HSWA

GOOD PRACTICE GUIDELINES

MAJOR HAZARD FACILITIES: Major Accident Prevention Policy and Safety Management Systems

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New Zealand Government

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This guideline offers advice on how to establish a Safety Management System (SMS) and prepare a Major Accident Prevention Policy (MAPP) that meets the requirements of the Health and Safety at Work (Major Hazard Facilities) Regulations 2016.

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> Health and Safety Executive (UK)

> National Offshore Petroleum Safety and Environmental Management Authority (Australia)

> Safe Work Australia

> WorkSafe Victoria (Australia)

> European commission's Major Accident Hazards Bureau

MAPP AND SMS KEY POINTS:

Operators of designated major hazard facilities must establish and implement an SMS.

Operators of designated lower tier major hazard facilities must prepare a MAPP.

Use the SMS as the primary means of ensuring safe operation.

Operators must engage with workers when preparing or revising a MAPP, and when designing and implementing the SMS.

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INTRODUCTION

IN THIS SECTION:

This guideline will help operators of major hazard facilities build effective safety management systems and operators of lower tier major hazard facilities prepare and implement a major accident prevention policy.

1.1 PURPOSE AND SCOPE OF THIS GUIDELINE

The Health and Safety at Work (Major Hazard Facilities) Regulations 2016 (the MHF Regulations) identify the facilities to which the MHF Regulations apply. The status of a facility depends on the types and quantities of specified hazardous substances present or likely to be present, among other factors.

Table 1 presents an overview of the different types of facility and the corresponding obligations imposed by the MHF Regulations. The focus of this guideline is on safety management systems (SMS) and the major accident prevention policy (MAPP).

DUTIES	EXISTING FACILITY	PROPOSED FACILITY	DESIGNATED LOWER TIER MAJOR HAZARD FACILITY	DESIGNATED UPPER TIER MAJOR HAZARD FACILITY
Notification	✓	✓		
Design notice (For a proposed facility that may exceed the upper threshold only)		✓		
Major accident prevention policy (MAPP)			✓	
Safety management system (SMS)			✓	✓
Emergency plan			✓	✓
Safety assessment			✓	✓
Safety case				✓

Table 1: Overview of duties under the MHF Regulations

This guideline is relevant to all operators of major hazard facilities (MHF), who must implement an SMS, and operators of lower tier major hazard facilities (LTMHF) who must prepare and implement a MAPP. If you have an existing facility, you will already have an SMS in place and it is highly likely if you're proposing to build an MHF you will also have existing systems. In these situations, you should review the scope and coverage of your SMS against the requirements of the MHF Regulations, using this guideline as a framework. Where you control more than one MHF, you must develop a separate SMS for each.

Regulation 36 requires operators of LTMHFs to prepare, retain, and implement a MAPP by establishing a SMS. Schedule 5 states that it must be proportionate to the major incident hazards, activities, and complexity of the organisation of the MHF, and it describes the specific matters to be included in the SMS.

Regulation 39 requires operators of upper tier major hazard facilities (UTMHF) to also establish and implement an SMS as the primary means of ensuring the safe operation of the facility. Schedule 5 describes the specific matters to be included in the SMS.

1.2 HOW YOU CAN USE THIS GUIDELINE

This guideline is for you as an MHF operator, process safety engineers, managers, and workers at MHFs. It also provides advice to help local authorities, councils, and emergency services carry out their duties. It is for all facilities designated as MHF's and is non-industry specific.

For operators of LTMHFs this guideline will help you prepare and implement a proportionate MAPP and SMS.

For operators of UTMHFs, this guideline will help you establish and implement a SMS required by the MHF Regulations.

Coloured boxes summarise sections of the MHF Regulations or the Health and Safety at Work Act 2015 (HSWA).

Grey boxes contain examples. These expand on the content of the section and help provide further clarification.

Figure 1 describes how the suite of major hazard facilities good practice guidelines (GPG) interacts.

This guideline includes information on elements of an SMS and MAPP, including:

> overview of an SMS
> policy, planning and objectives
> engaging with workers
> organisation and personnel
> operational controls
> human factors
> management of change
> performance monitoring
> incident management
> audit and review
> record management.

This guideline forms part of a set of guidance that includes information on:

> Emergency planning
> Notifications and designation
> Safety assessment
> Safety cases

The SMS must also include procedures for identifying and evaluating major incident hazards and planning for emergencies. For more information on these, see WorkSafe's GPGs *Major Hazard Facilities: Safety Assessment* and *Major Hazard Facilities: Emergency Planning*.

1.3 HOW THIS GUIDELINE FITS INTO THE SUITE OF GUIDELINES

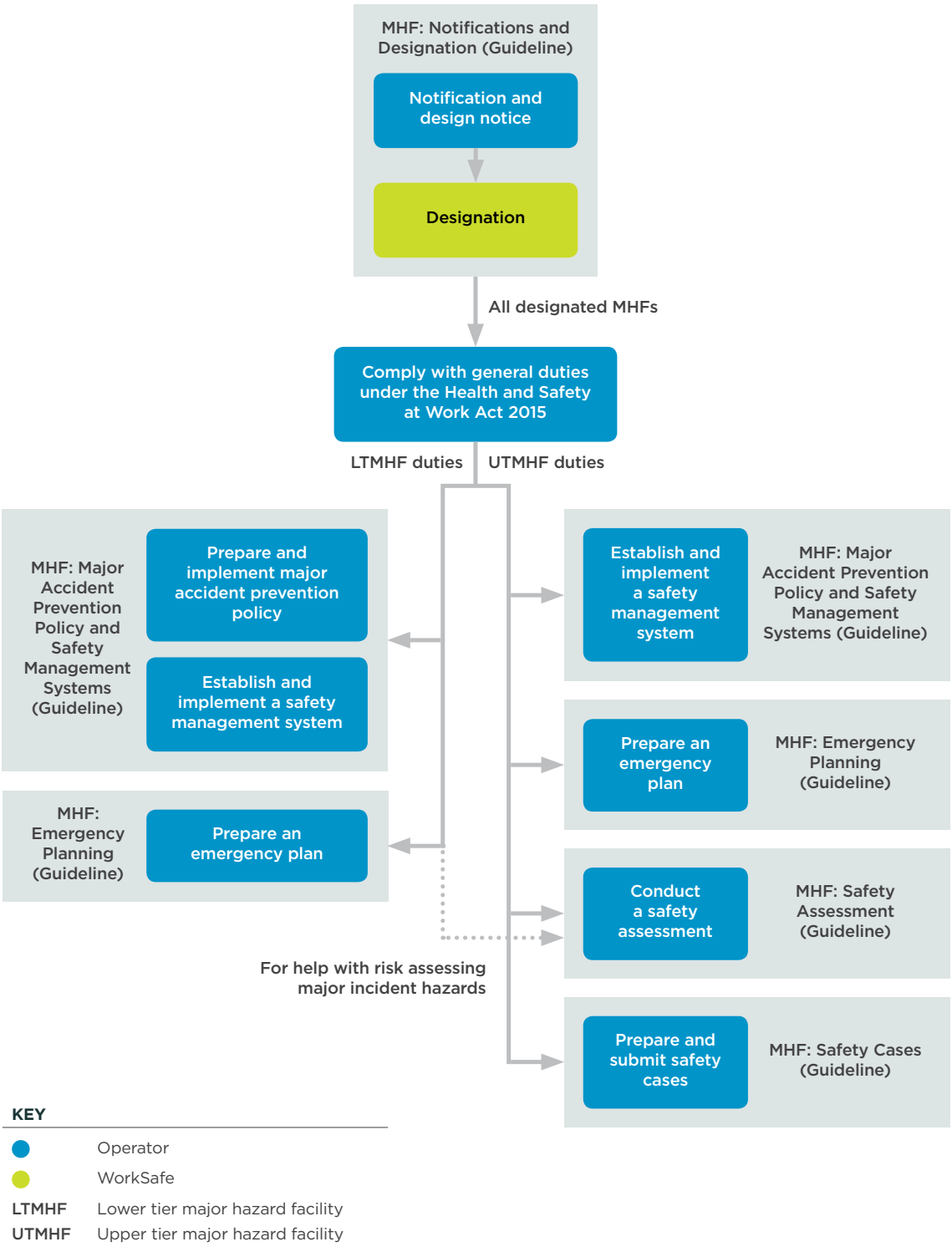

Figure 1: Overview of major hazard facilities guidelines

HOW THE SMS LINKS TO THE SAFETY ASSESSMENT

The purpose of a safety assessment is to identify all major incident hazards, their risk and implement controls to reduce risk so far as is reasonably practicable. The SMS provides a system for the management of all aspects of risk control. Integrate the safety assessment into the SMS with its review and improvement processes to understand how the system affects the MHF and its controls.

HOW THE SMS LINKS TO THE EMERGENCY PLAN

The MHF must have an emergency plan that effectively addresses all health and safety consequences of a major incident occurring. As the plan is MHF specific, it must be incorporated in the SMS, which is the system by which the plan can be managed. A strong and integrated SMS with good review and improvement processes will enable you to demonstrate the adequacy of your controls.

Regulation 31 requires the emergency plan to be integrated into the SMS.

HOW THE SMS LINKS TO THE SAFETY CASE

The purpose of a safety case is to demonstrate operators of UTMHFs are controlling all major incident hazards adequately. The safety case's largest part should come from the SMS, which is the primary means of ensuring the safe operation of the MHF. A strong and integrated SMS with good review and improvement processes will enable you to demonstrate the adequacy of your controls.

Schedule 7 requires the safety case include a summary of the SMS.

1.4 CONSIDERATIONS FOR FACILITIES THAT ALREADY HAVE AN SMS

A facility may already have some form of SMS in place at the time they first notify WorkSafe.

Generally, the task of establishing an SMS that complies with the MHF Regulations is an easier task for these facilities than developing an initial SMS. Conduct a gap analysis between the current SMS and the regulatory requirements to make any necessary revisions or additions. This guideline will help you identify any gaps between the current SMS and the requirements of the MHF Regulations.

Pay particular attention to the specific matters to be included in the SMS found in Schedule 5 of the MHF Regulations. It is also advisable to check:

> systems are implemented in practice

> all engineering and procedural controls are covered

> emergency plans cover all potential major incidents identified in the safety assessment.

1.5 WORKER ENGAGEMENT, PARTICIPATION AND REPRESENTATION PRACTICES

The intent of HSWA is for everyone to work together on improving health and safety. It places duties on all persons conducting a business or undertaking (PCBUs), as well as on officers, workers and others at workplaces. A PCBU must, so far as is reasonably practicable, engage with the workers who carry out work for it and who are, or are likely to be, directly affected by a work health and safety matter.

To improve health and safety at work, workers and PCBUs need to work together to find solutions. Effective worker engagement needs careful planning. Consider:

> the objectives
> who to engage
> the timing and duration
> the subject matter
> where the engagement should take place
> how to engage the workforce.

Figure 2 shows your twin duties to engage with workers and to have effective worker participation practices.

For certain duties under the MHF Regulations you must engage with, and make sure there is participation of, workers and any worker representatives who are:

> identifiable at the time
> working, or likely to be working, at the MHF.

These are stronger requirements than the twin duties placed on PCBUs under HSWA. The set of workers the duties apply to also differ. The twin duties under HSWA only apply to workers who carry out work for the business or undertaking. In comparison, the duties under the MHF Regulations apply to any identifiable worker 'working, or likely to be working,' at the MHF.

For more information, see WorkSafe's GPG *Worker Engagement, Participation and Representation*, which:

> describes a PCBU's two duties:
  - to engage with workers
  - to have effective worker participation practices
> provides practical advice on how to engage on health and safety matters
> describes effective worker participation practices, including representation, with examples.

Part 3 of HSWA and the Health and Safety at Work (Worker Engagement, Participation, and Representation) Regulations 2016 outlines worker engagement, participation, and representation requirements.

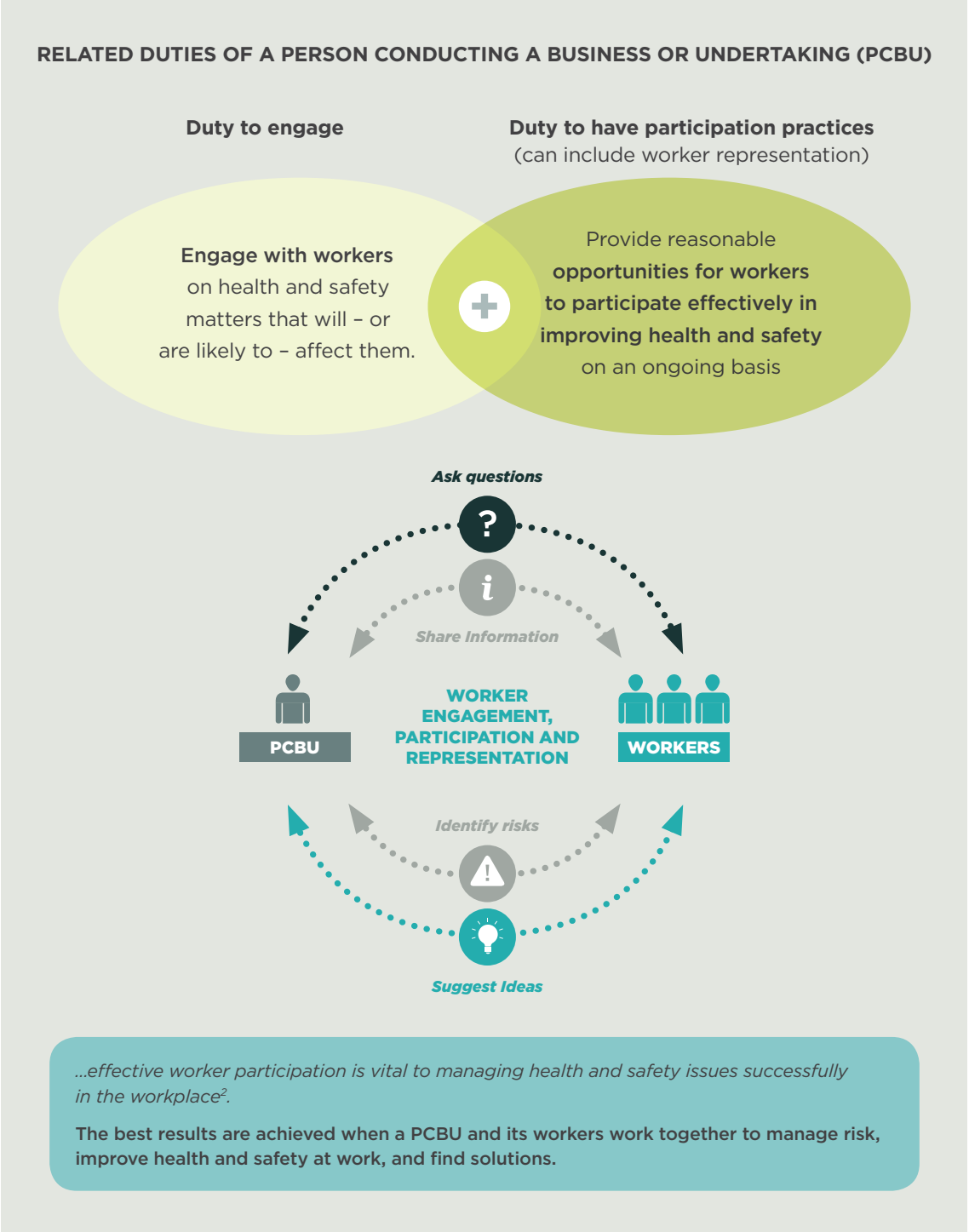

Figure 2: Worker engagement, participation and representation at a glance

[1] The Report of the Independent Taskforce on Workplace Health & Safety: He Korowai Whakaruruhau (2013) http://hstaskforce.govt.nz

02/

OVERVIEW OF A SAFETY MANAGEMENT SYSTEM

IN THIS SECTION:

This section covers some of the thinking and work to establish an SMS and introduces some of the key components.

