

DRAFT

REHABILITATION PLAN

KINGAROY USG

PILOT PLANT



August 2013



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1. INTRODUCTION

This draft Rehabilitation Plan has been prepared by Cougar Energy Limited to meet the requirements of the following:

- Environmental Authority MIN100656507;
- Environmental Protection Act 1994
- Mineral Resources Act 1989 and Regulations
- Code of Environmental Compliance for Exploration and Mineral Development Projects.
- National Water Commission - Minimum Construction Requirements for Water Bores in Australia
- Land Access Code 2010;
- Petroleum and Gas (Production and Safety) Act 2004;
- Petroleum and Gas (Production and Safety) Regulation 2004;
- Cougar Energy safety and risk management plans; and
- Landholder's specific requirements.

The rehab plan also describes the location and areas of rehabilitation, organisation, structure and safety/risk management protocols. It provides descriptions of both the pre - and post-mining land use suitability; provides description of the total area of disturbance; proposes the rehabilitation process and analogue site monitoring program to collect data immediately before commencement of the rehabilitation project in order to determine the conditions of a starting point as listed in the Rehabilitation Criteria section of Environmental Authority issued on 7 July 2011.

1.1 REHABILITATION GOALS

Four general rehabilitation goals have been adopted by Cougar Energy. They are as follows:

- Rehab project must be safe to humans and wildlife
- Be Non-polluting
- Creating a stable environment post rehab
- Able to sustain an agreed post gasification land use.

1.2 REHABILITATION OBJECTIVES

A list of the main rehabilitation objectives are presented below:

- the final landform is safe to humans and wildlife.
- the site is non-polluting.
- the final landform is stable.
- the site is able to sustain an agreed post- gasification land use.



- hazardous materials such as fuels, solvents and products of gasification are adequately managed.
- very low probability of subsidence or rock falls with serious consequences.
- adequate vegetation cover established to minimise erosion.
- soil properties that support and will continue to support the desired final land use.
- establish specified self sustaining natural vegetation or habitat.
- the Kingaroy local community are kept adequately informed of the rehab progress.
- the DEHP is kept adequately informed of the rehab progress by the instrument of environmental authority and progress reports until the MDL385 is surrendered.

2. LOCATION

The Cougar UCG Pilot plant is located some 17km Northwest of Tarong Power station and 10km Southeast of Kingaroy township on private land own by Stanwell Corporation Limited (former Tarong Energy) – the Landholder.

The pilot plant occupies a small area, of approximately 0.26km² (26ha), on the south-eastern part of MDL385.

The MDL in Figure 1 was granted to Cougar Energy on 22 February 2009 for duration of 5 years.

2.1 The Land

Prior to commencement of the construction work by Cougar Energy on Lot 6 RP852413 in November 2009, the land was occupied by Tarong Energy Corporation and formed a part of the regional agricultural cropping area. However no farming activities have been carried out for some time on Lot 6 prior to commencement of the construction works. At that time a preliminary flora and habitat assessment was conducted on behalf of CE by an independent agency BAAM Pty Ltd in September 2009 with an aim to establish native to the area species and habitat. A full report is available on request from Cougar Energy.



Figure 1: MDL 385

Cougar commenced construction of the UGC pilot plant in late 2009 and completed it in March 2010 with a very limited disturbance caused to the land (see Figure 2).

3. SITE REHABILITATION

The scope of rehabilitation work assumes that the area of disturbance will be rehabilitated back to as close as practicable to its original state. The original state is defined by the same land contours, vegetation and the habitat as it was found prior to the commencement of the site characterisation drilling followed by construction of the UGC

pilot plant and in accordance with Preliminary Flora and Habitat report produced by the independent biodiversity assessor BAAM Pty Ltd in September 2009.

The Landholder of the site is Stanwell Corporation Limited (former Tarong Energy).

We are in discussions with Stanwell to ascertain any interest in retaining any of the site structures/facilities, a mechanism of such retention will be established, and all relevant regulatory responsibilities will be transferred from Cougar Energy to the land holder should any of the above ground infrastructure be retained by Stanwell.

It is the intention to utilise Hassalls Auctions to facilitate the orderly sale of plant and equipment and also relocate certain items of plant and equipment to their holding yard in Kingaroy in preparation for either an auction or conventional sale process.

Subject to approvals from the DEHP and Stawell we anticipate commencing this works in September 2013.

3.1 Stages of the Rehabilitation

Cougar Energy is planning to complete the rehabilitation project in the following 4 stages

1. Remove evaporation pond and reshape the top soil to follow its natural land form
2. Remove pipe work and the gas processing plant including the control room and compressor shed
3. Remove concrete bunds, pipe supports and roads and reshape land to its natural form
4. Plug and abandon all water monitoring and production wells and reshape the soil to its natural land form.

Below we outline the summary of key activities and the time lines of the rehabilitation project.

Plan of Rehabilitation Kingaroy UCG Pilot Plant

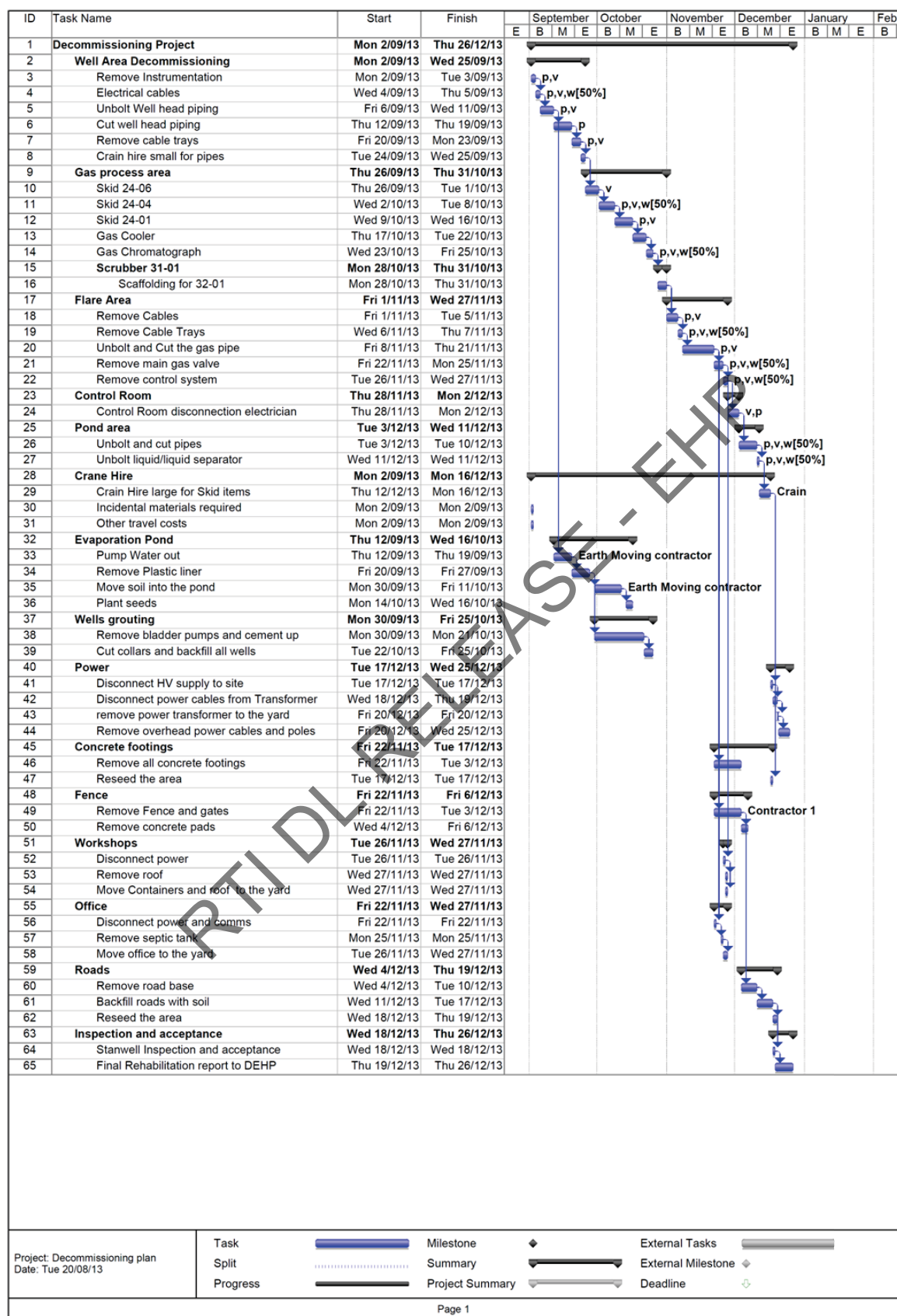
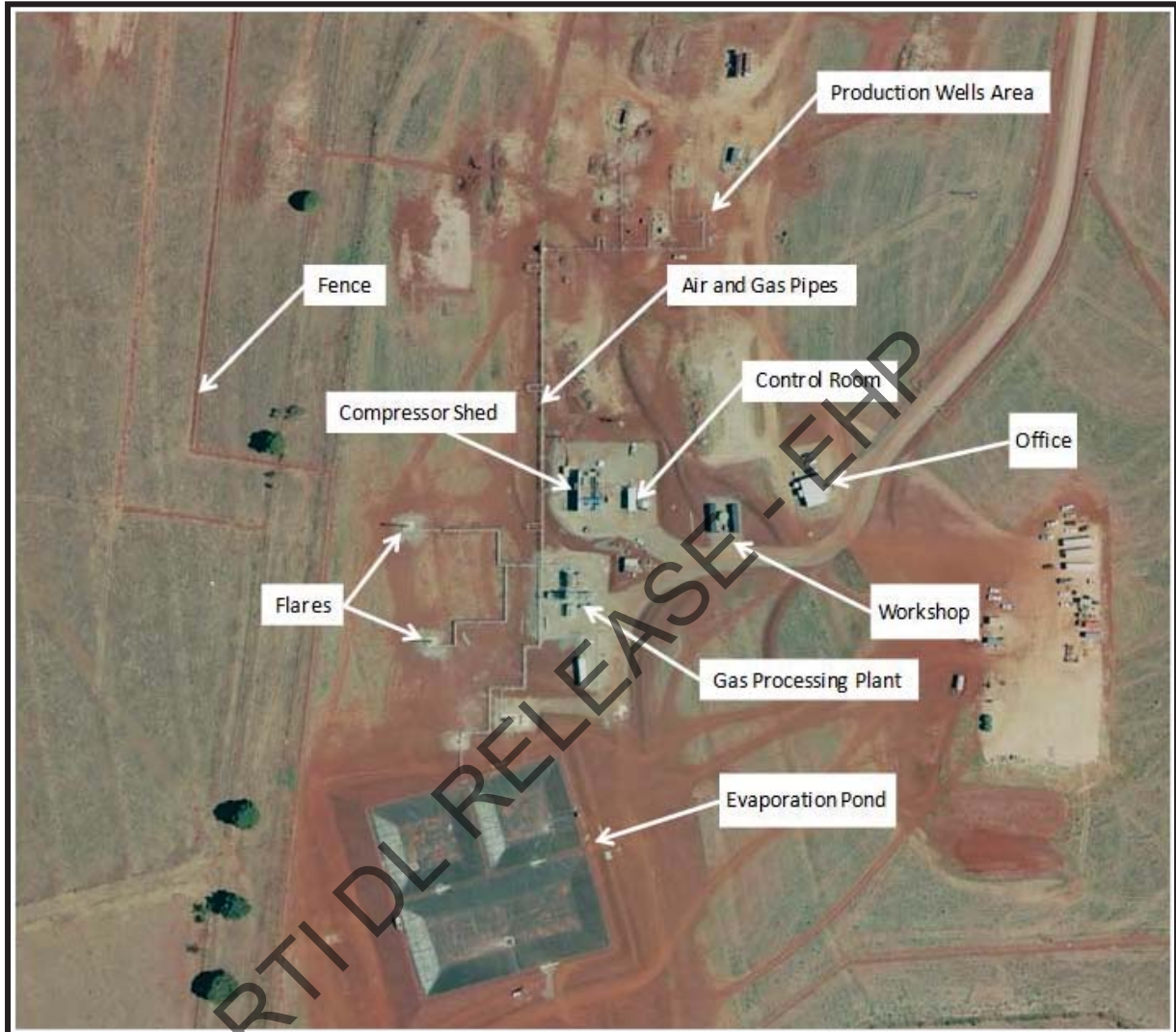


Figure 2: UCG Pilot Plant - Key Infrastructure Locations



3.2 Above Ground Infrastructure

Surface infrastructure of the pilot site consists of the following main components (see Figure 2):

- Evaporation Pond, comprising 3 water holding sections.
- Gas Processing and Cleanup Equipment.
- Steel pipes interconnecting the well area with the gas processing plant, evaporation ponds and flares.
- 2 vertical flares, main and standby.
- 1 x 2MVA, 11kV/450V Power Transformer Kiosk Type Schneider, 11kV power line with power poles and 3 x power distribution switchboards.
- Site office with septic amenities.
- Process control room equipped with 2 switchboards and PLC equipment.
- Concrete pads supporting all stationary equipment and pipes.
- Fence around the pilot site.
- Other associated process monitoring equipment and cabling.
- Solid Waste for Disposal.
- Roads.

3.3 Work Programme – Above Ground Infrastructure

Below we provide a high level overview of the works programme.

Soil erosion will be controlled by extensive site grading and grass seeding the areas of disturbance using grasses that are native to the areas vegetation.

3.3.1 Evaporation Ponds

- Remove rain water –drain by pumping out and irrigating the surrounding land after conducting the water quality tests and insuring that it is within the drinking quality guidelines.
- Remove all liners and pipes.
- Grade and fill in ponds with top soil and ensure that the landform is stable and reshaped as close as practicable to the landform of the site prior to the commencement of the gasification project.
- Top soil will be restored to the depth consistent with the depth of topsoil prior to the commencement of the construction activities.
- Implement erosion control structures where required
- Seed the area with Kikuyu grass seeds.

3.3.2 Gas Processing and Cleanup Equipment

- Unbolt skids.
- Remove power and control cables.
- Disassemble skids and set up for transport.
- Remove all interconnecting pipes – locate for transport.
- Remove all concrete footings.
- Restore top soil to the depth consistent with the depth of topsoil prior to commencement of the gas cleanup equipment construction.
- Implement erosion control structures where required
- Grade and seed the area.

3.3.3 Steel Pipework

- Disconnect all pipe-work and remove from site.
- Remove concrete pie support structures
- Grade and seed the area.

3.3.4 2 x vertical flares, main and standby

- Disconnect all cables,
- Remove concrete footings.
- Restore top soil to the depth consistent with the depth of topsoil prior to commencement of the gas cleanup equipment construction.
- Remove flares from site.
- Grade and seed the area.

3.3.5 Power Items

Disconnection and removal of 3.2.5 1 x 2MVA, 11kV/450V Power Transformer, 11kV power line with power poles and 3 x power distribution switchboards:

- Disconnect HV power to transformer.
- Remove transformer from the concrete pad.
- Relocate to auction yard.
- Remove concrete pad.
- Remove overhead and underground cables and poles.
- Restore top soil to the depth consistent with the depth of topsoil prior to commencement of the gas cleanup equipment construction.
- Grade and reseed the area

3.3.6 Site office with septic amenities

- Disconnect power and water and control cables
- Remove septic tank.
- Relocate office to auction yard.
- Grade and reseed area.

3.3.7 Process control room equipped with 2 switchboards and PLC equipment

- Disconnect power and water and control cables.
- Relocate control room to auction yard.
- Remove all concrete supports
- Grade and reseed area.

3.3.8 Concrete pads supporting all stationary equipment and pipes

- Remove all concrete pads and dispose of concrete to dump.
- Grade and seed area.

3.2.9 Fence around the pilot site

- Remove fencing panels and move off site.
- Remove all concrete footings.

3.3.9 Other associated process monitoring equipment and cabling

- Tanks and pumps to be disconnected.
- Remove from site.
- Grade and reseed area.

3.3.10 Solid Waste Disposal

- Excess rocks and soil to be removed from site to designated recycling area in Kingaroy.

3.3.11 Roads

- Grade and level all roadways.
- Remove road base
- Spread topsoil and seed.

3.3.12 Landholder Acceptance

- Have landholder inspect the site.

- Sign off on the acceptance and completion of the works.

If the landholder Stanwell expresses any interest in retaining any of the site structures/facilities, an appropriate mechanism for such retention will be established and all regulatory responsibilities will be transferred to the landholder.

3.3.13 DEHP

- Submit staged (interim) rehabilitation for acceptance
- Submit final rehabilitation report to DEHP for acceptance

4. WORK PROGRAMME-BELOW GROUND INFRASTRUCTURE-WELLS

Since early 2008 Cougar Energy has installed an extensive network of wells of various types within and around the pilot site. They are:

- Exploration wells - throughout the MDL385.
- Production/Injection - limited to the area of the pilot site.
- Ground Water Monitoring – within 2km radius from the pilot plant. Two types of the ground water monitoring wells have been installed:
 - open piezometers for collection of ground water samples and measurements of the ground water standing levels and
 - fully grouted VWPs designated for monitoring of hydrostatic pressure of various geological formations.

4.1 Works Programme

The scope of rehabilitation work for each type of wells therefore will differ, and will depend on the well type, depth and physical location. We outline this below:

- All production wells will be cemented completely from bottom to top as well as the triple casing structure (7", 9" and 12")
- All protruding casing will be cut down to one metre below the ground level in accordance with Petroleum and Gas (Production and Safety) Regulation 2004.
- All VWP monitoring wells that have already been cemented would only require trimming to the same one metre depth below the ground level.
- There is also a mixture of water monitoring wells. Some were constructed using PVC casing while others using steel. These will be cemented and cut down to 1m below the surface level.
- We will provide to the landholders and the DEHP details of the cement used and documentation evidencing that the wells have been fully plugged.

A full list of wells to be rehabilitated is presented in Table 1 below.

Table 1: Wells

#	HOLE NO	HOLE TYPE	LOCATION	Easting MGA	Northing MGA	Elevation	Total Depth (m)	Casing size	Volume (m3)	Cementing Required	Trim to the depth 1m
1	T5012	Monitor	O'Sullivan	385406	7056088	460.52	227	153	4.2	y	y
2	T5023	VWP	On Site	386770	7054727	545.08	234.46		0	N	Y
3	T5025	Monitor	Lucas	385269	7056974	464.19	235.38	153	4.3	Y	Y
4	T5028	Monitor - No Pump	O'Sullivan	385880	7056023	479.74	234	153	4.3	Y	Y
5	T5031	VWP	On Site	386851	7054757	547.92	372.35		0	N	Y
6	T5033	VWP	On Site	386575	7054730	535.42	302.85		0	N	Y
7	T5034	VWP	On Site	386703	7054634	542.51	300.3		0	N	Y
8	T5035	VWP	On Site	386707.93	7054839.1	540.33	241.23		0	N	Y
9	T5036	VWP	On Site	386674.02	7054717.8	540.55	199.57		0	N	Y
10	T5037	Monitor	Off Site	386498	7054811	531.2	54	50	0.1	Y	Y
11	T5038	Monitor	Off Site	386494.01	7054798.7	531.34	84	50	0.2	Y	Y
12	T5039	Monitor	On Site	386693	7054813	540.81	213.5	153	3.9	Y	Y
13	T5040	Monitor	On Site	386761.56	7054616.4	545.27	213.3	153	3.9	Y	Y
14	T5042	Production Well - P1	On Site	386743.9	7054715.4	544.15	221.98	166	4.8	Y	Y
15	T5044	Production Well - P2	On Site	386714.4	7054736.8	543.2	219	166	4.7	Y	Y
16	T5046	Production Well - P3	On Site	386724.7	7054688.3	543.95	213.45	166	4.6	Y	Y
17	T5048	Production Well - P4	On Site	386752.85	7054710.6	544.55	224	166	4.8	Y	Y
18	T5049	Monitor	On Site	386637	7054686	538.95	210.6	153	3.9	Y	Y
19	T5050	VWP	Off Site	386176.3	7054831.6	516.25	249.67	114	0	N	Y
20	T5051	VWP	Off Site	386186.25	7056358	504.95	288.23	114	0	N	Y
21	T5053	VWP	Off Site	385267.35	7056982.6	464	258.29	114	0	N	Y
22	T5054	VWP	Off Site	386518.8	7055138.1	524.5	279.28	114	0	N	Y
23	T5055	VWP	Off Site	386301	7054396	517.15	318.34	114	0	N	Y
24	T5058	Monitor	On Site	386746.65	7054709.3	544.4	206.6	166	4.5	y	Y
25	T5059	Production Well - P5	On Site	386691.33	7054710	541.37	218	177	5.4	y	Y
26	T5060	Production Well - P6	On Site	386705.89	7054706.3	542.37	213.85	177	5.3	y	Y
27	T5061	Monitor	On Site	386745	7054715	544.128	212	166	4.6	y	Y
28	T5062	Monitor	On Site	386709	7054730	542.382	42	60	0.1	y	Y
29	T5063	Monitor	On Site	386779	7054765	544.976	42	60	0.1	y	Y
30	T5064	Monitor	On Site	386707	7054730	542.353	66	60	0.2	y	Y
31	T5065	No Pump	On Site	386777	7054765	544.871	81	60	0.2	y	Y
32	T5066	Monitor	On Site	386706	7054730	542.374	90	60	0.3	y	Y
33	T5067	No Pump	On Site	386731	7054721	543.752	40.5	60	0.1	y	Y
34	T5068	Monitor	On Site	386801	7054690	546.684	41.5	60	0.1	y	Y
35	T5069	Monitor	On Site	386730	7054721	543.67	70	60	0.2	y	Y
36	T5070	No Pump	On Site	386800	7054690	546.695	81	60	0.2	y	Y
37	T5071	Monitor	On Site	386728	7054721	543.617	72	60	0.2	y	Y
38	T5072	Monitor	On Site	386736	7054664	543.917	94	60	0.3	y	Y

5. SAFETY AND ENVIRONMENTAL MANAGEMENT

5.1 *Health Safety Environmental and Community Policy*

Cougar Energy is committed to creating an incident-free workplace, safeguarding the health of all persons on our sites, preventing environmental harm and respecting the needs of the local communities. We will implement and maintain effective Health, Safety and Environmental Systems, supported by the provision of adequate resources.

These systems are periodically audited to assess their effectiveness and will be subject to ongoing audit through the period of the rehabilitation project.

We will strive to meet the respective responsibilities as covered under Legislation and to meet community expectations with regard to health, safety, environment and engagement with local stakeholders.

- **Our Safety Value:** We will never compromise safety.
- **Our Environmental Value:** We will always balance our operational needs with our environmental obligations and community expectations.
- **Injury Prevention:** We will prevent incidents and injuries through effective planning and implementation. Commercial expediency is not a reason to take risks. We believe that all injuries are preventable.
- **Behaviours and Accountability:** All persons at Cougar Energy will be accountable for their behaviour. We will have clear expectations and we will actively intervene to prevent risk-taking behaviours.
- **Hazard and Risk Management:** We will manage risks by identifying hazards, assessing risk and implementing effective controls to minimize damage, injury or harm.
- **Reducing Impact:** We will use resources efficiently and reduce waste through strategies of reduce, re-use, recycle.
- **Education and Training:** We will educate and train our employees and contractors so they understand and meet their obligations.
- **Compliance:** We will ensure all our activities comply with the law.
- **Community Engagement:** We will be responsible citizens in the community in which we operate.

5.2 Health and Safety Management Plan

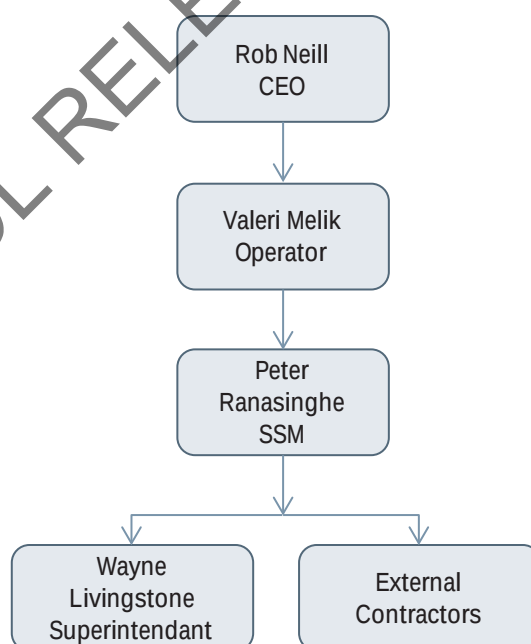
Current company Safety and Health management plan is presented in Appendix A.

5.2 Regulatory Authority

Since early 2012 the UCG pilot facility commenced operating under Petroleum and Gas (Production and Safety) Act 2004. The underground gasification activities on land the subject of a mineral development licence for activities relating to mineral (f) do not constitute “on site activities” and such are not subject to the Coal Mining Safety and Health Act 1999. (Reference: letter from Mr. Gavin Taylor the Chief Inspector of Coal Mines, 6 January 2010, see Appendix E).

The UCG pilot site has been out of operation Since June 2010. Following its closure the gas processing plant was put on preservation and sealed from entry by any personnel. However the plant remains governed by the P&G safety authority due to still open six production wells P1, P2, P3, P4, P5 and P6.

5.3 Health and Safety Organisational Structure



5.4 Safety System Management

Cougar’s safety management system is reviewed, audited and updated on regular basis by the Site Operator and Site Safety Manager. Usually it is done internally in February of

each year. However in February 2012 Cougar invited P&G safety inspectorate to carry out an audit which resulted in a satisfactory outcome.

5.5 Risk Management Plan and Controls

Risk Management Plan with completed controls and associated procedures is attached in Appendix B.

In addition to the existing standard risk assessment procedures all site works are governed by the permit to work system with procedures presented in Appendix C.

As a matter of practise for each job a separate permit to work form is completed.

This permit of work has an expiration period and calls for a specific job safety and risk analyses session to be conducted. When completed the form is submitted to the site safety manager for review and approval, so that no work can take place anywhere on site without a prior risk assessment and approval obtained from the site safety manager.

