UKOPA/08/0026

Process Safety Leadership Group

Working Group 1: Human Factors

Terms of Reference

Task
Make recommendations on management system arrangements, taking account of human factors and communications needed to secure safety during product transfer and storage. To report on progress to the PSLG. To complete the interim guidance on good practice in the BSTG Final Report.

Composition
The WG will be comprised of representation from industry, TUC and the COMAH CA. There will be representation from member companies of the TSA, UKPIA, CIA and UKOPA. Industry representatives will have recent relevant experience in human factors and management of operations. Representatives should have a thorough understanding of the MIIB recommendations for the Design and Operation of fuel storage sites and of the work of the Buncefield Standards Task Group (BSTG).

Scope – Human Factors (including Management of Operations)

MIIB (Rec 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.

(Rec 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.

(Rec 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.

(Rec 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**.

(Rec 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**.

(Rec 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;
- **developing incident databases** that can be shared across the entire sector, subject to data protection and other legal requirements. Examples 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**."

(Rec 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.

Purpose:

- Prevent a "Buncefield type" incident occurring again.

- Demonstrate industry & regulator determination to proactively grasp the learning from the Buncefield incident & translate into effective & practicable proposals.

- Deliver agreed & jointly owned proposals making best use of regulator & industry expertise and to facilitate consistent approach to management of this risk by providing an accepted & authoritative benchmark for operational standards & practices in the UK.

Success Criteria:

- Management / operational risk control systems to prevent, control, or mitigate a Buncefield-type incident are identified

- Recommendations are made about the application of good practice for Human Factors and the Management of Operations at relevant sites.

Process Safety Leadership Group

Working Group 2

Scope and application for Buncefield type sites

Task

To define a set of criteria for selection of sites at which a Buncefield type accident could occur. That is a large tank overfill of volatile liquid leading to the generation of a large vapour cloud. To report on progress to the PSLG.

Purpose

The application criteria will be used to identify a set of sites (or parts of sites). This list of sites will then be used in the development and application of revised safety standards which will be developed by other working groups. The list of sites will be used by HSE to apply revised land use planning arrangements.

End Result

This will be an agreed set of criteria that can easily be applied. There will be a clear record of why sites have been selected as being within scope.

Success Criteria

A set of clear selection criteria
Agreed by all members of the working group
Easy to apply
Easy to record
Provide a clear steer to the other working groups
Timely – aim for completion by end of April 2008

W/G2: Application

Team Leader – Stuart Barlow, HSE
Aim: To develop criteria to be used to identify the types of installations/operations at which the improved guidance / codes will be applied. To link with work on the application of any revised policy on land use planning

The following high level criteria will be considered by the working group and can be used by other working groups to provide an initial steer to their work.

Primary Criteria:

- Bulk tank installations with the potential to store large quantities of highly flammable liquids.

- Installations with the potential for rapid product transfer rates.

- Installations which engage in large single product transfer packages, including road, rail, and ship loading/unloading operations.

- tank top arrangements are liable to generate large quantities of vapour in the event of overfill.

Secondary criteria:

- Installations which have urban or commercial populations, or environmentally sensitive sites located nearby. (This will apply to safety standards and not to revise land use planning arrangements)
- More than one organisation involved in the management / control of product transfer.
- Products transferred into, from, or within an installation via a major accident hazard pipeline or any pipeline used to convey petroleum products (as defined in Part 2 to Schedule 1 of COMAH).
- The transfer management arrangements could prevent a rapid shutdown of product transfer

Process Safety Leadership Group

Working Group 3: Control and Instrumentation
Terms of Reference

Task
To learn the lessons from Buncefield to make recommendations on good practice for the design and maintenance of primary containment measures for bulk hazardous liquids.

Method
To take account of the recommendations in the Buncefield Major Investigation Board report on the Design and Operation of Fuel Storage Sites. To review the recommendations of the Buncefield Standards Task Group Final Report against the MIIB's recommendations and to establish a programme of work to address the outstanding issues. To report on progress to the PSLG.

Composition
The WG will be comprised of representation from industry and the COMAH CA. There will be representation from member companies of the TSA, UKPIA, CIA and UKOOPA. Industry representatives will have recent relevant experience in the design, implementation and maintenance of overfill protective systems or primary containment plant and equipment in the oil and fuel storage industry. Representatives should preferably hold chartered membership of a relevant professional body. Representatives should have a thorough understanding of the MIIB recommendations for the Design and Operation of Fuel Storage Sites and of the work of the BSTG.

