

Systematic assessment of safety integrity level requirements

Recommendation 1 The Competent Authority and operators of Buncefield-type sites should develop and agree a common methodology to determine safety integrity level (SIL)²⁰ requirements for overfill prevention systems in line with the principles set out in Part 3 of BS EN 61511.(ref 24) This methodology should take account of:

- _ the existence of nearby sensitive resources or populations;
- _ the nature and intensity of depot operations;
- _ realistic reliability expectations for tank gauging systems; and
- _ the extent/rigour of operator monitoring.

²⁰ A SIL is a measure of the safety system performance, in terms of the probability of failure on demand. There are four discrete integrity levels, SIL 1–4. The higher the SIL level, the higher the associated safety level and the lower the probability that a system will fail to perform properly. Application of the methodology should be clearly demonstrated in the COMAH safety report submitted to the Competent Authority for each applicable site. Existing safety reports will need to be reviewed to ensure this methodology is adopted.

Protecting against loss of primary containment using high integrity systems

Recommendation 2 Operators of Buncefield-type sites should, as a priority, review and amend as necessary their management systems for maintenance of equipment and systems to ensure their continuing integrity in operation. This should include, but not be limited to reviews of the following:

- _ the arrangements and procedures for periodic proof testing of storage tank overfill prevention systems to minimise the likelihood of any failure that could result in loss of containment; any revisions identified pursuant to this review should be put into immediate effect;
- _ the procedures for implementing changes to equipment and systems to ensure any such changes do not impair the effectiveness of equipment and systems in preventing loss of containment or in providing emergency response.

Recommendation 3 Operators of Buncefield-type sites should protect against loss of containment of petrol and other highly flammable liquids by fitting a high integrity, automatic operating overfill prevention system²¹ (or a number of such systems, as appropriate) that is physically and electrically separate and independent from the tank gauging system. Such systems should meet the requirements of Part 1 of BS EN 61511 for the required safety integrity level, as determined by the agreed methodology (see Recommendation 1). Where independent automatic overfill prevention systems are already provided, their efficacy and reliability should be reappraised in line with the principles of Part 1 of BS EN 61511 and for the required safety integrity level, as determined by the agreed methodology (see Recommendation 1).

²¹ The factors that determine the type of independent automatic system required will include the effects on the upstream system, for example if filling from a refinery process, a ship or a railway vessel. For all systems the outcome required is the same, ie automatically stopping supply to the dangerously full tank by means that are fully independent of the tank gauging system.

Recommendation 4 The overfill prevention system (comprising means of level detection, logic/control equipment and independent means of flow control) should be engineered, operated and maintained to achieve and maintain an appropriate level of safety integrity in accordance with the requirements of the recognised industry standard for 'safety instrumented systems', Part 1 of BS EN 61511.

Recommendation 5 All elements of an overfill prevention system should be proof tested in accordance with the validated arrangements and procedures sufficiently frequently to ensure the specified safety integrity level is maintained in practice in accordance with the requirements of Part 1 of BS EN 61511.

Recommendation 6 The sector should put in place arrangements to ensure the receiving site (as opposed to the transmitting location) has ultimate control of tank filling. The receiving site should be able to safely terminate or divert a transfer (to prevent loss of containment or other dangerous conditions) without depending on the actions of a remote third party, or on the availability of communications to a remote location. These arrangements will need to consider upstream implications for the pipeline network, other facilities on the system and refineries.

Recommendation 7 In conjunction with Recommendation 6, the sector and the Competent Authority should undertake a review of the adequacy of existing safety arrangements, including communications, employed by those responsible for pipeline transfers of fuel. This work should be aligned with implementing Recommendations 19 and 20 on high reliability organisations to ensure major hazard risk controls address the management of critical organisational interfaces.

Recommendation 8 The sector, including its supply chain of equipment manufacturers and suppliers, should review and report without delay on the scope to develop improved components and systems, including but not limited to the following:

- _ alternative means of ultimate high²² level detection for overfill prevention that do not rely on components internal to the storage tank, with the emphasis on ease of inspection, testing, reliability and maintenance;
- _ increased dependability of tank level gauging systems through improved validation of measurements and trends, allowing warning of faults and through using modern sensors with increased diagnostic capability; and
- _ systems to control and log override actions.

²² Also commonly known as 'high-high' level alarms.