5.6 Basic Environmental Aspects

5.6.1 Noise

The UCG pilot plant is located some 1.7km from a nearest residential house, however the following arrangements to minimise the noise impact during the decommissioning will be implemented:

- Cougar will inform potentially noise-affected neighbours about the nature of work stages and noise reduction measures.
- Give notice as early as possible for periods of noisier works such as excavation and describe the activities and how long they are expected to take.
- Keep affected neighbours informed of the progress.
- Appoint a principal contact person for community queries.
- Carry out work within normal working hours,
- Where it is reasonable to do so Cougar will schedule noisy activities for less sensitive times, (for example, delay a rock-breaking task to the later morning or afternoon), provide periods of respite from noisier works (for example, periodic breaks from jackhammer noise).
- Schedule work outside the weekend/evening hours in the schedule (including Saturday afternoon or Sunday) are more sensitive times and have noise requirements consistent with quieter work.

Noise level during the progress of the decommissioning works is not expected to exceed 85db beyond 100m from the site boundary fence.

5.6.2 Dust

Dust suppression during the decommissioning is important not only to the environment but also to the surrounding community and site personnel. The generation of dust can cause detrimental effects to the health and amenity of neighbours and employees, reduced visibility on site, increased wear on machinery and equipment and complaints from neighbours.

All reasonable and practicable measures will be implemented to minimise dust emission. Water can be used for dust suppression purposes from the onsite existing evaporation pond, which has a significant amount of rain water accumulated in it. A licence to take water is not required in this case.

5.6.3 Lighting and Visual Impact

There will be no artificial lighting required during the decommissioning work, as all onsite activities will be performed during the periods of daylight.

Visual impact will be limited to the removal of industrial-type structures such as gas cleanup equipment and flares with the associated pipe work, so that the area is returned to its original agricultural look.

5.6.4 Final Land Form

Cougar energy will be aiming at returning the land to its original form or to an equivalent form as on the surrounding lots. However if the landholder Stanwell would express an interest in retaining any of the site structures/facilities, such as power line, fences, roads, evaporation pond and etc, a mechanism of the retention will be established with all the relevant regulatory responsibilities transferred from Cougar Energy to Stanwell.

5.6.5 Revalidation and Soil Erosion

Soil quality, runoff, and soil loss management has been successfully implemented and maintained by Cougar before during and after the erection of UCG pilot plant. high coverage of grass and gravel will prevent surface runoffs and soil erosion very effectively.

Our land rehabilitation efforts and experience will be directed to reestablishment of the natural vegetation, flora and fauna in order to prevent any soil erosion due to runoffs.

A final land acceptance will be presented to the landholder for a sign-off and a final land rehabilitation report will be submitted to the DEHP for their records.

6. COMMUNITY

Between 2008 and 2009, Cougar has installed a number of ground water monitoring wells, open and closed, on the private properties of surrounding landholders. Those wells will be



plugged and abandoned, and the landholders who would be affected will be contacted first and then visited by Cougar personnel to agree on the mutually convenient time for this activity to take place.

Before and during the decommissioning works Cougar Energy will continue to leave and work with the local community side by side, and where possible the local community members and businesses will be asked to get involved or even be employed by Cougar to help to advance the decommissioning works further.

We will be encouraging local Kingaroy businesses to tender for rehabilitation work and where possible ensure local business can benefit from the rehabilitation project.

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7. APPENDIX A: SAFETY AND MANAGEMENT PLAN

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COUGAR ENERGY

COUGAR ENERGY LIMITED ABN 75 060 111 784
Suite 1002, 530 Little Collins Street,
Melbourne, Victoria, 3000 Australia.
Telephone: +61 3 9909 7200
Facsimile: +61 3 9909 7217
Website: www.cougarenergy.com.au
Email: enquiries@cougarenergy.com.au

New Power for Asia

HEALTH SAFETY AND

ENVIRONMENTAL

MANAGEMENT PLAN



205-PRO-170



C	07/08/2013	Reviewed for decommissioning	VM	PR	RN
B	14/02/2012	Reviewed change of Operator	VM	PR	LW
B	9/9/2011	Revised to reflect changed ops	AB/VM	PR	LW
A	12/12/2009	First draft	PRS 12/12/2009	AB	LW
Rev	Date	Description	Drafted	Checked	Approved

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1. PURPOSE

The purpose of this document is to describe our Health, Safety and Environment (HSE) Management System. This document is essentially a “road map” that lists our core HSE requirements and points to relevant site documentation.

Our HSE Management System is designed to provide a framework through which we:

- **Integrate** the HSE aspects of our activities into the overall management of the business, including business planning;
- **Standardise** HSE management across all our activities;
- Clearly **communicate** our expectations to employees and contractors;
- Establish clear **HSE criteria** against which our operations and associated support functions can be audited;
- **Report** HSE performance to interested parties, and;
- **Continually improve** our HSE performance.

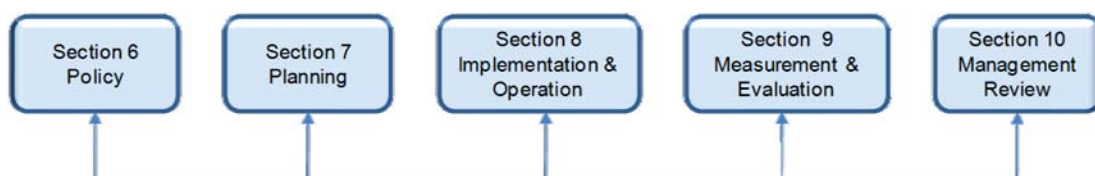
This HSE Management Plan applies to the Kingaroy Pilot Gasification Plant (KPGP) site operations, including:

- Pilot plant facilities and associated wells;
- Offices and site support functions;
- It was reviewed by the operator and modified for the decommissioning stage of the plot plant which was not operating since July 2010

This Management Plan is designed to assist and guide all Cougar employees, including the senior management.

2. DOCUMENT STRUCTURE

This manual is structured around the ISO 14001/ AS 4801 management system framework and P&G (production and safety) act 2004 as follows:



You can easily navigate around this document using the process map at the start of each Section and by using the Table of Contents.

Note that most of our operational HSE procedures are contained in Section 8.0 ([Implementation and Operation](#)) of this document.

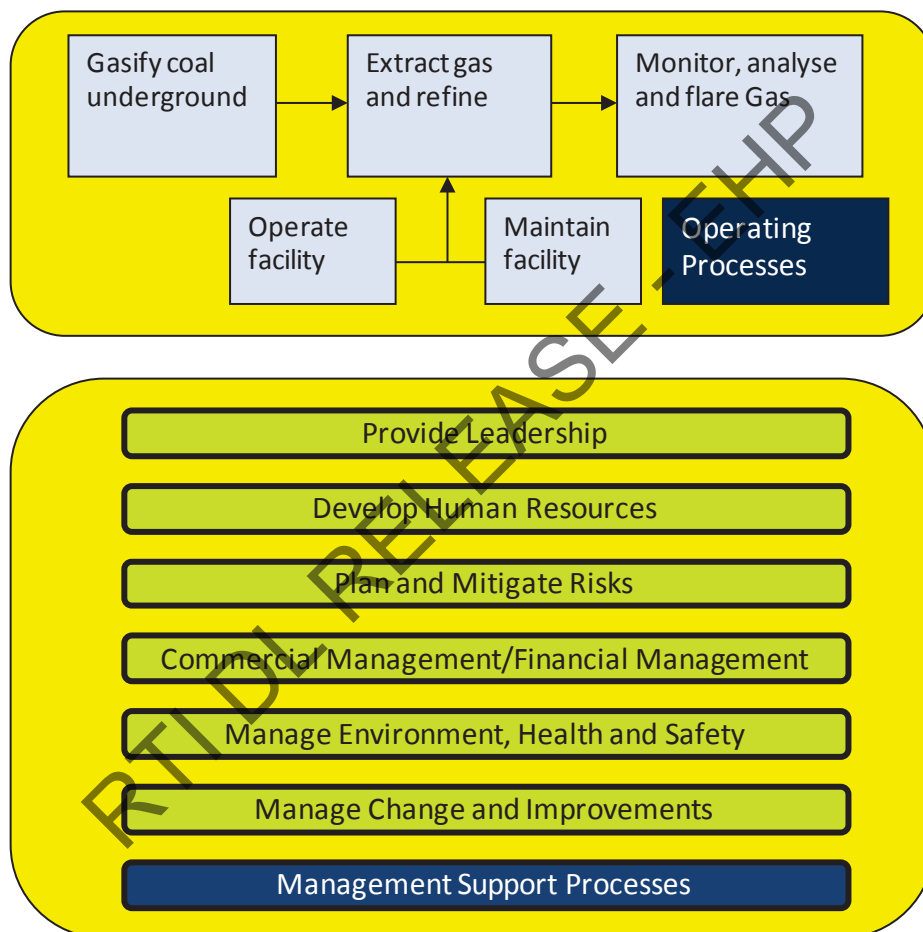


3. BACKGROUND

3.1 Company Description

The Kingaroy Pilot Site is located in the South Burnett region of South East Queensland. The site is operated by Cougar Energy Ltd (ABN 75 060 111 784).

The UCG pilot plant consists of a several main areas. Production wells area, Gas Clean up plant with Flares, Compressor area with Control room, Workshop and Office. A simplified process map of our key operating and support processes is provided below:



In July 2010 the Queensland Department of Environmental Resources (DERM) currently Department of Environment and Heritage Protection (DEHP) issued Cougar Energy with a notice halting further activities directed at restarting an underground burn. Subsequently in January 2011 DERM issued a Notice of Proposed Action that it intended to alter Cougar Energy's environmental licence preventing it from restarting at all.

This update of the HSE Management Plan is being undertaken to reflect the next stage of the plant operation – decommissioning and rehabilitation of all areas of disturbance (see Figure 1).

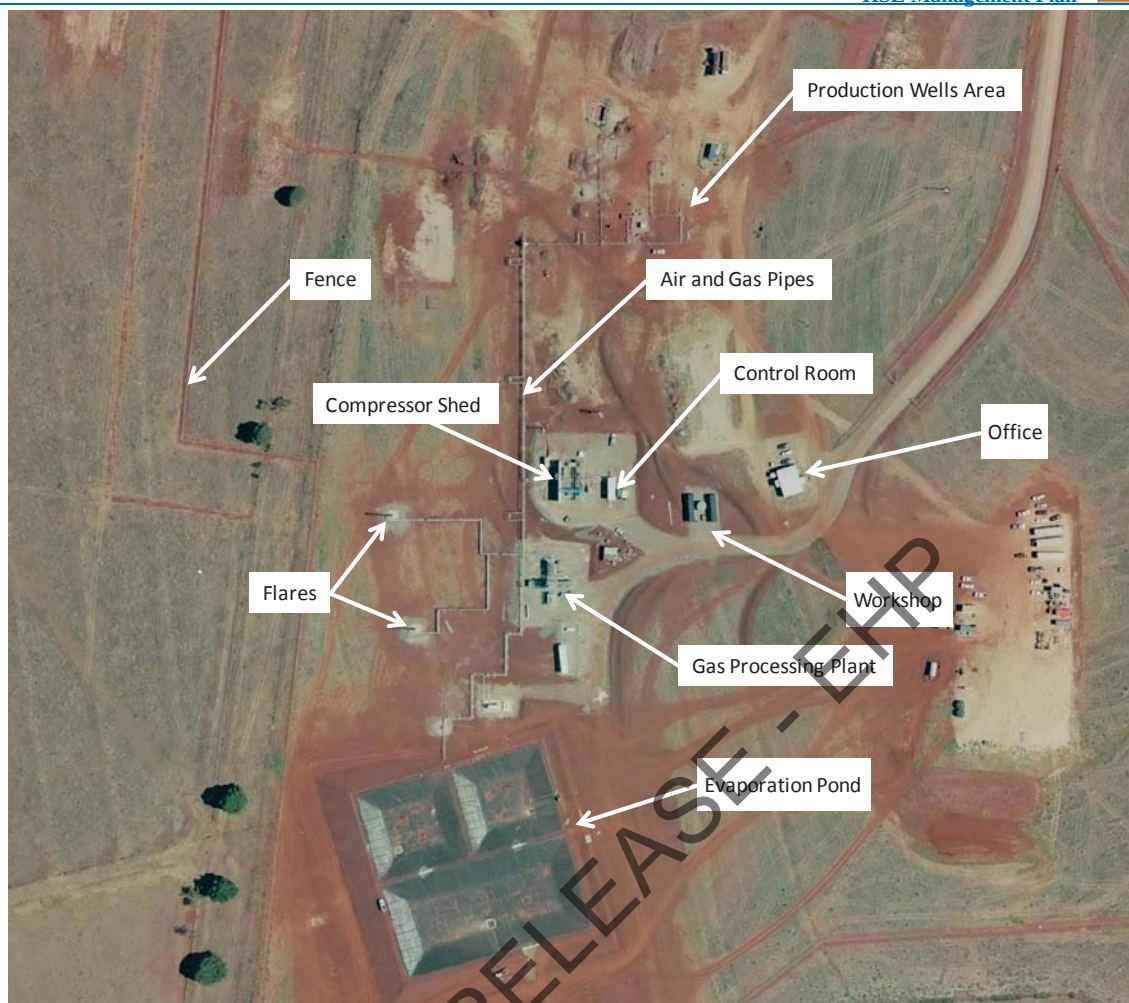


Figure 1: UCG pilot plant



3.2 HSE Philosophy

Our goal is to achieve **excellent health, safety and environmental performance** by integrating HSE management into business processes and developing a culture that promotes individual and collective accountability and ensures commitment to continual improvement

To achieve our goal, give effect to our company values and address the needs of our stakeholders, including the local community, we must operate within the parameters specified by applicable laws, management agreements and community standards. This requires us to operate so that our activities do not adversely affect our workforce or communities and environments in which we operate and to report on our HSE performance honestly, completely and with a high degree of transparency.

The achievement of our goal requires a **structured, systematic approach** to the management of health and safety hazards and environmental impacts and aspects.

RTI DL RELEASE - ENP



4. RESPONSIBILITIES

4.1 Site Management

The Site Supervisor shall be the site champion for HSE management issues and will ensure major HSE issues are brought to the attention of the **General Manager Project Services**.

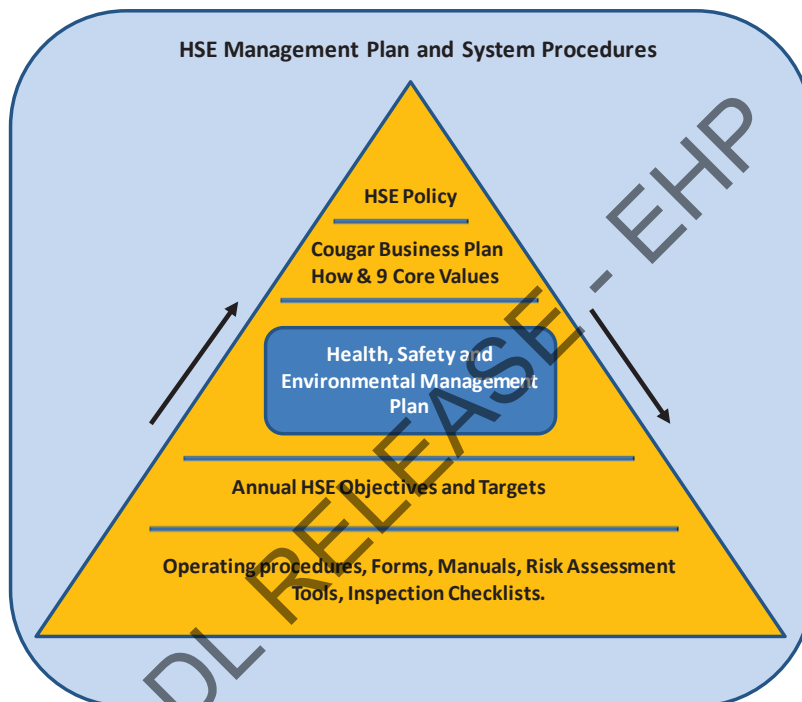
4.2 Site Staff

All staff are accountable for practising risk management principles in day-to-day work and ensuring that work is effectively planned and implemented to minimise the risk of incidents. Detailed responsibilities are listed in the various procedures forming part of this manual.

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5. MANAGEMENT SYSTEM FRAMEWORK

The following diagram illustrates the hierarchy of documents under the HSE system. As you move down the triangle toward its base, the documents are progressively providing detail as to **HOW** things should be done; moving up the triangle towards the apex provides context – **WHY** we are doing things. The HSE Management System is supported by our Business Management Systems, including supporting system procedures.



This HSE Management Plan is structured to be consistent with AS 4081 (Occupational Health & Safety Management Systems), ISO 14001 (Environmental Management Systems) and P&G Production and Safety Act 2004. This system model is essentially a **“Plan-Do-Check-Act”** continuous improvement framework as illustrated below:



The success of our management system depends on commitment from all levels and functions of the organisation and especially from our senior management. Accountability for effectively managing HSE issues at the Pilot Facility ultimately rests with the site senior management team. However, implementing and complying with health, safety and environment programs is the responsibility of all our employees.

In the sections that follow, a brief description is provided of the purpose of each of the major system elements of our HSE management system. This is followed by a summary of our core expectations for the major HSE processes for each system element.

Each sub-section includes a reference to the relevant clause in ISO 14001 and AS 4801 and a listing of relevant reference documentation including elements pertaining to **SafeOps for Petroleum and Gas**. The reference documents tell us how things should be done – they are the “doing” part of our system. Documents listed in italics are under development at the time of issue of this manual.

5.1 Health Safety Environmental and Community Policy

Cougar Energy is committed to creating an incident-free workplace, safeguarding the health of all persons on our sites, preventing environmental harm and respecting the needs of the local communities. We will implement and maintain effective Health, Safety and Environmental Systems, supported by the provision of adequate resources.

These systems are periodically audited to assess their effectiveness and will be subject to ongoing audit through the period of the rehabilitation project.

We will strive to meet the respective responsibilities as covered under Legislation and to meet community expectations with regard to health, safety, environment and engagement with local stakeholders.

- **Our Safety Value:** We will never compromise safety.

- **Our Environmental Value:** We will always balance our operational needs with our environmental obligations and community expectations.
- **Injury Prevention:** We will prevent incidents and injuries through effective planning and implementation. Commercial expediency is not a reason to take risks. We believe that all injuries are preventable.
- **Behaviours and Accountability:** All persons at Cougar Energy will be accountable for their behaviour. We will have clear expectations and we will actively intervene to prevent risk-taking behaviours.
- **Hazard and Risk Management:** We will manage risks by identifying hazards, assessing risk and implementing effective controls to minimize damage, injury or harm.
- **Reducing Impact:** We will use resources efficiently and reduce waste through strategies of reduce, re-use, recycle.
- **Education and Training:** We will educate and train our employees and contractors so they understand and meet their obligations.
- **Compliance:** We will ensure all our activities comply with the law.
- **Community Engagement:** We will be responsible citizens in the community in which we operate.

5.2 *The five key aspects of our HSE Management System:*

1. **Risk Management:** The aim is to identify and control all potential hazards, impacts and risks before they result in loss. We require all employees to be proficient in the risk management techniques that apply to their positions. Much of this Manual is devoted to risk controls.
2. **Behaviour Management:** The aim is to encourage employees to avoid risk taking behaviours through education, recognition and rewarding safe behaviours.
3. **Incident Management:** The aim is to thoroughly investigate all incidents to seek the root causes of loss events so that we may apply the lessons to prevent recurrence.

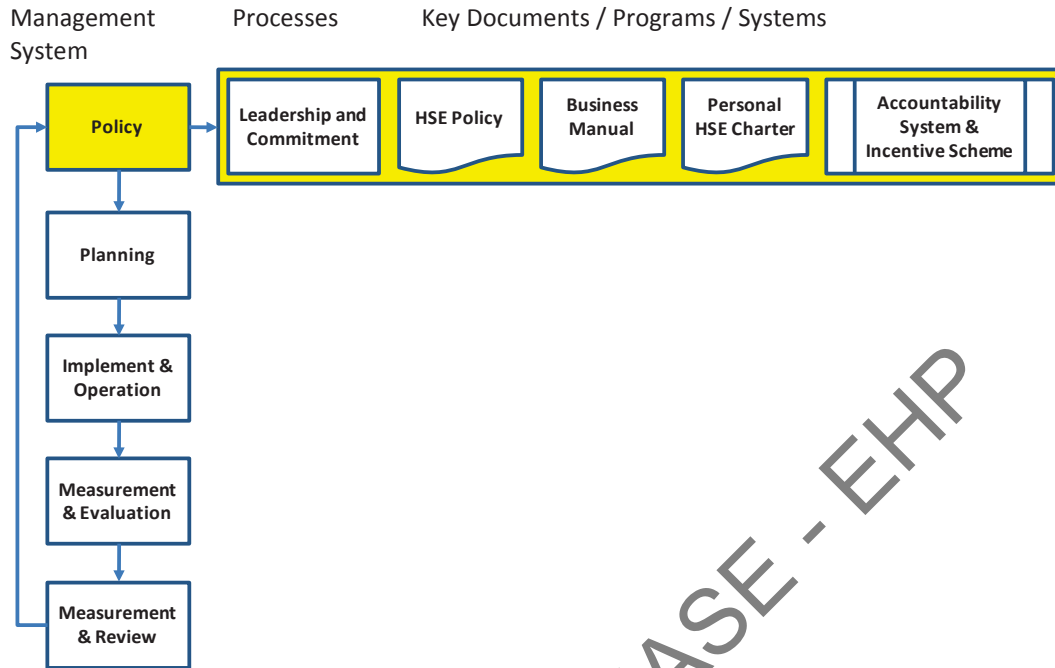


4. **Emergency/ Crisis Management:** The aim is to mitigate the consequences of a serious incident by having appropriate response and business continuity.
5. **Information/Data Management:** The aims are to ensure suitable hazard information is shared with relevant stakeholders and that HSE measurement data is collected, analysed and acted upon.

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6. SYSTEM ELEMENT – POLICY



Summary

The Health, Safety, Environment and Community Policy is the key driver for sustaining an effective HSE Management System. The policy reflects our site values and senior management commitment to compliance with applicable laws and continual improvement. The policy forms the basis for the establishment of HSE objectives and targets and assists in shaping the HSE climate of our site.

Our actions and decisions while at work should always be consistent with our Policy beliefs.

Documents supporting the policy, clarify accountabilities and drive the implementation of the HSE activities needed to secure excellent HSE performance at the site.

The **Site Supervisor** is accountable for overall HSE management and performance at the Kingaroy site.

6.1 Leadership and Commitment



ISO14001 Reference 4.1; 4.2
AS4801 Reference 4.1; 4.2



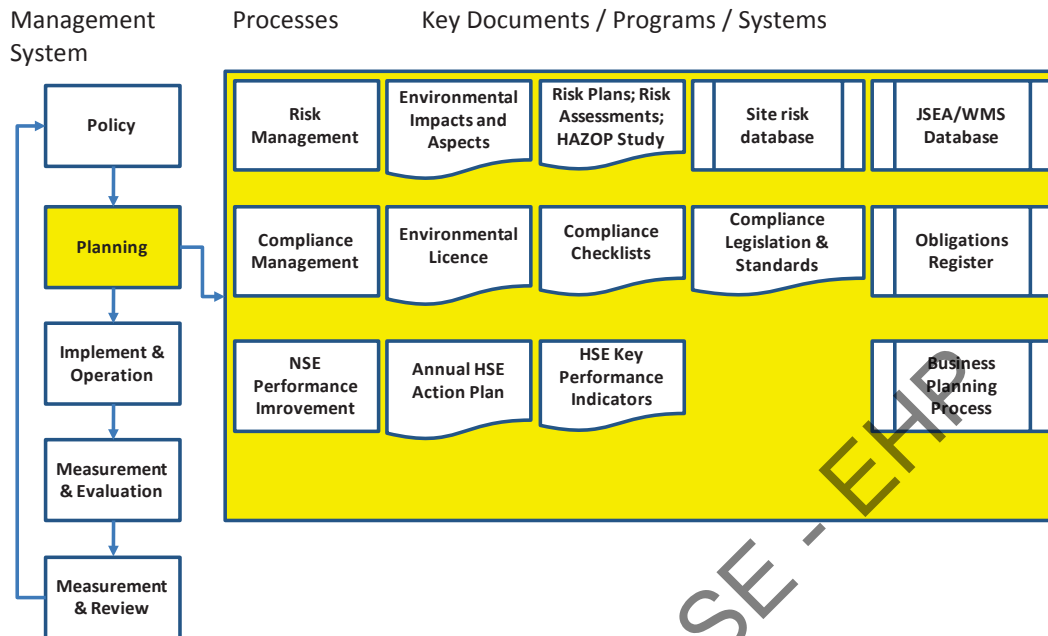
We will:

- **Communicate** the current **HSEC policy** to site personnel and other interested parties;
- Ensure site activities are done in **compliance** with the HSEC Policy;
- Require **senior management** to demonstrate commitment to the health and safety of employees (including contractors) and protection of the environment *through* active and visible participation in HSE activities and through their decision making.
- **Promote** HSE programs through appropriate initiatives, including dissemination of information and consultation with employees.

Reference Documentation - Policy	Location
<i>HSE Policy Document</i>	<i>Policy</i>



7. SYSTEM ELEMENT PLANNING



Summary

This part of the system is primarily about the identification of significant health and safety hazards and environmental aspects (or activities which may impact on the environment) and the planning required to mitigate them. Once identified, the risks arising from these hazards (or aspects) can be assessed and controlled.

Hazard [aspect and impact] identification is accomplished by taking into account the inputs and outputs associated with activities (such as construction, installation, operation and processing, maintenance and service), products and services. **Risk management** is a key requirement and this part of the system includes the methodology for assessing and managing risk.

The other key elements of planning include:

- managing legal and other obligations;
- establishing objectives and targets; and
- the use of management plans to describe how the objectives will be achieved, including time-frames and responsible personnel.

The successful implementation of a HSE Management System requires the allocation of appropriate resources and the commitment of all employees of the organisation. Commitment to HSE begins with senior management and extends through the line management organisation.



