



Planning

Hazardous Industry Planning and Assessment Guidelines

Guideline Summary



January 2011

Hazardous Industry Planning and Assessment Guideline Summary
© State of New South Wales through the Department of Planning
2011

23–33 Bridge Street
Sydney NSW Australia 2000
www.planning.nsw.gov.au

ISBN 978-1-74263-152-3
DOP HAZ_001

Disclaimer: While every reasonable effort has been made to ensure that this document is correct at the time of printing, the State of New South Wales, its agents and employees, disclaim any and all liability to any person in respect of anything or the consequences of anything done or omitted to be done in reliance upon the whole or any part of this document.

Introduction

In February 1999, a chemical process vessel exploded at the Concept Sciences, Inc. (CSI), production facility near Allentown, Pennsylvania. Four employees and a manager of an adjacent business were killed. Two CSI employees survived the blast with moderate-to-serious injuries. Four people in nearby buildings were injured.

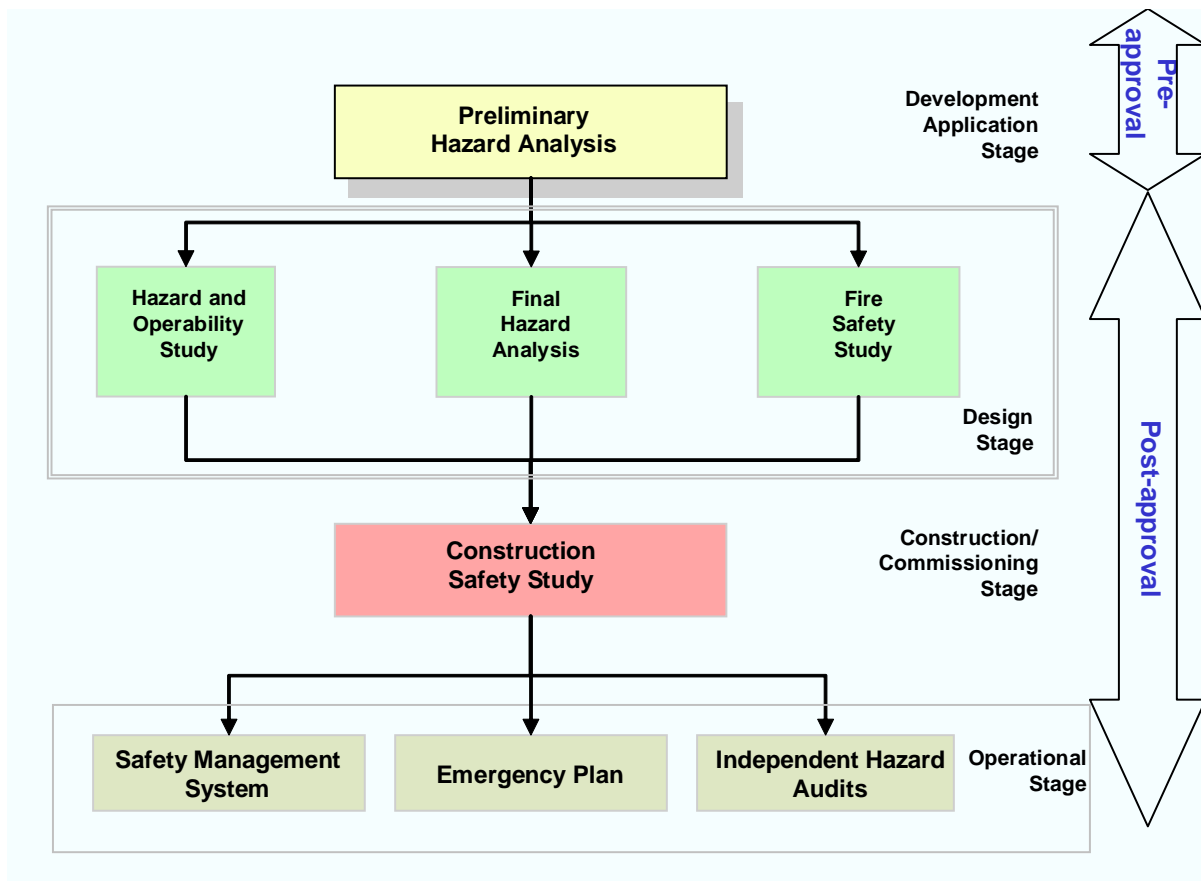
The production facility was extensively damaged. The explosion also caused significant damage to other buildings in the Industrial Park and shattered windows in several nearby homes.