Recommendation 9 Operators of Buncefield-type sites should introduce arrangements for the systematic maintenance of records to allow a review of all product movements together with the operation of the overfill prevention systems and any associated facilities. The arrangements should be fit for their design purpose and include, but not be limited to, the following factors:

- _ the records should be in a form that is readily accessible by third parties without the need for specialist assistance;
- _ the records should be available both on site and at a different location;
- _ the records should be available to allow periodic review of the effectiveness of control measures by the operator and the Competent Authority, as well as for root cause analysis should there be an incident;
- _ a minimum period of retention of one year.

Recommendation 10 The sector should agree with the Competent Authority on a system of leading and lagging performance indicators for process safety performance. This system should be in line with HSE's recently published guidance on *Developing process safety indicators* HSG254.(ref 23)

Engineering against escalation of loss of primary containment

Recommendation 11 Operators of Buncefield-type sites should review the classification of places within COMAH sites where explosive atmospheres may occur and their selection of equipment and protective systems (as required by the Dangerous Substances and Explosive Atmospheres Regulations 2002). This review should take into account the likelihood of undetected loss of containment and the possible extent of an explosive atmosphere following such an undetected loss of containment. Operators in the wider fuel and chemicals industries should also consider such a review, to take account of events at Buncefield.

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Recommendation 12 Following on from Recommendation 11, operators of Buncefield-type sites should evaluate the siting and/or suitable protection of emergency response facilities such as firefighting pumps, lagoons or manual emergency switches.

Recommendation 13 Operators of Buncefield-type sites should employ measures to detect hazardous conditions arising from loss of primary containment, including the presence of high levels of flammable vapours in secondary containment. Operators should without delay undertake an evaluation to identify suitable and appropriate measures. This evaluation should include, but not be limited to, consideration of the following:

- _ installing flammable gas detection in bunds containing vessels or tanks into which large quantities of highly flammable liquids or vapour may be released;
 - _ the relationship between the gas detection system and the overfill prevention system. Detecting high levels of vapour in secondary containment is an early indication of loss of containment and so should initiate action, for example through the overfill prevention system, to limit the extent of any further loss;
 - _ installing CCTV equipment to assist operators with early detection of abnormal conditions.
- Operators cannot routinely monitor large numbers of passive screens, but equipment is available that detects and responds to changes in conditions and alerts operators to these changes.

Recommendation 14 Operators of new Buncefield-type sites or those making major modifications to existing sites (such as installing a new storage tank) should introduce further measures including, but not limited to, preventing the formation of flammable vapour in the event of tank overflow. Consideration should be given to modifications of tank top design and to the safe re-routing of overflowing liquids.

Recommendation 15 The sector should begin to develop guidance without delay to incorporate the latest knowledge on preventing loss of primary containment and on inhibiting escalation if loss occurs. This is likely to require the sector to collaborate with the professional institutions and trade associations.

Recommendation 16 Operators of existing sites, if their risk assessments show it is not practicable to introduce measures to the same extent as for new ones, should introduce measures as close to those recommended by Recommendation 14 as is reasonably practicable. The outcomes of the assessment should be incorporated into the safety report submitted to the Competent Authority.

Engineering against loss of secondary and tertiary containment

Recommendation 17 The Competent Authority and the sector should jointly review existing standards for secondary and tertiary containment with a view to the Competent Authority producing revised guidance by the end of 2007.

The review should include, but not be limited to the following:

- _ developing a minimum level of performance specification of secondary containment (typically this will be bunding);
- _ developing suitable means for assessing risk so as to prioritise the programme of engineering work in response to the new specification;
- _ formally specifying standards to be achieved so that they may be insisted upon in the event of lack of progress with improvements;
- _ improving firewater management and the installed capability to transfer contaminated liquids to a place where they present no environmental risk in the event of loss of secondary containment and fires;
- _ providing greater assurance of tertiary containment measures to prevent escape of liquids from site and threatening a major accident to the environment.

Recommendation 18 Revised standards should be applied in full to new build sites and to new partial installations. On existing sites, it may not be practicable to fully upgrade bunding and site drainage. Where this is so operators should develop and agree with the Competent Authority risk-based plans for phased upgrading as close to new plant standards as is reasonably practicable.

Operating with high reliability organisations

Recommendation 19 The sector should work with the Competent Authority to prepare guidance and/or standards on how to achieve a high reliability industry through placing emphasis on the assurance of human and organisational factors in design, operation, maintenance, and testing. Of particular importance are:

- _ understanding and defining the role and responsibilities of the control room operators (including in automated systems) in ensuring safe transfer processes;
 - _ providing suitable information and system interfaces for front line staff to enable them to reliably detect, diagnose and respond to potential incidents;
 - _ training, experience and competence assurance of staff for safety critical and environmental protection activities;
 - _ defining appropriate workload, staffing levels and working conditions for front line personnel;
 - _ ensuring robust communications management within and between sites and contractors and with operators of distribution systems and transmitting sites (such as refineries);
 - _ prequalification auditing and operational monitoring of contractors' capabilities to supply, support and maintain high integrity equipment;
 - _ providing effective standardised procedures for key activities in maintenance, testing, and operations;
 - _ clarifying arrangements for monitoring and supervision of control room staff;
- and
- _ effectively managing changes that impact on people, processes and equipment.

