



Australian Pipelines & Gas Association

**ONSHORE PIPELINE PROJECTS**

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**CONSTRUCTION HEALTH AND SAFETY  
GUIDELINES**

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## FOREWORD

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Australia's onshore pipeline industry plays an essential role in meeting the energy and other needs of millions of Australians through efficient and environmentally robust infrastructure systems.

These APGA Onshore Construction Health and Safety Guidelines are an essential part of the construction process, providing advice on the incorporation of health and safety issues in the preparation of Construction Health and Safety Management Plans.

Pipelines and gas will play an increasingly important role in the Australian economy over the years ahead, with considerable activity in the construction of new onshore pipelines, the expansion of existing pipeline systems and the development of gas infrastructure. The industry is determined to meet the expectations of its people, regulators and the wider community by minimising incidents that affect the workforce and the environment in which we work.

The Australian Pipelines & Gas Association (APGA) believes that all member Companies must actively pursue strategies that ensure excellence in health and safety outcomes in all aspects of their business activities.

These APGA Guidelines were first developed in 2005 and are now in their third revision. APGA welcomes views from its members and other stakeholders, including technical regulators, on additional topics that should be included in the section on Guidance Notes. The APGA Health Safety and Environment Committee continues to review the industry health and safety issues, constantly adding further supporting guidelines and material.

The Guidelines examine the hierarchy of roles played by owners, contractors, subcontractors, specialist subcontractors and legislators. These groups represent the main target audience for the Guideline. The guideline should promote a common understanding of the health and safety philosophies, issues and processes that will contribute to excellent health and safety outcomes across the chain of participants involved in the pipeline construction process.

APGA encourages all Members involved in the construction of pipelines and other gas infrastructure to make full and effective use of these Guidelines so that they are informed and active contributors on relevant health and safety matters. Adoption of the Guidelines by APGA members is entirely voluntary and the APGA Health Safety and Environment Committee welcomes feedback on all aspects of the Guidelines.

These Guidelines have been reviewed and endorsed by State regulators and their advice has been incorporated in the document.

Mark Dayman - President APGA

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## Health and Safety Policy for Australia's Pipeline and Gas Industry

The Australian Pipelines & Gas Association (APGA) believes that all members must actively pursue strategies that ensure excellent health and safety outcomes in all aspects of their business activities.

In particular, APGA believes the core elements of such a strategy for members should include:

- adoption of strategies for continuous improvement in health and safety outcomes based on the philosophy that all accidents and incidents are preventable
- leadership, accountability and relentless commitment of all involved in the industry to promote a culture of excellence in health and safety performance.
- provision of a consultative process involving all industry participants in defining their own responsibilities and accountabilities for health and safety
- active promotion of a culture that places safety ahead of any other objective and ensures a safe and healthy working environment
- effective competency based training
- availability of any necessary resources including personnel, systems or safety equipment
- effective knowledge of, and compliance with, all obligations resulting from applicable laws, regulations, industry best practices and standards
- development of industry guidelines on key aspects of health and safety
- effective and aligned reporting of health and safety outcomes through industry wide statistics, safety alerts and by other means
- facilitation of effective rehabilitation programs where necessary

In order to promote this APGA health and safety policy among its members, APGA will:

- maintain an effective and proactive Health Safety and Environment Committee, reporting to the APGA Board
- develop and disseminate applicable construction safety industry guidelines
- provide a range of forums to discuss and address health and safety issues
- maintain an industry wide safety alert system, to be available to members and non-members on the APGA website
- lead the industry in achieving sound health and safety legislation, including regular meetings with Australian regulatory authorities
- keep its members fully abreast of safety initiatives developed by others and considered applicable to the activities of its members

Cheryl Cartwright  
APGA Chief Executive - June 2015

## **PART A General**

### **1.0 Purpose and Scope of these Guidelines**

The Australian Pipelines and Gas Association Ltd (APGA) is the peak body representing Australasia's pipeline infrastructure sector, with a focus on gas transmission, but also including transportation of other products, such as oil, water, slurry and CO<sub>2</sub>. Its members include constructors, owners, operators, advisers, engineering companies and suppliers of pipeline products and services. APGA has a diverse membership base with members including contractors, owners, operators, advisers and engineering companies and suppliers of pipeline products and services.

APGA is committed to a strategy that promotes good health and safety outcomes for the industry and builds upon the excellent record of member organisations.

The purpose of these guidelines is to assist organisations and personnel involved in pipeline construction to promote the highest achievable levels of workplace and pipeline health and safety for onshore pipeline projects across Australia or wherever member organisations operate.

The intent of the guidelines is to encourage the adoption of a uniform approach to managing health and safety on pipeline and gas construction projects through the development of consistent health and safety plans that effectively integrate with member organisations' health and safety management systems.

The scope of the guidelines is intended to apply to onshore pipeline construction and major repair or looping projects.

Over time the guidelines have evolved through the adoption of new and improved approaches to health and safety management. All involved in the industry are encouraged to contribute to ongoing development of the document.

The guidelines have been developed to assist in effectively meeting statutory and regulatory health and safety requirements through a consultative approach with government, community and related organisations, as well as applying the principles of identification of hazards and management of risks to a level that is as low as reasonably practicable, and providing for continuous improvement.

### **2.0 The Role of the Client or Proponent**

Clients and project proponents have a vital role in the establishment and ongoing management of project construction health and safety standards. They inevitably influence and impact on how Projects are structured, the amount of detail provided in the tendering process, the time allowed for project planning, licensing and approvals timetables, the time of year of the project, the time allowed to complete the project, the specification of project health and safety standards, the selection of the construction contractor and the degree of project surveillance and involvement.



The APGA Health and Safety Committee have prepared the Guideline for Treatment of Health and Safety Matters in Tendering to aid clients and constructors in ensuring a more detailed and transparent process for health and safety requirements in the tendering phase of a project. Refer to these guidelines on the APGA website.

There are now a number of different contracting strategies available, which impact how health and safety is managed throughout the project. These strategies range from fixed price contracts to full alliance contracts. Proponents should ensure that the impact of the management of health and safety expectations is considered when selecting a contracting strategy.

### **3.0 Structure of the Guidelines**

Part A (this part)	Gives general and background information
Part B	Provides guidelines to assist those wishing to prepare a valid construction health and safety plan, in terms of structure, level of detail, and compliance with the expectations of regulators.
Part C	Outlines the contents of a model Health and Safety Plan
Part D	Provides a framework for emergency response plans
Part E	Provides information on potential construction health and safety issues and recommended practices in a number of key topic areas.
Part F	Appendices - reference material

## 4.0 Definitions

**As Low As Reasonably Practicable (ALARP)**

A level of risk that is not intolerable, and cannot be reduced further without the expenditure of costs that are grossly disproportionate to the benefit gained. <sup>1</sup>

**Audit**

A critical examination of all or part of the total project management system with reference to health and safety

**Competent Person**

A person who has acquired, through training, qualification, or experience, or a combination of these, the knowledge and skills, including the Health and Safety knowledge and skills, qualifying that person to perform the task required.

**Consequence**

The outcome of a hazardous event or possible range of outcomes associated with an event, injury, loss or damage.

**Construction Work**

Any work carried out in connection with the construction, alteration, conversion, fitting-out, commissioning, renovation, repair, maintenance, refurbishment, demolition, decommissioning or dismantling of a structure

**Control Measures**

Actions to eliminate or reduce the chance of an event occurring or to reduce the effect of the hazard event if it does occur

**Employee**

In relation to a pipeline project, includes any individual engaged to perform work on the project site or easement on behalf of the licence holder or Principal Contractor and includes employees contractors or in a self-employed capacity

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<sup>1</sup> **Reasonably practicable**, in relation to a duty to ensure health and safety, means that which is, or was at a particular time, reasonably able to be done in relation to ensuring health and safety, taking into account and weighing up all relevant matters including:

- the likelihood of the hazard or the risk concerned occurring and
- the degree of harm that might result from the hazard or the risk and
- what the person concerned knows, or ought reasonably to know, about the hazard or the risk and ways of eliminating or minimising the risk and
- the availability and suitability of ways to eliminate or minimise the risk and
- after assessing the extent of the risk and the available ways of eliminating or minimising the risk, the cost associated with available ways of eliminating or minimising the risk, including whether the cost is grossly disproportionate to the risk.

<b>Formal Safety Assessment (FSA)</b>	A formal investigation of the nature, likelihood and impact of potential hazards and the means to prevent or minimise or control the consequences to as low as is reasonably practicable. The FSA may incorporate specific studies to provide reasoned arguments and judgements contributing to the formal investigation.
<b>Hazard</b>	A source or a situation with a potential for harm in terms of human injury or ill-health, damage to property, damage to the environment or a combination of these.
<b>Hazard/Risk Control</b>	Hazard or risk reduction actions that are undertaken to reduce the risk to as low as is reasonably practicable.
<b>Health and Safety Representative (HSR)</b>	An employee elected representative and member of a health and safety committee to represent a group of employees on health and safety matters.
<b>Incident</b>	Any unplanned event resulting in, or having a potential for injury, ill-health, damage or loss.
<b>Monitoring</b>	A management function of checking for acceptable performance as tasks and Projects are undertaken and completed.
<b>Owner</b>	The organisation responsible for the design, construction, testing, inspection, operation and maintenance of pipelines. For licensed pipelines, this is the "licence holder".
<b>Performance Standard</b>	Standards established by or recognised by the Operating Authority indicating who is responsible for carrying out an activity, what has to be done, when an activity has to be performed, and what outcomes are to be expected.
<b>Person with management or control of a workplace</b>	A person conducting a business or undertaking to the extent that the business or undertaking involves the management or control, in whole or in part, of the workplace. The person must ensure, so far as is reasonably practicable, that the workplace, the means of entering and exiting the workplace and anything arising from the workplace are without risks to the health and safety of any person.
<b>Plant</b>	Plant includes any machinery, equipment, appliance, container, implement and tool, and includes any component or anything fitted or connected to any of those things. Plant includes items as diverse as cranes, computers, machinery, forklifts, vehicles, and power tools.

<b>Probability</b>	Qualitatively, the probability or chance of the outcome occurring with respect to exposure to the hazard
<b>Project Management Team</b>	The team of personnel who deliver the Project from conception to operation. (The team may include the owner, constructor, alliance team, etc.)
<b>Risk</b>	The effect of uncertainty on objectives.  NOTE – Risk is often expressed in terms of a combination of the consequences of an event (including changes in circumstances) and the associated likelihood of occurrence. <sup>2</sup>
<b>Risk Acceptance Criteria/ Acceptance Standards</b>	Qualitative and quantitative criteria / standards selected by the Licence holder and/or the constructor, which reflect contemporary societal values, what is reasonably practicable and good pipeline construction practice.
<b>Health and Safety Management Plan</b>	A documented plan that describes how health and safety will be managed.
<b>Health and Safety Management System (also Safety Management System)</b>	A comprehensive integrated system for managing health and safety that sets out safety objectives, systems, performance standards, and indicators to be met, maintained, verified and continually improved.
<b>Surveillance</b>	See Monitoring
<b>The Plan</b>	The Construction Health and Safety Management Plan
<b>Validation</b>	Evidence (reports, certificates etc.) that equipment and/or systems are fit for purpose
<b>Worker</b>	A person who carries out work in any capacity for a person conducting a business or undertaking and includes: <ul style="list-style-type: none"> <li>• employees</li> <li>• contractors or subcontractors</li> <li>• employees of a contractor or subcontractor</li> <li>• employees of a labour hire company who has been assigned to work in the person's business or undertaking</li> <li>• outworkers</li> <li>• apprentices or trainees</li> <li>• students gaining work experience</li> </ul>

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<sup>2</sup> AS/NZS ISO 31000:2009 Risk management—Principles and guidelines

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**Workplace**

A place where work is carried out for a business or undertaking and includes any place where a worker goes, or is likely to be, while at work.

## 5.0 Abbreviations

ALARP	As Low As Reasonably Practicable
AS	Australian Standard
ERP	Emergency Response Plan
FSA	Formal Safety Assessment
HAZAN	<p>Hazard Analysis - the application of numerical methods to obtain an understanding of hazards in terms of how often a hazard will manifest itself</p> <p>And with what consequences for people, process and plant. HAZAN is the essential prerequisite for the complete risk assessment process.</p>
HAZID	<p>Hazard Identification (Study) - a tool for hazard identification, used early in a project to help organise the HSE deliverables in a project. The structured brainstorming technique typically involves designer and client personnel engineering disciplines, project management, commissioning and operations.</p> <p>The main major findings and hazard ratings help to deliver HSE compliance, and form part of the project Risk Register.</p>
HAZOP	Hazard and Operability Study
JHA	Job Hazard Analysis
NDT	Non Destructive Testing
PC	Principal Contractor
PCBU	Persons Conducting a Business or Undertaking
PPE	Personal Protective Equipment
QRA	Quantitative Risk Analysis
RCD	Residual Current Device

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ROPS	Rollover Protection System
SDS	Safety Data Sheet (formally MSDS)
SMP	Safety Management Plan
SMS	Safety Management System
SWMS	Safe Work Method Statement

## 6.0 Preparation of a Construction Health and Safety Plan

### 6.1 Introduction

The preparation of a health and safety plan is essential for ensuring statutory requirements are met, for outlining how the organisation's safety management is to be conducted, and to clearly outline the project's safety expectations.

The scope of the plan should include mobilisation, construction/installation, fabrication, testing, pre-commissioning and commissioning (and may specifically exclude design and operations if these are documented separately, in which case there should be a linkage to the separate documentation)

Whilst this document is a guideline for construction health and safety, it also references the AS2885 safety management study process and the commissioning phase, to ensure all risks are considered for 'whole of life' of the project.

The structure and format of the plan shall be defined, outlining its main elements (i.e. facility/project description, formal safety assessment, and safety management system), sub-elements, and the interfacing, supporting and referenced documents. This should also indicate hierarchy and precedence in case of conflict.

### 6.2 Regulatory Framework

Each State or Territory has its own legislative requirements for construction safety, though most have adopted the National Model Work Health and Safety Act and Regulations, and the legislation is now largely consistent. The project management team will ensure the legislative requirements are identified, understood, and integrated into the plan. There is often more than one regulatory authority.

### 6.3 Planning for Compliance

As part of the planning process for each pipeline project the project management team should have a full understanding of the legislative and statutory duty requirements of the jurisdictions in which the pipeline is to be constructed.

