

# Distribution Network Control Centre Observation Report Exercise Revive

10<sup>th</sup> & 11<sup>th</sup> November 2010

## 1. Introduction

Exercise Revive was the annual Network Emergency Coordinator (NEC) Emergency Exercise. The requirement for the NEC is detailed in the Gas Safety Management Regulations (GS(M)R) and the NEC is responsible for declaring Gas Emergencies on behalf of the Gas Industry. Participation in emergency exercises ensures that all relevant industry players understand the actions required of them in a gas supply emergency.

The Emergency documents that are used within the gas industry are derived from E1 the Policy for Managing Network Gas Supply Emergencies and E2 the policy for managing Local Gas Supply Emergencies. Supporting these documents are the E3 Emergency procedures which are held by each of the Distribution Network Operators that detail the actions required to manage an emergency.

Since Network Sales it is necessary to ensure that the different Emergency procedures are able to manage emergencies in a similar way. There are certain things that are required to be in place, and information that needs to be provided. Exercises also provide an opportunity to test accurate communication routes are in place.

During 2010 there have been three previous emergency exercises.

- Exercise Reform tested the success of Firm Load Shedding following the implementation of Interruption Reform. It provided an opportunity to ensure as a Distribution Network we would still be able to fulfil our network obligations that our firm load shedding performance was no worse pre Interruption Reform i.e. That we could at least shed 10% of network load within 4hours.
- Exercise Avogadro was a Department of Energy & Climate Change (DECC) exercise looking at the procedures and involvement that the government is required to have in order to assist in the management of a gas supply emergency.
- Exercise Respond was a small scale exercise that involved all Distribution Network Operators (DNO) and provided an opportunity for the control room teams to produce the NETMAN1 following a request from GNCC (Gas National Control Centre). The NETMAN1 is the initial information requested during a Gas Supply Emergency and it includes information on the current Storage and Demand levels for each Distribution Network.

National Grid UK Gas Distribution manages Network Gas Supply Emergencies through a central management team based within DNCC. They are supported by Customer Services who perform Firm Load Shedding and Operations teams who are able to physically reduce demand by isolating pipeline systems if required.

### 1.1 Exercise Scope

Exercise Revive was a full scale simulation of a Network Gas Supply Emergency (NGSE) carried out by the NEC. The exercise provided the opportunity for all participants within the industry to test their procedures for managing a Network Gas Supply Emergency. Exercise Revive focused on the later stages of an NGSE; Stage 4 Isolation and Stage 5 Restoration. Earlier stages of an NGSE have been successfully tested through the previous exercises held in 2010.

Participants within UKD included:

Distribution Network Control Centre (DNCC)

National Grid DNCC Exercise Revive Report

Customer Services (Hinckley & Northampton)  
Operations Incident team  
Shippers  
Distribution Operational staff

The exercise focussed on the emergency response through Isolation and Restoration of a NGSE. The NEC provided a scenario which declared Stages 1, 2 & 3 simultaneously, prior to moving through Stage 4 and Stage 5. Firm Load Shedding was retested in a scenario based on post interruption reform, which significantly reduces the number of interruptible sites available to be load shed in an emergency. This also provided an opportunity for further evidence to be provided to the HSE that DNO's will be able to continue to fulfil their obligations, to reduce demand following the reduction in the number of interruptible sites and the corresponding increased number of firm sites.

Interruption Reform Uniform Network Code Mod 90 changed the way charges are assigned to those sites that provide interruptible capacity. Interruption will only be available in areas where it is really necessary. This change to interruption increases the number of sites that are required to be Firm Load Shed. Within the Safety Case we have an obligation to Firm Load Shed 10% of load within 4hours; Exercise Reform provided validation this can be successfully achieved. Exercise Revive provided further validation.

In addition to the standard exercise, the scenario also included the use of a number of new forms to trial and DNCC took the opportunity to use a revised Emergency Management Team structure, which was based on the reduced workload anticipated for interruption and the implementation of a new interruption system in 2011.

