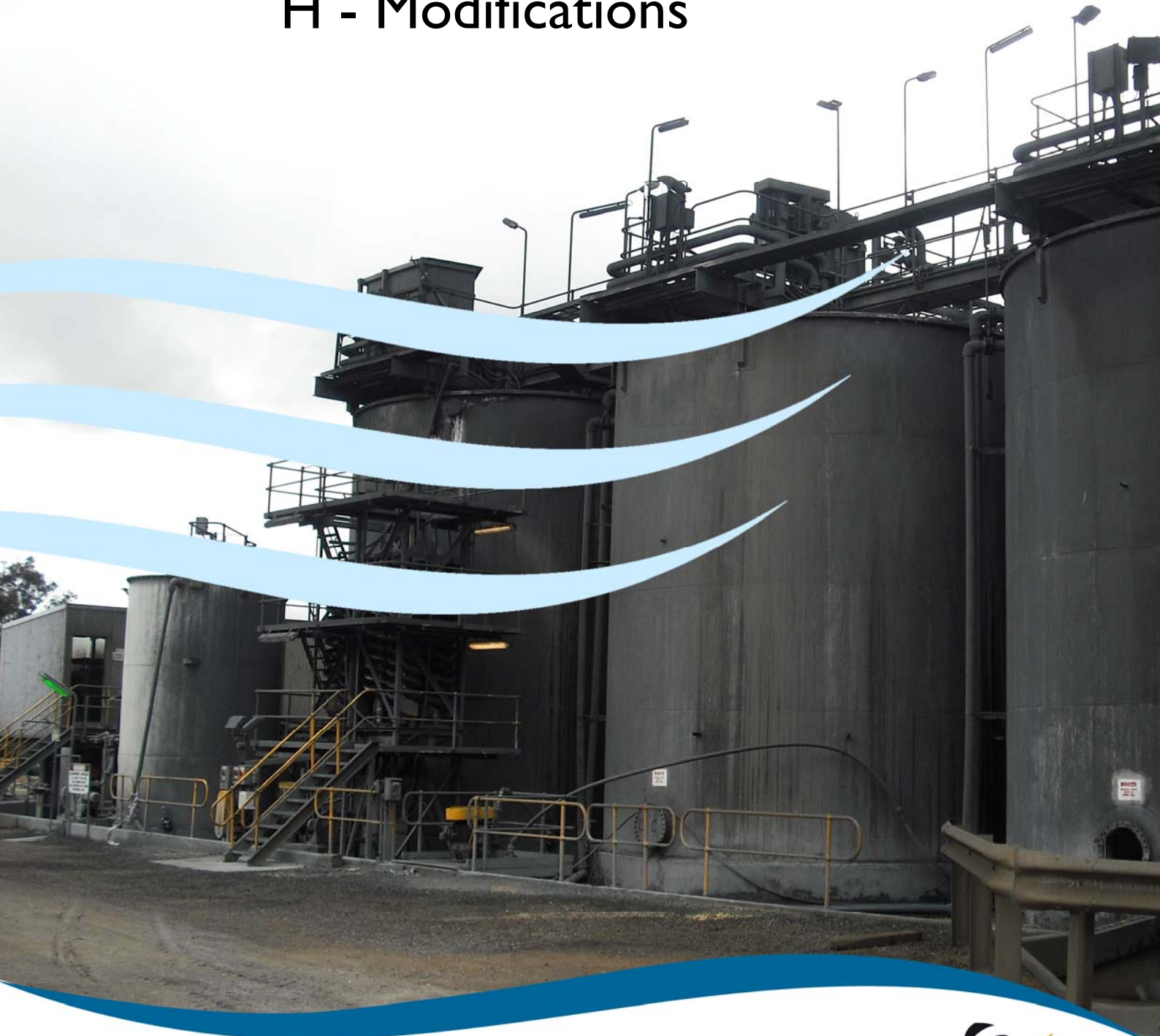


Guidelines for Major Hazard Facilities H - Modifications



Disclaimer

This information is for guidance only and is not to be taken as an expression of the law. It should be read in conjunction with the *Dangerous Substances (Safe Handling) Act 2005*, the *Dangerous Substances (Safe Handling) Regulation 2009* and any other relevant legislation. Copies of the legislation can be purchased from Print Applied Technology: call (03) 6233 3289 or free call 1800 030 940. It is also available on the Internet at www.thelaw.tas.gov.au

Acknowledgement

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I Introduction

The purpose of the *Dangerous Substances (Safe Handling) Act 2005* (the Act) and *Dangerous Substances (Safe Handling) Regulations 2009* is to prevent harm to people, property and the environment arising from handling dangerous substances. The Act imposes certain safety obligations on occupiers of Major Hazard Facilities (MHFs).

