



**ONSHORE PIPELINE PROJECTS**

# **CONSTRUCTION HEALTH AND SAFETY GUIDELINES**



## **FOREWORD**

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

Pipelines will play an even more important role in the Australian economy over the years ahead and this will involve considerable activity in the construction of new onshore pipelines and the expansion of existing pipeline systems. It is essential that the industry continue to respond to the expectations of its people, technical regulators and the wider community by minimising incidents that affect our workforce and the environment in which we work.

The Australian Pipeline Industry Association (APIA) 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 APIA Onshore Construction Health and Safety Guidelines provide advice to members on the incorporation of health and safety issues in the overall preparation of Construction Health and Safety Management Plans. APIA would welcome views from its members or other stakeholders, including technical regulators, on additional topics that should be included in the section on Guidance Notes. The APIA Health and Safety Committee is progressively reviewing the industry health and safety issues and gradually adding more supporting guidelines and material.

The Guideline examines the hierarchy of roles played by owners, contractors, subcontractors and specialist subcontractors. These groups represent the main target audience for the Guideline. It is expected that the Guideline will promote a common understanding of the safety philosophy, issues and processes that will contribute to excellent health and safety outcomes across the entire chain of participants involved in the pipeline construction process.

APIA encourages all Members involved in the pipeline construction process to make full and effective use of this Guideline so that they can be informed and active contributors on pipeline health and safety matters. Adoption of the Guideline by APIA members is entirely voluntary and the APIA Health and Safety Committee continue to welcome feedback on its value and possible improvements.

This document has been reviewed and endorsed by State regulators. The majority of their comments and advice have been incorporated in the latest revision.



Ashley Kellett  
President APIA

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

### POLICY

The Australian Pipeline Industry Association (APIA) believes that all Member Companies must actively pursue strategies that ensure excellent health and safety outcomes in all aspects of their business activities.

In particular, APIA believes the core elements of such a strategy for Member Companies 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.
- To provide 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

### IMPLEMENTATION

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

- Ensure the creation of an effective and proactive Health and Safety Standing Committee, reporting to the APIA Board
- Develop and disseminate industry guidelines, including in relation to construction safety
- Provide a range of forums to discuss and address health and safety issues
- Implement an industry wide safety alert system, to be available to members and non-members on the APIA website
- Lead the industry in achieving with government 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

*APIA Board  
August 2008*

## **PART A General**

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

The Australian Pipeline Industry Association Ltd (APIA) is the peak national body representing the interests of Australia's transmission pipeline sector. APIA's current membership is predominantly involved in the high-pressure transmission of oil and gas, however, the Association welcomes membership of companies and individuals involved in the transmission via pipelines of other products, including water. APIA has a diverse membership base with members including contractors, owners, operators, advisers and engineering companies and suppliers of pipeline products and services.

The Australian Pipeline Industry Association (APIA) 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 construction projects through the development of consistent health and safety plans which 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 will evolve 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 Pipeline 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 APIA 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 Appendix 1.

There are now a number of different contracting strategies available, which impact on 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 hazards and recommended practices in a number of key topic areas.
Appendices	Reference material

### **4.0 Definitions**

<b>As Low As Reasonably Practicable (ALARP)</b>	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>
<b>Audit</b>	A critical examination of all or part of the total project management system with reference to health and safety
<b>Competent Person</b>	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.
<b>Consequence</b>	The outcome of a hazardous event or possible range of outcomes associated with an event, injury, loss or damage.
<b>Control Measures</b>	Actions to eliminate or reduce the chance of an event occurring or to reduce the effect of the hazard event if it does occur
<b>Employee</b>	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> This is the agreed industry definition. However, some State regulators may wish to see the definition expressed differently. When preparing the SMP, the Regulators should be consulted.

<b>Employee Health and Safety Representative</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>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>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>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>	Combination of the frequency, or probability, of occurrence and the consequence of a specified hazardous event.  NOTE — The concept of risk always has two elements: the frequency or probability with which a hazardous event occurs and the consequences of the hazardous event. <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.

<sup>2</sup> AS/NZS 3931 Risk analysis of technological systems—Application guide

<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

## 5.0 Abbreviations

<b>ALARP</b>	As Low As Reasonably Practicable
<b>AS</b>	Australian Standard
<b>ERP</b>	Emergency Response Plan
<b>FSA</b>	Formal Safety Assessment
<b>HAZAN</b>	Hazard Analysis - the application of numerical methods to obtain an understanding of hazards in terms of how often a hazard will manifest itself  And with what consequences for people, process and plant. HAZAN is the essential prerequisite for the complete risk assessment process.
<b>HAZID</b>	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.  The main major findings and hazard ratings help to deliver HSE compliance, and form part of the project Risk Register.
<b>HAZOP</b>	Hazard and Operability Study
<b>JHA</b>	Job Hazard Analysis
<b>MSDS</b>	Material Safety Data Sheet
<b>NDT</b>	Non Destructive Testing
<b>PPE</b>	Personal Protective Equipment
<b>QRA</b>	Quantitative Risk Analysis