Recommendation 20 The sector should ensure that the resulting guidance and/or standards is/are implemented fully throughout the sector, including where necessary with the refining and distribution sectors. The Competent Authority should check that this is done.

Recommendation 21 The sector should put in place arrangements to ensure that good practice in these areas, incorporating experience from other high hazard sectors, is shared openly between organisations.

Recommendation 22 The Competent Authority should ensure that safety reports submitted under the COMAH Regulations contain information to demonstrate that good practice in human and organisational design, operation, maintenance and testing is implemented as rigorously as for control and environmental protection engineering systems.

Delivering high performance through culture and leadership

Recommendation 23 The sector should set up arrangements to collate incident data on high potential incidents including overfilling, equipment failure, spills and alarm system defects, evaluate trends, and communicate information on risks, their related solutions and control measures to the industry.

Recommendation 24 The arrangements set up to meet Recommendation 23 should include, but not be limited to, the following:

- _ thorough investigation of root causes of failures and malfunctions of safety and environmental protection critical elements during testing or maintenance, or in service;

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- _ developing incident databases that can be shared across the entire sector, subject to data protection and other legal requirements. Examples²³ exist of effective voluntary systems that could provide suitable models;
- _ collaboration between the workforce and its representatives, dutyholders and regulators to ensure lessons are learned from incidents, and best practices are shared.

²³ Such as HSE's Offshore Hydrocarbon Releases Database and the Rail Safety and Standards Board's National Incident Reporting System, NIR-Online.

Recommendation 25 In particular, the sector should draw together current knowledge of major hazard events, failure histories of safety and environmental protection critical elements, and developments in new knowledge and innovation to continuously improve the control of risks. This should take advantage of the experience of other high hazard sectors such as chemical processing, offshore oil and gas operations, nuclear processing and railways.

Assessing the potential for a major incident

Recommendation 1 Operators of Buncefield-type sites should review their emergency arrangements to ensure they provide for all reasonably foreseeable emergency scenarios arising out of credible major hazard incidents, including vapour cloud explosions and severe multi-tank fires that, before Buncefield, were not considered realistically credible. The Competent Authority should ensure that this is done.(ref 25: Rec 2)

Managing a major incident on site

Recommendation 2 The Competent Authority should review the existing COMAH guidance on preparing on-site emergency plans. This guidance needs to reflect the HSE's Hazardous Installations Directorate (HID) Chemical Industries Division inspection manual used by inspectors to assess the quality of the on-site plan in meeting the COMAH Regulations. In particular, reference should be made to the need to consult with health advisors and emergency responders.(ref 25: Rec 1)

Recommendation 3 For Buncefield-type sites, operators should review their on-site emergency plans to reflect the revised guidance on preparing on-site emergency plans as per Recommendation 2. The Competent Authority will need to check that this is done.

Recommendation 4 Operators should review and where necessary revise their on-site emergency arrangements to ensure that relevant staff are trained and competent to execute the plan and should ensure that there are enough trained staff available at all times to perform all the actions required by the on-site emergency plan.(ref 13: Recs 6 & 19) (ref 26: Rec 10)

Recommendation 5 For Buncefield-type sites, operators should evaluate the siting and/or suitable protection of emergency response facilities such as the emergency control centre, firefighting pumps, lagoons or manual switches, updating the safety report as appropriate and taking the necessary remedial actions.(ref 13: Rec 12)

Recommendation 6 Operators should identify vulnerable critical emergency response resources and put in place contingency arrangements either on or off site in the event of failure at any time of the year and make appropriate amendments to the on-site emergency plan. This should include identifying and establishing an alternative emergency control centre with a duplicate set of plans and technical information. (ref 26: Rec 10)

Recommendation 7 For COMAH sites, if the operator relies on an off-site Fire and Rescue Service to respond, the operator's plan should clearly demonstrate that there

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are adequate arrangements in place between the operator and the service provider. The Competent Authority will need to check that this is done.