The investigation of this incident revealed a number of shortcomings:

- the facility's process safety management systems were insufficient to properly address the hazards inherent in the manufacturing process and to determine whether these hazards presented substantial risks;
- basic process safety and chemical engineering practices—such as process design reviews, hazard analyses, corrective actions, and reviews by appropriate technical experts—were not adequately implemented; and
- the existing system of siting approval by local authorities allowed a highly hazardous facility to be inappropriately located in a light industrial park.

This incident, which is by no means an isolated example, is one of the reasons that the NSW Department of Planning has formulated and implemented integrated risk assessment and land use safety planning processes that take account of both the technical and the broader locational safety aspects of potentially hazardous industry. These processes, which are implemented under the Environmental Planning and Assessment Act 1979, are summarised in the following diagram.



The Guidelines

A number of Hazardous Industry Planning Advisory Papers (HIPAPS) and other guidelines have been published progressively by the Department to assist stakeholders in implementing the process. All of the existing HIPAPS have now been revised and several have been completely rewritten. HIPAPS 10-12 are additions to the original series.

This document outlines the purpose and scope of the current guidelines.

Applying SEPP 33

State Environmental Planning Policy (SEPP) No 33: Hazardous and Offensive Development presents a systematic approach to the assessment of development proposals for potentially hazardous and offensive industry or storage. Through the policy, the permissibility of a proposal to which the policy applies is linked to its safety and pollution control performance. SEPP 33 also aims to ensure that the merits of proposals are properly assessed (in relation to off-site risk and offence) before being determined.

SEPP 33 ensures that only those proposals which are suitably located, and able to demonstrate that they can be built and operated with an adequate level of safety and pollution control, can proceed.

The Applying SEPP 33 guidelines cover the following topics:

- knowing when SEPP 33 applies;
- SEPP 33 administrative requirements;
- assessing applications under SEPP 33;
- common queries about the policy; and
- identifying a potentially hazardous development.

Appendices provide additional information.

HIPAP No. 1 - Industry Emergency Planning Guidelines

An important element of any system for the prevention of major accidents is the establishment of a site-specific emergency plan. Emergency planning seeks to minimise the effect of an accident inside and outside a facility and requires the timely application of defined procedures by personnel with adequate training and resources. For this to occur, plans and procedures specific to relevant activities at the facility must have been developed, documented and tested prior to the occurrence of an event.

This advisory paper aims to assist the Operator of a facility in the establishment, maintenance, testing and review of an emergency plan that provides for the protection of people and the environment in the event of an accident. For the Operators of Major Hazard Facilities, it also outlines the regulatory expectations in assessing the adequacy of the emergency plan as described in the Operator's Safety Report. The guidance has been updated in consultation with Fire and Rescue NSW¹.

An appendix provides a 33 point checklist that summarises the important components of a site-specific emergency plan and provides an assessment basis for the relevant public authorities when evaluating the completeness of emergency preparedness.

HIPAP No. 2 - Fire Safety Study Guidelines

A fire safety study's objective is to ensure that the existing or proposed fire prevention, detection, protection and fighting measures are appropriate for the specific fire hazard and adequate to meet the extent of potential fires for the subject development.

These guidelines have been jointly prepared and issued by the NSW Department of Planning and Fire and Rescue NSW. For development involving substantial quantities of hazardous materials, the Department and the Fire and Rescue NSW have a common involvement and collaborate closely.

The fire safety study is one element in the safety assurance process. Emergency planning is also an important element and its relationship to fire safety arrangements should be clearly dealt with in the study and the report.

Fire and Rescue NSW also has a wider role and responsibilities which cover other types of development, particularly under the provisions of the Building Code of Australia (BCA) and the EP&A Act. These guidelines should help developers required to prepare reports for Fire and Rescue NSW under those provisions.

HIPAP No. 3 - Risk Assessment

These guidelines describe the overall land use safety planning framework for potentially hazardous industrial developments. They provide advice relevant to developers, consultants, local and State government, and the community.

The guidelines outline considerations for siting a potentially hazardous development and describe the assessment studies which need to be carried out at various stages of the development process - from concept, through initial design and examination of environmental impact, to detailed design and operation.

A more detailed discussion of land use safety planning issues is found in HIPAP 10: *Land Use Safety Planning*.

The assessment requirements outlined in the guidelines include:

- A preliminary hazard analysis study to be undertaken at an early stage of a project and as part of the development application
- A hazard and operability study, fire safety study, emergency plan and an updated hazard analysis which are appropriate assessment studies and safety procedures to be undertaken as part of the detailed design of the proposed development. A construction safety study prepared to ensure safety during construction.
- Implementation of a comprehensive safety management system which incorporates independent hazard auditing at regular intervals during the operation of the development. This is appropriate to ensure continued safety of the development and of the development and of surrounding land uses.

