

## Natural gas pipeline system

The operator for the notified major accident hazard pipelines in this area is Northern Gas Networks (NGN). The product carried is natural gas.

NGN supply maps showing pipeline routes and data to the civil contingencies team. This information is shared with Northumberland Fire and Rescue Service. The details recorded include data on bore diameter, operating pressure and above ground equipment such as valves and pumping stations. For security reasons this information is not available to the public, but local authority planning and civil contingency sections can make a request to NGN for the pipeline major accident prevention document, which contains the above information.

### Release of gas

Significant damage to a major accident hazard pipeline that results in a pipeline puncture or rupture will lead to a pressurised release of natural gas. If ignited this may give rise to a thermal radiation hazard to individuals in the vicinity. Ignition can be immediate, delayed local ignition, delayed remote ignition, or no ignition at all. Each scenario may have different consequences, hazard ranges and duration and for this reason time, scale and sequence of any incident will vary.

Duration of pipeline leaks

When a high-pressure pipeline fails, immediate and rapid de-pressurisation occurs over a matter of seconds, and this is followed by relatively stable flow as the pipeline unpressurises due to the leak and continued pumping of gas into the pipeline. Flow may last for several hours, dependant on the location and topography of the pipeline and the time taken for NGN personnel to arrive on-site to shut down valves.

### Blast effects and projectiles

The pressure blast at the time of failure can be significant in close proximity to the pipeline. Covering material over the pipeline may be thrown into the air at high velocity, but the serious effects will diminish with distance. Delayed ignition in the vicinity of buildings may result in loss of window glass as a result of blast over pressure.

### Fire and explosion

The ignition of any release of gas will cause a flare, which may have serious effects due to thermal radiation. People can be shielded indoors but radiation levels may be sufficient for buildings to catch fire. Techniques are available for estimating the thermal radiation from an estimated quantity of gas released over time. Any failure of pipelines carries the risk of ignition, but experience has shown that in the majority of cases ignition does not occur.

If a release of gas does not ignite immediately, it will form a cloud, which will disperse over large distances. If a cloud of gas ignites it may burn back as a flash fire to the point of origin. As it disperses it will be diluted with air, the concentration falling below the lower explosive level (LEL) when it will no longer present a fire hazard. The distance over which such a release may disperse depends on the type of release and the prevailing weather conditions. Concentrations and duration may be estimated using plume modelling.

It is important that ignited gas is not extinguished unless specifically requested by the NGN on-site controller.

### Noise

The release of high-pressure gas creates a great deal of noise, which can be very intense leading to temporary hearing damage. High noise levels can also be disorientating and may cause unexpected behaviour in people affected.

### **Emergency planning distances**

NGN have calculated hazard information related to thermal radiation. This is supplied to the fire and rescue service and is also available to planning departments within local authorities.

### **Plan activation**

In view of the extreme nature of a high-pressure pipeline failure it is likely that initial notification will be by a member of the public either by a 999 call or to the gas emergency number.

The emergency services and NGN will follow their standard procedures to investigate reports. If at any stage they identify a requirement for additional resources, a mutual decision will be taken to notify other organisations and undertake wider coordination. This process is the same as that employed in response to other major incidents.

There is a single national gas emergency number for all notifications: 0800 111 999.

### **Ethylene pipeline system**

The operator for the notified major accident hazard pipelines in this area is SABIC UK Petrochemicals. The product carried is ethylene.

### **Release of gas**

Significant damage to a major accident hazard pipeline that results in a pipeline puncture or rupture will lead to a pressurised release of ethylene.

### **Blast effects and projectiles**

Release of very high pressure gas from an underground pipeline would cause soil and stones to be ejected from the formed crater. However, severe chilling will freeze any moisture in the ground and may cause the ground to become more stable. Debris from a high pressure gas release is only likely to be thrown during the first few minutes of a release and its range will be small.

### **Noise**

The release of high-pressure gas creates a great deal of noise. This would have two effects:-  
The hazard would be self-advertising.

Close to the leak, noise levels may be very high and people could become disorientated and may behave unexpectedly. The noise may cause temporary hearing damage but permanent hearing damage is not likely.

### **Plan activation**

The emergency services and SABIC UK will follow their standard procedures to investigate reports. If at any stage they identify a requirement for additional resources, a mutual decision will be taken to notify other organisations and undertake wider coordination. This process is the same as that employed in response to other major incidents.