Warning and informing the public

Recommendation 8 COMAH site operators should review their arrangements to communicate with residents, local businesses and the wider community, in particular to ensure the frequency of communications meets local needs and to cover arrangements to provide for dealing with local community complaints. They should agree the frequency and form of communications with local authorities and responders, making provision where appropriate for joint communications with those bodies.(ref 26: Rec 3)

Recommendation 9 The Competent Authority should review the COMAH guidance to assist operators in complying with Recommendation 8 and should work with the Cabinet Office to integrate the COMAH guidance and the CCA *Communicating with the public guidance*,(ref 27) so that communications regarding COMAH sites are developed jointly by the site operator and the local emergency responders.

Preparing for and responding to a major incident off site

Recommendation 10 The Cabinet Office should initiate a review of the arrangements to identify a minister (and their devolved counterparts) and their role to complement and support the emergency responders following a major incident to ensure national arrangements work as intended and there is continuity of government attention throughout the response and recovery phases. The review should include communications, public reassurance, the interface with planning for a return to social normality (Recommendation 27), and arrangements to ensure that recommendations made following major incidents are implemented.

Recommendation 11 The Civil Contingencies Secretariat, working with the Competent Authority, should ensure that COMAH emergency arrangements are fully integrated with those under the CCA with the aim of ensuring that major hazard events are dealt with consistently at all levels, from on site to national, in terms of planning, shared resources, and practical arrangements. The review should include, but not be limited to, confirmation that:

- _ response arrangements take account of devolved responsibilities;
- _ lead responsibility in government for ensuring emergency response arrangements at COMAH sites is dealt with consistently under COMAH and CCA;
- _ procedures and guidance are suitably aligned; and
- _ deployment of emergency equipment considers both COMAH and CCA sectors and sites.

Recommendation 12 Communities and Local Government should complete and, where necessary, initiate an assessment of the need for national-level arrangements to provide, fund and maintain, emergency response equipment (such as high volume pumps, firefighting foam and specialist pollution containment equipment). The review could also consider criteria for allocation and use of this equipment across the UK.

Recommendation 13 The Civil Contingencies Secretariat should review guidance to responders on assessing the extent of the impact of an incident at a COMAH site to ensure appropriate scales of response and resources are provided, at local, regional or national levels.

Review of off-site emergency plans

Recommendation 14 The Civil Contingencies Secretariat, working with the Competent Authority, should arrange for national guidance to local authorities to be prepared, addressing as a minimum the areas covered in Recommendation 15. Guidance should also address the competencies

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required for emergency planners, and be clear on the resources that may be demanded for an effective emergency planning function. The guidance should be a living document, ie periodically updated in the light of new knowledge of handling major emergencies.

Recommendation 15 Local authorities should review their off-site emergency response plans for COMAH sites in line with the revised guidance produced in response to Recommendations 13 and 14, and in the case of fuel storage sites, to take account of explosions and multi-tank fire scenarios. The aim is to ensure plans contain the key information from relevant COMAH safety reports (without compromising the safety reports' confidentiality), which should be provided by site operators following their reviews of arrangements under Recommendation 1. The review should include but not be limited to the following:

- _ input from trained and competent emergency planners following clear guidance;
- _ working in conjunction with Regional Resilience Forums, and their equivalents in Scotland and Wales, in preparing their off-site emergency plans to understand potential impacts on the Region.(ref 28) The Local Resilience Forum structure encourages multi-agency co-operation and information sharing within a county. The Regional Resilience Forum,²⁴ and their equivalents, should determine where further consultation is applicable and determine how this is done within and across regions;
- _ working in conjunction with neighbouring local authorities in developing their offsite emergency plans and involving these authorities in training and in emergency exercises;
- _ extending co-operation beyond the statutory consultation distance (CD) supplied by HSE to take into account the worst possible impact of a major incident, in effect re-calibrating the public information zone, which conventionally aligns with the CD;
- _ considering with other primary responders the fitness for purpose of the plans for the different tiers of the command and control structure (gold/silver/bronze);
- _ taking account, with appropriate expert input, of the local environment to identify what would be at risk and to identify the potential consequences. CCS and the Competent Authority, as the enforcing authority under COMAH, should ensure the reviews are carried out.

²⁴ The Regional Resilience Forums are established by each Government Office to discuss civil protection issues from the regional perspective and to create a stronger link between local and central government on resilience issues. Similar arrangements are made in the devolved administrations.