## Onshore Pipeline Projects Construction Health and Safety Guidelines

<b>RCD</b>	Residual Current Device
<b>ROPS</b>	Rollover Protection System
<b>SMP</b>	Safety Management Plan
<b>SMS</b>	Safety Management System

## **PART B Preparation of a Construction Health and Safety Plan**

### **1.0 General**

#### **1.1 Introduction**

The preparation of 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 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.

#### **1.2 Regulatory Framework**

Each State or Territory has its own legislative requirements for construction safety. The Project Management Team will work with the respective Regulatory Authority/s to ensure the legislative requirements are identified, mutually understood, and integrated into the Plan. There is often more than one Regulatory Authority.

#### **1.3 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 in each Health and Safety Management Plan.

In addition to legislation in the form of act and regulations, most jurisdictions reference national standards and local codes of practice, some of which may be called up under legislation, or as a licence condition.

## **1.4 Approvals**

The 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.

## **1.5 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.

Whilst it is not a regulatory standard, the Australian Accident and Compensation Council (AACC, formally the National Occupational Health and Safety Commission) has issued the National Standard for Construction Work [NOHSC:1016 (2005)], which should be used as a reference standard when preparing the Construction Health and Safety Management Plan<sup>3</sup>.

## **1.6 Use of Sub Contractors**

Where subcontractors are to be used, the Plan should be developed so as to provide sub contractors with enough detail on the expected health and safety standards for the Project. Sub contractors may provide their own Health and Safety Plans under the umbrella of the Construction Health and Safety Management Plan.

## **1.7 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.

## **1.8 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.

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<sup>3</sup> *At the commencement of a Project, the Responsibilities for Health and Safety should be determined. The National Standard for Construction Work [NOHSC:1016(2005)] gives good guidance on safety responsibilities.*

## **2.0 Formal Safety Assessment**

### **2.1 Introduction**

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 AS 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. 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 AS4360 / AS3931. 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.

### **2.2 Formal Safety Assessment Process**

#### **Objective:**

*To establish an integrated safety assessment process for the identification of hazards and through the elimination and control techniques reduce the risk exposure of project personnel, the public and threats to the pipeline to ALARP.*

#### **Issues to Cover:**

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.

- AS2885.1 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 AS4360 / AS3931.

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).

### **2.3 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 Hazard Assessment and Implication Review (CHAIR) 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;
- forewarn the contractor of the residual hazards that have been identified within the design and will need to be managed during the construction work

### **2.4 Hazard Identification**

#### **Objective:**

*To establish processes to systematically identify hazards associated with construction of the pipeline project.*

#### **Issues to Cover:**

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

The hazard 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 hazard identification process depends on the purpose and health and safety outcomes to be achieved. The method of hazard identification can involve a detailed technical workshop or job hazard analysis by the workcrew 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 hazard 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 and previous Project Risk Registers; and
- Consultation with involved stakeholders.

The outcome and results of the hazard identification process should result in the establishment of a formal record for each hazard collated in a project Hazard Register.

**Other Issues for Consideration:**

- Incident, injury records from previous projects and the industry
- Interaction of work parties, stakeholders, processes, plant and environment
- Hazards associated with major accident/incident events

**2.5 Risk Assessment**

**Objective:**

*To determine the potential consequences of identified hazards and the likelihood with which a hazardous outcome or incident may occur.*

**Issues to Cover:**

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. In practical terms the risk level can be represented by:

RISK LEVEL	=	CONSEQUENCE	X	LIKELIHOOD
		<i>The outcome of a hazardous event or possible range of outcomes associated with an event, injury, loss or damage.</i>		<i>Qualitatively the probability or chance of the outcome occurring with respect to exposure to the hazard</i>

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

Business and regulatory agencies may utilise different consequence and likelihood descriptions and different risk matrices. The Project Management Team should agree on the risk acceptance criteria and risk levels for consistency across the Project. ASNZS 4360:2004 *Risk management* and HB436:2004 *Guidelines to ASNZS 4360 Risk Management*, should be used for guidance.

**Other Issues for Consideration:**

- 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.

## **2.6 Hazard and Risk Reduction and Control Measures**

**Objective:**

*To develop effective hazard and risk control strategies, processes and techniques to reduce risk levels As Low As Reasonably Practicable (ALARP).*

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

**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 Construction Health and Safety Management 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:**

- 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.