As part of the project planning process the project management team will:

- identify applicable legislation and other legal requirements (probable licence conditions etc.);

- have access to copies of all legislation (hard or electronic format) prior to and on site;
- ensure appropriate personnel have an adequate understanding of their legal responsibilities;
- provide a system to identify changes and amendments to applicable legislation and assess the impact of such changes in a timely manner. A Legislation Register should be established and maintained for the duration of the project to ensure legislative changes are monitored, assessed, implemented and communicated; and
- review relevant legislation and other legal requirements to assess specific application and develop an appropriate compliance strategy.

A listing of applicable legislation and conditions will be included or referenced in each health and safety management plan.

In addition to legislation, reference should be made to all applicable national and state codes of practice, some of which may be called up under legislation, or as a licence condition.

#### 6.4 Approvals

The health and safety management plan should list all key statutory approvals and notifications required for construction health and safety management plans. The approvals required by each State and Territory vary and are subject to change, and are therefore not listed here.

#### 6.5 Preparation of the Plan

A suitably experienced and qualified person should prepare the health and safety plan, either from the project management team, or on behalf of them. It should be prepared with sufficient time to submit to regulatory authorities (if required) and allow for comments by those bodies.

Where possible, involvement by personnel and stakeholders in the development of the plan should be sought. The plan shall describe the duties, responsibilities, authorities and accountabilities with respect to the development and implementation of the plan.

The construction health and safety plan will often work in parallel with the construction environmental management plan. Opportunities for co-management of, and integrated management systems for safety and environmental issues should be considered.

The SafeWork Australia publication, *Construction Work Code of Practice 2013* should be used as a reference standard when preparing the plan. This code includes various references to sections of the WHS Act and Regulations, which set out the legal requirements.

If the plan is that of the nominated principal contractor (PC), additional regulatory requirements relating to PC obligations must be included.

#### 6.6 Use of Subcontractors

Where subcontractors are to be used, the plan should be developed to provide subcontractors with enough detail on the expected health and safety standards for the project. Subcontractors may provide their own health and safety plans under the umbrella of the construction health and safety management plan.

### **6.7 Submission of the Safety plan**

Where regulatory authorities require the health and safety plan to be submitted and/or approved, their requirements for contents and submission of the Plan should be determined early in the project's development to avoid delays.

### **6.8 Review of the Plan**

The plan should outline the circumstances that would trigger the review and resubmission of the plan for review and approval (design or route changes etc.) and summarise how the objectives are achieved.



## **PART B Formal Safety Assessment**

The formal safety assessment for onshore pipeline projects should reflect license, regulatory requirements and best industry practice. These and any other objectives should be determined by and committed to by the organisations and members of the project management team.

For gas and liquid petroleum pipelines, Australian Standard *2885* provides the basis for procedures to ensure that threats to the pipeline and loss of pipeline integrity are reduced to as low as reasonably practical (ALARP). Other hazard and risk assessment processes utilised during the design and implementation phases of a project may include; hazard and operability studies, construction hazard identification assessments, commissioning hazard identification studies and job hazard analysis and work method statements etc.

The formal safety assessment should adopt an integrated approach to the identification of hazards, threats and risks associated with construction of the pipeline and that through the implementation of elimination, reduction and control risks reduce the overall safety risk level to ALARP.

The primary safety study that should make up the basis of the formal safety assessment (and therefore the plan) should be construction work environment, and activities HAZID and RA (other than those involving loss of pipeline integrity) should be assessed using *AS/NZS ISO 31000:2009 Risk management—Principles and guidelines*. Critical action items shall be closed out prior to construction commencing.

Recommendations arising primarily from *AS2885.1*, QRA and HAZOP (or other HAZID methodology) should be done as a pre-requisite and in a timely manner preferably before the issuance of the engineering design documents.

### **1.0 Formal Safety Assessment Process**

The project management team should specify the techniques and methodologies for hazard identification, assessment and risk control involved in the planning, design, construction, commissioning and operation of processes, plant and activities associated with delivery of the pipeline project to reduce the risk of exposure of project personnel, the public and threats to the pipeline.

- *AS 2885.1* safety management study primarily deals with loss of pipeline integrity involving hydrocarbon release and impacting on public.
- Construction work environment and activities HAZID and RA other than those involving loss of pipeline integrity should be assessed using *AS/NZS ISO 31000*.

Hazard/risk identification and risk assessment techniques may include one or a combination of the following:

- AS 2885 safety management study;
- hazard and operability study (HAZOP);
- control hazard and operability study (CHAZOP);
- Hazard Analysis (HAZAN);

- construction hazard assessment implication review (CHAIR)
- qualitative risk assessment (QRA);
- failure mode and effects analysis (FMEA);
- construction hazard identification study (HAZID); and
- job hazard analysis (JHA).

## 2.0 Safety in Design

Consideration of health and safety issues in the design stage of a construction project is essential for improved health and safety outcomes. A construction HAZID workshop will bring together all the key stakeholders involved in design to help identify and eliminate (or minimise) inherent risks in a structured and systematic way. Safety in design recognises that a design involves key considerations such as operability, aesthetics and economics with the elements of safety. It also acknowledges that a design process may be determined by many different stakeholders and/or influences. The process should:

- identify the hazards presented by potential design solutions and consider the risks these hazards will generate for construction workers and others who may be affected by the construction work (e.g. members of the public);
- include health and safety considerations amongst the design options so that they can avoid the hazards, reduce their impact or introduce control measures to protect those at risk where it is reasonably practicable; and
- forewarn the contractor of the residual hazards that have been identified within the design and will need to be managed during the construction work.

## 3.0 Project Risk Identification

Risk identification involves the systematic review of all construction, activities, processes, design, products, materials, plant, equipment, services, site location, worker health, and work environment to identify the inherent risks and the way in which they could occur. The risk identification process should also consider issues arising from emergencies, unplanned events, incidents and changes in process, organisational structure, design, environment and legislation etc.

The risk identification process relies on the involvement of knowledgeable and experienced persons. To maximise the benefit and quality of the hazard identification and risk assessment process the involvement of personnel with detailed knowledge of the work processes and practical experience are essential to ensure all potential hazards or issues are considered.

The methodology used in the risk identification process depends on the purpose and health and safety outcomes to be achieved. The method of identification can range from a detailed technical workshop to a job hazard analysis by the work-crew in the field. The outcomes should be to identify hazards and develop appropriate controls for the safety of personnel and community etc.

Issues to consider during the identification process include:

- scope and objectives;
- knowledgeable and experienced persons;
- available and required Information and records;
- assumptions made as part of the process;
- physical experience of the work environment;
- understanding of the task, process or design;
- plant and equipment used in the task or process, including any safety equipment;
- skill in facilitating the hazard identification technique;
- past project experience, lessons learnt knowledge, and previous Project Risk Registers;
- consultation with involved stakeholders;
- scope and location of the project and its impact on potential fatigue and working hours;
- incident, injury records from previous projects and the industry;
- interaction of work parties, stakeholders, processes, plant and environment;
- impacts of the project work environment on health and wellbeing; and
- hazards associated with major accident/incident events

The outcome and results of the risk identification process should result in the establishment of a formal record for each risk, collated in a project risk register.

#### **4.0 Risk Assessment**

Risk assessment is the process used to determine the level of risk associated with identified hazards, for the purpose of control. The priority for control increases as the established level of risk increases.

The issues and systems associated with the systematic identification of hazards equally apply to hazard and risk assessment process, i.e. involvement of knowledgeable and experienced persons.

Hazard and risk assessment extends the identification process to assessing the consequences and likelihood of the hazard occurring and adverse outcome.

It may be qualitative, semi-quantitative or quantitative, or a combination of these depending upon the hazard and risk information and data available. For pipeline construction, generally, a qualitative assessment should be used, depending on the circumstances.

Business and regulatory agencies may utilise different consequence and likelihood descriptions and different risk matrices. The project management team should use their company's standard risk matrix, or alternatively, agree on the risk acceptance criteria and risk levels for consistency across the project. The client may specify a risk process to be used. AS/NZS ISO 31000:2009 Risk management – principles and guidelines, and SA/SNZ HB 436:2013 (Guidelines to AS/NZS ISO 31000:2009), should be used for guidance.

Other issues for consideration include:

- linkages for different hazard and risk assessment studies;
- latest design and construction information;
- sensitivity analyses to determine adequacy of critical input assumptions;

- identified hazards and risk data is consistent with industry practice; and
- evaluation of past projects and lessons learnt reports. Fatigue risk management, including potential causation factors

## 5.0 Hazard and Risk Reduction and Control Measures

The project management team should develop control strategy for each of the identified hazards based on a hierarchy of control designed to match the level of risk with the purpose of reducing the risk to ALARP.

The hierarchy of control assigns the highest priority to elimination of risk, with the least effective control being to minimise the consequence of exposure.

### 5.1 Hierarchy of Control Measures

Where the management and control of a risk is described by a regulation, then that method must be followed. Where a code of practice applies, that method, or an equal, or better method must be followed. Otherwise, the hierarchy of control must be used in the following order:

1. Elimination
2. Substitution
3. Isolation
4. Engineering Controls
5. Administrative Controls and Safe Work Practices, and
6. Use of Personal Protective Equipment (PPE).

A set of control measures should be developed for each hazard and risk. The control measures may consist of a combination of a number of measures based on the hierarchy of control with the combined effect being to reduce the total risk level to an agreed risk acceptance criteria and performance standards based on ALARP.

The hazard identification and risk assessment process should list each control measure with assigned responsibility when the control measure should be implemented.

A risk control action plan should be prepared as part of the hazard identification and risk assessment process, where specific actions arising for individual hazards are assigned to responsible persons and for action within specified time frames.

Legislative obligations for individual hazards and their controls should be specified.

As far as practicable, project personnel should be consulted on the selection of hazard and risk control measures, i.e. during job hazard analysis discussions.

The Plan and subsequent procedures should reflect and link control strategies developed through the hazard identification and risk assessment process.

The project management team should implement a system to monitor the effectiveness of controls and implementation of the risk control action plan to continuously improve health and safety performance on the project.

Project health and safety inspections, testing, checks and audits should verify that agreed hazard and risk control strategies are being implemented, are effective and where improvements could be achieved.

Other issues for consideration include:

- documentation of risk management systems, controls and practices;
- systems for the maintenance of controls;
- hazard and risk control effectiveness;
- demonstration of hazard and risk control options considered; and
- documentation for the rejection of alternative hazard and risk controls.

## 5.2 Assessment of Results

*The objective of this section is to demonstrate in a verifiable manner that hazard and risk reduction and control measures have reduced exposure to ALARP.*

The project management team should be able to demonstrate that the hazard and risk reduction and control measures adopted for the project have been reduced to as low as reasonably practicable and that such demonstration can be verified in a workplace and community context.

The consolidated results of the formal safety assessment should demonstrate the strategy and logic of the hazard identification and risk reduction and control process by:

- describing the detailed project safety assessment strategy
- describing the logic for using chosen safety assessment techniques;
- demonstrating involvement of knowledgeable and experienced persons;
- demonstrating as far as practicable, that all hazards have been identified;
- describing a positive shift between untreated and treated risk levels;
- demonstrating agreed controls have reduced risk levels to ALARP;
- describe the assumptions in deriving the safety assessment results; and
- describing the method of validating the assessment results.

The results of the formal safety assessment process should clearly demonstrate that:

- the project risk profile has been reduced to as low as reasonably practicable (ALARP)
- actions arising out of the formal safety assessment process are tracked, implemented and closed out prior to the construction activity commencing and/or are checked to ensure they remain in place for the duration of the project; and
- risk reduction measures have been incorporated into the plan and procedures for the Project.

The project management team should therefore commit to the view that the objectives of the formal safety assessment have been met.

When carrying out the risk assessment process, it is useful to review Part E – Guidance Notes, to ensure all aspects are included.

*Ref: Work Health and Safety Regulations 34-38, 297.*

## **PART C Model Construction Health & Safety Management Plan**

The aim of this section is to provide sufficient detail to ensure understanding of the nature of the project. AS 2885.1 requires that a construction safety plan is prepared, reviewed by appropriate personnel, and approved. The principal contractor for a construction project must prepare a written WHS management plan for the workplace before work on the project commences.

There may be a requirement to include client-specific requirements in the plan.

*Ref: AS2885.1 Section 2.7.1 Construction Safety*

*Ref: Work Health and Safety Regulations 309-311*

### **1.0 Project/Facility Description**

This section should provide an overview and a clear understanding of the purpose of the asset and its activities, a description of pipeline/s and facilities and how and when they are to be constructed.

A location plan should be included, together with information about any activities in the area that may present a risk. The general description should include geographical location, environment description, site metrological conditions, geotechnical information, interaction with existing facilities, construction staffing philosophy and arrangements, accommodation, facilities, travel arrangements, etc.

### **2.0 Contractual Relationships and Responsibilities**

This section should outline the various parties associated with the project, and who carries what responsibilities for health and safety management.

### **3.0 Specific Health and Safety Issues**

Detail any project-specific issues that are addressed by the plan. The contents of this section will identify this project's specific hazards, construction safety issues, and broadly how they are addressed. These may include:

- construction facilities (temporary and permanent), plant and equipment that include breakdown and description of primary functions, and safety features and systems;
- location-specific issues;
- project duration;
- time of construction;
- work cycles;
- work scope in relation to impacts on health and fatigue;
- design-specific issues.

### **4.0 Applicable Legislation and Codes**

The project management team should ensure that a legislative analysis is completed and utilized in the preparation of the construction safety plan and associated documents. (Refer to PART A6.3).

A project compliance register should be established, used in the development of procedures and plans, and monitored for compliance and changes throughout the Project.

#### 4.1 Principal Contractors' Obligations

Under legislation, the health and safety management plan prepared by the principal contractor must include:

- the names, positions and health and safety responsibilities of all persons at the workplace whose positions or roles involve specific health and safety responsibilities in connection with the construction project;
- the arrangements in place between any persons conducting a business or undertaking at the workplace for consultation, cooperation and coordination of activities in relation to compliance with their duties under the WHS Act and Regulations;
- the arrangements in place for managing any work health and safety incidents that occur;
- any site-specific health and safety rules and the arrangements for ensuring that all persons at the workplace are informed of these rules; and
- the arrangements to collect and assess, monitor and review the SWMS(s).