2.1 WHAT IS AN SMS?

An SMS provides a systematic way to identify hazards and provide assurance the controls remain effective. An SMS should be systematic, comprehensive, and integrated with other processes within the facility. Like all management systems, the SMS provides for setting goals, planning, measuring performance, and support for a culture of continual improvement.

One management method for the control and continual improvement of systems and processes is the Plan Do Check Act (PDCA) method. It simplifies systems management into four steps:

> establishing goals and processes
> implementation
> studying the results
> making adjustments.

The model's circular nature shows the system evolving continually, with each rotation perfecting it further, and taking account of change and innovation.

Figure 3: PDCA continual cycle

2.2 ELEMENTS OF THE SMS

Establishing an SMS that meets the MHF Regulations should include a number of elements addressing:

> **Higher-level system needs** including policies and objectives (eg the MAPP) – section 3 of this guideline.
> **Worker-related systems** including worker engagement, recruitment, induction and training – sections 4 and 5.
> **Day-to-day and longer term safe operation** including operating procedures, work permitting, maintenance management, human factors and management of change – Sections 6, 7, and 8.
> **The SMS's effectiveness**, including performance monitoring, auditing and incident management – sections 9, 10, and 11.
> **Administrative procedures** such as document control – section 12.

Different operators have different ways of organising these elements. For example, different operators treat asset integrity management either as a part of maintenance management, or as a stand-alone system. Depending on the facility's complexity, the SMS may vary from 12 to 30 principal elements and include an array of underlying sub-systems, procedures and documents.

Figure 4 shows each element linking to the others, and the integrated system evolving through continual improvement.

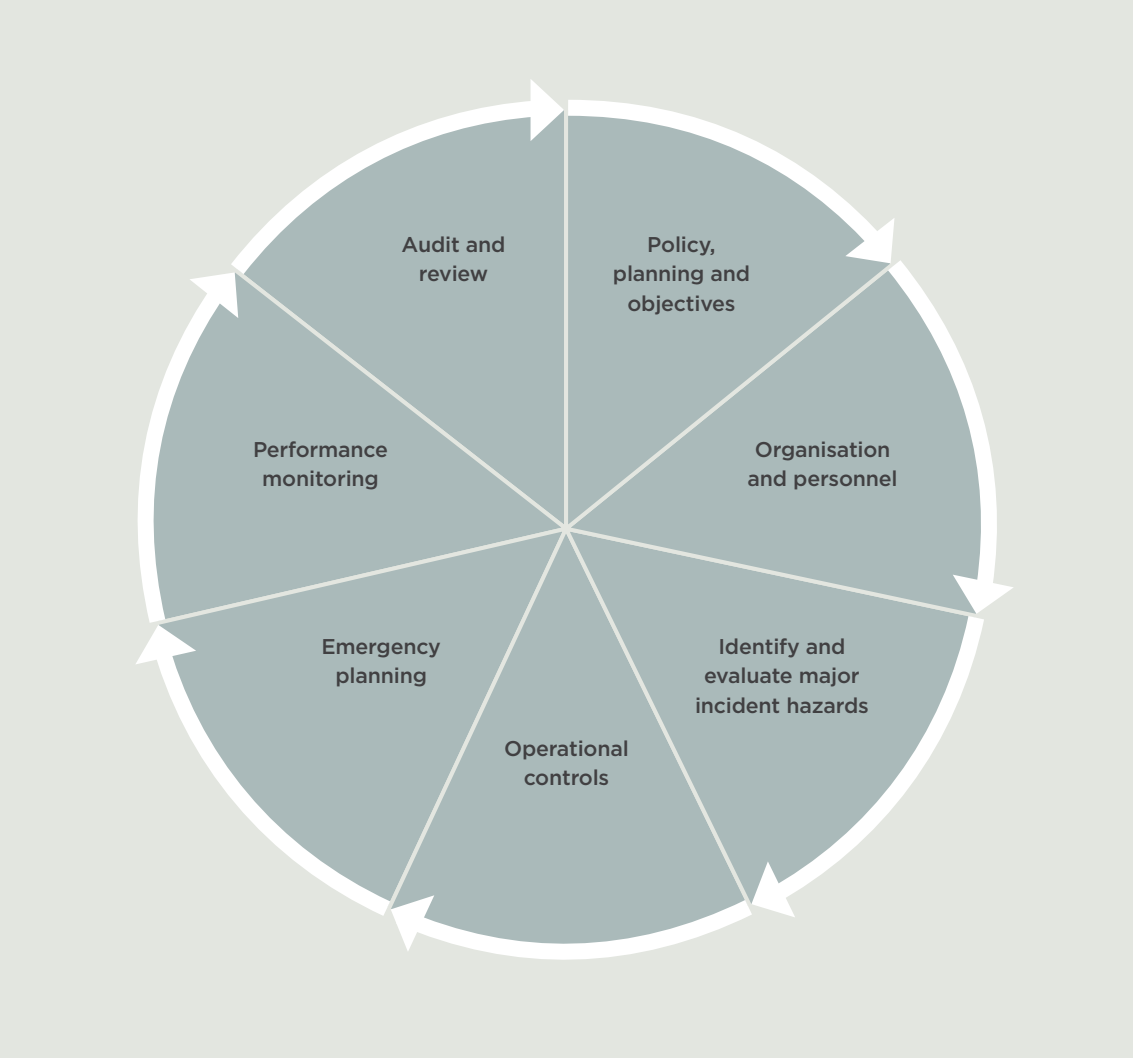

Figure 4: Elements of a continually improving SMS

2.3 EVALUATING THE CONTEXT

The first step in preparing the SMS is to evaluate and understand both the internal and external environment the MHF operates in, as this can significantly influence the design of the SMS.

Evaluating the MHF's external context may include:

> the social and cultural, political, legal, regulatory, financial, technological, economic, natural and competitive environment, whether international, national, regional or local

> key drivers and trends influencing objectives

> relationships with, and values of, external stakeholders.

Evaluating the MHF's internal context may include:

> governance, organisational structure, roles and accountabilities

> policies and objectives, and the strategies to achieve them

> resources (eg capital, time, and people)

- information systems, information flows and decision-making processes (both formal and informal)
- relationships with, and values of, internal stakeholders
- the MHF's culture
- standards, guidelines and models adopted by the MHF
- the form and extent of contractual relationships.

2.4 ESTABLISHING THE SMS

Establishing an SMS involves developing and implementing SMS procedures. For most MHFs, this stage will also involve considerable consultation. You may choose to seek specialist support from someone familiar (such as consultants) because of the large amount of work at this stage.

The SMS must:

- be comprehensive and integrated, with clear linkages between systems and controls
- be implemented and used as the primary means of ensuring the safe operation of the MHF
- focus sufficiently on major incident and process safety, including planning and operations
- comply with all regulatory requirements, including documenting the SMS and having it readily accessible to people who use it
- cover the whole MHF
- remain current through continual review and revision.

LINK AND INTEGRATE THE SYSTEMS

The SMS should not be a pure paperwork system; rather reflect the overall safety culture and operation of the MHF, and be consistent with the safety assessment in that it reflects and is proportionate to the identified risks.

The safety assessment provides a clear understanding of what controls you need to prevent major incidents occurring at an MHF. Adequately support and check controls through the SMS so they will work as designed. This is not as daunting as it may sound, since a few common SMS elements support most controls. For example:

- insuring reliability of safety instrument systems through maintenance and inspection planning or critical function testing.
- insuring reliability of procedural controls by including them in a competency based training and assessment plan.

When setting up a new SMS provide some means of making sure the system elements are fully integrated and links between systems are not broken. For example, some operators do this by regular programmed reviews of all documents within the SMS.

For more information on identifying hazards, assessing risk and implementing controls to reduce risk so far as reasonably practicable, see WorkSafe's GPG *Major Hazard Facilities: Safety Assessment*.

2.5 IMPLEMENTING THE SMS

After developing the SMS procedures, make sure people who have suitable skills and knowledge implement them. Engage with workers and develop training packages to explain the SMS when setting it up. Do not underestimate the time and effort involved in fully implementing the SMS and avoid delaying development of the SMS.

Everyone involved in operating a MHF should have knowledge of the SMS to the extent relevant to their role, and be competent to perform that role.

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POLICY, PLANNING, AND OBJECTIVES

IN THIS SECTION:

Define your health and safety policy and your commitment to it in the SMS. The health and safety policy and organisational commitment to achieving it set out how the SMS will be followed.

3.1 DEVELOPING A HEALTH AND SAFETY POLICY

The health and safety policy is the core of an SMS, and should be developed first. The policy should set a clear high-level statement detailing your explicit commitment to preventing incidents, and include broad aims, and performance targets. The policy establishes the framework, contributing to a high-quality safety culture at the MHF.

Policies are usually expressed in general terms. The policy tells everyone health and safety are important parts of all operations, and should be reinforced through periodic review and involvement of management.

Your health and safety policy must:

> include a statement of your commitment, intentions, and principles in relation to the facility's overall health and safety performance; and

> provide a framework for action and for setting the facility's health and safety objectives and targets.

Also consider including:

> a definition of key management responsibilities and accountabilities for hazards issues

> commitment by senior management to controlling hazards and preventing major incidents

> clearly referencing major incident hazards and preventing major incidents (ie recognising MHFs with major incident potential need a special focus and commitment to reducing and controlling the risk of major incidents)

> providing adequate resources and setting measurable and trackable improvement objectives

> management supporting a safety culture and how that culture is embedded throughout the organisation

> commitment to compliance with relevant legislation, codes and standards

> communication and training requirements

> commitment to your primary duty of care

> long-term objectives.

Schedule 5 requires that the SMS describe how the safety policy and specific safety objectives will be communicated to all persons participating in implementing the SMS.

3.2 DEVELOPING A MAJOR ACCIDENT PREVENTION POLICY

If you're an operator of an LTMHF, there is a specific requirement to prepare and implement a MAPP by establishing a SMS. This sets out the policy specifically about preventing major incidents, and will point to the risk management parts of the SMS, and safety assessment. The MAPP can be integrated into your safety policy. You may want to review the existing policy and revise it to include the requirements of a MAPP. It may also be appropriate to prepare the MAPP as an addendum to an existing policy.

If you're an operator of a UTMHF, information on preventing major incidents is already included in the safety case, and a MAPP is not required. LTMHF operators do not have to produce a safety case, but need to prepare a MAPP.

A MAPP is not a mini safety case but a high-level policy document referring to detailed documentation within the SMS. Within the SMS's hierarchy of documentation, at the top the MAPP sets out the policy and principles of major hazard prevention. Each subsequent level explains in more detail how these principles apply, finishing with working documents and instructions.

Regulation 36 requires operators of LTMHFs prepare, retain, and implement a MAPP by establishing a SMS

WHAT IS A MAPP?

A MAPP must be in writing and should include your overall aims and principles of action about the control of major incident hazards. Its purpose is to prevent the occurrence of major incidents and limit their consequences to people at or near the facility by appropriate means, structures, and management systems. It can also act as a clear statement of senior management's commitment to achieving high standards of major incident control.

The MAPP should set out the policy on preventing major incidents: in other words a statement of general intent, which includes the aims and the principles you plan to adopt. The MAPP does not need to contain a detailed description of your SMS. However, it should give enough detail to show you have systems in place to cover all the aspects listed later in the section 'What should go in your MAPP?'. The MAPP must address the management of major incident hazards and should be tailored to the facility.

A MAPP is similar in approach to a health and safety policy document, but must deal specifically with major incident hazards. Clearly state the scope of the MAPP and make sure it is consistent with all sources of major incident hazards at the facility.

The MAPP does not have to be submitted to WorkSafe. It should be available for inspection and available to workers at the facility.

WHAT SHOULD GO IN YOUR MAPP?

The MAPP should contain information on the following areas:

> organisation and personnel
> identification and evaluation of major incident hazards
> operational control
> planning for emergencies
> monitoring performance
> audit and review.

The scope, structure and amount of detail should be proportionate to the hazards present – the greater the hazards the more detail you will have to provide. For most facilities, the MAPP will be relatively short and simple. The MAPP does not need to include detailed records, you may already have the information in your safety policy and SMS (eg training records, internal site inspection records, audit reports, operating procedures, risk assessments, etc), and can simply refer to them. However, you need to make sure the information provided in the MAPP refers specifically to the key roles for preventing and mitigating major incident hazards.

In summary, the MAPP will include:

> your policy setting out your aims and principles of action about the identifying, preventing and mitigating major incidents;
> a description of your SMS for achieving the stated aims
> a commitment to continual improvement.

ORGANISATION AND PERSONNEL

This should set out roles and responsibilities of workers at all levels involved in managing major incident hazards including recruitment, training, and involvement in safety matters. All workers should be considered, including contractors.

IDENTIFICATION AND EVALUATION OF MAJOR INCIDENT HAZARDS

The MAPP should describe the overall aims, approach and policy for major incident hazard identification and risk assessment. Describe how the results are used; for example, your policy on eliminating hazards.