## **1.2 Objectives of the exercise**

The objectives of this exercise was to test that effective procedures are in place to manage a Gas Supply Emergency. This includes ensuring that effective communication is in place. In addition to testing the standard communication routes, through Stages 1-3, Declaration, Interruption and Firm Load Shedding, Exercise Revive was designed to focus on the less tested Stage 4 Isolation and Stage 5 Restoration processes.

A secondary exercise was also identified to test the success of continuing Firm Load Shedding, beyond the usual sample data, usually 200 -250 sites. In the event of a genuine incident Firm Load Shedding would continue as required by the NEC, detailed in updated requests for demand reduction. To gain a better understanding of the demand reduction curve the NEC requested that a further 50 sites be contacted, from further down the Firm Load Shedding database. The sample included sites 301-350, but this was not revealed until the day of the exercise.

## **1.3 Report Objectives**

This report will outline the observations made during the exercise, identifying best practice and areas for improvement. The observations have been documented by each NGSE Stage performed, and include subsequent recommendations. Also included is an account of the areas which performed well and the actions identified to improve our performance. There is a breakdown of the Firm Load Shedding Data performed by Distribution Customer Services (CS) and the Isolation plans and discussions with Operations.

Following the analysis of the observations and recommendations made during the exercise, a more detailed Action plan has been put together including owners and suggested timescales for completion. (Section 3.5)

## 1.4 Participants and their roles

The following table identifies the members of Distribution that were leading the team during the exercise. The DNCC had a full emergency management team in place with liaison identified in Operations, Customer Services and at GNCC.

Role	Name
<b>DNCC – EMT</b>	
Exercise Coordinator & Emergency Advisor	Liz Fearn
Incident Controller	Richard Allen (Phil Brown)
Demand Controller	Rob Mitchell (Mark Freeman)
Network Manager Liaison	Carole Preston
TTF Operators	Gordon Compton
IGT/DN Contact	Lola Abiodun, Kareen Pilkington
Interruption Firm Load Shedding Liaison Officer	Diane Bentick
Log Keeper	Olurotimi Adeosun / Jatender Loi
EMT Support/ Fax Monitor	Chris Brine/ Derek Sharpe

**N.B. team members in brackets were in a mentoring / supporting role.**

<b>Customer Services</b>	
Firm Load Shedding Process Supervisor	Jonathan Ryan / Claire Sultana
<b>NG Operations Incident Room</b>	
Emergency Controller	Chris Green
<b>NEMT</b>	
GNCC/ DNCC Liaison Officer	Rosanna York & Wendy Arrowsmith

## 2. Observations

### DAY ONE

#### 2.1 Declaration of Stage 3

At 09:00 GNCC called a teleconference for all Distribution Network Operators. The initial fax from GNCC declared Stages 1 – 3 simultaneously. The scenario given was that a tanker had sunk in the North Sea and sunk and that the tanker was lying over the Langed pipeline. The operators of the pipeline had shut the safety valves on this pipeline on safety grounds and there was an estimated 70 MCM loss in supply.

The DNCC was not asked to provide a NETMAN1; a pre-prepared version was used based on a high demand day. The production of the NETMAN1 is regularly tested by the control room, and a separate exercise had recently tested the ability of all the DNO's to produce a NETMAN1 when requested by GNCC (Exercise Respond). NETMAN1 forms are produced by all DN control centres and provide information to the current supply and demand positions of each LDZ, this is used by the NEC to develop a Strategy to manage the situation.

Exercise Revive was based on the scenario taking place post implementation of Interruption Reform and therefore emergency interruption was limited to those consumers that will have an interruptible contract post October 2011. Firm Load Shedding included all consumers who will no longer be interruptible post October 2011. The exercise tested the contact details of the top 200 sites by load size in each LDZ.

A combination of Shipper supplied contact information and the contact details obtained and held by NGG as part of the preparation for Interruption Reform were used in Exercise Revive.

All DM Firm Supply Points in Exercise Revive were successfully contacted by telephone and no site visits were required.

