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By email
With reference to: Incident 96261-S

Hi Catherine

Please accept my apologies for the delay in responding to your email regarding the incident on 1st December 2009.
In responding I have tried to answer the questions you asked and I have also provided a timeline as recorded at our control room and from my information from site.
This details Central Networks response to the incident occurring, and our restoration of supplies to the area.
I hope this provides enough information as to the cause of the incident and any future risk.
I was directly involved with the restoration of supplies and the repair of the network so If you need any further help or clarification then please do not hesitate to contact me.

With Regards

Dave Marriott

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Project Manager Restoration & Repairs

9/2/2010

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Report on Incident 96261-S Northampton 11Kv, Riverside Way, 11Kv OCB 20

Catherine I have answered your specific questions and then followed with a timeline of events.

Questions

Was the cabling smouldering?

The explosion occurred on our 11000volt switchgear at a part we call the D/O box, this is where the cable connects to the switchgear. The D/O box is of a steel construction, the fault forced the bolted plate off the D/O box. Inside the box the cable is protected and insulated with bitumen compound to insulate the cable. It was this compound that caused the fumes and smoke.

There was significant damage to the box and also to the main switchgear tank which meant that the equipment along with its age meant replacement rather than repair was the best option to fix the problem.

What was smouldering and giving off smoke?

This would have been the bitumen compound and the cable within the D/O box.

Fumes were emitted from the substation on a subsequent day when we attempted to clean out the bitumen compound from within the D/O box. These fumes were sucked into the main building by the ventilation duct which sits above the substation door. We had consulted with NBC before using the equipment and the smoke sensor in the room was disabled to stop the fire alarm from activating unnecessarily. A decision was made after this to suspend all operations using a blow torch until we could provide adequate ventilation for the substation.

Did the Fire officers use something to contain this or stop the smouldering?

No there was no evidence of any being used; the initial explosion and any fire had quickly extinguished itself, although I am no fire expert.

Thereafter:

NBC electrician were called out, who then called out Central Networks?

Central Networks were aware that there was an 11000volt fault in the area and had already dispatched engineers to strategic positions. We were alerted to the potential fire at the council offices by Northamptonshire Fire & Rescue calling our call centre to report the problem; this was quickly linked to the fault so that no attempt was made to re-energise the area where the potential fault was located. Engineers were then sent to the council offices to investigate the extent of the problem.

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Questions

What area does the Sub station cover, there seems to be conflicting information - I have heard that BMW (across the road), the hospital St Andrews, & the traffic lights were all affected, is this true?

This circuit feeds different substations along the cable route before reaching a point on our network where there is an open switch; there are fourteen substations on this section of cable.

This did include initially St Andrews Hospital Main Site and the old Cliftonville school site, W Grose (Vauxhall garage) Northampton School for Boys and Riverside House amongst others and are a mixture of domestic and commercial customers..

The BMW garage was not off supply because of this incident, I am not sure about the Traffic lights but looking at the low voltage network I am of the opinion that they stayed on.

Why did this happen?

Initially it was thought that the D/O box on the switchgear had faulted and was the cause of the fault. Subsequent investigations on site found that the initial problem was a cable joint on Cliftonville road which had faulted; this then caused a flashover in the D/O box on the switchgear at the council offices and subsequent failure.

A weakness had developed within the D/O box that was not evident under normal conditions but became a problem when abnormal fault current was passed through the cables and switchgear, at the time of the fault.

The unit at the council offices was an oil filled ring main unit and as been replaced with a refurbished unit of similar function but a different design. The unit still uses oil as an insulation medium inside the switchgear but the D/O boxes are now a dry box this means there is now no bitumen compound inside these boxes.

Could this happen again?

Another fault on this piece of network or any other piece of network can never be ruled out and we rely on the fact that the 11000volt cable network and switchgear is normally robust enough to be able to deal with these situations. I know on this occasion it failed but this was not a normal occurrence and with the equipment that has been installed as a replacement this should now re-enforce the network to be able to withstand the stresses placed upon it in the future.

Preventative maintenance is carried out across our network and some issues were identified at this substation when it was maintained but they were not the cause of this incident. The unfortunate event this time is that we lost all functionality of the substation at the council offices because of the damage to the switchgear, normally with a cable fault we are able to re-energise either side of the fault to just leave the faulty section disconnected and all supplies restored, on this occasion both sides were affected, leaving portable generation as the only means to restore supplies.

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Timeline of Events

01/12/2009

- At 07:19 our Network Control Room received indications that the Riverside Way circuit at the Northampton 11Kv Primary substation had tripped initially affecting 859 customers
- This circuit feeds different substations along the cable route before reaching a point on our network where there is an open switch; there are fourteen substations on this section of cable. This did include initially St Andrews Hospital Main Site and the old Cliftonville school site, W Grose (Vauxhall garage) Northampton School for Boys and Riverside House.
- The BMW garage was not off supply because of this incident I am not sure about the Traffic lights but looking at the low voltage network I am of the opinion that they stayed on.
- I was the first engineer dispatched to site at 07:25 due to my proximity to the location, initially we were just aware of the circuit tripping and so we are dispatched to strategic substations to investigate whether the fault indicators at that site have operated. Another two engineers were dispatched at 07:35.
- At 07:39 Central Networks call centre received a call from Northants Fire & Rescue of smoke coming out of the substation building at the Borough council offices, one of our engineers was sent to site whilst I was involved in switching to restore customers supplies.
- At 07:52 837 customers had their electricity restored
- At 08:04 13 customers had their electricity restored
- This left the section of cable off supply with three substations connected and 9 customers a)Cliftonville Offices Substation (council offices) 1 customer. b) Quinns substation (behind the Vauxhall garage) 3 customers and c) Cliftonville School substation (now part of St Andrews and including the new hospital building.
- This piece of network was transferred to my control from our central control room to allow investigations to take place at the substation on the council site. Initial investigations revealed that the substation would not be re-energised because of the damage to the switchgear and so a Generator would be required.
- Central Networks supplied this generator and covered all the running costs. The generator was ordered at 08:56
- To try to restore supplies to the other two substations off supply a decision was made to cut and joint the cable outside the council substation. This would allow the cable to be re-energised restoring supplies to these customers.
- The generator arrived at about 13:00hours, the leads were run out and connected to the councils Low voltage distribution board with the help of the council's electrical Team, this was completed by 14:30hours. Supply was not restored at the council offices until 16:35hours due to a problem on the councils own equipment.

- The attempt to restore supplies at the other two substations failed when the cable did not pass its re-commissioning tests. At this time two additional generators were ordered for these sites, this was at 16:32hours.
- Whilst waiting for the generators a fault location was carried out which gave an indication of where the fault was located. This was about 50m away from the entrance to the old Cliftonville School.
- The supplies were restored to these at 22:34 Quinns substation and 23:20 Cliftonville School substation.

02/12/2010

- Excavation works and further investigations took place

04/12/2010 – 11/12/2009

- Excavation Jointing and switchgear replacement work

All electrical works and testing were completed by Friday 11th December 2009 when the electrical supply was available to use.

This just left the removal of the three generators with agreement from the customers.

The generator at Quinns substation was removed at 09:38hours on Sunday 13th December 2009.

The generator at Cliftonville School was removed at 06:30hours on Monday 14th December 2009.

The generator at the Council offices was removed on Saturday 19th December 2009.

I hope this gives an accurate timeline as to the events that occurred and Central Networks response.

Regards

Dave Marriott

Project Manager

Restoration & Repairs

Central Networks