## **2.7 Assessment of Results**

**Objectives:**

*To demonstrate in a verifiable manner that hazard and risk reduction and control measures have reduced exposure to ALARP.*

**Issues to Cover:**

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.

The Project Management Team should therefore commit to the view that the objectives of the Formal Safety Assessment have been met.

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

### **1.0 Introduction**

The aim of this section is to provide sufficient detail to ensure understanding of the nature of the Project.

#### **1.1 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.

#### **1.2 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.

#### **1.3 Specific Health and Safety Issues**

Detail any project specific threats 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 being 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; and
- Design-specific issues.

### **2.0 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 B Section 1.3).

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

### **3.0 Leadership and Commitment**

#### **3.1 Policy and Statement of Commitment**

##### **Objectives:**

*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.*

**Issues to Cover:**

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:**

- 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.

### **3.2 Organisation and Responsibility**

**Objectives:**

*To establish an effective organizational structure with defined roles, responsibilities and accountabilities for implementation and maintenance of the Health and Safety policy and system.*

**Issues to Cover:**

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 Construction Health and Safety Management Plan and induction.

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.

The Project Management Team should review the responsibilities and accountabilities for each role regularly or organisational changes throughout the project.

Key roles for which responsibilities and accountabilities for health and safety 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;
- Workcrew 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.

**Other Issues for Consideration:**

- The interface between key players should be clearly defined;
- Define and document reporting lines for incidents, regulatory and community notifications;
- Responsibilities and accountability of others should also be defined i.e. sub-contractors, self-employed persons, service providers and visitors etc.;
- Consider the development and use of a responsibility matrix; and
- Involvement of commissioning and operations responsibilities where necessary.

### **3.3 Employee Involvement and Communication**

**Objectives:**

*To establish that effective mechanisms exist to promote active consultation, communication and involvement of all personnel in the management of health and safety and the control of workplace hazards.*

**Issues to Cover:**

Formal consultative mechanisms should be established involving employees and elected employee representatives during 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. 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 material safety data sheets.

Communication between the Licence holder 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:**

- Progress meetings with key players should have Health and Safety as a standing agenda item.
- General health and safety legislation in most jurisdictions provides for the formal election of safety representatives or safety committee members or both.
- 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

### **3.4 Resources**

**Objectives:**

*To ensure sufficient resources are provided to develop, implement and maintain the Health and Safety Management System to achieve the Health and Safety objectives for the project.*

**Issues to Cover:**

The Project Management Team through project planning process should define and allocate sufficient resources in terms of finance, human and specialist advisers to implement the project Health and Safety Policy and Safety Management System.

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

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 safety management system. (Reference AS 2885.1:2007, paragraph 2.7.1 (m))

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 (paramedics and OHS nurses), field inspectors or specialist risk and safety management consultants assist with risk assessment, auditing activities and rehabilitation providers.

**Other Issues for Consideration:**

- Funding of emergency exercises;

- Printing, publication of Health and Safety documentation;
- Funding of specialised training;
- Funding of health and safety studies; and
- Numbers of personnel required for construction, including the amount of night work that may be required, and the work hours generally.
- 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; specialist software packages (eg. for controlling hazardous substances or producing ID cards); provision of ancillary equipment such as laptops, printers, laminators, projectors; etc.

## **4.0 Planning**

### **4.1 Hazard Identification and Risk Assessment**

**Objective:**

*To establish a systematic approach to the management of hazards and risks associated with pipeline project activities.*

**Issues to Cover:**

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).

The studies should be carried out early and a Project Risk Register developed before construction commences. (Refer to part B, 2.0 of this Guideline). The Risk Register will identify the need for the preparation of JHAs for work-crews, manual task assessments, specific plans, procedures, training to be conducted, personnel experience and qualifications, 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; and
- Consideration of continual review and analysis of the effectiveness of risk assessment and control processes.

### **4.2 Hazard & Risk Communication**

**Objective:**

*To establish systems and techniques for communicating hazard and risk information to relevant stakeholders and monitor feedback on the effectiveness of controls*

**Issues to Cover:**

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.

### **4.3 Objectives, Plans & Performance Standards**

**Objective:**

*To establish, maintain and monitor measurable and achievable health and safety objectives, plans and standards consistent with the project health and safety policy.*

**Issues to Cover:**

The Project Management Team should agree on and define verifiable health and safety objectives, plans and standards for the project which 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,
- 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, plans and standards 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 Incidents</li> <li>• Lost Time Incident Frequency Rate</li> <li>• Restricted Work Injuries</li> <li>• Medical Treatment Incidents</li> <li>• First aid Treatments</li> <li>• Treatable Injury Incidents<sup>4</sup></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 measurable targets are nominated by the Project Management Team so that progress against these targets can be assessed.

