GENERATOR UPDATE – NOVEMBER 2012

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REASON FOR THE ITEM

This report provides an overview of the generator itself and a summary of the tests and real activations since its installation in January 2011.

OPTIONS OPEN TO THE COMMITTEE

1. To consider and note the information provided.

INFORMATION

The Civic Centre generator is crucial to the continuation of critical Council services and is an invaluable addition to the Council's resilience and has been called upon at least twice a year since installation.

Since June 2011, Civil Protection assumed responsibility for the planned testing of the generator under its Business Continuity remit. Day-to-day maintenance and operation of the generator is the responsibility of the FM contractor, Mitie.

Overview - Civic Centre generator

The generator provides the building with diesel-generated electricity. Unlike many generators for a building of this size, it powers more than just the emergency systems (lifts, lighting and fire alarm/suppressant) thus allowing the building to continue to operate almost as normal.

It is designed to start automatically following a power loss, surge or dip, in order to minimise risk of damage to electronic equipment and interruptions to Civic Centre activities. When the generator starts, there is a 15-30 second loss of power to the building, during which only battery powered equipment remains on. Although inconvenient and minor data loss can occur, there is not a proportionately cost effective way to avoid this and, in addition, the short loss of power alerts the organisation to the fact the generator has started.

What does the generator power?

Although a very large generator, it is not able to provide power to all parts of the Civic Centre site. It provides power to:

Phase I

It powers	It does not power
• All plug sockets • All lights • ICT server rooms (and respective air-conditioning)	• Building management system (heating and cooling) • Ovens in Oasis café

• All lifts • Fire alarm • Tannoy	

Phase II

It powers	It does not power
• All lifts • Fire alarm • Tannoy	• Lights • Plug sockets • Building management system (heating and cooling)

What if neither generated nor mains power are available?

As a result of the developments of the generator's capabilities, which are a direct result of the testing regime, this scenario is increasingly unlikely. However, if it did occur, the following is backed up by battery:

- Partial lighting across Phases I and II (there is currently a project to increase provision in Phase I)
- Fire alarm and suppressant/sprinkler systems
- Tannoy
- ICT servers (only enough to allow for a controlled shutdown, which reduces time required to restart and minimises data loss risk.

Tests

Following the May 2011 power failure, a programme of testing was implemented (see table in Appendix A).

There are two types of test, which can take place either in- or out-of-hours:

1. Off-load – this test checks whether the generator starts automatically and can run without fault but at a idle rather than full power. An off-load test normally sees the generator running for about 15 minutes. It has no effect on the operation of the Civic Centre and does not test the automatic switching from mains to generated power.
2. On-load – this test is as per the off-load test with the exception that it simulates full power loss to the building (i.e. Phase I and parts of Phase II temporarily lose power) and tests the automatic switching from mains to generated power. This test also involves all staff in Phase I as all their electronic equipment will stop working during the switch between mains and generated power, and vice versa. To allow for more in depth checks of the generator and to minimise disruption to staff, the generator run for at least 3 hours during an on-load test.

In addition to the generator tests and exercises listed in appendix A, since January 2012 Mitie have undertaken a weekly off-load test to ensure the generator starts without fault.

Furthermore, the generator undergoes a 6-monthly service by the contractor.

Mike Price
Civil Protection Manager

Timeline (from January 2011 to present)

Date	Event / test type	Outcome/notes
January 2011	Generator installed	Off load test included in the installation, which worked without fault.
17th May 2011	First power failure following installation of new generator	Although generator started, it did not provide power to the building. Cause identified and repaired
18th June 2011	Out of hours 'off-load' test	To test the fixes from 17th May. Further issues identified but resolved on the day.
8th July 2011	Out of hours 'on-load' test	Demonstrated the generator would automatically switch from mains to generated power without manual intervention.
31st August 2011	1st in-hours 'on-load' test	Generator ran for approx. 3 hours from 0700 to demonstrate to staff its effectiveness at allowing operations to continue. Automatic switching worked as expected.
18th January 2012	2nd in-hours 'on-load' test	The generator started but only ran for 20 seconds each time. Facilities Management and Mitie intervened and returned the building to mains power after approximately 5 minutes. It was identified that the cold weather meant the diesel was too cold to keep the generator running safely, so it shut down automatically after 20 seconds. The fuel heating system was repaired (burnt out cable) and a more advance telemetry system was installed, to alert facilities management to future fuel temperature issues or if the starter motor batteries lose power.
6th February 2012	Out of hours 'on-load' test	To check the repairs. All worked without fault.
16th February 2012	Local area power failure	Generator started and ran properly but no power reached the building. After a short while without power, Facilities Management/Mitie intervened and manually switched to generated power. Building returned to mains power 3 hours later. Fault identified as a programming error in the switching system. Fault rectified and the switching system set up to always default to generated power even if mains power returns subsequently.
22nd February 2012	Rearranged in-hours 'on-load' test	Cancelled due to proximity to real power failure on 16th February.
23rd February 2012	Local power failure	Generator started and worked without fault. Due to the timing of the failure, it ran 17:30 to give staff an uninterrupted afternoon's work and to undertake a series of observations of the generator under a full winter load.
Late September 2012	Local area power surge	Power failed at approximately 09:05 on a weekday. The generator worked to plan - it detected the surge, and started and switched power automatically; all in all, 20 seconds to return power to the building. The Civic ran on generated power for approx. 2 hours to coordinate a switch back around a number of Civic events. No faults detected.
w/e of 13th and	Civic centre maintenance	Generator used deliberately to maintain power to the building while maintenance work to high

14th October	works	voltage supply took place. Minor fault identified and subsequently repaired.