Recommendation 16 HPA [Health Protection Agency], HPS [Health Protection Scotland] and NPHS [National Public Health Service] Wales, EA [Environment Agency], SEPA and EHSNI [Environment and Heritage Service Northern Ireland] should provide local contact details to local authorities and Local Resilience Forums ²⁵ (LRFs) to facilitate emergency plan development. This will ensure local authorities have clear consultation routes for the public health and environment aspects of their off-site emergency plans.(ref 13: Rec 5)

²⁵ The principal mechanism for multi-agency co-operation between all Category 1 and 2 responders in a local police area is the Local Resilience Forum (LRF). The aim of LRF is to facilitate fulfilment of the statutory duties of the members. The LRF is not a statutory body, but it is a statutory process under the Civil Contingencies Act 2004.

Recommendation 17 Local authorities should ensure their off-site emergency plans give due consideration to meeting the welfare needs of responders, including arrangements to provide food and drink and toilet and washing facilities, on all shifts. This will also need to include guidance on rest breaks and the provision of accommodation for responders from outside of the local area. Plans should make provision for the contribution of the volunteer community in attending major incidents in the welfare and other supporting roles.(ref 26: Rec 26) (ref 25: Rec 38)

Recommendation 18 In reviewing their off-site emergency arrangements for COMAH sites, revised in accordance with our recommendations, local authorities should identify the facilities,

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resources and actions that are critical to successfully respond to an emergency and should provide contingencies for Buncefield-type sites. Local authorities should review and where necessary revise emergency arrangements to ensure that relevant staff are trained and competent and that there are enough trained staff and resources to perform the actions required by the emergency plan at all times.

Recommendation 19 Local authorities should ensure their revised off-site emergency arrangements for COMAH sites are tested within 12 months of production. Exercise scenarios based on real incidents should be compiled by CCS and the Competent Authority and available for multi-agency exercise development:

_ All Category 1 responders should ensure their staff are trained within six months of production to deliver the emergency response.(ref 25: Recs 7, 14 & 16)

_ Local authorities should arrange for councillors and elected members to have awareness training regarding their role in planning for, responding to and recovering from emergencies to effectively represent their communities.²⁶

26 Training is available at the Emergency Planning College, Easingwold
www.epcollege.gov.uk/EMSEM.

Recommendation 20 Local Resilience Forums and devolved equivalents should assess and advise operators, local authorities and the Competent Authority on the effectiveness of communications with residents, local businesses, dutyholders and the wider community in the event of a major incident. The assessment should use an agreed standard in line with CCA2004 guidance *Communicating with the public*(ref 27) and include arrangements with local media to avoid conflicting advice being received, and to ensure key messages are transmitted.

Responding to a major incident

Recommendation 21 The CCS should conclude their review of arrangements for obtaining and using air quality data in an emergency. This revision of arrangements should be delivered no later than 2008. The review should include:²⁷

agreement on clear notification procedures;

_ agreement on roles and responsibilities for collecting air quality data;

_ arrangements to disseminate the above to all responders and include them in emergency plans;

_ agreement on performance standards for quality and delivery;(ref 25: Recs 5 & 15)

_ consideration for the provision of local meteorological stations in the vicinity of COMAH sites, which can provide local wind direction and speed. Defra should ensure that financial or resource restraints do not hinder the delivery of a robust air monitoring capability.

27 Defra has proposed that the Environment Agency take on the co-ordinating role for air quality in a major incident, excluding radiological and nuclear incidents or those involving chemical warfare agents. The project to draw up and implement the coordination arrangements includes Defra, Welsh Assembly Government, Health Protection Agency, Met Office, Food Standards Agency, Government Decontamination Service, local authorities and Fire Services. SEPA and EHS (Environment and Heritage Service Northern Ireland) are due to be consulted and included.

Recommendation 22 The Civil Contingencies Secretariat and Department of Health should clarify the different roles for providing health advice at Strategic Co-ordinating Group [SCG] (Gold Command and Control Centre) to local responders. Local agreements should be in place in advance to allow health agencies to decide quickly who will do what in any incident so that the SCG chair receives the support they need. Different arrangements will exist in devolved areas and planning should take account of these.(ref 25: Rec 23) Information relevant to public health arising from the incident at the major hazard site in question should be available at the outset to enable health responders to give accurate, useful advice when first needed.

Recommendation 23 The operators of industrial sites where there are risks of large explosions and/or large complicated fires should put in place, in consultation with fire and rescue services at national level, a national industry–fire service mutual aid arrangement. The aim should be to enable industry equipment, together with operators of it as appropriate, to be available for fighting major industrial fires.(ref 26: Recs 2 & 25) (ref 29: p5) Industry should call on the relevant trade associations and working group 6 of the Buncefield Standards Task Group to assist it, with support from CCS. The COMAH Competent Authority should see that this is done.