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

**Objective:**

*To develop, implement and maintain procedures for the identification, collation, review and dissemination of information and standards relevant to the safe design and construction of the pipeline.*

**Issues to Consider:**

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.

#### 4.5 Management System Documentation

**Objective:**

*To establish and maintain an accessible documented Health and Safety Management System that is integrated with other management systems.*

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<sup>4</sup> *The Safety Plan may consider a more realistic target that combines Lost Time, Restricted Work and Medical Treatment Injuries, rather than focusing on individual targets.*

**Issues to Cover:**

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.

Refer also to Part C, 5.4.

**Other Issues for Consideration:**

- Access to and distribution of current copies of documents
- Removal of superseded documents.
- Effective communication of changes

## **4.6 Purchasing, Contractors and Importers**

**Objective:**

*To ensure that the planning phase of the Project considers the health and safety impacts of purchasing, contractor selection and importation on construction.*

**Issues to Cover:**

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, construction equipment, chemicals, etc. The Project Management Team should ensure that contractors and suppliers are provided with the Project's health and safety requirements.

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

Refer also to Part C, 5.3.

## **5.0 Implementation**

### **5.1 Design, Construction and Commissioning**

**Objective:**

*To demonstrate that hazards and risk associated with design, construction and commissioning of the pipeline and associated plant and equipment are eliminated or reduced to ALARP.*

**Issues to Cover:**

Design specifies suitable equipment for the required duty. 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,
- Other specialist hazard identification and risk control processes i.e. Control Hazard and Operability and Safety Integrity Level studies as appropriate.

The pipeline constructor, in consultation with the nominated pipeline operator and/or the Licence holder, should perform 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:**

- 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.
- Maintainability and access considerations are considered

## **5.2 Management of Change**

**Objective:**

*To ensure that changes and modifications are reviewed for hazards and risk prior to implementation and information on change requirements are communicated to relevant personnel and stakeholders.*

**Issues to Cover:**

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 including design changes should be documented where an assessment of the risk and safety implications are recorded, approved and sign-off by or on behalf of the Licence holder.

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**

- 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.

### **5.3 Purchasing & Control of Materials & Services**

**Objective:**

*To develop and maintain systems for the control of purchased services and materials to ensure additional hazards are minimised.*

**Issues to Cover:**

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 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);and
- Direct and ongoing monitoring of health and safety performance through inspection and audits.
- 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. Material 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,
- 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:**

- 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.

## **5.4 Safe Operating Procedures**

**Objective:**

*To develop and use Safe Operating Procedures which effectively manage hazards and risks arising from the project activities.*

**Issues to Cover:**

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 5.

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:**

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

## **5.5 Materials Handling and Storage**

**Objective:**

*To establish and maintain safe systems for the handling and storage of materials*

**Issues to Cover:**

Assessment of manual handling tasks provides an important hazard and control measure as part of the Job Hazard Analysis process. Manual handling or ergonomic 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.

The Project Management Team should establish and maintain a register of prescribed hazardous materials and dangerous goods used on the Project. Material Safety Data Sheets should be held on site for all potentially hazardous substances. Hazards associated with the use of hazardous substances should be assessed and incorporated into the task Job Hazard Analysis.

Hazardous materials or dangerous goods should be stored in designated areas consistent with the legislation and segregation requirements ie explosives stored in a separate and secure location away from public and personnel. Refuelling tanks and tankers should be located within a bunded area remote from accommodation facilities.

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.

**Other Issues for Consideration:**

- 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.

## **5.6 Maintenance and Repair**

**Objective:**

*To establish and maintain systems for the maintenance of the pipeline and plant and equipment associated with construction.*

**Issues to Cover:**

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 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.

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

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:**

- 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.

## **5.7 Employee Selection, Competency and Training**

**Objective:**

*To ensure the selection of and ongoing competency of project personnel*

**Issues to Cover:**

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.

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 (ie 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.

All personnel on the project site should 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 system 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 be assessed for competency in key health and safety knowledge prior to commencing work on site. The following includes some key health and safety leadership skills:

- Legal obligations;
- Health and Safety responsibilities and Leadership;
- Safety Management System Commitments;
- Project Hazard Identification;
- Accident / Incident reporting;
- Emergency response leadership;
- Development of a JHA;
- Conducting toolbox meetings; and
- Tag & lockout procedures.

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 system and controls identified in the hazard identification and risk assessment process.

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

A record of all training 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.

**Other Issues for Consideration:**

- Process for the review of position specifications;
- Adequacy and effectiveness of training and delivery techniques;
- Timely scheduling of training;
- Induction of visitors, service providers and casual employees; and
- Consideration of pre-employment screening.

