

HAZARD/THREAT CATEGORY	SUB-CATEGORIES
Industrial technical failure	Technical failure of upstream (offshore) oil/gas network leading to a disruption of upstream oil and gas production
Hazard and threat description including scale:	RISK REFERENCE NO:
Technical failure leading to catastrophic accident destroying all or parts of an offshore facility and taking six months to restore normal levels of service. A fire or explosion on board a significant offshore installation could result in a 15% loss of gas supply to UK which, at the top end, would cause the disconnection of users with interruptible supply and would impact on power generation, possibly prompting three hour rota electricity cuts. Downstream oil would not be so adversely affected given alternative means of supply	H38
DATE OF REVISION	NEXT REVIEW DATE
November 2007	November 2008
Version	2
Author	Appropriate Utility through TVP

## 1. Overview of hazard or threat

The hazard described above could result in Electricity Supply Rota Disconnections if fuel supplies to power stations are compromised.

- Rota disconnections or rolling power cuts can be used to correct a mismatch between the amount of power available from the power stations and the amount of power required by the end users or customers. That is, to ensure that the amount of power available is shared fairly and equally amongst all customers. This is achieved by switching off the power to some customers for fixed periods.
- For the smallest mismatches between supply and demand this could result in the rota disconnection of supplies during peak periods of electricity usage for a small proportion of customers whilst for larger mismatches this could result in rota disconnections of three hours, or multiples of three hours, throughout a twenty four hour period.
- The rota disconnections will occur throughout the whole of the UK on a fair and, as far as technically possible, equally distributed across all customers. However, some customers are given protected customer status by the government. For example, vital services, major food manufacturers, processors and storers, and certain continuous process and manufacturing plants.
- Is likely that there would also be appeals to the public and industry to reduce demand (by government).
- If the problem was associated with a primary fuel supply problem the effect would be national whilst if it was a local network constraint the problem could be localised.

## 2. Key historical evidence

### 1972 - UK

Rota disconnections resulted during the miner's dispute when coal stocks to the power stations were interrupted. During this period coal was the main primary fuel for power stations. This resulted in the

“three day working week” when rota disconnections were employed to limit demand under the Electricity Supply Emergency Code.

### **2000 – Kenya**

In Kenya, which has an electricity system significantly less resilient than the UK system, during the summer drought, rota disconnections were introduced after output from its hydro-electric power stations was cut, a pylon bringing in power from Uganda collapsed and a failure at Mombassa power station.

### **2001 - USA**

In California (USA), as a result of demand exceeding capacity the operators initiated rota, or rolling, 90 minute power cuts to reduce demand.

### **2003 – Northern Ireland**

In Northern Ireland, following problems at key power stations; rota disconnections were introduced to reduce demand in the province.

### **2003 – Italy**

On Thursday, 25<sup>th</sup> June 2003, a surge in demand led Italian electricity firms to order the first country-wide power cuts for more than 20 years. The jump in demand stretched the country's national grid requiring utility firms to cut power for up to one and half hours in major cities. The result was rolling power cuts across the country - the first since 1981.

### **2003 – Canada**

Rolling power cuts were avoided after government appeals to reduce demand were heeded.

### **2003 China**

Under rolling blackouts, residents go one day in four without power in some regions. This was caused by a mismatch in supply and demand and is common in developing countries where demand is rising faster than supply.

### **2005 USA**

In Southern California, power was cut to 500,000 customers for 30 minutes to reduce demand. This was caused by a mismatch in supply and demand.

### **Summary:**

**The only time that the UK has been subject to rota disconnections, or rolling power cuts, was during the miner’s strike in 1972. None of the other events listed above are currently transferable or applicable to the UK.**

## **3. Likelihood (CCA Assessment)**

<b>HAZARD</b>	<b>Outcome description</b>	<b>Likelihood</b>
<b>Rota Disconnections, or rolling power cuts</b>	<15% of UK demand	2
<b>Rota Disconnections, or rolling power cuts</b>	>15% of UK demand	2

No rota disconnections have been implemented across the whole of mainland UK since 1972.