Scope
Overfill protection systems:

a. design, testing and maintenance of overfill protection system and equipment (Recommendations 2(1st bullet point) 4 and 5) ,
b. improved components and systems – alternative high level detection, increased dependency of tank level gauges, systems to control and log override actions, alternative means of ultimate high level detection (Recommendation 8),
c. measures to detect hazardous conditions arising from loss of primary containment (Recommendation 13),
d. management systems for maintenance of overfill protection equipment and systems to ensure their continuing integrity in operation
e. application of automated shut down systems (Recommendation 3)
f. Maintenance of Records (Recommendation 9)

Priorities
- Developing solutions to fully automated shut down systems
- Inspection, testing and maintenance of overfill protection systems

Outcomes
A clear specification of a 'recognised good practice' for primary containment.

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Working Group 5 – Emergency Arrangements -Terms of Reference

Task
To assist in ensuring that the lessons regarding emergency arrangements from Buncefield are learnt by developing good practice guidance for sites storing bulk hazardous liquids and other COMAH sites.

Method
To identify and/or develop good practice guidance whereby the recommendations for industry in the Buncefield MIIB report on the "emergency preparedness for, response to and recovery from incidents" can be effectively and efficiently implemented by industry. To build on the emergency arrangements recommendations of the Buncefield Standards Task Group final report. To work with other bodies on emergency arrangements recommendations that are their responsibility when industry input to their work is sensible.

Composition
WG5 will have two parts, Emergency Arrangements Group – Core (EAG – Core) and Emergency Arrangements Group – COMAH (EAG - COMAH). These sub-groups will respectively have general responsibilities for working on issues that affect Buncefield-type sites and are mainly on-site, and those affecting COMAH sites in general that are mainly off-site. Dividing the work is not straight-forward owing to the nature of some of the recommendations however responsibility for specific recommendations is clear and this should facilitate efficient and full delivery.

Both sub-groups will be led by the WG5 team leader although they will mostly work separately on their recommendations. The WG5 team leader will maintain an overview of the work and will ensure that the work is efficiently and effectively conducted. Membership of the groups will be geographically influenced to facilitate meetings and the make up of each will be:

- EAG – Core: Seven members plus WG5 team leader. Members to come from industry sectors with sites that are Buncefield-type (eg members of UKPIA, TSA, UKOPA or CIA). A membership of 7 will allow the same methodology that worked for the BSTG WG6 on emergency arrangements with each topic (eg MIIB recommendation) being worked on by a team of two. Each member will be the primary person for a specific topic and also the secondary person for a different topic. A membership of 7 will allow flexibility should topics require more input or new topics require action.
- EAG – COMAH: Ten members plus WG5 team leader. Members from COMAH sites (eg members of UKPIA, TSA, UKOPA, CIA, BCA or LPGA) with play in from other bodies as appropriate eg Local Authority, Fire & Rescue Service, EA etc. Same methodology as for EAG - Core however all topic areas will have an industry member as the primary person responsible for it. 10 members will allow flexibility to deal with other issues that may arise.

A number of names of potential industry members for this WG have been identified with a grounding in emergency arrangements work essential. The majority of the industry members of the BSTG WG6 would be suitable and some have expressed interest in continuing the work. The appropriate non-industry members for EAG – COMAH have been identified.

Scope
See tables below.

Priorities

- Work required dealing with a reasonably foreseeable scenario of an explosion followed by a multi-tank fire.
- Mutual aid issues.

Outcomes

Delivering in a timely fashion clear good practice guidance for sites to implement on the emergency arrangements topics covered in the tables below.

PSLG - Working Group 5 – Emergency Arrangements Group - Core

AIM: To develop guidance for on-site emergency arrangements and the integration with off-site arrangements for Buncefield–type sites

Topic to be considered		Details/objectives

On site emergency arrangements	**On site emergency plans**	- Use BSTG template for on-site emergency plans (www.hse.gov.uk/comah/buncefield/final.htm) as tool to prepare/ review plans (top-tier COMAH sites should already have on-site emergency plans).
		- Ensure that on site plans include scenario of a multiple tank fire following an explosion.
		- Consideration of 'Controlled Burn' strategy (EA PPG 28).
		- Consideration of the following MIIB Recommendations on the emergency preparedness for, response to and recovery from incidents (MIIB EP):
		  - **MIIB EP 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.
		  - **MIIB EP 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.
		  - **MIIB EP Recommendation 3** For Buncefield-type sites, operators should review their onsite 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.

