Safety and environmental standards for fuel storage sites

Buncefield Standards Task Group (BSTG)

Final report: Extract (Executive summary)

Introduction

1 The purpose of this report is to specify the minimum expected standards of control which should be in place at all establishments storing large volumes of petroleum and similar products capable of giving rise to a large flammable vapour cloud in the event of a loss of primary containment. Although in the main aimed at the operators and regulators of major fuel facilities, parts of the guidance in this report should be applied to other enterprises managing major hazards. To ensure focused and timely follow-ups we have limited our considerations to tanks containing petrol as defined in paragraph 7. It is possible that a limited number of other substances (with specific physical properties and storage arrangements) will be drawn into scope in the future.

2 This report is our final report and it is in four parts. Part 1 details the actions required of operators, including timescales, and Part 2 contains all of the detailed guidance produced by BSTG, including for completeness the guidance from our initial report. Part 3 sets out work in progress, ie work that BSTG has started but is yet to complete, and Part 4 provides a comparison with the work of BSTG and the MIIB report *Recommendations on the design and operation of fuel storage sites*.[1]

3 Our original intention was to produce this guidance in the form of a route map to existing standards relevant to risk controls at bulk fuel storage sites within scope. Wherever possible we have done this and for convenience simply provided a brief summary of that information. In other areas, where there is an absence of any pre-existing authoritative guidance, we have had to produce guidance from scratch. We have also, on occasion, produced detailed commentary on guidance where appropriate, for example, with regards to BS EN 61511:2004 *Functional safety. Safety instrumented systems for the process industry sector*.[2]

4 In its report on the design and operation of fuel storage sites, the MIIB recommended that, 'The sector, in consultation with the Competent Authority, needs to build on [the work of BSTG] to put in place continuing arrangements for comparable leadership in relation to operating and safety standards on a long-term basis. In our view action to improve sector leadership will be the key to facilitate implementation of our recommendations and to provide a focus for continuous improvement.' It also stated that a key challenge facing the fuel sector is dealing with the issues arising from the Baker Panel Report[3] into the BP Texas City incident, where it was made clear that deficiencies in process safety culture, management and corporate oversight were not limited to BP and that all companies should thoroughly evaluate these for themselves and improve them as necessary.

5 To take forward continued improvements in industry, it is proposed to build on the model developed for BSTG – a small, focused, oversight team to lead, develop and promote improvements to safety and environmental control at fuel storage sites. This new group, the Petrochemical Process Standards Leadership Group (PPSLG), will be supported by dedicated working groups dealing with specific topics. PPSLG will be chaired by a senior member of industry and involve representatives from the United Kingdom Petroleum Industry Association (UKPIA), the Tank Storage Association (TSA), the United Kingdom Onshore Pipeline Operators' Association (UKOPA) and the Chemical Industries Association (CIA), as well as representatives from the Competent Authority. It will lead, develop and promote improvements to the safety and environmental controls and will, in particular:

- demonstrate effective leadership within the sector;
- develop organisational and technical solutions;
- share learning from incidents and good practice;

- drive forward research;
- assist in assuring the process of monitoring compliance with the MIIB's and BSTG's recommendations;
- make further recommendations; and
- take effective account of the findings of the exploration of the explosion mechanism.

6 It is anticipated that all in-scope sites will benchmark their current operation against the guidance in this report. Any gaps should be closed without undue delay. Part 1 of this report gives compliance dates that we consider achievable in most cases. Best endeavours should be made to comply with the timescales. Any site that cannot meet these compliance dates should discuss the reasons with their local Competent Authority inspector.

Scope – sites and activities covered by the guidance

7 Pending the results of work that is currently ongoing, BSTG limited its work to tanks containing material and operating under similar regimes that existed at Buncefield, namely:

- COMAH top- and lower-tier sites, storing:
- gasoline (petrol) as defined in Directive 94/63/EC [European Parliament and Council Directive 94/63/EC of 20 December 1994 on the control of volatile organic compound (VOC) emissions resulting from the storage of petrol and its distribution from terminals to service stations],[4] in:
- vertical, cylindrical, non-refrigerated, above-ground storage tanks typically designed to standards BS 2654,[5] BS EN 14015:2004,[6] API 620,[7] API 650[8] (or equivalent codes at the time of construction); with
- side walls greater than 5 metres in height; and at
- filling rates greater than 100 m^3/hour (this is approximately 75 tonnes/hour of gasoline).

8 Other materials could have the same vapour-forming attributes as gasoline defined above. A key piece of work to be pursued by PPSLG will be to consider widening the scope of materials that this report should apply to. A start has been made on this through joint work undertaken by the Health and Safety Laboratory (HSL) and Shell Global Solutions (SGS) but further work is required.

9 This guidance is issued jointly by:

- Health and Safety Executive (HSE);
- Environment Agency (EA);
- Scottish Environment Protection Agency (SEPA);
- United Kingdom Petroleum Industry Association (UKPIA);
- Tank Storage Association (TSA); and
- United Kingdom Onshore Pipeline Operators' Association (UKOPA).