Further details of the studies and systems are provided in the other guidelines in the series.

HIPAP No. 4 - Risk Criteria for Land Use Planning

The assessment of risk necessitates the establishment of criteria against which judgments can be made as to the compatibility of various land uses.

¹ Formerly known as the NSW Fire Brigades.

There are two dimensions of risk which should be considered separately, individual and societal. On the one hand, the individual's concern about their own life or safety is mostly independent of whether the risk is from an isolated incident or a large scale disaster. Society's risk perception, however, is mostly influenced by multiple fatality or injury disasters.

When a risk is to be imposed on an individual or a group of people (e.g. by locating a hazardous facility in an area), the concept of 'acceptability' of that risk for the decision-making process is that it should be low relative to other known and tolerated risks.

In assessing the tolerability of risk from potentially hazardous development, both qualitative and quantitative aspects need to be considered.

Relevant general principles are:

- the avoidance of all *avoidable* risks;
- the risk from a major hazard should be reduced wherever practicable, even where the likelihood of exposure is low;
- the effects of significant events should, wherever possible be contained within the site boundary; and
- where the risk from an existing installation is already high, further development should not pose any incremental risk.

The guideline presents and discusses quantitative risk criteria related to fatality (individual and societal), injury, property and environmental damage. The criteria can be applied at the strategic level as well as to individual development. Risk criteria are also relevant in examining development in the vicinity of potentially hazardous facilities.

HIPAP No. 5 - Hazard Audit Guidelines

A hazard audit is a systematic and critical examination of a facility, its operations and safety systems. Its object is to identify any shortcomings in the measures which are in place to minimise the likelihood and consequences of hazardous incidents.

The requirement for regular hazard audits recognises that with the increasing scale of operation, complexity of technology and automation of industry, continued commitment is required for the safe operation of potentially hazardous facilities. Independent hazard audits provide assurance that the plant and operations, as a whole, continue to be safe and to be operated at a high level of competence. They provide an opportunity to review plant, equipment, operating procedures and safety systems and to incorporate, where appropriate, further improvements to hardware and software systems. Operating standards are therefore not only maintained but are continually reviewed and updated to incorporate new technology or information.

This paper provides guidance on the requirements and general approach to be adopted for hazard audits and the form and content of the audit report.

HIPAP No. 6 - Guidelines for Hazard Analysis

In assessing development proposals (for new facilities and substantial modifications to existing ones) and existing plants, the emphasis is on preventing or minimising major hazardous incidents on-site, such as fire and explosion or the release of significant quantities of toxic or biologically harmful chemicals, that could result in significant off-site effects.

The assessment of the suitability of a site to accommodate an existing or proposed development of a potentially hazardous nature must be based on consideration of:

- the nature and quantities of hazardous materials stored and processed on the site;
- the type of plant and equipment in use;
- the adequacy of proposed technical, operational and organisational safeguards;
- the surrounding land uses or likely future land uses; and
- the interactions of these factors.

This information is incorporated into the hazard analysis. The objective of hazard analysis is to develop a comprehensive understanding of the hazards and risks associated with an operation or facility and of the adequacy of safeguards. Without such analysis it is difficult to be confident that design and operation can be carried out with an adequate level of safety.

The hazard analysis process encompasses qualitative and quantitative methods. However, neither quantified nor qualitative analysis should be pursued for its own sake.

The quality of the hazard analysis depends on the ability of the analyst to understand the plant and processes at the facility and assess what might go wrong. The analyst should draw upon specialised technical expertise to provide guidance as necessary.

This document provides guidance on the general approach recommended for hazard analysis and details the requirements for reports to be submitted to government authorities.

HIPAP No. 7 - Construction Safety Studies

Construction safety study is an integral part of the approval process and is typically carried out after project design has been completed. The Construction Safety Study focuses on hazards with the potential to impact offsite areas rather than on occupational health and safety (OH&S) issues, which are dealt with outside the planning system.

The Construction Safety Study identifies all hazards which are specific to demolition, construction and commissioning activities associated with proposed development. The study also identifies the safeguards that will be put in place to ensure those hazards are controlled.

The Construction Safety Study is relevant to new development and modifications and additions to existing development. It also applies to the demolition of a facility at the end of its operating life, whether or not it is to be replaced.

The following areas are given particular attention:

- demolition of existing plant and structures;
- contamination;
- hazardous materials for demolition / construction;
- excavation hazards;
- interaction with continuing operations;
- drainage arrangements;
- natural events;
- hazardous materials during commissioning; and
- sequencing of commissioning activities.

The guidelines also provide guidance on the form and content of construction safety study reports for submission to government authorities.