OPERATIONAL CONTROL

This should record how you ensure you have adequate management arrangements, workplace precautions and controls in place for safe operation. It should outline your system for developing, reviewing and revising procedures, and describe how you make sure the procedures are properly communicated.

PLANNING FOR EMERGENCIES

This section overlaps with your policy for major incident hazard identification and risk assessment described previously. Your MAPP needs to detail your policy on identifying possible major incidents and to show that you have plans in place to respond. It should indicate the types of major incidents you have identified and considered. You need to consider the possible role of people in neighbouring premises (both residential and commercial) and the emergency services. Your MAPP should include your policy on reviewing and testing the emergency procedures.

MONITORING PERFORMANCE

You need to have a system for assessing whether your facility continues to meet the objectives in your MAPP, and whether the standards you set are being maintained.

Your MAPP should describe how this assessment takes place, and how you would correct any deficiencies. This part of the document also needs to include your system for reporting and investigating accidents and near misses, and to explain how you implement lessons learnt.

AUDIT AND REVIEW

You need to have a system for making sure your management systems and procedures continue to be correct, and they are being followed. Your MAPP needs to describe how you use audit and review to maintain the validity of both the MAPP and SMS. In addition to reviewing the MAPP and SMS after an audit, review them if you make any modifications that could have significant repercussions in preventing major incidents, including changes to:

> your facility
> the type or amount of hazardous substances used
> how you process or store them.

Regulation 37 requires certain records of the MAPP be retained.

3.3 SETTING HIGH-LEVEL GOALS AND OBJECTIVES

The ‘planning’ stage of safety management is the work performed to define the scope, boundaries and performance objectives of specific SMS components. Many facilities achieve this by setting standards for various SMS elements. Consider these other aspects of the SMS during planning:

> emergency planning, including developing pre-incident plans
> applying relevant New Zealand and international standards

Planning should outline specific strategies for managing risks associated with hazards

identified in the facility including those with impacts on the workplace, local community and the environment. The plan must be documented and should include risk management strategies, objectives and timetables for reaching specific goals.

In planning to implement the SMS find out the following basic information:

> major incident hazards, their risks and their controls from the safety assessment
> legal and other requirements which apply to the organisation
> standards, objectives and targets for management and operational work
> the management plan and system to achieve the objectives and targets.

The aim of the planning process is to establish the organisation's risk profile. This enables the organisation to focus its resources on areas most important to achieving its objectives successfully. Planning is continual, enabling the organisation to identify changes such as new activities, materials and legal requirements.

Example 1: Health and safety policy and objectives

The safety policy

These are often expressed in general terms. Common examples of goals include:

> 'We are committed to providing a healthy and safe work place and safe systems of work for all workers.'
> 'We continuously seek ways to improve the health and safety of our workforce and the community.'

Specific safety objectives

These tend to be more specific and concrete, such as:

> 'Complete retrospective Hazard and Operability (HAZOP) program for Plant Areas X and Y.'
> 'Develop and deliver new competency-based training assessment (CBTA) training program for Emergency Response Team.'

Regulation 39 requires UTMHF operators state the specific safety objectives and describe the systems and procedures that will be used to achieve those objectives.

04/

ENGAGING WITH WORKERS

Engaging with workers is essential when developing a robust MAPP and SMS for the safe operation of the MHF.

On top of the general duties under HSWA, you have specific engagement duties under the MHF Regulations.

When preparing or revising a MAPP, and when designing and implementing the SMS, you must engage with, and make sure there is participation of, workers and any worker representatives identifiable at the time. You need to engage those workers working or likely to be working at the MHF, and could consider engaging with other workers, their representatives, and even unions to get a more comprehensive perspective.

By drawing on workers' detailed and practical knowledge, you are more likely to identify all major incident hazards, make more informed decisions about major incidents and choose better controls.

For example:

> Using workers' specific knowledge of operating practices and potential hazards of the facility. Workers and health and safety representatives (HSR) can confirm identified hazards and put forward potential hazards for consideration.

> Workers can confirm whether documentation accurately reflects what occurs at the facility, and whether proposed controls and supporting operational procedures will be practical to use and maintain.

> Engaging with workers in the identification of hazards and controls to raise their awareness of these issues, which are critical to safe operation.

> Using operational workers most exposed to risk from a major incident that have a stake in the level of risk accepted at the facility.

Engaging with workers allows them opportunities to influence health and safety at work – including how their work is done and their working conditions.

Regulation 65 requires the operator to engage with workers when preparing or revising a MAPP and when establishing and implementing a SMS.

05/

ORGANISATION AND PERSONNEL

IN THIS SECTION:

An SMS should have systems in place that ensure the MHF has workers with appropriate responsibilities and necessary skills to implement procedures.

5.1 ALLOCATING RESOURCES TO THE DEVELOPMENT AND IMPROVEMENT PROCESS

Decisions on allocating resources to developing the SMS will depend on several factors unique to each facility. Failing to assign sufficient resources to developing and improving the SMS can end up producing greater long-term cost. Developing an effective SMS needing minimal revision is the most desirable outcome.

Decisions on resource allocation should consider:

> what is available at the facility

> sufficient engineering resources with the right expertise

> whether the right workers have been allocated to the work

> whether they will be available when needed.

Schedule 5 details the specific organisation and personnel matters that must be included in the SMS.

5.2 RESPONSIBILITY AND ACCOUNTABILITY

The primary duty of care is on the PCBU to eliminate or minimise risk in the workplace, and a PCBU cannot contract out of it or delegate it. More than one PCBU can have a duty around the same matter, and must consult, co-operate and co-ordinate activities to control it.

Officers are people who can exercise significant influence over the management of your facility. Each officer has a duty to exercise due diligence because they make policy and investment decisions that can affect workers' health and safety.

Make sure that every worker understands their own responsibilities, and that systems are in place to make sure individuals are accountable for these responsibilities. Practically this means that everyone (not just management) has a responsibility for safety, whether it is to report failed controls, hazards, near misses and incidents, or to respond in emergency situations.

Effectively allocating responsibility and accountability requires that:

> senior management understands their obligations and responsibilities for all processes required under the MHF Regulations, including managing the work required within the SMS

> responsibilities of everyone at the facility with respect to minimising the risk of a major incident or minimising the consequences of one are defined, documented and communicated, including contractors

> there are clear performance expectations for all workers, including any major incident-specific responsibilities they have.

Measuring levels of knowledge and the effectiveness of the processes used to transfer that knowledge will be particularly important if high skill levels of individual workers are a significant contributor to safety at the MHF.

To make sure that each worker is aware of and understands their roles, PCBUs, jointly with workers, need to record the responsibilities for each position. Record the management structure for your operation, including all responsibilities and accountabilities. Make sure, where appropriate, position descriptions include information on managing major incident hazards. When allocating responsibilities, explain each item and ask for feedback to make sure they understand. Record these responsibilities once everyone agrees, and make sure those with safety roles have a copy of their tasks, as well as including one in their personnel record.

Include a relevant schedule of responsibilities in the induction kits issued to each worker.

5.3 STRUCTURE AND AUTHORITY OF SAFETY MANAGEMENT

You should define, document and communicate the management and organisational structure, as well as human resources.

While everyone has a responsibility for health and safety under HSWA, ultimately you (as the operator) are accountable for process safety under the MHF Regulations. Just as you delegate authority down through the organisation to fulfil objectives, safety needs to be a part of every manager's responsibilities. Those who are accountable for workers' safety in a particular area should have authority to propose and input into redesign work processes. Make sure these adjustments are within your management of change processes (MoC).

Line managers and supervisors should accept, as an integral part of their duties, the functional responsibility for implementing and administering safety procedures at the workplace. However, they need to have the authority to match their responsibility to act effectively.

To enable the strongest possible framework for SMS development, top-level management of the MHF could consider appointing a specific management representative for co-ordinating, establishing, implementing and maintaining the SMS. The management representative should report directly to senior management on SMS performance, effectiveness and potential improvement opportunities.

The organisational structure also needs to allocate areas of responsibility in managing an emergency. For more information on emergency planning, see WorkSafe's GPG *Major Hazard Facilities: Emergency Planning*.

Schedule 5 details the specific arrangements for planning for emergencies that must be included in the SMS.

5.4 WORKER SELECTION AND INDUCTION

Choosing the right workers with the right skills is the first step to ensuring they have the capacity to carry out their work competently. Besides the task-specific information, training and instruction needed for operating the MHF, provide induction information and training to all new workers, including supervisors and managers. This should include:

> information on hazards and risks at the MHF
> critical safety procedures or rules
> emergency procedures
> worker safety responsibilities and information on the systems used in the MHF to ensure effective communication of safety-critical information
> a policy of ongoing assessment to make sure competence is maintained.

Appropriately consider worker selection for the safety-critical operations at the MHF. Draw on the knowledge gained from the SMS development to make sure workers have the base skills required and capacity to carry out the work.

Put processes in place to manage selection and training where abrupt change to workers could impact safety-critical operations. Good hand-over systems and careful recruitment will minimise the impact.

5.5 TRAINING

Everyone in an organisation requires adequate training on how to follow processes safely. Training helps people gain the skills and knowledge, and ultimately gain the competence and experience, to carry out their work safely and without risk to their health.

You should implement a comprehensive training system for all workers, including temporary and short-term workers, to ensure a minimum acceptable level of worker competence and to develop an appropriate level of process knowledge and understanding.

Effective training by competent trainers will ensure workers are fully aware of the hazards associated with the processes and are competent in the use of adopted controls. Training will also cultivate a safety culture and reduce human errors that may lead to major incidents.

Schedule 5 requires that the SMS describes the means of ensuring that personnel have, and retain, the necessary skills and knowledge to perform their allocated tasks and discharge their allocated responsibilities.

WHAT SHOULD A TRAINING PLAN CONTAIN?

Training should be an appropriate mixture of principles and practice, with some means of assessment by suitably qualified personnel to check the training has been understood. This may require providing information and training material in suitable languages.

Training should focus on a job or task rather than on an occupation. All workers should be appropriately trained for the tasks and processes they work with. For workers involved with equipment and changing work site conditions, training should include techniques for identifying potential malfunctions, hazardous conditions and unsafe work situations. Workers you engage with when carrying out your safety assessment should be trained on the tools they will be using.

The type of training each person at the MHF will receive will depend upon:

> each person's role and responsibilities at work
> each person's occupation (eg plant and machine operators and people who handle hazardous substances need specific training)
> the hazards identified during an inspection of your workplace
> the type and occurrence of injury and disease at work.

HOW SHOULD THE TRAINING BE DELIVERED?

As well as task-specific information and instruction, training should provide workers with the greater context of the MHF. Training should include both the specific needs of their role and more general material on the MHF, the management structure, and the roles and tasks peripheral to theirs. Training in internal procedures should also be included in training plans as well as formal training courses.

REFRESHER TRAINING

Refresher and supplementary training at appropriate intervals should follow initial information, training and instruction. Even when there have been no changes in operating the MHF, refresher training may be necessary to address and maintain key work health and safety competencies.

INSTRUCTION AND INDUCTION FOR VISITORS

As well as general information, provide detailed instruction to visitors on the major incident hazards that could affect them during their time on site. The nature of training should match the targeted audience's needs, and the areas in which they will be working or visiting. For example, it is not necessary to train visitors in all features of the emergency procedures. However, make them aware of potential major incidents, emergency alarms and signage and actions they have to take during an emergency.

RECORDING THE TRAINING

Keeping good records of training provided to workers and visitors is an essential element of an effective training system. Accurate training records will assist you in reviewing the training provided and with the scheduling of refresher training. If training is less formal, or 'on the job', ensure it is still documented in the worker's training record.

5.6 COMPETENCY

Training helps people gain skills and knowledge. However, training alone will not necessarily mean that a person is competent. There are many situations where a person's knowledge or skills will not be sufficient to carry themselves and their colleagues through tasks safely. It is experience that teaches what does and doesn't work.

To ensure competence, find out what is expected within a particular job role. Often this will require the review of job descriptions, roles and responsibilities, minimum standards, and industry expected good practice.

COMPETENCY STANDARDS

Develop competency standards for all workers. Develop these standards to reflect the demands of the work processes and any expected changes at the MHF.

Standards should match the competency requirements for the specific MHF or work area. Even if generic competency standards are available, parts of the standards should include issues unique to a particular process. It is common to be dependent on high skill levels from workers to deliver safe operation of the MHF, at least in some operational areas of the MHF, if not the entire MHF. Each competency standard should cover both skills and behaviours, and have a minimum expected competency and levels above that.

Engage with workers experienced in the processes when developing competency standards. Standards should be based on actual knowledge requirements of processes rather than theoretical perceptions of competency. Engage with the HSR or directly with workers for the parts of the MHF where the competency standards apply.

Test the competency standards and assessment process to ensure fairness, quality, and consistency.

FITNESS FOR WORK

Put systems in place for managing the potential for impairment of workers' ability to perform safely. These could include:

> drug and alcohol policies
> systems to reduce fatigue and manage shift work
> baseline and ongoing fitness-for-work medical assessments
> equitable policies on overtime and leave allowances.

5.7 MANAGING CONTRACTORS

Contractors can introduce unsafe conditions, processes, practices and standards and need to be subject to safety controls to make sure their practices do not jeopardise safety.

If you direct a contractor to carry out work at the MHF, all the controls applicable to workers apply. The contractors and their workers should be given an induction, involved in health and safety meetings and communications for the time they are at the MHF, and actively managed.

The nature of contracting work to external staff also requires SMS elements that specifically focus on controlling that work. Make sure the SMS deals with the use of contractors by incorporating:

> a selection system
> a process for providing the contractor with information
> safety record keeping requirements
> ongoing evaluation of safety performance of each contractor
> a day-to-day management system for contractors and their work at the MHF including the process for nominating workers at the MHF responsible for managing the work of the contractor.

Remember that not only can contractors put workers at risk, but they may also be at particular risk. They may be strangers to the workplace and therefore unfamiliar with your procedures, rules, hazards and risks. Even regular contractors may need reminding. The level of control needed will be proportionate to the complexity of the task, as well as the level of risk. Clearly specify the tasks the contractor will be doing, and manage both the risks they're exposed to, and those they may introduce.

Consider shift changes and worker turnaround, and span of control where there are potentially very high numbers of contractors on site (compared with the numbers in routine operations). Also, make sure to identify and manage subcontracting situations.

Schedule 5 requires that the SMS include arrangements for ensuring contractors and sub-contractors are aware of their roles and responsibilities under the SMS.