These obligations include conducting and documenting a Systematic Risk Assessment (SRA) of the operations, the implementation of appropriate risk reduction measures, consultation with the community and the submission of a safety report. The occupier of a MHF is also required to notify the Secretary of the Department of any modification or change that significantly alters the risk associated with the facility. Before the modification takes place, the occupier must assess the proposed modification in terms of how it will increase risk at the facility and how it may impact on the appropriateness and accuracy of the SRA, the risk reduction measures in place, consultation with the community and the safety report.

The occupier of the facility must have well-established processes for the management of change. Changes include

- Organizational change (change of ownership, structure etc) that may affect the operations of the facility
- Changes to working arrangements that affect the rating of risks
- Changes in operations – technology, substances
- Changes in infrastructure – planning of new or renovations or demolition of built structures, plant, transportation infrastructure etc.

This guideline provides information on the management of modifications at an MHF with respect to the occupier's obligations under Section 20 and 38 of the Act. This information is provided for guidance only and is not designed to impose a particular management arrangement for handling modifications at a MHF, however does identify the general issues that must be considered.

1.1 List of Acronyms

- AFARP – As far as reasonably practicable = ALARP
- DS – Dangerous Situation
- DSE – Dangerous Substances Emergency
- EP&Ps – Emergency Plans and Procedures
- LDSL – Large Dangerous Substances Location
- MHF – Major Hazard Facility
- NOHSC – National Occupational Health and Safety Council
- PMHF – Possible Major Hazard Facility
- SMS – Safety Management System
- SR – Safety Report
- SRA – Systematic Risk Assessment
- the Act – *Dangerous Substances (Safe Handling) Act 2005*
- the Regulations – *Dangerous Substances (Safe Handling) Regulations 2009*
- the Secretary – The Secretary of the Department of Justice
- WST – Workplace Standards Tasmania

2 Key Safety Management System Legislative Issues

2.1 Safety Obligations

Under Section 36 of the Act, the occupier of a MHF is required to fulfill certain obligations before any modification is carried out at the facility that significantly alters the risk associated with the facility. These requirements include:

- notifying the Secretary;
- reviewing and updating the SRA;
- implementation of specific employee training and education;
- reviewing and updating certain risk reduction measures such as EP&Ps and relevant components of the SMS; and
- reviewing the safety report and providing an update to the Secretary.

2.2 Timeframe

Section 36 of the Act states that before a MHF is modified in a way that significantly alters the risk associated with the facility, its occupier must notify the Secretary of the proposed modifications.

3 Changes and Modifications

3.1 Definition of a Modification

All operational sites, for a variety of reasons, make changes. These changes are implemented to provide some benefit to the business; whether it be productivity, reduction in risks to health, safety, security and environment, operational or financial improvements.

To properly manage such changes to process, equipment and systems, the meaning of what is meant by a 'change' or 'modification' must be established.

Generally, modifications include changes to equipment, substances (dangerous or otherwise), procedures and process conditions, other than those which could be described as 'replacement in kind'. The Act definition of a modification is provided in Guide Note 1. The particular focus of the Act is on those changes which can potentially impact on risk to people, property and the environment.

Guide Note 1 –The Act definition of a Modification

Modification: of a MHF includes-

- A change to plant, processes or quantities of dangerous substances handled at the facility or location; or
- The introduction of different dangerous substances or new plant, processes, or operating procedures at the facility or location; or
- Organisational change at the facility or location; or
- A change to the safety management system at the facility or location.

3.2 Unforeseen Consequences

Many dangerous substances emergencies or dangerous situations at facilities have occurred due to the unforeseen consequences resulting from the implementation of

modifications. Without appropriate consideration of all possible implications, such modifications may introduce a new hazard. (see Guide Note 2)

Guide Note 2 – Flixborough Disaster 1974

Modifications and temporary changes have been the cause of a number of catastrophic accidents in the past. The most notable example was the vapour cloud explosion and fire at the Nypro facility at Flixborough UK in 1974. The dangerous substances emergency killed 28 people and injured in excess of 400. The release and explosion of 50 tonnes of hot cyclohexane was due to the failure of a temporary bypass pipe connecting two reaction vessels.