7.1 Leadership and Commitment



ISO14001 Reference 4.1; 4.2

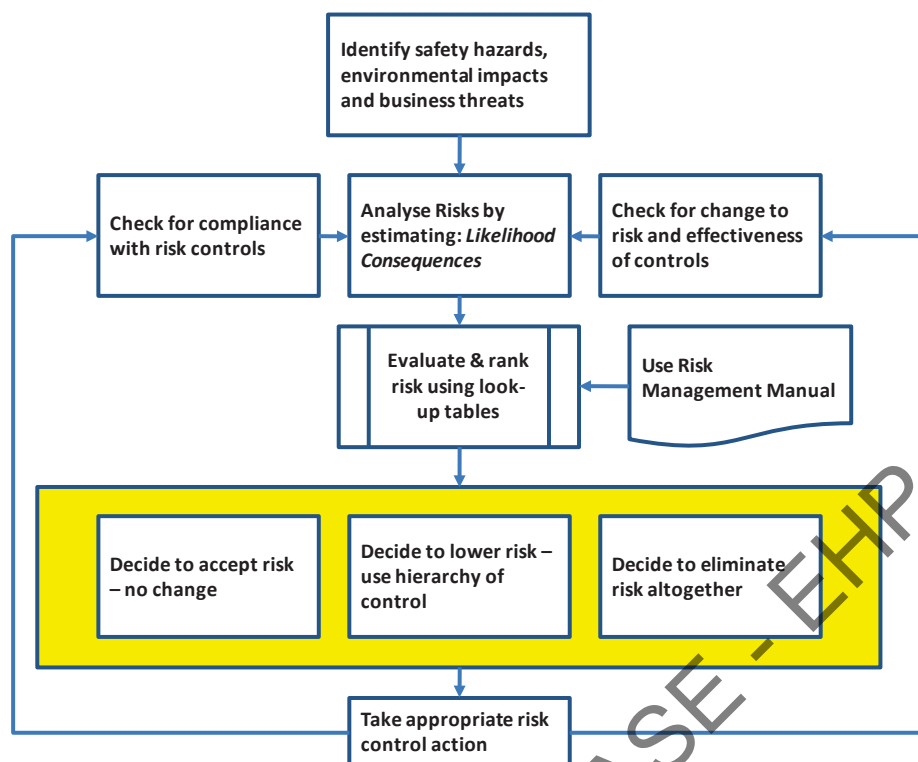
AS4801 Reference 4.1; 4.2

We Will:

- Implement appropriate **workplace hazard identification, risk assessment and control processes** generally in accordance with AS/NZS 4360
 - ✍ *Hazard identification techniques may include toolbox meetings; pre-start checklists; incident reports; and inspections.*
- Encourage the **active involvement** of all employees and contractors in risk management.
- Manage risks using the **hierarchy of control measures** as follows:
 - ☐ Eliminate the hazard or substitute the hazard for a safer alternative;
 - ☐ Use engineering controls to separate the hazard from personnel;
 - ☐ Develop appropriate procedures and work instructions, train personnel, enforce special rules, post warning signs;
 - ☐ Using personal protective equipment.
- Ensure that **contractors** implement suitable risk management techniques while working at our workplaces.
- Ensure that **significant changes** to plant and processes are subject to formal risk assessment using a suitable technique. The assessment shall involve relevant technical specialists and employee representatives. All relevant site personnel impacted by the change will be notified and informed of any additional HSE requirements.

Reference Documentation – Leadership and Commitment	Location
<i>HSE Policy Document</i>	<i>Policy</i>
<i>Work Methods Statement</i>	<i>Form</i>

The broad process for risk management is summarised in the diagram below:



The Risk Management Process (above) and the Hierarchy of Risk Control (below)





7.2 Compliance Management



We Will:

- **Identify all HSE legal obligations** applicable to the site, including acts, regulations, codes, standards, laws and licences
- **Assess the implications** to the site of various legal obligations and establish systems to ensure consistent compliance with the obligations such as statutory notification and reporting requirements.
- **Communicate** relevant information on legal and other requirements to our employees and to our contractors as necessary. Hold all site staff accountable for compliance with our legal obligations.
- **Audit and report** legislative compliance on a regular basis (at least annually via internal audit).
- **Adopt** the more stringent obligation where there is a difference between legal obligations and the obligations imposed by this HSE Management System Manual.

Reference Documentation – Leadership and Commitment	Location
<i>Register of Licences and Permits</i>	<i>Available through Melbourne office</i>
<i>Environmental Authority (Licence MIN 1006 5650 7</i>	<i>Electronically</i>
<i>Maintenance Schedule Tasks (for statutory obligations)</i>	<i>Available through Melbourne office</i>

7.3 HSE Performance Improvements



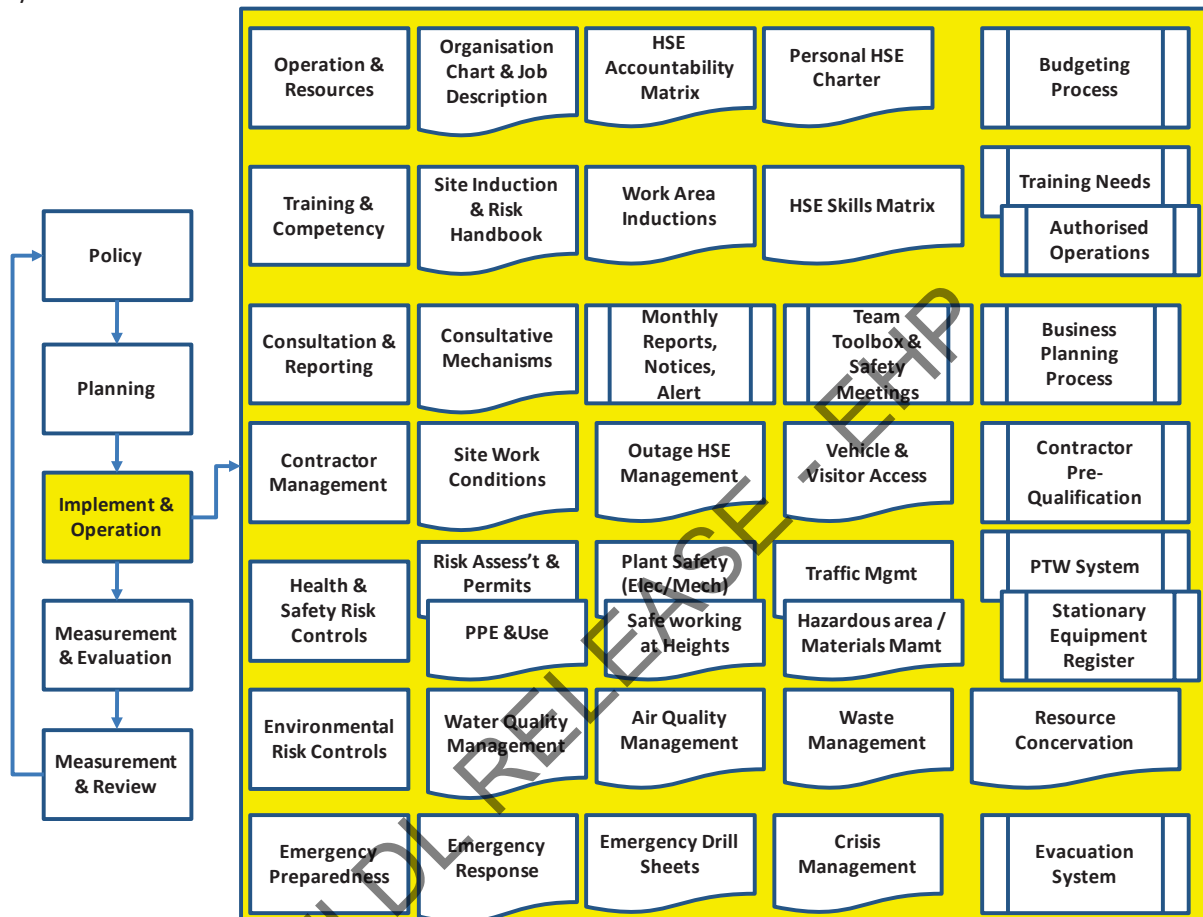


8. SYSTEM ELEMENT – IMPLEMENTATION AND OPERATIONS

Management
System

Processes

Key Documents / Programs / Systems



Summary

The successful implementation of a HSE Management System requires the allocation of appropriate resources and the commitment of all employees of the organisation. Commitment to HSE begins with senior management and extends through the line organisation. All management personnel should have clear HSE responsibilities listed in their position descriptions. Most of the “doing” aspects of the HSE Management System are detailed in this part. Key requirements include:

- Consultation, communication and reporting, including the reporting of all HSE incidents;
- Training and competency;
- Document management and record-keeping requirements P&G (P&S) Act 2004 [675(1)r];
- Permit-to-Work system for safe plant access P&G (P&S) Act 2004 [675(1)i];
- Clear and user friendly HSE procedures and forms;

- Effective management of contractors and other third parties;
- Emergency preparedness and response, including crisis management.

8.1 Organisation and Resources

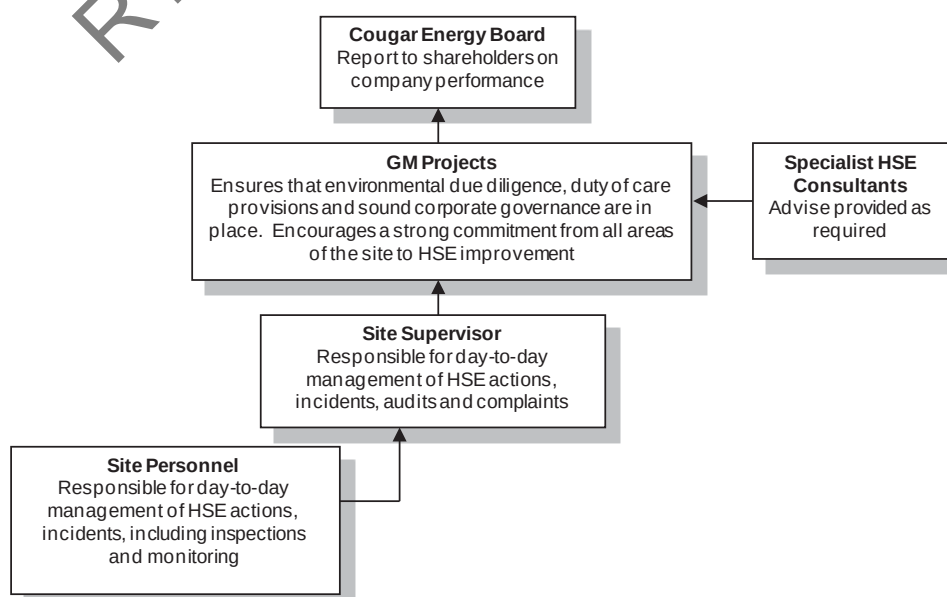


ISO14001 Reference 4.1; 4.2
AS4801 Reference 4.1; 4.2

We Will:

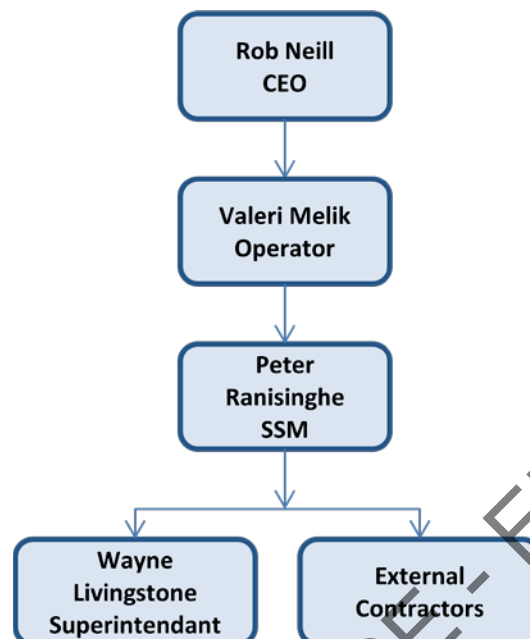
- Provide appropriate **HSE resources** to give proper effect to this Manual. This includes the provision of suitable and sufficient first aid facilities, pollution control devices and emergency equipment.
- Provide access to a suitably qualified person as the **Workplace Health and Safety Officer**
- Hold line managers **accountable for the** HSE performance of the activities directly under the line manager's controls, including control of contractors.
- Assign **accountability** to individuals for the HSE implications of their own actions and vest in individuals a duty to carry out their work in a manner which does not present a risk to themselves, or to others and which minimises potential adverse impacts on the environment. Individuals will be held accountable for identifying and reporting hazards and potential environmental harm arising from their activities, and effectively managing risks at their workplace.
- Ensure that **position descriptions** for each individual contain general requirements relating to HSE management.

8.2 Cougar Energy HSE Management Responsibilities and Structure





8.3 Organisational Structure for Decommissioning



This safety management structure applies to all areas of the plant as well as entire area of MDL385.

8.3.1 Lone Worker

With the change in site operations to “care and maintenance” there has been a dramatic reduction in workforce numbers. Often this will mean that only two people are present on site. The presence of two people on site means that if one becomes injured the second person is available to ensure medical attention can be provided promptly. In some circumstances only one person may be on site, for example if the second person is ill or on holidays. In this event the lone worker is restricted to administration activities on or off site or site surveillance activities such as walking around the site.

8.4 Training and Competency



ISO14001 Reference 4.1; 4.2

AS4801 Reference 4.1; 4.2

P&G (production and Gas safety) Act 2004 [675(1)h]



We Will:

- Identify the **training needs** of individuals so that they may do their jobs safely and efficiently – this may be done through position descriptions, supervisor assessments or job hazard analysis.
- Ensure that each person successfully completes the required competency training before starting his or her job.
- Ensure that the training needs are updated on at least a two yearly basis and as soon as changes are introduced in work processes or station operations.
- Ensure employee training is provided through suitably experienced or **accredited trainers**.

Core Requirements:

All personnel and contractors attending site must satisfactorily complete a **general site induction** prior to commencement of work at the site. As a minimum, the site induction shall include information on emergency procedures, HSE rules, key legal obligations, major hazards and potential environmental impacts, incident reporting, fitness for work and the process for resolving HSE concerns. The site induction shall, where appropriate, also include a site orientation that covers site layout and location of facilities, emergency equipment, first aid post and muster points.

Contractor organisations must demonstrate through appropriate training records that their line managers, employees and subcontractors have been provided with appropriate training to ensure that they are competent to do assigned tasks.

Any person who will be doing activities or tasks that require a Licence or **Certificate of Competency** (for prescribed occupations) must provide evidence of the competency to the relevant CE manager or contractor supervisor who shall retain a record of the Licence or Certificate. Other relevant training certificates such as First Aid Certificates shall be kept on file.

Reference Documentation – Training and Competency	Location
Site Induction Procedure	Procedure UCG Pilot Plant
Induction Questionnaire	Form

8.5 Communication, Consultation and Reporting



ISO14001 Reference 4.4.3

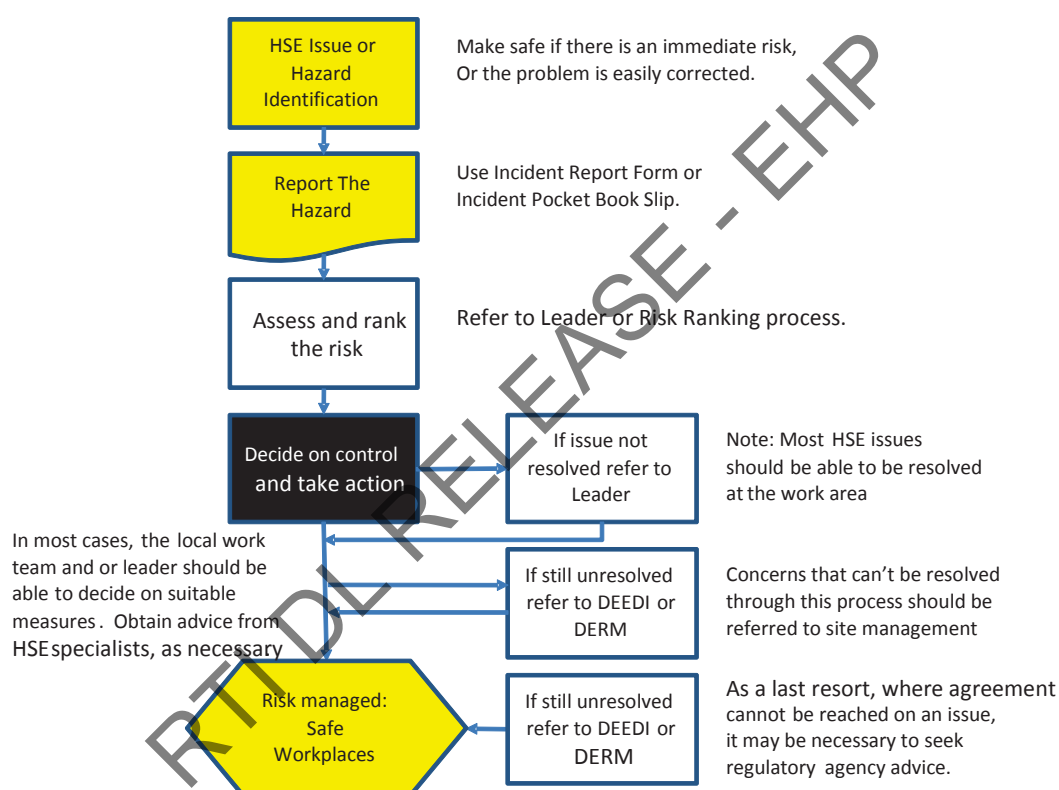
AS 4801 Reference: 4.4.3.1; 4.4.3.2; 4.4.3.3

P&G Act 2004 [675(1)m]

We Will

- Establish and maintain suitable **consultative structures** at the site to facilitate communication and consultation with all personnel on HSE matters. As a minimum requirement, CE shall comply with relevant legal obligations relating to consultation.

The process for resolving HSE issues and concerns is summarised in the following diagram:



Resolving HSE Issues and Concerns

A formal safety assessment consisting of the systematic assessment of risk with description of the technical and other measures has been undertaken, to control the identified risk at the decommissioning phase of the project.

8.6 Change Management and Modifications



ISO14001 Reference 4.4.6

AS 4801 Reference: 4.4.6

P&G Act 2004 [675(1)ma]



We Will:

- **Identify workplace hazards, potential impacts and risks** associated with change and implement action to effectively manage those risks. The type and extent of the risk assessment shall be appropriate to the nature of the change and the risks associated with it. All significant changes to process design and operations shall be subject to formal hazard review and risk assessment processes such as HAZOP study or similar.
- **Involve suitable personnel** in hazard reviews and provide the necessary resources for effective review.
- **Seek approvals** for changes from, or notify changes to, the appropriate authorities as required.
- Involve all personnel who may be affected by the change in the change process, including **consultation, communication** of the changes, and training and assessment of the competency of personnel P&G Act 2004 [675(1)m].
- **Document** and update all documents and drawings that are necessary as a result of the change.

Reference Documentation – Change Management and Modifications	Location
Risk Management	Procedure
Hazop Study	Recorded
Change Management Procedure	Procedure

8.7 Contractor Management



ISO14001 Reference 4.4.6

AS 4801 Reference: 4.4.6, (4.3.1 & 4.4.1.2)

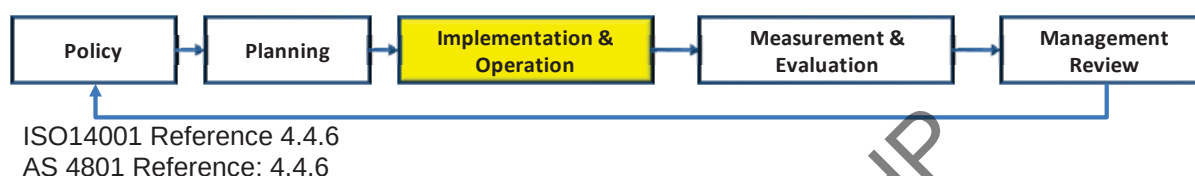
We Will:

- Ensure that any contractors used on the site are properly **assessed**, prior to the award of the contract, to determine the contractor's **capability** to:
- Comply with the relevant provisions of this HSE Management System Manual and associated HSE procedures, including site work conditions and rules;
- Comply with applicable legal obligations;
- Not adversely impact on the site's overall safety and environmental performance.
- Ensure that contract documents include appropriate clauses relating to compliance with site rules and insurance provisions to protect against claims made as a result of the contractor's work.
- Require contractors, where applicable, to submit a suitable HSE Plan and we will audit performance of the contractor against their HSE Plan.

- Suspend the contractors operations if work is not performed in full conformance with their HSE Plan and site standards and rules.
- Provide feedback to the contractor to facilitate discussions on concerns and to provide improvement opportunities.

Reference Documentation – Contractor Management	Location
Site Induction Procedure	Procedure

8.8 Health and Safety Risk Controls



We will implement comprehensive control procedures for identified major risks. The core requirements for site major hazards are listed below:

Permit-to-Work System – Cougar Energy was established and maintained a suitable and effective Permit-to-Work (PTW) system for all work done by site personnel involving electrical or hazardous materials isolation, work in confined spaces, excavation and hot work. Cougar Energy provides appropriate training for relevant site personnel to ensure good understanding of the site PTW system, and ensures that authorised personnel who are to provide specialised services (such as gas testing and proving isolations) have the required knowledge and skills [675(1)i].

A skills assessment will be carried out identifying the minimum skills, knowledge, competencies and experience requirements for each person to carry out specific work [675(1)g].

Confined Space Work – CE will ensure that all work involving confined spaces complies with AS 2885 - *Safe Working in Confined Spaces*. In particular, all personnel involved with any aspects of confined space work are required to participate in a suitable training course in confined space work and be assessed as competent.

Excavation – CE will ensure all necessary precautions are taken to prevent damage to underground services, injury to personnel and excessive environmental disturbance resulting from excavation operations.

Electrical Safety – CE shall ensure that all electrical equipment brought onto the site is maintained and inspected at regular intervals, including tagging of equipment. Only licensed and competent persons shall do electrical work.

Portable Equipment and Tools – CE will implement inspection and test procedures to ensure that tools and equipment used on site by personnel and contractors are fit



for purpose and maintained in a safe condition. All Employees and contractors will be responsible for inspecting tools and equipment prior to use.

Hazard Controls – Hazards are defined as having the potential to cause serious injury or death unless they are adequately controlled. Major hazards are such things as (but not limited to);

- Rotating equipment
- Vehicles and Mobile Equipment
- Hot vessels and pipe-work
- Working at heights
- Hazardous areas and Ignition sources
- Working near evaporation ponds

The controls we use to manage these hazards are briefly summarised below. In most cases, specific procedures are available:

Machine Safe Guarding – We will ensure that people are protected against accidental contact with moving parts of fixed or rotating machinery by:

- Identifying exposures to moving parts of fixed machinery,
- Guarding machinery in accordance with AS4204

Vehicles and Mobile Equipment – We will establish and maintain a system for controlling vehicle and mobile equipment access to the site and will ensure that such equipment is fit for purpose. Control systems will include the following:

- A traffic management plan, including road layout, traffic flows and speed limits,
- Motor vehicles will not be permitted access to the site unless authorised;
- Vehicle and mobile equipment only need to be operated by people who are trained and have an authorised licence or certificate;
- Maintenance of vehicles and mobile equipment in accordance with manufacturers' recommendations and retention of maintenance records;

Fall Prevention (safe working at height) - We will establish and maintain systems to ensure that site personnel are protected from fall injuries by:

- Ensuring that walkways and fixed ladders higher than 1.8m have secure handrails and guards;
- Ensuring that people who have to work at heights above 1.8m have no significant fear of height.
- Applying a JSEA/WMS or similar system for assessing the risks associated with work at heights above 1.8m.
- Ensuring personnel safety through compulsory requirements such as wearing personal fall arrest equipment, and installing temporary guard rails or restraints.

Hazardous Areas – We will define hazardous area on the site that may contain a flammable or explosive atmosphere under certain conditions. Where hazardous

areas have been identified we will implement effective control of ignition sources. Control measures may include enforcing a no-smoking rule; eliminating sources of accidental ignition (including mobile phones); and controlling hot work with a permit system that ensures, through continuous monitoring, the conditions remain safe while the hot work takes place.

Working in Hot Environments-where relevant and necessary, we will introduce suitable programs to protect people from the hazards arising from working in a hot environment. If feasible, we will use engineering methods, such as ventilation systems, to lower temperatures so that they are reasonably comfortable for work. Otherwise, we will consider implementation of the following measures:

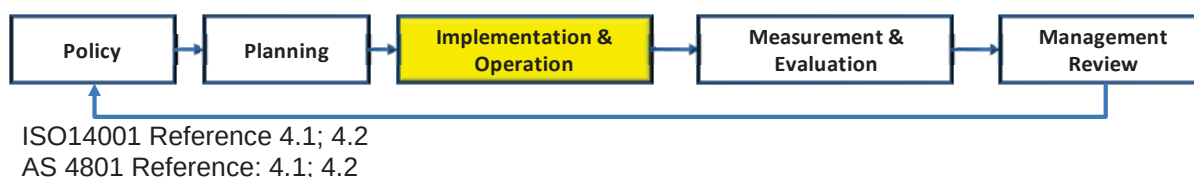
- Ensuring that people who have to work in hot areas are in good physical condition;
- Endeavour to use power tools, lifting aids and other devices to reduce the physical workload in hot areas;
- Providing barriers against radiant heat;
- Providing shelters and cool drinking water;
- Redistributing work in hot areas so that strenuous work is done in the coolest part of the day.
- Educating people how to prevent heat illness, as well as the symptoms, causes and treatment of the illness.

Security Arrangements-CE has security procedures that incorporates the following features:

- Controls to prevent unauthorised persons from entering the site or causing damage or loss to those using the site.
- Protection of confidential information.
- Reporting all thefts of equipment and material.