The Secretary of State's first report to Parliament on "Security of Gas and Electricity Supply in Great Britain" published July 2005 states that "This winter the gas market is likely to be tighter than in recent winters. In the longer-term, improvements in gas infrastructure that are already under construction will ease this situation. The market has already responded in anticipation of declining UK gas supplies with new import and storage infrastructure, some of which will be available for the coming winter. More is expected to be available next winter and thereafter. In the medium to longer term, proposals for the construction of new electricity generating capacity are also coming forward in anticipation of future developments in the electricity supply-demand balance. While in the immediate future such proposals mainly concern further gas-fired facilities, in the longer-term renewables, and other alternative technologies, such as low-emission coal generating capacity, are expected to add to the diversity of our generating fleet."

**Summary.**

Rota disconnections or rolling power cuts are unlikely to occur this winter.

**4. Impact**

Summary

HAZARD	Outcome Description	Impact				
		Health	Social	Environ	Financial	Overall
Technical failure of upstream (offshore) oil/gas network leading to a disruption of upstream oil and gas production	Rota Disconnections, or rolling power cuts	3	3	3	3	3

The hazards below are ones the civil community may wish to consider:

Details

IMPACTS ASSOCIATED WITH ROTA DISCONNECTIONS
PRIMARY:
Care of the vulnerable
Services will be stretched for those services and businesses without good business continuity plans
If concurrent with cold temperatures, fatalities due to hyperthermia may occur due to the failure of power for: electric space heating; for pumps and boiler controls for gas and oil central heating systems; and making hot drinks and cooking.
Increase in property fires caused by: <ul style="list-style-type: none"> <li>1. candles and oil lamps;</li> <li>2. portable space heaters such as portable gas fires, paraffin heaters;</li> <li>3. increase in the use of coal fires;</li> <li>4. householders leaving on cooker rings and electric fires which when the power is restored cause a fire because of their proximity to flammable material.</li> </ul>
Crime may increase in unlit streets and houses. Fire alarms may spuriously operate during power cuts which could reduce their effect and encourage burglaries.

Increase in the number of food poisoning cases, if power cuts are for greater than 12 hours, caused by: <ol style="list-style-type: none"> <li>1. foodstuffs in refrigerators warming up;</li> <li>2. inadequate heating of food;</li> <li>3. food defrosting and refreezing in deep freezers.</li> </ol>
Potential for loss of power supplies to telephone exchanges, water and sewage treatment and pumping stations where they do not have alternative power supplies (UPS or generators)
Short-term loss of production due to closure of businesses during rota disconnections
Widespread disruption to the food chain. For example: <ol style="list-style-type: none"> <li>1. Frozen food will be difficult to keep frozen unless stores have generators</li> <li>2. Food production may be affected e.g. bakeries, processed food manufacturers etc</li> <li>3. Restaurants and bars etc may be unable to open</li> </ol>
Widespread disruption to mobile telephone networks during power cuts that do not have backup supplies.
Potential disruption to rail and underground services where stations cannot remain open without power supplies for ticketing, lighting, lifts and escalators, public announcement communications etc
<b>SECONDARY:</b>
People trapped in lifts.
If electrical equipment does not have a UPS or generator supply it will fail. For example: <ol style="list-style-type: none"> <li>1. Telephone switchboards;</li> <li>2. Computer systems;</li> <li>3. Tills and cash machines and credit card authentication systems;</li> <li>4. Traffic Lights, street lights and other street furniture (and congestion charging);</li> <li>5. Mobile telephone networks;</li> <li>6. Emergency Services Communication Networks (including Airwave after six hours);</li> <li>7. fuel pumps (in petrol stations);</li> </ol>
Pollution from sewage pumping stations caused by power cuts.
Failures of UPS and back up generators during power cuts could affect even those who are prepared. Battery capacity diminishes with "age". Generators are not usually rigorously tested frequently on load. Generators also have to receive regular maintenance if running and regular fuel supplies.
Damage to power cables during rota cuts will not become apparent until the power is restored which could result in injuries to people working near damaged cables.
Overstretch of key resources (equipment and personnel) and agencies especially the emergency services and care and social services.
Public need for information, advice, benefits and emergency payments. For example, for those without secondary means of heating etc
The vulnerable may need special care
Disruption to crematoria

## 5. Vulnerability and resilience

All businesses affected by rolling or rota power cuts that do not have good business continuity plans that take into account the failure of power supplies will be vulnerable to the rolling or rota power cuts.

