

FACT SHEET (May 2014)

Fire Incident at Bukit Panjang Exchange on 9 October 2013 (“Incident”)

1. A fire broke out at the Bukit Panjang exchange (the “Exchange”)¹, at around 1402hrs on 9 October 2013, at one of the four lead-in entry locations in the Exchange’s cable chamber. The fire damaged optical fibre cables and affected telecommunication services provided by multiple operators in the northern and western parts of Singapore, including fixed voice, broadband Internet access and mobile services. The service disruption also affected telecom and broadcast services to close to 270,000 subscribers², including residential users, some government agencies, businesses, financial institutions, and multi-application kiosks providing e-commerce and payment services. The affected services were fully restored on 17 October 2013 at 0220hrs.
2. IDA has found that Singapore Telecommunications Limited (“SingTel”), CityNet Infrastructure Management Pte Ltd (“CityNet”) and OpenNet Pte Ltd (“OpenNet”) had not fulfilled their respective obligations, such as to provide sufficiently resilient telecommunication systems and services, and to restore services to affected end users as quickly as possible when the service disruptions occurred.

Cause of the Incident

3. IDA has conducted its investigations and review of the resiliency of SingTel’s key fixed line infrastructure involved in the Incident³. IDA had formed a review panel, comprising relevant telecommunications network and fire experts, to assist in its investigations and review.
4. Based on IDA’s investigations, IDA has concluded that the service disruptions were due to a fire in the cable chamber of the Bukit Panjang Exchange, which was most likely caused by hot works carried out by SingTel on its cables on 9 October 2013. IDA noted that instead of using a SingTel-issued blowtorch, an unauthorised blowtorch was used to

¹ Bukit Panjang exchange, formerly owned by SingTel, is now owned and managed by CityNet. CityNet is a trustee-manager of the NetLink Trust, which owns the telecom exchanges, ducts and manholes used to support the Nationwide Broadband Network (“NBN”). SingTel owns 100% of the units in the NetLink Trust at present. Besides Bukit Panjang exchange, CityNet owns and manages six other telecom exchanges.

² The number of “subscribers” here refers to the absolute number of subscriptions across all service providers, e.g., a user could have signed on to both fixed voice and broadband Internet services. In this case, this counts as two subscriptions.

³ IDA has started a broader review of key fixed-line infrastructure of key telecom operators, to review the overall resiliency of telecom networks in Singapore.

heat and shrink a thermo fit to seal a cable duct. The flame of the unauthorised blowtorch was almost twice as hot as that of a SingTel-issued blowtorch.

5. In addition, IDA's investigations also revealed that SingTel did not ensure that the hot works safety procedures and protocols were adhered to by its workers, and there were also several shortcomings and/or failures on SingTel's part which contributed to the Incident, as summarised below:
 - a) Use of unauthorised blowtorch: SingTel did not comply with its own standard operating procedures ("SOPs"), which required all equipment used for hot works to be inspected before use.
 - b) Likely failure of SingTel worker to observe a full 30-minute fire watch: This was required under SingTel's and CityNet's SOPs.
 - c) The fire alarm had been deactivated prior to hot works in accordance with SingTel and CityNet's SOPs, as smoke from such works could trigger false alarms. However, there was no re-activation of the fire alarm when SingTel's worker left the Exchange's cable chamber unattended during his lunch, which was not in accordance with the SOPs.
 - d) Failure to ensure proper supervision of the hot works: Proper supervision plays a key role in ensuring safety before, during and after the hot works. However, there was no such supervision of the hot works by CityNet or SingTel on 9 October 2013.
 - e) IDA also found a piece of material in the vicinity of the fire (i.e., a small burnt piece of cardboard) which should not have been present, indicating that there could be other possible materials contributing to the fire.
6. IDA found that the fire, and consequently the service disruption, could have been prevented had SingTel enforced its SOPs and work safety practices.

Service Restoration

7. Service restoration work commenced around 1815hrs (after SCDF's site clearance) on 9 October 2013, via a two-pronged approach: (i) diverting of telecommunication traffic from affected cables to other spare cables at the Exchange that were not affected by the Incident; and (ii) repairing the damaged cables, where damaged sections of the fibre cables were cut away and rejoined (or spliced) strand-by-strand. SingTel completed the

restoration of its fibre cables on 11 October 2013 around 0715hrs, and full restoration of SingTel's fixed line services was achieved at 1500 hours on 14 October 2013 (i.e., after 120 hours and 58 minutes).