*NOTE: APIA has commenced work on training and competencies for Pipeline Construction. It is expected that a Pipeline Training and Qualification Passport will be introduced in 2009.*

## **5.8 Workplace Environment**

**Objective:**

*To establish systems, facilities and processes to ensure and promote a safe work environment*

**Issues to Cover:**

The Project Management Team should develop health and safety processes to ensure and to promote a safe working environment. Management of workplace environment issues should

be developed through the Project Construction Hazard Identification Assessment process and may include the following:

- Protection Against Atmospheric Contamination;
- Control of Dust;
- Housekeeping;
- Lighting and Ventilation;
- Noise Assessment & Management;
- Signposting & Hazard Identification;
- Personal Protective Equipment;
- Temperature/Heat Stress Management;
- Hygiene;
- Radiation Protection;
- Working Hours;
- Workplace Amenities;
- Chemical spill management; and
- Management of defective plant.

**Other Issues for Consideration**

- Measuring and identifying exposure limits to atmospheric contaminants.
- Assessing, measuring, signposting and protection against noise exposure.
- Review of specialist subcontractor safety plans (e.g. NDT radiation safety plans)
- Access to potable water and waste water management
- Camp and accommodation arrangements
- Fitness for Work strategies

## **5.9 First Aid and Emergency Response**

**Objective:**

*To establish and implement effective first aid and emergency response arrangements for the project*

### **5.9.1. 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. 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.

### **5.9.2. Emergency Management**

#### **Issues to Cover:**

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 project Emergency Response Plan should assign roles and responsibilities of key personnel including assignment of an Emergency Coordinator and be developed in consultation with local community emergency response agencies.

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;
- Communication with Regulatory authorities and the Client/Owner
- Interface with site personnel, other involved stakeholders and community emergency response agencies;
- Out of hours emergency arrangements; and
- Camp and facility emergency response arrangements.

An 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.

Emergency Drills should be scheduled and conducted at appropriate times to ensure readiness, adequacy and effectiveness of the Emergency Response Plan.

Part D provides greater detail on Emergency Response Planning.

## **6.0 Monitoring & Evaluation**

### **6.1 Inspection, Testing & Monitoring**

#### **Objective:**

*To establish effective systems of inspection, testing and monitoring to ensure the objectives of the project Health and Safety policy and Safety Management System are implemented.*

#### **Issues to Cover:**

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:**

- 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.

## **6.2 Health Monitoring Systems**

**Objective:**

*To monitor and evaluate the effects of the work environment on the health of employees, contractors and visitors on the Project.*

### **6.2.1. Health Monitoring**

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.

## **6.3 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:**

- Communication of rehabilitation requirements to all employees;
- Exposure to specific hazards may require specialist health monitoring ie 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.

## **6.4 Incident Reporting and Investigation**

**Objective:**

*To establish effective systems for reporting and investigating hazards and incidents and to establish measures to prevent recurrence.*

**Issues to Cover:**

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 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
- Identification of witnesses and protecting evidence at the scene
- Consultation with relevant authorities, site and operations personnel
- Conducting investigation to identify root causes and recommendations to prevent recurrence.
- 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.

**Other Issues for Consideration:**

- 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 ie sub-contractors, 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 APIA database, and issue of industry hazard alerts.

## 6.5 Health & Safety Information & Reports

### Objective:

*To establish and maintain a system for the analysis, dissemination, storage archiving and retrieval of information relevant to health and safety.*

### Issues to Cover:

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>• Inspection and maintenance records</li> <li>• Job observations</li> <li>• Hazardous materials registers</li> <li>• Material Safety Data Sheets</li> </ul>	<ul style="list-style-type: none"> <li>• Noise assessment reports</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, toolbox, progress. Health and Safety Committee</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 4.3.

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.

### Other Issues for Consideration:

- Integration of Health and Safety reporting requirements with other project reporting systems.

## **7.0 Audit, Review & Improvement**

### **7.1 Project Health and Safety Audit**

**Objective:**

*To periodically verify the effectiveness of health and safety arrangements on the project*

**Issues to Cover:**

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:**

- 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 and the Health and Safety Committee; and
- Commitment of management to implement the recommendations and corrective actions.

### **7.2 Management Review and Improvement**

**Objective:**

*To establish processes to regularly review the safety management system to assure the arrangements adopted are effective in meeting the policies and objectives for the project.*

**Issues to Cover:**

During the Project, executive management representatives should periodically review the effectiveness of the safety management system 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.
- Community Health and Safety impacts and expectations.

**Other Issues for Consideration:**

- Benchmarking project Health and Safety performance with other organisation, project and industry data; and
- Continual/periodic review and update of the Project Hazard Register.

## **PART D    Emergency Response Plan**

### **1.0 Introduction**

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
- Review 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 may incorporate:

- Emergency Response Organisation
- Training
- Communication
- Equipment and Resources

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;
- Involvement of emergency services personnel and processes;
- Contacts (internal and external); and
- Combinations of any of the above.