Recommendation 24 Fire and rescue authorities and their equivalents in Wales, Scotland and Northern Ireland should review the availability of materials and equipment nationally and determine if they are sufficient to respond to and manage major incidents.²⁸ (ref 26: ch 7 & Ref 10) Critical interface components, such as foam equipment couplings used by the FRS, should be capable of use both by the FRS and with any industry the authority may call upon. The administrations of Scotland and Wales should be involved in such a review as responsibility for the FRS is devolved. Communities and Local Government and equivalent administrations should see that this is done.

²⁸ This is being taken forward by the Fire Service Practitioners Forum 'Buncefield Task and Finish Group'.

Recommendation 25 The recommendations in the Hertfordshire Fire and Rescue Service report(ref 26) into the lessons learned from the Buncefield fires that are widely applicable, should be put into effect where it is practical to do so as soon as possible. Communities and Local Government ministers, in cooperation with the Civil Contingencies Secretariat and equivalent administrations, should see that this is done.

Recommendation 26 The Civil Contingencies Secretariat should review the procedures and arrangements²⁹ in government offices in the English regions for deploying liaison staff to ensure effective communications between central government and Gold Command (Strategic Control Group) in a major emergency. The review should ensure that communications are managed in a way which minimises the demands on Gold Command and maximises efficiency. It should also ensure that the necessary level of human and technical resources can be sustained over a significant period if required by the demands of the response and recovery phases. The review should be conducted with the equivalent administrations to ensure equivalent improvements in communication arrangements for incidents in devolved areas.

²⁹ GO East and HPA have recognised the need to deliver incident management training and to increase the number of liaison officers and assistants as part of their reviews. Cabinet Office has identified workstreams to review the central government arrangement for responding to an emergency and for the provision and management of information in support of the central response. This will address issues that arose between Gold Command and central government.

Recovering from a major incident

Recommendation 27 The Cabinet Office should confirm formally, to avoid any doubt, where lead ministerial responsibility lies for the recovery phase following a major incident until the affected community has regained social normality. We believe responsibility should lie, in most foreseeable situations, with Communities and Local Government (or its successors, or in the case of Scotland and Wales, its devolved administration counterparts) supported as necessary by other central departments. In the event it is agreed that another minister should assume this role in a specific situation, the transfer of responsibility should be made clear. Emergency arrangements should take full account of the need to ensure recovery starts as soon as possible, including a smooth handover of lead ministerial responsibility where appropriate.

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Recommendation 28 Local authorities should ensure that recovery plans dovetail with off-site emergency response plans and the Regional Economic Strategy³⁰ (and devolved equivalents) to ensure that all relevant organisations are involved at an appropriately early stage.

³⁰ The RDA would play a key role in driving economic development in the region, especially if a major incident had an economic impact across a number of local authority areas or across the whole region.

Recommendation 29 Communities and Local Government should review options for government support to communities affected by a disaster and produce practical recommendations without delay. The review should consider the merits and mechanisms for providing immediate, short-term financial assistance to affected communities, for instance through establishing special status, and how long the period of special treatment should last. The lead minister for recovery that we ask to be confirmed in Recommendation 27 should have responsibility for controlling special funding provided for recovery. Suitable indicators of social and economic well-being should be adopted to assist in the monitoring of the recovery. The equivalent administrations should be involved in the review to ensure that appropriate financial support arrangements are put in place in their areas.

Recommendation 30 Central government should give urgent consideration to support to assist in the recovery of the area around Buncefield, including to both help restore business confidence and attract new workers and new employment. The aim would be to apply to the Buncefield area the principles of our recommendations right away. The Secretary of State for Communities and Local Government should see this consideration takes place.

Recommendation 31 The Health Protection Agency and equivalent health bodies (HPS, NPHS and DHSSPS (Department of Health, Social Services and Public Safety, Northern Ireland)) should agree a framework for continued co-ordination of health impact assessment and response after the acute incident response phase stands down.

Recovery of the environment

Recommendation 32 The Environment Agency (in consultation with SEPA and the Northern Ireland Environment and Heritage Service) should complete, as quickly as possible, its review of methodologies for assessing the potential harm to the environment arising out of credible major incidents at COMAH sites, and from the emergency response scenarios attaching to them. The objective is to improve information provided to aid planners and emergency responders. The work should align with the arrangements introduced for the Scientific and Technical Advice Cell (STAC).