No.	Observation	Recommendation
1	No initial contact made by GNCC, as would be expected in an emergency.	Ensure that emergency planning include a full walkthrough of Major events list, to ensure that Excons are aware of the contacts to expect.
2	Confusion within the DNCC Emergency Management Team regarding the simultaneous declaration of stages.	Increase awareness of simultaneous declaration through training. Add a statement to the task card to explain simultaneous declaration.
3	Firm Load Shedding initiation was confused due to planning by multiple persons and no coordination	Ensure only one contact is in place for GNCC /DNCC to avoid confusion.
4	Forms to use during an exercise both electronic and paper were difficult to find.	Ensure that electronic copies of all forms are saved into an appropriate location in the shared area, ensure that all staff are told of the location. Make use of the paper copies available in the Incident room.
5	Communication methods are changing to include use of email – ensure correct addresses are used.	Use of email internally was inconsistent with both personal and box accounts being used. Ensure all task cards and emergency procedures include the correct email box accounts for reference
6.	Some of the forms used during Interruption are no longer relevant post Interruption Reform	Forms need to be reviewed based on the changes brought in by Interruption Reform. Take forms to be discussed at E3 alignment group. (GNCC and all DN representatives)
7	Some confusion regarding which forms are sent and which are expected to be received by the EMT	Ensure awareness of the prefixes for forms is added to training. Increase awareness of what the different forms are for through training
8	Hourly updates from Customer Services received promptly. Positive change from previous exercises.	Change the method of communication from Fax to email –as it is internal communication. Keep fax number as a BCM contingency.
9	Confusion regarding the contact numbers Shippers should use, some used a Control room number	The number used was previously an interruption hotline. Shippers to be made aware which numbers are to be used. Ask them to remove all previous numbers.
10	Improve method of communication to request the Operations teams to set up the Incident room.	Request that Operations provide copies of the Band C standby rotas.

## 2.2 Stage 4 Isolation

Following the completion of the Firm Load Shedding, GNCC then requested that it was also necessary to isolate sections of the system to further reduce load. The level of demand required to be Isolated was based on an understanding that Firm Load Shedding was not completed to the required level. A request for a further reduction in demand, which led to approximately 10% of each of the Networks remaining load required to be Isolated.

The Operations Incident room sent representatives into the DNCC Incident room to take part in the teleconference with GNCC (NEMT) , this allowed for a prompt handover of the NET 5. Operations representatives were also able to give a suggested timescale for completion of this form. The advantages of having these liaison representatives in the DNCC is that DNCC were able to obtain an immediate understanding of the Operations issues relating to Manpower and the potential effects of the weather conditions. The Operations incident team were also able to explain the reasoning behind the isolation plans being discussed. Weather and Operations team locations are important to deciding what isolation will be the most efficient use of resources available. Also considered was the impact and time in order to restore those areas Isolated.

No.	Observation	Recommendation
11	Forms required for Isolation plans were not available to Operations teams (NET 5Ra & NET 5Rb) within the procedure document.	Ensure Operations have copies of all forms that they send to DNCC within their E3 procedures. Electronic copies should also be available.
12	Timescales for achieving completion of Isolation plans (one hour) unrealistic – due to a review of manpower, logistics of isolating the system	Work needed to understand what is achievable/ acceptable to NEC.
13	Inclusion of GBNA within the decision loop worked well	Revise the process to formalise this change
14	Estimates of Operational timescales for isolation (and restoration) were based on experience	Experience should be consolidated into an estimating tool, possibly a spreadsheet or guidance document. This would ensure a consistent approach to manpower and timescales
15	Criteria for selecting sectors for isolation were determined on the day	Document the factors that need to be considered when selecting sectors for isolation to ensure a consistent approach to managing isolation. Include in E3 procedures.
16	There is a need to identify which Non-domestic loads are in isolated sectors.	IES has a requirement to be able to produce a report with the listing of all sites within an isolated area.