There were six reactors in series at Flixborough, liquid flowed through the reactors by gravity from No.1 to No.6. Due to the development of a crack in the fifth reactor, it was removed. The temporary bypass was used to connect reactor No.4 to No.6.

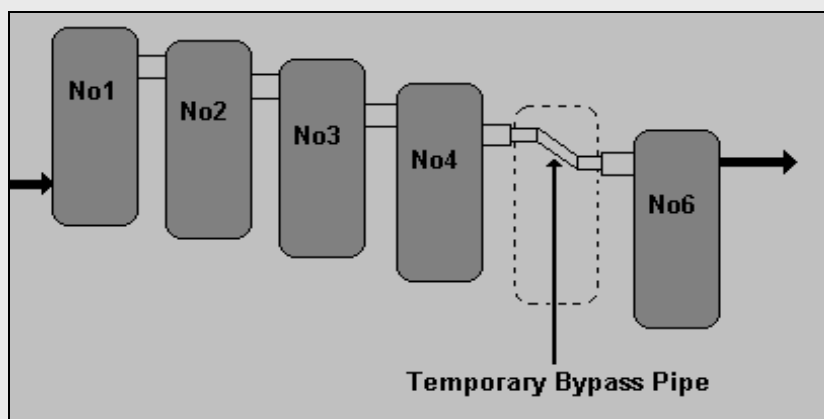


Figure: Schematic of reactors and the bypass arrangements at Flixborough

The change management processes at Flixborough were inadequate. The following issues are worthy of note:

- The bypass design was inappropriate, supported by scaffolding and free to rotate or twist if the pressure increased (this apparently caused the bypass arrangement to fail) – no appropriate design, design review & hazard assessment;
- There was no suitably qualified mechanical engineer on site to co-ordinate the appropriate design and installation of the bypass – no management of change for personnel;
- There was no design information apart from a sketch in chalk on the workshop floor – no appropriate modification documentation;
- The modification was only temporary yet the failure occurred 2 months after it was installed.

The potential for problems arising from modifications can be influenced by a number of factors related to the implementation of the modification. Such factors include:

- the timing of the modification – the modifications may be well planned during a plant design phase or rushed during a time of stress such as commissioning or a plant breakdown situation;
- the requirement for sanctioned capital – a greater degree of consideration may be given to potential impact of the modification when justification for the sanctioning of capital is required; and
- the permanency of the change – modifications which are considered temporary may not receive the same level of scrutiny as a permanent modification.

3.3 Significant Alteration to Risk

Apart from the appropriate management of change provisions as part of the facility's SMS, the Secretary's specific interest in modifications surrounds those modifications that significantly alter the risk associated with the facility. This does not necessarily relate to the size or significance of the modification, but rather the potential impact on risk due to the modification (see Guide Note 3).

Guide Note 3 – Significance of Modification

Major changes to the office area of a facility involve major construction work, disruption of employees and significant change to the appearance of the site. This project could be considered a significant modification, but may have little if any impact on risk at the facility.

Alternatively, the seemingly minor increase in production at a facility to meet increasing demands may impact adversely on the pressure relief capacity and thereby significantly impact on risk.

The significance of the modification does not necessarily significantly alter risk.

The determination of whether risk is changed due to a proposed alteration needs to be quantified in some way and not solely on judgement or 'gut feel'. The post-modification

level of risk must be compared to the pre-modification (i.e. from the SRA) to determine if there is a difference which can potentially impact on risk to people, property and the environment.

In comparing pre-modification and post-modification levels of risk the same risk assessment techniques assumptions must be employed in both cases. Further information regarding risk assessment techniques is available in ***Guidelines for Major Hazard Facilities, C – Systematic Risk Assessment.***

The following factors must be considered in determining the significance of the modification and the change to risk, hence the requirement in accordance with Section 36 to inform the Secretary.

Off site risk

An alteration in risk would be identified by a change in the cumulative risk associated with the facility's operation, e.g. an increase in the storage quantity of a dangerous substance may result in a significant increase in risk to the surrounding sites as a result of a subsequent dangerous substances emergency.

Inherent level of risk

Changes to the hazards present at a facility change the inherent level of risk associated with the facility. While appropriate risk reduction measures can be employed to manage this risk to an acceptable level, significant changes to the hazards at the facility are of interest to the Secretary. Are the introduced risks being managed appropriately?