Reference Documentation – Health and Safety Risk Controls	Location
Risk Management	Procedure
Safe Working in a Confined Space	TBA - Procedure
Site Excavation	TBA - Procedure
Test and tag results	With Testing Company
Confined Space Entry List	TBA - Form
Excavation and Penetration Certificate	Form
Isolation Certificate	Form

8.9 Hazardous Material Management



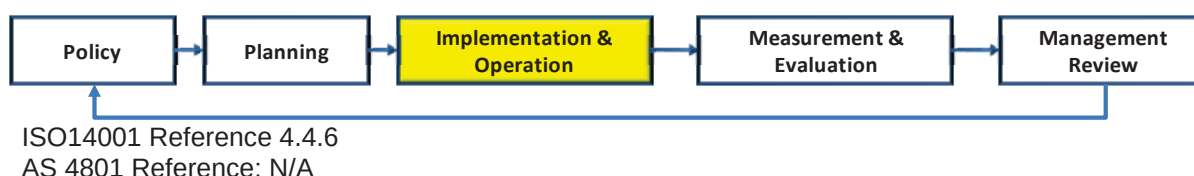
We Will:

Establish and maintain a system for controlling use of dangerous goods and hazardous substances. The system will include the following features:

- A process for controlling the introduction, production or acquisition of dangerous goods and hazardous substances to the site;
- A register of Material Safety Data Sheets for all substances used and or produced on site;
- An Emergency Manifest that identifies the location of significant inventories of dangerous goods;
- Storage of dangerous goods in accordance with relevant Australian Standards – AS 1940 for flammables and combustibles (diesel, oils), AS 3780 for corrosives (acids and caustics), AS 4452 for toxics
- An education program that ensures relevant site personnel are aware of the requirements for storing and using dangerous goods and hazardous substances;
- An inspection and audit program that ensures dangerous goods and hazardous substances are stored and used correctly.
- Ensure that each person working with (or near) a dangerous goods or hazardous substance has the personal protective equipment specified in the MSDS and uses the equipment properly.
- Ensure all dangerous goods and hazardous substances are properly labelled and stored in appropriate containers.
- Ensure the prompt containment and clean-up of all spills and leaks of dangerous goods or hazardous materials.
- Ensure disposal of hazardous materials, including transport of regulated wastes, is in accordance with the Environmental Authority (DERM) or Local Council requirements.
- Ensure appropriate design of dangerous goods stores, including provisions for security, access to fire fighting equipment, illumination, ventilation and suitable separation and segregation of non-compatible goods.

Reference Documentation – Hazardous Materials Handling	Location
Emergency Services Manifest	At Front Gate

8.10 Environmental Risk Controls



8.10.1 Water Quality Management

We Will:

- **Not discharge** contaminated or other waste water to any surrounding land or waterway.
- Control all **stormwater run-off** to minimise potential contamination by site activities. This shall include segregating clean run-off waters from any

- contaminated waters or wastes generated in any area of the site.
- Service, refuel and repair machinery in designated, bunded areas with collection sumps to contain any spills and contaminated water.
- Monitor** surface and ground waters to verify that our water management strategies are effective.

Reference Documentation – Water Quality Management	Location
Database of water quality testing results	Melbourne

8.10.2 Waste Management

We will implement and maintain a **Waste Management Strategy** that includes the following:

- A **precautionary approach** to waste management. Waste management decisions will be guided by a careful assessment to avoid, where practicable, environmental harm and an assessment of the risk weighted consequences of various options.
- Training** of all relevant personnel, including contractors, on procedures concerning waste minimisation, recycling and disposal
- Details of the **collection, storage and or disposal** of solid, liquid or hazardous wastes.
- All waste removal and transport from site must be by **appropriately licensed contractor** and disposal shall only be to **licensed waste disposal facilities**. Transport of any Hazardous or Regulated Waste shall comply with all relevant legislation including waste tracking requirements.
- In order of preference, the **hierarchy of waste management control** shall be as follows:
 - Waste avoidance** – We will develop and implement practices, which prevent the generation of wastes. Practices include, where feasible, the use of cleaner production techniques and identification and implementation of alternative products or practices to eliminate or reduce the amount or toxicity of waste.
 - Waste reduction** – We will develop and implement practices that reduce waste. Practices include, where feasible, evaluation of products by purchasing personnel.
 - Material reuse** – We will reuse ‘waste’ materials for original purpose where possible and practical.
 - Recycling** – We will use valuable materials/by-products in other processes. Practices include the implementation of recycling programs on site (for eg timber, metal and waste oils).
 - Waste treatment** – We will reduce the potential for environmental nuisance or environmental harm by treatment at or as close as practicable to the site of generation.

8.10.3 Air Quality Management

We will implement and maintain **Air Quality Management Strategy** that includes the following:

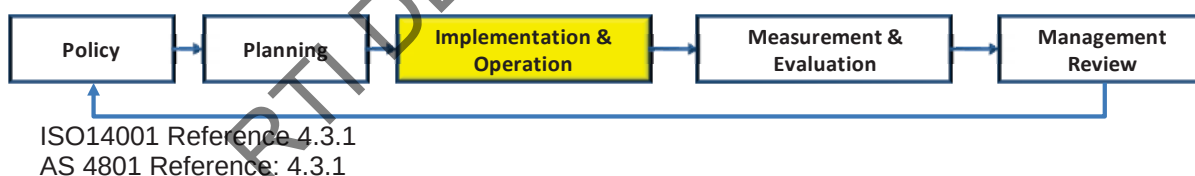
- Identification of all potential **contaminant sources**, including dust, odours and greenhouse gases;
- Ambient air quality monitoring strategy;
- Stack testing processes;
- Consultation with interested parties on air quality management strategies;
- Reference to air emissions procedures to prevent or minimise environmental impact, including procedures for effective and efficient operation of pollution control equipment;

8.10.4 Land and Vegetation Management

We Will:

- Take action as soon as practicable after a **contamination event** to:
 - o put in place immediate controls to contain the contamination; and
 - o develop cost-effective remediation and/or rehabilitation strategies detailing both the scope and timing of control actions.
- Ensure that all works which has the potential to cause **ground surface disturbance** is to be undertaken only with manager approval.
- Develop and implement an **erosion and sediment control plan for disturbed areas**, where applicable. The object of the plan will be to minimise erosion and sediment transport by controlling water movement through disturbed areas.

8.11 Emergency Preparedness



We Will:

- Implement and maintain a Site **Emergency Response Plan**, which will identify and document potential emergency situations at the site. The Plan will specify the emergency command organisation and nominate an Emergency Controller.
- Ensure that first response emergency actions can be carried out efficiently and effectively through the provision of **sufficient resources and training**.
- **Regularly liaise with external agencies** such as the local Fire Services, Ambulance, Police and other local response teams to ensure an appropriate level of response.
- Hold regular emergency response **drills** to:
 - o ensure that personnel are prepared for emergencies;
 - o evaluate the effectiveness of the response; and
 - o make any changes that will improve the effectiveness of the response.

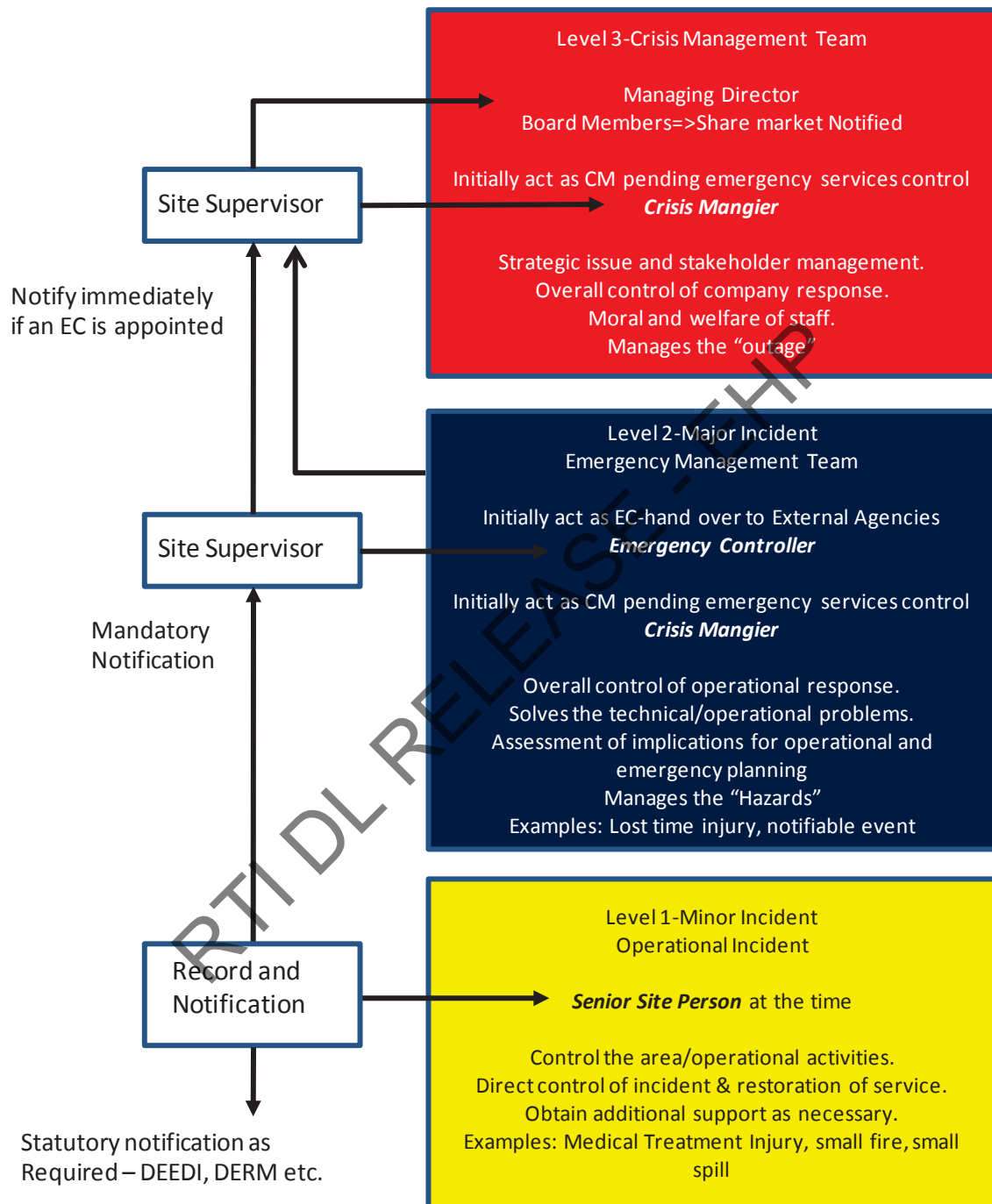


Reference Documentation – Emergency Preparedness	Location
Emergency Response Plan	Procedure

RTI DL RELEASE - EHP



The diagram below summarises the **emergency incident classification** used at site and how an emergency escalates to a crisis.



8.11.1 Fire Prevention and Control

We Will:

- Ensure that a suitable type and number of **fire extinguishers** are available around site.
- Establish suitable **systems** for fire prevention and control that include:
 - o **Contractual arrangements** for regular maintenance of fire fighting
 - o **Inspection processes** to control the accumulation of flammable and combustible waste materials;
 - o **Layout maps** of the site showing types and locations of fire fighting and control equipment and markings and routes for emergency evacuation.
 - o Identification of **training needs** for site personnel likely to be involved in responding to emergencies

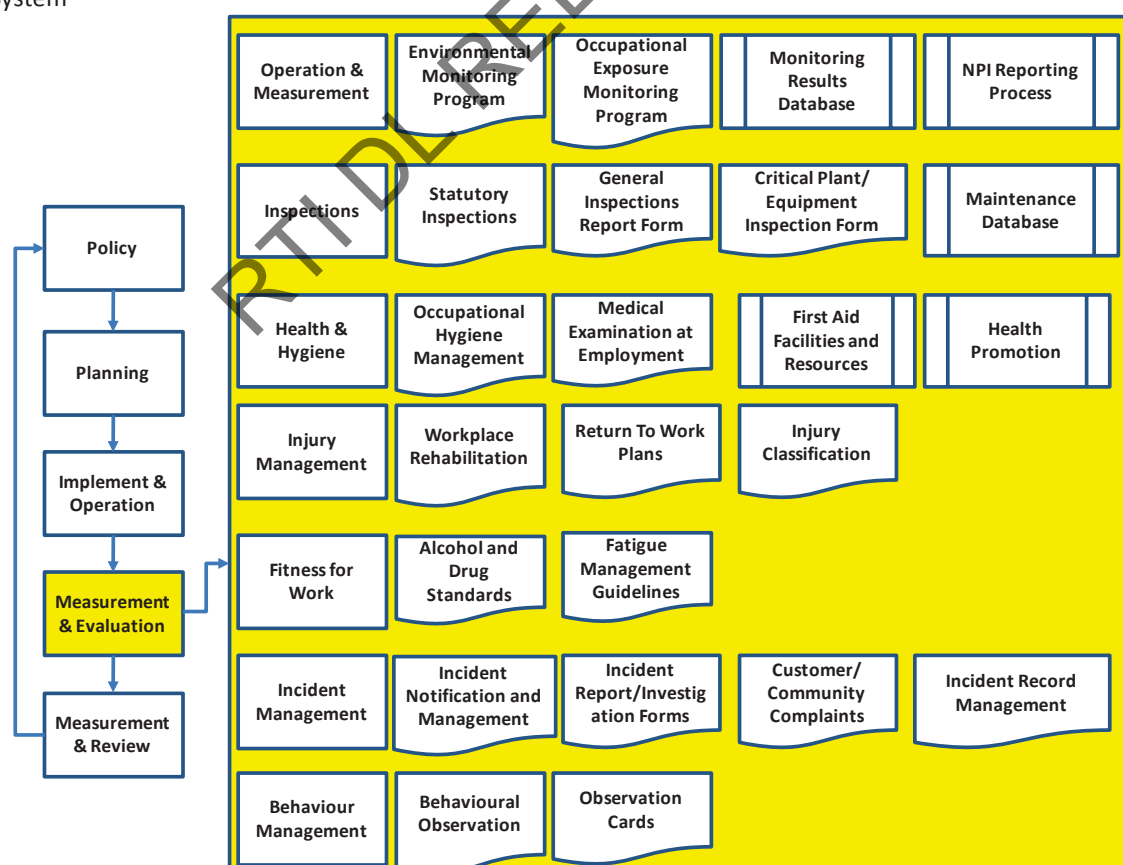
Reference Documentation – Fire Prevention and Control	Location
Emergency Response Plan	Procedure
Emergency Services Manifest	At Front Gate

9. SYSTEM EVALUATION-MEASUREMENT AND EVALUATION

Management
System

Processes

Key Documents / Programs / Systems





Summary:

The measurement and evaluation section of the HSE management system involves the site establishing, implementing and maintaining processes to monitor and measure, on a regular basis, the key characteristics of site operations and activities that can cause injury, illness, loss of availability or environmental harm. The types of processes that must be implemented include:

- A process for incident investigation and corrective and preventative action;
- Management of fitness for work issues, such as stress, fatigue and use of alcohol and other drugs in the workplace;
- Management of injured employees and rehabilitation procedures;
- A monitoring program for measuring key HSE parameters, such as injury statistics, incidents, workplace contaminant concentrations, and water, air and land discharges;
- Ensuring that equipment used to measure, inspect or test processes has sufficient sensitivity and selectivity and is maintained and calibrated.
- Inspection programs (e.g. planned and general inspections) to verify HSE performance;
- HSE records and information management R&G Act 2004 [675(1)r];

9.1 Monitoring and Measurement



We Will:

- Establish **monitoring programs** for the measurement of key occupational exposure parameters and potential environmental impacts. The programs will be risk-based and consistent with licence and regulatory requirements.
- Use **documented sampling techniques** that are consistent with accepted national and international practice, such as Australian Standards, and ensure that suitably qualified and experienced personnel make measurements.
- **Analyse** collected samples using, to the extent feasible, **certified laboratories** that have been endorsed by a suitable certifying body, such as NATA.
- Use **approved emission estimation techniques** where direct measurement is not possible or feasible.
- Ensure **suitable and reliable pollutant monitoring equipment** is installed where necessary.
- Ensure that **monitoring equipment is well maintained** and stored in conditions that prevent damage or adjustments that would invalidate the calibration setting and the accuracy of measurement.
- Use appropriate **statistical techniques** in the analysis of data.

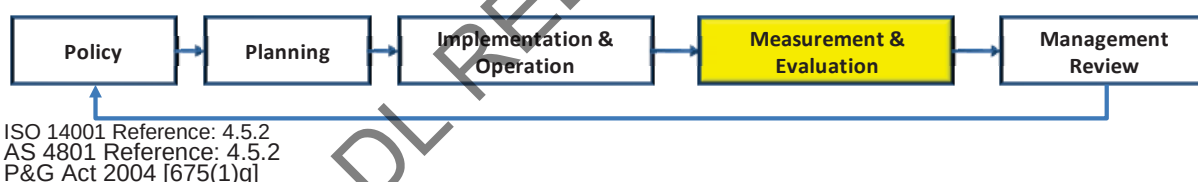
9.2 Inspections



We Will:

- Implement and maintain **inspection systems** for our workplace based on a risk-based evaluation of needs.
- Implement **Checklists** for identified high risk plant.
- **Categorise and prioritise defects** identified during operating inspections, by utilising our risk management tools. We will apply effective **corrective actions**, aimed at preventing recurrence and facilitating continual improvement.
- Commend “above standard” and safe conditions and behaviours by providing **positive feedback** to the individual or work team involved as soon as practical.

9.3 Incident Management



We Will:

- Encourage **immediate reporting, notification and recording** of all work-related incidents, injuries and illnesses;
- Implement prompt actions targeting the **root causes** of the incident following incident events. Actions will specify the person responsible and the timeframe for completion.
- Periodically review **implementation of actions** to ensure effectiveness and timely completion;
- **Classify** incidents according to risk potential, not just the actual consequence;
- Assign **accountability** to line managers for the incident management process, including timely completion of incident reports and investigations;
- **Communicate** lessons learnt and incident findings to all relevant personnel;
- Adopt **incentive schemes** that encourage people to report incidents;
- Provide **timely feedback** to reporters/ complainants on the outcomes of incident investigations, including mitigation action;
- **Analyse** incidents to determine where improvements to practices, procedures and systems can be implemented.

Reference Documentation – Incident Management	Location
Incident Report & Investigation	Form

Reporting and investigation timeframes are detailed below:

Requirements for Formal Reporting and Investigation of Incidents

Incident Consequence or Potential	Phone Report to MD via Site Super (<24 hrs)	Notification to DEEDI (<24 hrs)	Notification to DERM (<24 hrs)	Initial Incident Alert to Managers (< 24 hrs)	Incident Report ** (<2 days)	Investigation Report (<10 days)
<i>Insignificant</i>						
<i>Minor</i>						
<i>Moderate</i>	✓			✓	✓	✓
<i>Major</i>	✓			✓	✓	✓
<i>Catastrophic</i>	✓			✓	✓	✓
Statutory Notifications						
<i>Notifiable Injury</i>	✓	✓*			✓	✓
<i>Dangerous Event</i>	✓	✓*			✓	✓
<i>Environmental Harm</i>	✓		✓*		✓	✓

* Report by GM

** Using Incident report form

Initial Notification Details

Telephone report given personally by either responsible manager (or delegate) to GM Projects (or delegate) or Managing Director.

Points to cover in verbal report or Initial Incident Alert include the following:

- Person(s) involved;
- Description of incident;
- Nature of injuries (current status);
- Nature of property/equipment/environmental damage;
- Immediate control strategy;
- Proposed actions; and
- Other notifications (e.g to government authorities).

Report Timeframes

The timeframes refer to the completed report being submitted to the relevant manager, with copy to Site Supervisor.



9.4 First Aid, Medical Assessments and Health Surveillance



9.4.1 First Aid, Medical Assessments and Health Surveillance

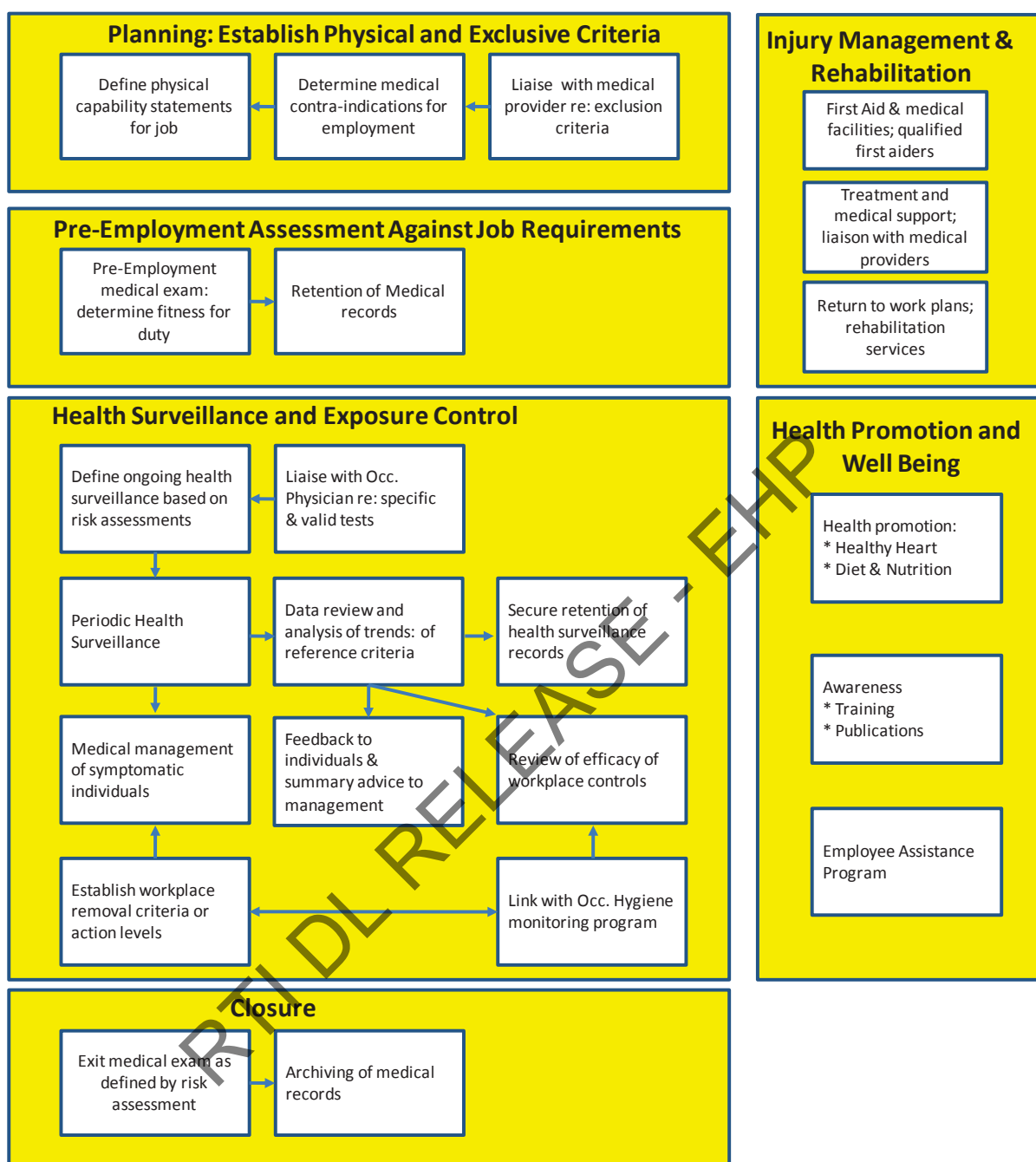
We Will:

- Provide suitable and sufficient **first aid facilities**, including trained first aiders, and ready access to adequate medical services to all employees.
- Ensure that employees and contractors are selected on the basis of them having the requisite **physical and mental capabilities** to do assigned tasks.
- Implement a suitable **pre-employment medical examination** for designated employees. The purpose of the pre-employment medical shall be to:
 - o Establish a health status baseline for the employee;
 - o Ensure any known health conditions are monitored; and
 - o Ensure individuals are placed in positions compatible with their mental and physical capabilities.

Note: the pre-employment medical may include drug screening.

- Ensure that the health surveillance program is based on detecting changes in the employee's health status that may be attributed to **workplace exposure**. Surveillance will only be done where specific and valid tests are available and may include lung function testing and audiometric testing. We will establish guidelines, where necessary, for the **medical management** of symptomatic individuals.
- Establish suitable processes for the **review and analysis** of health surveillance data and feedback of results to individuals and managers.
- Ensure that all personnel health records are **securely stored** and maintained as **confidential** records.
- Promote health education and **healthy lifestyle** through awareness programs and initiatives.

The overall process for **provision of health and medical services** is summarised in the diagram located on the next page:





9.4.2 Occupational Hygiene Surveys

Note: Occupational hygiene is concerned with the identification, assessment and control of the risks arising from physical, chemical and biological agents in the workplace.

We Will:

- Ensure **compliance** with accepted regulatory or **industry exposure** standards through the rigorous application of the hierarchy of risk control measures.
- Organise and implement **occupational hygiene surveys**, where necessary, to detect and measure workplace contaminants. Such surveys may result in advice on control measures and/or personal protection to ensure employee exposure is avoided, or at least reduced to within exposure standards. Areas that may be subject to survey include hot work areas, ventilation and air-conditioning systems, water systems, and work areas where there may be exposure to significant levels of noise or atmospheric contaminants, such as dust, vapours and gases.
- Only use **experienced or qualified individuals** (eg occupational hygienists) to do or coordinate occupational hygiene surveys.

9.5 Fitness for Work



We Will:

- Ensure that suitable processes are established and maintained to provide assurance that site workers are fit for work and **not adversely affected by fatigue, stress, alcohol or other drugs**, including prescription medications.
- **Not tolerate** persons on site being under the influence of alcohol, drugs or substances such that their work performance is impaired or site safety is compromised;
- Hold all site workers, including contractors and visitors, **accountable** for responsible fitness for work **behaviours**;
- Treat any site worker who is under the influence of alcohol or drugs in a **fair and consistent** manner;
- Provide **guidance** to workers on managing stress, fatigue and extended work hours.
- Implement the following standards:
 - o **Alcohol** – blood alcohol concentration (BAC) less than 0.02% at all workplaces, including offices; BAC less than 0.02% for all employees in line management functions.
 - o **Drugs** – concentrations of drugs in urine as per AS 4308 (amphetamines <300 ng/L; benzodiazepines <200 ng/L; opiates <300 ng/L; cannabinoids

- <50 ng/L; cocaine metabolites < 300 ng/L);
- o **Hours** – Unless a risk assessment is done, the maximum permissible hours of work is 14 hours in any 24-hour period and no more than 6 consecutive days without a 20 hour rest period away from work.
- Provide an **Employee Assistance Program** for employees who seek assistance in dealing with fitness for work issues.

