage Location	Cable break on Segment A, located 31.4884 kms from Alexandria Cable Station. This places the cable break approx. 19.61kms (10.59 nautical miles) off shore in about 140 meters of water depth.
Probable Cause	<p>The Harbour port of Sydney was closed due to gale force winds and un-navigable seas into the port. As a result, several large ships had to ride out the storm at anchor off Sydney. One of those ships (the Russian ship - Maksim Mikhaylov) was reported to be in close vicinity of the cable corridor. It later reported to the harbour authorities that it had paid out it's port anchor and was drifting. It appears that it may have dragged it's anchor over the Southern Cross cable as well as TASMAN 1 cable and broken these cables. TASMAN2 was also hit and has degraded but the cable did not break.</p> <p>Radar plots provided by the Sydney Harbour Port Authority place this ship directly over the cable at the time of the outage. Southern Cross are pursuing the matter through the appropriate channels.</p>
Traffic Impact	76 circuits were affected.
Traffic Restoration Action	All traffic has been restored via Segment E, F1, G1, G2 and H. Segment F1 was out of commission at the time of the Segment A outage due to pre-planned remedial re-laying activity. After the re-laying activities had been completed off Nedonna Beach and minimal re-commissioning tests were conducted to ensure continuity of this segment, Segment F1 was immediately brought back into service
Segment Repair Plan	The cable repair ship CS Pacific Guardian has been mobilised to repair Segment A. The Ship sailed from Auckland Monday

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	<p>morning 11:30 local time (23:30 UTC) after a pre-repair meeting was held on board. Southern Cross representatives will board the ship when the ship arrives at the repair area.</p> <p>It is estimated the repair ship will arrive in the repair area around Friday afternoon local time.</p> <p>It is anticipated that the cable repair will take 12 days from the start of the ship sailing from Auckland.</p>
Key Personnel Escalated	<p>The SCCL Crisis Management Team (CMT) was activated within hours and included Ernie Wan (CTO), Dean Veverka (Network Operations Director), Dave Hercus (Marine Manager), Brian Hart (Operations Manager), Struan Millward (Provisioning Manager), Ron Craig (Technical Manager), Richard Pfannenstiel (Project Manager), Ross Pfeffer (Asia Pacific Marketing Director), Mike Schwarz (SNOC Manager).</p>

Detailed Report (unfolding of events)

On Saturday 28 July 2001 (UTC) at 21:54 the SNOC Network Management System (NMS) experienced a major alarm storm indicating a major network problem. Several customers reported hits to their circuits at this time.

Initial fault indications pointed to a power failure at the Alexandria site. Investigation proved power was fine at Alexandria but that the Power Feed Equipment (PFE) for Segment A had tripped and a cable break was suspected.

OTDR readings confirm that there was a cable break on Segment A, at 31.48kms from the Alexandria cable station. This placed the cable break approx. 19.61kms (10.59 nautical miles) off shore in about 140 meters of water depth.

The Cable Ship Pacific Guardian was given early notice that we had a cable break on Segment A, and a ban on all activity in the Southern Cross Cable Network was put in place.

The seven North-South traffic rings affected were identified as:

AUUS01 – 8 circuits

AUUS02 – 3 circuits

AUUS03 – 15 circuits

AUUS04 – 14 circuits

AUUS05 – 4 circuits

AUUS14 – 8 circuits

OMNI01 – 22 circuits

An additional 2 un-protected circuits on a Australia-NZ ring lost service bringing the total affected circuits to 76.

Australia-New Zealand protected traffic was not down but had been automatically re-routed around the long protection path through Hawaii and Fiji.

NZ-USA traffic was not impacted (except for the outstanding loss of protection path due

to Segment F1 out of service).

Hawaii-USA(mainland) traffic was not affected (except for the outstanding loss of protection path due to Segment F1 out of service).

The major priorities identified by the CMT were

- 1 – Restoration of traffic as soon as possible
- 2 – Customer communication to keep customers advised of the situation
- 3 – Reduction of further damage to the Segment A cable.
- 4 – Mobilisation of the CS Pacific Guardian to repair Segment A.

Restoration of Traffic

Segment F1 which along with Segments G2 & G1, provides the normal backup route between Australia and the US, was not available (due to planned maintenance). The work on F1 was nearing completion however.

The initial attempt to restore Australia to the US service was therefore to route the traffic on Segments G2 and G1 to Oahu, then manually patch traffic onto Segment I between Oahu and Hawaii (Big Island) then onto Segment D to Morro Bay. This avoided the need to use the unavailable Segment F1.

While this work was being undertaken the re-commissioning work on F1 was accelerated.

The work on re-engineering Segment I was hampered by problems to the NMS. The visibility of the network by the NMS became very poor and the NMS was unable to issue commands to release the circuits to the newly engineered routes. As a work around the ADM aggregates were swapped so that no switching was required by the NMS.

Prior to completion of the Segment I restoration solution, Segment F1 became fit for traffic and it was decided to restore traffic via the normal F1 route. This would be less problematic than the Segment I solution and would make normalisation upon completion of the Segment A repair simpler.

As part of the planned work to segment F1, the Australia-US circuits had been forced onto Segments A, B, C and D, to ensure they did not try to switch to Segments G2, G1 and F1 during the F1 work. This meant the circuits had to be force released by the NMS. The problems with the NMS, which were caused by overloading with alarms, continued and the force release of circuits by the NMS proceeded slowly, one circuit at a time, then ceased altogether.

The NMS was restarted which took 35 minutes, and all protected circuits on the affected traffic rings were force released to their normal G2, G1 and F routing.

The un-protected circuits were manually re-configured onto G2, G1 and F, as they had previously been moved to the other side of the network during the planned work to segment F1.

Comment

Southern Cross, SNOG, Landing Party and ASN staff all worked extremely hard under a great deal of pressure to bring the traffic back as quickly as possible.

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At the time of the Segment A failure, Segment F1 off the Oregon coast was out of service due to planned maintenance. Southern Cross had no option but to perform this maintenance due to US permitting authorities requiring a slight variation in the path and burial of the cable. Southern Cross agreed, viewing this change as essential to the longer-term reliability of our cable network. Accordingly the requirement was scheduled for a period when climatic conditions in the Northern Hemisphere allowed for the shortest possible disruption to our protection. All customers were pre - advised that the network was to be placed into an unprotected state for a limited period.

The damage to Segment A occurred during a storm off the coast of Sydney, during which a ship is believed to have dragged its anchor across the short un-buriable section of Segment A. The ship's anchor is believed to have also damaged TASMAR and TASMAR 2 cable systems.

While we believe the combination of events that transpired was very unfortunate, Southern Cross acknowledges the 12-15 hour outage was too long, and we are very much focused on improving our planning and processes to ensure it never happens again.

Our SDH network had not been designed for dual failure scenarios. However, in the interim while we determine the most appropriate changes to our network design, we have put into place manual restoration plans to accommodate dual failure scenarios. These have been communicated to the SNOC and Landing Parties.

We are re-assessing our SDH design and propose to make more use of our Hawaiian interlink cable in design of the SDH rings to ensure near-automated protection is possible even during dual failure situations.

While the cable is under a hazardous condition with the Segment A repair work, we have suspended all maintenance and upgrade activity that could potentially disrupt service. We have also increased the frequency of cable patrols on both land and sea sections of the cable.

We apologise for the extended duration of the outage. We can assure you that Southern Cross is totally committed to providing the most reliable capacity connections possible. As mentioned above, we are currently reviewing, in considerable depth, the performance of all aspects of our network and are identifying procedural and equipment improvements that can be made. We will be sharing these with you more fully in the near future.