### 5.0 Leadership and Commitment

#### 5.1 Policy and Statement of Commitment

*The objective of this section is to demonstrate a high level of commitment to effective health and safety management, consistent with and at least equal to the other business aims of each of the organizations of the project management team.*

The project management team is committed to ensuring a healthy and safe work environment for all personnel associated with the project.

The project management team should develop and signed a project specific health and safety policy or statement of commitment, consistent with the health and safety policies of the parent organisations.

Key objectives of the project health and safety policy and/or statement of commitment include:

- management commitment to providing a safe and healthy workplace;
- assessment and reduction of risk to as low as reasonably practicable;
- complying with all applicable laws and regulations;
- involving personnel in health and safety strategy development;
- establishment of measurable objectives and targets;
- integrating health and safety into all aspects of project delivery;
- providing trained and competent personnel;
- implementing appropriate health and safety protection technologies; and
- improving Project health and safety performance.

The project health and safety policy will be communicated to all employees and interested parties through training, induction and consultation.

The project management team will implement processes to raise awareness and promote a health and safety culture of active involvement in achieving the objectives of the health and safety policy.

Other issues for consideration include:

- the health and safety policy of each of the parent organisations should be included as an appendix.
- in addition to employees interested parties could include, regulatory authorities, emergency services, support personnel, contractors, caterers, landowners, etc. and include visitors and the local community.
- the health and safety policy should be consistent and may be integrated with other project or business policies and procedures including environment, employment, training, health, rehabilitation or quality policies or procedures.

## 5.2 Organisation and Responsibility

The organisational structure and arrangements described through an organisation chart should describe the broad health and safety responsibilities and reporting lines for each of the lead organisations involved in the project.

A summary of the key health and safety responsibilities, accountabilities and authority levels for the management of safety activities should be detailed in a responsibility and accountability matrix.

All personnel will be notified of their health and safety roles, responsibilities and accountabilities through communication of the plan, inductions and training (if required).

Personnel with defined health and safety responsibilities and accountabilities should acknowledge their understanding and acceptance of their roles and responsibilities through position specifications for key roles and verified by signature and induction records.

Throughout the project, the project management team should regularly review the responsibilities and accountabilities for each role and organisational changes.

Key roles for which responsibilities and accountabilities for health and safety may include:

- proponent or license holder;
- project manager (for principal contractor);
- pipeline operations manager;
- project health and safety manager and other health and safety personnel;
- contractors' project managers;
- construction managers;
- work crew supervisors/foreman (including subcontractors); and
- all personnel



The project management team needs to ensure that sufficient personnel with appropriate skills are appointed commensurate with the level of risk associated with construction activities and work and shift patterns during normal and emergency situations.

Responsibilities and accountabilities should be managed by:

- clearly defining the interface between key players;
- defining and documenting reporting lines for incidents, regulatory and community notifications;
- defining responsibilities and accountability of others i.e. subcontractors, self-employed persons, service providers and visitors etc.;
- developing and using a responsibility matrix; and
- involving commissioning and operations responsibilities where necessary.

Persons Conducting a Business or Undertaking (PCBU) and persons with management or control of a workplace have many duties under legislation and regulations. Generally they must:

- identify reasonably foreseeable hazards that could give rise to risks to health and safety;
- eliminate risks to health and safety so far as is reasonably practicable; and
- if it is not reasonably practicable to eliminate risks to health and safety – minimise those risks so far as is reasonably practicable.

*Ref: Work Health and Safety Act S20-26 – Persons Conducting Businesses or Undertakings*  
*Ref: Work Health and Safety Act S27-28 – Officers, Workers, Other Persons at the Workplace*  
*Ref: Work Health and Safety Regulations*

## 5.3 Safety Leadership and Behaviour Based Safety

### 5.3.1 Safety Leadership

The Project may consider the benefits of safety leadership programmes that provide leadership skills and information for supervisors and managers to enable them to proactively manage safety. These programmes build skills to increase leaders' communication and capability to influence across all levels of an organisation, as well as giving them greater understanding of the entire safety process.

### 5.3.2 Behaviour Based Safety (BBS)

The Project may consider the benefits of behavioural based safety (BBS) programmes - an approach that focuses on workers' behaviours, and encourages all personnel to take an active, thinking role in their safety. BBS programmes go hand in hand with corporate culture. Safety observations are conducted widely, and address both positive and negative observations, before they become hazards and incidents.

Clients will sometimes mandate observation programs be implemented on their projects.

## 5.4 Employee Involvement and Communication

Formal consultative mechanisms should be established such as involving employees and elected employee representatives in hazard identification workshops, job hazard analysis preparation and health and safety management system reviews.

A process for election of health and safety representatives and establishment of a health and safety committee should be clearly evident and documented, even if the workers do not request one or more be elected. Health and safety representatives should be appropriately trained and competent to perform their duties.

Development of a positive health and safety culture on the project is achieved through active participation of involved parties. Methods to promote participation in achieving the project health and safety objectives include regular health and safety toolbox and job start meetings, involvement in hazard identification workshops and job hazard analysis preparation, induction and ongoing training, incident investigations and procedure reviews.

Acceptable methods and accessible packages for communicating health and safety information include health and safety alerts, posters and notice boards, minutes of meetings, performance reports, health and safety plans, procedures, legislation and technical operating manuals, and safety data sheets.

Communication between the licence holder, and or client, and the project management team is a critical element in managing health and safety. Regular scheduled meetings, and where necessary, unscheduled meetings should be held to communicate health and safety issues to all levels of the workforce throughout the project.

Other issues for consideration include:

- progress meetings with key players should have health and safety as a standing agenda item.
- formal communication is essential for proposed changes in organisational structure, reporting lines and work activities etc.
- mechanisms should be established for consultation and resolution of health and safety issues.
- where possible, ensure a wide range of personnel and stakeholder participation and consultation in the development and implementation of the plan.

## 5.5 Resources

The project management team, through the project planning process, should define and allocate sufficient resources in terms of finance, human resources, and specialist advisers to implement the project plan.

The project budget should specifically provide for the management of health and safety on the project and to fund implementation of the plan.

The project management team needs to ensure management personnel are assigned sufficient authority to commit additional resources if required, to ensure health and safety objectives are achieved.

The project management team should appoint suitably qualified and experienced health and safety personnel to facilitate the implementation of the plan.

*Ref: AS 2885.1:2012, paragraph 2.7.1*

The project planning process should include an assessment of the need for direct and indirect health and safety resources i.e. first aid training and first aid trained personnel (e.g. paramedics and Occupational nurses), field inspectors or specialist risk and safety management consultants assist with risk assessment, auditing activities and rehabilitation providers.

Other issues for consideration of resourcing include:

- funding of emergency exercises;
- printing, publication of health and safety documentation;
- funding of specialised training;
- funding of health and safety studies;
- numbers of personnel required for construction, including the amount of night work that may be required, and the work hours generally;
- administrative support;
- health and safety incentive programs; and
- other resources such as suitable vehicles for safety personnel to visit work crews and the various sites; first aid rooms; ambulances; emergency response equipment including emergency communications equipment for remote sites; provision of accommodation to minimise fatigue risk, specialist software packages (e.g.. for controlling hazardous substances or producing ID cards); provision of ancillary equipment such as laptops, printers, laminators, projectors; etc.

## 6.0 Planning

### 6.1 Hazard Identification and Risk Assessment

The Project's over-riding duty is to eliminate risks to health and safety, so far as is reasonably practicable and, if it is not reasonably practicable to eliminate risks to health and safety, to minimise those risks so far as is reasonably practicable<sup>3</sup>.

Systematic processes are used to identify hazards, to assess the likelihood and consequences of risk and to agree on the implementation of controls to ensure risks associated with construction activities are reduced to as low as reasonably practicable (ALARP).

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<sup>3</sup> From Section 17, Work Health and Safety Act

The studies should be carried out early and a project risk register developed before construction commences. (Refer to part B of this Guideline). The risk register will identify the need for the preparation of safe work method statements, JHAs, manual task assessments, hazardous chemical risk assessments, specific plans, procedures, training to be conducted, personnel experience and qualifications, specialist equipment required, etc.

The construction hazard identification and risk assessment process needs to consider:

- documented standards and procedures for systematic identification, assessment, control and review of risk;
- agreed and documented risk acceptance criteria;
- competent and experienced personnel involved in hazard identification and risk assessment and control process;
- construction methodology;
- design specifications for construction;
- safety in design;
- health and wellbeing considerations; and
- consideration of continual review and analysis of the effectiveness of risk assessment and control processes.

## 6.2 Hazard & Risk Communication

Hazard and risk communication is derived from the primary document, the formal safety assessment. This identifies the need for, extent of, and link to, on-site risk tools. The primary strategy for hazard and risk communication on site is generally through the job hazard analysis (JHA) process (also referred to as job safety analysis, job risk analysis, job safety and environment analysis, or safe work method statement). The process requires that supervisors actively involve all members of the work crew and other stakeholders in the development of the JHA through identification and control of hazards and risk on site. The JHA process should link into the formal hazard and risk identification process and project hazard register.

Hazards, risks and their controls should form a significant part of the project training and induction program.

There must be means of:

- records of communication on hazards and risk; and
- effective communication of hazards and risk associated with day-to-day work changes.

## 6.3 Objectives, Plans & Performance Standards

The project management team should agree on and define verifiable health and safety objectives, plans and standards for the project that reflect responsibilities, legislative requirements and project health and safety policy commitments. Typical objectives may include:

- prevention of incidents;
- control of hazards;

- 
- stakeholder consultation;
  - compliance with applicable legislative requirements;
  - compliance with approved industry standards and codes; and
  - a platform for continuous improvement.

The Plan should incorporate agreed and measurable health and safety performance objectives including both leading and lagging health and safety performance indicators.

Project health and safety objectives should be communicated to all personnel during induction and toolbox meetings to ensure an understanding of and participation in achieving the project health and safety objectives.

Typical performance standards include:

Lagging Indicators	Leading Indicators
<ul style="list-style-type: none"> <li>• Lost Time Injuries and Frequency Rate</li> <li>• Restricted Work Injuries</li> <li>• Medical Treatment Injuries</li> <li>• First aid Treatments</li> <li>• Recordable Injuries</li> <li>• Near Misses</li> <li>• Vehicle Incidents</li> <li>• Government Notices, etc.</li> </ul>	<ul style="list-style-type: none"> <li>• Job Observations</li> <li>• Hazard Reports</li> <li>• Corrective Actions</li> <li>• Pre-start Meetings</li> <li>• Toolbox Meetings</li> <li>• Inductions</li> <li>• Inspections</li> <li>• Climate Surveys</li> <li>• Audit Compliance, etc.</li> </ul>

The Plan should also incorporate:

- accountability of managers and supervisors for meeting performance standards,
- performance indicator monitoring, reporting and review; and
- communication of the Plan's objectives through contractual arrangements and planning meetings.

It is also preferable that the project management team nominates measurable targets so that progress against these targets can be assessed. Clients may also specify and require targets.

#### 6.4 Sources of Information (Legislative and other Standards)

The project safety management system must provide for the analysis of legislative and standards requirements for the project and facilitate a clear understanding by all involved personnel.

The legislative and standards requirements for the project should form an integral part of the supervisor development and employee induction program. These requirements should be reinforced during pre-start, toolbox and health and safety improvement team/committee meetings.

Legislation and codes of practice will be readily available to personnel on the project site, either in hard copy or available electronically.

#### 6.5 Management System Documentation

Project health and safety documentation including revisions to the Safety Management System and Construction Safety Plan should be maintained in hard and electronic format on site. A revision to the key project health and safety documentation i.e. plans, procedures, hazard identification and risk assessment records (i.e. JHAs) should be controlled through a formal document control process.

Documentation requirements such as safe operating procedures, work method statements, forms and records etc. should be consistent with any parent company documentation and as identified in any formal safety assessment.

The system for management system documents should include access to, and distribution of, current copies of documents, removal of superseded documents and effective communication of changes.

## 6.6 Purchasing, Plant Hire, Contractors and Importers

The project management team should consider development of systems for ensuring that products and services for the construction project have been assessed for health and safety impacts to ensure that once construction commences, all information is available and known. Examples may be the purchase of PPE (requirements, fit function and training), construction equipment/ plant hire (i.e. plant risk assessments and competency), chemicals (safety data sheets storage, usage, segregation and possibly neutralisation requirements), etc. The project management team should ensure that contractors and suppliers are provided with the Project's health and safety requirements.

Some issues to consider with importation include quarantine requirements, chemical hazards (from processing and contained in the product) and if Australian Standards are being met. The products of the imported goods should at least meet minimum Project expectations and Australian legal requirements.

The selection of suitable subcontractors is particularly important where they are specialists in hazardous operations, e.g. non-destructive testing (for instance using x-ray techniques) and hydro-testing.

## 7.0 Implementation

### 7.1 Design, Construction and Commissioning

A design basis manual should be prepared to ensure specified design requirements and safety performance standards are achieved. The design process should follow a systematic approach to planning, controlling, and verifying the design by appropriately qualified and experienced personnel in the industry.

Traceable records of design should validate conformance with regulatory requirements, industry standards and sound engineering practice.

Key techniques to eliminate or reduce design, construction and commissioning risks include:

- pipeline and facilities AS 2885 Risk Assessment workshops;
- pipeline and facilities hazard and operability studies;
- conceptual and construction hazard identification workshops;
- commissioning hazard identification and planning workshop; and
- other specialist hazard identification and risk control processes i.e. control hazard and operability and safety integrity level studies as appropriate.

Responsibilities for pre-commissioning should be well defined early. The pipeline constructor, in consultation with the nominated pipeline operator and/or the Licence holder usually performs pre-commissioning.

A specific commissioning program for the pipeline or facility should be prepared by the nominated pipeline operator and commissioning manager to ensure the safety of personnel, public and pipeline during all commissioning activities and the introduction of gas.

Hand-over and approval for the introduction of gas during commissioning should be with the approval of the owner and regulatory authorities following completion of construction activities. In some States, the regulatory authority must issue a 'consent to operate' prior to commissioning.

Other issues for consideration include:

- obtaining approvals and permits as per Regulatory requirements;
- responsibility for design and competency of design personnel;
- exchange of information across technical interfaces;
- ensuring risk reduction measures are incorporated at the design phase;
- design changes are reviewed as part of the overall risk management process;
- human factor and ergonomic considerations are considered at design phase; and
- maintainability and access during operations.

