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**Health and Safety Executive
Hazardous Installations Directorate
Land Division**

National Field Delivery Unit

**Operational Strategy for the Pipeline and
Natural Gas Supply Industries**

2003/2006

April 2003

Introduction

1 The National Field Delivery Unit (NFDU), part of the Health and Safety Executive's (HSE) Hazardous Installations Directorate (HID), has developed this strategy. NFDU has the operational lead within HSE for the pipeline and upstream¹ natural gas industries. The intention of the strategy is to ensure the risks in the pipeline and natural gas supply industries are properly controlled and to support the Health and Safety Commission's (HSC) strategic plan² for securing the health, safety and welfare of people at work and the public. The strategy also supports HID's strategic plan 2001 - 2004.

2 This strategy covers the period 2003 – 2006 and is reviewed and revised annually.

HSC/E's strategic plan

3 HSC/E's strategic plan covers 4 main blocks of work:

- **Major Hazards** – which includes onshore and offshore pipelines, major gas installations and the safe supply of natural gas;
- **Priority programmes** – there are currently eight priority programmes covering industry wide topics that have been identified as contributing to high incident rates of injury or ill health. Currently two areas, stress and musculoskeletal injuries, are relevant to this sector;
- **Securing compliance** – HSE will continue to enforce the Health and Safety at Work Act 1974 in all workplaces, focusing on those that require most improvement;
- **Mandatory Activities** – including projects to modernise and improve health and safety legislation in Great Britain and promoting research that supports HSC/E's business aims.

4 To provide clarity of the link to the HSC/E strategic plan, this strategy is written broadly to match these blocks of work.

Stakeholder engagement

5 NFDU recognises that its plans cannot be achieved without stakeholder engagement. Critical stakeholders include:

- other UK government departments and regulatory bodies (e.g. DTI, Ofgem);
- other governments/departments (e.g. the Manx Government, European Pipeline Regulatory Authorities);
- operators, contractors and manufacturers;
- industry groups, employers and employee representatives;
- professional institutions, trade associations and standards making bodies;

and NFDU will continue to make contact and consult where necessary.

¹ Upstream of the emergency control valve at consumers premises

² HSC's strategic plan for 2001/2004

6 NFDU has a policy for contacting and consulting employees and employee' representatives during routine inspections and in more formal settings. For example, the Head of Unit meets annually with Transco Trades Union representatives. The policy of employee consultation will continue across the gas and pipelines industries.

7 We hold two workshops within the Unit each year to review current issues, meet formally once a year with Offshore Division (OD) to discuss offshore pipeline issues and has regular meetings with Safety Policy Division (SPD) on gas and pipeline matters.

Scope of the strategy

8 The strategy covers the integrity and safety of all pipelines [and associated equipment and plant] where the Pipelines Safety Regulations 1996 [PSR] apply. This includes major accident hazard pipelines (MAHPs), both onshore and offshore, and non-MAHPs covered by PSR. Both health and safety risks are covered.

9 In respect of the natural gas supply industry, it covers the onshore gas supply network from the beach terminals through to the end of the network which is usually the emergency control valve at individual premises. It includes the transmission, distribution and storage systems and the health and safety of those exposed to risks from these activities.

10 The strategy encompasses issues under the Gas Safety (Management) Regulations 1996 [GS(M)R] concerning security of supply, gas quality and emergency service provision in the event of a gas escape.

11 The strategy also covers a number of strategic oil storage installations operated by the Oil and Pipelines Agency (OPA).

Current influences on the strategy

Natural gas supply industry

12 The gas industry continues to be in a period of change where the role of existing players evolves and new companies enter the industry.

13 Some of the key issues affecting the UK gas supply environment are:

- a continued increase in demand for gas due to gas-powered electricity generation and anticipated increases in gas imports through the European interconnector;
- a potential shortfall of indigenous UK stocks in the next 5 years;
- an increase in LNG usage;
- further structural changes in the industry.

Pipeline Industry

14 Nearly all pipelines on land pass through areas accessible and/or in close proximity to the general public and require an effective regulatory regime to ensure they are operated safely. Pipelines are also a potential source of danger to offshore installations and vessels and an equally effective regime is required to protect those who live and work in this environment.

15 The majority of pipeline systems, including major accident hazard pipelines, have a very good safety record in this country and one of the priorities of the strategy is to ensure this level of safety is maintained or improved upon where necessary. Proactive inspection of new or modified MAHP designs is given a high priority to ensure safety and integrity is designed in at the outset. A precautionary approach is adopted, including the principles of inherent safety, to ensure that pipelines are properly routed, designed, built and operated so that the risks of failure are reduced to as low as reasonably practicable.

16 However, pipelines are vulnerable to damage from a variety of causes and proper provision for emergency arrangements and plans should exist to control and mitigate the effects of incidents and accidents.