	Emergency equipment	- Type and amount
		- Location
		- Protection of vulnerable equipment
		- Contingency/redundancy arrangements
		- Consideration of:
		  - **MIIB EP 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. *(Note that this recommendation restates Recommendation 12 of the MIIB's Design and Operation Report).*
		  - **MIIB EP 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.

	Testing of the on site plan	- Test methods:
		  - Table top
		  - Simulations
		  - Live play
		  - Strengths/limitations of the above?
		- Use of exercises to demonstrate competence?

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PSLG - Working Group 5 – Emergency Arrangements Group - COMAH

AIMS:
To develop guidance on emergency arrangements for all COMAH sites
To work with other bodies (eg Local Authority Planners, Fire and Rescue Services, Local Resilience For a) for recommendations on off-site issues where industry input is required (eg testing off-site plans, mutual aid issues).

Topic to be considered		Details/objectives
On site emergency arrangements	**The role of terminal personnel, training and competence**	- Definition of key roles and responsibilities in an emergency - Competence assurance arrangements (training, assessment methods) - Consideration of: - **MIIB EP 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.
	The role of external bodies in the on-site plan	- Definition of roles/responsibilities of external bodies (blue light services) - Co-ordination with on-site personnel - Training and competence relevant to terminal emergencies – site familiarisation, product hazard awareness) - Consideration of: - **MIIB EP 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 are adequate arrangements in place between the operator and the service provider. The Competent Authority will need to check that this is done.
Integration with off site arrangements	**Communication with the public**	- Consideration of: - **MIIB EP 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.
	Mutual aid arrangements	- With / without overlapping COMAH sites - Consideration of: - **MIIB EP 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. 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.

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Process Safety Leadership Group

Working Group 6: Mechanical Integrity

Terms of Reference

Task
To learn the lessons from Buncefield and other recent significant loss of containment incidents to make recommendations on good practice standards for the design and maintenance of primary containment measures for bulk hazardous liquids.

Method
To take account of the recommendations in the Buncefield Major Investigation Board report on the Design and Operation of Fuel Storage Sites. To review the recommendations of the Buncefield Standards Task Group Final Report against the MIIB's recommendations and to establish a programme of work to address the outstanding issues. To report on progress to the PSLG.

Composition
The WG will be comprised of representation from industry and the COMAH CA. There will be representation from member companies of the TSA, UKPIA, CIA and UKOOPA. Industry representatives will have recent relevant experience in the design, implementation and maintenance of primary containment plant and equipment in the oil and fuel storage industry. Representatives should preferably hold chartered membership of a relevant professional body. Representatives should have a through understanding of the MIIB recommendations for the Design and Operation of Fuel Storage Sites and of the work of the BSTG.

Scope

(Rec 2- 2nd bullet point) 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 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

(Rec 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.

(Rec 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

(Rec 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.

(Rec 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.

(Rec 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.

Priorities

To make proposals on good practice for the inspection and maintenance of plant and equipment (excluding overfill protection systems) associated with bulk storage of hazardous liquids.

Outcomes

A clear specification of ‘good practice’ for primary containment. That the standards developed represent a minimum legal standard under COMAH regulation 4 that can be used to underpin the CA Containment Policy.

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WORKING GROUP 7 TERMS OF REFERENCE
Co-ordination

Working Group 7

Task

To ensure that all of the Working Groups in the Process Safety Leadership Group (PSLG Steering Group) have:

- sufficient resources, expertise,
  - This will be done by asking WG leaders for:
    - Firstly, positive confirmation in their first report that sufficient resources and expertise are available – (including admin & support) to complete their work, and
    - then to highlight any problems or issues in their routine highlight reports.
    - Urgent issues to be referred directly to WG7 leader.