06/

OPERATIONAL CONTROLS

IN THIS SECTION:

Operational controls may be defined as any systems, procedures, and operational hardware and software, that are intended to eliminate hazards, prevent or reduce the likelihood of incidents from occurring, or minimise the severity of consequences of any incidents that do occur.

Operational controls assist in ensuring safe operation of the MHF, and include:

> safe operation and maintenance of plant
> plant processes
> permit-to-work systems
> maintenance of equipment
> temporary stoppages (eg start-ups and shutdowns).

There are two types of operational controls, both essential for an effective SMS:

> pro-active, which eliminate or minimise the likelihood of incidents
> reactive, which minimise the consequences of incidents that do occur.

Adopt controls that address the findings of the safety assessment, using the most effective practical combination of measures available, considering staff capabilities, technological options, good practice and organisational objectives.

Set up robust and effective communication systems to make sure workers understand the design, implementation, review and any change of operational controls.

Schedule 5 details the specific operational control arrangements that must be included in the SMS.

6.1 DESIGN PRINCIPLES AND STANDARDS

The SMS should document the design principles and engineering standards chosen to adopt or develop to ensure safe operation of the MHF. Since many standards change over time, the system needs some means of making sure it is kept up-to-date.

'Design principles' can take many forms and may include technical, engineering or management principles developed or applied at the MHF.

Examples include:

> principles for managing human factors
> standards for development or implementation of operating procedures
> design principles for control rooms and alarm systems
> engineering design standards
> fire protection standards
> maintenance standards
> loss control principles
> process control systems.

These are often captured in 'Basis of Design' documents for new facilities, but may be harder to collect and document for older facilities. They should be consistent with the approach to risk reduction and safety management in the safety case (if appropriate).

Specific engineering standards should be more detailed than a simple generic statement such as 'Flammable liquids storage facilities conform to AS 1940'. Many facilities use corporate-wide engineering standards, which can include specific details. For example, what valves are permitted or preferred in certain services, when certain types of level gauges are permitted, mandated or forbidden, and rules for setting alarm set points for various services.

When relying on original equipment manufacturers (OEM) designing equipment to recognised appropriate international standards, make sure the SMS notes this design to OEM standards, and describes why those standards are suitable for the facility.

6.2 FACILITY DESIGN

A well-designed facility limits the possibility that equipment will be damaged and, by its process design, limits the quantity of hazardous substance that could be released. Facility and process design (including hazardous substances used) determine the need for safety equipment, security, buffer zones, separation distances to boundaries, and mitigation planning. It is generally preferable to eliminate any hazardous characteristic during the design stage rather than simply adding on safety equipment or security measures.

6.3 PLANT PROCESSES

You should have robust processes in place for any work activity that could have an effect on major incident prevention. A thorough hazard identification of all work activities will be a vital step in identifying the work that can impact on major incident prevention.

Processes should be designed specific to that site and the hazards identified. Processes need to be defined to ensure that all operations and activities are conducted in a manner that will minimise the risk of major incidents or near misses at the MHF. This extends to all activities that could have a safety impact, including:

> process operation
> warehousing and storage, maintenance and distribution
> control of workers and visitors.

Examples of specific topics include:

> permit-to-work system, communication of work schedules/maintenance status
> job safety analysis (JSA)
> task analysis
> hand-over between shifts and fatigue management
> relieving arrangements
> supervision of processes
> procedures for hazardous plant and processes such as rigging, scaffolding, cranes and load shifting equipment
> working at heights
> classification and definition of hazardous areas
> internal site traffic control and movement of vehicles
> control of access to hazardous areas and processes.

The system must accommodate circumstances where abnormal conditions can potentially arise and should be supplemented by a process for reporting when abnormal conditions do occur during work, and a documented remedial response to these reports.

Plant processes should be documented and revised if the documentation does not match the actual conditions designed for in the work practices. Processes should regularly monitor if workers understand and apply the information contained within process documentation and whether these are implemented and maintained.

You should engage with those who use the documentation to improve the accuracy and simplicity of it.

6.4 PERMIT-TO-WORK SYSTEMS

Permit-to-work (PTW) systems are an integral part of any operation where there could be incompatible or interlinked tasks.

They are formal documented processes used to manage work identified as significantly hazardous by making sure all safety measures are in place before work starts.

A PTW system is also a way to communicate between site management, plant supervisors, operators and those who carry out the

hazardous work. Essential features of a PTW system are:

> clear identification of who may authorise particular jobs (and any limits to their authority) and who is responsible for specifying the necessary precautions
> training and instruction in the issue, use and closure of permits
> monitoring and auditing to make sure the system works as intended
> clear identification of the types of work considered hazardous
> clear and standardised identification of tasks, risk assessments, permitted task duration and supplemental or simultaneous activity and controls.

The terms 'permit-to-work', 'permit' or 'work permit' refer to the paper or electronic certificate or form used to authorise certain people to carry out specific work at a specific site at a certain time. It also sets out the main precautions needed to complete the job safely.

WHEN ARE PERMIT-TO-WORK SYSTEMS REQUIRED?

Consider PTW systems whenever the intention is to carry out particularly hazardous work. PTW systems should not be applied to all activities. Experience has shown their overall effectiveness may be weakened.

PTW systems are not normally required for controlling general visitors to site or routine maintenance tasks in non-hazardous areas.

PTW systems are normally considered most appropriate to:

> non-production work (ie intrusive maintenance, repair, inspection, testing, alteration, construction, dismantling, adaption, modification or cleaning)
> non-routine operations
> jobs where two or more individuals or groups need to co-ordinate activities to complete the job safely
> jobs where there is a transfer or work and responsibilities from one group to another (ie shift changeovers).

More specially, the following are examples of types of jobs where permits could be considered:

> work of any type where heat is used or generated (eg by welding, flame cutting, grinding) and work which may generate sparks or other sources of ignition
> work which may involve breaking containment of a flammable, toxic or other dangerous substance or pressure system, and work involving the use of hazardous substances, including explosives
> work on high voltage electrical equipment or other electrical equipment which may give rise to danger
> entry and work within confined spaces
> pressure testing
> work affecting evacuation, escape or rescue systems
> work at height
> any other potentially high-risk operation.

6.5 OPERATING PROCEDURES

Operating procedures describe:

> tasks to be performed
> data to be recorded
> operating conditions to be maintained
> samples to be collected
> health and safety precautions to be taken.

Operating procedures are required to be technically accurate, understandable to workers and revised periodically to ensure they accurately reflect current operations. Process safety information (covered below) needs to be used as a resource to ensure that operating procedures and practices are consistent with the known hazards of the process and that operating parameters are accurate.

For operating procedures to be effective and comprehensive, they should cover the following issues:

> documented procedures for:
  - start-up
  - normal operation
  - abnormal operation
  - temporary operations
  - emergency shutdown
  - normal shutdown
  - start-up following emergency shutdown
  - start-up following a turnaround
> clear indication of any safety-critical steps in the procedure
> safe operating limits consistent with the process safety information
> safe operating windows (SOWs), including:
  - consequences of deviations from limits
  - actions required to correct deviations
> procedures for responding and managing abnormal conditions
> instructions to ensure that corrective actions are implemented in a timely manner
> clear lines of authority to take corrective actions
> work-related health and safety information and procedures, covering:
  - physical and chemical properties of hazardous substances
  - special/unique hazards
  - precautions to take during normal operations and emergencies
> review of operating procedures to ensure they reflect current best practice
> safety systems, their functions and their operation, including the operation of safety-critical elements, including isolation, venting and automatic shutdown
> emergency procedures and notification protocols.

DEVELOPING OPERATING PROCEDURES

Operating procedures are prescribed methods to be followed routinely for the performance of designated operations or in designated situations. During the development and implementation of operating procedures, any standards used for the processes should be documented for inclusion in the safety case (if appropriate). Have engineering and operational workers regularly review operating procedures to ensure they:

> are accurate
> provide practical and understandable instructions on how to perform duties safely
> are subject to ongoing assessment for their appropriateness.

The objective of clear operating procedures is to make sure activities are conducted methodically, reproducibly and safely. Identify which work methods, processes, or critical tasks potentially have significant safety implications and develop safe operating procedures to prevent associated incidents.

PROVIDING OPERATING INSTRUCTIONS

Documenting operating procedures enables workers or contractors to perform or supervise each task or procedure consistently. The operating instructions for each procedure should include applicable safety precautions and contain appropriate information on safety issues.

The operating instructions should cover:

> pressure limits, temperature ranges, flow rates
> what alarms and instruments are important if an upset condition occurs
> what to do when an upset condition occurs
> start-up and shutting down processes
> include explanations of the associated potential hazards so that workers will be better informed about the extent of the safety issues associated with the procedures.

WHEN REVIEW IS REQUIRED

Operating procedures should be reviewed to keep them up-to-date, for example:

> when new information is obtained

> at regular intervals in line with the facility's document control procedures

> when MoC alters a process (see section 8).

The consequences of operating procedure changes should be fully evaluated and any changes communicated to relevant workers. For example, mechanical changes to a process are evaluated to determine if operating procedures and practices also require changing. All MoC actions should be co-ordinated and integrated with current operating procedures and engage workers about the changes before implementing them.

6.6 ONGOING ASSESSMENT

Put processes in place to make sure process operators conduct informal reviews of their work areas, known hazards, and the safety of processes. Constant vigilance for changing conditions strengthens more formal hazard management. Checks and casual assessments of this kind can be included into training and safety meetings. Encourage workers to check their environments at least visually at intervals throughout their shift or work day, noting and reporting any areas of concern, as this will lead to continual improvement overall.

6.7 THE CONTROL SYSTEM

A control system is responsible for normal operation of the plant and in many instances is the first layer of protection against major incidents. It takes inputs from sensor and process instruments and provides output based on control functions in accordance with approved design control strategy. Integrate control systems into the SMS and make sure to monitor their performance.

Typically, control systems perform the following functions:

> Control the process within pre-set operating condition, optimise plant operation to produce a good quality product and attempt to keep all process variables within its safety limit.

> Provide operator interface for monitoring and control.

> Provide alarm/event logging and trending facilities.

> Generate production data reports.

Normally if the control system fails, alarms will notify operations that human intervention is needed to re-establish control within the specified limits. If the operator is unsuccessful then other layers of protection, for example, pressure safety valves, inherently safe process design, or emergency procedures need to be in place to bring the process to a safe state and minimise risk.

6.8 EQUIPMENT INTEGRITY

Put an equipment integrity system in place to ensure the continued integrity of all plant and equipment. Where its failure could cause or contribute to a major incident the equipment counts as a safety-critical element. The system should focus on the maintenance of existing plant and equipment as well as making sure newly installed equipment meets design criteria and standards.

Consider these elements in an equipment integrity system:

> identification of equipment to be tested, inspected or maintained, such as:
  - pressure vessels
  - storage tanks
  - critical piping systems
  - relief and vent systems and devices
  - control systems (monitoring devices, sensors, alarms, interlocks)

  - emergency shutdown systems
- identification of safety-critical elements
- definition of inspection and testing requirements
- procedures for undertaking equipment repairs
- documented procedures for maintaining integrity of key equipment
- skills, experience and knowledge required for maintenance activities
- frequency of inspection and testing
- establishing criteria for acceptable test results
- inspection and testing records and documentation
- monitoring and reporting of equipment defects, faults and degradation
- maintenance of equipment integrity during periods of construction (particularly when construction is carried out while the MHF is operating)
- quality assurance procedures for spare parts
- materials and equipment design specifications
- the identification and categorisation of equipment and instrumentation
- documentation of manufacturer recommendations on average time to failure for equipment and instrumentation.

The system should be supported by:

- the use of published codes and standards to help establish an effective testing and inspection of equipment plan
- training for maintenance workers on topics such as preventative maintenance plan procedures, safe practices, and the application of special equipment that may be required
- a verification process for:
  - 'as built' drawings
  - safety-critical elements
  - certifications of coded vessels and other equipment
  - materials of construction
  - equipment installation work at the work site to ensure correct materials, procedures and qualified staff are being used.

Consider all circumstances. The process and equipment integrity systems should specifically consider identified hazards and their associated risks.

The greatest challenge to process and equipment integrity often comes outside periods of normal operation, such as commissioning, start-up and shutdown. For this reason, the systems need to consider how to ensure integrity through a range of circumstances from initial design, fabrication, installation and construction through to normal operation and shutdown. Tracking and checking of fabrication and installation stages should be included.

For more information on safety-critical elements see WorkSafe's GPGs *Major Hazard Facilities: Safety Assessment* and *Major Hazard Facilities: Safety Cases*.

Schedule 5 requires that the SMS include arrangements for independent and competent persons to verify that safety-critical elements are or will be suitable and will remain in good repair and condition throughout the life cycle of the facility.

ANALYSING TRENDS

The ability of an organisation to analyse maintenance and inspection records and recognise trends can strongly influence process integrity. Analysis may indicate the need to change materials, design of the equipment or change operational procedures.

Trend analysis can also provide a valuable basis for decision making in relation to the frequency of maintenance and inspection, and as an effective 'early warning' system for potential failures caused by such factors as corrosion and equipment fatigue.

6.9 SECURITY AND ACCESS

Make sure systems are in place to control security and prevent any unauthorised access to the MHF. Particular attention should be directed at the physical security of the MHF, chemical storage areas and chemical processes. All MHFs should have appropriate security in place to minimise crime and to protect people, property and the environment.

Threats may come in different forms and from different sources. Outward threats include trespassing, unauthorised entry, theft, burglary, vandalism, bomb threats or terrorism. Internal threats may include theft, substance abuse and sabotage.

DEVELOPING THE SECURITY PLAN

Criteria for an effective security plan:

> focus on prevention by reducing the vulnerability of the MHF to security breaches
> comprehensive and integrated into the SMS
> systematic identification of security scenarios and linkage to critical vulnerabilities and protective counter-measures.

An effective security and access control system should address the following:

> security system requirements should be clearly defined for all roles in the organisation
> the security and access control requirements of the MHF in both facility training and induction plans
> human resources and procurement systems and procedures should incorporate security issues such as:
  - pre-employment screening
  - media communications and information control
  - contractor and contracting security
  - vendor selection
  - loss reporting (internal and external), investigation and records.
> effective worker engagement and participation in the development and maintenance of security processes
> security system inspections and audits
> computer security measures for systems vulnerable to hacking and other unauthorised access
> specific allocation of responsibilities for security
> assessment of operations and vulnerabilities
> implementation of control and counter-measures including policies, operating procedures, equipment and resources to reduce security risks
> procedures for reporting and responding to security threats
> procedures for the evaluation, testing, review and revision of security plans
> scope of security and access control.