9.6 Injury and Rehabilitation



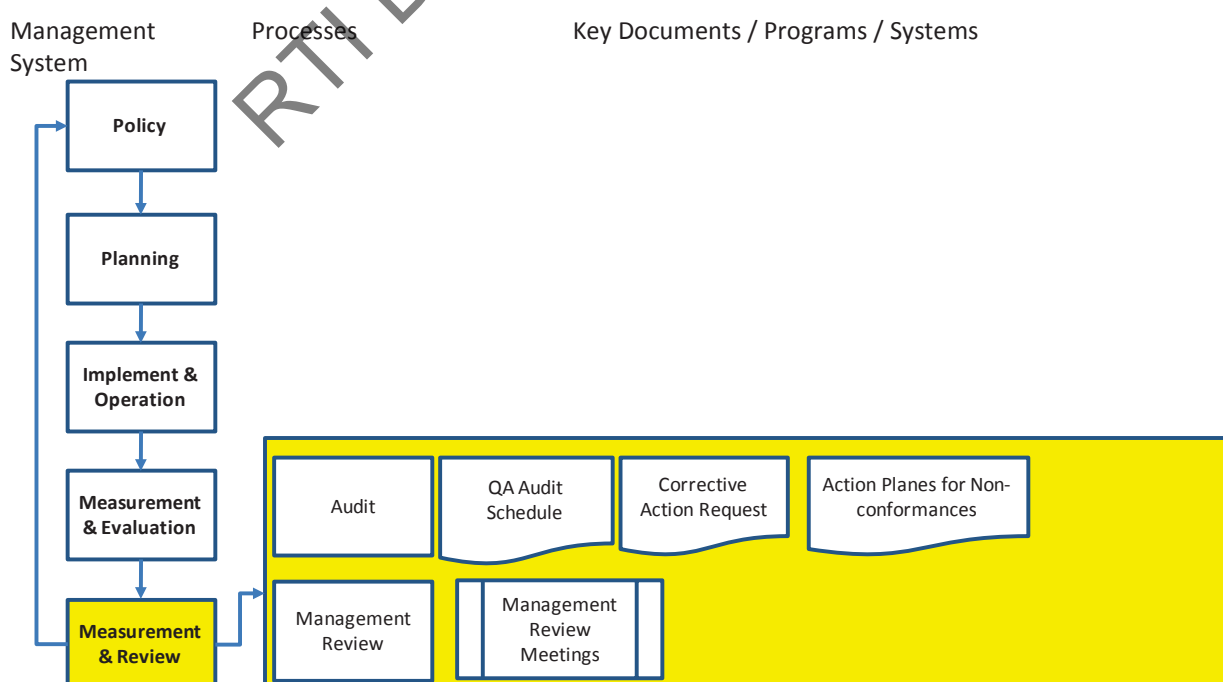
ISO 14001 Reference: n/a

AS 4801 Reference: 4.5.1.2; 4.4.4.7; 4.5.2

We Will:

- Ensure that a process for the **efficient handling** of workers compensation **claims** is established and maintained, including an injury management and rehabilitation procedure.
- Establishing **communication** with the injured person as soon as possible, and maintain communication during the rehabilitation and return-to-work process.
- Providing **prompt medical diagnosis** and treatment to maximise the rate and extent of recovery.
- Ensuring **confidentiality** of medical information.
- Assisting the injured worker to **return to work** as soon as it is safe to do so, including the provision of meaningful suitable duties.

10. SYSTEM EVALUATION-MANAGEMENT REVIEW





Summary

Periodic review of the site HSE Management System by senior management assists in ensuring the continuing suitability and effectiveness of the developed system procedures. It also promotes a continual improvement philosophy.

Management review is the means whereby the overall performance of the HSE Management System is evaluated. It provides the link between the HSE Management System, the organisation, and the environment external to the organisation. This involves evaluating the HSE Management System's ability to meet the overall needs of the organisation, its stakeholders, its employees, and regulating agencies. Management review is different from more specific system-evaluation and auditing efforts that address specific aspects of the system elements.

Management review is the hallmark of a successful system and is a key attribute of strong management commitment to HSE. Without feedback, there can be no strategic planning or continual improvement

10.1 System Auditing



ISO 14001 Reference: 4.5.4
AS 4801 Reference: 4.5.4
P&G act 2004 [675(1)n]

We Will:

- Schedule a **comprehensive, independent audit** of the HSE Management System at a frequency of not less than every 2 years – assuming the pilot plant operates beyond that point. The audit shall include verifying compliance with the following:
 - o The requirements of this HSE Management System Manual;
 - o Applicable legislative requirements and licence and permitting conditions;
 - o Effective control of potential major hazards and environmental impacts; and
 - o Operating procedures and work instructions developed to satisfy the HSE Policy and the expectations detailed in this management system manual.
- Appoint suitably qualified and **experienced auditors** to do the audit.
- Prepare **action plans** in response to critical audit recommendations and require senior managers to report progress until all actions have been completed.
- Implement a schedule of periodic internal management system audits to **self-assess** progress in implementing system requirements.



10.2 Management Review



The management system described in this Manual will be subject to comprehensive review by the Management team on a biennial basis. Observations, conclusions and recommendations arising from the review will be documented and suitable actions taken to amend the system documentation accordingly.

The management review will consider the impact/implications of:

- Changing legislation;
- Changing expectations and requirements of stakeholders;
- Changes in the organisation's products, services or activities;
- Changes in organisational structure;
- Advances in science and technology;
- Lessons learnt from incidents in, or outside, organisation;
- Feedback from communication and or reporting.

Periodic review of the effectiveness of the HSE Management System will occur via senior management meetings.

11. REFERENCES

Petroleum and Gas Act 2004
 Petroleum and Gas Regulation 2004
 AS 4801: Occupational Health and Safety Management Systems
 ISO 14001: Environmental Management Systems
 Environmental Licence (MDL 385 EA)



8. APPENDIX B: RISK MANAGEMENT PLAN

RTI DL RELEASE - EHP

RISK MANAGEMENT PLAN

RESPONSE AND ALTERNATIVE

PRESENTATION

RTI/DL RELEASE - EHP

COUGAR ENERGY LTD

1 August 2011

Background

In its Information notice dated 19 July 2011 confirming its decision to amend the existing Environmental Authority (EA) MIN100656507, DERM responded in general terms to the three bases upon which Cougar Energy relied in its objection to the proposed amendments.

These responses provided no more technical detail on the reasons why Cougar's objection was rejected, other than a broad reference to the Company's response to requirement 25 of the Environmental Evaluation (EE) relating to provision of a Risk Management Plan. This reference states that:

"The second rejected environmental report (...) did not meet the requirements of the EE....In particular, the response to requirement 25 to develop a risk management plan was considered to be so substandard that unacceptable period of time would be necessary to revise the plan to an acceptable standard"

Such a harsh judgement on the material submitted by the Company warrants a response, despite the lack of any specific information provided in support of the above statement. Cougar maintains that it provided a Risk Management Plan to an acceptable standard and that the response provided contained all the elements that DERM listed in requirement 25. This will be demonstrated in the following Sections.

Review of Requirement 25

Requirement 25 states as follows:

"Undertake a thorough environmental risk assessment of all aspects of the underground coal gasification operation and associated above ground treatment (including start up and decommissioning phases) and, from risks identified, develop a Risk Management Plan that includes contingency plans, mitigation measures, monitoring programs and incident response procedures for any foreseeable risk. The risk assessment shall include relevant consideration, and application, of the documents "AS/NZS ISO 3100:2009 Risk Management - Principles and guidelines" and "HB 203:2006 Environmental risk management - Principles and process"."

The requirement essentially consists of two parts. The first is the environmental risk assessment (ERA) whilst the second is the Risk Management Plan.

In order to provide an experienced and independent response to this requirement, Cougar engaged the international consulting firm GHD to assist with the first part of the requirement, development of an environmental risk assessment. GHD applied the methodologies outlined in AS/NZS ISO 31000:2009 Risk Management – Principles and guidelines and HB 203:2006 Environmental risk management – Principle and process as the basis for the environmental risk assessment as prescribed by requirement 25, and included the undertaking of an extensive ERA workshop. In its Information notice of 19 July, DERM has not commented on the environmental risk assessment suggesting that it is satisfied with this part of the requirement.

In contrast to prescribing the methodology standard to be used for carrying out the environmental risk assessment, DERM has not provided a format standard to which

the second part of requirement 25 – the Risk Management Plan - should be presented.

Risk Management Plan

Cougar Energy submitted the Risk Management Plan in the form of a policy, a procedure, and a table. The table was provided in Appendix D – Explanation of Controls, pages 112 to 137 of the requirement 25 response, submitted on 10 December 2010.

This listed all of the controls that were identified in the environmental risk assessment and provided a more detailed explanation than that given in the table created during the risk assessment workshop. The list included controls that are contingency plans, mitigation measures, monitoring programs and incident response procedures.

In this table, rather than categorise each of the controls according to whether they relate to a contingency plan, mitigation measure, monitoring program or incident response procedure, they were categorised as an Existing Control or a Proposed Control. This was intended to make it easier for the reader of the response to understand what controls were in place at the time of the ERA workshop and what controls are being further worked on. Note that in total 368 controls were identified, highlighting the thoroughness of the risk assessment.

It is worth noting that whilst the focus of requirement 25 appears to be on controls that operate after an incident (contingency plans, mitigation measures, monitoring programs and incident response procedures), most of the controls identified in the environmental risk assessment operate prior to an incident (eliminate the hazard, engineering controls and operational controls) highlighting the emphasis Cougar Energy places on prevention of incidents occurring rather than dealing with the impacts once they have occurred.

Cougar Energy believes that important aspects of a Risk Management Plan are:

- Company Risk Management Policy to demonstrate how seriously risk management is taken
- Standardised risk assessment methodology
- Monitor and review process – for existing and new risks
- Accountabilities

These aspects and more are covered in the Cougar Energy Risk Management Policy and the Cougar Energy Risk Management Procedures which is why they were provided in Appendices B and C of the response to requirement 25. The Policy and Procedures are again presented here in Appendix B and C.

Reformatting the Controls of the Environmental Risk Management Plan

To demonstrate that the table of controls provided contains contingency plans, mitigation measures, monitoring programs and incident response procedures it has been reformatted into the attached Table 1 to include a column that nominates which category each control belongs to. The categories are:

- **Elimination** – where the environmental hazard is eliminated by this type of control (eg only use a well for air injection rather than injection and production so it won't see high temperatures).
- **Substitution** - eg use a less hazardous chemical
- **Engineering Control** – provide a control that is hard/permanent in nature – eg thicker casing
- **Administrative Control** – a softer control such as a procedure that relies on human action or intervention
- **Contingency Plan** – a control that is in place prior to an incident to reduce the impact once an incident has taken place
- **Mitigation Measure** – a factor which reduces the impact of an incident once it has occurred
- **Monitoring Program** – a control that monitors aspects of the environment for impact
- **Incident Response Procedures** – a control that outlines how to respond in the event of an incident.

In some cases the controls in Table 1 fall into multiple categories. Consistent with prudent risk management, only the scenarios that fall into a high or medium risk category have been presented in the table. Each of the control measures identified in requirement 25 is represented in the table.

It is worth noting that the procedure that Cougar Energy uses for response to incidents (Emergency Response Procedure) has been previously supplied in the response to requirement 20 of the EE dated 16 September 2010. It is again provided in Appendix D.

Accepted Environmental Evaluations

It is difficult to understand why DERM has considered the Risk Management Plan so substandard given that it has previously accepted responses to a similar requirement. In a letter from Mark Evans to Dr Len Walker dated 27 January 2011, reference BNE428866, DERM accepted the responses to EEs 19 and 20, and the Notice for additional information. These EE requirements required the provision of contingency plans, mitigation measures, monitoring programs and incident response procedures.

Appendixes:

Appendix A	Table 1
Appendix B	Risk Management Policy
Appendix C	Risk Management Procedure
Appendix D	Emergency Response Procedure

Appendix A: Table 1

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Table 1 Risk Management Plan - Controls

The table below is taken from Appendix D of the response to requirement 25. A column on the right has been added in which the type of control is identified. Only the high and medium risk scenarios have been included from the original table.

# & Risk Rating	Hazard and Cause	Controls – Existing & Proposed Controls	Control Type
	Coal Gasification		
1.1 Med	Extended period of forward combustion pushing contaminants into coal	<p>Existing Controls</p> <p>Forward combustion is the period in which newly ignited coal is burnt at the base of the well at which ignition took place. It involves injecting air at a pressure into the ignition well to establish an adequate fire to allow the subsequent steps. The controls in already place are:</p> <ul style="list-style-type: none"> • During the site characterisation phase high pressure air was injected into the coal seam. This allowed Ergo Exergy to make an assessment on whether forward combustion would likely be successful • Ergo Exergy (technology provider) to be present when ignition takes place • Smaller spacing between wells to be used for ignition (compared to spacing between other wells). This means that the subsequent steps in bringing the well pairing on line would be short so that the coal containing the hydrocarbon products from forward combustion would be consumed more quickly. 	<ul style="list-style-type: none"> • Engineering • Elim/Eng/Admin • Engineering
		<p>Proposed Controls</p> <p>Document the decision criteria that Ergo Exergy use in deciding how long the forward combustion step is to last.</p>	<ul style="list-style-type: none"> • Eng/Admin
1.2 Med	Operating pressure of cavity above coal seam groundwater	<p>Existing Controls</p> <ul style="list-style-type: none"> • One of the fundamental operating controls for a UCG process is ensuring that the UCG cavity pressure is kept below the 	<ul style="list-style-type: none"> • Monitoring Program

	pressure forcing contaminants into coal	<p>coal seam pressure. At Kingaroy 23 Vibrating Wire Piezometers (VWPs) were installed at five locations surrounding the production wells. Of these VWPs five are located in the coal seam. The VWPs are monitored by a computer operating 24/7. Thus coal seam pressure is accurately known surrounding the gasifier. The pressure that the cavity is operating at is known by the pressure as measured by the pressure transmitters on the pipework going to the injection well and the pipework coming out of the production well (all wells have identical pipework). These two pressure transmitters (or more if multiple wells are in operation) are monitored continuously by a computer operating 24/7. An operator reviews the computer readings at least every hour.</p> <ul style="list-style-type: none"> • A mass balance on gas is carried out across the gasifier (in vs out) to monitor for gas loss into the formation. • Groundwater quality of the coal seam and upper aquifer is monitored. 	<ul style="list-style-type: none"> • Monitoring Program • Monitoring Program
1.4 Med	Loss of means of injecting air underground leading to unplanned shutdown with the potential for contaminants to remain in the cavity	<p>Existing Controls</p> <p>In this case venting of the cavity would be available but would not be initiated if it was thought that a means of injecting air would be available soon.</p> <p>The controls available at Kingaroy are:</p> <ul style="list-style-type: none"> • Two air compressors – only one is required to keep the gasifier operating • Addition connection points for temporary diesel driven compressors – and temporary diesel compressors are readily available from multiple suppliers • In the event that the air could not be made available for injection, the cavity could be vented as per planned shutdown. The extent of groundwater contamination compared to planned shutdown would be minimal. • The gas from the venting process would be sent to the flare. The flare gas would be combustible for most of the venting 	<ul style="list-style-type: none"> • Eng/Contingency Plan • Eng/Contingency Plan • Contingency Plan • Contingency Plan

		<p>step.</p> <ul style="list-style-type: none"> If the cavity groundwater is found to have elevated levels of some species then the cavity water could be pumped out. 	<ul style="list-style-type: none"> Monitoring/Mitigation
		<p>Proposed Controls</p> <ul style="list-style-type: none"> Have a pump available to install in production well to pump out water if required. 	<ul style="list-style-type: none"> Contingency Plan
1.5.1 High	<p>During the early stages of the life of the gasifier following ignition, the two operating wells both block rapidly so that cavity gas cannot be vented and contaminants are transported from the cavity into the surrounding coal.</p>	<p>Existing Controls</p> <p>The primary theory for the blockage of the two wells at Kingaroy is that there was a significant water influx which rapidly changed to steam and displaced cement powder within the cavity up both of the wells. Controls were put in place during the design and installation of the two new wells P5, P6 that were installed in June, July 2010 to avoid this occurring again. The controls were:</p> <ul style="list-style-type: none"> Selection of cement recipe that contains a cement loss additive to minimise the risk of loss of cement to the formation during cementing Improved QA during cementing up the wells – more frequent cement sampling to ensure that the cement is well mixed , closer watching of cement returns (to ensure that cement is not lost to formation), ensuring that the cement delivery was continuous (ie without interruption – P4 cementing pumping interruption was one of the causes of the loss of 3300 litres of cement to the coal seam) Well design, including casing/hole tolerance, well conditioning prior to cementing etc to be carried out by Drilling Engineer 	<ul style="list-style-type: none"> Elimination Admin/Elimination Elimination/Admin
		<p>Proposed Controls</p> <p>Install a groundwater extraction well between two startup production wells. In the event that both wells block, groundwater can be extracted as soon as required. A pumping well will be installed between P5 and P6 prior to restart. In the event of both wells blocking, and the cavity is filled with water, pumping can commence</p>	<ul style="list-style-type: none"> Contingency Plan

		immediately to maintain the inward hydraulic gradient.	
1.5.2 Med	During the early stages of the life of the gasifier following ignition, one of the two operating wells blocks rapidly with the potential for an unplanned shutdown. This could occur with cement or with high temperature at the bottom of one of the wells melting the well walls together	<p>Existing Controls</p> <p>At startup at least three wells are available. In the event that one of the well pair used for startup becomes blocked, the third well can be connected in to the non blocked well using Reverse Combustion Linking (RCL). This will allow ongoing operation without loss of gas from the cavity.</p> <p>Thus the controls are:</p> <ul style="list-style-type: none"> • Have at least three wells available at ignition (there are currently four ready for re-ignition, P5, P6, P2 and P3) • Have a compressor on standby for RCL in new well • Procedures available for RCL • Have a drill rig on standby-by for clearing blocked wells • Melting the bottoms of wells is controlled by limiting the temperature exiting the top of that well. Well temperatures are logged routinely by the operators and a limit is placed on the maximum temperature. <p>In the event that the third well cannot be brought on line, the scenario becomes an unplanned shutdown – see controls outlined as for Loss of Injection Air.</p>	<ul style="list-style-type: none"> • Contingency Plan • Contingency Plan • Contingency Plan • Contingency Plan • Administrative
1.6.1d 1.6.1s High	Well casing failure due to compression of the casing due to it being not able to expand when it heats up.	<p>Existing Controls</p> <p>If the casing is heated too quickly then the couplings can fail in compression.</p> <p>The controls are detailed in response to requirements 19 and 20 of EE dated 16 September 2010 and are repeated here.</p> <p>A range of controls are listed below. A number of them relate to the new well design used for the two well P5 and P6. They are noted as existing controls as they are in place at the time of writing this document:</p> <ul style="list-style-type: none"> • Use a thicker casing – 29pound per foot casing has been used (compared with 26ppf for the casing that failed) • Use a strong coupling – VAM TOP couplings. • Use a stronger grade of carbon steel for the casing –casing 	<ul style="list-style-type: none"> • Engineering • Engineering • Engineering

		<p>grade changed from K55 to L80</p> <ul style="list-style-type: none"> • Carry out a cement bond log to assess the quality of the cement bond • Heat up the wells more slowly – this is already noted in the operating instructions but will be reemphasized for the pilot restart 	<ul style="list-style-type: none"> • Engineering • Administrative
		<p>Proposed Controls</p> <ul style="list-style-type: none"> • Provide computer monitoring of the temperature indicator at the well head (original design only provided local indication at this point). This would allow for data trending and quicker response to temperature fluctuations to ensure that the well is not heated up too quickly. • Monitor the VWPs more closely for indication of syngas leaving the casing • Ensure flowmeters are promptly fixed to assist with a mass balance across the cavity to assist with identifying a leak of syngas from the casing • In the event of broken casing, do not inject air as this may disperse syngas and pyrolysis products that have escaped. • Get a well design engineer to review and sign off the well design of P5 and P6. The well design for P5 and P6 took into account the input of a range of experts including Ergo Exergy, geothermal well experts, cementing experts, and drilling experts however a final signoff of the thermal design of the well by an expert in the field of well design was not sought. • In the restart of the pilot plant it is proposed to use P2 and P3 for air injection only (and hence will only see ambient temperatures along the length of the well. To ensure that these wells are not used as production wells, the facility to connect the surface lines of P2 and P3 to the syngas header will be disconnected. 	<ul style="list-style-type: none"> • Engineering • Monitoring Program • Monitoring Program • Mitigation/Admin • Engineering • Elimination
1.6.2d	Well casing failure	Existing Controls	

1.6.2s High	due to higher external pressure from multiple casings and water trapped in between the casings.	<p>The controls are detailed in response to requirements 19 and 20 of EE dated 16 September 2010 many of which are repeated here. A range of controls are listed below. A number of them relate to the new well design used for the two well P5 and P6. They are noted as existing controls as they are in place at the time of writing this document:</p> <ul style="list-style-type: none"> • Only use a single string design so that water cannot be trapped outside • Use a thicker casing – 29pound per foot casing has been used (compared with 26ppf for the casing that failed) • Use a strong coupling – VAM TOP couplings. • Use a stronger grade of carbon steel for the casing—casing grade changed from K55 to L80 • Increase the scrutiny of the cementing contractors equipment to reduce the likelihood of cementing interruption • If top up of cementing is required, ensure that water is not trapped between the old and new cement. • Increase the frequency of cement sampling during the cementing operation as a means of evaluating the cement consistency along the length of the casing string. • Carry out a cement bond log to assess the quality of the cement bond • Heat up the wells more slowly – this is already noted in the operating instructions but will be reemphasized for the pilot restart 	<ul style="list-style-type: none"> • Engineering • Engineering • Engineering • Engineering • Administrative • Administrative • Admin/Elimination/ Monitoring Program • Monitoring Program • Administrative
		<p>Proposed Controls</p> <ul style="list-style-type: none"> • Monitor the VWPs more closely for indication of syngas leaving the casing • Ensure flowmeters are promptly fixed to assist with a mass balance across the cavity to assist with identifying a leak of syngas from the casing • In the event of broken casing, do not inject air as this may disperse syngas and pyrolysis products that have escaped. 	<ul style="list-style-type: none"> • Monitoring Program • Monitoring Program • Mitigation/Admin

		<ul style="list-style-type: none"> Get a well design engineer to review and sign off the well design of P5 and P6. The well design for P5 and P6 took into account the input of a range of experts including Ergo Exergy, geothermal well experts, cementing experts, and drilling experts however a final signoff of the thermal design of the well by an expert in the field of well design has not been sought yet. In the restart of the pilot plant it is proposed to use P2 and P3 for air injection only (and hence will only see ambient temperatures along the length of the well. To ensure that these wells are not used as production wells, the facility to connect the surface lines of P2 and P3 to the syngas header will be disconnected. 	<ul style="list-style-type: none"> Engineering Elimination
1.6.3d 1.6.3s Med	Well casing failure due to external corrosion.	Existing Controls <ul style="list-style-type: none"> The geological environment at the pilot site is generally low corrosion. The casing has a significant thickness allowing for some corrosion. The casing is only required to have a short life of 1-2 years. The casing is manufactured to the API standard API 5CT. 	<ul style="list-style-type: none"> Engineering Engineering Engineering Engineering
1.6.4d 1.6.4s Med	Well casing failure due to internal corrosion	Existing Controls <ul style="list-style-type: none"> The heavier hydrocarbons produced by UCG coat the pipe preventing corrosion. The casing has a significant thickness allowing for some corrosion. The casing is only required to have a short life of 1-2 years. The casing is manufactured to the API standard API 5CT. 	<ul style="list-style-type: none"> Engineering Engineering Engineering Engineering
1.6.5d 1.6.5s Med	Well casing failure at coupling due to incorrect installation (cementing	Existing Controls Proper quality assurance during the installation process, ie: <ul style="list-style-type: none"> Thorough inspection of the casing and couplings prior to installation to ensure that the threads are in good condition Ensuring that the threads are not cross threaded 	<ul style="list-style-type: none"> Administrative Administrative

	failures/problems covered elsewhere)	<ul style="list-style-type: none"> • Torquing up the couplings to the correct torque • Pressure testing of casing as part of cementing operation 	<ul style="list-style-type: none"> • Administrative • Admin/Monitoring
1.6.6d 1.6.6s Med	Well casing failure due to internal overpressure	<p>Existing Controls</p> <p>The pressures encountered in UCG applications is significantly less than used in oil and gas which is the market in which the casing is typically used. The maximum operating pressure that a hot well would see at Kingaroy would be 10 barg. The maximum pressure that an injection well saw (ie it was at ambient temperature) was 34barg. In fact it is flange connections that are typically have the lowest design pressure, rather than the casing and the flanges are on the surface pipework and not in the ground.</p> <p>The K55 casing that was used for wells P1-P4 was hydrostatically tested by the manufacturer to 315barg (10 times higher than the maximum cold temperature that the pipe was subjected to). The new casing for P5 and P6 has an even higher pressure rating. Thus the casing used in UCG has a high factor of safety as far as internal overpressure from the process is concerned.</p> <ul style="list-style-type: none"> • Casing has a short lifetime requirement 1-2 years. 	<ul style="list-style-type: none"> • Elim/Engineering • Engineering
1.6.7d 1.6.7s Med	Well casing failure due to thermal cycling.	<p>Existing Controls</p> <ul style="list-style-type: none"> • Fatigue of the wells due to heating and cooling isn't an issue per se. It is more about how quickly the wells are heated or cooled – this is addressed in scenario 1.6.1. • Casing manufactured to API 5CT. • Casing is designed for the temperature/pressure combinations that it may see. 	<ul style="list-style-type: none"> • Engineering • Engineering
1.7.1 Med	Subsidence of overburden leading to well breakage below the aquitard	<p>Existing Controls</p> <ul style="list-style-type: none"> • This is limited to be below the aquitard as subsidence is controlled to not undermine the aquitard by limiting the size maximum span of coal taken (this is managed by the mass balance and maps made of the coal that has been taken) • This is unlikely to occur early in the life of the gasifier as insufficient coal would have been taken for this to occur. In that case there will be at least two other wells operating that 	<ul style="list-style-type: none"> • Engineering/Mon • Mitigation Measure

