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Scottish Power Mobile Flood Unit and Resilience Report – May 2012

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Executive summary

This report outlines the legislation (the Pitt review) that focused SPEN on taking action to mitigate the potential flooding risk to its critical national infrastructure.

After extensive research by SPEN and a competitive tender process, AET was selected as the supplier to deliver SPEN’s cost effective flood protection solution. AET were tasked with delivering the solution within SPEN’s extremely demanding timescales and AET achieved full delivery to all sites one month ahead of schedule. And to quote Linda Lewis SPEN’s Operations & Emergency Planning Liaison Officer

“Fran Corrie, MD AET, provided us with excellent service throughout, from the expert advice she initially provided with regard to the product right through to the bespoke onsite training for our staff. To assist our staff in the deployment of the barriers she also took the trouble to provide a laminated instruction manual to be kept in storage alongside the barriers.”

An overview of the equipment provided in SPEN’s flood protection solution can be found in the appendix to this report.

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Background

Following the Pitt review the need to provide adequate protection for critical infrastructure which had been identified as ‘at risk’ had to be given priority by anyone responsible for resilience within the Utilities industry.

It states that floods can cause serious indirect impacts, including damage to important energy, water, communication and transport infrastructure. They can also interfere with basic public services such as schools and hospitals.

For example, the 2007 floods disabled major infrastructure in Gloucestershire. Flooding at Tewkesbury’s Mythe water treatment works left 140,000 homes without clean water for up to 17 days.

It was also necessary to shut down Castle Meads electricity sub-station, leaving 42,000 people without power in Gloucester for 24 hours. Flooding on the M5 motorway trapped 10,000 people, with many others stranded on the rail network.

A big effort to set up temporary flood defences at Walham electricity substation saved the power supply to 500,000 people in Gloucestershire and South Wales. Other vulnerable infrastructure includes emergency service stations and headquarters, which was also be part of the response, and important public services such as hospitals, schools and care homes.

Scottish Power assessment

Linda Lewis Operations & Emergency Planning Liaison Officer SPEN said “ given the contents of the Pitt report following the Gloucester flooding incident and the amount of flooding we have seen around the country since then, it was felt necessary for SPEN to take a proactive approach in the resilience of its infrastructure from natural hazards such as flooding.

Substations are located throughout the region on many different types of terrain and so SPEN requires flood barriers that are not site specific and versatile enough to enable us to have a flexible approach towards flood defence”.

The main requirements were established as being:

- Light and Easy to use;
- Easily transportable and could be transported in a transit type van;
- Can be deployed by a two man team with minimum training;
- Can cope with angles;
- Will retain the bulk of the water if the barrier receives a small puncture through vandalism;
- Re-useable – just hose down ;



- No detailed site survey required, although this is not advisable;
- Is not site specific and can be used on any site; and
- Can be deployed in advance of a flood

Scottish Power conclusion:

After an extensive investigation of many of the different types of flood barriers available it was agreed that the Alteau Barrier was the best fit for SPEN's flood requirements.

Conclusion of the tender process

After the completion of an extensive tender process AET was awarded the contract to manufacture and build the solution by the end of December 2011. AET delivered a fully bespoke solution to the deployment sites one month ahead of the deadline.

SPEN's view of AET's service

Linda Lewis Operations & Emergency Planning Liaison Officer SPEN said

“Fran Corrie, MD AET, provided us with excellent service throughout from the expert advice she initially provided with regard to the product right through to the bespoke onsite training for our staff. To assist our staff in the deployment of the barriers she also took the trouble to provide a laminated instruction manual to be kept in storage alongside the barriers.”

Creating a model for the future

Permanent flood protection is sometimes the only solution to prevent critical National infrastructure being flooded. However, where the potential risk of flooding is lower, but the need to take some action is high, then a temporary reusable cost effective solution may be appropriate than not mitigating the risk at all. The AET solution offered to SPEN met this criterion, as it has done for other AET clients worldwide.

Appendix 1. Flood equipment supplied to SPEN

AET supplied:

- Three Mobile flood units,
- A resilience back up unit
- Emergency kit
- Onsite Training

Mobile Flood Unit

Each Mobile flood units contained:

- Alteau Flood Barrier X10
 - Size when deployed: 10m (length) x 700mm (max height when self-inflated by flood water)
 - Weight: 85kgs
 - Fabric: 650g PVC coated Polyester.