## 7.2 Management of Change

Changes to design, procedures, personnel, equipment, or construction methods may have the potential to adversely affect health and safety on the project. Changes should be managed through an approved Change Management Procedure where the potential impact and the significance of the change can be assessed. Significant changes should be risk-assessed, documented, approved and signed-off by the relevant manager, or in some cases, the Client or Licence Holder.

Guidance needs to be provided to field personnel with specific regard to the level of change management approval required for "in process" changes of personnel, equipment or methods.

Key personnel on the project should carry out a formal hand-over of responsibilities resulting from organisational changes, changes in reporting relationships and scheduled work absences.

Prior to implementation of changes to work processes, plant or equipment the proposed change should be communicated to relevant personnel during toolbox or Health and Safety committee meetings.

All variations and revisions to controlled documents should be in accordance with project document control procedures.



Other issues for consideration include:

- cumulative impact of minor changes;
- change is not limited to technical change;
- impacts of changes in staffing levels; and
- changes to Project scope, cost or construction timeframe.

### 7.3 Purchasing & Control of Materials & Services

Major specialist contractors engaged on the project should be required to submit a project specific health and safety plan for the scope of their work (e.g. Radiation Safety Plan). Alternatively the contractor should sign a formal statement of commitment for implementation of the Project's Construction Health and Safety Management Plan.

Contractors and service providers should be managed to agreed management procedures that include:

- selection of contractors based on experience, safety record and management systems;
- selection of processes based on safety (and quality and environmental) outcomes;
- communication of the Project Safety Management System through contractual arrangements, planning meetings and induction etc.;
- verification of contractor competencies particularly where Regulatory requirements exist (e.g. a certified Radiation Safety Officer);
- direct and ongoing monitoring of health and safety performance through inspection and audits; and
- selection of plant and equipment to ensure health and safety considerations have been taken into account.

Processes should be established to ensure that materials are delivered and installed in a manner fit for purpose. These processes should include arrangements for monitoring of goods and services to ensure technical, quality, safety and environmental specifications are complied with.

Arrangements should be made for materials hand-over, traceability and reconciliation during load out. These arrangements should provide for quarantining of out of specification materials and plant.

All materials will be appropriately packaged, labelled and documented. Safety Data Sheets and Transport Safety Data Sheets should be retained with hazardous materials.

The movement of larger or hazardous materials should be set out within a Transport Management Plan developed in consultation with, and where required approved by, relevant transport and local government authorities.

Vehicles and construction equipment including hired in plant and equipment should have been selected with health and safety considerations, and be delivered fit for purpose. Key provisions to ensure safety of plant include:

- supply of operating instructions and manuals;
- documented assessment of plant safety prior to releasing for use; and

- recording daily inspection/maintenance reports.

A Plant and Equipment Register should be established to retain service and maintenance schedules and records of condition.

Other issues for consideration include:

- involvement of contractors in hazard identification and risk assessment processes
- arrangements for communicating safety related issues to contractors;
- emergency response arrangements for plant and materials in transport;
- consultation with personnel prior to purchase of materials and equipment with health and safety implications; and
- camp providers and camp standards.

#### 7.4 High Risk Work and Safe Work Method Statements

SWMS are required for the 18 high risk construction work activities defined in the WHS Regulations, some relevant ones being included:

- risk of a person falling more than 2 metres (in some jurisdictions this is 3 metres)
- work on a telecommunication tower
- likely to involve disturbing asbestos
- work in or near a confined space
- work in or near a shaft or trench deeper than 1.5 m or a tunnel
- use of explosives
- work on or near pressurised gas mains or piping
- work on or near energised electrical installations or services
- work in an area that may have a contaminated or flammable atmosphere
- work on, in or adjacent to a road, railway, shipping lane or other traffic corridor in use by traffic other than pedestrians
- work in an area with movement of powered mobile plant
- work in or near water or other liquid that involves a risk of drowning

A principal contractor must also obtain the SWMS before high-risk construction work on a construction project starts, and review them as required.

*Ref: Work Health and Safety Regulation 291, 299-303*

#### 7.5 Safe Operating Procedures

Safe Operating Procedures provide the detail necessary to manage specific hazards and risks and to document processes for the management of controls used to ensure that a safe system of work for key work activities and tasks.

The Project Management Team should establish a clear, comprehensive and continually improving set of Safe Operating Procedures to cover all phases of the project.

A typical list of Safe Operating Procedures used on pipeline projects has been included in Appendix 4 – Suggested Documentation List.

Safe Operating Procedures should be developed as a result of the project risk assessment studies and link with the Job Hazard Analysis process for communication of control measures to site personnel.

Safe Operating Procedures should be managed through the project document control process.

Other issues for consideration include:

- Arrangements for feedback on the effectiveness or improvement of procedures;
- Processes for development of Safe Work Method Statements for non-routine work activities and High Risk Work; and
- JHAs to manage site-specific issues and change to work.

## 7.6 Manual Tasks

Risks to health and safety relating to a musculoskeletal disorder associated with hazardous manual tasks must be managed.

Assessment of manual tasks provides an important hazard and control measure as part of the Job Hazard Analysis process. Manual task risk assessments should be incorporated in induction training and toolbox talks as a means of communicating control measures. Monitoring the effectiveness of manual handling controls should form part of the routine safety inspection or observation program.

- Repetitive or sustained force;
- High or sudden force;
- Repetitive movement;
- Sustained and/or awkward posture; and
- Exposure to vibration.

Workers should be consulted on identifying, assessing and implementing controls for manual tasks. Wherever possible, the hierarchy of controls should be used when deciding controls.

*Ref: Work Health Safety Regulation 60*

## 7.7 Materials Handling and Storage

### 7.7.1 Pipe, Plant and other Heavy Transport

Projects will need to consider their Chain of Responsibility obligations for all heavy transport within their Health and Safety Plan, or develop a Transport Management Plan. The project should have procedures and monitoring processes to deal with loading, hours of work, fatigue, the transportation of dangerous goods and heavy vehicle speeding. There are obligations for all of the following project roles:

- Drivers – those who physically drive a heavy vehicle
- Consignors – those who commission the carriage of a load by road
- Packers – those who place goods in packages, containers or on pallets transported by road
- Loaders – those who place or restrain the load on a heavy vehicle

- Operators and schedulers – those who operate the business that controls the use of a heavy vehicle
- Receivers – those who pay for the goods or take possession of the load
- Employers or managers of a business may also be personally liable for breaches by an employee

### **7.7.2 Pipe handling and other Lifting**

Lifting or winching of major plant items and materials should be the subject of and be performed in accordance with, a specific lifting methods statement incorporating a critical lift assessment prepared prior to commencement of the lift. Lifting equipment should be inspected by a competent person with certification and marking requirements recorded in a lifting equipment register prior to use on site.

Plant, equipment and materials should be secured to prevent unauthorised access or damage including deterioration e.g. as a result of excessive heat/cold/moisture/dust.

### **7.7.3 Hazardous Chemicals Transport and Handling**

The Project Management Team should identify chemicals to be used for the project, and then establish and maintain a register of hazardous materials on site. Safety Data Sheets shall be obtained, reviewed and assessed to ensure all controls such as storage, transport, use, PPE, health monitoring etc., are implemented. Hazards associated with the use of hazardous substances should be assessed and incorporated into the task Job Hazard Analysis.

Hazardous materials should be stored with appropriate signage, in designated areas consistent with the legislation and segregation requirements i.e. explosives stored in a separate and secure location away from and personnel. Refuelling tanks and tankers should be located within a bounded area remote from accommodation facilities. Other issues for consideration include:

- Shipping of plant and materials by road, rail, sea, and air;
- Helicopter operations;
- Disposal of hazardous materials;
- Signposting of hazardous materials storage areas and containers; and
- Storage and transportation of foodstuffs and drinking water associated with camps.

## **7.8 Maintenance and Repair**

A program for routine inspection and maintenance of plant and equipment should be developed and implemented on the project site. Critical plant and equipment for inclusion in the inspection and maintenance schedule includes:

- Power Generators;
- Cranes, Sidebooms and Lift Trucks;
- Slings and lifting equipment;
- Excavators;
- Site Trucks;
- Transport and refuelling Vehicles;
- Power Leads, Portable Electrical Tools and RCDs;
- Ladders and Scaffolding;

- Safety Harnesses;
- Gas monitoring Equipment; and
- Abrasive Blasting Equipment.

Inspection and maintenance schedules and frequencies should reflect manufacturers' and legislative requirements as well as good construction work practice.

Plant and equipment requiring registration through regulatory authorities or agents of regulatory authorities should be specified in a Plant and Equipment Register. Formal inspections by certified personnel should also be documented. Records of plant and equipment inspections, maintenance, repair or modification should be retained in the Plant and Equipment Register. Where trucks are de-rated load capacity these should be clearly identified especially where similar non de-rated vehicles are in use.

Project-authorized drivers or operators should inspect project vehicles and plant regularly, and the results of the inspection recorded in a logbook or check sheets.

Plant and equipment found to be defective or dangerous should be taken out of service and tagged as "Out of Service" until such time as a qualified technician has made suitable repairs.

Other issues for consideration include:

- Hazards and risks associated with maintenance activities and tasks;
- Procedure for reporting defective or dangerous plant; and
- Management of working hours, sole workers and location of maintenance work.

## 7.9 Employee Selection, Competency and Training

The Project Management Team should assess and plan the human resource requirements of the project to ensure personnel are suitably fit, competent and personal with the necessary safety behaviours for the tasks assigned to contribute to a positive safety culture on site.

### 7.9.1 Needs Assessment and Employee Selection

The Project shall identify the skills and labour needs for the Project, and establish a competency and skills register, and position specifications should be prepared.

All persons doing Construction Work will need to hold a Construction Induction card prior to commencing work. Qualifications should be verified, and the project may consider requirements for pre-employment medicals.

### 7.9.2 Induction

All personnel on the project site shall receive a project specific induction before commencing work and accessing the project site.

Induction training must address site and project specific health and safety issues identified in the hazard identification, risk assessment and control process, their responsibilities for health and safety, the project safety management Plan and specific emergency arrangements.

Induction participants should complete an assessment to determine their level of knowledge and understanding of the project induction training material.

All supervisors should attend a leader specific induction and/or be assessed for competency in key health and safety knowledge prior to commencing work on site. Some key health and safety leadership skills include:

- Regulatory obligations;
- Health and Safety responsibilities and Leadership;
- Regulatory requirements for Communication and Consultation;
- Safety Management System Commitments;
- Project Hazard Identification;
- Accident / Incident reporting;
- Emergency response leadership;
- Development of, and requirements for WMSs/JHAs;
- Conducting toolbox meetings and effective communication;
- Management of work hours, fatigue and employee well-being.

The Project should have a process for induction of visitors, service providers and casual employees.

A specific induction should be developed and conducted prior to the commencement of Commissioning and Hand-over Activities. The focus of the Commissioning component of the induction process should communicate health and safety information contained in the Commissioning Manual including isolation and tagging systems, introduction of product on site, gas monitoring (if relevant) and emergency arrangements

### **7.9.3 Training**

Project health and safety training requirements form an integral part of the overall project human resource strategy and training needs analysis. The competency criteria and safety attributes necessary for each position should be described in a Competency and Skills Matrix. Where a position specification identifies statutory competencies (i.e. certification) evidence of such competencies should be required prior to selection and a copy of the certificate retained on site.

Training programs should be delivered by nominated workplace trainers and be reviewed and reassessed periodically to ensure the adequacy and effectiveness in delivery of required skills, knowledge and competencies.

Specialised training may be required to address safety critical tasks and specific training needs relative to the project i.e. vehicle operation/driving, permit to work, manual handling, first aid, heat stress, etc. These training courses should be developed to complement the project safety management plan and controls identified in the hazard identification and risk assessment process

A VOC assessment (to determine whether a person can safely operate a piece of equipment for which they hold the certificate or competency or other relevant formal qualification)

should be used to verify qualifications if required or their competency cannot be verified by other means (e.g. they have previously worked for the company and skills are known)

#### **7.9.4 Qualifications**

The Project should identify all health and safety related qualifications required for the project, including those of subcontractors. This may include High Risk Licences, Electrical Licences, Explosives Licences, etc.

#### **7.9.5 Records**

A record of all training and qualifications should be retained on site in a Project Training and Induction Register. Training course materials, attendance and assessments records should be reviewed both as part of the project human resource strategy, monitoring and audit program.

High Risk Work Licences expire after 5 years.

NOTE: The APGA Construction Skills Passport allows technicians operators and trades people working in our industry to maintain a record of their experience, providing a guide to new employers on skills available and also highlighting the skills that are attained and retained in the construction industry. Projects should encourage and support its use, by adding qualifications and records of skills attained to the employees' and contractors' Passports.

*Ref: Work Health and Safety Regulations 39, 316-327*

### **7.10 Communication and Consultation**

Throughout the project, there should be active health and safety communication with all workers, subcontractors, supervisors and managers. This can be achieved by toolbox meetings, prestart meetings, 'start of cycle' prestart meetings, climate surveys, health and Safety committee meetings, management meetings that include consultation with health and safety representatives, and senior management site visits and group meetings.

### **7.11 Workplace Environment**

The Project Management Team should develop health and safety processes to ensure and to promote a safe and healthy working environment. Management of workplace environment issues should be developed through the Project Construction Risk Identification Assessment process. Issues to consider include Environmental Conditions, Accommodation, Workplace Amenities, Mental Health and Fatigue.

#### **7.11.1 Environmental Conditions**

The Project should assess and implement controls for environmental conditions to ensure personnel health and safety such as:

- Protection Against Atmospheric Contamination;
- Control of Dust;
- Housekeeping;
- Lighting and Ventilation;

- Noise Assessment and Management;
- Signposting and Hazard Identification;
- Personal Protective Equipment;
- Temperature/Heat Stress Management;
- Hygiene;
- Radiation Protection;
- Chemical handling and Chemical spill management;
- Measuring and identifying exposure limits to atmospheric contaminants;
- Assessing, measuring, signposting and protection against noise exposure; and
- Review of specialist subcontractor safety plans (e.g. NDT radiation safety plans)

### 7.11.2 Accommodation and Workplace Amenities

The health and safety aspects of accommodation and workplace amenities must be assessed to ensure there are no risks to health and safety. The requirements for the Project will vary depending on the size and location of the workplace (including whether it is in a remote area), the number of employees and the numbers of men and women, the type of work done at the workplace, whether travel is involved and how much the distance to the nearest amenities

Issues to evaluate, manage and maintain include:

- Access to potable water and waste water management;
- Washing facilities;
- Camp and accommodation arrangements;
- Recreational facilities
- General health and hygiene issues

### 7.11.3 Mental Health

A mentally healthy workplace promotes a positive workplace culture, minimises workplace risks related to mental health, supports people with mental health conditions appropriately and prevents discrimination. The actions that promote good mental health in the workplace are the same as those that contribute to a productive and positive working environment. Pipeline projects generally are in remote areas, fly-in/fly-out or drive-in/drive out for work cycles in excess of 21 days.