## DAY TWO

### 2.3 Stage 5 – Restoration

Day 2 began with an update teleconference with GNCC declaring Stage 5 actions could begin, with partial restoration. Additional Gas Request (AGR) forms were used for the first time, to provide the NEMT with an estimate of gas that could be utilised by each LDZ. This form was updated several times as more gas became available. Consideration was also given to the areas of the network that had been isolated and the timescales to restore all supplies. A gradual daily increasing demand was proposed.

Due to the nature of the incident a single restoration plan may not be suitable; instead a number of considerations should be made in order to achieve restoration in the most efficient way. A working group has been set up to consider, where possible, the use of self purge and relight procedures (E4 and E5), to accelerate the restoration process.

No.	Observation	Recommendation
17	Stage 5 processes require further development	Whilst prescriptive processes are likely to be inappropriate, factors to consider and the decision making process could be further refined.
18	DNCC to look at manual forecast calculations and how to increase demand based on different restoration scenarios	Look at the way Gas demand is forecast. Raise awareness with GNCC as to the accuracy of such calculations
19	Further understanding required on how DNO's invoke Self purge and relight or suspend the Standards of service	Look in to what documentation and agreement would be required in these circumstances and ensure documentation is in place. This would need to be industry wide.
20	Need to look at the process of declaring multiple LGSE's following Isolation	Add to Ops and DNCC E3 procedures a flow chart to show the change from NGSE to LGSE document.

## 2.4 Additional Observations

The following are general observations that may help to improve the success of exercises or emergency procedures in the future.

No.	Observation	Recommendation
21	Telephone directory similar to that published on Avogadro should be maintained during an incident	Determine what numbers would be required and establish who would be responsible for creating and circulating this type of document.
22	Operations Incident room needs to dovetail with DNCC and CS	Further work to refine and align all documents across the teams, perhaps set up a Distribution Emergency process group.
23	Some Shippers do not seem to understand how Interruption Reform will change the way sites will be contacted during an Emergency.	Provide Shippers with information regarding their responsibilities to the sites in their portfolio following the implementation of Interruption Reform.
24	New forms from GNCC – SitRep and AGR had a few issues due to lack of supporting information	Provide feedback on use of the forms, work with the E3 alignment group to refine the forms and their use.
25	Loss of access to an emergency database due to EMT staff going home early. (note this was an interim database and should not be an ongoing issue)	Ensure a handover process is in place for all members of the EMT to ensure all aspects of processes can be maintained appropriately.
26	Pass information gained from Restoration to the development of new systems.	Restoration methodology and form use to be documented and passed to the Interruption & Emergency System development team to ensure suitable requirements are in place to manage Restoration

## **3. Conclusions**

### **3.1 UK Distribution**

Exercise Revive was on the whole a positive learning experience for Gas Distribution and the testing of Stage 4 & Stage 5 has identified a number of areas that require further development. All those involved found the experience useful to understand how an emergency might be managed through restoration. In some areas it is clear that the procedures need to be developed to manage different types of situations.

UKD is currently going through a restructure which may lead to changes in the way the Emergency process is managed moving forward. The result of this restructure is yet to be finalised, however it is possible that the way emergency procedures are implemented may change and this may lead to an increased requirement for training and changes to the Emergency Management Teams currently in place.

Representation on the E3 alignment group that ensures alignment of the E3 procedures continues to be led by DNCC. This group focuses on the processes in place that communicate with GNCC and ensures consistency with other Distribution organisations, to ensure all organisations produce the same information and have the same understanding of what is required.

### **3.2 DNCC**

The DNCC Emergency Management Team found that involving the appropriate number of individuals made the process run more smoothly. There is a need to get more people involved in exercises for training purposes, however limiting the involvement meant that those involved were able to get more learning from the experience. The Key roles were held by managers who had not performed these roles before, supported by experienced Mentors. The confusion at the beginning of the exercise with regards to communication and simultaneous invoking of Stages identified the need for further training and familiarisation with the E3 procedures and particularly the task cards. On the whole though the exercise went well and has highlighted a number of items that will need to be altered prior to the changes brought in through Interruption Reform. The DNCC used a different Emergency Management Team structure that will need to be formalised prior to October 2011.