8. IDA also noted that SingTel had certain business continuity management ("BCM") policies and processes in place, and that SingTel had implemented these during the Incident. However, SingTel's BCM did not have specific contingency plans to address serious service outage situations of such a scale as the Bukit Panjang incident.

Network Resilience

9. In terms of SingTel's network resilience, IDA's observations are that while SingTel's overall network architecture design is found to be generally in line with international practice, there are still areas for improvement. In particular:
 - a) The use of flame and lead sealants in the cable chamber is an outdated and hazardous practice, and is not in line with industry best practices and standards. This view was also supported by SingTel's own consultant. SingTel had started the process of replacing the use of lead sealants with Multi Cable Transit system⁴ but progress has been slow⁵. If the use of lead sealants had been fully replaced, no hot works would have been required and the Incident would not have occurred.
 - b) Eight out of the 53 fibre cable rings connecting through the Exchange were temporarily routed using one single cable entry point, representing a single point of failure for that Exchange. While such temporary routing of fibre cable rings is sometimes unavoidable due to construction work, the original routings should be restored as soon as possible, e.g., when works are completed.
10. Additionally, IDA found that SingTel had wrongly assumed that fibre paths were diverse for certain enterprise customer services without fully testing them. This points to improvements required in SingTel's operational processes.
11. The above findings are also consistent with SingTel's own Board Committee of Inquiry ("BCOI") findings.

⁴ The Multi Cable Transit system is a cable sealing system that provides protection from fire, smoke, water and blast pressures at the point where cables enter an exchange through the cable chamber. The use of this system does not require hot works.

⁵ SingTel targets to replace these by July 2014.

Assessment

SingTel

12. IDA has found SingTel to be in breach of the Code of Practice for Telecommunication Service Resiliency 2008 (“Service Resiliency Code”). Under the Telecommunications Act (Cap. 323) (“TA”), IDA may impose a financial penalty of up to 10% of a licensee’s annual gross turnover (“AGTO”), or S\$1 million, whichever is higher.
13. In determining the final financial penalty, IDA took into consideration all the relevant factors, including but not limited to the length of the Incident, the number of affected subscribers, and the fact that the Incident was a serious one which could have been prevented.
14. On the other hand, IDA also acknowledged the presence of several mitigating factors, including SingTel’s commitment to invest in enhancing network resilience. Some of the commitments SingTel made include: (i) replacing lead duct seals in exchanges with the Multi Cable Transit system which does not require heating; (ii) installation of automatic fire suppression systems within cable chambers in all its exchanges; (iii) centralised monitoring of smoke detectors and fire alarms; (iv) enhancing the physical security of cable chambers, in particular, installing CCTVs to prevent unauthorised access; and (v) enhancing its Operations Support System and processes to ensure compliance to fibre path diversity requirements for enterprise customers with redundancy and path diversity needs. IDA also considered the compensation SingTel had given to its end users and the way it managed the Incident, including its pro-activeness and transparency in public communications and the convening of a BCOI. IDA will require SingTel to put in place these committed improvement measures, and monitor the progress and implementation.
15. Taking into account all the relevant factors, including the mitigating factors, as well as the caps set out above, IDA has imposed a financial penalty of S\$6 million on SingTel. A service outage of this magnitude is unprecedented. With increasing dependency of businesses and consumers on communications, a very strong signal must be sent to telecom operators that they must take network resilience very seriously and invest in the relevant upgrades to ensure against service outages.

CityNet

16. As the owner and manager of the Exchange, CityNet did not meet its Licence obligation as a Facilities-Based Operator to maintain and operate telecommunication systems⁶, which include the cable chamber in the Exchange, in an adequate and satisfactory manner. In particular, IDA found that there were procedural lapses on CityNet's part, such as a lack of robust approving process for hot works in the Exchange⁷, and the failure to ensure safety of the work area and compliance with proper operating procedures⁸. IDA also found that CityNet failed to ensure a proper fire watch⁹, did not have in place a proper fire alarm deactivation protocol¹⁰ and there was a lack of physical security at the cable chamber¹¹. Had CityNet done so, the fire might have been prevented, or CityNet might have helped to minimally reduce the fire risk and/or helped to detect the fire earlier, which would be relevant for the efficacy and timeliness of the firefighting and service restoration efforts for the Incident.
17. Nevertheless, IDA took into account the corrective measures committed by CityNet as mitigating factors. Some of the commitments CityNet made include: (i) replacing the lead duct seals in all cable chambers; (ii) installing gas suppression systems and more fire extinguishers in all cable chambers; (iii) installing a centralised alarm monitoring system to monitor critical building alarms, including smoke detectors (and other fire warning alarm systems); and (iv) installing an electronic access system, together with CCTVs located at the entrance of each cable chamber. IDA will require CityNet to put in place these committed improvement measures, and monitor the progress and implementation.
18. Accordingly, IDA has imposed a financial penalty of S\$300,000 on CityNet¹².