Changes to hazards and hence changes to the inherent level of risk may include:

- Changes to the manifest of a dangerous substance – generally a change of 10% or greater would be considered significant;
- Changes to process conditions, e.g. processing temperature, pressure etc.; and
- Changes to equipment, e.g. reliability, containment integrity etc.

As risk is a function of consequence and likelihood, the alteration to the inherent risk at a facility, due to the implementation of a modification, may be influenced by changes in consequence, likelihood or both. (see Guide Note 4)

Guide Note 4 – Alteration to Risk – Consequence & Likelihood

A facility intends increasing the manifest of a dangerous substance. Depending upon how the increase is implemented, the risk at the facility may be affected in the following ways:

Consequence – if a handling system (tank, packaged store area) at the facility is increased, the impact of a potential dangerous substances emergency involving this system will increase accordingly. i.e. increase in the amount of dangerous substances that could be released.

Likelihood – if an additional handling system (tank, package store area) is constructed at the facility, the likelihood of a failure that may lead to a dangerous substances emergency will increase accordingly. i.e. increase the number of handling systems increases the number of potential areas for failure.

4 Control of Modifications

To minimise the impact of modifications, procedures must be established for the safe management of change at the facility. These procedures must cover changes/modifications to plant, systems, processes and people to ensure that such changes do not compromise safety.

The management of change procedures must include provisions for the assessment of risk associated with intended changes or modifications. Appropriate risk reduction measures must be identified and implemented to maintain risk at an acceptable level.

The procedures must include:

- definition of what constitutes a change or modification;
- the process for initiating change;
- authority for approving intended changes;
- documentation of the change;
- safety implications/assessment of risk associated with the change including requirements for quantitative risk assessment of the modification as appropriate;
- implementation of risk reduction measures so risk is managed appropriately;
- communication processes established to ensure information of changes is appropriately disseminated and understood; and
- post change review.

The procedures must ensure that appropriately qualified and experienced personnel are used in the modification design, review of the design, hazard assessment and the final approval of the modification.

An occupier of a MHF must include within their procedures the requirement that the Secretary is notified prior to the implementation of the modification if the modification will alter the risk associated with the facility.

5 Modifications

5.1 Summary of Obligations

Before any modification is carried out that alters the risk, the occupier must:

- review and update the EP&Ps as per Section 13 of the Act;
- notify the Secretary regarding the modification as per Section 36 of the Act;
- review and update the SRA as per Section 38 of the Act;
- conduct education and training relevant to the modification as per Section 21 & 41 of the Act;
- review and update the SMS as per Section 21 & 42 of the Act; and
- review the safety report and give an update of it to the Secretary as per Section 44 of the Act.

5.2 Notification of Changes

As a minimum, the occupier must provide the Secretary with the following information about the intended modification before the modification is carried out:

- a comprehensive description of the proposed modification including a scaled plan(s) showing the location of the modification within the facility;
- details of any new hazards introduced and changes to the risk associated with the facility;
- details of the risk reduction measures employed to manage the risks associated with the modification;
- the level and appropriateness of information, education and training provided to relevant employees who may be affected by the modification; and
- a demonstration that the implementation of the modification continues to provide an acceptable level of risk.

5.3 Education and Training

The occupier must establish processes to ensure that relevant employees who are potentially affected by modifications, are provided with the appropriate level of information, education and training regarding the modification. This training must be

provided to ensure that relevant employees can continue to perform their roles and duties safely and to the required competency standard.

The information, education and training must cover issues such as:

- the nature of the hazards associated with the modification;
- the processes used to identify, assess and control the risks associated with the modification; and
- the use and maintenance of the processes to control the risks associated with the modification.

5.4 Safety Report Update

The occupier must provide an updated safety report to the Secretary prior to implementing any modifications that significantly alters risk at the facility. The update of the safety report can be either:

- a new safety report document written incorporating the intended modification; or
- an appropriate addendum to the current safety report addressing specifically the areas of the original document affected by the implementation of the intended modification.

In each case the update of the safety report must address the impact of the intended modification on the following:

- the SRA of the facility and a demonstration that risk is at an acceptable level ie AFARP;
- the induction, information, supervision education and training at the facility;
- the EP&Ps at the facility;
- the SMS at the facility; and
- the community consultation arrangements for the facility.