HIPAP No. 8 - HAZOP Guidelines

An important element of any system for the prevention of major accidents is conducting a hazard and operability study (HAZOP) at the detail design stage, of the plant in general and the operating and safety control systems in particular. HAZOPs seek to minimise the effect of an atypical situation in the operation/process by ensuring that control and other safety systems such as functional safety (e.g. emergency safe shutdown) are in place and work with a high level of reliability to achieve a safe outcome from a situation that could have resulted in a major accident.

The HAZOP process is used to identify potential hazards and operational problems in terms of plant design and human error. The technique is applied during final design of the process and plant items before commencement of construction.

HAZOPs have also proven to provide financial benefits to the plant owner/operator by minimising the time and money spent in installing add on control and safety systems, the need for which may become evident at the time of plant commissioning in the absence of a HAZOP. On the operability front benefits are gained by implementing at design stage, the remedial recommendations to operability issues identified during the HAZOP.

This advisory paper aims to provide guidance to all persons associated with the design and operation of a facility to appreciate the need for a HAZOP and also the general procedure that is followed in carrying out a HAZOP and reporting the study results. It gives a broad indication of what is required in undertaking a HAZOP with a list of references for further study.

HIPAP No. 9 - Safety Management System Guidelines

These guidelines describe safety management principles and their implementation in a formal Safety Management System (SMS). Examples, checklists and useful references are included. For operators, proponents

and others required to make formal submissions, guidance in preparation of SMS submissions to public authorities is also provided.

These guidelines are complementary to other NSW Department of Planning's Hazardous Industry Planning Advisory Papers (HIPAPs) which describe the elements of the formal risk assessment process. The SMS guidelines describe the extension of safety assurance beyond planning phases to encompass the full operating life of a facility.

For developments involving modifications to existing sites, the SMS also provides a valuable framework for guiding the design and safety assessment of the proposal.

The SMS is described as the comprehensive and integrated system for managing safety at a potentially hazardous facility and which sets out:

- The safety objectives;
- The systems and procedures by which these are to be achieved;
- The performance standards which are to be met; and
- The means by which adherence to these standards is to be maintained.

The guidance provided by this document describes a SMS model that includes the following elements:

- Safety Policy and Commitment to Policy;
- Management and Administration of the SMS;
- Operational Controls that includes all the elements of an efficient Process Safety System; and
- Safety Assurance.

HIPAP No. 10 - Land Use Safety Planning

Land use safety planning is essentially a mechanism for dealing with actual or potential conflicts between sources of risk, such as potentially hazardous industrial developments, and surrounding land uses.

In a positive sense, its aim is to foster appropriate development in appropriate locations.

It aims to ensure on one hand, that industrial development does not pose an unacceptable risk to the surrounding area and on the other, that exposure to risks from existing industrial development are not increased by changes in land uses surrounding such development.

These guidelines focus on the land use safety implications of industrial hazards, in particular those arising from loss of containment of hazardous materials leading to fires, explosions and toxic releases.

They provide advice to planning authorities and other stakeholders in relation to strategic land use safety planning and development assessment and control. They also discuss risk criteria for land use safety planning and cover emergency planning in the context of land use safety.

A number of ancillary issues are discussed in appendices, most notably, development in the vicinity of potentially hazardous industry.

HIPAP No. 11 - Route Selection

Where a development involves the transport of significant volumes of dangerous goods and/or hazardous materials, there may be a need to select preferred transport routes from a number of possible alternatives.

These guidelines provide an overall integrated framework for the assessment of road transport routes for the transportation of hazardous materials. They are based on the basic principles that land use safety planning should complement technical and operational safety management. Optimum transportation decisions can only be made when all relevant aspects of and use safety, traffic and economic elements are exposed and integrated into the decision making process.

Essentially, the study process includes:

- examination of the road hierarchy and identification of routes for heavy vehicle transportation;
- elimination of those routes where there are legal or physical constraints, special/sensitive land uses or where there is inadequate emergency access;
- rating the potential routes on the basis of environment and land use risk factors, traffic factors and economic factors;
- a comparison of each of the route alternatives on the basis of their rating against each of the factors.

The guidelines cover each step of this process:

The ultimate decision is a balanced judgement considering each of the factors.

HIPAP No. 12 - Hazards-Related Conditions of Consent

Hazards-related conditions of consent are imposed to ensure that safety is not compromised during the design, construction and ongoing operation of an approved development.

The use of a standardised set of conditions of consent promotes a consistent approach to assessment but this can lead to overly onerous requirements for low to medium hazard developments. It is important that the conditions be 'fit-for-purpose'.

These guidelines present an approach to tailoring the conditions of consent to the hazards and risks of a particular development, as assessed in the PHA.