07/

HUMAN FACTORS

IN THIS SECTION:

Human factors apply what we know about people, their abilities, characteristics, and limits to the design of equipment they use, their work environment, and jobs they perform.

7.1 MANAGING HUMAN FACTORS

Human factors refer to environmental, organisational and job factors, and human and individual characteristics that influence behaviour at work in a way which can affect health and safety. A simple way to view human factors is to think about three aspects: the job, the individual and the organisation and how they impact on people's health and safety-related behaviour.

Careful consideration of human factors at work can reduce the number of accidents and work-related health issues. It can also pay dividends in terms of a more efficient and effective workforce.

Incidents can occur through people's involvement with their work. As technical systems have become more reliable, the focus has turned to human causes of accidents. Many incidents are blamed on the actions or omissions of an individual who was directly involved in operational or maintenance work. This response ignores the fundamental failures which led to the incident. These are usually rooted deeper in the organisation's design, management and decision-making functions.

Work has an impact on people's health as well as on their safety. A positive work experience leads to job satisfaction and contributes to physical and mental well-being. Well-designed tasks and working environments that suit people's individual skills and capabilities can help here. Physical health problems can result from lost-time injuries such as slips and falls, and from manual handling problems.

Mental well-being can be affected if someone witnesses a traumatic event, suffers bullying or violence at work, or experiences stress at work.

The process-related activities where human factors could have the most influence are:

> designing of a process
> engineering of a process
> specifying the process components
> receiving and installing equipment
> commissioning
> operating the process
> predicting safeguards necessary to control the risk at an acceptable level and sustaining these safeguards for the life of the process
> maintaining, inspecting and repairing the process
> troubleshooting and shutting down the process
> managing process changes.

Consider minimising the negative impacts of human factors by:

> making equipment and process operation simple and easy
> making sure workers who supervise work areas are competent to recognise issues relating to fitness for work
> behaviour control systems (to combat bad work habits)
> administrative systems like MoC, PTW, and auditing
> other methods of worker engagement, participation and representation.

SAFETY-CRITICAL TASKS

Companies frequently rely on humans to manage safety-critical tasks and assume people will always behave as expected. This is not always the case. Where it is practicable to do so, put engineering controls in place to perform safety-critical tasks rather than relying on humans. When using workers to perform safety-critical tasks, consider both the person operating the equipment and how the job and the organisation are fitted to them. In particular, consider the design of:

> work areas
> control and display devices
> alarm handling and prioritisation
> communications systems
> tools and machinery
> written materials and procedures
> workloads.

7.2 WORKPLACE CULTURE AND ORGANISATIONAL COMMITMENT

Every group of people develops a 'culture' – shared attitudes, beliefs and ways of behaving. In an organisation with a good culture everyone puts health and safety high on the list. Everyone shares accurate perceptions of the risks and adopts the same positive attitudes to health and safety. This influences the ways in which individuals in the group handle new events and decisions. They know, for example, that they are not expected to react to a problem by cutting corners on health and safety for operational needs.

Some key aspects of an effective culture include:

> good ways of informing and engaging with workers
> recognition of the fact that everyone has a role to play
> commitment by top management to involving the workforce
> co-operation between workers
> open two-way communications
> high quality of training.

Changes made by managers to improve health and safety will be seen as clear indicators of their commitment. Some suggestions are:

> Review the status within the organisation of the health and safety committees and the health and safety practitioners and increase it if necessary. Give them high visibility.
> Make sure senior management are seen to receive regular reports of health and safety performance and act on them.
> Give publicity to the work of all health and safety committees. Make sure their recommendations are implemented.
> Make sure appropriate health and safety actions are taken quickly and are seen to have been taken.

08/

MANAGEMENT OF CHANGE

IN THIS SECTION:

MoC is an essential element of a robust and comprehensive SMS. It is a formal process that ensures changes are not introduced which could inadvertently compromise the safety of the MHF.

The SMS must contain formal procedures for planning and managing changes at the MHF. These commonly refer to a 'Management of Change' process.

Schedule 5 requires that the SMS include arrangements for the development and implementation of procedures for ensuring that changes are analysed to identify any new major incident hazards or their impact on control practices, safety-critical elements, or previously identified major incident hazards.

8.1 WHAT IS 'CHANGE'?

MoC is the careful, systematic and critical examination of any change or proposed change to understand the safety implication. Changes could be to plant, equipment, structure, process, procedures, practices, hazardous substance and their quantities, operational controls, personnel, roles, systems or organisation and be temporary or permanent.

Change can impact the MHF's safe management, so managing this process needs to be robust enough to control changes to make sure risks remain reduced so far as is reasonably practicable.

Example 2 provides circumstances that may be considered a 'change' that may require management.

Develop a comprehensive definition of what is considered a change in your MHF and develop your own MoC processes based on this definition. Then compare any proposed change to this definition to find out if the proposed change will require management under the defined processes.

Example 2: Changes that may need formal management

- Introduction of new hazardous substances.
- Alteration of the activities performed (eg the chemical process technology) involving these materials.
- Plant trials that place the process outside of its normal operating envelope, or permanent changes to the operational envelope.
- Introduction of temporary processes, buildings, plant or equipment.
- Re-start of the MHF, or a section of it, after an extended period shut down.
- Changes to the content of management, operating, maintenance, engineering or emergency procedures.
- Changes to the frequency or nature of safety-critical activities (eg maintenance).
- Changes to the suppliers of spare parts, consumables, where there is an associated change in the part or consumable being supplied.
- Changes to organisational structure, such as restructures, de-manning, out-sourcing, or relocation of personnel.
- Introduction of a new contractor group.
- Bypassing or defeating of control (eg shutdown valves).

Example 3: Different types of change

Alterations in storage tank level should not need formalised control but should be administered under operating procedures. However, storage of a product that has not been held in that tank previously/recently would need to be controlled as a change. In addition, changes to the relevant operating procedure would require formal control, as would any changes to high/low level alarm points, SOWs, and trip settings, if outside of previously agreed ranges. Depending on the nature of the MHF, and on the overall structure of the operator's organisation and management system, it may be necessary to control different types of changes through slightly differing processes.

However, this would need careful consideration to ensure a consistently robust approach and to ensure that all necessary persons were involved in reviewing each type of change. Some facilities have found it useful to appoint one suitably experienced and qualified person to review all change proposals to determine the level of further review and analysis required.

LIKE FOR LIKE REPLACEMENT

Replacement of equipment by an identical item ('like for like' replacement) may not need to be considered a 'change'. However, carefully define what you consider 'like for like' replacement, as similar equipment may have a different detailed specification (eg a new model of pump may have a higher discharge pressure or a new model of valve may have a new seat material). Regularly review this aspect of the MoC process.

8.2 ESSENTIAL ELEMENTS OF MANAGEMENT OF CHANGE

A robust MoC process should include:

- any change or proposed change likely to be undertaken in context specific to the MHF
- all relevant types of change; temporary or permanent
- reviewing and assessing all changes before implementing them
- clearly defined authorisation process by which the change can be implemented
- basing reviews on auditable criteria, triggering detailed assessments as necessary
- making sure suitably knowledgeable and experienced people conduct assessments and reviews and properly record them
- making sure decisions are transparent and formally accepted
- making design changes with detailed assessments (eg safety assessment)
- checking each change for compliance with legislation and standards to make sure adequate systems are in place for continuing compliance and verification
- altering controls in line with changes to make sure risks remain reduced so far as is reasonably practicable
- implementing maintenance and performance monitoring as a result of the change
- engaging with workers and, where appropriate, consulting emergency services
- applying quality assurance and quality control processes throughout each change
- fully implementing changes to drawings, procedures, work instructions, the safety case etc
- necessary instruction and training covering the change
- processes for correcting any deficiencies noted during monitoring and review
- auditing of the process.

8.3 IDENTIFYING CHANGES

It is important to prevent informal changes from occurring, either individually or in aggregation. Unless all changes are formally identified, they cannot be properly controlled.

Changes originating within the MHF or your organisation can be addressed by requiring all proposed changes to be formally requested, via a standard procedure and form. Introduce new people to the procedure and form at induction, and through subsequent training in the process. It is important to make sure workers understand the reasoning behind the MHF's design and processes, so they can recognise a relevant change. It is also important that workers are alert for change and have systems in place to make sure incremental change does not occur.

It may be more difficult to identify external changes to the MHF, as this requires either that third parties reliably notify you of all relevant changes or you periodically request the necessary information. Some types of external change may be minimised, but not necessarily eliminated, by suitable contractual arrangements.

If changes are outside your control, for example contractor or supplier change, put in place communication processes so that, while you don't manage the change, the third party is aware of it and can make sure any impact on the MHF is managed appropriately.

8.4 MANAGING TEMPORARY CHANGES

Manage temporary changes just as much as permanent changes. In fact, temporary changes can mean the risk level is elevated and incidents are more likely to occur.

Make sure the MoC process carefully distinguishes between permanent and temporary changes and has checks in place preventing changes becoming permanent without thorough review when those changes were only meant to be temporary.

Limit the allowable duration of a temporary change, as some temporary changes may increase risks long-term. Make sure you have ongoing monitoring for any impact on the MHF's risk profile.

MANAGING URGENT CHANGES

Sometimes you may have to make urgent changes; for example, to prevent a major incident from occurring. In such cases, it may be undesirable to delay making the change until there is an official review and assessment. However, still have some level of review of the proposed change upfront, and make sure to assess it as soon as possible afterward. Still assess and review a change that has already been reversed. Because the change may have had potentially undesirable outcomes, assess the change to identify a better solution to any similar future 'emergency'.

Carefully consider the parameters controlling what changes are allowed and how this can be built into the MoC process.

PERMIT-TO-WORK SYSTEM

There may be benefit in linking the MoC process with the PTW system. People administering the PTW system could then check with the MoC records, to confirm that work requests only relate to properly assessed and authorised changes.

8.5 APPROVING OR REJECTING A PROPOSED CHANGE

There should be formal criteria for accepting or rejecting change. Safety criteria could be based on assessing risk using a 'risk matrix' method, for example, or on quantitative risk criteria. Whatever criteria you use, make sure they are consistent with eliminating and minimising risk so far as is reasonably practicable.

Decisions should be transparent and approved at an appropriate senior level in the organisation. In no case should the decision, whether to accept or reject any change, violate your duties under HSWA and regulations.

8.6 IMPLEMENTING A PROPOSED CHANGE

Draft necessary changes to documentation and drawings, where possible, before implementing any change (ie before equipment is installed or worker starts in a role). This may include changes to process drawings, process descriptions, safeguarding memoranda etc, and changes to the safety assessment, MAPP, SMS, emergency plan and safety case as necessary. The drafted changes can be approved and then introduced concurrently with the change itself being made.

Provide all affected workers with training about the change. Before commissioning the change, sufficiently train some workers to make sure initial operations are safe. Any remaining training should follow immediately after the change. This minimises potential confusion between the status of the MHF and the status of training while making sure there are always suitably trained workers available (eg training in emergency shutdown needs to cover operation of the newly installed plant).

Before commissioning, check the change has been implemented as intended. Carry out normal commissioning checks, including checking that all actions arising from safety, operability and other reviews are closed-out. Also, check the controls meet their required performance.

Compliance with legislation, the design intent, and actions arising during the change project, should all be formally 'signed-off'.

Some facilities use forms or checklists to identify follow-up activities after a change has been approved. This enables you to ensure change process completion. Make sure a feedback mechanism informs those who raised the initial change request, or the issue that led to the change, of the action that will be taken.

Where changes are cancelled or reversed, it will be necessary also to cancel or reverse changes to documentation, procedures and the SMS. Workers trained in the change should be formally notified the change is to be cancelled or reversed. Reversing a change may need to be treated as a change in itself.

8.7 REVIEWING A CHANGE

WHO SHOULD REVIEW CHANGES?

Involve all representatives of all relevant and affected groups (workers and where appropriate, emergency services) in the review of all proposed changes. The workers involved may vary from case to case but, in general, should include representatives of the safety, operations, maintenance and engineering departments.

Before this, you could use a committee or 'oversight' process to briefly review each change as it is proposed. This early review could identify any need for more detailed review and could identify anyone who should be involved.

Reviews of proposed changes should involve workers with seniority reflecting the scale of the change, hazard or risk. Make sure the reviewers have the knowledge, skills and experience to identify all risks associated with a proposed change and to consider them thoroughly.

FACTORS TO CONSIDER WHEN REVIEWING A PROPOSED CHANGE

Where a potential change may alter the risk profile, the MoC process should trigger review of the hazards, risks and controls, as well as any engineering or other reviews. A senior person, or people, should sign-off all decisions to start these reviews. Base the decision on auditable criteria such as if the change would affect a piping and instrumentation diagram (P&ID), and require a HAZOP study or the like.

Separately assess each change to the design or operation on its own merit, and apply a suitable level of change control. Reviews should consider not only the change itself,

but the impact on other procedures, practices, plant, or equipment. The review's format should reflect the:

> MHF's nature

> severity of its hazards and risks

> nature of the proposed change in relation to the hazards and risks.

Example 4: Methods to consider when reviewing a change

A change to chemical process plant that requires alteration to P&IDs would typically be subject to a HAZOP study, among other reviews. Likewise, a change to a feedstock of a chemical process plant could also be subject to a HAZOP study. However, HAZOP would probably not be useful as a means of reviewing changes to drum storage of hazardous substances at the same facility. Other methods may be more appropriate in such cases, eg 'What if? studies'.

MANAGING THE QUALITY OF THE CHANGE

There is a link between MoC and management of quality. If the change is not what was intended or is not what was reviewed, the agreed change or control may be invalid. Reviews should include an investigation of why the change process failed (eg was the technical governance process inadequate to prevent a recurrence?). Therefore quality management principles should be robustly applied to all changes, whether engineered, written, operational or organisational.

09/

INCIDENT MANAGEMENT

IN THIS SECTION:

Finding out both the immediate and the underlying causes of an incident is the key to preventing similar incidents through the design of effective controls. You should carry out your own investigation to make sure risks are controlled effectively.

Incorporate an integrated incident management system into the SMS. The incident management system should:

- record details of incidents
- identify incidents which are major incidents, notifiable events and near misses
- contain a procedure for major incident and notifiable event notifications, including all statutory requirements
- contain a procedure for incident investigation
- allocate responsibilities for incident investigation to appropriately qualified workers or external experts
- involve workers in the incident investigation and inform all staff about the investigation and its results
- make sure actions arising from incident investigations are tracked through to completion
- record any actions resulting from investigations that result in alterations to the SMS, including alterations to controls.