Projects should promote good mental health in the workplace by:

- Increased awareness;
- Supporting individuals;
- Monitoring work hours and schedules;
- Ensuring there is some capacity for recreational/non-work activity;
- Increasing job control;
- Rewarding achievable deadlines and targets;
- Avoiding excessive workloads;
- Social programs; and
- Access to employee Assistance schemes;



#### 7.11.4 Fatigue

As above, pipeline projects generally are in remote areas, fly-in/fly-out or drive-in/drive out for work cycles in excess of 21 days, which can be a factor in the development of fatigue. In the project planning phase, the project team should consider the potential issues contributing to fatigue and put measures in place to minimise the risk of fatigue. Relevant factors include:

- working hours and sleep debt;
- work cycles;
- commuting distances
- influence of smoking, nutrition, sleep, overweight and obesity;
- issues impacting sleep quality; and
- poor health

Workers and supervisors should be provided with information on causes of fatigue, and minimising the factors that lead to fatigue at the induction and at other times during the project.

The Project should actively monitor the measures it implements for fatigue management to ensure the issues are being addressed for the duration of the project, and especially as the project extends to its middle and later phases.

*Ref: Work Health and Safety Regulations 39-40, 44-47, 49-52  
Ref: APGA Fatigue Risk Management Guidelines*

#### 7.12 Plant

The following issues will need to be considered and managed:

- inspection of plant;
- review safety information and safety alerts etc.;
- conduct plant risk assessments if required;
- ensure noise assessment has been undertaken;
- ensure all regulatory requirements for specific plant are implemented;
- provide specific training, and/or ensure all personnel operating the plant are qualified and competent;
- have procedures or processes for maintaining, repairing, cleaning and storing plant; and
- ensure all emergency devices, isolations and guarding are operational.

*Ref: Work Health and Safety Regulation 203 and WorkSafe Australia Managing Risks of Plant in the Workplace Code of Practice September 2013*

#### 7.13 First Aid and Emergency Response

##### 7.13.1 First Aid Facilities and Services

First aid facilities should be appropriate to the type and location of the work being performed and be consistent with local regulatory requirements and the Project Emergency Response Plan. A risk assessment of possible emergencies with respect to the location/s should be

conducted to ensure first aid equipment and resources are appropriate to manage all potential injury events on the site and travelling to and from site.

An approved and appropriate first aid kit should be available with each work-crew, motor vehicle, office, and accommodation facility. First aid equipment checks should form part of the regular site safety inspection program.

Each work-crew should generally have at least one first aider holding a current recognised first aid qualification.

A list of trained first aiders is to be displayed on site notice boards or notified to work crews. First aiders should be readily identified (e.g. with a "First Aider" sticker or badge).

A first aid treatment register should be kept for the project.

*Ref: Work Health and Safety Regulation 42*

### **7.13.2 Emergency Management**

Refer to Part D of this Guideline.

*Ref: Work Health and Safety Regulation 43*

## **8.0 Monitoring & Evaluation**

### **8.1 Inspection, Testing & Monitoring**

The Project Management Team should ensure that processes are implemented for the inspection, testing and monitoring of site construction activities, plant and equipment. Typical processes include:

- procedures for ensuring plant is checked prior to use;
- planned regime of health and safety inspections;
- work activity observations;
- pre-operation inspections of vehicles and plant;
- inspection and testing of electrical equipment;
- inspections of cranes and lifting equipment;
- inspections of pressure vessels and pressure testing equipment;
- inspections of emergency, first-aid, fire and spill control equipment; and
- camp and amenities inspections.

Planned inspections and/or observations should be performed by competent and experienced persons and include elected Health and Safety Representatives or the Health and Safety Officer if there are no representatives. Inspections should follow an agreed format (i.e. checklist), timeframes, and be documented.

Supervisors should be trained to monitor work practices for health and safety issues and potential hazards as part of the daily Supervisor reporting process.

Identified unsafe or untagged plant and equipment should be tagged "Out of Service" until the plant or equipment is repaired or retagged by a competent and authorised person.

Recommendations for the elimination of hazards or unsafe practices or improvements in Health and Safety practices including assigned responsible persons should be recorded in a Corrective Action and System Improvement Request. A Corrective Action Register should be used to track and close-out actions and improvements.

Other issues for consideration include:

- inspection forms and registers i.e. lifting, electrical equipment etc.;
- inspection and testing frequencies and schedules;
- systems for verifying corrective actions have been completed and are effective;
- legislative requirements for inspections and frequency; and
- job Observation Program.

## 8.2 Health Monitoring Systems

The project should promote a healthy work environment and personnel should be fit to perform their normal duties safely. Health monitoring includes processes to ensure that personnel are fit for work with respect to their mental and physical capabilities. Policies and procedures should be in place to identify and manage employees' fitness for work.

Typical health monitoring and fitness for work processes include:

- pre-employment fitness and health assessments;
- injury and rehabilitation management on and off the work site;
- employee assistance programs;
- drug and alcohol policy; and
- camp and amenity hygiene.

Mandatory health monitoring is required for noise exposure, hazardous chemical exposure, lead and asbestos. If any of these issues are present in the Project the health monitoring shall be documented. Records must be kept for periods as stated in legislation.

## 8.3 Workers Compensation, Rehabilitation and Return to Work Program

All employees including subcontractors and self-employed persons must be covered under suitable worker's compensation policy arrangements. Evidence (policy or extract) of workers compensation policies should be retained on the project site.

A workplace rehabilitation policy and procedure should be developed for the project. The policy should nominate a rehabilitation coordinator and be communicated during induction training and displayed on notice boards.

Other issues for consideration include:

- communication of rehabilitation requirements to all employees;

- exposure to specific hazards may require specialist health monitoring i.e. shot blasting, non-destructive testing etc.;
- consultation with medical professionals on supervised return to work programs; and
- establishing relationships with medical personnel to ensure understanding of the return to work programs.

#### 8.4 Incident Reporting and Investigation

All accidents, incidents and near miss incidents no matter how minor, should always be reported and investigated in order to identify, and eliminate or control the causes and prevent recurrences.

A project specific procedure should be developed for the reporting, investigation and implementation of corrective actions arising from accidents and incidents. The client should be consulted to ensure that reporting systems used are understood. The client may prescribe reporting and investigation systems to be used.

The following should form an integral part of the accident/incident reporting and investigation process:

- making the accident/incident scene safe;
- protecting others (including members of the public) from injury;
- treatment, medical assistance and evacuation of injured personnel;
- assignment of responsibility for the accident/incident site;
- assessment of the seriousness of the accident/incident event;
- notification of organisational management personnel, employee representatives and authorities;
- assignment of responsibility for reporting and investigation, including minimum timeframes;
- identification of witnesses and protecting evidence at the scene;
- consultation, and responsibility for communicating, with relevant authorities, site and operations personnel;
- conducting investigation to identify root causes and recommendations to prevent recurrence; and
- timely implementation of recommendations.

Corrective action requests provide a permanent and traceable record of the close-out of recommendations arising from accident/incident reports and investigations.

The type of accidents and incidents that must be reported as well as the timeliness of reporting and submission of investigation reports are dictated by organisational and legislative requirements.

Safety Alert Notices should be issued to disseminate information on incidents to project personnel. The project risk register should also be reviewed and updated as required.

Other issues for consideration include:

- training of personnel and supervisors on reporting and investigation processes;

- competence and the balanced make-up of the investigation team;
- objectivity, independence and transparency of the investigation and outcome;
- resourcing of investigation teams and for implementing the recommendations;
- inclusion of accident/incident hazards on project hazard and risk register;
- application of accident/incident reporting procedure to all parties i.e. subcontractors, service providers and self-employed persons;
- reporting of vehicle and plant incidents and damage;
- documentation of regulatory requirements for incident reporting, and contact procedures; and
- contributing incident reports to the APGA database, and issue of industry hazard alerts.
- **Note: APGA collects Industry Construction Safety statistics, and member organisations are encouraged to provide these to APGA every Quarter.**

### 8.5 Health & Safety Information and Reports

Maintenance and disposition of health and safety information and records should be in accordance the project document control and records procedure.

Health and safety records may be required to be held for statutory periods and should be legible, identifiable, traceable and readily retrievable.

Typical project information and records include:

<ul style="list-style-type: none"> <li>• Safety alerts</li> <li>• Hazard reports</li> <li>• Accident and incident reports</li> <li>• Hazard identification and risk assessment reports.</li> <li>• Job Hazard Analysis</li> <li>• Safe Work Method Statements</li> <li>• Inspection and maintenance records</li> <li>• Job observations</li> <li>• Hazardous materials registers</li> <li>• Safety Data Sheets</li> <li>• Plant Risk Assessments</li> </ul>	<ul style="list-style-type: none"> <li>• Noise assessment reports</li> <li>• Training records</li> <li>• Ergonomic and manual handling risk assessments</li> <li>• Qualification, certificate, training and induction records</li> <li>• Government notices</li> <li>• Audit reports</li> <li>• Meeting reports such as toolboxes, progress reports,</li> <li>• Health and Safety Committee Minutes</li> <li>• Corrective actions</li> <li>• Calibration results</li> </ul>
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Individual employee health records, including details of medical treatment and rehabilitation need to be controlled to maintain confidentiality.

Project health and safety performance should be monitored through a system of agreed lead and lag indicators (refer to Australian Standard 1885.1 for standard health and safety lag indicators). Also refer to Section 6.3 of this Part.

A project reporting matrix should be established to ensure that Health and Safety reports are prepared and disseminated to relevant personnel within agreed time frames.

The project should consider integrating health and safety reporting requirements with other project reporting systems.

## 8.6 Compliance Monitoring

Throughout the project, there should be continual review of the application to the compliance requirements. The compliance register should be used for review. Any changes to legal or other requirements during the Project shall be recorded on the register, communicated to project personnel and where required, procedures and processes amended.

## 8.7 Risk Monitoring

The project risk register is a living document, and should undergo periodic review to ensure that all risks are captured, no new risks have arisen during the project, and that all risk controls are in place and effective. The project risk register should be used as one of the audit/inspection tools.

## 9.0 Audit, Review & Improvement

### 9.1 Project Health and Safety Audit

A system and program of health and safety audits should be established, implemented and maintained to verify that the health and safety management arrangements are being implemented to specified regulatory and performance standards and to provide a mechanism to identify opportunities for system improvement.

Experienced and knowledgeable personnel should conduct the audit.

Audit findings should be submitted in a formal report and corrective action request as appropriate.

Other issues for consideration include:

- ensuring subcontractors are included in audits;
- dissemination of audit reports to involved stakeholders and authorities;
- audit protocol inclusion of legislation, codes, Australian Standards and contractual requirements etc.;
- conducting audits with internal or independent resources;
- involvement of project personnel in the audit process;
- communication of audit findings with the project workforce, the Health and Safety Representative/s, and the Health and Safety Committee; and
- commitment of management to implement the recommendations and corrective actions.

### 9.2 Management Review and Improvement

During the project, executive management representatives should periodically review the effectiveness of the Plan in meeting the policy and objectives of the organisations involved in the project and to drive the implementation processes necessary to achieve the project health and safety objectives.

The review process should utilise progress, audits and risk assessment reports, statistical data and client and stakeholder feedback etc. to determine which arrangements adopted for

the project are effective in meeting the health and safety policy objectives and where improvements can be realised.

Performance against the project health and safety policy objectives and safety management system and project health and safety improvement plan should form a specific component of the project close-out report. Typical elements of the close-out report include:

- identified areas for health and safety improvement;
- sources of information used and applicable to the project;
- effectiveness of employee communication and feedback;
- results of Accident/Incident Investigations;
- results of monitoring, inspection and audit programs;
- health and safety impacts of changes in project delivery;
- changes in the project organisation structure;
- sampling of management and employee safety perception "climate";
- improvements in construction work practices and technology; and
- community health and safety impacts and expectations.

Other issues for consideration include:

- benchmarking project health and safety performance with other organisation, project and industry data; and
- continual/periodic review and update of the project hazard register.

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## **PART D Emergency Response Plan**

### **1.0 Introduction**

Prior to mobilisation, the project management team should assess each project activity and potential external factors or influences that may give rise to identifiable emergency event and develop a project specific emergency response plan.

The development of the emergency response plan should consist of three phases:

- planning for emergencies and liaison with statutory authorities;
- implementation and training in the plan; and
- reviews and drills.

### **2.0 Assessment of Credible Emergency Events**

The project should determine all potential credible emergency events and their likelihood taking into account the size and location of the project. A risk evaluation on all credible events should be conducted and form the basis of the emergency response plan.

### **3.0 Emergency Action Plans and Procedures**

Plans and procedures shall be developed. Often, regulatory authorities shall review the emergency response plan. Plans need to consider (but not limited to):

- emergency response organisation;
- training;
- communication;
- equipment and resources;
- size and spread of project;
- terrain;
- communication limitations (mobiles, next g, radio, etc.);
- up to date contacts (internal and external);
- availability of emergency services;
- requirements from regulatory authorities; and
- drills.

### **4.0 Emergency Response Organization**

The emergency response organisation should consist of a minimum of emergency controller, site controller, communications, personnel support, management liaison, and regulatory liaison. An analysis of the minimum number of personnel shall be conducted.

Roles and responsibilities shall be established and documented.

### **5.0 Training**

A major requirement is to ensure that details of emergency response procedures must be included in the project site-specific induction. All personnel on site including visitors should



be informed of key elements of the project emergency response plan during induction and notified of any changes during toolbox meetings. Matters to be covered include:

- muster and assembly points;
- emergency notification (sirens, radio, etc.) and communication arrangements;
- communication protocols, equipment and facilities;
- out of hours emergency arrangements; and
- camp and facility emergency response arrangements.

Key personnel and everyone assigned a role shall be trained in the plan and their particular role.

- communication with regulatory authorities and the client/owner
- interface with site personnel, other involved stakeholders and community emergency response agencies;
- drills and simulations;
- procedures for specific emergencies; and
- location of emergency services.