Businesses should ensure that their key suppliers have resilient business continuity plans as power cuts at their suppliers' premises could have knock on effects for their own business. For example, where companies operate on a just-in-time basis if delivery of supplies from a key supplier is affected then the company could be forced to stop production even if they are not directly affected by the power cuts.

## 6. Overall assessment

CATEGORY	SUB-CATEGORY		
Industrial technical failure	Technical failure of upstream (offshore) oil/gas network leading to a disruption of upstream oil and gas production and rolling or rota power cuts.		
SCALE	IMPACT	LIKELIHOOD	RISK
Rota Disconnections <15%	Moderate (3)	Rare (2)	Medium
Rota Disconnections >15%	Moderate (3)	Rare (2)	Medium
<b>CONTROLS IN PLACE:</b>			
<ul style="list-style-type: none"> <li>• Industry Black Start Plans</li> <li>• Fuel Security Code</li> <li>• Electricity Supply Emergency Code</li> <li>• Department Trade and Industry (DTI) Incident Response Plan</li> <li>• Royal Berkshire Hospital NHS Trust Business Continuity Plans</li> <li>• Heatherwood and Wexham Park Hospitals NHS Trust Business Continuity Plans</li> <li>• Berkshire Primary Care Organisations Business Continuity Plans</li> <li>• Berkshire Healthcare Trust Business Continuity Plans</li> <li>• Buckinghamshire Hospitals NHS Trust Business Continuity Plans</li> <li>• Milton Keynes Hospital NHS Trust Business Continuity Plans</li> <li>• Buckinghamshire Mental Health Trust Business Continuity Plans</li> <li>• Buckinghamshire Primary Care Organisations Business Continuity Plans</li> <li>• Oxford Radcliffe Hospitals NHS Trust Business Continuity Plans</li> <li>• Oxford Mental Health Trust Business Continuity Plans</li> <li>• Nuffield Orthopaedic Clinic Business Continuity Plans</li> <li>• Oxfordshire Primary Care Organisations Business Continuity Plans</li> <li>• South Central Strategic Health Authority Business Continuity Plans</li> <li>• Berkshire Integrated Emergency Planning Structure</li> <li>• Wokingham District Council Emergency Plan</li> <li>• Reading Borough Council Emergency Plan</li> <li>• West Berkshire Council Emergency Plan</li> <li>• Bracknell Forest Borough Council Emergency Plan</li> <li>• Royal Borough Council of Windsor and Maidenhead Emergency Plan</li> <li>• Slough Borough Council Emergency Plan</li> <li>• Buckinghamshire County Council Emergency Plan.</li> <li>• Aylesbury Vale District Council Emergency Plan.</li> <li>• Chiltern District Council Emergency Plan.</li> <li>• South Bucks District Council Emergency Plan.</li> <li>• Wycombe District Council Emergency Plan.</li> </ul>			

- Environment Agency Incident Management Plans
- Environment Agency 24/7 incident response
- Environment Agency Memorandum of Understanding with Fire Brigades, Police, Local Authorities, Highways Agency, Health Protection Agency and Health Authority.
- South Central Ambulance Service NHS Trusts Business Continuity Plans
- Milton Keynes Council Major Incident Guide
- Thames Valley Police Emergency Procedures Manual
- ACPO Emergency Procedures Manual
- ACPO Motorway Manual of Guidance
- Oxfordshire County Council Emergency and Business Continuity Plans
- Royal Berkshire Fire & Rescue Service Major Incident Policy
- Oxfordshire Fire & Rescue Service Major Incident Policy
- Buckinghamshire Fire & Rescue Service Major Incident Policy