The Plan should outline numbers and type of exercises for the duration of the project. Following the simulations, a debrief report should be prepared with recommendations for improvement, and the corrective actions then implemented.

#### **3.1 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.

#### **3.2 Training**

A major requirement is to ensure that details of emergency response procedures must be included in the Project site-specific induction. Key personnel and everyone assigned a role shall be trained in the plan and their particular role

- Number/frequency of drills and simulations;
- Procedures for specific emergencies;
- Plan review and update;
- Location of emergency services;
- Size and spread of project;
- Terrain; and
- Communication Limitations (mobiles, Next G, Radio, etc).

Where emergency drills are able to be undertaken, disruption to the project/public shall be minimised.

### **3.3 Communication**

#### **3.3.1. Project internal emergency communication**

Care must be taken to ensure that all persons involved in the drill are aware that it is a drill.

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

#### **3.3.2. 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, procedures and contacts, and where possible be invited to be involved in practices and simulations.

#### **3.3.3. Communication with media, the public and stakeholders**

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

### **3.4 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.

## **4.0 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:

- Notification
- Response times
  - ⇒ By affected personnel to evacuate and conduct a head count
  - ⇒ Of 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
- Verification of implemented improvements.

**PART E Hazard Guidance Notes**

## 1.0 Construction processes and their hazards

Process	Typical Hazards	Typical Management and Control Strategies
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>• Procedures and JHAs</li> <li>• Remote communications equipment</li> <li>• Check-in processes</li> <li>• Well-equipped vehicles</li> <li>• Maps, GPS</li> <li>• PPE</li> </ul> <p><b>Refer to APIA Guideline: <i>Remote Locations Health and Safety</i></b></p>
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,</li> <li>• Fauna and stock, snakes</li> <li>• Use of chainsaws</li> <li>• Barb wire</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> </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> </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</li> <li>• Check ground conditions</li> </ul>

Process	Typical Hazards	Typical Management and Control Strategies
	<ul style="list-style-type: none"> <li>Personnel in vicinity</li> </ul>	<ul style="list-style-type: none"> <li>Inductions</li> <li>First aid kits and qualifications in crew</li> <li>Check area before reversing or slewing</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> <li>Wet, uneven and/or slippery surfaces</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> <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> <li>Personnel clear of the fall zone of the pipe</li> <li>Ensure stable pipe support for cutting pipe</li> </ul>
Trenching including exposing buried services by hand	<ul style="list-style-type: none"> <li>Slips, trips, falls</li> <li>Electricity</li> <li>Manual handling</li> <li>Overhead hazards</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> </ul>

Process	Typical Hazards	Typical Management and Control Strategies
	<ul style="list-style-type: none"> <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>• 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>
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>• Fire fighting equipment</li> <li>• Water tank</li> <li>• Secure and stable skid piles</li> <li>• Cap unattended pipes</li> <li>• Earthing of pipe</li> </ul> <p><b>Refer APIA publication: <i>Guidelines for Management of Electrical Hazards in Pipeline Constructing</i></b></p>

Process	Typical Hazards	Typical Management and Control Strategies
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 and 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>• MSDSs</li> <li>• Manual handling training</li> <li>• Chemical handling procedures</li> <li>• PPE to include those required by MSDS</li> <li>• Fire extinguishers</li> <li>• No smoking in vicinity of flammable chemicals</li> <li>• Job rotation</li> </ul>
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>

Process	Typical Hazards	Typical Management and Control Strategies
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> <li>• Moving plant</li> <li>• Fire</li> <li>• Uneven ground</li> </ul>	<ul style="list-style-type: none"> <li>• Procedures and JHAs</li> <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 (eg 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>• MSDSs</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> <li>• Radio communications</li> <li>• Monitoring of pressures</li> <li>• Signage and barricading of the area</li> </ul>

Process	Typical Hazards	Typical Management and Control Strategies
		<ul style="list-style-type: none"> <li>• Access and egress from bellhole</li> <li>• Earthing</li> <li>• Secure the area</li> </ul> <p><i>Refer APIA Guideline: Beware the Energy During Hydrotest</i></p>
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> </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> </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> <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>

Process	Typical Hazards	Typical Management and Control Strategies
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> </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> </ul>
Refuelling	<ul style="list-style-type: none"> <li>• Fire</li> <li>• Explosion</li> <li>• Slips, trips Falls</li> <li>• Spills</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>
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> </ul>