		<p>will allow the gasifier to continue.</p> <ul style="list-style-type: none"> • It may be possible to repair the well • If it is not possible to repair the well it would be plugged with cement 	<ul style="list-style-type: none"> • Mitigation Measure • Mitigation Measure
		<p>Proposed Controls</p> <ul style="list-style-type: none"> • It is intended to install extensometers as part of the restart of P5 and P6. They would be installed at multiple depths and would indicate the extent of subsidence. 	<ul style="list-style-type: none"> • Monitoring Program
1.7.3 Med	Subsidence of overburden causing damage to aquitard allowing drawdown and potential contamination of upper aquifer	<p>Existing Controls</p> <ul style="list-style-type: none"> • Caving study has been carried out by rock mechanics expert from Golders that sets down the maximum span of coal that can be removed to ensure that caving does not extend upwards to the aquitard. The method of staying within the span is by the way that the wells are operated. A mass balance is carried out on a daily basis and the coal taken is recorded against a particular location in the coal seam. • VWPs and groundwater monitoring wells 	<ul style="list-style-type: none"> • Eng/Monitoring • Monitoring Program
		<p>Proposed Controls</p> <p>The extent of subsidence will be monitored by extensometers. The results of the monitoring will be used to develop a subsidence model. A safety margin will be maintained to ensure that the aquitard is not damaged.</p>	<ul style="list-style-type: none"> • Monitoring Program
1.9.4 Med	Coal contains high concentrations of species that may be toxic when the coal is gasified such as leachable species in ash(eg excessive heavy metals) or species that enter the gas stream (eg high sulphur coal) and ultimately exit	<p>Existing Controls</p> <ul style="list-style-type: none"> • Core samples were tested for elemental analysis as well as an ash leaching study prior to startup. • Stack sampling to be carried out. • Gas dispersion to be carried out. 	<ul style="list-style-type: none"> • Engineering • Monitoring Program • Monitoring Program

	the flare		
1.12.2 Med	Final shutdown, not an ideal shutdown as per the planned shutdown outlined above (eg regulatory enforced shutdown or other unplanned cessation of operation) leaving mixture of gases and hydrocarbons in the cavity.	Existing Controls <ul style="list-style-type: none"> • Carry out as ideal a shutdown as possible • Continue to vent the wells to remove the residual gases from the cavity and coal • Monitor the groundwater concentrations in the cavity and surrounding wells • Investigate groundwater mitigation measures if needed • Site handover back to existing landowner won't occur until the requirements of the Environmental Authority have been met and the requirements of the landholder have been met. 	<ul style="list-style-type: none"> • Mitigation/Admin • Administrative • Monitoring Program • Mitigation Measure • Administrative
		Proposed Control <ul style="list-style-type: none"> • Develop detailed shutdown methodology prior to restart (general shutdown methodology exists) 	<ul style="list-style-type: none"> • Administrative
2.1.1 2.1.2 Med	Spills from & storage of solid and liquid waste (ash & tars) from cleaning of vessels.	Existing Controls <ul style="list-style-type: none"> • Vessels designed such that persons do not need to enter vessels for cleaning. • Vessels should be able to be cleaned by high pressure water • Vessels and pipework designed such that ash and should collect in a single location easy to access for removal. • Gas purification plant design is such that it is possible to open a vessel with the rest of the facility on line. This will allow an assessment of quantity and type of material to be disposed of. Then detailed plans can be prepared for removing and disposing of waste from vessels. • Vessels are bunded so any spillages from the process of cleaning is contained. • Low volumes of solid and liquid waste expected • Spill kits on site 	<ul style="list-style-type: none"> • Elimination Measure • Engineering • Engineering • Engineering • Engineering • Mitigation Measure • Contingency/Incident Response Procedure
i		Proposed Controls	

		<ul style="list-style-type: none"> An external contractor will be utilized to collect and dispose of waste. The detailed methodology will be developed once the nature and quantity of the waste is assessed during plant operations. The material will not be stored on site for an extended period. 	<ul style="list-style-type: none"> Administrative Administrative
2.2.5 Med	Gas release from vessels and pipework during their opening for maintenance	Existing Controls <ul style="list-style-type: none"> When a pressure vessel in the gas processing skid is to be taken of service for maintenance, the pressure of the gas processing skid is taken down to atmospheric pressure (the wells continue to be held at their normal operating pressure). Once this is done the vessel to be taken out of service is bypassed and isolated and the rest of the equipment is repressurised. This means that the maximum quantity of gas to be released to atmosphere is approximately 10Nm³ anytime a vessel is to be taken out of service. 	<ul style="list-style-type: none"> Engineering
3.1.2 Med	Rupture of hydrocarbon storage tank 33-02 due to vehicle movements, with a spill of 1000L.	Existing Controls <ul style="list-style-type: none"> Tank is only filled up halfway at maximum reducing quantity to be lost Tank is atmospheric pressure so that leak will only be driven by the head of the liquid above the rupture Tank is double skinned Tank is strong – carbon steel Tank has bollards around it to protect it from traffic Site speed limit Require permit and supervision for vehicle to enter the area Limited traffic in the area Tank designed to AS1940 Site is continuously manned for quick response in the event of a leak from the tank. Operators trained for response to a spill. Spill kits provided nearby 	<ul style="list-style-type: none"> Administrative Engineering Engineering Engineering Engineering Administrative Administrative Elimination Engineering Incident Response Proc Administrative Incident Resp Proc

		<ul style="list-style-type: none"> Spill to be cleaned up. This may include the use of an excavator to dig up contaminated dirt. Contaminated dirt to be removed by accredited company. Prior to final site hand over conditions of the DERM administered Environmental Authority must be met. Includes provision for assessment of land contamination. 	<ul style="list-style-type: none"> Incident Resp Proc Admin/ Monitoring Program
		Proposed Control <ul style="list-style-type: none"> Detailed procedure to be developed for cleaning up spill including remediating spill area 	<ul style="list-style-type: none"> Administrative
3.2.1 Med	Incorrect valve line-up (eg a valve left open) due to operator error leading to a release of 100L of hydrocarbon	Existing Controls <ul style="list-style-type: none"> Operator selection and training Written operating procedures Line walked prior to bringing a line into service Line walked again once the line brought back into service Process is not complex reducing the likelihood of this type of error Liquid lines are all quite close Prior to final site hand over conditions of the DERM administered Environmental Authority must be met. Includes provision for assessment of land contamination. 	<ul style="list-style-type: none"> Administrative Administrative Administrative Administrative Admin/Elimination Engineering Admin/Monitoring
		Proposed Control <ul style="list-style-type: none"> Detailed procedure to be developed for cleaning up spill including remediating spill area 	<ul style="list-style-type: none"> Admin
4.3.2 Med	Noxious/offensive odour from pond causing health impacts to neighbours	Existing Controls <ul style="list-style-type: none"> Ergo Exergy's experience with UCG pilot plants is that the pond water odour does not persist a significant distance Site personnel are aware of the potential for odour to become an issue with neighbours. It is an easy issue to detect. Pond odour monitoring is part of the project Environmental Authority. Carry out additional monitoring in the event of a complaint. 	<ul style="list-style-type: none"> Elimination Monitoring Program Monitoring Program Monitoring Program
		Proposed Controls	

		<ul style="list-style-type: none"> • Monitor pond water quality for species that cause odour. 	<ul style="list-style-type: none"> • Monitoring Program
5.2.1 Med	Unburnt syngas being emitted through the flare because it has a low calorific value and is unable to burn causing excessive odour	Existing Control <ul style="list-style-type: none"> • Upstream process increases the calorific value of the gas by removing water (condensing water from the syngas and knocking out the liquid water) increasing the likelihood of the flare operating under routine conditions. It also removes some odour producing species. • UCG process is operated to minimise the likelihood of producing low calorific value gas • Flare is designed to be able to burn with low calorific value gas and wide range of flows • Flare tip 11.5m above the ground • Significant distance to receptors • Backup flare available in the event that maintenance required on flare 	<ul style="list-style-type: none"> • Engineering • Administrative • Engineering • Engineering • Mitigation Measure • Engineering
		Proposed Controls <ul style="list-style-type: none"> • Carry out air dispersion modeling once three months of data has been gathered (EA requirement) 	<ul style="list-style-type: none"> • Monitoring Program
5.2.2 Med	Unburnt syngas being emitted through the flare because it has a low calorific value and is unable to burn causing excessive pollutant release (eg NH ₃ and H ₂ S)	Existing Control <ul style="list-style-type: none"> • Upstream process increases the calorific value of the gas by removing water (condensing water from the syngas and knocking out the liquid water) increasing the likelihood of the flare operating under routine conditions. It also removes some ammonia and hydrogen sulphide. • UCG process is operated to minimise the likelihood of producing low calorific value gas • Flare is designed to be able to burn with low calorific value gas and wide range of flows • Flare tip 11.5m above the ground • Significant distance to receptors • Backup flare available in the event that maintenance required on flare 	<ul style="list-style-type: none"> • Engineering • Administrative • Engineering • Engineering • Mitigation Measure • Engineering
		Proposed Controls	

		<ul style="list-style-type: none"> Carry out air dispersion modeling once three months of data has been gathered (EA requirement) 	<ul style="list-style-type: none"> Monitoring Program
5.2.3 Med	Unburnt syngas being emitted through the flare because it has a low calorific value and is unable to burn causing excessive pollutant release (eg VOCs, PAH, BTEX)	<p>Existing Control</p> <ul style="list-style-type: none"> Upstream process increases the calorific value of the gas by removing water (condensing water from the syngas and knocking out the liquid water) increasing the likelihood of the flare operating under routine conditions. It also removes some VOCs, PAH, BTEX. UCG process is operated to minimise the likelihood of producing low calorific value gas Flare is designed to be able to burn with low calorific value gas and wide range of flows Flare tip 11.5m above the ground Significant distance to receptors Backup flare available in the event that maintenance required on flare 	<ul style="list-style-type: none"> Engineering Administrative Engineering Engineering Mitigation Measure Engineering

Appendix B: Risk Management Policy

RTI DL RELEASE - EHP



COUGAR ENERGY LIMITED

RISK MANAGEMENT POLICY

9 December 2010

Cougar Energy Limited

Risk Management Policy

Purpose

The purpose of this policy is to establish the roles, responsibilities and protocols to be adhered to regarding risk management in Cougar Energy Limited ("CXY").

The aim of this policy is not to eliminate risk, rather it is to respond to and manage the risks involved in CXY's activities to maximise opportunities and minimise loss exposures.

Scope

This policy applies to CXY and is intended to address the management of risks that could have a material affect on the operations of CXY or which could have an adverse impact on shareholder value and the legitimate interests of other stakeholders.

Responsibility

The Board is ultimately responsible for risk management for CXY. The Board has delegated responsibility for monitoring the risk management process within CXY to the Audit and Risk Committee. The Chief Financial Officer will report to the Audit and Risk Committee on the risk management framework set out in this Policy.

Objective

CXY will maintain a risk management framework that will comply with the Standards Australia Risk Management Standard [(AS/NZS 4360:2004 (as updated from AS/NZS ISO 31000:2009 and HB 266:20100))] and that will minimise the occurrence of:

- injury or harm to employees and contractors;
- damage to the reputation of CXY;
- significant financial loss to CXY;
- environmental risks; and
- project risks including engineering change and modifications.

The Board views risk management as a continuous process and a fundamental component of effective corporate governance. It is only through effective planning that management may identify, analyse and document risks and risk management strategies, and it is through this planning process that key risks and risk management strategies are communicated to staff and stakeholders.

RISK MANAGEMENT FRAMEWORK

Risk Tolerance

CXY recognises that risk management is not about eliminating all risks, it is about identifying and responding to risks in a way that creates value for CXY and its shareholders.

In making risk decisions the key consideration should always be the alignment of risk with reward to ensure that the level of risk accepted by CXY is commensurate with the expected benefits and/or the cost to mitigate the risk.

It is recognised that CXY's risk strategy and risk tolerance level will be continually reassessed as the Company implements its development strategy.

Risk identification policy

All staff are to be responsible for identifying and managing those risks associated with the activities and functions under their control. An individual prior to starting the activity is expected to do a qualitative assessment to determine likely hazards and to check that the necessary controls are in place and functioning effectively. This is referred to as personal risk management – we STOP, we THINK (about the tasks we will be doing), and we ask ourselves three questions as illustrated below:

The Three "Whats"



When a business risk has been identified it will be incorporated into a Risk Register which will also document any internal risk control policies that may be developed. The Risk Register will be maintained and updated on an ongoing basis by the Chief Financial Officer.

Key Impact Areas

The Board has chosen a methodology so that potential risks currently relevant to the Company can be grouped into the following broad impact and/or functional areas:

- Safety.
- Property Damage.
- Environmental.
- Production Interruption.
- Financial.
- Quality.
- Reputation/Publicity.
- Legal Action.

Risk Consequences

Risk management criteria is used to evaluate the significance of risk. They should reflect CXY's objectives and its legal and regulatory requirements. There are two types of risk criteria:

- consequence of the risk; and
- likelihood of the risk.

Consequence of risk

These risks can be categorised into five broad categories:

- A – Major
- B – Serious
- C – Moderate
- D – Minor
- E – Insignificant

The table defines the context in which CXY will apply the methodology in assigning and assisting with defining the 'consequence' criteria.

Grade	Rating – 1-5	CONSEQUENCE							
		Safety	Environment	Property Damage	Production interruption	Financial	Quality	Reputation / Publicity	Legal action
A	5	Fatality or Disability	Major Spill; Serious Env. Harm	> \$100k / Significant	Full interruption – Many days	> \$100k	Unusable	National press attention	Litigation commenced
B	4	Serious Lost Time injury or illness	Spill; Env. Harm	< \$100k / Minor plant Damage	Plant / Well < 1 day	< \$100k	Unusable	Regional reporting	Credible threat of litigation
C	3	Medical treatment injury	Env. Nuisance (noise, dust)	< \$10k Heavy Equipment	Plant / Well interruption minor	< \$10k	Just usable	Local reporting/	Mediation
D	2	Minor first aid injury	Minor Env. Nuisance	< \$1k / Tooling	Partial Loss / significant	< \$1k	Below Spec.	Not a core value	Disagreement
E	1	No Injury	No Env. Nuisance	< \$200	Partial Loss / Minor	< \$200	Per Spec.	None	None

Likelihood of risk

Choose the likelihood remembering that "likelihood" is a function of both probability (chance) and exposure. These risks can be categorised into five broad categories – Very Likely; Likely; Unlikely; Highly Unlikely; Almost Impossible.

The table defines the context in which CXY will apply the methodology in assigning and assisting with defining and rating the 'likelihood' criteria.

Sensitivity	Rating 1-5	Description
Very Likely	5	Almost certain. This event is expected to occur in most circumstances or will happen today or in less than one week.
Likely	4	Between once per week and once per month; or the event will probably occur in most circumstances.
Unlikely	3	Between once per month and once per year; or the event should occur at some time.
Highly Unlikely	2	Between once per year and once per ten years; or the event could occur some time
Almost Impossible	1	Unlikely to ever recur; or may occur in exceptional circumstances. Greater than one event in ten years.

RISK IDENTIFICATION

Risk analysis involves developing an understanding of the risk through consideration of causes and sources of risk, their consequences and the likelihood that those consequences can occur. An overall inherent risk rating can be obtained once the consequence and likelihood ratings have been determined by multiplying the Consequence rating by the Likelihood rating and classifying the product as per the following table:

Likelihood – Inherent Risk Rating					
Grade	Very Likely	Likely	Unlikely	Highly Unlikely	Almost Impossible
A	Extreme - 25	Extreme - 20	High - 15	High - 10	Medium - 5
B	Extreme - 20	High - 16	High - 12	Medium - 8	Low - 4
C	High - 15	High - 12	Medium - 9	Low - 6	Low - 3
D	High - 10	Medium - 8	Low - 6	Low - 4	Low - 2
E	Medium - 5	Low - 4	Low - 3	Low - 2	Low - 1

The level of inherent risk (which is the product of the rating of Consequence X Likelihood) is rated as follows:

	Combined Score – Inherent Risk Rating
Extreme	17-25
High	10-16
Medium	5-9
Low	1-4

The Board recognises that risk analysis is at best an imprecise science and that not all personnel are likely to be in a position to accurately assess the level of risk that may be associated with a particular process. Accordingly, personnel are encouraged to take a conservative outlook when determining whether or not to "escalate" a decision to accept a particular risk.

The responsibility of identifying, assessing and managing (or escalating) risks lies with all management and staff and where staff are unclear they should seek the guidance of the Chief Financial Officer irrespective of their function.

RISK MITIGATION & MANAGEMENT: CONTROLS & PROCEDURES

The primary responsibility for the development and implementation of controls and procedures to address inherent operational risk is assigned to the Chief Financial Officer, who will work in consultation with the Company Secretary and Chairman of the Audit and Risk Committee.

This responsibility is supported by the development of the following standards for the management of operational risks:

- compliance with regulatory and other legal requirements;
- periodic assessment of operational risks faced, and the adequacy of controls and procedures to address the risk identified via risk assessments;
- appropriate segregation of duties, including the independent authorisation of transactions;
- development of contingency plans;
- application of administrative, ethical and business standards via policy documents;
- reporting of operational losses and proposed remedial action;
- risk mitigation activities, including insurance, where this is effective; and
- training and professional development.

Compliance with the above standards is also supported by a program of periodic reviews undertaken by internal review and external review.

Risk Evaluation

Risk evaluation is used to determine which residual risks need treatment and the priority of the implementation of their treatment.

To assess the controls and procedures in place the following questions apply:

- Are all appropriate controls and procedures present?
- Does the control or procedure address the risk effectively?
- Is the control or procedure well designed, documented and properly communicated?
- Is the control or procedure in operation and applied consistently?
- Is the control or procedure reviewed by anyone independent of the person performing the control or procedure?

A weighting is then given to indicate the effectiveness of the control or procedure as set out below.

Weighting	Rating	Description
1	Poor	At best control addresses risk, but is not documented or is not in full operation, at worst control does not address risk and is poorly designed, not documented nor in full or partial operation
0.85	Fair	Control addresses risk partly but design, documentation and/or operation of control requires improvement
0.75	Good	Control addresses risk fully, but design documentation and/or operation of control could be improved
0.50	Excellent	Control addresses risk, well designed, is documented and in full operation.

The inherent risk rating together with the assessment of any internal controls are applied in a formula to produce a numeric representing residual risk as shown in the table below. The formula is weighted to emphasis impact and control over likelihood, thus as controls improve, residual risk is lessened.

RESIDUAL RISK MATRIX					
Inherent risk rating	Control Assessment				
		Excellent 0.50	Good 0.75	Fair 0.85	Poor 1
Low	1	0.50	0.75	0.85	1.0
	2	1.0	1.5	1.7	2.0
	3	1.5	2.25	2.55	3.0
	4	2.0	3.0	3.4	4.0
Medium	5	2.5	3.75	4.25	5.0
	8	4.0	6.0	6.8	8.0
	9	4.5	6.75	7.65	9.0
High	10	5.0	7.5	8.5	10.0
	12	6.0	9.0	10.2	12.0
	15	7.5	11.25	12.75	15.0
	16	8.0	12.0	13.6	16.0
Extreme	20	10.0	15.0	17.0	20.0
	25	12.5	18.75	21.25	25.0

Risk Reporting

CXY will maintain a Risk Register of all risk indicating the assessed severity of the residual risk. This register will be updated at least semi- annually by the Chief Financial Officer.

The Audit and Risk Committee will review the Risk Register after it has been updated and report to the Board on all residual risks that have been assessed as "High".

Ongoing report on residual risks that have a "High" rating; breaches of this policy and external developments which impact on the risk management framework will be made to the Audit and Risk Committee.

Notification about events or circumstances that have a significant negative impact on any risks with a "High" consequence rating should be made to the Managing Director and the Chairman of the Audit and Risk Committee at the earliest possible instance.

Risk Treatment

Once residual risk have been identified and calculated the following table dictates the type of management action required.

Residual Risk Rating	Score	Appropriate Management Response
Extreme Risk	17-25	Immediate attention – cessation of activity
High Risk	10-17	Active management – a risk action plan must be implemented and monitored by the Audit & Risk Committee
Medium Risk	4.25-9.0	Regular monitoring – risk action plan must be in place and the risk should be monitored by Management in conjunction with a review of existing control procedures
Low Risk	0.5-4.0	No need for risk action plan but periodic review by Management of the risk evaluation

RISK MANAGEMENT REVIEW

Revision

Ongoing review is essential to ensure that this policy remains relevant. Factors that may affect the likelihood and consequences of an outcome may change, as may the factors that affect the suitability or cost of internal risk control policies. It is therefore necessary to continually assess risks and the effectiveness of any control policies.

Monitoring and review also involves learning lessons from the risk management process, by reviewing events, the internal risk control policies and their outcomes.

CXY will monitor and evaluate its performance in relation to risk management. This will be achieved by:

- regular reporting to the Audit and Risk Committee;
- half yearly reporting by the Audit and Risk Committee to the Board;
- semi-annual review of CXY's Risk Register by the Audit and Risk Committee; and
- annual review of this Risk Management Policy by the Audit and Risk Committee.

Amending the Policy

The Board must approve any and all changes to this policy which needs to be mandatorily reviewed annually.

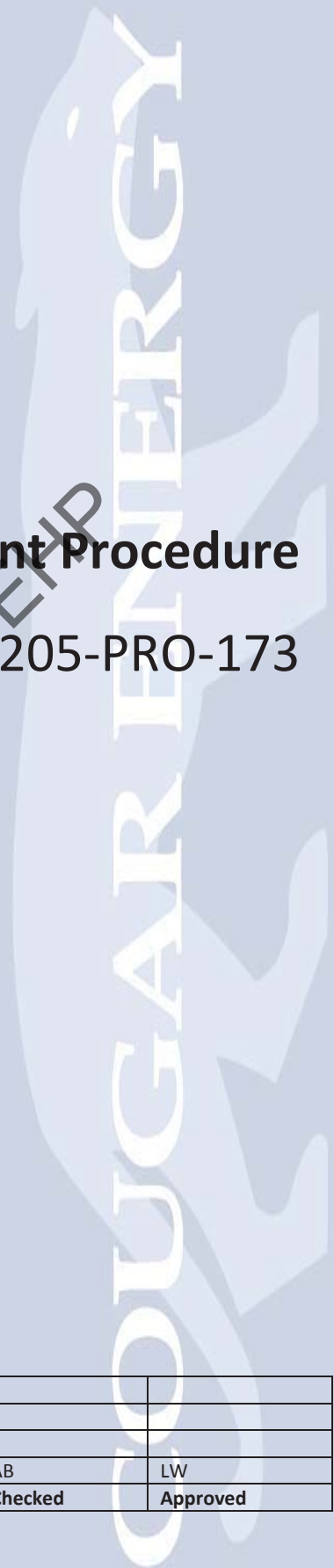
Appendix C: Risk Management Procedure

RTI DL RELEASE - EHP

Risk Management Procedure

205-PRO-173

RTI DL RELEASE - ENP



B	02/12/2010	Updated for ISO31000	PRS		
A	10/01/2010	First draft	PRS	AB	LW
Rev	Date	Description	Drafted	Checked	Approved

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1 Purpose

The purpose of this document is to promote and create a risk management culture at the Cougar Energy - Kingaroy Pilot Gasification Plant site. This is achieved through the adoption of a systematic approach to the management of all potential operational risks, including HSE risks. This document specifies a framework for the consistent and transparent evaluation of risk and the use of a variety of risk management tools, including safety and environmental risk assessment, engineering change management and job hazard analysis.

The document also requires regular reporting and review of significant risks by site management.

2 Scope

This procedure will apply to all areas and functions of the Cougar Energy site, including:

- Health and safety risk management, including personal risk management and team-based risk assessments;
- Environmental risk management;
- General risk management of business activities and processes;
- Project risk management, including engineering change and modifications;
- Contractor activities, where CEL exercises management control.

3 Background

Cougar Energy Ltd will implement systematic risk assessments consistent with the requirements of Australian Standard ISO 31000:2009 Risk management-Principles and guidelines

The purpose of these assessments is to identify potential site threats (eg hazards and impacts) and to ensure that we are effectively managing the risks arising from these threats. A key aspect of risk management is the assessment of risk in order to establish control priorities. It is important that this is done in a consistent and transparent manner. We use standard likelihood and consequence tables to rank the risk (refer Section 4.2). In the case of environmental and health risks, we also consider the sensitivity associated with the risk, in recognition that some environmental and health issues may cause community or workforce concern/ anxiety with consequent impact on our corporate image. This is especially true of risks that are perceived to be outside the control of individuals.