Schedule 5 requires that the SMS include a system for reporting major incidents and near misses, failure of protective measures, and investigations and follow-up actions based on lessons learnt.

9.1 NOTIFIABLE EVENTS

A notifiable event is when someone dies or when a notifiable incident, illness or injury occurs because of work. WorkSafe must be informed of all notifiable events. Notifiable injuries, illnesses and incidents are specified in HSWA.

For more information on notifiable events, incidents, and injuries and illnesses see WorkSafe's guideline *Introduction to the Health and Safety at Work Act 2015*.

There are other regulations which include requirements for notification. Make sure you are familiar with all the legislation and regulations that apply to your MHF.

Section 56 of HSWA requires a PCBU to ensure WorkSafe is notified of an event immediately after becoming aware of it.

NOTIFIABLE INCIDENTS

HSWA requires PCBUs to notify WorkSafe if there is an unplanned or uncontrolled incident at a workplace that exposes a person (worker or otherwise) to a serious risk to their health and safety because of immediate or imminent exposure to:

- a substance escaping, spilling, or leaking
- an implosion, explosion or fire
- gas or steam escaping
- pressurised substance escaping
- electric shock
- the fall or release from height of any plant, substance or object
- damage to or collapsing, overturning, failing or malfunctioning of any plant that is required to be authorised for use
- the collapse or partial collapse of a structure
- the collapse or failure of an excavation or any shoring supporting an excavation
- the inrush of water, mud, or gas in workings in an underground excavation or tunnel

- the interruption of the main system of ventilation in an underground excavation or tunnel
- a collision between two vessels, a vessel capsize, or the inrush of water into a vessel
- any other incident declared in regulation to be a notifiable incident.

The MHF Regulations expand on this list to include the following:

- an unplanned event (other than a false alarm) that requires the emergency plan to be implemented
- an event that does not cause, but has the potential to cause, a major incident
- damage to, or failure of, a safety-critical element that requires intervention to ensure it will operate as designed.

In the event of becoming aware of a notifiable incident from the MHF Regulations, notify WorkSafe on three separate occasions (otherwise notify according to HSWA):

- **As soon as possible**, after becoming aware a notifiable incident has occurred, either by telephone, electronic means, or in writing including all reasonably available information required under Schedule 4. If giving notice by phone, give the details required by WorkSafe.
- **An initial written notice** including information required under Part 1 of Schedule 4, within 7 days, or another date specified by WorkSafe (whichever is latest).
- **A detailed written report** including information required under Parts 1 and 2 of Schedule 4, within 30 days, or another date specified by WorkSafe (whichever is latest).

To notify, please use WorkSafe's electronic *Notifiable Incident Major Hazard Facility* form, available at www.worksafe.govt.nz. You can save this form and use it for the detailed written report following the initial written notification.

WorkSafe require notifiable incidents to be notified and reported for three primary purposes:

- to provide timely information on matters which may require an urgent regulatory response (investigation)
- to gather information which can subsequently inform the planning and targeting of regulatory interventions (intelligence)
- to secure statistical information regarding notifiable events that helps to identify and track trends and progress, target activities, and inform guidance on prevention (statistics).

This information can then be shared with industry to prevent a similar event happening in the industry.

Section 57 of HSWA requires a PCBU to keep a record of each notifiable event for at least 5 years.

9.2 ENCOURAGING WORKERS TO REPORT INCIDENTS

A well-developed culture of near-miss reporting can be invaluable in preventing major incidents. Lessons can only be learnt from effective investigation, and investigation needs the incident or near miss to have first been reported. There should be a supportive and non-punitive approach to comprehensive reporting of incidents and near misses.

A well-kept incident register can be valuable when investigating notifiable events and near misses, identifying trends and issues with general culture.

9.3 INVESTIGATING INCIDENTS

You must establish procedures to make sure all incidents are investigated as soon as reasonably practicable, to identify the underlying as well as the obvious causes. Incident investigations should be initiated as soon as practicable and the results communicated to all those who could be affected by similar circumstances. This could extend beyond the organisation.

WHY INVESTIGATE?

Findings from your investigations can help prevent the incident, or similar incidents, from happening again and improve your overall risk management. This will also point to areas of your risk assessments that need to be reviewed and help the development of specific measures to eliminate or reduce the probability of recurrence.

Process safety investigations form an essential part of the monitoring process that you are required to carry out. Incidents, including near misses, can tell you a lot about what is really happening in your workplace. Investigating your incidents will help you uncover and correct any breaches in health and safety compliance you may have been unaware of.

An investigation can help you identify why the existing controls failed and what improvements or additional controls are needed. It can:

> provide a true snapshot of what really happens and how work is really done (workers may find short cuts to make their work easier or quicker and may ignore rules – you need to be aware of this)
> improve the management of risk in the future
> help other parts of your organisation learn
> demonstrate your commitment to effective health and safety and improving worker morale and thinking towards process safety.

HOW TO INVESTIGATE

An effective investigation requires a methodical, structured approach to information gathering, collation and analysis.

Investigations of incidents should target the root or underlying cause(s) and make sure that any investigation findings trigger a review of all controls connected to an incident. Incidents should be investigated considering the potential consequences and actual consequences. This is particularly important where an incident is a notifiable event or near miss. Consider the following elements and approaches:

> selecting and training internal investigators
> activating and supporting an investigation
> producing reports on the results of investigations
> disseminating knowledge gained from the investigation
> recording and monitoring actions that result from the investigation findings.

Incident and near miss investigation systems should include:

> procedures for internal and external incident and near-miss reporting, including statutory requirements
> the reporting procedures should be clearly documented, including appropriate report forms that clearly indicate:
  - reporting structure (who reports to whom)
  - reporting time frames (by when) for major incidents, minor incidents and near misses (eg a major incident may require immediate reporting to senior management and external agencies, while a minor incident may be reported through standard weekly or monthly reporting systems)
  - reporting procedures (eg communication channels such as standardised reporting forms, regular meetings, computerised systems etc)
> report formats should be able to provide appropriate records of the events, with complete information about the events, people involved, plant conditions at the time of the event, and timings
> report formats should guide the identification of both immediate causes, such as substandard conditions and behaviours, and root causes including

systems deficiencies and lack of compliance with statutory requirements and standards

- responsibilities and procedures for investigation of incidents and near misses
- worker engagement during incident and near-miss investigation and follow up
- development of skills in incident and near-miss investigation, including root cause analysis
- establishment of a system for acting on recommendations, including tracking and ensuring the completion of corrective measures
- availability of incident reports to relevant workers
- incident and near-miss documentation requirements
- dissemination of lessons learnt from incidents (internally and externally)
- procedures for the prompt reporting of investigation outcomes in accordance with statutory requirements.

HOW HUMAN FACTORS CAN CONTRIBUTE TO INCIDENTS AND NEAR MISSES

Very often, little attempt is made to understand where human factors have contributed to an incident or near miss. Identifying those factors can help to improve the safety culture in an operation as well as fixing the obvious process problems.

9.4 REPORTING ON THE FINDINGS OF AN INVESTIGATION

A report of an investigation of a major incident should include:

- specified hazardous substances involved
- the cause of the major incident and the contributing factors
- relevant documentation used in the investigation including witness statements, reports, SMS procedures, photographs, diagrams, drawings, records, etc
- immediate consequences on people, property and the environment surrounding the MHF and steps taken to mitigate consequences
- extent of the involvement of emergency services and a critique of the implementation of the MHF's emergency plan during the incident
- actions taken and planned to prevent the major incident reoccurring, with responsibilities for these actions and timeframes for their completion
- a description of the alterations to the SMS that have occurred or are proposed following the investigation
- responsibilities and procedures for investigation of the incident
- a record of worker engagement during investigation and follow up
- a description of the how the lessons from the incident have been disseminated to workers.

Consider keeping internal reports of investigations for the life of the MHF. These reports may be requested at any time by WorkSafe, and should be part of the safety assessment of the MHF. The reports can be used in the safety case, to demonstrate the adequacy of controls and any review and improvement of those and the larger SMS as a result of the investigation findings.

10/

PERFORMANCE MONITORING

IN THIS SECTION:

Performance monitoring is the monitoring, measuring and evaluation of activities, non-conformances, and controls. It provides assurance that controls are in place and effective.

You must develop and apply procedures to ensure performance monitoring of:

> activities carried out under the SMS
> actions on non-compliance
> controls.

This should support your policies and objectives, which mean that monitoring and performance standards need to be set to make sure the policies and objectives are met.

Schedule 5 details the specific arrangements for monitoring performance that must be included in the SMS.

10.1 WHAT IS PERFORMANCE MONITORING?

The main aspects to performance monitoring are:

> monitoring activities carried out under the SMS
> monitoring and measuring the performance of controls
> evaluating if the monitored performance is suitable and achieves the desired outcomes
> investigating any non-compliance found
> reporting performance monitoring and any necessary corrective action
> implementing corrective action to ensure ongoing performance is to a suitable standard
> following up what was monitored and reported is accurate and any corrective actions taken.

Performance monitoring is different to auditing. Audits monitor and check the organisation is correctly following the procedures under the SMS. Performance monitoring is the:

> routine checking that activities under the SMS are actually being conducted
> measurement of actual performance of the SMS elements
> comparison of this performance with defined performance standards.

10.2 DEVELOPING PERFORMANCE STANDARDS

Develop a comprehensive set of SMS performance standards which are workable, appropriate to the MHF, and above all ensure the safety of people at the MHF. The performance standards should also include arrangements for measuring the effectiveness of the SMS and should relate to all aspects of the SMS.

DEFINING PARAMETERS OF A PERFORMANCE STANDARD FOR CONTROLS

The MHF Regulations require the SMS to specify the performance standards that apply to controls for managing risk. The performance standards are the parameters against which controls are assessed to make sure they reduce risk so far as is reasonably practicable. When you develop these standards, consider what level of performance is reasonable to achieve from each control, including:

- functionality
- availability
- reliability
- survivability
- dependency
- compatibility.

A performance standard should state the key performance indicators (KPIs) the control has to achieve in order to perform as intended.

Some performance standards for engineering controls may be adopted from manufacturer's recommendations. Determine if these are appropriate to the specific conditions of your MHF.

If you base a performance standard on industry standards and codes for a control to meet, include the key requirements that the control will be measured against during its life. Don't simply list the codes and standards that apply.

It is important that the parameters set in the performance standard are specific, measurable, appropriate, realistic and timely (SMART).

- **Specific** – performance standards are well defined and not open to wide interpretation.
- **Measurable** – performance standards take many forms and can be quantitatively or qualitatively expressed.
- **Appropriate** – align the performance standard with the overall goal of the control.
- **Realistic** – performance standards are achievable, but may be challenging, and attainable using resources available.
- **Timely** – develop and make performance standards available in a timely manner (eg operational performance standards should be available prior to start-up of operations).

The SMS must include arrangements for making sure it (in particular the controls and ongoing review) is being implemented and maintained effectively. The SMS must fully support and maintain the performance standards of the controls.

The performance standards should be clearly traceable to their associated controls. They should also reference associated:

- strategies
- procedures
- work instructions
- other assurance related documentation.

Put in place a system for monitoring controls and developing standards for measuring their effectiveness including failure indicators of any control. This enables you to measure, monitor and test the effectiveness of each control.

PERFORMANCE STANDARDS FOR 'OTHER' CONTROLS

In general, the process of assigning performance standards to engineering controls is straightforward when a control is viewed in terms of:

- functionality
- availability
- reliability
- survivability
- dependency
- compatibility.

There are however, certain procedures or administrative controls within the SMS that are key risk management controls.

When it comes to setting performance standards for administrative or procedural controls the same principles apply as for engineering controls although not all parameters may be relevant.

Considering 'other' controls in the safety assessment process tends to be at a high level (ie at a system level). It is in the development of performance standards that an appropriate level of detail is introduced. This level of detail should be appropriate to the complexity of the system, and should allow the performance standards to be verifiable (ie quantifiable and measurable).

SINGLE OR GROUPED CONTROL PERFORMANCE

It may be necessary to define more than one standard for a control or group of controls. Determine the method for reporting performance against these standards and corrective actions to take:

> in the event of failure of controls

> should any KPIs not perform to standard.

Only the key aspects of any given control will require performance standards. Develop performance standards with appropriate KPIs for these aspects. KPIs may be for a control group or individual controls. Where you have existing KPIs, put review processes in place to make sure they reflect change.

PERFORMANCE OF THE SAFETY-CRITICAL ELEMENTS

The SMS should specify the performance standards that apply to safety-critical elements. Indicate how each safety-critical element (or group) is expected to perform under all anticipated conditions. Clearly describe contingency measures to apply if the element's performance falls outside its critical operating parameters.

Example 5: Performance standards showing failure of controls

Indicators of failure or poor performance may include:

> alarms which indicate failure of specific items (eg power, utilities or out of service/not functional equipment)

> the number of breakdown repairs, this indicates the reliability of controls

> a high number of pre-emptive repairs from inspections

> evidence of mal-practice from field observations, audits etc.

Effectiveness measures that identify where controls are effective are also important. They should sit alongside failure measures and show the desired level of performance for each issue.

Example 6: Performance standards

The following are some examples of performance standards for various controls. These are only provided to assist you in devising appropriate measures for your MHF.

CONTROL	PERFORMANCE MONITORING	
	EFFECTIVENESS MEASURES	FAILURE MEASURE
Instrument	> Equipment activates at set point (or within 1% of set point). > Responses occur within specified timeframes (eg trip activation closes valve within 1 second).	> Equipment out of service or inactive. > Equipment failed recorded on board/ in logbook.
Procedure	> Audit /review shows procedure in use and users follow it.	> Evidence of mal-practice, short cuts.

Table 2: Performance measures for various controls

10.3 PERFORMANCE MONITORING OF SMS ELEMENTS

Performance monitoring involves developing detailed performance standards for measuring the effectiveness of the SMS.

You can use a performance standard to establish the level of performance required for elements of the SMS. A comprehensive set of workable performance standards appropriate to the MHF will be necessary. Performance standards can be defined at a high level for the SMS as a whole, and in more detail for each individual element of the SMS. The standards could include both the current required level of performance, and a target level to be achieved within a specified timeframe.

Again consider the principle of 'SMART' in defining performance standards. You should also consider using a combination of performance standards which set both:

> leading indicators (that measure the activities or inputs of the organisation to managing safety)
> lagging ones (that measure the outputs or actual performance achieved).