## 2.0 General Health and Safety Issues

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

Issue	Hazards and Issues	Typical Management and Control Strategies
Protection of the Public	<ul style="list-style-type: none"> <li>• Excavations</li> <li>• Plant and machinery</li> <li>• Access to construction sites 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</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> </ul>
Powerlines 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> <li>• Excavations hitting services</li> </ul>	<ul style="list-style-type: none"> <li>• Identification of powerlines and underground services on Alignment sheets</li> <li>• Catenary wires and Flagging</li> <li>• Notification to power authorities</li> <li>• Supervision</li> <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 powerlines</li> <li>• Spotters</li> </ul> <p><b>Refer APIA Guideline: <i>Guidelines for Management of Electrical Hazards in Pipeline Construction</i></b></p>
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> </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>

Issue	Hazards and Issues	Typical Management and Control Strategies
Lifting of Materials	<ul style="list-style-type: none"> <li>• Falling objects</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>
Handling of Chemicals	<ul style="list-style-type: none"> <li>• Spillage</li> <li>• Fire</li> <li>• Injury</li> <li>• Environmental damage</li> </ul>	<ul style="list-style-type: none"> <li>• Procedures</li> <li>• Compliance with legislative requirements</li> <li>• MSDS</li> <li>• Correct storage</li> <li>• Handling procedures</li> <li>• PPE</li> <li>• Material handling equipment</li> </ul>
Site Communication	<ul style="list-style-type: none"> <li>• Lack of understanding of procedures</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> <li>• Investigation processes</li> <li>• Corrective action database/list</li> <li>• Responsibilities assigned</li> </ul>

Issue	Hazards and Issues	Typical Management and Control Strategies
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>
Fitness for Work	<ul style="list-style-type: none"> <li>• Personnel putting themselves and others at risk</li> <li>• Impaired judgement</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>• Drug and alcohol testing programs</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> </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> <li>• Remote travel</li> <li>• Terrain</li> <li>• Effects of drugs/alcohol</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> <li>• Project vehicle speeds (ROW)</li> <li>• Licensing</li> <li>• Fit for Work Policy</li> </ul>

Issue	Hazards and Issues	Typical Management and Control Strategies
		<ul style="list-style-type: none"> <li>• Fatigue management</li> <li>• Refer to relevant legislation and statutory authorities</li> </ul> <p><i>Refer to APIA Guideline and DVD: <a href="#">Vehicle Safety Guidelines</a></i></p>
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>
Trip, Slip and Fall Hazards	<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>
Electrical Equipment	<ul style="list-style-type: none"> <li>• Electric shock</li> </ul>	<ul style="list-style-type: none"> <li>• Pre-use inspections</li> <li>• Earthing</li> <li>• Portable RCDs</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>

Issue	Hazards and Issues	Typical Management and Control Strategies
Pressure, Air hoses and equipment	<ul style="list-style-type: none"> <li>• Air embolism</li> <li>• Eye injuries</li> <li>• Flailing equipment</li> </ul>	<ul style="list-style-type: none"> <li>• Safety clips in place</li> <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)</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> </ul>
Manual Handling	<ul style="list-style-type: none"> <li>• Crushing injuries</li> <li>• Pinch injuries</li> <li>• Posture strain</li> <li>• Repetitive strain</li> <li>• Vibration</li> <li>• Hand tools</li> <li>• Power tools</li> <li>• Load handling</li> </ul>	<ul style="list-style-type: none"> <li>• JHA</li> <li>• Manual handling training</li> <li>• PPE – gloves</li> <li>• Hand and power tool training</li> <li>• Load handling – team lifting</li> <li>• Mechanical devices</li> <li>• Team lifting</li> </ul>

## Appendices

## **Appendix 1 - APIA Guideline for Treatment of Health and Safety Matters in Tendering**

The obligations and responsibilities relating to “duty of care” are clearly identified in all State and Territory legislation, and through national guidelines such as the National Standard for Construction Work, and these responsibilities cannot be sub-contracted.

Therefore it is in the interest of the Proponent of any construction project to ensure that Health and Safety management is adequately resourced at all levels throughout the project, and that this is not compromised during contractual negotiations.

The APIA Construction Safety Committee has prepared the attached Guideline to assist both Clients and Contractors in managing Health and Safety matters in tender documentation to facilitate a fair and transparent tender process. The objective is to identify in the tender and response documents the Client expectations on certain matters and/or the Contractor’s bid price provision for certain matters.

It is proposed that this Guideline will be added to the existing APIA Construction Safety Plan Guidelines document at the next revision. As with all items in the Construction Safety Plan Guidelines, any feedback from the industry on this Guideline is welcome.

The APIA Construction Health and Safety Committee recommends that tender documents be specific regarding the manner in which certain items related to health and safety management are priced in tenders.