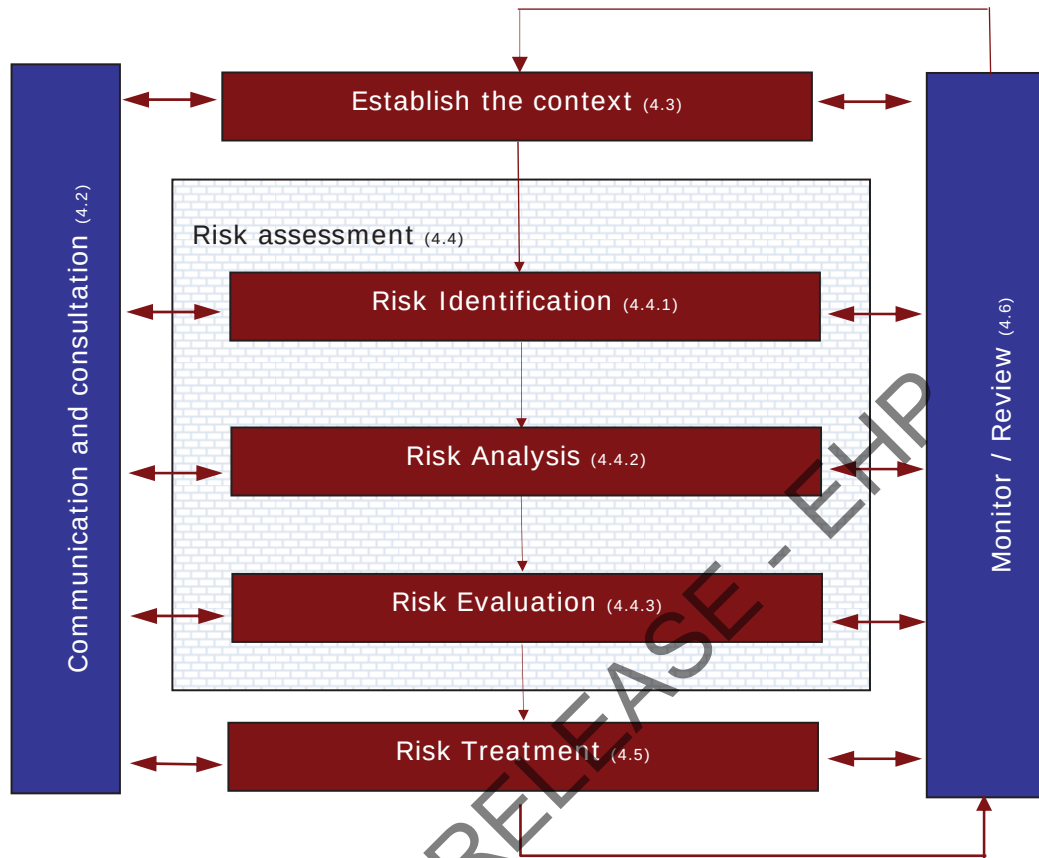
3.1 Regulatory Context

Risk management underpins legislation and specific regulatory requirements that relate to the need to formally assess risks associated with workplace hazards, including plant and hazardous substances. Risk assessment is also required under the numerous State and Federal Government Acts.

4 Procedure

4.1 The Risk Management Process

An overview of the risk management process is shown below.



4.2 Communication and Consultation

Communication and consultation with external and internal stakeholders is required to take place at all stages of the risk management process. Consequently part of the risk process is about identifying the stakeholders, in the first instance, whom are likely to be impacted upon. Whether formal or informal communication is required consideration must always be given to the methods needed to assist in the process of communication our risk based activities.

4.3 Establish the context

The objective, strategies, scope and parameters of the activity(s) where the risk management process is being applied should be established. The management of risk will allocate resources used to carry out risk management. The resources required, responsibilities and authorities, and records to be kept are to be specified.

The external context can include, but not limited to:

- Social and cultural, political, legal, regulatory, financial, technological, economic, natural and competitive environment.
- Key drivers and trends having impact on the objectives of the Cougar; and
- Relationships with, perceptions and values of external stakeholders

The internal context can include, but not limited to:

- Governance, organisational structure, roles and accountabilities;
- Policies, objectives, and the strategies that are in place to achieve them;
- The relationships with and perceptions and values of internal stakeholders;
- Cougars culture
- Information systems, information flows and decision making processes (both formal and informal)
- Standards and models adopted by Cougar; and
- Form and extent of contractual relationships.

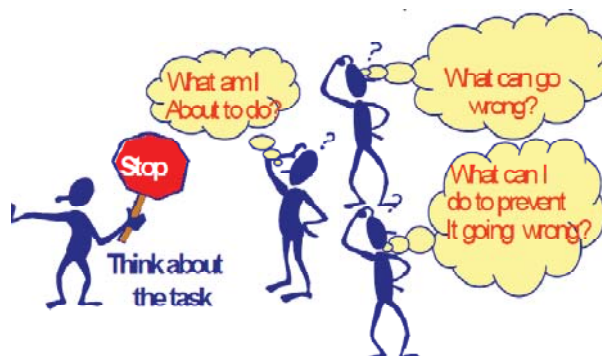
4.4 Risk Assessment

All Cougar Energy personnel are empowered and encouraged to identify potential risks in the workplace. We have a variety of techniques or risk assessment tools that can be used to facilitate this process.

Risk assessment can be qualitative, semi-quantitative or quantitative. An individual prior to starting the job is expected to do a qualitative assessment (i.e. a non-recorded or pocket book risk assessment to determine likely hazards and to check that the necessary controls are in place and functioning effectively). This is referred to as personal risk management – we STOP, we THINK (about the tasks we will be doing), and we ask ourselves three questions as illustrated below:

[Please note: The Pocket Book can be used for qualitative assessment]

The Three “Whats”



Semi-quantitative assessments typically involve checklists or structured forms; these include job safety and environmental analysis for critical jobs and risk plans for business risk.

Quantitative assessments are based on numerical data and detailed analysis and are typically complex and time-consuming; these are generally done for major projects and significant engineering modifications (eg HAZOP study).

The following table summarises the various risk management techniques used at the Cougar Energy site, including where the technique should be applied and who is typically responsible for championing the assessment.

Technique	Application and Comments	Responsibility
Business Risks – Business Planning Process		
Risk Identification, Analysis and Assessment Schedule	Used for preliminary analysis of business risks. If risk level is assessed as being Low or Medium, a monitoring plan is developed. Otherwise a formal Risk Plan is required.	Applicable managers.
Risk Plan	Used for summarising the analysis of significant business risks. Applies across all business functions. The Plans are submitted to the Board for endorsement.	Site Manager
Technique	Application and Comments	Responsibility
Work Activities and OHS Risks - Proactive Risk Assessment (Before/During Job)		
Informal assessment - on the job Stop & Think - 3 What's	Non-recorded hazard identification and control before job commencement. Done by the individual or discussed as pre-shift briefing, talk box talks etc. When a hazard is identified it is either fixed immediately or reported via Pocket Book (pink Slip) or reported via Incident Reporting process.	All individuals on a daily basis.
Inspection checklists - eg equipment pre-use checks, General Inspection Form;	Pre-use checks prior to using designated "high-risk" plant or equipment. General inspections typically done on a scheduled (eg monthly or quarterly) basis in all work areas. Defects and non-conforming items result in Work Orders. Risk ranking is done on identified health and safety hazards or potential environmental impacts and priority and remedial action responses are related to risk.	All individuals on a daily basis. Championed by managers.
Identification of OHS hazards, environmental issues and concerns.	Any OHS hazard, potential environmental issue or concern identified by employees, contractors and visitors. Use Pocket Book or directly log hazard/ issue/ concern and control actions documented and given to Site Manager. Where necessary, do a risk assessment.	All individuals and teams to identify. Site Manager to respond and do a risk assessment.

Job Safety Analysis / Work Method Statement	A JSA/ WMS must be done when specified on the Work Order or where the risk rank of the job has been calculated as being higher than "Medium". Otherwise, WMS done for safety or environment-critical jobs and non-routine jobs. A WMS is used to assess the safety hazards and potential environmental impacts associated with each step of the job. The risk is assessed on the basis of the control measures to be implemented. Jobs with a risk ranking of "Extreme" must not be done. All "Extreme" ranked risks must be referred to the Site Manager for consideration.	Work teams and respective manager to coordinate WMS process. Site Manager must approve potential extreme risk jobs and recommend additional controls.
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4.4.1 Risk Identification

Risk identification identifies the sources of risk, areas of impacts, events (including changes in circumstances) and their causes and their potential consequences. The aim of this step is to generate a comprehensive list of risks based on the events that might create, enhance, prevent, degrade, accelerate or delay the achievement of objectives. It may be important to identify the risks associated with not pursuing an opportunity. The below table(s) provide a course set of examples as assistance for you to place the problem into.

Selection of a Suitable Risk Management Technique

Technique	Application and Comments	Responsibility
<i>Incidents - Reactive Risk Assessment (after the incident has occurred)</i>		
Incident Report Form	Reactive risk assessment is done following incidents. The potential risk of the incident is considered, not just the actual consequence arising from the incident. Refer to incident reporting and investigation process for details on investigation triggers.	Site Management.
<i>Risk Assessment During Design and Modifications/Engineering Change</i>		
Hazard and Operability (HAZOP) Study	Detailed line by line assessment of hazard and operability issues using piping and instrumentation diagrams and process flow diagrams. Usually done at preliminary and detailed engineering design using a team or relevant and experienced people..	Process Engineers
Engineering	Used to thoroughly assess the risks.	Process Engineers
Change Management	Associated with Major Engineering modifications and projects at the site	Process Engineers

4.4.2 Risk Analysis

Risk analysis provides an input to risk evaluation and to decisions on whether risks need to be treated, and on the most appropriate risk treatment strategies and methods. Risk analysis can also provide an input into making decisions where choices must be made and the options involve different types and levels of risk.

The way in which consequences and likelihood are expressed and the way in which they are combined to determine a level of risk should reflect the type of risk, the information available and the purpose for.

ACTION Step 1.

Determine Consequences (refer Formal Matrix and Pocket Book Matrix as appropriate): for inherent risk, consider the worst credible consequence arising from the breakdown event; for residual risk, consider the most likely consequence with the current or proposed controls in place.

Formal Matrix – to be used for broader business risk assessment documentation

Grade	CONSEQUENCE							
	Safety	Environment	Property Damage	Production interruption	Efficiency	Quality	Reputation / Publicity	Legal action
A	Fatality or Disability	Major Spill; Serious Env. Harm	< \$1m / Significant	Full interruption – Many days	< \$1m	Unusable	Regional press attention	Goto Court
B	Serious Lost Time injury or illness	Spill; Env. Harm	< \$100k / Minor plant Damage	Plant / Well < 1 day	< \$100k	Unusable	Local reporting only	Use of Solicitor
C	Medical treatment injury	Env. Nuisance (noise, dust)	< \$10k / Heavy Equipment	Plant / Well interruption minor	< \$10k	Just usable	Confined to Site	Mediation
D	Minor first aid injury	Minor Env. Nuisance	< \$1k / Tooling	Partial Loss / significant	< \$1k	Below Spec.	Not a core value	Disagreement
E	No Injury	Perception	< \$200	Partial Loss / Minor	< \$200	Per Spec.	None	None

Pocket Book Matrix – to be used for site based risk assessment

Grade	CONSEQUENCE				
	Safety	Environment	Property Damage	Production interruption	Efficiency
A	Fatality or Disability	Major Spill; Serious Env. Harm	< \$1m / Significant	Full interruption – Many days	< \$1m
B	Serious Lost Time injury or illness	Spill; Env. Harm	< \$100k / Minor plant Damage	Plant / Well < 1 day	< \$100k
C	Medical treatment injury	Env. Nuisance (noise, dust)	< \$10k / Heavy Equipment	Plant / Well interruption minor	< \$10k
D	Minor first aid injury	Minor Env. Nuisance	< \$1k / Tooling	Partial Loss / significant	< \$1k
E	No Injury	Perception	< \$200	Partial Loss / Minor	< \$200

Severity and Consequence	Description - Safety, Environment, Damage, Plant / Well interruption
A Major	<ul style="list-style-type: none"> Fatality or serious disability or extensive injuries (lost time > 4 weeks) or serious illness; Safety Prohibition Notice issued; Major Spill or emission release leading to off-site impact (serious environmental harm); site remediation efforts with EPA and community involvement; potential penalty; regular licence exceedances. Property/Plant damage (or revenue loss) between \$100k and \$1m; Production interruption leading to well shut down or plant rendered inoperable for more than one month.
B Serious	<ul style="list-style-type: none"> Serious medical treatment or lost time injury (< 4 weeks absence or alternate duties); Safety Improvement Notice issued Spill or emission event leading to licence breach and possible site remediation (> \$10 and < \$100k); reporting to EPA or public concern or nuisance (eg complaint about odour, dust, water contamination or noise). Property/Plant damage (or revenue loss) between \$10k and \$100k.
C Moderate	<ul style="list-style-type: none"> Medical treatment or minor injury treatment to multiple persons; Environmental nuisance such as noise or dust emissions. Small, unconfined spill or on-site release to environment (eg emission of low volume, concentration); Property / Plant damage (or revenue loss) between \$1k and \$10k; Technical non-compliance with business system procedures;
D Minor	<ul style="list-style-type: none"> Minor injury / first aid treatment; Minor environmental nuisance. Small, contained spill or emission (of very low volume, concentration or mass load). Contaminant highly biodegradable; Property / Plant damage (or revenue loss) between \$200 and \$1000; Partial loss.
E Insignificant	<ul style="list-style-type: none"> No injury; Perception of environmental issue (no actual impact); Property/Plant damage (or revenue loss) up to \$200; Partial loss – minor significance only.

Sensitivity Rating Definitions – Alternative to above

Use the following table for sensitive cultural, environmental and health risks, where the perception of the risk may be at variance with the actual risk. In such cases, examine both the consequence Table (Formal or Pocket Book) and the sensitivity table and use the highest rating that is obtained.

Sensitivity	Description
A..... Major	Community incident report. Significant workforce anxiety. Potential for local media coverage and damage to corporate image. Examples include release of toxins in water and or air.
B..... Serious	The level of public or workforce concern is expected to be high and there is the potential for Media involvement. Examples include potential health effects, green house gas abnormally high.
C..... Moderate	The environmental risk, health risk or public or workforce concern is expected to be of medium concern.
D..... Minor	The environmental risk, health risk or public or workforce concern is expected to be of low concern.
E..... Insignificant	The environmental risk, health risk or public or workforce concern is non-existent

ACTION Step 2.

Determine Likelihood (refer Table below): consider the likelihood of the breakdown event occurring during the task. Remember that likelihood is the product of both probability (based on historical experience) and exposure. Exposure relates to how often and how long the risk takers will be exposed to the breakdown event during the job/ task.

Likelihood Rating Definitions

Choose the likelihood remembering that “likelihood” is a function of both probability (chance) and exposure.

Sensitivity	Description
Very Likely	Almost certain. This event is expected to occur in most circumstances or will happen today or in less than one week.
Likely	Between once per week and once per month; or the event will probably occur in most circumstances.
Unlikely	Between once per month and once per year; or the event should occur at some time.
Highly Unlikely	Between once per year and once per ten years; or the event could occur some time
Almost Impossible	Unlikely to ever recur; or may occur in exceptional circumstances. Greater than one event in ten years.

ACTION Step 3.

Determine Risk Ranking (refer Risk Ranking Table below): use the risk matrix to determine whether the risk is “Low”, “Medium”, “High” or “Extreme”.

Risk ranking table

The level of risk is determined by combining the consequence grade with the likelihood of occurrence as shown in the following matrix:
i.e using the consequence table determine if the event is either A,B,C,D,E and then consider the likelihood.

		Likelihood		Extreme or High – STOP Medium or Low - PROCEED	
Grade	Very Likely	Likely	Unlikely	Highly Unlikely	Almost Impossible
A	Extreme	Extreme	High	High	Medium
B	Extreme	High	High	Medium	Low
C	High	High	Medium	Low	Low
D	High	Medium	Low	Low	Low
E	Medium	Low	Low	Low	Low

To use an example:

What can happen if I drive to work today! (Hopefully nothing but!)

You can have an accident – either loss/damage of asset or worse still loss of life. This represents a Grade A event. However the next question is “how likely” is it that I might have an accident in the car and die. We like to consider this as “almost impossible”. This is a “medium” outcome, hence the reason we can still drive BUT with caution!

ACTION Step 4.

Refer to (Risk response and reporting requirements) Table below for generic risk action requirements

Risk response and reporting requirements

The table below describes the action to be taken as a function of the assessed risk level.

Risk Rank	Management Controls & Responsible Persons
Extreme	Do not proceed with job. Detailed investigation. Planning required at senior management level eg. Site Manager (with advice from HSE specialists if necessary).
High	Must be referred to Site Manager. Job can proceed provided sign-off by manager and the work team are fully briefed on the hazards and risk controls.
Medium	Proceed with job taking additional care and record risks in pocket book. Risk control can be discussed with leader or colleagues.
Low	Proceed with job, taking usual precautions. Risk control can be discussed with leader or colleagues.

4.4.3 Risk Evaluation

The purpose of risk evaluation is to assist in making decisions, based on the outcomes of risk analysis, about which risks need treatment and the priority for treatment implementation.

To ensure consistency in the evaluation of risk throughout Cougar Energy- Kingaroy Pilot Gasification Plant, risk assessors shall utilise the likelihood and consequence tables detailed below. Where the assessment team considers that a more appropriate evaluation framework is available and applicable to the risk scenario under consideration, then this alternative framework may be used with the approval of the CEL Manager.

Examples may include: technological systems (refer AS 3931); information security (refer SAA HB 231); and outsourcing (refer SAA HB 240).

When evaluating risk we consider two scenarios:

- The **inherent** or potential risk – by considering the worst credible consequence if the controls fail;
- The **residual** or remaining risk – by considering the most likely consequence with our controls in place and being used effectively.

The first step in risk evaluation is to establish the critical breakdown (or loss of control) event that is to be assessed. For example, this may be a fall from height, an oil spill to water, contact with electricity, bankruptcy of a core contractor or critical item of plant not shipped on time.

As an additional note when consideration risk evaluation and its treatment. This relates to two types of breakdown events to look for, namely:

- Activity or 'task-related' hazards - those associated with actually doing a task or activity; and
- Passive or 'system-related' hazards - those that can occur as a result of not doing a task or not doing an activity properly or not at all. These normally impact someone else at a later time (eg if an inspection is not done properly plant failure may occur, causing a loss at a subsequent time). These are often "system" or procedural failures.

4.5 Risk Treatment

Risk treatment involves selecting one or more options for modifying risks, and implementing those options. Once implemented, treatments provide or modify the controls. See hierarchy of controls!

In treating workplace risks we seek to apply the hierarchy of risk control measures to the extent practical (refer [Attachment 8.1](#) for details). Our preferred risk management approach is the elimination of risks, followed by reducing risks through engineering controls. We recognise that the success of lower order controls such as administrative processes and use of personal protective equipment is strongly dependent on effective training and supervision.

Risk Assessment

When assessing the risk **before** controls, consider:

- The worst **credible** consequence if an accident occurred; and
- The likelihood in relation to the breakdown event occurring **during** the job.

When assessing the risk **after** controls, consider:

- The most **likely** consequence if an accident occurred (given the controls selected to reduce risk); and
- The likelihood of an accident occurring with controls in place.

Risk Response - Action Requirements

Risk	Proactive - Response following Risk Planning	Accountability
E	<p>Extreme Risk - detailed research and management planning required by Site Manager with input from specialist staff.</p> <p>Risk Profile logged on Site Risk Register and risk is subject to periodic management review to ensure timely implementation of action plan.</p> <p><i>(Work tasks shall not proceed until risk personal injury or environmental harm is mitigated; formal hazard reviews for major engineering modifications or organisational change; formal risk assessment documented, together with action plan)</i></p>	Executive Director.
H	High Risk - Responsible Manager attention needed.	Site Manager.

	<p>Risk profile logged on Site Risk Register and risk is subject to periodic management review to ensure timely implementation of action plan.</p> <p><i>(WMS for work tasks with sign-off by Site Manager; formal hazard reviews for projects and engineering modifications or organisational change; formal risk assessment documented, together with action plan)</i></p>	
M	<p>Medium Risk - Senior work team member responsibility for control measures must be specified - usually the on-shift operator or contractor supervisor.</p> <p><i>(WMS for work tasks with sign off by team leader)</i></p>	Work-Team
L	<p>Low Risk - manage by routine or recorded procedures or methods.</p> <p><i>(Individual non-recorded risk assessment on the job)</i></p>	Individual

4.6 Monitor and Review

4.6.1 Measurement and Analysis

The flow chart at [Attachment 8.2](#) outlines the process for identifying and assessing the impact of business risk, including a system for their management.

The Risk Assessment is to be used for logging potential risks, and recording the results of the analysis, assessment and action required. Other methods may be used for recording identified risks, but the relevant Manager will authorise the method.

In the case of hazards/ impacts/ threats with a residual risk ranking of "Extreme" or "High", a formal Risk Plan is required. The plan is to be documented and will be subject to regular review by the site manager. Any major changes in the site risk profile shall be notified to the Site Manager and will assess the risk and implement appropriate risk reduction or transfer actions.

4.6.2 Process Review

The Cougar Energy Site Manager shall maintain a site Risk Register for "High" and "Extreme" business risks. The Site Manager will review the Risk Register on a 6-Monthly basis. Newly identified "High" or "Extreme" health, safety or environment risks or critical incidents shall be reported to the Manager, and ultimately to Owners, via the monthly reporting process (refer also to Incident Reporting and Management).

4.6.3 Competency Requirements

All managers at site are required to participate in a training on the general risk management processes outlined in this procedure, including:

- The various techniques available for risk assessment;
- Identifying the need for formal risk assessment;
- Doing formal risk assessment, including action planning, monitoring and reporting.

All managers and employees involved in potentially hazardous work tasks shall be provided with Work Method Statement (WMS) / Job Safety and Environmental Analysis (JSEA) training. The Site Manager shall be responsible for organising this training to be delivered.

The basic steps in risk assessment shall be included in the site induction for employees and contractors. Nominated personnel (eg engineers and other specialist personnel) shall participate in formal, design hazard review training as necessary and as approved by their manager.

5 Responsibilities

5.1 Site Management

The Cougar Energy Site Manager is accountable for ensuring that hazards and threats to the site are identified, risks are assessed and suitable risk reduction measures are implemented. Where applicable, the Cougar Energy Site Manager shall ensure that risk assessments are done and reviewed on a regular basis.

5.2 Site Staff

The respective on-shift operator is directly responsible for day-to-day risk management for areas under their control, including ensuring that identified corrective actions are implemented and that feedback on risk issues is provided to all relevant personnel.

All employees and contractors are expected to be familiar with the risk assessment techniques applicable to their work tasks. All individuals are required to participate in the risk assessment process as a routine job requirement and are also responsible for using the identified risk control measures.

6 Definitions

Hazard	refers to anything that may cause harm.
Risk	refers to the possibility of hazards and threats such as economic or financial loss or gain, physical damage, injury or delay, being realised. The concept of risk has two elements, i.e. the likelihood of something happening and the consequences if it happens.
Risk Mgmt	refers to the systematic application of management policies, procedures and practices to the tasks of identifying, analysing, assessing, treating, communicating and monitoring risk.

7 References

AS ISO 31000:2009,	Risk management-Principles and guidelines
AS ISO Guide 73:2009,	Risk management – Vocabulary
AS ISO/IEC 31010,	Risk management-Risk assessment techniques
AS 3931,	Technological Systems
SAA HB 231,	Information Security
SAA HB 240,	Outsourcing

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8 Attachments

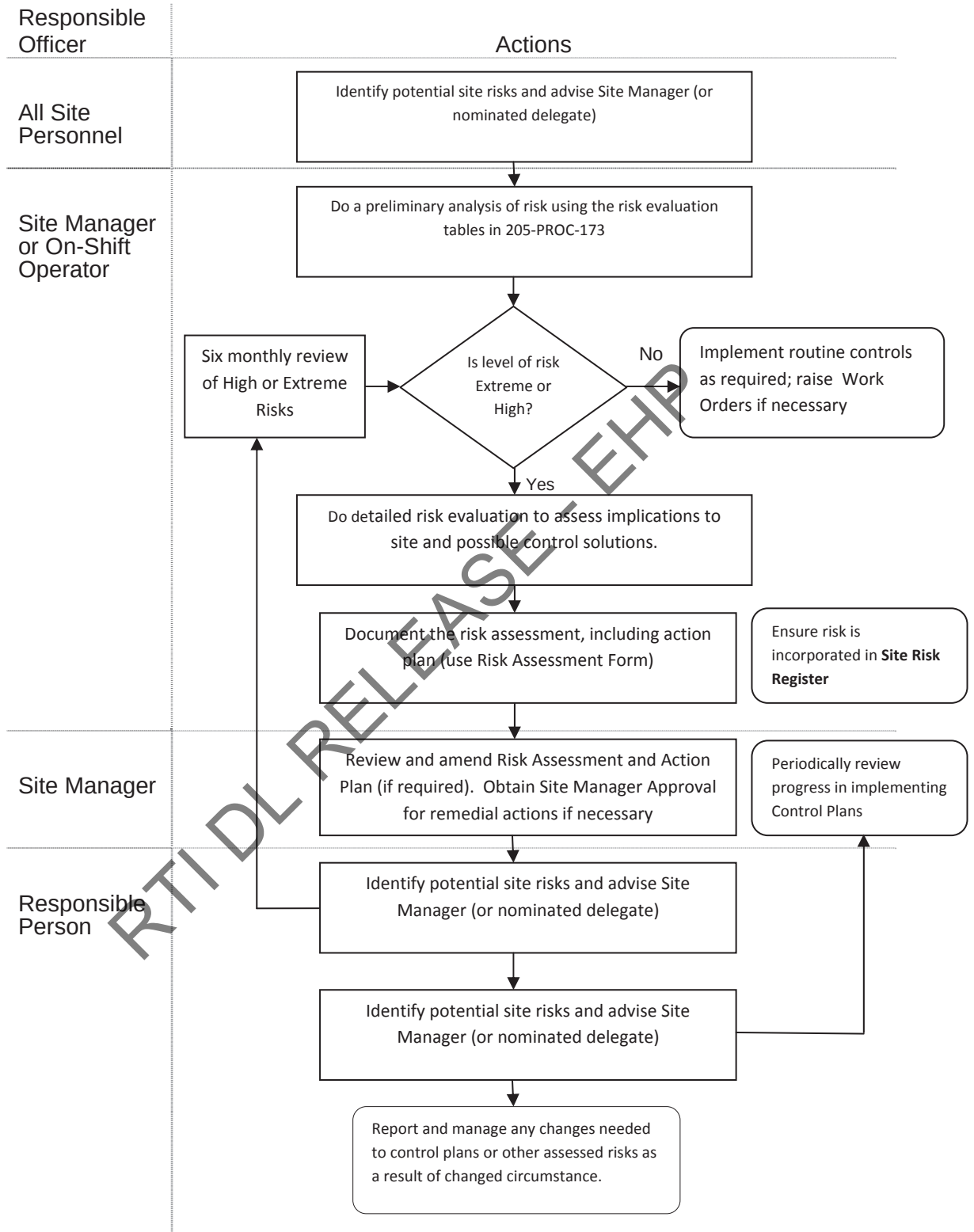
8.1 Hierarchy of Workplace Risk Control Measures

The “hierarchy of control” should be applied whenever health and safety hazard controls or environmental impact controls are being considered. In accordance with this hierarchy, the first efforts should be to avoid the risk altogether. If this is not possible, efforts should be made to combat the risk at its source through good engineering design.