Further information regarding the content of the safety report is available in ***Guidelines for Major Hazard Facilities, J – Safety Report.***

6 Summary of Occupier's Requirements

The occupier may use the following as a checklist.

The occupier must be able to demonstrate the following:

- The Secretary has been notified prior to modifications to the facility that will result in a significant change in risk.
- Processes have been established for the control of modifications and changes at the facility
- Suitably qualified and experienced personnel are involved in the approval and implementation of modifications
- All hazards associated with intended modifications are identified and their risks assessed prior to the implementation of all modifications
- Appropriate risk reduction measures are employed to ensure the risks associated with the intended modification are managed to an acceptable level
- The obligations under the Act with respect to modifications are included in the control of modification processes at the facility

7 Additional Information

The guidelines, additional information or clarification of any of the issues raised in the guidelines can be obtained by contacting Workplace Standards Tasmania, Department of Justice, at any of the following addresses:

Postal: PO Box 56, ROSNY PARK, TAS 7018
Tel: 1300 366 322 (within Tasmania)
(03) 6233 7657 (outside Tasmania)
Fax: (03) 6233 8338
E-mail: wstinfo@justice.tas.gov.au
Web: www.wst.tas.gov.au

Copies of the *Dangerous Substances (Safe Handling) Act 2005* and *Dangerous Substances (Safe Handling) Regulations 2009* can be obtained from Print Applied Technology P/L at any of the following addresses:

Postal: PO Box 307, HOBART, TAS 7001
Street: 33 Innovation Drive, Technopark
DOWSING POINT, TAS 7010
Tel: (03) 6233 3360
Fax: (03) 6233 5346
Web: www.thelaw.tas.gov.au

Copies of the National Standard for the Control of Major Hazard Facilities [NOHSC:1014(2002)], National Code of Practice for the Control of Major Hazard Facilities [NOHSC:2016(1996)], National Standard for the Storage and Handling of Workplace Dangerous Goods [NOHSC:1015(2001)] and National Code of Practice for the Storage and Handling of Workplace Dangerous Goods [NOHSC:2017(2001)] can be obtained from Safe Work Australia, at any of the following addresses:

Postal: GPO Box 9880, CANBERRA, ACT 2601
Tel: (02) 6121 5317
Fax: (02) 6121 9284
Web: www.safeworkaustralia.gov.au

Copies of Australian Standards AS 3745 : Emergency Control Organisations and Procedures for Buildings, Structures and Workplaces, AS/NZS 3931 : Risk Analysis of Technological Systems – Application Guide, AS/NZS 4360 : Risk Management, AS/NZS 4581 : Management System Integration – Guidance to Business, Government and Community Organisations, AS/NZS 4801 : Occupational Health and Safety Management Systems – Specification with Guidance for Use, HB76 : Dangerous Goods – Initial Emergency Response Guide and HB221 : Building Continuity Management can be obtained from SAI GLOBAL at any of the following addresses:

Tel: 131 242
Fax: 1300 654 949
Web: www.saiglobal.com/shop

The Health and Safety Executive (United Kingdom) has an excellent reference library to assist with Emergency Planning for Major Accidents and Preparing Safety reports for its Control of Major Accident Hazard Regulations 1999 (COMAH) and can be accessed by its website: www.hse.gov.uk/comah/

The Hazardous Industries and Chemicals Branch of the Department of Employment and Industrial Relations, Queensland, has an excellent reference library to assist Major Hazard Facilities in respect to safety risk assessment, safety management systems, emergency plans and procedures etc and can be accessed by its website: www.deir.qld.gov.au

Likewise WorkSafe Victoria also has an excellent reference library to assist with Major Hazard Facilities matters and can be accessed by its website: www.workcover.vic.gov.au

ISO/PAS 22399 : Societal Security – Guideline for Incident Preparedness and Operational Continuity Management published by the Business Continuity Institute is an excellent resource on how to deal with emergency planning and can be accessed by its website: www.thebci.org.au

“Loss Prevention In The Process Industries” by Frank P. Lees, “What Went Wrong? Case Histories of Process Plant Disasters” and “Learning from Accidents in History” by Trevor Kletz are excellent resource material and can be accessed on the web.



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Workplace Standards Tasmania
PO Box 56 Rosny Park TAS 7018
Phone: 1300 366 322 (inside Tasmania)
(03) 6233 7657 (outside Tasmania)
Email: wstinfo@justice.tas.gov.au
Web: www.wst.tas.gov.au
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