- High volume Pump and Hoses X 2
 - Max Capacity: 1450L/Min, 87.0Cu. m/hr (19130 Gal/Hr)
Engine: Honda GX240, Single Cylinder, Air cooled, Petrol, 4.5KW @ 3600 RPM
Fuel Tank Capacity: Standard 6.0 litres
Solids Handling capacity: 6mm
 - Port Connections: 4" X 4" with 4" BSP CAP & TAIL TYPE COUPLINGS FOR HOSE. Weight: 54kgs. Max.
Delivery Head: 28 meters
Max Suction Lift: 7.9 meters

- Accessories:
 - 4m of reinforced suction hose (for the inlet suction)
 - 28m of standard outlet lay flat hose (for outlet)



- Aqua-sac® s.o.s bags x 500
 - UK Patent GB2438613: Size: **Dry bag** 60cm x 37cm Weight 0.4 kg, **inflated bag** 54cm x 31cm with a height of 10.5cm. Weight 13kg (under 15kg HSE single lift requirement)



- Aqua-sac® inflation tank X 2
 - Size: 200mm x 750mm. rigid portable steel frame. 600g PVC coated Polyester liner with drain



- Ground sheets X 10
- 38cms Stakes (for Alteau Barrier) X 20
- Sledge Hammer 4lb 16-Inch F/glass Handle X 2

Mobile Flood unit deployment, storage and re-use.

This section covers the training that was provided to SPEN with regard to deployment, storage, and re-use.

- Alteau Flood Barrier:
 - Each 10 metre section of the barrier will require a 3 man lift from a standard LGV vehicle. It can be deployed quickly and easily in 10m lengths on site. Each 10 metre length can be joined to other 10 metre lengths together to form a 50 metre barrier(5 x 10metre barrier), or a 100 metre barrier(10 x 10metre barrier) Connection is achieved using integral industrial standard Velcro fasteners on each end of the 10 meter barrier.
 - The barrier can be used on grass, gravel chips, concrete, tarmac, paving. The barrier will mould to most gentle undulating surfaces due to the flexibility of the fabric.
 - Alteau Flood Barrier is designed to rise automatically with the flood water, as such it does not need any external power source or pre inflation. The weight of the flood water provides stability and inflation. The barrier will deflate with falling flood water. Heavy duty pegs can, where the ground allows be used to provide extra support during inflation
 - When the flood water subsides the barrier can then be hosed down, re rolled and stored in 10 metre lengths.
 - With all none permanent barriers there will be seepage. To deal with this our solution is to recommend the use of high volume pump's and the patented Aqua-sac® s.o.s self-inflating “sandbags”
- High Volume Pump:
 - This would be used to pump out any seepage using a 75mmx 4m inlet hose.
 - The pumps can be hosed down once the flood subsides, stored and reused for future deployment.
- Aqua-sac® s-o-s self-inflating “sandbags”
 - Provided with the kit for areas where there may be gaps in protection and for extra security in doorways and within the buildings themselves is the aqua-sac® self-inflating sand bag.
 - Aqua-sac® is a revolutionary patented alternative to traditional sandbags for flood defence. Comprising of a heavy duty Jute sack and a cotton liner. Fully bio-degradable, the aqua-sac® is inflated by simply submerged in water. It will also absorb flood water. After five minutes in some 13 litres of water the seemingly empty sandbag will inflated to the size of a sand filled sandbag. However at 13kg, an aqua-sac® is significantly lighter than traditional sand filled sandbags so reducing manual handling risks.
 - To provide additional flexibility, 10 ground sheets (3.6m x 2.4m) are to be included in the kit. They would be used in conjunction with the aqua-sac® s-o-s self-inflating “sandbags”. There are a number of ways they can used with the bags and this was covered in the training package.
 - The bags are easy to stack and store in boxes of 50 bags weighing 23kgs per box, easily transported in cars or LGV vehicles.



- Once inflated aqua-sac® can be left on site for re use for up to 6 months. (refreshing with water as necessary) After this time bags should be destroyed in normal land fill as they will begin to bio-degrade (Scottish Power has a procedure for use.) Aqua-sac is already a preferred sand bag alternative having already been purchased by Scottish Power for flood defence in the past

aqua-sac® inflation tank.

- The lightweight tank comes in a flat pack state for simple construction (10minutes) on site. To provide a volume of water in advance for aqua-sac® inflation. Each tank has the capacity to inflate approx. 50 bags at one time.
- After use the tank can be drained folded, hosed down, and re store for future use.

Deployment of the full flood kit at each site

- Once the kit is delivered on site it can be deployed by 3 trained personnel within 4 hour time frame.

Resilience Kit

This is used as back up equipment to supplement the main deployable equipment, and is retained at one of the sites,.

- Aqua-sac® x 1000
- Ground sheets x 20
- PUMP x 1

Emergency Kit

This is kit that should be worn by the team when deploying the equipment. It is used to supplement their own personal kit, identified in a SPEN site risk assessment.

- 24 Hrs Ration Pack x 2
- Waterproof torch (Headlamp) x 2
- Waders Size 12 x 2
- Sealable Plastic bags A4 size x2
- Life Jacket x 2
- Whistle x 2
- Guardian flashing light Visible to 5km x 2

Onsite training

Equipment familiarization training was provided to the SPEN operations team. This training does not negate the need for SPEN to practice deployment of the equipment in their flood areas.

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