In setting performance standards consider the following questions:

> How will I know that this particular system or control is working effectively?
> Alternatively, what will tell me the system or control is not working?

Performance standards should be detailed and transparent. They should be defined in such a way as to provide a meaningful measure of effectiveness.

LEADING PERFORMANCE INDICATORS

Leading indicators monitor the design, development, and operation of management arrangements. These tend to be preventative in nature, for example:

> routine inspections of premises, plant and equipment by staff
> workplace exposure monitoring to prevent harm to health
> planned function check regimes for key pieces of plant
> number of new or enhanced safety controls implemented
> results of observations and accident investigation results
> risk assessments and job hazard analysis.

LAGGING PERFORMANCE INDICATORS

Lagging indicators monitor evidence of poor performance but can also identify better practice, for example:

> investigating incidents and incidents (see section 9)
> monitoring cases of ill health and sickness absence records
> compliance issues.

Example 7: Lead and lag performance measures

The following are some examples of performance measures for various components of an SMS. The examples are provided only to assist operators to devise appropriate measures for their MHF.

SMS PERFORMANCE STANDARD	PERFORMANCE MONITORING	
	LEAD INDICATORS	LAG INDICATORS
Safety-critical elements A system is in place to identify test and maintain the plant and equipment to ensure the required design and reliability standards for safety-critical elements are met.	> selection, design, modification etc in accordance with company standards > equipment tested to schedule > audits of the above processes completed to schedule.	> results from scheduled testing > results from breakdown maintenance > results from incident investigations where safety-critical equipment caused or contributed to incident > actions from audits, testing and incidents etc relating to safety-critical equipment are completed to schedule to ensure system is continuously improved.
Mechanical integrity A system is in place to test, inspect and maintain mechanical assets to applicable standards.	> mechanical assets inspected and tested to schedule > temporary/interim repairs replaced with permanent repair to schedule > reported mechanical defects corrected to schedule > audits of the above processes completed to schedule.	> number of incidents/leaks due to mechanical integrity issues > results from inspection and testing of assets > actions from audits, testing and incidents etc relating to mechanical integrity are completed to schedule to ensure system is continuously improved.
Procedures A system is in place for the development, implementation and review and revision of effective operating and maintenance procedures.	> procedures issued and reviewed and revised to schedule > audit of the above processes.	> number of procedures current and available for use (eg results from audits) > number of incidents with cause(s) relating to inadequate procedures > actions from audits and incident investigations are completed to schedule to ensure procedures are effective.
Training A system is in place to make sure workers have the necessary skills and knowledge to effectively do their job.	> required training (including refresher training) for specific jobs completed to schedule > audit on training requirements for specific jobs (eg status against risk matrix, number attending training sessions etc).	> number of incidents related to inadequate/insufficient training > findings from survey or tests on competency and knowledge > actions from audits and incident investigations are completed to schedule to ensure training system is effective.

SMS PERFORMANCE STANDARD	PERFORMANCE MONITORING	
	LEAD INDICATORS	LAG INDICATORS
Management of change A system is in place for the management of temporary and permanent changes.	> audit or quality review of change documentation, sign-off and approval process are completed to schedule.	> number of incidents related to MoC process inadequacy > actions from audits and incident investigations are completed to schedule to ensure MoC process is effective > number of approved temporary changes still in place beyond approval expiry date > number of changes made that bypassed or shortcut the MoC process

Table 3: Performance monitoring of some SMS elements

10.4 REPORTING

Have a formal performance monitoring component focusing on reporting and investigation of the systems performance. This is a key component to implementing continuous improvement.

A recommended approach is to monitor the performance of the SMS as you would when you monitor other aspects of your business. The outcome of any monitoring of the SMS needs to be reported back to key decision makers in your organisation.

Reporting should include:

> what aspects of the system's performance management need to be aware of

> how corrective action is to be implemented to ensure the system's effectiveness

> how performance of all aspects of the SMS is to be reported

> how review of the SMS is to include the results of the performance monitoring.

10.5 FOLLOW UP

Conduct follow-up investigation of the SMS to make sure ongoing improvement is actioned. Follow up enables you to look into the detail of the performance monitoring information and decide if an absence of evidence of problems really is indicating good health and safety performance, or whether there is a breakdown in recognition or communication of problems.

Any follow up and review of the SMS should be mindful of the results of any monitored performance. The results of monitoring should enable you to clearly improve your SMS when auditing and reviewing it.

11/

AUDIT AND REVIEW

IN THIS SECTION:

This element creates the continual improvement cycle. An audit provides assurance of the integrity of both the SMS and the technical elements of process safety management within it. The review closes the continual improvement loop.

You must adopt procedures to make sure the SMS is implemented, understood, followed, and effective. Internal or external audits are a key part of these procedures. The monitoring (see section 10), audit and review of the SMS can provide you with the means of prioritising action items and improvements, with higher priority being given to higher risk issues. Progress on action items should then be formally tracked.

- **Audit** is the process of checking the overall established SMS is understood and is being used. Auditing tests whether the management framework (in particular the monitoring and corrective action processes) is being implemented and is effective. It can also include evaluation of the degree of compliance against the defined performance standards. Both quality control and quality assurance are necessary to check:
  - that activities actually occur
  - the activities are being performed to a suitable standard
  - the systems, procedures, controls etc are achieving the desired results.
- **Review** is the ongoing process of evaluating whether the entire SMS and the performance standards within it remain adequate, fit-for-purpose, and in line with current good practice. Decide whether or not the performance standards are appropriate once you have gained practical experience.

An effective audit and review process will contain a mix of:

- external formal audits
- internal formal audits and reviews by workers outside the operating line function
- self-assessments undertaken by work groups within the facility
- safety tours
- task observations.

These reviews and audits are separate to audits carried out for other purposes (such as HSNO LTC audits, public safety management system audits, PECPR audits, ISO Accreditation audits which many facilities must also conduct).

Schedule 5 details the specific audit and review arrangements that must be included in the SMS.

11.1 INDEPENDENT AUDIT

Auditing is the most commonly used means for checking the performance of SMS elements against their performance standards. The SMS must include a system for managing these audits (eg qualifying auditors, scheduling, documenting results and tracking recommendations).

Auditing should look at both implementation and functionality of the systems, that is:

- Does the MHF have a system that meets the required standard?
- Does the MHF follow its own system procedures and are they effective?

An audit provides assurance of the integrity of both the SMS and the technical elements of process safety management within it. An effective audit will help you make sure that all the management and technical elements of the SMS are in place and are functioning effectively.

Note that some operators use the term "auditing" to refer to activities such as safety tours, physical conditions inspections and behaviour observation carried out by line managers as part of their active performance monitoring activities. These types of monitoring activities address some aspects of the SMS but do not involve the fundamental assessment of the validity and reliability of the SMS itself.

AUDIT INDEPENDENCE

Trained and experienced people who are independent of the system being audited should carry out audits. This means people who are outside the span of control of the worker responsible for the procedure or system being audited. For individual SMS elements, have workers with no direct responsibilities for that element carry out the audit. However, if the SMS as a whole is being audited, the auditor should be independent of the MHF.

If your company or organisation runs multiple MHFs, there could be advantages to having workers from other facilities carry out audits. They understand the substances, processes, plant and culture while still being sufficiently independent to provide an impartial view (provided the reporting line is high enough in the organisation).

WHAT SHOULD AN AUDIT PLAN CONTAIN?

An effective audit plan should meet the following criteria:

> audits should be carried out by an independent and competent person
> audit results should be reported to a higher level of authority than the person responsible for the system or element being audited
> audits should be planned according to a systematic schedule that determines both their frequency and scope
> the effective auditing of the SMS and its operational aspects should include regular in-depth audits that critically examine all levels of the SMS, including:
  - the overall management of the system and the robustness of its implementation
  - the technical adequacy of the system in relation to 'fit-for-purpose' criteria
  - the compliance aspects of the system in relation to the match between actual operation of the SMS and its elements and the system documentation
> the audits should pay particular attention to:
  - systems and procedures critical to safe operation
  - nature of the MHF's operation in terms of its major incident hazards and the controls in place to prevent major incidents
  - systems for making sure structures, equipment and associated technical controls are adequate for safe operation
  - systems for minimising the consequences of near misses
  - systems for making sure that all workers have the necessary competencies required for safe operation
> audits should incorporate performance monitoring, using qualitative and quantitative techniques for performance rating and benchmarking against good practice.

In addition to the comprehensive audit of the whole SMS, there should be periodic and random sub-system audits of key elements or a component of the system to provide ongoing assurance.

PLANNING AND PROCEDURES

Careful planning of resources in terms of timing of meetings and interview locations, records, SMS information and data and access to areas of the MHF needs to be made. Procedures for the audit of the SMS should be developed by the MHF.

Information should include:

> roles and responsibilities for auditors and workers
> definitions for audit findings such as major and minor non-conformities and observations
> standards
> audit trail development
> sampling techniques
> opening and closing meetings
> audit reporting.

Quality assurance processes should consider these factors that require defined technical understanding of operational procedures and system knowledge.

DOCUMENTATION

The SMS must provide support for the documentation and communication of audit findings. In practice, this could mean providing audit report templates, audit schedules, corrective and preventative action reports, action tracking registers and forums for the communication and review of audit findings.

11.2 REVIEW OF THE SMS

The SMS should include means for you to formally review the SMS internally, and develop improvements based on the results. This review must be documented. The aim of internal review is for you (the operator) and management with executive responsibility of the MHF and the SMS to confirm periodically the continuing suitability and effectiveness of the whole system.

A review process should:

> identify the key systems and operational processes and their continued suitability
> assess system and control performance using a complete suite of performance monitoring in the SMS
> review the MHF's policies and objectives for adequacy in light of safety assessment activities, any change and system improvement.

If an activity measure shows that a particular system is not being used in the required situations, review why that would be happening. For example:

> Are people unaware the system is required in those situations?
> Is the system too cumbersome?
> Are human factors involved?

A number of key inputs and outputs can be identified as being crucial to a successful review. Carry out reviews at least annually. Inputs for the management review process should include:

> follow-up actions from previous reviews
> performance levels compared against established performance standards and health and safety policies
> implementation of the SMS based on audit results
> monitoring results
> opportunities for improvement
> incident investigations
> specific recommendations arising from any audit
> specific recommendations arising from any inspections
> training needs assessments
> monitoring of safety-critical elements
> worker suggestions
> legislative change.

Outputs for the management review process should include decisions and actions on:

> improvement of the effectiveness of the SMS and its processes
> improvement of major hazard controls and incident prevention
> resources needed to take action.

MANAGEMENT INVOLVEMENT

A review by senior management contributes towards decisions on the SMS and key safety-critical elements. It provides you with formal and systematic opportunities to learn about the effectiveness of the systems in place. Action plans that reflect lessons learnt provide a meaningful and effective basis for continually improving the SMS.

The actions needed to improve performance may be quite different if effectiveness measures are found to be deficient. For example, if the data showed the system was being used incorrectly or the safety matters that system was meant to manage were breaking down despite workers using the system as specified, the system may need to be revised.

A management review may also include other matters to generate improvements, including incidents at similar facilities in New Zealand or overseas, or new and emerging issues that may be relevant to the MHF's operation.

Reviewing also gives you the opportunity to celebrate and promote your health and safety successes. The most important aspect of reviewing is that it closes the loop. The outcomes of your review become what you plan to do next with your SMS. The final step of the review is likely to be documenting it and updating the SMS based on the review outcomes and decisions.

11.3 ONGOING REVIEW AND REVISION OF THE SMS

You must review and, as necessary, revise the SMS when:

> ongoing review indicates a change or proposed change to the MHF could:
  - create a major incident hazard that had not been previously identified
  - increase the likelihood or a major incident
  - increase the magnitude or severity of the consequences from a major incident.
> a control no longer minimises the risk so far as is reasonably practicable
> a new major incident hazard, or risk associated with that hazard, is identified
> the results of engagement with workers indicates that a review is necessary
> a HSR requests a review because the HSR reasonably believes that grounds for review exist (which may affect the health and safety of workers)and you have not adequately conducted a review
> there is a change of operator.

The MoC process should make sure the ongoing review happens every time a relevant change is proposed.

Regulation 35 requires the operator to review and, as necessary, revise the SMS in particular circumstances.

12/

RECORD MANAGEMENT

IN THIS SECTION:

Record management is an extremely important element of the SMS. Good quality documentation and data control is a crucial source of proof of your capacity to operate the MHF safely.

You must document the SMS, and it must be accessible to anyone who uses it. This is to make sure people using it will correctly follow it and understand it. Make sure there is enough documentation the risk management activities and decisions are traceable and reproducible. Documenting the SMS enables you to test and review its performance, and enables an auditor to test the adequacy of the system, its implementation, and its effectiveness.

You should have information in paper or electronic form to describe:

> the core requirements of the SMS and their interactions
> a concise description of MHF activities, products and services
> guidance on accessing information within the SMS
> safe operating procedures, work instructions, guidelines and forms (eg incident reports).

Ultimately, good records management will help you build a safety case, or respond to any other kind of safety review.

12.1 DOCUMENT AND RECORD CONTROL

Implement processes for the control of all SMS related documents. All documents should be:

> readily located; periodically reviewed, revised, as necessary, and approved for adequacy by authorised workers
> the current version with obsolete versions removed from all points of issue and points of use or otherwise assured against unintended use
> obsolete versions suitably identified, if retained for legal and/or knowledge preservation purposes.

SMS records document the actions arising from procedures and protocols that form part of the SMS. Records of operational and SMS performance provide a snapshot of outputs at a given time under given circumstances. The main difference between controlled documents and records is the review and revision of SMS documents; whereas records are evidence the activity is complete, and so require no revising or altering. For example, the maintenance system may have a standard form to record maintenance activities and this form is a controlled document that may be updated as part of the SMS; while the completed form is a record, that is evidence of maintenance taking place.

Good safety records management involves systematic and consistent means of storing and retrieving records including:

> identification
> collection
> indexing
> maintenance
> filing
> retrieval and retention

- protection and security
- storage on site
- storage off site, including:
  - off-site servers
  - cloud storage
  - removable media.

Decisions concerning the level of detail, methods to use and records management should consider:

- the MHF and organisation's needs for continuous learning
- benefits of reusing information for management purposes
- costs and effort involved in creating and maintaining records
- legal, regulatory and operational needs for records including information remaining available after any incident
- ability to revisit and update information
- retention period
- sensitivity of information.