Table 1 *Summary of action required*

Topic	Completion date
Systematic assessment of safety integrity levels (SILs)	
Control and safety systems for petroleum storage tanks	INITIAL RECOMMENDATION Assessment of the safety integrity level (SIL) requirements for overfill prevention systems against BS EN 61511:2004[2] should have been completed **by the end of June 2007.** Relevant maintenance and testing regimes to meet BS EN 61511:2004[2] should be in place **by the end of November 2007.** Improvements required to achieve the required level of integrity should be in place **by the end of November 2007.**
Incorporating the findings of SIL assessments into COMAH safety reports	NEW RECOMMENDATION Existing safety reports should be reviewed to incorporate a demonstration that: ● the overall systems for tank filling control are of high integrity, with sufficient independence to ensure timely and safe shutdown to prevent tank overflow; and ● the overall systems for tank filling control meet BS EN 61511:2004[2] **by the end of December 2007**. An appropriate demonstration of compliance should be included in safety reports submitted to the Competent Authority **by the date of the next five-year periodic review of the safety report.**
Protecting against loss of primary containment using high-integrity systems	
Management systems for maintenance of equipment and systems to ensure their continuing integrity in operation	INITIAL RECOMMENDATION Inspection and maintenance systems should already be established. Changes to the testing and maintenance regime resulting from the SIL assessment should be in place **by the end of November 2007.**
Tank overfill prevention: defining tank capacity	INITIAL RECOMMENDATION The capacities of storage tanks should be clearly defined and appropriate safety margins put in place to prevent a release. This action should have been completed **by the end of January 2007.**
Fire-safe shut-off valves	INITIAL RECOMMENDATION The assessment of valves as being fire-safe should have been completed **by the end of April 2007**.
Remotely operated shut-off valves (ROSOVs)	INITIAL RECOMMENDATION The assessment (as per HSG244[10]) of the need for ROSOVs on tank outlets should have been completed **by the end of June 2007.**

Table 1 *Summary of action required (continued)*

Topic	**Completion date**
Testing of overfill protection systems	INITIAL RECOMMENDATION Inspection and maintenance systems **should already be established.** Changes to the testing and maintenance regime resulting from the SIL assessment should be in place **by the end of November 2007.**
Safe management of fuel transfer	INITIAL RECOMMENDATION Adopt the principles for safe management of fuel transfer and develop consignment transfer agreements consistent with these principles. This should have been completed **by the end of January 2007.** NEW RECOMMENDATION Ensure that suitable 'job factors' are provided to facilitate safe fuel transfer; to be reviewed **by the end of December 2007.** INITIAL RECOMMENDATION Companies involved in inter-business transfer of fuel by pipeline should have agreed on the nomenclature to be used for their product types **by the end of January 2007.** INITIAL RECOMMENDATION For ship-to-shore transfers, carry out a terminal-specific review to ensure compliance with the *International Shipping Guide for Oil Tankers and Terminals* (ISGOTT).[11] This should have been completed **by the end of January 2007.** NEW RECOMMENDATIONS Receiving sites to develop procedures for transfer planning and review them with their senders and appropriate intermediates **by the end of December 2007.** Ensure that written procedures are in place, and consistent with current good practice, for safety-critical operating activities in the transfer and storage of fuel **by the end of June 2008.**
Engineering against loss of secondary and tertiary containment	
Leak-tight bunds	NEW RECOMMENDATION Bund wall and floor construction and penetration joints should be leak-tight. **Should already be in place** as good practice.
Fire-resistant bund wall joints	INITIAL RECOMMENDATION Joints in bunds must be capable of resisting fire: improvements should have been completed **by the end of May 2007.**

Table 1 *Summary of action required (continued)*

Topic	**Completion date**
Bund capacity	NEW RECOMMENDATION Bund capacity at existing installations should be a minimum of 110% of the largest contained tank. **Should already be in place** as good practice.
Firewater management and control measures	NEW RECOMMENDATION Site-specific planning of firewater management and control measures should be undertaken with active participation of the local Fire and Rescue Service. To be completed **by the end of June 2008.**
Tertiary containment	INITIAL RECOMMENDATION Assessment of sites and action plans for improvement should have been completed **by the end of January 2007.**
High reliability organisations	
Roles, responsibilities and competence	NEW RECOMMENDATION Identification of roles and responsibilities **by the end of September 2007.** Implement a competence management system **by the end of June 2008.**
Staffing and shift work arrangements	NEW RECOMMENDATION Demonstrate adequate staffing arrangements by the end of March 2008. Ensure that shift work is adequately managed to control risks from fatigue **by the end of June 2008.**
Shift handover	INITIAL RECOMMENDATION This was a priority action that should have been completed **by the end of January 2007.**
Organisational change and management of contractors	NEW RECOMMENDATION Policies and procedures in place **by the end of December 2007.**
Performance evaluation and process safety performance measurement	NEW RECOMMENDATION Ensure suitable active monitoring programme and develop a set of leading and lagging indicators **by the end of December 2007.** Procedures for investigation of incidents and near misses and the audit and review of the control of major accident hazards **should already be in place.**

Table 1 *Summary of action required (continued)*

Topic	**Completion date**
Emergency arrangements	
Principles for emergency arrangements	NEW RECOMMENDATION Arrangements for on-site emergency response implemented **by the end of January 2008.**
On-site emergency plan	NEW RECOMMENDATION Template for the on-site emergency plan completed **by the end of January 2008.**
Firefighting planning and preparation	NEW RECOMMENDATION Firefighting planning and preparations implemented **by the end of January 2008.**