For pipeline construction projects tender documents should address at least the following:

1. Placement of construction camps so as to limit the required travel time to and from the worksite to a nominated maximum; and to give consideration to use of existing public roads.
2. Nomination of the manner in which workers are transported from camps to site and back.
3. Any intended restrictions on allowable speed of travel by vehicles on the site.
4. Clarification of any intended restrictions on driving between sunset and sunrise, as applicable for construction crews, support crews, and/or pipe haulage contractors.
5. Durations of rostered work cycles and breaks, management of any exceptions, and payment for travel time.
6. Any specific provisions for fatigue management required by the Client or offered by the Bidder.
7. Time to be set aside for inductions, training, and toolbox meetings.
8. Any specific requirements to provide assurance of fitness for work.
9. Bonus (incentives) or penalty provisions for actual performance above or below a nominated measurable target.
10. Minimum requirements for first aid or emergency medical intervention (i.e. numbers and locations of first-aiders, paramedics, nurses, ambulances, medivac availability).
11. Journey management including vehicle safety fit-out and onboard vehicle recording systems.
12. Minimum required construction communications facilities.
13. Client requirements for reporting and auditing.
14. Minimum Safety personnel requirements (numbers and competency).

15. Competency and training of supervisors with regard to Occupational Health and Safety.

Following are some additional Health and Safety related matters that may warrant consideration in preparation of tender requests and submissions:

1. Ratio of Safety officers to Construction Workers.
2. Ratio of Paramedics and First Aid officers to Construction Workers.
3. Use of any existing available services such as the RFDS.
4. Nomination of a Provisional Sum for Safety Incentive schemes.
5. Fitness for Work initiatives such as provision of a gym in each camp.
6. A requirement that access and haulage routes be subjected to risk assessment.

**Implementation of this Guideline**

Preparation of tender documentation by Clients and Bidders to incorporate this Guideline could be handled in either of two ways as follows.

a) Client Nominated Basis

Where the Client has an expectation that a certain basis must be applied on any of the above or similar items then the Client should nominate that expectation clearly in the Invitation to Tender so that all Bidders compete on the same basis for safety management matters considered important by the Client.

b) Basis not Nominated by the Client

Where the Client does not wish to nominate a certain basis, then the tender documents should invite the Bidders to nominate clearly the basis upon which their tender has been priced, together with an indication of the cost of providing the specified Health and Safety management services. Even if not requested the Bidders should clearly identify and price their intended management and allowances for Health and Safety matters.

On this basis a Client can then make an informed assessment of the “value” of the services provided during evaluation of tenders.

*Version 1, 13 March 2008*

## **Appendix 2 - AS2885 Part 1 - 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 powerlines 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 *AS2885.3—2001 Pipelines—Gas and liquid petroleum Part 3: Operation and maintenance*

Refer also *AS2885.5:2002 Pipelines—Gas and liquid petroleum Part 5: Field pressure testing*

## **Appendix 3 - Standards used in the Preparation of these Guidelines**

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 4360:2004 Risk management

AS/NZS 4801:2001 Occupational health and safety management systems - Specification with guidance for use

Australian Safety and Compensation Council (ASCC) (formerly the National Occupational Health and Safety Commission) National Standard for Construction Work [NOHSC:1016 (2005)]

National Code of Practice for Induction for Construction Work

CHAIR Safety in Design Tool (WorkCover New South Wales)

## **Appendix 4 – APIA endorsed Health and Safety Guidelines<sup>5</sup>**

- APIA Guideline and DVD: *Vehicle Safety Guidelines*
- APIA Guideline: *Guidelines for Management of Electrical Hazards in Pipeline Constructing*
- APIA Guideline: *Beware the Energy During Hydrotest*
- APIA Guideline: *Remote Locations*

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<sup>5</sup> Refer to the APIA website for an up-to-date list, as guidelines are being continually developed.

## **Appendix 5 – 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. Safety Consultation/ Meetings
12. Fitness for Work
13. First Aid and Medical Treatment
14. Hazard Reporting
15. Management of Injured Workers
16. Manual Handling
17. Reviews, Audits and Inspections
18. Trenching/Excavation Safety
19. Electrical Safety
20. Work Permits
21. Confined Space
22. Hand and Power Tools
23. Welding and Cutting Safety
24. Safety Disputes
25. Crane and Lifting Safety
26. Working in Vicinity of Powerlines
27. Chemical Management
28. Working at Height
29. Missing Persons
30. Abrasive Blasting
31. Commissioning Plan
32. Commissioning Procedures
33. Working in Hazardous Areas
34. Traffic Management Plan
35. Transport Management Plan
36. 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 Register
2. Training and Induction Register
3. Plant and Equipment Register
4. Chemicals, Dangerous Goods Register
5. Incident Register
6. Hazard Register
7. First Aid Register
8. HSE Inspection Register
9. JHA Register
10. Corrective Action Register