## 6.0 Communication

Project internal emergency communication of the emergency plan should be carried out through a number of means such as inductions, toolbox meetings, routine management meetings, and through the conducting of exercises. The communication process should be supported by handout material with contact procedures and cards etc.

An emergency communication protocol for transmitting emergency information shall be developed and communicated to all personnel.

The emergency contact list should be maintained and displayed at prominent location and with each work-crew. The emergency contacts list should include the telephone numbers and location of community emergency response agencies and a list of project first aiders. It should be reviewed and updated periodically as required.

### 6.1 Interface with emergency agencies

Following initial contact with emergency services agencies, there should be follow-up contact to ensure contact names remain known and current. Emergency services should be provided with maps, GPS coordinate information, procedures and contacts, and where possible be invited to be involved in practices and simulations.

### 6.2 Communication with media, the public and stakeholders

The plan should establish a procedure and nominated personnel for contact between the client, media, public, family members, unions and local interests.

## 7.0 Emergency Equipment and Resources

The Project shall ensure that equipment and resources provided for commensurate with the analysis of the assessment of risks and possible emergencies. An evaluation of the resources

(physical and personnel) should be conducted to ensure that an emergency can be managed by the organisation/project adequately and in a timely fashion. Factors influencing this include location, size and spread of project, personnel numbers, and access to hospitals and other emergency response, e.g. some projects will only require first aid qualified personnel; others may require paramedics and/or nurses and well-equipped first aid rooms.

## 8.0 Drills

The emergency response plan shall provide for emergency simulations and specify the frequency and type of exercise. The detail and number of exercises will be dependent on the nature and size of the project and may include:

- desktop simulations;
- evacuation drills at sites/offices/camps;
- full simulations at site;
- simulations of crisis plans at the management level; and
- involvement of emergency services personnel and processes;

Emergency drills should be scheduled and conducted at appropriate times to ensure readiness, adequacy and effectiveness of the emergency response plan.

Care must be taken to ensure that all persons involved in the drill are aware that it is a drill. Where emergency drills can be undertaken, disruption to the project/public shall be minimised. The Plan should outline numbers and type of exercises for the duration of the project, this being largely dependent on the size and duration of the project. Following the simulations, a debrief report should be prepared with recommendations for improvement, and the corrective actions then implemented.

## 9.0 Review and Improvement

Review and improvement shall be made up of both formal review processes, and the conducting of exercises or simulations. Reviews shall consider, as necessary:

- promptness of notification;
- project response times;
- time taken for personnel to evacuate and conduct a head count/locate all personnel;
- time for emergency response teams to attend;
- readiness and suitability of response teams and equipment;
- leadership of evacuation and response teams;
- possible improvements to the above;
- a time-frame to implement improvements; and
- verification of implemented improvements.



## **PART E Guidance Notes**

*Note: References provided here and throughout the document are indicative and do not constitute legal advice.*

## 1.0 Construction processes and their hazards

Process	Typical Hazards	Typical Management and Control Strategies	References
Landowner Consultation and Survey	<ul style="list-style-type: none"> <li>• Working alone</li> <li>• Driving</li> <li>• Weather exposure</li> <li>• Unsupervised remote work</li> <li>• Poor communications</li> <li>• Natural hazards</li> <li>• Fauna, stock, snakes</li> <li>• Poor communications</li> <li>• Long work cycles</li> </ul>	<ul style="list-style-type: none"> <li>• Remote Work Procedures</li> <li>• Procedures and JHAs</li> <li>• Appropriate communications equipment</li> <li>• Check-in processes</li> <li>• Well-equipped vehicles</li> <li>• Maps, GPS</li> <li>• PPE</li> </ul>	<ul style="list-style-type: none"> <li>• Section 48 Work Health and Safety Regulations – Remote or Isolated Work</li> <li>• APGA Guideline: Remote Locations Health and Safety</li> </ul>
Fencing	<ul style="list-style-type: none"> <li>• Working alone</li> <li>• Natural hazards</li> <li>• Poor communications</li> <li>• Falling trees</li> <li>• Electric fences, barb wire</li> <li>• Fauna and stock, snakes</li> <li>• Use of chainsaws</li> <li>• Walking on uneven ground</li> <li>• Dehydration</li> <li>• Overhead and underground hazards</li> </ul>	<ul style="list-style-type: none"> <li>• Procedures and JHAs</li> <li>• Radio contact</li> <li>• First aid kits and qualifications</li> <li>• Adequate water</li> <li>• PPE including gloves</li> <li>• Manual Handling training</li> <li>• DBYD</li> <li>• Trained drivers</li> <li>• Vehicle equipment/ setup and spares</li> <li>• Call-in procedures</li> </ul>	<ul style="list-style-type: none"> <li>• Work Health and Safety Regulations – Remote or Isolated Work - Section 48</li> </ul>



Process	Typical Hazards	Typical Management and Control Strategies	References
	<ul style="list-style-type: none"> <li>• Rough terrain</li> <li>• Stranding/Breakdown</li> </ul>		
Clear and Grade	<ul style="list-style-type: none"> <li>• Overhead and underground hazards</li> <li>• Dust</li> <li>• Poor visibility</li> <li>• Inexperienced CH monitors</li> <li>• Poor ground conditions</li> <li>• Personnel in vicinity</li> <li>• Rough terrain</li> <li>• Stranding/Breakdown</li> </ul>	<ul style="list-style-type: none"> <li>• Procedures and JHAs</li> <li>• DBYD</li> <li>• PPE</li> <li>• Radio communications in all vehicles</li> <li>• Signage on powerlines, catenary wires</li> <li>• Check ground conditions</li> <li>• Inductions, trained and competent personnel</li> <li>• First aid kits and qualifications in crew</li> <li>• Check area before reversing or slewing</li> <li>• Vehicle setup and spares</li> <li>• Checking procedures</li> </ul>	
Pipe Stringing and Loadout	<ul style="list-style-type: none"> <li>• Overhead hazards due lifting, carrying, strapping, rigging</li> <li>• Crushing</li> <li>• Swinging pipe</li> <li>• Dropped loads</li> <li>• Rolling pipe</li> <li>• Trips, slips, falls</li> </ul>	<ul style="list-style-type: none"> <li>• Procedures and JHAs</li> <li>• Powerlines marked; vehicle heights and crane reach known</li> <li>• Qualified and experienced dogmen and operators</li> <li>• Areas kept clear where lifting activities take place</li> <li>• Test loads</li> </ul>	<ul style="list-style-type: none"> <li>• LUEZ Guidelines</li> </ul>

Process	Typical Hazards	Typical Management and Control Strategies	References
	<ul style="list-style-type: none"> <li>• Wet, uneven and/or slippery surfaces</li> </ul>	<ul style="list-style-type: none"> <li>• Lifting equipment inspections and registers</li> <li>• Stable areas nominated for pipe locations</li> <li>• Hands clear of pipe</li> <li>• Observe maximum working at heights limits</li> <li>• Personnel clear of the fall zone of the pipe</li> <li>• PPE includes good footwear, gloves and hardhats</li> <li>• Consider vacuum lifting, pipe marked at centres</li> <li>• Transport Management Plan</li> <li>• First aid kits and qualified personnel in crew</li> </ul>	
Pipe Bending (and cutting)	<ul style="list-style-type: none"> <li>• Crushing</li> <li>• Falls from height</li> <li>• Swinging pipe</li> <li>• Trips, slips, falls</li> <li>• Wet, uneven and/or slippery surfaces</li> <li>• Burns</li> <li>• Fire</li> </ul>	<ul style="list-style-type: none"> <li>• Procedures and JHAs</li> <li>• PPE including gloves</li> <li>• First aid kits and qualified personnel in crew</li> <li>• Qualified and experienced dogmen and operators</li> <li>• Clear of bending machine when in operation</li> </ul>	

Process	Typical Hazards	Typical Management and Control Strategies	References
		<ul style="list-style-type: none"> <li>• Personnel clear of the fall zone of pipe</li> <li>• Ensure stable pipe support for cutting pipe</li> </ul>	
<p>Trenching including exposing buried services by hand</p>	<ul style="list-style-type: none"> <li>• Slips, trips, falls</li> <li>• Electricity</li> <li>• Manual handling</li> <li>• Overhead hazards</li> <li>• Underground hazards</li> <li>• Dust</li> <li>• Snakes, fauna</li> <li>• Trench collapse</li> <li>• Wet, uneven and/or slippery surfaces</li> </ul>	<ul style="list-style-type: none"> <li>• Procedures and JHAs</li> <li>• Powerline signage</li> <li>• DBYD</li> <li>• First aid kits and qualified personnel in crew</li> <li>• Remain clear of machines when starting</li> <li>• Awareness of conveyors and exposed moving parts</li> <li>• Guarding to remain in place</li> <li>• Remain safe distances from working machinery</li> <li>• PPE to include hearing protection and safety glasses</li> <li>• Persons setting range poles to be clear of and aware of ditching m/c</li> <li>• No entering trenches &gt;1.5m</li> <li>• Personnel to remain clear of trench edges</li> <li>• Isolate machines for maintenance</li> </ul>	<ul style="list-style-type: none"> <li>• Work Health and Safety Regulations 304-6</li> </ul>

Process	Typical Hazards	Typical Management and Control Strategies	References
Welding, cutting and Tie-ins	<ul style="list-style-type: none"> <li>• Falling or swinging pipe</li> <li>• Springing pipe – pipe movement</li> <li>• Crushing</li> <li>• Sparks, buffer wire, burrs</li> <li>• Broken grinding discs</li> <li>• Grinder kickback</li> <li>• Air pressure hoses</li> <li>• Slips, trips, falls</li> <li>• Eye injuries- dust, particles, weld flash</li> <li>• Burns</li> <li>• Fire</li> <li>• Oxygen and acetylene</li> <li>• Electrical hazards (overhead, underground)</li> <li>• Manual handling</li> <li>• Wet, uneven and/or slippery surfaces</li> </ul>	<ul style="list-style-type: none"> <li>• Procedures and JHAs</li> <li>• No standing between pipe and boom</li> <li>• First aid kits and qualified personnel in crew</li> <li>• PPE includes gloves, double eye protection, anti-flash safety glasses</li> <li>• Pre-use inspections for equipment and cables</li> <li>• Firefighting equipment</li> <li>• Water tank</li> <li>• Secure and stable skid piles</li> <li>• Cap unattended pipes</li> <li>• Earthing of pipe=</li> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• APGA publication: Guidelines for Management of Electrical Hazards in Pipeline Constructing</li> </ul>





Process	Typical Hazards	Typical Management and Control Strategies	References
Blasting and Field Joint coating	<ul style="list-style-type: none"> <li>• Abrasive blasting</li> <li>• Pressure hazards</li> <li>• Dust</li> <li>• Chemicals</li> <li>• Manual handling</li> <li>• Air quality</li> <li>• Fire/explosion</li> <li>• Air pressure hoses</li> <li>• Sips, Trips and falls</li> <li>• Chemical fumes and skin exposure</li> <li>• Fire</li> <li>• Static electricity</li> <li>• Wet, uneven and/or slippery surfaces</li> </ul>	<ul style="list-style-type: none"> <li>• Procedures and JHAs</li> <li>• Personnel to be clear of grit blasting area</li> <li>• First aid kits &amp; qualified personnel in crew</li> <li>• PPE to include safety glasses and blasting helmet</li> <li>• Ventilation suit with filter and air intakes clear</li> <li>• Pre-use inspection checks</li> <li>• Certified blasting equipment</li> <li>• Use less hazardous blasting medium</li> <li>• Hose fittings, dead man switches, whip checks, etc.</li> <li>• Housekeeping practices</li> <li>• SDSs, Chemical handling procedures</li> <li>• Manual handling training</li> <li>• PPE to include those required by SDS</li> <li>• Fire extinguishers</li> <li>• No smoking in vicinity of flammable chemicals</li> <li>• Job rotation</li> </ul>	

Process	Typical Hazards	Typical Management and Control Strategies	References
Lower-in	<ul style="list-style-type: none"> <li>• Overhead hazards</li> <li>• Falling pipe</li> <li>• Crushing</li> <li>• Slips, Trips, Falls</li> <li>• Wet, uneven and/or slippery ground</li> <li>• Electricity</li> <li>• Open trench, trench collapse</li> </ul>	<ul style="list-style-type: none"> <li>• Procedures and JHAs</li> <li>• First aid kits and qualified personnel in crew</li> <li>• Powerlines marked</li> <li>• No standing between pipe and boom</li> <li>• Spotters as necessary</li> <li>• Lifting equipment register</li> <li>• Pre-use inspections</li> <li>• PPE to include hard hats</li> <li>• Earthing strings</li> <li>• Trained in use of Jeeper</li> <li>• No entry to trench &gt;1.5 m</li> </ul>	
Bedding, Padding, Backfill	<ul style="list-style-type: none"> <li>• Overhead hazards</li> <li>• Open trench, trench collapse</li> <li>• Dust</li> </ul>	<ul style="list-style-type: none"> <li>• Procedures and JHAs</li> <li>• First aid kits and qualified personnel in crew</li> <li>• No entry to trench &gt;1.5 m</li> <li>• Spotters</li> <li>• PPE to include safety glasses and dust masks</li> </ul>	
Reinstatement	<ul style="list-style-type: none"> <li>• Overhead hazards</li> </ul>	<ul style="list-style-type: none"> <li>• Procedures and JHAs</li> </ul>	

Process	Typical Hazards	Typical Management and Control Strategies	References
	<ul style="list-style-type: none"> <li>• Moving plant</li> <li>• Fire</li> <li>• Uneven ground</li> </ul>	<ul style="list-style-type: none"> <li>• First aid kits and qualified personnel in crew</li> <li>• Reversing alarms, flashing lights</li> <li>• Marking of powerlines</li> <li>• PPE to include hearing protection</li> <li>• Eye contact with operators</li> <li>• Ensure area clear before operating equipment</li> <li>• Fire extinguishers</li> <li>• Water tank where required</li> <li>• Plant pre-use inspections</li> <li>• Assess area for hazards (e.g. excessive slope, rocks, slippery conditions, muddy conditions)</li> </ul>	
Clean and Dry Pipe and hydrotest	<ul style="list-style-type: none"> <li>• Chemicals and fuel</li> <li>• Slips Trips Falls</li> <li>• Electricity</li> <li>• Working in Bellholes</li> <li>• Manual handling</li> <li>• Welding (see above)</li> <li>• High pressure hoses</li> </ul>	<ul style="list-style-type: none"> <li>• Procedures and JHAs</li> <li>• Appropriately rated whip checks</li> <li>• Correctly rated hoses</li> <li>• SDSs</li> <li>• Fire extinguishers</li> <li>• Pre-use inspections</li> <li>• Emergency plan for site</li> <li>• Tested and tagged equipment</li> <li>• Lifting aids such as cranes</li> </ul>	<ul style="list-style-type: none"> <li>• APGA Guideline: Beware the Energy During Hydrotest</li> </ul>