RECORD RETENTION REQUIREMENTS

Operators of LTMHFs must make a record of:

- the MAPP for the facility
- any revision of the MAPP
- the findings and recommendations of any audit of the MAPP and SMS
- any actions that will be, or have been, taken to implement those recommendations.

Regulation 37 requires operators of LTMHFs keep certain records of the MAPP for at least 5 years after they were made, stored both in a secure place at the LTMHF and at a separate nominated address.

12.2 DOCUMENT REVIEW AND PROCESS CHANGE

Consider the importance of updating documents within the SMS when planning and maintaining documents and data control systems. Some operators do this by regular programmed reviews of all documents within the SMS. Some operators with electronic document systems ensure that links between documents are always maintained by providing hyperlinks between them. Consider document review as part of the MoC process, or following an incident or review of the SMS.

Consider how best to record the nature of temporary changes in drawings, manuals and procedures etc. For short-term changes, document updates may be unnecessary but formal document update may be required for changes that exist for extended periods.

13/

APPENDICES

IN THIS SECTION:

13.1 APPENDIX A: MORE INFORMATION

NEW ZEALAND

ENVIRONMENTAL PROTECTION AUTHORITY

For information about how to manage hazardous substances visit the Environmental Protection Authority's website www.epa.govt.nz or call 0800 376 234.

NEW ZEALAND LEGISLATION

To access all legislation including Acts and regulations visit the New Zealand Legislation website www.legislation.govt.nz

YOUR LOCAL COUNCIL

Your council might have additional rules that need to be met. Check with your local council for specific rules that apply in your region.

INTERNATIONAL

EUROPEAN COMMISSION (EUROPE)

For information and guidance from the European commission's Major Accident Hazards Bureau visit their website minerva.jrc.ec.europa.eu/publications

HEALTH AND SAFETY EXECUTIVE (HSE) (UK)

For information and guidance about the UK's Control of Major Accident Hazards (COMAH) Regulations visit the HSE's website www.hse.gov.uk

NATIONAL OFFSHORE PETROLEUM SAFETY AND ENVIRONMENTAL MANAGEMENT AUTHORITY (AUSTRALIA)

For guidance to assist with preparing a safety case for a MHF visit the National Offshore Petroleum Safety and Environmental Management Authority's (NOPSEMA) website www.nopsema.gov.au

SAFE WORK AUSTRALIA (AUSTRALIA)

For guidance to assist with preparing an effective safety case that meets Australia's Work Health and Safety Regulations visit Safe Work Australia's website www.safeworkaustralia.gov.au

WORKSAFE VICTORIA (AUSTRALIA)

For guidance to assist with preparing a safety case for a MHF visit WorkSafe Victoria's website www.worksafe.vic.gov.au

FURTHER READING

For information and guidance about health and safety or to contact the High Hazard Unit visit WorkSafe's website www.worksafe.govt.nz or call 0800 030 040.

Related WorkSafe publications:

- *Introduction to the Health and Safety at Work Act 2015*
- *Major Hazard Facilities: Emergency Planning*
- *Major Hazard Facilities: Notifications and Designation*
- *Major Hazard Facilities: Safety Assessment*
- *Major Hazard Facilities: Safety Case*
- *Worker Engagement, Participation and Representation*
- *WorkSafe position on overlapping duties*
- *WorkSafe position on officers' due diligence*

Developing Process Safety Indicators
Health and Safety Executive www.hse.gov.uk

Guidance Note: Consultation and Representation at a Major Hazard Facility
WorkSafe Victoria www.worksafe.vic.gov.au

Guidance Note: Management of Change at a Major Hazard Facility
WorkSafe Victoria www.worksafe.vic.gov.au

Guidance Note: Performance Standards and Indicators
WorkSafe Victoria www.worksafe.vic.gov.au

Guidance Note: Safety Management Systems for Major Hazard Facilities
WorkSafe Victoria www.worksafe.vic.gov.au

Guidance on Permit-to-Work Systems
Health and Safety Executive www.hse.gov.uk

Guide for Major Hazard Facilities: Information, Training and Instruction for Workers and Other Persons at the Facility
Safe Work Australia www.safeworkaustralia.gov.au

Guide for Major Hazard Facilities: Safety Management Systems
Safe Work Australia www.safeworkaustralia.gov.au

Guidelines on a Major Accident Prevention Policy and Safety Management System, as Required by Council Directive 96/82/EC (Seveso II)
European Commission minerva.jrc.ec.europa.eu/publications

Major Accident Prevention Policies for Lower-tier COMAH Establishments
Health and Safety Executive www.hse.gov.uk

Reducing Error and Influencing Human Behaviour – HSG48
Health and Safety Executive www.hse.gov.uk

13.2 APPENDIX B: GLOSSARY

TERM	BRIEF EXPLANATION
Accepted safety case	A safety case which WorkSafe has accepted under Regulation 48.
Amended safety case	If WorkSafe has initially rejected a safety case or revised safety case under Regulation 48, an operator may amend the safety case and resubmit it for acceptance. This is an amended safety case.
Change or proposed change at a MHF	Defined in the MHF Regulations. It means a change or proposed change of any kind, including: > a change to any plant, structure, process, hazardous substance or other substance used in a process, (including the introduction of new plant, new structure, new process or new hazardous substance) > a change to the quantity of specified hazardous substances that are present or likely to be present at the facility > a change to the operation, or the nature of the operation, of the facility > a change to the facility's SMS > an organisational change at the facility (including a change in its senior management).
Control	A measure to eliminate or minimise, so far as is reasonably practicable, the risk of a major incident occurring; or to minimise so far as is reasonably practicable, the magnitude or severity of a major incident, as described in Regulation 30.
Critical operating parameters	The upper or lower performance limits of any equipment, process or procedure, compliance with which is necessary to avoid a major incident.
Designated transfer zones	Defined in Regulation 11 of the Hazardous Substances (Classes 1 to 5 Controls) Regulations 2001.
Designation	A formal decision made by WorkSafe that a facility is or will be either an LTMHF or an UTMHF for the purposes of the MHF Regulations.
Emergency	An incident at a MHF requiring activation of the emergency plan.
Environmental Protection Authority (EPA)	A government agency responsible for certain regulatory functions concerning New Zealand's environmental management.
Facility	Defined in the MHF Regulations, means the whole area under the control of the same person where specified hazardous substances are present in 1 or more places. Two or more areas under the control of the same person and separated only by a road, railway, inland waterway, pipeline, or other structure are treated as 1 whole area for the purposes of this definition.
Facility emergency control centre (FECC)	An area where designated personnel co-ordinate information, develop strategies for addressing the media and government agencies, handle logistical support for the response team, and perform management functions. A centralised support facility allows emergency managers and staff to contend with incident issues more effectively.
Facility emergency controller (FEC)	The person in charge of managing an emergency for the facility and has overall responsibility for all functions performed by facility personnel during an emergency.
Failure of a control	This means if the control: > is a positive action or event: the non-occurrence or the defective occurrence of that action or event > consists of a limitation on an operational activity, process or procedure: the breach of that limitation.

TERM	BRIEF EXPLANATION
GHS	The Globally Harmonized System of Classification and Labelling of Chemicals, Fifth revised edition, published by the United Nations.
Greenfield	An area of land, or some other undeveloped site earmarked for commercial development.
Hazard	A situation or thing that could harm someone, and includes a person's behaviour. For example, an unguarded machine, hazardous substances etc.
Hazard identification	The systematic and comprehensive process of identifying hazards.
Isolated quantity	Defined in the MHF Regulations, means a quantity of a hazardous substance where its location at the facility is such that it cannot on its own initiate a major incident elsewhere at the facility.
Knock-on effects	Secondary events (such as toxic releases) triggered by a primary event (such as an explosion), resulting in an increase in consequences or in the area of an impact zone over the initial event.
Local authority	A territorial authority within the meaning of section 5(1) of the Local Government Act 2002.
Local community	This is defined in the MHF Regulations as: (a) meaning, at a minimum, all persons within a 1 km radius of any point on the perimeter of a MHF, and (b) including all persons in an area which might be affected by a major incident occurring at a MHF. The words 'at a minimum' mean the 1 km radius does not mark the extent of the definition. Paragraph (b) may extend the scope of the definition well beyond 1 km in some circumstances.
Lower threshold quantity	Defined in the MHF Regulations, the quantity specified in column 4 of table 1 or column 3 of table 2 of Schedule 2, and calculated in accordance with Part 3 of the MHF Regulations.
Lower tier major hazard facility (LTMHF)	Defined in the MHF Regulations, a facility that WorkSafe has designated as an LTMHF.
Major hazard facility (MHF)	Defined in the MHF Regulations, a facility that WorkSafe has designated as an LTMHF or a UTMHF.
Major incident	Defined in the MHF Regulations as an uncontrolled event at a MHF that involves, or potentially involves, specified hazardous substances, and exposes multiple persons to a serious risk to their health and safety (including a risk of death) arising from an immediate or imminent exposure to: > 1 or more of those substances as a result of the event > the direct or indirect effects of the event.
Major incident hazard	Defined in the MHF Regulations, a hazard that has the potential to cause a major incident.
Major incident pathway	The process or sequence by which the major incident hazard develops into a major incident. Depending on the incident process model adopted, this includes how the initiators, contributing factors, enabling conditions, system failures and mechanisms come together into the incident.

TERM	BRIEF EXPLANATION
Near miss	A situation where a worker or any other person is exposed to a serious risk to their health and safety, even if no harm was incurred.
Notifiable event	This is defined in HSWA as: > the death of a person > a notifiable injury or illness > a notifiable incident.
Notifiable incident	Defined in HSWA, generally an incident that exposes workers or other people to a serious risk to health or safety. It must be reported to WorkSafe, or the relevant designated agency.
Notification	The notification to WorkSafe required by MHF Regulations 12, 13, and 17. Notification is required if specified hazardous substances are present or likely to be present at a facility in a quantity equal to or exceeding the lower threshold quantity or if there is a proposed new operator.
Off site	Defined in the MHF Regulations, this means not on site.
Officer	Defined in HSWA, in summary it means a person that exercises significant influence over the PCBU's management. For example, the CEO, a director, or a partner in a partnership.
On site	Defined in the MHF Regulations, this means at or in a facility.
Operator	Defined in the MHF Regulations, the PCBU who manages or controls a facility or a proposed facility, and has the power to direct the whole facility be shut down.
Person conducting a business or undertaking (PCBU)	Defined in HSWA, generally any legal person running a business or undertaking. For example, includes a limited liability company, partnership, trust, incorporated society, etc.
Pipeline	Defined in Regulation 2 of the Health and Safety in Employment (Pipelines) Regulations 1999.
Proposed facility	Defined in the MHF Regulations. It is an existing workplace that is to become a facility or a facility that is to be built in the future.
Qualitative risk assessment	A relative measure of risk based on ranking or separation into descriptive categories such as low, medium, high.
Quantitative risk assessment	The use of data to determine risk. Requires calculations of two components of risk; the consequence of the hazard, and the likelihood that the hazard will occur.
Risk	The likelihood of a specific level of harm occurring from a hazard.
Risk assessment	This involves considering what could happen if someone is exposed to a hazard and the likelihood of it happening.
Safety assessment	Defined in the MHF Regulations, the general process by which the operator of a MHF systematically and comprehensively investigates and analyses all aspects of risks (including decisions around which controls to implement) to health and safety associated with all major incidents that could occur in the course of the operation of the MHF.
Safety case	Defined in the MHF Regulations, generally a written presentation of the technical, management and operational information covering the hazards and risks that may lead to a major incident at a UTMHF, and their control. It provides justification for the measures taken to ensure the safe operation of the facility.

TERM	BRIEF EXPLANATION
Safety management system (SMS)	Defined in the MHF Regulations, generally a comprehensive integrated system for managing all aspects of risk control at a MHF and used by the operator as the primary means of ensuring safe operation of the MHF.
Safety-critical element	Defined in the MHF Regulations, means any part of a facility or its plant (including a computer program): > that has the purpose of preventing, or limiting the effect of, a major incident; and > the failure of which could cause or contribute substantially to a major incident.
Specified hazardous substances	Defined in the MHF Regulations, these are table 1 or 2 hazardous substances.
Structure	Defined in HSWA, means anything that is constructed, whether fixed, moveable, temporary, or permanent; including: > buildings, masts, towers, frameworks, pipelines, quarries, bridges, and underground works (including shafts or tunnels) > any component of a structure > part of a structure.
Table 1	The table of categories of hazardous substances in Schedule 2 of the MHF Regulations.
Table 1 or 2 hazardous substance	Defined in the MHF Regulations, this means: > hazardous substances specified in column 1 of table 2 of Schedule 2 > categories of hazardous substances referred to in column 1 of table 1 of Schedule 2.
Table 2	The table of named hazardous substances in Schedule 2 of the MHF Regulations.
Threshold quantity	Defined in the MHF Regulations, means the lower threshold quantity or the upper threshold quantity.
Transit depot	Defined in Regulation 3 of the Hazardous Substances (Classes 1 to 5 Controls) Regulations 2001.
Union	Is an organisation that supports its membership by advocating on their behalf. The Employment Relations Act 2000 gives employees the freedom to join unions and bargain collectively without discrimination. Workers can choose whether or not to join a union. A union is entitled to represent members' employment interests, including health and safety matters.
Upper threshold quantity	Defined in the MHF Regulations, means the quantity specified in column 5 of table 1 or column 4 of table 2 of Schedule 2, and calculated in accordance with Part 3 of the MHF Regulations.
Upper tier major hazard facility (UTMHF)	Defined in the MHF Regulations, means a facility that WorkSafe has designated as a UTMHF.
Worker	Defined in HSWA, generally a person who carries out work in any capacity for a PCBU. It covers almost all working relationships, including employees, contractors, sub-contractors, and volunteer workers.

TERM	BRIEF EXPLANATION
Worker representative	In relation to a worker, means: > the health and safety representative for the worker > a union representing the worker > any other person the worker authorises to represent them (eg community or church leaders, lawyers, occupational physicians, nurses, respected members of ethnic communities). Workers can ask a worker representative to raise health and safety issues with a PCBU on their behalf.
Workplace	Defined in HSWA, generally a place where work is carried out for a PCBU, including any place where a worker goes, or is likely to be, while at work.

Notes

DISCLAIMER

WorkSafe New Zealand has made every effort to ensure the information contained in this publication is reliable, but makes no guarantee of its completeness. WorkSafe may change the contents of this guideline at any time without notice.

This document is a guideline only. It should not be used as a substitute for legislation or legal advice. WorkSafe is not responsible for the results of any action taken on the basis of information in this document, or for any errors or omissions.

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