⁶ Under Condition 6 (Basic Obligation to Support Public Telecommunication Licensees) of CityNet's FBO licence, it is provided that "[CityNet] shall establish, install, maintain and operate the Systems and shall: where [CityNet] has available ducts and associated manholes, provide access to and use of such ducts and manholes; and where [CityNet] has no available ducts and associated manholes, procure or deploy such ducts and manholes and provide access to and use thereof, to any Public Telecommunication Licensee designated by IDA under Section 6 of the Act that requests [CityNet] for such ducts and associated manholes (as the case may be)."

⁷ SingTel's hot work application was approved although it was incomplete and SingTel had submitted the wrong application form. CityNet did not appear to have any formal criteria or standards by which hot works applications would be assessed.

⁸ CityNet did not carry out a physical check of the area at and around the hot works to ensure that the area was safe for commencement of hot works.

⁹ CityNet's hot work application form required the signature of (a) person carrying out the hot works and (b) CityNet's representative, both before and after the completion of hot works. However, these were not implemented.

¹⁰ CityNet did not specify any measures to be taken to monitor the site while the fire alarm was deactivated.

¹¹ Physical access to the cable chamber was not tightly controlled.

¹² Under the TA, CityNet may be liable for a financial penalty of up to S\$1million or 10% of its AGTO, whichever is higher.

OpenNet

19. OpenNet is the Network Company (“NetCo”) responsible for the design, build and operation of the passive infrastructure layer of the NBN. While not a direct contributor to the cause of the Incident, OpenNet has been found to contribute to the delay in service restoration to affected users.
20. IDA found that OpenNet could have expedited the restoration and recovery process, such as by adopting more appropriate service restoration processes for larger scale service disruptions. As a result, the duration of service disruptions to affected users was unnecessarily prolonged. In this regard, IDA found OpenNet to have contravened its obligations under the Code of Practice for Next Gen NBN NetCo Resiliency, and has imposed a financial penalty of S\$200,000.
21. IDA has required OpenNet to enhance its BCM and work with the other operators on an end-to-end BCM in the multi-layered NBN.

Other affected telecom licensees

22. IDA has also carried out investigations into whether Nucleus Connect Pte Ltd (“Nucleus Connect”) and StarHub Limited (“StarHub”), as downstream operators, have breached their respective service resiliency codes as a result of this Incident. For both StarHub and Nucleus Connect, the Incident’s impact has crossed the relevant threshold for their fixed-line telephone services and end-user connections respectively. Other than the fact that both operators did not cause the Incident, IDA has also reviewed the recovery efforts of both StarHub and Nucleus Connect, and found no evidence that both licensees had acted in a manner that led to delays in service restoration.
23. Accordingly, IDA has decided not to take further enforcement actions on StarHub and Nucleus Connect.

Areas of Improvement

24. The Incident highlighted the need to re-examine the systemic resilience of all critical parts of Singapore’s infocomm infrastructure as well as the efficacy of inter-operator coordination in the multi-layered NBN, in a crisis situation such as this Incident, to bring about speedy service recovery. IDA has embarked on a review of the resilience of all critical parts of Singapore’s infocomm infrastructure and the review is expected to be completed in the second half of 2014. The review will help to identify any other potential weakness in the critical networks and seek to address them to minimise the risk of

widespread service disruptions. In addition, IDA has worked with the industry to put in place a set of coordination processes to improve inter-operator communication and coordination during major service disruptions. To ensure that such a coordination process stays relevant to the operators and industry, IDA will review the coordination process from time to time.

25. IDA is also looking into the need for greater network monitoring capability across the multi-layered network infrastructure to enhance the overall resiliency of the NBN.
26. IDA will continue to review its regulatory frameworks to ensure that telecommunication operators take proactive steps to enhance the resilience of their networks and services. IDA will also explore ways to further strengthen the resilience of Singapore's telecommunication networks through multiple operators, networks, and different technology platforms.

ISSUED BY CORPORATE AND MARKETING COMMUNICATIONS DIVISION
INFOCOMM DEVELOPMENT AUTHORITY OF SINGAPORE

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