Investigation of the explosion mechanism

Recommendation 1 It is recommended that a joint industry project be initiated that will, in its first phase, have the objectives of completing the assessment started by the Group and, on the basis of this, of defining the requirements for further research. This research – experimental and theoretical – would then be completed in a second phase of the project. Guidance to industry and HSE should be a primary deliverable of the work.

Recommendation 2 Governance of the project should be through a steering committee comprising stakeholders from industry and HSE, as regulator. The first phase of work would be conducted primarily by a technical committee, one member of which would act as project manager.

Recommendation 3 The Group recommends that this project should be initiated as soon as possible, with the first phase to be completed in early 2008. The additional experimental and

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theoretical work should then be completed within the following 18–24 months. To facilitate the first phase of the project being completed to schedule, it is suggested that there should be a maximum of ten sponsors. Broader support may be required for the second phase of the work.

Land use planning and the control of societal risk around major hazard sites

Improving the organisation of the land use planning system around major hazard sites

Recommendation 1 We recommend a cross-government and wide-ranging review of the land use planning system around major hazard sites in Britain. The review should include:

- _ the system for hazardous substances consents;
- _ the system for determining planning applications around major hazards sites;
- _ the relationship between planning applications around major hazard sites and development plans and planning;
- _ the scope of hazardous installations to which the land use planning system should be applied; and
- _ the integration of societal risk into the planning system around major hazard sites.

The aim of the review should be to revise the planning system around major hazard sites in Britain to produce a more consistent and transparent system across the non-nuclear, onshore major hazards sector. The system should be responsive to levels of risk presented at each site. It should ascribe responsibilities to dutyholders and the relevant authorities, including in the devolved administrations, in a proportionate and targeted manner. A minister should be responsible in each administration for seeing the review is carried out.³¹ The review should be commenced without undue delay in order to implement its conclusions within a reasonable timeframe. Wherever feasible, work on revising the elements of the system should be undertaken simultaneously rather than sequentially.

³¹ In Recommendation 10 of our sixth report we call for a minister to be responsible, *inter alia*, for seeing that lessons learned from major incidents – and therefore our recommendations – are carried out.

Recommendation 2 The review should take account of our approach to improving the control of major hazard risks at major hazard sites.

Our approach integrates:

- _ integrity levels of the major hazard sites in relation to containment of dangerous substances and process safety;
- _ mitigation against the effects of a major incident on off-site populations and installations;
- _ preparedness for emergency response to limit the escalation of potential major incidents;
- _ land use planning; and
- _ the regulatory system for inspection and enforcement under COMAH and other relevant law.

Economic considerations

Recommendation 3 We recommend that the economic case for a revised land use planning system around major hazard sites arising from the wide-ranging review should consider the full range of the costs and benefits of restricted development, including costs to the relevant industry sectors, local businesses and regional economies, and the use of land for housing and public amenity.³² This should be undertaken as part of the wide-ranging review called for in Recommendation 1.

³² See the Board's response to the regulatory impact assessment accompanying CD211, available on the Buncefield website www.buncefieldinvestigation.co.uk.

Recommendation 4 We recommend that the use of market-based mechanisms identified in HSE's recently published economics working paper,(ref 30) are considered further to assess their potential application within the revised land use planning system around major hazard sites. We would expect HSE to co-ordinate this work with the wider economics community having an interest in the planning system.

Public understanding

Recommendation 5 We recommend that the workings of the revised land use planning system around major hazard sites are described in guidance in a form accessible to the general public. The guidance should have ownership of all the key government stakeholders, including the devolved administrations.

Risk assessment and other technical issues

Recommendation 6 We recommend HSE adopts a policy for the consistent application of formal risk assessment of land use planning applications around major hazard sites that is responsive to levels of risk at particular sites.

Recommendation 7 Priority should be given to improving source terms and frequency data relevant to QRA at major hazard sites. This should include:

- _ improvements in defining major hazard scenarios at flammable storage sites called for in Recommendation 1 of our sixth report;(ref 16)
- _ improving recording and sharing of incident data and improvements to investigation of root causes of incidents and near misses called for in Recommendations 23–25 of our fifth report;(ref 13) and
- _ integrating the outcomes of the explosion mechanism project group set up in response to our seventh report.(ref 5)

We call on the COMAH operators and the Process Safety Leadership Group to take the lead in delivering these outcomes, and the Competent Authority to give technical support.

³³ The Process Safety Leadership Group was established in August 2007, replacing the Buncefield Standards Task Group.

Estimating consequences of an event

Recommendation 8 We recommend that HSE universally adopts individual risk of fatality as the criterion for expressing the consequence of events, in preference to the risk of receiving a dangerous dose or worse.