Process	Typical Hazards	Typical Management and Control Strategies	References
		<ul style="list-style-type: none"> <li>• Radio communications</li> <li>• Monitoring of pressures</li> <li>• Signage and barricading of the area</li> <li>• Access and egress from bellhole</li> <li>• Earthing</li> <li>• Secure the area</li> </ul>	
Horizontal Directional Drilling	<ul style="list-style-type: none"> <li>• Overhead hazards</li> <li>• Slips trips falls</li> <li>• Burns</li> <li>• Crushing</li> <li>• High pressure hoses</li> <li>• Underground hazards</li> </ul>	<ul style="list-style-type: none"> <li>• Procedures and JHAs</li> <li>• Housekeeping</li> <li>• PPE</li> <li>• DBYD</li> </ul>	
General Labouring Tasks that includes skid handling, water and fuel trucks, TAs, fauna handlers, cleaners, etc.	<ul style="list-style-type: none"> <li>• Strains</li> <li>• Sprains</li> <li>• Work at height</li> <li>• Slips, trips and falls</li> <li>• Manual handling injuries (cuts and abrasions)</li> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• JHAs</li> <li>• Task assessments</li> <li>• Pre-employment medicals</li> <li>• First aid kits and qualified personnel in crew</li> <li>• Foam trench breakers, foam trench pillows, etc. where possible</li> <li>• Minimise size and weight of sandbags</li> <li>• Rotate tasks</li> <li>• Mechanical lifting devices</li> </ul>	<ul style="list-style-type: none"> <li>• Hazardous Manual Tasks Code of Practice 2011</li> </ul>

Process	Typical Hazards	Typical Management and Control Strategies	References
		<ul style="list-style-type: none"> <li>Gloves</li> </ul>	
NDT	<ul style="list-style-type: none"> <li>Radiation exposure</li> <li>Radiation Sources</li> <li>Chronic health effects</li> <li>Long term illness and /or death</li> </ul>	<ul style="list-style-type: none"> <li>Procedures and JHAs</li> <li>First aid kits and qualified personnel in crew</li> <li>Radiation Management Plan</li> <li>Trained and qualified personnel</li> <li>Signage</li> <li>Barriers</li> <li>Training and induction of personnel</li> <li>Radiation monitoring</li> </ul>	
Camp and Workshop	<ul style="list-style-type: none"> <li>Slips, trips, falls</li> <li>Chemical exposure and spills</li> <li>Rotating machinery</li> <li>Sharp objects</li> <li>Fire</li> <li>Waste hazards</li> </ul>	<ul style="list-style-type: none"> <li>Procedures and JHAs</li> <li>First aid kits and qualified personnel</li> <li>Emergency response plan</li> <li>Housekeeping</li> <li>Food and hygiene inspections</li> <li>Workshop inspections</li> <li>Training</li> <li>Waste management</li> </ul>	
Refuelling	<ul style="list-style-type: none"> <li>Fire</li> <li>Explosion</li> <li>Slips, trips Falls</li> </ul>	<ul style="list-style-type: none"> <li>Procedures and JHAs</li> <li>No source of combustion within 20m of refuelling activity</li> <li>Earthing</li> </ul>	

Process	Typical Hazards	Typical Management and Control Strategies	References
	<ul style="list-style-type: none"> <li>• Spills</li> </ul>		
Pipe Loading and Transport	<ul style="list-style-type: none"> <li>• Road use</li> <li>• Contractor Management</li> <li>• Lifting hazards</li> <li>• Stockpile falls of pipe</li> <li>• Falls from height</li> </ul>	<ul style="list-style-type: none"> <li>• Transport plans and procedures</li> <li>• Loading Guidelines</li> <li>• Exclusion zones</li> <li>• Stockpile procedures and rules</li> </ul>	<ul style="list-style-type: none"> <li>• LUEZ Guidelines</li> </ul>
Commissioning	<ul style="list-style-type: none"> <li>• Live gas environments</li> <li>• Live electrical equipment</li> <li>• Unidentified hazards</li> </ul>	<ul style="list-style-type: none"> <li>• Commissioning planning</li> <li>• Commissioning procedures and Plan</li> <li>• Permit systems</li> <li>• Tagging and Isolation</li> <li>• Barricading, fencing, and locking</li> <li>• Authorised personnel</li> <li>• Permit to Work</li> </ul>	

## 2.0 General Health and Safety Issues

Issue	Hazards and Issues	Typical Management and Control Strategies	References
Fire Protection	<ul style="list-style-type: none"> <li>• Bushfire, property damage, environmental damage</li> </ul>	<ul style="list-style-type: none"> <li>• Firefighting equipment such as water carts, fire extinguishers,</li> <li>• Clearing (where permitted)</li> </ul>	

Issue	Hazards and Issues	Typical Management and Control Strategies	References
		<ul style="list-style-type: none"> <li>• Training and induction</li> <li>• Water trucks</li> <li>• Liaison and consultation with authorities</li> <li>• Liaison and consultation with landowners and councils</li> </ul>	
Protection of the Public	<ul style="list-style-type: none"> <li>• Excavations</li> <li>• Plant and machinery</li> <li>• Access to construction sites</li> <li>• Vehicle access</li> <li>• Hazards associated with welding activities</li> <li>• Crossing roads, railways etc.</li> </ul>	<ul style="list-style-type: none"> <li>• Security of plant and equipment</li> <li>• Signage</li> <li>• Barricading and barriers</li> <li>• Traffic management Plan</li> <li>• Notifications and planning</li> <li>• Training of personnel</li> <li>• Qualifications of personnel</li> <li>• Security personnel</li> <li>• Identification of high-risk areas/locations</li> <li>• Barriers</li> </ul>	<ul style="list-style-type: none"> <li>• Work Health and Safety Regulations 214-215, 298</li> <li>• Manual of Uniform Traffic Control Devices</li> </ul>
Power lines and Adjacent Infrastructure Including Underground Power	<ul style="list-style-type: none"> <li>• Induced voltage</li> <li>• Touch and Step potential</li> <li>• Fault currents</li> <li>• Electrical storms and lighting</li> </ul>	<ul style="list-style-type: none"> <li>• Identification of power lines and underground services on Alignment sheets</li> <li>• Catenary wires and Flagging</li> <li>• Notification to power authorities</li> <li>• Supervision</li> </ul>	<ul style="list-style-type: none"> <li>• APGA Guideline: Guidelines for Management of Electrical Hazards in Pipeline Construction</li> <li>• SafeWork Australia General Guide for Working in the</li> </ul>

Issue	Hazards and Issues	Typical Management and Control Strategies	References
	<ul style="list-style-type: none"> <li>Excavations hitting services</li> </ul>	<ul style="list-style-type: none"> <li>Working outside Exclusion zones</li> <li>Procedures for working in storms</li> <li>Earth mats</li> <li>Engineering review of work adjacent to or under power lines</li> <li>Spotters</li> </ul>	<p>Vicinity of Overhead and Underground Electric Lines</p> <ul style="list-style-type: none"> <li>Work Health and Safety Regulation 166</li> </ul>
Excavations	<ul style="list-style-type: none"> <li>Public, personnel and fauna injury</li> <li>Traffic hazards</li> <li>Night-time hazards</li> <li>Underground services such as power, water, telecommunications</li> <li>Pipe damage</li> <li>Confined space</li> </ul>	<ul style="list-style-type: none"> <li>Barricading and barriers</li> <li>Notification</li> <li>Minimise open trench</li> <li>Procedures and processes to avoid trench entry</li> <li>Lighting</li> <li>Surveillance and/or security</li> <li>Shoring</li> <li>Minimise trench depth where possible</li> </ul>	<ul style="list-style-type: none"> <li>Work Health and Safety Regulations – Excavation Work Section 304-306</li> <li>Excavation Code of Practice</li> <li>Work Health and Safety Regulation 166</li> </ul>
Lifting of Materials	<ul style="list-style-type: none"> <li>Falling objects</li> <li>Dropped loads</li> <li>Swinging objects</li> </ul>	<ul style="list-style-type: none"> <li>PPE</li> <li>Inspection of equipment</li> <li>Use of correctly rated equipment</li> <li>Training</li> <li>Qualified personnel</li> <li>Procedures</li> <li>Minimise required access to height</li> </ul>	<ul style="list-style-type: none"> <li>Work Health and Safety Regulations 54-55</li> </ul>



Issue	Hazards and Issues	Typical Management and Control Strategies	References
Handling of Chemicals	<ul style="list-style-type: none"> <li>• Spillage</li> <li>• Chemical exposure</li> <li>• Fire</li> <li>• Injury</li> <li>• Environmental damage</li> </ul>	<ul style="list-style-type: none"> <li>• Procedures and Manifests</li> <li>• Compliance with legislative requirements</li> <li>• SDS</li> <li>• Correct storage</li> <li>• Handling procedures</li> <li>• PPE</li> <li>• Material handling equipment</li> <li>• Signage</li> <li>• Training</li> </ul>	<ul style="list-style-type: none"> <li>• Work Health and Safety Regulations 341-388</li> </ul>
Site Communication	<ul style="list-style-type: none"> <li>• Lack of understanding of procedures</li> <li>• Errors and incidents</li> <li>• Poor emergency response</li> </ul>	<ul style="list-style-type: none"> <li>• Prestart Meetings</li> <li>• Records</li> <li>• Newsletters</li> <li>• Toolbox meetings</li> <li>• Committee Meetings and distribution of minutes</li> <li>• Supervisor Meetings</li> <li>• Hazard reports/alerts</li> </ul>	
Incident Reporting and Investigations	<ul style="list-style-type: none"> <li>• Lack of learning from incidents</li> </ul>	<ul style="list-style-type: none"> <li>• Reporting procedures</li> <li>• Training and induction</li> <li>• Training for investigators</li> <li>• Records</li> </ul>	

Issue	Hazards and Issues	Typical Management and Control Strategies	References
		<ul style="list-style-type: none"> <li>• Investigation processes</li> <li>• Corrective action database/list</li> <li>• Responsibilities assigned</li> </ul>	
Competency	<ul style="list-style-type: none"> <li>• Incidents and injury</li> <li>• Inefficient processes</li> <li>• Property and equipment damage</li> </ul>	<ul style="list-style-type: none"> <li>• Pre-employment processes</li> <li>• Interview and/or reference checks</li> <li>• On-the-job evaluation of skills</li> <li>• Inductions</li> <li>• Development of skills matrices</li> <li>• Training records</li> <li>• Training programs</li> </ul>	
Management of Change	<ul style="list-style-type: none"> <li>• Lack of review of implications when changing process and plant</li> </ul>	<ul style="list-style-type: none"> <li>• Procedures</li> <li>• JHAs and JHA review</li> <li>• Review of change implications prior to implementation</li> <li>• Communication of change</li> <li>• Document control processes</li> <li>• Change control register</li> </ul>	
Vehicles and Driving	<ul style="list-style-type: none"> <li>• Third party road users</li> <li>• Road quality</li> <li>• Fatigue</li> <li>• Vehicle type and setup</li> </ul>	<ul style="list-style-type: none"> <li>• Training, competence, attitude and assessment</li> <li>• Work Scheduling</li> <li>• Vehicle maintenance</li> <li>• Vehicle type, setup and equipment</li> </ul>	<ul style="list-style-type: none"> <li>• APGA Guideline and DVD: Vehicle Safety Guidelines</li> </ul>

Issue	Hazards and Issues	Typical Management and Control Strategies	References
	<ul style="list-style-type: none"> <li>• Remote travel</li> <li>• Terrain</li> <li>• Effects of drugs/alcohol</li> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• Project vehicle speeds (ROW)</li> <li>• Licensing</li> <li>• Fit for Work Policy</li> <li>• Fatigue management</li> <li>• Refer to relevant legislation and statutory authorities</li> </ul>	
Explosives	<ul style="list-style-type: none"> <li>• Blasting in public areas</li> <li>• Blasting in vicinity of construction crews</li> <li>• Missiles</li> </ul>	<ul style="list-style-type: none"> <li>• Blasting Management Plan</li> <li>• Regulatory review</li> <li>• Job Hazard analysis</li> <li>• Trained and qualified personnel</li> <li>• Notifications</li> </ul>	
Trips and Slips	<ul style="list-style-type: none"> <li>• Uneven ground</li> <li>• Access and egress from plant and vehicles</li> </ul>	<ul style="list-style-type: none"> <li>• PPE, especially appropriate footwear</li> <li>• Awareness</li> <li>• Lighting</li> <li>• Housekeeping</li> <li>• H&amp;S Inspections</li> <li>• Use of handrails and ladders</li> </ul>	
Falls from Height	<ul style="list-style-type: none"> <li>• Injury</li> <li>• Death</li> </ul>	<ul style="list-style-type: none"> <li>• Eliminate the need to work at heights</li> <li>• Fall prevention devices</li> <li>• Work positioning systems</li> </ul>	<ul style="list-style-type: none"> <li>• Work Health and Safety Regulation 78-80, 225.</li> </ul>

Issue	Hazards and Issues	Typical Management and Control Strategies	References
		<ul style="list-style-type: none"> <li>• Fall arrest systems</li> <li>• Training in requirements</li> <li>• Supervision</li> </ul>	
Electrical Equipment and Electrical installation	<ul style="list-style-type: none"> <li>• Electric shock</li> </ul>	<ul style="list-style-type: none"> <li>• Electrical licenced personnel</li> <li>• Pre-use inspections</li> <li>• Earthing</li> <li>• Portable RCDs, including testing</li> <li>• Housekeeping</li> <li>• Test and tagging program</li> <li>• Tagging and isolation</li> <li>• Resuscitation qualified electrical personnel</li> <li>• All electric leads kept dry</li> <li>• All electric leads kept insulated</li> <li>• Avoid live work situations</li> <li>• DBYD</li> <li>• Protect overhead cables</li> <li>• Maintain safe clearances – exclusion zones</li> </ul>	<ul style="list-style-type: none"> <li>• Work Health and Safety Regulations 147-166</li> <li>• AS/NZS 3012:2010</li> <li>• AS/NZS 3760:2010</li> </ul>
High pressure, Air hoses and high pressure equipment	<ul style="list-style-type: none"> <li>• Air embolism</li> <li>• Eye and other serious injuries</li> </ul>	<ul style="list-style-type: none"> <li>• Safety clips in place</li> <li>• Safety valves</li> <li>• Maintenance programme</li> </ul>	