Those taking part in the exercise within the DNCC EMT, have all completed mandatory annual emergency training and also hold an emergency STC. Those fulfilling the key roles of the EMT should also hold the Emergency Handling for Managers STC, or be working towards achieving this STC. To embed an increased awareness of emergencies DNCC try to encourage the team to take part in an exercise, ideally every three years.

### **3.3 Customer Services**

Customer Services continue to improve in understanding of their role in a Gas Supply Emergency. With the increased number of sites involved in Firm Load Shedding from next year the improvements to their team structures and the procedures they have in place is already showing benefits. An increased awareness of their role in Gas Supply Emergencies and greater training of staff has improved the success rate.

Further work needs to be done to formally handover the maintenance of procedures and systems to the Customer Services team, this work has been supported by DNCC. The implementation of a new Firm Load Shedding system in 2011 should facilitate this.

### **3.4 NG Operations**

Operations Incident Room was well placed and able to provide relevant information to the Emergency Management team when requested. Exercise Revive provided an opportunity to look at the development of Isolation plans and the use of Self Purge and Relight procedures (E4 and E5). Isolation has been identified as a more complicated area, as it is not just about reducing load in the

fastest possible way, but also identifying the most appropriate solution based on manpower, weather conditions and Restoration. Operations procedures need to be refined to include some of the learning gained from this exercise, particularly ensuring the correct forms can be accessed when required.

### 3.5 Action Plan

The following action plan has been developed based on the observations made during the exercise. Timescales and actions should be updated and maintained to ensure that they are addressed prior to the next emergency exercise.

No	Category	Action	Owner	Completion Date
1	Process	Update all E3 procedures to include learning from Exercise Revive: DNCC, Operations & FLS	Liz Fearn	April 2011
2	Process	Update forms within E3 procedures to ensure they are fit for purpose – discuss at E3 alignment with iDN's	Liz Fearn	April 2011
3	Ops	Provide DNCC with standby rotas for Band C managers to enable Operations incident room to be established	Chris Green	December 2010
4	Process	Ensure relevant forms are available to all staff electronically and paper copies – all to update paperwork	LF/CG/ FLS	April 2011
5	Ops	Further work to develop and refine E4/E5 and link to E3 procedures	Chris Green	August 2011
6	System	Ensure IES (Interruption & Emergency System) requirements reflect information required during an incident	Liz Fearn	December 2010
7	Process	All Distribution E3 documents need to dovetail, look into establishing a Distribution Emergency process group.	Liz Fearn	March 2011

## 4. Supplementary Information – Firm Load shedding

### 4.1 Firm Load Shedding Summary by LDZ and Shipper

This table details a breakdown of successful and unsuccessful contacts by LDZ and shipper. The table shows data from both that collected by Shippers (xoserve) and NG and the difference in performance.

### 4.2 Large DN Loads (>2mtpa <50mtpa)

The following table showing the difference between successful contact of just using data provided by xoserve and those collated by xoserve and National Grid for the larger sites. This shows that the increased success of the Firm Load Shedding is partially the result of more accurate contact details being available. To collect the National Grid data, time was spent contacting sites individually and ensuring that those contacted were familiar with the emergency process.

To continue to ensure the success of Firm Load Shedding it is important to maintain accurate data, whether this is through xoserve or through direct contact with sites.