- guidance and direction
  - This is set out in the attached 'WG Principles & Framework'

To work effectively and efficiently on their tasks and to co-ordinate the delivery to the PSLG of the appropriate information for it to monitor and report on progress and make all necessary proposals through a communications plan that is fit for purpose.

Purpose

- To ensure that the other working groups are able to do their work effectively.
  - This means work is completed:
    - on time,
    - covering the right scope of issues – the PSLG Group will sign off the ToR and scope prepared, and
    - to the agreed standard – (see attached 'WG Principles & Framework')

- To ensure that systemic issues and solutions are not overlooked.
  - An overview and gap appraisal will be the responsibility of WG 7

- To ensure that a fit for purpose communications plan is designed and operated effectively and efficiently.
  - The communication plan will be developed by WG7 & approved by the PSLG

- To ensure that the correct information is disseminated according to the Project timetable.

End Result

- Adequately addressed the Buncefield MIIB Design & Operation Recommendations and produced either guidance, new standards or an agreed position to allow individual sites to comply with the recommendations in accordance with the CA Containment Policy.

- Update the BSTG Final Report to ensure it covers all the Buncefield MIIB Design & Operation Recommendations detailing specific proposals and guidance for industry to adopt good practice and a timetable for implementation.

Success Criteria

- The WGs are not constrained by resource or guidance issues.
- Highlight reports are delivered to the PSLG according to the WG programmes.
    - WG7 will track and monitor production of highlight reports
- The work groups interface efficiently with each other.
    - This will be done primarily via:
        - the WG Leader meetings
        - clear specification of the WGs' Scope
- Systemic issues and solutions are identified and allocated for effective action.
    - WG7 will take an overview to ensure over-arching issues are adequately considered
- Information at all levels of the project is delivered effectively and efficiently.
    - Covered by the communication plan – reporting deadlines to be built into WG programmes
- The PSLG is able to respond to all MIIB D&O Recommendations and other areas as appropriate.

Working Group 7 Principles and Framework

Roles and Responsibilities

The Working Group Team leader will be responsible for:

- directing the work of the working group and ensuring it completes its allocated tasks according to its designated area of work,
- organising the right level of expertise and resources required within the WG
- producing a programme of work for the WG clearly setting out:
    - the scope of the issues to be considered
    - specific tasks to be completed
    - the timetable for completion of tasks
- reporting progress to the PSLG and highlighting problems relating to resourcing or progress to the PSLG
- raising and discussing issues of potential overlap or gaps in relevant issues with other WG Team Leaders

Individual Members of the Working Group will be responsible for:

- completing their allocated tasks to standard and on time
- highlighting problems and issues with may preclude completion of their tasks to the WG leader
- maintaining confidentiality of the information discussed within the WG.
- Declaring any conflict of interest which arises between their commercial interests and the work of the WG

Principles

1. Because of the uncertainty in relation to the cause of the explosion at Buncefield a precautionary approach will be adopted when deciding on good practice for management arrangements and control systems.
2. The Competent Authority retains its current policy in relation to regulatory decisions.

3. Working Groups should not aim to revise/rewrite current guidance, standards or codes of practice but to assess the adequacy of existing guidance and make recommendations for change.
4. The work of reviewing current standards, guidance and codes should be set in the context of the overall requirements within organisations for the safe management of product transfer and storage of hazardous substances.
5. A holistic approach should be adopted to ensure that individual items or standards are considered in a broader context of overlapping control and mitigation systems.

Process

The Working Group should:

1. Define the range of issues for consideration within the WG
2. For each issue:
    a. Identify current guidance, standards or codes of practice covering that issue
    b. Identify any gaps in the existing guidance, standards or codes
    c. Identify current industry practice in relation to that issue
    d. Identify good practice based on existing guidance, standards or codes (good practice will be interpreted as a minimum standard required by law for that issue)
    e. Make recommendations for additional guidance, standards or codes where the current arrangements are not considered adequate.
    f. Provide some early examples of the complete process for several issues.

        The example could be in the form of a 'bow-tie' setting out the barriers of protection and mitigation for each major hazard scenario, or

        A hierarchy of control:
        - Inherent safety
        - Containment
        - Control system
        - Detection
        - Mitigation
        - Emergency action

3. Produce the findings of this analysis in the form of a route map to existing guidance, standards or codes of practice which specifies:

    The issue + the context = reference to the minimum good practice for this issue