Issue	Hazards and Issues	Typical Management and Control Strategies	References
	<ul style="list-style-type: none"> <li>• Flailing equipment</li> </ul>	<ul style="list-style-type: none"> <li>• Pre-inspection checks</li> <li>• Hose inspections</li> <li>• Cylinders stored correctly</li> <li>• Pressure gauges checked</li> <li>• Appropriate whip checks (Stainless steel or 'stocking' type) keepers, chains, slings, and proprietary special couplings</li> <li>• Flashback arrestors</li> </ul>	
Use of Plant	<ul style="list-style-type: none"> <li>• Plant defects</li> <li>• Pinch points</li> <li>• Crush points</li> <li>• Noise exposure</li> <li>• Dust exposure</li> <li>• Rollover</li> </ul>	<ul style="list-style-type: none"> <li>• Shut down plant for maintenance</li> <li>• Plant risk assessments conducted</li> <li>• Plant noise surveys</li> <li>• Wheeled plant to be fitted with ROPS</li> <li>• Sealed cabins</li> <li>• PPE and hearing protection</li> <li>• Guarding</li> <li>• Emergency stops</li> </ul>	<ul style="list-style-type: none"> <li>• Work Health and Safety Regulations 203-226</li> </ul>
Manual Tasks	<ul style="list-style-type: none"> <li>• Muscular Skeletal Injuries due to:</li> <li>• Posture strain</li> <li>• Repetitive strain</li> <li>• Vibration</li> </ul>	<ul style="list-style-type: none"> <li>• Assess tasks that have JHA</li> <li>• Manual handling training</li> <li>• PPE – gloves</li> <li>• Hand and power tool training</li> <li>• Load handling – team lifting</li> </ul>	<ul style="list-style-type: none"> <li>• Work Health and Safety Regulations 60-61</li> </ul>

Issue	Hazards and Issues	Typical Management and Control Strategies	References
	<ul style="list-style-type: none"> <li>• Crushing injuries</li> <li>• Pinch injuries</li> <li>• Hand tools</li> <li>• Power tools</li> <li>• Load handling</li> </ul>	<ul style="list-style-type: none"> <li>• Mechanical devices</li> <li>• Team lifting</li> <li>• Develop alternative handling techniques and use of equipment</li> </ul>	
Noise	<ul style="list-style-type: none"> <li>• Public complaints</li> <li>• Noise induced hearing loss</li> </ul>	<ul style="list-style-type: none"> <li>• Mufflers and attenuation</li> <li>• PPE</li> <li>• Substitution</li> <li>• Procedures</li> <li>• Exposure times minimised</li> </ul>	<ul style="list-style-type: none"> <li>• Work Health and Safety Regulations 56-59</li> </ul>
Confined Space	<ul style="list-style-type: none"> <li>• Asphyxiation</li> <li>• Death</li> <li>• Engulfment</li> </ul>	<ul style="list-style-type: none"> <li>• SWMS</li> <li>• Risk assessments</li> <li>• Permit to Work</li> <li>• Rescue procedures and equipment</li> <li>• Monitoring equipment and processes</li> </ul>	<ul style="list-style-type: none"> <li>• Work Health and Safety Regulation 62-77</li> </ul>

### 3.0 Health and Wellbeing Issues

Issue	Hazards and Issues	Typical Management and Control Strategies	References
Fitness for Work	<ul style="list-style-type: none"> <li>• Personnel putting themselves and others at risk</li> <li>• Impaired judgement</li> <li>• Fatigue</li> </ul>	<ul style="list-style-type: none"> <li>• Evaluation of cycle breaks in early stages of project development</li> <li>• Fit for Work policies</li> <li>• Rehabilitation services</li> <li>• Provision of exercise facilities</li> <li>• Management of hours of work</li> <li>• Management of extremes of climate</li> <li>• Camp/accommodation</li> <li>• Fatigue minimization measures</li> <li>• Drug and Alcohol policies and procedures</li> </ul>	
Mental Health	<ul style="list-style-type: none"> <li>• Illness</li> <li>• Poor productivity</li> <li>• Lack of Concentration</li> <li>• Social Issues</li> <li>• Poor stamina</li> <li>• Limited ability to undertake multiple tasks</li> <li>• Family</li> </ul>	<ul style="list-style-type: none"> <li>• Provision and availability of support information</li> <li>• Supervisor awareness</li> <li>• Implementation of Mental Health programs</li> <li>• Monitoring of the workplace and hours of work</li> <li>• Support programs/ Employee Assistance programs/companies</li> <li>• Communications for family and home contact</li> </ul>	<ul style="list-style-type: none"> <li>• <a href="http://www.headsup.org.au">www.headsup.org.au</a></li> <li>• <a href="http://www.beyondblue.org.au">www.beyondblue.org.au</a></li> </ul>

Issue	Hazards and Issues	Typical Management and Control Strategies	References
		<ul style="list-style-type: none"> <li>• Exercise programs and equipment</li> </ul>	
Drugs and Alcohol	<ul style="list-style-type: none"> <li>• Impaired workers</li> <li>• Safety of the worker and others</li> </ul>	<ul style="list-style-type: none"> <li>• Pre-employment screening</li> <li>• Drug and alcohol testing programs</li> <li>• Drug and Alcohol policies</li> <li>• Supervisor and worker education and awareness</li> </ul>	<ul style="list-style-type: none"> <li>• APGA Drug and Alcohol Guidelines</li> </ul>
Fatigue	<ul style="list-style-type: none"> <li>• Impaired workers</li> <li>• Safety of the worker and others</li> </ul>	<ul style="list-style-type: none"> <li>• Pre-employment screening (sleep apnoea)</li> <li>• Careful consideration of work cycles</li> <li>• Camp rules</li> <li>• Nutrition in camps</li> <li>• Supervisor and worker education and awareness</li> </ul>	<ul style="list-style-type: none"> <li>• APGA Fatigue Management Guidelines and Handbook</li> </ul>
Chemical and other Exposures	<ul style="list-style-type: none"> <li>• Chemical exposure with adverse health effects</li> <li>• Noise exposure with long term hearing loss</li> </ul>	<ul style="list-style-type: none"> <li>• Health Surveillance for designated hazardous chemicals</li> <li>• Task assessments</li> <li>• PPE</li> <li>• Audiometric testing if required</li> </ul>	<ul style="list-style-type: none"> <li>• Sections 368-378 Work Health and Safety Regulations – Health Monitoring</li> </ul>



## PART F Appendices

### 1.0 Appendix 1 - AS2885.1-2012 - Section 2.7

#### 2.7.1 Construction safety

Construction of pipelines shall be carried out in a safe manner.

The safety of the public, construction personnel, adjacent property, equipment and the pipeline shall be maintained and not compromised.

A construction safety plan shall be prepared, reviewed by appropriate personnel, and approved. This review shall take the form of a construction safety plan workshop.

Specific construction safety requirements exist in each regulatory jurisdiction. The more stringent of the regulatory requirements and the requirements of this Section shall apply.

#### NOTES:

Review by appropriate personnel should include designers, construction personnel, OH&S personnel, environmentalists and/or the approval authority.

The construction safety plan detail should be consistent with the nature of the work being undertaken. It may be a component of an integrated construction safety system, a construction safety case (where the regulatory jurisdiction requires this), or a project or activity specific safety plan.

At least the following shall be addressed:

- a) approved fire protection shall be provided and local bushfire and other fire regulations shall be observed.
- b) where the public could be exposed to danger or where construction operations are such that there is the possibility that the pipeline could be damaged by vehicles or other mobile equipment, suitable physical and/or procedures measures shall be implemented.
- c) where a power line is in close proximity to the route safe working practice shall be established.
- d) where a pipeline is in close proximity to a power line, potential threats from induced voltage and induced or fault currents to personnel safety shall be assessed and appropriate measures taken to mitigate dangers to personnel and equipment.
- e) adequate danger and warning signs shall be installed in the vicinity of construction operations, to warn persons of dangers (including those from mobile equipment, radiographic process and the presence of excavations, overhead power lines and overhead telephone lines).

- f) unattended excavations in locations accessible to the public shall be suitably barricaded or fenced off and, where appropriate, traffic hazard warning lamps shall be operated during the hours of darkness.
- g) during the construction of submerged pipelines, suitable warnings shall be given. Signs and buoys shall be appropriately located to advise the public of any danger and to minimize any risk of damage to shipping. Where warnings to shipping are required by an authority controlling the waterway, the authority's requirements for warnings should be ascertained and the authority advised of all movements of construction equipment.
- h) provision of adequate measures to protect the public from hazards caused by welding.
- i) procedure to be followed for lifting pipes both from stockpile and into trench after welding.
- j) procedure for safe use and handling of chemicals and solvents.
- k) frequency and provision of safety talks (tool box meetings).
- l) accident reporting and investigation procedure.
- m) appointment of safety supervisor and specification of duties.
- n) travel associated with attending the worksite.
- o) statutory obligations.
- p) traffic management plan.

### **2.7.2 Testing safety**

The construction safety plan shall address safety through all phases of testing of the pipeline during construction.

### **2.7.3 Commissioning safety**

The commissioning plan shall consider the safety of the activities undertaken through all phases of commissioning and, where required, develop specific procedures to manage the safety during commissioning of the pipeline.

Commissioning safety shall comply with AS 2885.3—2001 Pipelines—Gas and liquid petroleum Part 3: Operation and maintenance

Refer also AS 2885.5:2002 Pipelines—Gas and liquid petroleum Part 5: Field pressure testing

## 2.0 Appendix 2 - Standards used in the Preparation of these Guidelines

The following standards, codes and guidelines have been used in the preparation of these this document, and may be required to be used in construction health and safety systems and processes. The list is not exhaustive and each project should undertake their own analysis of requirements.

- AS 2885: Pipelines - Gas and liquid petroleum
- AS 3745—2002 Emergency control organization and procedures for buildings, structures and workplaces
- AS/NZS 3931:1998 Risk analysis of technological systems - Application guide
- AS/NZS 3760:2010 In-service safety inspection and testing of electrical equipment
- AS/NZS ISO 31000:2009 Risk management – principles and guidelines
- AS/NZS 4801:2001 Occupational health and safety management systems - Specification with guidance for use
- AS/NZS 3012:2010 Electrical installations – Construction and demolition sites
- AS/NZS 1269.1:2005 Occupational noise management—Measurement and assessment of noise emission and exposure
- AS/NZS 1891.1:2007 Industrial fall-arrest systems—Harnesses and ancillary equipment
- AS/NZS 60079.10 Electrical apparatus for explosive gas atmospheres – Classification of hazardous areas
- CHAIR Safety in Design Tool (NSW)
- Confined Spaces Code of Practice
- Excavation Work Code of Practice
- Hazardous Manual Tasks Code of Practice
- Managing Risks of Plant in the Workplace , Code of Practice, September 2013 (Worksafe Australia)
- Managing Noise and Preventing Hearing Loss at Work Code of Practice
- Managing the Risk of Falls at Workplaces Code of Practice
- National Code of Practice for Induction for Construction Work
- Safe Work Method Statement for High Risk Construction Work Information Sheet
- Worksafe Australia Code of Practice Construction Work November 2013

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### Appendix 3 – APGA endorsed Health and Safety Guidelines<sup>4</sup>

- APGA Angle Grinder Guidelines Rev A
- APGA Code of Practice for Upstream PE Gathering Networks in the CSG industry
- APGA Drug and Alcohol Management Guidelines
- APGA Fatigue Management Guidelines
- APGA Guidelines for Management of Electrical Hazards in Pipeline Constructing
- APGA Guidelines for Treatment of Health and Safety Matters in Tendering
- APGA Helicopter Induction Safety Awareness Guidelines
- APGA Hydro-testing Guidelines
- APGA Industry Guideline for Effective Auditing and Enhanced HSE Performance
- APGA Remote Location Safety Guidelines
- APGA Vehicle Safety Guidelines
- Fatigue Management workshop report and guidelines
- Guidance Note on Safe Working Loads

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<sup>4</sup> Refer to the APGA website for an up-to-date list, as guidelines are being continually developed.

### 3.0 Appendix 4 – Suggested Documentation List

Note: This suggested list of procedures is a guide only. Project procedures should be developed using information from risk and hazard assessments, legislative requirements, and Project policies, etc.

#### *Procedures*

1. Inductions
2. Safety Training
3. Risk Assessment
4. On Site Risk Assessment (Job Hazard Analysis)
5. Change Management
6. Tagging and Isolation
7. Incident Reporting and Investigation
8. Personal Protective Equipment
9. Driving and Vehicle Safety
10. Plant Risk Assessment
11. Health and Safety Consultation/ Meetings
12. Fitness for Work
13. First Aid and Medical Treatment
14. Hazard Reporting
15. Management of Injured Workers
16. Behaviour-based Safety Program
17. Manual Handling
18. Reviews, Audits and Inspections
19. Trenching/Excavation Safety
20. Electrical Safety
21. Stop Work Authority
22. Permit to Work
23. Confined Space
24. Hand and Power Tools
25. Welding and Cutting Safety
26. Safety Disputes
27. Crane and Lifting Safety
28. Working in Vicinity of Power-lines
29. Chemical Management
30. Working at Height
31. Missing Persons
32. Abrasive Blasting
33. Commissioning Plan
34. Commissioning Procedures
35. Working in Hazardous Areas
36. Traffic Management Plan
37. Transport Management Plan
38. Journey Management Procedure
39. Managing the Safety of Remote Workers
40. Discipline procedure

Specific procedures will have to be developed for specific risks identified in the risk assessment processes. For example, procedures for managing plant in steep terrain, pipe freezing, etc.

### ***Registers***

1. Project Hazard/Risk Register
2. Project Compliance Register
3. Training and Induction Register
4. Plant and Equipment Register
5. Chemicals Register
6. Incident Register
7. Hazard Register
8. First Aid Register
9. HSE Inspection Register
10. SWMS and JHA Register
11. Corrective Action Register
12. Lessons Learnt Register