Shipper	Successfully contacted xoserve Data only	Successfully contacted xoserve Data + NG Data	Number of Sites	% of Successful Contacts xoserve only	% of Successful Contacts xoserve + NG Data
AGA TOTAL	110	159	175	62.86%	90.86%
AGI TOTAL	22	35	41	53.66%	85.37%
BUS TOTAL	37	69	78	47.44%	88.46%
EMI TOTAL	0	1	1	0.00%	100.00%
GLC TOTAL	25	40	48	52.08%	83.33%
HDW TOTAL	11	28	31	35.48%	90.32%
KIN TOTAL	65	84	95	68.42%	88.42%
LEP TOTAL	2	3	3	66.67%	100.00%
NGD TOTAL	15	18	21	71.43%	85.71%
NGS TOTAL	69	113	126	54.76%	89.68%
POW TOTAL	0	2	2	0.00%	100.00%
QUA TOTAL	110	158	169	65.09%	93.49%
RBS TOTAL	1	1	1	100.00%	100.00%
RGG TOTAL	3	4	4	75.00%	100.00%
RWE TOTAL	0	1	1	0.00%	100.00%
SCP TOTAL	1	3	3	33.33%	100.00%
SHE TOTAL	2	2	3	66.67%	66.67%
SMT TOTAL	1	2	2	50.00%	100.00%
SOP TOTAL	7	9	10	70.00%	90.00%
STA TOTAL	15	32	33	45.45%	96.97%
VEC TOTAL	15	30	37	40.54%	81.08%
VOL TOTAL	62	108	116	53.45%	93.10%

### 4.3 High level Summary

A summary of the results from Exercise Revive are shown in the tables below. The tables show the percentage of load that has been reduced through Firm Load Shedding

Gas Network	NL	WM	NW	EM	EA
Number of Sites to be Contacted	200	200	200	200	200
Unable to Contact	10	29	17	11	20
Unable to Stop using Gas	0	4	1	5	1
Could Stop using Gas	190	167	182	184	179
Percentage DM Load Shed	100%	100%	100%	100%	100%
Percentage NDM Load Shed of the Sample Sites	97%	85%	91%	93%	87%

Gas Network	NL	WM	NW	EM	EA
Percentage Load Shed After 4 Hours	8.0%	8.5%	12.9%	19.8%	9.1%

NEC Exercise	% LDZ Load Shed in 4 Hours Elapsed Time
Neptune	4.0%
Opus	7.8%
Prelude	9.8%
Quartz	9.0%
Reform	10.7%
Revive	11.9%

n.b. The last three Firm Load Shedding exercises have used post interruption reform data, with 7 sites interruptible and an increased number of sites asked to Firm Load Shed.

The results of Exercise Revive have again shown an improved load shedding performance compared to previous exercises. The improved success of Firm Load Shedding has been achieved in a number of ways. The processes used have been reviewed and updated, including a review of the organisational structure used. These have also been trained out to all staff that may be required to assist. Performance has improved as more staff understand the purpose of Firm Load Shedding and its importance during an Emergency.

### 4.4 Secondary Firm Load Shedding Exercise

A Secondary exercise was carried out to look at the success of Firm Load Shedding as we progress through the list of available industrial loads. The total number of sites within the FLS database is approximately 16,000 for all five LDZs. During the NEC exercises the Firm Load Shedding scope was to contact the top 200 – 250 sites. An exercise was put in place to test the success of contacting sites 301 – 350. This sample data sites have rarely been contacted in previous exercises and some have far smaller SOQ totals and would have limited impact on Load shedding across an LDZ.

The aim of the exercise was to test awareness of the process for those with smaller SOQ's and to establish if there is a point, where Firm Load Shedding no longer has any affect on reducing demand and that further measures need to be put in place by the NEC, e.g. Isolation. This also provided more accurate information to produce a detailed Load Shedding curve.

A summary of the results from the secondary exercise are shown below.

<b>Gas Network</b>	<b>NL</b>	<b>WM</b>	<b>NW</b>	<b>EM</b>	<b>EA</b>
Number of Sites to be Contacted	50	50	50	50	50
Unable to Contact	18	23	6	8	15
Unable to Stop using Gas	1	3	10	10	2
Could Stop using Gas	31	24	34	32	33

<b>Gas Network</b>	<b>NL</b>	<b>WM</b>	<b>NW</b>	<b>EM</b>	<b>EA</b>
Percentage of sites that could stop using Gas	62%	48%	68%	64%	66%

Contact was made with 72% of the 250 sites with a total of 62% of consumers able to stop using gas. This exercise has highlighted the success of the work done to validate contact information to ensure it is accurate for firm sites. The success of firm load shedding depends on the ability to make successful contact with a site.