



Assessed to:
ISO 9001:2015
Cert No. 642

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Stat-X Actuation

Date of Actuation- October 2017

Enclosure use: Lithium Ion cell charging station.
Stat-X design density: 100g/m³
Location: External 40Ft container Almelo, Holland.
Installed by: Spain distributor PROinSener in their equipment.
System checked tested and commissioned in Spain by Nobel Fire 2 months prior.

Incident record of events report from site, translated by them into English from German/Spanish and Dutch:

11 PM 28th

1. First alarm.
2. The owner of the area (Jan Bolk) was informed by some neighbours and Police
3. Jan went to the installation/container
4. Light outside of the container was on -> AC power on the container
5. Jan and others open the container
6. The Stat-X unit at the entry door was activated.
7. Jan switch the alarm off, reset the alarm.
8. Jan closed the door.
9. Jan left the area to organize some contact detail of the costumer.

2 AM 29th

1. Jan was informed that the fire alarm was on again.

2:30am 29th

1. He arrived onsite
2. Andreas was on the phone with Jan and Dominique (S4Energy)
2. He opened the door.
3. Smell of Ammonia reported, while the door was opened.
4. Jan switched off the alarm at the fire panel again.
5. He disconnected the ups batteries on the fire panel and completely powered down the fire system.
6. Alarm is off.
7. Everyone left the area.

12:00 pm 29th

1. Andreas and Johan meet in Almelo at the installation
2. We opened the container
3. We didn't find any reason for reason for a fire.
4. All Stat-X cartridge have be activated.
5. Strong smell of Stat-X.

As you can see a confused story from site and after discussion it was determined that there is a possibility that the fire system was in "first stage" alarm of the Two stage activation level on attendance of the security person. The first stage alarm had attracted the attention of local residents and/or police to investigate. There were severe weather conditions at the time with Thunder and lightning and very heavy rain, so we believe in all the panic of the noise at the dead of night in a residential area that the manual release was pressed in an attempt to quieten the system. Hence 11pm point 6- "The cartridge at the entry door was activated".

From discussion with our distributor post the event and on inspection of the batteries, it is most likely that a fire/overheat event had occurred and that the fire detection system consisting of 1st stage optical smoke detection and 2nd stage 60°C conventional coincidence detectors had entered 1st stage alarm. 2nd stage alarm and activation leve had not been reached. As security attended they manually activated the system not being able to interpret the events and not having any understanding of what the enclosure was or how it was being protected.

The whole system discharged and activated as designed.

The enclosure was situated externally and subject to extreme weather conditions at the time. It was not ventilated nor was any form of post discharge care instigated for a number of days. The control panel was shut down completely with back up batteries disconnected. The enclosure was closed and locked and left for a few days without any attendance.

Subsequently we were asked to attend site and carry out an investigation, 5 days after discharge. All fire system equipment was checked and tested and found to be in an operational condition with no faults or malfunctions present. Sensors were replaced as a matter of course and left with the site owner. The system was recharged and reset. 2 weeks later the installed hardware such as Li-ion batteries and controls were removed and returned to Spain for test, inspection and investigation. New equipment was installed in its place.

This week we have learned:

The batteries were manufactured by LG and consisted of 240 modules. Of the 240 modules 5 were showing as providing minimal voltage and it is believed that these were the potential source of defect that caused first stage alarm. We have not been advised what caused this defect and it is not necessarily our concern. The fire system had performed its function and detected a condition that triggered 1st stage alarm. The remaining 235 modules were fully functional and are being returned to active service needing minimal clean up. All cooling fans and control circuitry has been tested and found to be fully operable and functional. LG have passed the batteries as fully functional however they no longer underwrite the warranty as they have been involved in what can be termed a fire incident and subjected to the by-products of combustion and the fire extinguishing medium.

It was noted that the bare copper bus bars and connections had shown signs of accelerated aging and surface oxidation and required further attention.

Observations:

- 1) The company with ownership must provide clear instructions to all potential attendees on the fire system and its potential conditions. NFS had advised this and appropriate signage but actions had not been taken.
- 2) Provide remote monitoring of the fire system in the overall enclosure management controls: This had been advised prior by NFS and is now actioned post the discharge event.
- 3) Post discharge ventilation and clean up was never instigated and it was a full 2 weeks before any attempt was made to recover the enclosure hardware.
- 4) Clean up did not start till approximately 4 weeks after discharge.
- 5) NFS had carried out full training and authorisation of the installing company in Spain and post discharge care formed part of that critical advice.
- 6) Full clean up and instructions were provided again at the time of discharge and again before we attended site 5 days later, but instruction and advice had been ignored. It is more than likely if the cleaning regime and post discharge care had been instigated that a much more successful and faster return to service will have been achieved.
- 7) Issue stronger post discharge advice from our perspective.
- 8) Urge the system owner to act on that advice.
- 9) The incident 1st stage alarm has likely been caused by a true over heat and battery Cell issue. It had not progressed to a full level 2 fire condition and only a 1st stage alarm level had been raised for investigation. Lack of attendance knowledge means the fire system was actuated accidentally.
- 10) We do not know if the overheat would have progressed to a fire if an attendance had not been made.
- 11) Subsequent inspection and test of the Li Ion batteries and hardware by the manufacturer while needing a clean-up due to the length of time they had been left, showed no sign of deterioration of performance and they deemed them fit for a return to service. Although they took the opportunity to negate the warranty due to the whole incident weather exposure and fire suppression medium exposure.

The events and comments have been collected from all of the companies and personnel that attended site at the start of the incident through to recommissioning the system on site. Eye witness accounts from attending engineers and manufacturer observations have been used to formulate this brief.

Yours sincerely,



Ian Bartle
Managing Director