MAJOR HAZARD BLOCK

17 In terms of HSC/E's major hazard block of work, NFDU's work splits broadly into the following areas:

- Gas Safety (Management) Regulations 1996 (GS(M)R);
- Pipelines Safety Regulations 1996
- Control of Major Accident Hazards Regulations 1999 (COMAH);

Gas Safety (Management) Regulations 1996 (GS(M)R)

Safety case assessment and verification

18 New safety cases and material revisions to existing safety cases will be assessed as they arise. However, there will be more emphasis on post-assessment verification and inspection to ensure gas transporters are complying with accepted safety cases.

19 The Safety Case Handling and Assessment Manual (SCHAM) will be updated periodically following operational experience and feedback from stakeholders.

Network gas supply emergencies

20 One of the main aims of GS(M)R concerns continuity of supply and duty holders have to establish adequate arrangements to minimise the risk of a supply emergency and for dealing with one should it occur.

21 Assessment, verification and inspection of the Network Emergency Co-ordinator's (NEC's) and Gas Transporter safety cases will continue to ensure adequate arrangements regarding supply emergencies are in place.

22 NFDU may observe tests of the NEC's procedures for managing a network gas supply emergency.

23 The extent to which gas shippers, suppliers and major gas consumers co-operate with the NEC will be closely monitored. A large scale NEC emergency exercise in 2002 identified shortcomings in the reliability of shipper emergency contact information and NFDU is working with the NEC, Shippers, Ofgem and DTI to resolve this issue, specifically through the Commercial Issues Working Group.

24 NFDU will continue to support the Government's Gas Industry Emergency Committee (GIEC) and Joint Response Team (JRT) on wider issues concerning gas supply emergencies.

25 NFDU has commissioned support from HSE's Health and Safety Laboratory (HSL) to look into the potential pre-cursors of a gas supply emergency with a view to informing our intervention strategy with duty holders and other stakeholders e.g. DTI, Ofgem.

26 The quality of GS(M)R investigation reports is of current interest to NFDU and a system for collecting and analysing information from these reports has been implemented. Naturally, leaks from Transco's ageing iron mains form a significant part of these reports and NFDU have commissioned HSL to inspect Transco's investigation system concerning leaks from the distribution networks and consequences for their mains replacement policy. HSL will report in April 2003.

27 NFDU continues to monitor developments in the liberalised gas industry and possible effects on standards of safety. We are involved currently with:

- meter competition and unbundling proposals;
- changes to the exit reform regime and consequences for the safety case;
- proposals concerning liquefied natural gas (LNG) facilities;
- potential further structural changes in the industry and the consequences for maintenance of a secure supply and emergency service provision.

Pipelines Safety Regulations 1996 (PSR)

28 Whereas GS(M)R is concerned primarily with security of supply, PSR deals with, amongst other matters, the integrity and safety of pipelines and associated plant and systems. NFDU's work is concentrated on the following areas:

- Major accident hazard pipelines (MAHP), onshore and offshore;
- The natural gas distribution networks and mains replacement;

although other non-MAHP are not ignored.

Major accident hazard pipelines (MAHP)

29 One of the Unit's primary functions is to ensure that duty holders design, construct, operate and maintain pipeline systems safely. This is achieved by assessing and verifying the arrangements described in pipeline notifications submitted under PSR.

30 Assessment, verification and inspection will continue for pipeline aspects of safety cases required under the Offshore Installations (Safety Case) Regulations 1992 where NFDU pipeline inspectors provide specialist topic support to HSE's Offshore Division.

31 A range of assessment and inspection activities is planned over the period including targeted assessment of new pipelines and enforcement of the general duties under PSR.

32 There are significant safety considerations with the potential uprating of more of the natural gas transmission system to 85 bar and HID have developed a codified system for assessing future uprating proposals.

33 A range of assessment and inspection activities is planned over the period. A proactive approach is adopted from the concept design stage, including routing, through to construction, commissioning, the operational phase and on to decommissioning for MAHPs. There will be more emphasis on systems where operating pipelines may not be a core business activity.

34 Activities include:

- responding to statutory notifications under regulations 20, 21 and 22;
- inspecting new and modified pipeline designs, including routing;
- acting as focal point within HSE for communication with the Department of Trade and Industry for Petroleum Act 1998 and Pipelines Act 1962 pipelines;
- inspecting pipeline fabrication and construction activities;
- inspecting pipeline operations and safety systems;
- inspecting pipeline schemes of inspection and maintenance;
- inspecting and auditing major accident prevention documents (MAPDs);
- inspecting arrangements by pipeline operators and local authorities for responding to incidents, emergencies and major accidents; and
- investigating pipeline incidents and accidents (in conjunction with others in HSE where appropriate).

35 NFDU intends to expand the inspection process to include design houses as well as paying more attention to pipeline constructors and fabricators.