Reliability of engineered systems

Recommendation 9 We recommend that the risk assessment methodology and criteria for land use planning purposes align with those for risk assessment under the COMAH regime. The methodology should take account of the reliability of the engineered systems designed to achieve improved standards of primary containment, as called for in Recommendation 1 of our fifth report. The methodology should also incorporate a realistic major incident scenario in the light of Buncefield (explosions, multi-tank fires) as called for in Recommendation 1 of our report making recommendations for emergency preparedness etc.(ref 16) Account should also be taken of the vulnerability of the surrounding population and any mitigatory measures that apply to people or buildings and other physical assets. The Competent Authority should see that these revisions are carried out to a satisfactory standard and that appropriate guidance is issued to ensure the necessary improvements to risk assessments are delivered in practice.

Roles of the site operator and the Competent Authority

Recommendation 10 Operators of major hazard sites should, as a priority, review and amend as necessary their management systems for maintenance of equipment and systems to ensure their continuing integrity in operation. Where there are a number of operators at a facility (as there were at Buncefield) the review should be integrated between site operators to the appropriate extent. The Competent Authority should see that this is done.

Recommendation 11 We recommend that the regulatory regime for major hazard sites should ensure proper assessment of safety integrity levels (SILs) through the development of appropriate standards and guidance for determining SILs. Application of the methodology should be clearly demonstrated in the COMAH safety report submitted to the Competent Authority for each applicable site. Existing safety reports will need to be reviewed to ensure this methodology is applied.

Consented quantities

Recommendation 12 We recommend that CLG and the relevant ministers in the devolved administrations, HSE and BERR consider reforms to the major hazardous substances consent system, with the aims of:

- _ streamlining and simplifying the withdrawal of consents on sites that are 'dormant'; and
- _ allowing the size and nature of the hazardous inventories to be varied to enable realistic risk assessment for off-site planning purposes, including for revised development plans.

Existing and new developments

Recommendation 13 In moving to a fully risk-based system, and as part of the review called for in Recommendation 1, there should be a wider perspective given to the management of new planning applications where off-site development already exists. Consideration should include:

- _ the parties who should come together to give relevant and necessary advice and expert support to the planning authority;
 - _ the size and nature of the existing population exposed to the risks on site;
 - _ the safety integrity levels and environmental protection measures on the site relevant to the nature and intensity of operations;
 - _ the mitigatory measures (ie means of reducing the consequences of a major incident) achievable for off-site buildings;
 - _ the emergency preparedness and response arrangements;
 - _ the needs of the regional economy as formally determined by the relevant authorities, and expressed in regional policies such as the Regional Spatial Strategy and Regional Economic Strategy;
 - _ the strategic economic/national interest issues if relevant; and
 - _ the further reductions that may be achieved in residual risk arising from the major hazard site.
- CLG, the Welsh Assembly Government, the Scottish Government and HSE should give consideration to this issue and produce the necessary guidance to see the revised approach is implemented effectively.

Technical issues relating to societal risk

Recommendation 14 We recommend that HSE should bring together key stakeholders and experts in the planning system (planning authorities, developers, operators, regulators, risk assessment specialists) with a view to reaching agreement as early as possible on:

- _ the way societal risk is measured and assessed;
- _ the data sources required for assessment purposes;

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- _ the acceptability criteria for societal risk values around particular sites; and
- _ a suitable weighting factor for more serious, less frequent events (scale aversion).

Recommendation 15 HSE should take necessary steps to amend the Pipeline Safety Regulations with the aim of extending land use and emergency planning controls (and other suitable regulatory protections if necessary) to major pipelines carrying gasoline (petrol).

Public understanding

Recommendation 16 We recommend that HSE should review, update and publish documentation on the process for handling land use planning risk assessments around major hazard sites by local authorities, and the main contributors to the decision-making process. The resulting publication should be capable of being understood by a lay audience.

Local planning authority resources

Recommendation 17 Local planning authorities and the administrations responsible for them should ensure the necessary expertise and other resources are available to implement the revised planning system around major hazard sites, as well as management systems to ensure maintenance of competencies, monitoring, audit and review of the planning systems in their authority.

Implementation and priorities

Recommendation 18 The Competent Authority should agree a priority programme with site operators and planning authorities for assessing societal risk at sites of identified concern using the risk assessment methodologies developed in line with our recommendations. Account should also be taken whether the ALARP [as low as reasonably practicable] threshold has been raised due to considering previously unaccounted hazard scenarios.