36 Currently NFDU are examining procedures for hydrostatic testing of gas transmission pipelines and this work will continue.

37 NFDU will develop new strategies for dealing with operators of an ageing pipeline population and with pipelines reaching the end of their original design lives. This will include methods of assessing proposals for revalidation, rehabilitation as well as decommissioning and abandonment of pipelines.

38 Whilst NFDU resources are targeted at MAHP, some of the above activities are applicable to non-MAHP and will be used where appropriate.

The natural gas distribution networks and mains replacement

39 The medium pressure [MP] and low pressure [LP] gas distribution and service pipe networks are a special category of non-MAHPs, comprising the largest proportion of the pipeline infrastructure in this country. Transco operate the majority of these pipelines and failures in the ageing iron mains population (some laid over 100 years ago) through fracture and corrosion have been a cause for concern for a number of years.

40 In September 2001, HSE published its enforcement policy for the replacement of iron gas mains³. This announced an accelerated mains replacement programme for 'at risk' (i.e. within 30m of property) LP ductile

³ The Health and Safety Executive's enforcement policy for iron gas mains.

iron and cast iron mains for the period 2002 – 2007. This would put Transco in a position to decommission the remainder of the at risk mains within 30 years.

41 The 'at risk' MP ductile iron mains were subject of an Improvement Notice that required Transco to remove ~ 2300 km of pipes by 31 December 2002. This period was subsequently extended to 30 April 2003 whereby some 2800 km of mains will have been removed.

42 Following on from this, in 2002 – 2003 work year, NFDU audited Transco's West Midlands Network's compliance with the mains replacement policy and further similar work is planned.

43 In addition, under the proposed Pipelines Safety (Amendment) Regulations 2003, NFDU, on behalf of HSE, will approve replacement programmes for the iron gas main population and monitor progress in achieving these plans.

44 Whilst Transco operate the major iron networks, there are a number owned and operated by other duty holders e.g. Local Authorities, Housing Associations. NFDU, in association with HSE's Field Operations Directorate (FOD), has started a programme for identifying these networks and ensuring they are replaced as required. Priority attention is being given to medium pressure ductile iron networks.

45 NFDU will monitor developments concerning the integrity of polyethylene pipes (PE). Issues of interest include long-term effects through material ageing, use at higher pressures and systems for locating PE pipes.

46 NFDU will examine issues concerning the quality of the installation of PE pipes, for example butt welds.

47 As the structure of gas industry changes, cooperation and communication between network operators and other stakeholders has become more important. NFDU will monitor this situation and take action where appropriate to ensure safety standards are maintained.

48 NFDU considers safe control of operations on gas networks to be important, and non-routine operations, including isolation standards, will be inspected.

Control of Major Accident Hazards Regulations 1999 (COMAH)

Major accident hazard sites - safety report assessment and inspection

49 NFDU will assess COMAH safety reports, covering a range of establishments in the gas supply chain, including terminals and gas storage sites, and the Oil and Pipelines Agency (OPA) fuel storage facilities.

50 NFDU will implement inspection plans covering these establishments, which includes assessing the integrity of plant and safety management systems.

51 An inspection plan for low pressure gas holders has been developed.

52 In support of a wider HSE/HID project, NFDU will be inspecting the safety of occupied buildings at COMAH sites.

PRIORITY PROGRAMME BLOCK

53 As part on the Government's initiative on revitalising health and safety, HSC/E's strategic plan contains eight priority programmes. Two of these are currently relevant to the gas and pipelines industries:

- Musculoskeletal disorders;
- Work-related stress.

Musculoskeletal disorders - hand arm vibration syndrome (HAV)

54 HAV from use of percussive tools has been identified as being potentially the most significant health issue in the gas supply sector. NFDU is continuing with a central intervention with Transco plc looking at HAV incidence rates and programmes for controlling and minimising the risks. Already this has resulted in significant improvements. It is hoped best practice can be identified which will be shared with other stakeholders in the utilities sector.

Work related stress

55 NFDU became aware that some manual workers in the gas distribution networks were working long hours regularly. This has implications for occupational stress, working safely, response to gas leaks on the network and compliance with the Working Time Directive. In 2002 NFDU inspectors worked with HID human factors specialists and FOD working time officers looking at these issues and will report in 2003. The recommendations from that report will be progressed.

SECURING COMPLIANCE BLOCK

56 Inspection and other regulatory activities to secure compliance with the law are at the core of the work of HSE and NFDU. This is achieved through a mix of assessment, preventative inspection, investigations, and formal and informal enforcement.

57 Preventative inspection is targeted at major hazard sites, major accident hazard pipelines (both on and offshore) and compliance with GS(M)R.

58 Similarly, investigation activities are targeted in these areas. However, the investigation of serious gas explosions resulting from leaks from distribution networks forms a significant proportion of NFDU reactive work and will continue to remain a priority, particularly where fatalities occur.

59 Investigation of complaints by employees, their representatives and members of the public is also a high priority.

60 Enforcement action following inspection and investigation will be taken in line with the Health and Safety Commission's enforcement policy.

Controlling third party interference

61 Approximately 75 % of reports to HSE required by GS(M)R concern gas leaks from distribution mains and services resulting from damage by third party interference, mainly during construction activities. The lead responsibility for investigating these incidents lies with HSE's Field Operations Division [FOD] but NFDU will support FOD in investigating these incidents and, where necessary, in taking formal enforcement action.

62 There have been several instances of damage to gas mains when horizontal drilling techniques have been used and further work is proposed to ensure proper control measures are used.

MANDATORY ACTIVITIES BLOCK

63 HSE's Mandatory Activities are concerned with modernising legislation, providing information and advice, conducting research and operating statutory schemes and approval systems – where they support delivery of HSC/E's and Governments Public Service Agreements Targets. Whilst much of this work is carried forward elsewhere in HSE, NFDU make a significant contribution in several areas.

Gas legislation and operational policy

64 NFDU will continue to work closely with HSE's SPD in the developing policy and legislation. This will include assessing Ofgem and DTI proposals, EU developments and the impact of new legislation.

Pipelines Safety Regulations 1996 (PSR)

65 NFDU has worked closely with SPD on proposed changes to the Regulations as a result of the agreed mains replacement programme for iron gas pipes. Other issues are outstanding e.g. gasoline pipelines, testing emergency plans by local authorities and additional duties on pipeline designers and constructors. NFDU will continue to provide support to SPD on further developments of PSR.

66 NFDU has supported the United Kingdom Onshore Pipeline Operators Association (UKOPA) and the Emergency Planning Authorities in developing a code of practice for testing pipeline emergency plans and will continue to assist SPD as this work progresses.

Review of the Gas Safety (Management) Regulations 1996

67 NFDU will continue to support SPD in the review of the GS(M)R and is represented on the Transmission and Distribution working group.

European Union Pipelines Safety Instrument

68 It is probable that the European Union (EU) will start moves to introduce a Pipelines Safety Instrument within the period of this strategy and technical and other support will be provided to SPD during discussions with industry, other government departments and in negotiations with Europe.

Gas and pipeline safety standards

69 Although the Methodology and Standards Development Unit (MSDU) in HID take the lead on standards work, NFDU will continue to provide technical and operational support for standards development.

Gas and pipeline safety initiatives, projects and R&D

70 NFDU will continue to support MSDU in identifying, developing and managing pipeline and gas related R&D where there is a clear benefit in terms of safety and, in particular, where Joint Industry Projects (JIPs) are proposed.

71 Continued support will be given to UKOPA for its leakage and incidents databases and to the United Kingdom Offshore Operators Association (UKOOA)/Institute of Petroleum for the development of the Pipeline and Riser

Loss of Containment Study (PARLOC). HSE is also a corporate member of the Pipelines Industry Guild (PIG) and is represented by NFDU.

72 NFDU/MSDU proposed a project on “Public Perception of Risks from MAHPs” which is currently being evaluated.

73 The potential for uprating the operating pressures of gas transmission pipelines continue. NFDU were involved in assessing the uprating the gas transmission system to 85 bar and in developing a codified system for these assessments. They are also represented on the panel revising IGE TD3. NFDU will be involved in assessing future proposals, taking into account the principles in HSE’s document ‘Reducing risks, protecting people’ and the ALARP suite of documents which supports it.

74 Guidance is to be developed to ensure that hazard and technical assessments associated with offshore pipelines (including risers) can be properly evaluated. Key areas of attention include riser Emergency Shut Down Valves (ESDVs) (where HSE is working closely with UKOOA), High Integrity Pressure Protection Systems (HIPPS) and subsea isolation systems.

75 NFDU has commissioned work to look at the factors affecting the failure of large diameter (>12 “) cast iron distribution mains to support its intervention with respect to Transco’s mains replacement policy.

Treaties and Memoranda of Understanding

76 The implementation of a number of treaty arrangements for pipelines between the UK and other countries, including Norway, Republic of Ireland and the Netherlands is the responsibility of NFDU. Pipeline Inspectors also act of behalf of the Isle of Man for pipeline activities in Manx waters and on the island. As indigenous gas resources deplete, UK is likely to become a net importer of gas within the next five years, and NFDU will monitor developments in this area, particular concerning issues surrounding present and future interconnectors.

Local initiatives, projects and R&D

77 NFDU is involved in a number of projects on its own or in conjunction with other HSE Directorates or other government departments. For example, assessing offshore pipeline emergency shut down valve performance, corrosion management of offshore pipelines and risers and the extension of high pressure/high temperature operations.