The hierarchy is as follows:

- **Elimination** - Eliminate the hazard or impact altogether to avoid the risk (eg stop using a dangerous substance if it is not necessary, use a safer method of work).
- **Substitution** - Change the activity or process to one that is less harmful.
- **Engineering Control** - Separate people from the hazard or limit the number of people exposed by enclosing or physically guarding the hazard; use pollution control technology; securely bund environmentally hazardous substances.
- **Administrative Control** - Design a safe system of work that reduces the risk to an acceptable level
 - Provide written procedural controls (eg safe work method statements);
 - Provide adequate supervision;
 - Identify training needs and provide required competency-based training;
 - Consider other administrative controls (eg rules, permit-to-work controls, reduce exposure via shift work arrangements, signs, warning placards, etc).
- **Personal Protective Equipment** - Protect people by providing appropriate PPE (this should always be the last resort).

8.2 Flow Chart - Identification, Assessment and Monitoring of Site Risks



Appendix D: Emergency Response Procedure

RTI DL RELEASE - EHP

Emergency Response Procedure

205-PRO-168

0		First Draft	TES	PS	LW
Rev	Date	Description	Drafted	Checked	Approved

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Business Procedure Title: **Emergency Response Procedure**

Business Procedure Number: **205-PROC-168**

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RTI DL RELEASE - EHP



1 Purpose

As part of the Cougar Energy Limited Safety Management Plan, this Emergency Response Plan is a guideline as to how to execute and respond in the event that there is an Emergency or an Evacuation at site. This document will list scenarios and methods of response as well as appropriate emergency contacts and will also include a Site Plan Layout. This Emergency Response Plan is specific to the Kingaroy Pilot Gasification Plant (KPGP) and is designed to assist and guide all Cougar Energy employees, contractors and visitors in the event that there is a real emergency situation on Site.

It is not possible to cover every emergency situation or scenario of a likely event in this procedure but the importance of response relies upon ensuring that site safety requirements and the need for enforcing safety control standards are paramount to this operation.

Continuous improvement and competence of personnel is also applicable and the need for ongoing training, development and efficiency is gained through emergency drills which will provide continued strength and support to this ERP.

2 Procedure

2.1 Safety and Emergency Procedure

An emergency is an unexpected event that poses a threat to life, property or the environment and requires immediate action to prevent or limit such a threat. The Emergency Response Procedure sets out the minimum procedures that should be undertaken by CEL trained personnel.

In the event that the emergency escalates and cannot be contained by CEL trained personnel then Level 2 – Code Blue of the Emergency Incident flowchart is to be implemented. See Attachment Section for Flowchart. It will then be at the discretion of the Emergency Controller to define if the emergency needs to be escalated to Critical Level – Code Red.

The goal for the Code Red and Blue plan is to support this Plan, through providing a consistent communications framework that supports the operational response to a crisis and will enable CEL to provide timely, accurate information to all of our Stakeholders.

2.2 Responsibilities

2.2.1 Site Management

The **Site Manager** is accountable for providing sufficient resources to ensure the effectiveness of the Management System described in the HSE management plan.

The **Operations Manager** shall be the site champion for HSE management issues and will ensure major HSE issues are brought to the attention of the Site Manager. The Operations Manager will also be the designated Emergency Controller in the event of a serious event on site and will monitor and control the situation until emergency services attend site and take control of the scene.

The **Shift Operator** shall be the one responsible for raising the alarm, implementing the



Emergency Response Plan, contacting emergency services as applicable, notifying the Operations Manager of the situation, instigating evacuation if required and monitoring and controlling the situation until the Operations Manager becomes the Emergency Controller.

2.2.2 Site Staff

All **staff** are accountable for practising risk management principles in day-to-day work and ensuring that work is effectively planned and implemented to minimise the risk of incidents. Detailed responsibilities are listed in the various procedures. All appropriately trained site staff are also responsible for assisting in the event of an emergency and are required to assist the Duty Operator in either rendering first aid where required or removing anyone from harm to the evacuation muster point.

2.3 Classifications of Emergencies

In the event of an emergency, the Duty Operator will classify the situation under the category Major, Serious or Minor. An emergency must be reported within 24 hours to Workplace Health and Safety and depending on the level of the emergency or incident further notification may be required to the P&G Inspector. See Attachment Section for Emergency Contacts.

2.4 Major Emergency

A major emergency is an incident having major safety, environmental, governmental, economical or public welfare implications

2.5 Serious Emergency

A serious emergency is one that has implications beyond the control of CEL training personnel. It would generally involve external emergency services or resources including government agencies.

2.6 Minor Emergency

A minor emergency is one that can be satisfactorily handled by CEL trained personnel and does not have any affect or threat to parties outside of Cougar Energy Limited and the KUCGPP operation.

2.7 Notification

In the event of serious injury it is crucial to notify emergency services i.e. Ambulance, Fire Brigade or Police as soon as possible. It is also important that the next of kin of the injured are promptly notified. This responsibility is to be undertaken by the Operations Manager or as designated by the Site Manager.

If a very **Serious** or **Major** emergency has occurred then notification should be given to the next of kin via a member of the local police force upon further advise of medical professionals.

Under no circumstances are names to be released before the next of kin have been notified. Media representation will be by the Site Manager or delegated Authority.

2.8 Sharing Roads with Mobile Equipment

In the case of an emergency involving a fatality, serious injury or significant damage to person, property, plant and or environment, the Operations Manager will lead the Incident Investigation. Government or Regulatory Inspectors may also carry out their own investigation into the extent



and cause of the situation and all CEL personnel are to provide full cooperation into the incident as requested.

As per the Petroleum & Gas Act and Regulation, Petroleum and Gas Authorities are to be notified **immediately**, (means without delay) after the incident occurs, other than a delay caused by action taken to—

- (a) save the life of, or prevent further injury to, a person; or
- (b) contain damage to property.

2.9 General Safety

2.9.1 Personal Protective Equipment (PPE)

All Visitors, Contractors and Employees on CEL sites are to comply with the required PPE as set out by the appropriate Site Induction. Safety Clothing must be worn at all times including a minimum of; hard hats, safety glasses, long sleeve trousers, long sleeve HI VIS Shirts or long sleeve shirts with HI VIS anti static vests, safety steel cap boots. Please observe all safety signs they are there to protect all personnel, contractors and visitors on site.

2.9.2 Smoking

CEL Sites are **NON – SMOKING** sites. Please only use designated area to smoke. Any breach of this rule could result in not only a serious safety breach but also result in you being asked to leave site.

2.9.3 Intrinsically Safe

Before accessing any of the restricted zones, you will be asked to remove any possible breaches of these zones. For example intrinsically unsafe equipment and sources of ignition. Mobile phones are to remain at the Site Administration office until your return and departure from site.

3 General Evacuation

D.(danger) R. (response) A.(airway) B.(breathing) C.(compressions) D. (defibrillation)

A situation may arise at site that requires the immediate evacuation of non essential personnel. This could be due to a number of reasons. The following should be followed:

- Take whatever steps are necessary to minimise further risk, damage or injury prior to evacuation
- Sound Evacuation Air Horn (**3 long blasts**)
- All non essential personnel, visitors and contractors to report to Muster Point
- Duty Operator to contact Operations Manager or Emergency Services as dictated by the Emergency
- Anyone in the vicinity that needs to be evacuated is to be removed as quickly and safely as possible
- If there are injured personnel apply first aid, if safe to do so
- If able move injured personnel from harm's way , if safe to do so
- Wait for emergency services and assistance



- Duty Operator or designated person to collect Attendance Book and do a role call at Muster Point to ensure everyone is accounted for other than those assisting with the emergency.

Incident Report to be completed and external reporting as necessary

5 Bomb Threat

Upon receiving a Bomb Threat, refer to the Emergency Information Booklet as well as following the below:

- Keep Caller talking (Do Not Hang Up)
- Alert another staff member and have them call 000 stating the phone number they are calling from and the area under threat
- Keep the line open until police arrive
- Record information as per the Bomb Threat Checklist
- If suspect item is found, **Do Not Touch**
- Remove anyone in the vicinity from the area
- Notify the Site Manager or delegate (duty operator)
- Await further instructions
- Do Not Use RADIO's or MOBILE phones as this could possibly cause the item to explode
- Wait for Emergency Services to arrive and take control of the situation

Incident Report to follow

6 Well Blowout, Fire or Explosion

D.(danger) R. (response) A.(airway) B.(breathing) C.(compressions) D. (defibrillation)

Any loss of containment of hydrocarbons or fire is a serious situation that requires immediate corrective action. With appropriate wind conditions, and the right type of fuel sources (heat, dry winds, dry grass) a fire can spread rapidly and present serious threat to life, property and plant as well as the surrounding areas.

The key to containing a Well site fire is to isolate the problem and then de-pressure that section of plant and equipment at risk to a safe area, if possible.

The Duty Operator should ensure that Emergency Services (Fire Brigade) have been contacted and that all personnel on site know and understand their duties. Drills should be conducted regularly as appropriate.

On discovery of hydrocarbon containment or fire, raise alarm and proceed as follows:

- Inform the Duty Operator, advise location, type and extent of the emergency (fire)
- Duty Operator to contact Site Manager or Delegate and advise of situation.
- Duty Operator to contact Emergency Services



- Site Manager or Delegate to notify adjoining land owners/occupiers as to the situation
- Fight fire with appropriate fire equipment but only if safe to do so
- The Duty Operator should secure well and inlet to the associated gathering line if possible.
- Determine type, location and extent of fire
- If safe to do so, de-pressure any gas containing equipment located close to the fire by venting/flaring to minimise collateral damage
- Direct all non essential personnel to the appropriate Muster Area
- Shut off or remove any source of fuel if possible and safe to do so
- Site Manager or delegate to determine the need for any additional services or further evacuation
- If possible, apply measures to eliminate off site impacts
- Report to muster point immediately as per General Evacuation procedure

Incident Report to follow

7 Bush Fire

D.(danger) **R.** (response) **A.**(airway) **B.**(breathing) **C.**(compressions) **D.** (defibrillation)

Any fire is a serious situation that requires immediate corrective action. With appropriate wind conditions, and the right type of fuel sources (heat, dry winds, dry grass) a fire can spread rapidly and present serious threat to life, property and plant as well as the surrounding areas. The key to containing a well site fire is to isolate the problem area in the form of long grass and scrub and then shut in the affected well(s) at risk, so as to minimise damage from the fire.

- Upon discovery of a fire that threatens a well site, raise the alarm with the Duty Operator
- Advise location, type and extent of fire
- If time permits and is safe to do so, clear away any long grass or scrub that may act as a fire source
- Secure well by closing Master Valve
- Duty Operator to raise alarm with Site Manager /Delegate and await further advice regarding closing off any pipes or vessels. Closing of any pipe that are exposed to heat could result in them becoming over pressured and fail.
- Advise Emergency Services **000** – Fire Brigade
- If bush fire is likely to be fuelled by gas and or hydrocarbon liquids from the surface flow line, either;
- Close gathering line inlet valve and bleed off Well Head facilities, and consider de-pressuring the gathering line at Gas plant end.
- If safe to do so, de-pressure any gas containing equipment located close to the fire by venting/flaring to minimise collateral damage

Incident report to follow



- While natural gas will normally disperse quickly and in an upward direction, gas vented from high pressures can be very cold and hence heavier than air (H₂S), until it warms up, and can contain heavier hydrocarbon that will not disperse so easily.

In the event that there is a Fire or an Explosion at site, the Duty Operator is to be immediately notified. Minor fires may be dealt with by CEL trained personnel if reasonably safe to do so. The below is a guide on how to respond to the situation:

- Duty Operator to raise alarm with Emergency Services if fire or explosion is in anyway threatening personnel, property, gas plant, gas lines, Well Sites.
- Dial 000/112
- Activate emergency air horn (3 LONG BLASTS)
- Proceed with evacuation plan
- If safe to do so, rescue anyone in danger
- Notify Site Manager or delegate
- Isolate fire / smoke (if safe to do so)
- Turn off to isolate all electrical or fuel sources
- Follow instructions issued by Site Manager or delegate
- If deemed necessary shut down plant as per procedure (appendix 1)
- Incident Report
- Site Manager to determine if response is External Reportable or not

Incident report to follow

8 Gas Release

D.(danger) R. (response) A.(airway) B.(breathing) C.(compressions) D. (defibrillation)

In the event that there is a Gas Release at site, the following steps are to be followed:

- Raise Alarm and remove any personnel including visitors and contractors from the immediate area preferably up wind of the gas leak.
- Take notice of Wind Sock to identify which way the wind is blowing
- If safe to do so, attempt to extinguish the flames or evacuate. However gas may be toxic so flame may remain until adequate assessment completed by Site Manager or delegate
- Try and isolate release if safe – Site Manager to assess
- Notify Site Manager or delegate as soon as practicable

Incident report to follow

9 Lightning

D.(danger) R. (response) A.(airway) B.(breathing) C.(compressions) D. (defibrillation)



Storms and Lightning are expected throughout the region. Some months can be more aggressive than other months. Thunderstorms and lightning are natural phenomena posing significant risks of injury and death. Lightning can injure or kill in a number of ways. Refer to Appendix for Guidelines on Personal Lightning Safety.

If a Thunderstorm is visibly active in the immediate area following precautions are recommended:

- Stop operating any machinery or equipment and move to the Control room or Site Administration Office for shelter
- Bring up Lightning tracker website and monitor using this website (insert website details here)
- Visit Bureau of Metrology (BOM) for any Severe Thunderstorm / Weather warnings
- If the Lightning strikes have been absent for more than 30 minutes than it would be considered safe to proceed outside and continue operations and outdoor activities
- Do not use a Landline during a storm

Incident Report to follow

Imminent lightning activity can be recognised in a number of ways:

AURALLY - If thunder is heard, lightning strikes are occurring. Thunder intensity is a very approximate guide to the strike distance - very loud thunder implies a strike in close proximity.

VISUALLY - If lightning flashes, either cloud to cloud or cloud to ground, are observed.

VISUALLY and AURALLY - If a lightning flash is seen, the time to hear the thunder provides an estimate of how far away the strike was. If the flash to thunder interval is less than 30 seconds, lightning is occurring within 10km. You are then in a potentially dangerous situation.

IF YOU CAN HEAR IT – CLEAR IT

IF YOU CAN SEE IT – FLEE IT

10 Medical Emergency

D.(danger) **R.** (response) **A.**(airway) **B.**(breathing) **C.**(compressions) **D.** (defibrillation)

- If necessary safely remove casualty from the immediate danger
- Dial 000/112
- Commence First Aid
- Remain with the Casualty
- Record all Medical Injuries on Incident Report

Incident report to follow



11 Road Accident

D.(danger) R. (response) A.(airway) B.(breathing) C.(compressions) D. (defibrillation)

- Call 000/112
- If safe to do so, try and make accident scene safe
- Commence First Aid
- Remain with Casualty until Emergency Services arrive.
- Remain at scene until advised it is alright to leave
- Record details on Incident Report

Incident report to follow

12 Snake

D.(danger) R. (response) A.(airway) B.(breathing) C.(compressions) D. (defibrillation)

If a snake is located in the immediate vicinity of a work area or common and is posing serious risk or threat and the potential to be bitten then the following steps need to be followed:

- Do not approach the snake or attempt to pick it up yourself
- Try if you can to identify the snake from a safe distance if possible
- Call **Snake Handler, Gunter Glaser** on **0429 613 324** to seek assistance/removal and relocation of the snake
- If bitten by a snake follow the appropriate Pressure Immobilisation Technique (**P.I.T**)
- Remain Calm
- Call 000/122
- Remain with Casualty until Emergency Services arrive at the scene

Incident report to follow

13 Gas / Atmosphere Release

Hydrogen Sulphide - H₂S (refer MSDS)

Carbon Monoxide – CO (refer MSDS)

14 Spills/Leaks

Pollution as a result of an oil or chemical spill can have a significant impact on the environment. All spills are to be reported immediately to the Duty Operator. Spills are to be contained or managed as per the MSDS recommendations and in accordance with the Site Environmental Waste Management Plan. Good Housekeeping practices and regular inspections of plant and equipment can assist in minimising the risks associated with Spills and Leaks.



- Report all spills or leaks to the Duty Operator as soon as possible
- Identify the contaminant and contain the spill or leak as per the MSDS. Use bunds / absorbers as required
- Administer first aid if applicable as per the MSDS
- Use the correct PPE as advised by the MSDS
- Disposal of the contaminant should be via appropriate waste disposal bins
- If spill is of a significant size and is considered to have potential impact to site and operations the Site Manager or delegate is to notify the EPA as soon as possible and any and all other authorities as dictated.
- Contact Emergency Services that are applicable

Incident report to follow

Emergency Spill Kits are located in the Tar Oil Tank area. The emergency spill kits are 4 x IBC's that are marked accordingly and have removable lids for easy access. The 4 kits contain the following:

- 1 x shovel
- 3 x tarps
- 20 x garbage bags
- 2 x disposable overalls
- 10 pairs of disposable gloves
- 5 x P4 dust masks
- 1 x 50m roll Danger tape

15 Security Breach

The presence on site of any individuals who have not made themselves known to the operations is to be treated as a security breach. Upon the discovery of unauthorised personnel on site:

- Notify Shift Operator of their presence and location on site
- If intruders seem to be non threatening, question them as to their business at site
- Advise that they are to report to Site Administration building before accessing site
- Escort unauthorised personnel to the Site Administration building if appropriate
- If intruder is acting in any way, dangerous or threatening manner, do not approach and have Shift Operator contact Emergency Services immediately and request assistance – Police **000**
- If intruder is threatening plant in a manner that may lead to a process incident then if safe to do so, secure the process appropriately to minimise risk and injury to personnel and damage to plant and equipment
- Ensure that emergency contacts have been contacted and that the Site Manager or delegated person is aware of the intruders to site.
- Assist authorities as requested

Incident report to follow



16 Media Control

Any major emergency affecting the KPGP is likely to attract the attention of the media and or local community members. All staff are requested to be aware of the importance of ensuring that all Media interest are referred to the appropriate person, Kylie Gane-Gomez. So that Cougar Energy Limited is represented with informed responses to media questioning, all enquiries must only be handled by the following:

Cougar Energy Limited - Media Information Number - 1800 259 010

3 Definitions

None.

4 Reference Documentation

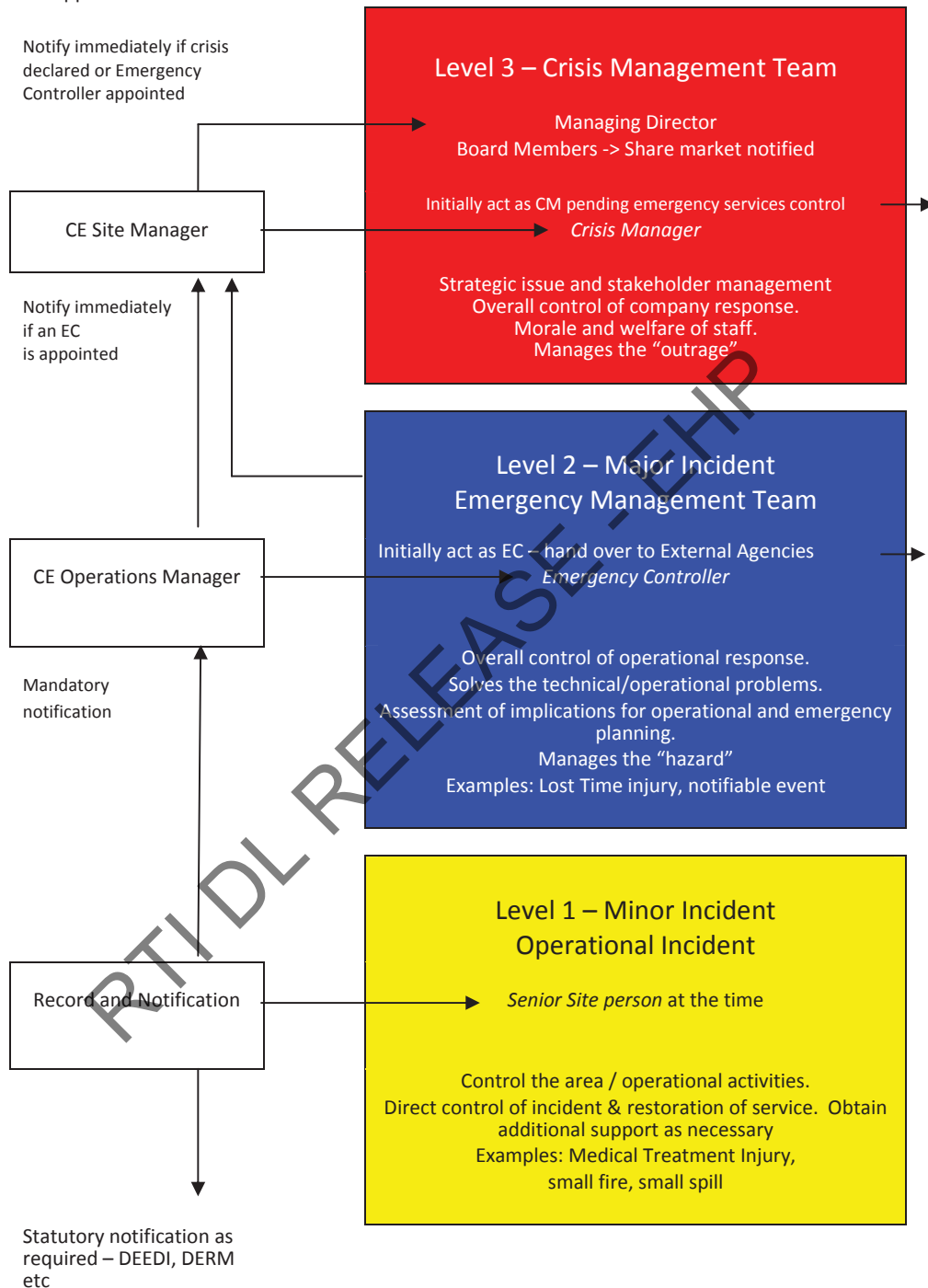
Petroleum and Gas Act 2004
Petroleum and Gas Regulation 2004
HSE Management Plan 205 – PROC – 170
Emergency Contacts List 205 – PROC – XXX
Emergency Shutdown Procedure
Incident Report and Investigation Procedure
Incident Report and Investigation Form
Guidelines on Personal Lightning Safety
Bomb Threat Checklist
Emergency Information Booklet

5 Attachments

The diagram below summarises the emergency incident classification used at site and how an emergency escalates to a crisis.



Notify immediately if crisis
Controller appointed





Emergency Contact List

Emergency Services

Police, Fire, Ambulance 000
Poisons Information 131 126
SES - Storms, Flooding 132 500

Snake Handler - Gunter Glaser (QPWS Permit)

sch4p4(6) Personal information

Cougar Energy Emergency Contacts

Site Manager

Operations Manager

Superintendent

Process Engineer/s

sch4p4(6) Personal information

Emergency Controller

Shift Operator 07 3168 2605

Cougar Energy Locations

Melbourne Office 03 9909 7200

Brisbane Office 07 3236 2352

Kingaroy Office 07 3168 2607 / 07
3168 2608

0	15/01/2010	First draft	TES 15/01/2010	AB	LW
Rev	Date	Description	Drafted	Checked	Approved

Queensland Government – Workplace Health and Safety – 1300 369 915 or

www.worksafe.qld.gov.au

Queensland Mines and Energy (DEEDI) – Brisbane HEAD Office 3237 1626

Or email enquiries to gassafe@dme.qld.gov.au or www.dme.qld.gov.au



RTI DL RELEASE - EHP

GUIDANCE NOTES FOR COMPLETING FORM

- STEP 1. Define, Area and Title

STEP 2. Define the Operational Environment

STEP 3. Define Operational Activity

STEP 4. List all Team Members

STEP 5. List any Reference Materials used

STEP 6. Complete the JSA/Risk Assessment using the Permit to Work Hazard identification.

STEP 7. Complete the action Plan where applicable

STEP 8. Agree on the critical safety behaviours to complete the job safely

STEP 9. Check for other documents, sign off and give the Form to your Supervisor.



RISK ASSESSMENT FORM

Title:
EPC 385 Broad Brush Risk Assessment Conducted on **Insert DATE**

Mining/Operational Activity Photographs, Diagrams, Plans, Sketches etc.(Equipment Type/Mining Methods etc)

STEP 1: Area / Date:
EPC 385 August – December 2013

STEP 2. UCG Pilot Site

STEP 3. Operational Activity:
Decommissioning of underground and above the ground facilities

STEP 4. Risk Assessment Team members:

	Name	Organisational Role	Process Role (Facilitator/Team Member)	Process /Task Experience	Consensus Yes/No	Signature
Risk Assessment assumes that current controls are adequate and working	Rob Neill	SSE	Team Member			
Level 1 Risk Assessments including task level (e.g. Take 5),	Valeri Melik	Operator	Team Member	5 years		
Level 2 Risk assessments including Job Safety/Hazard Analysis (JSA / JHA) form of Permit to Work	Peter Ranisinghe	Site Safety Manager	Team Member	3 years		
Generic Induction	Wayne Livingstone		Team Member	6 years		
Site Induction		Contractor	Team Member			
Tool Box Meetings for Task Specific Requirements		Contractor	Team Member			
Risk Assessment Methodology		Contractor	Team Member			
The Risk Scores have been achieved using the qualitative risk analysis matrix from the Cougar Risk Management Standard which has been attached at the end of this document.						

Definitions: ALARP – As Low as Reasonably Practicable LTA – Less than Adequate	STEP 5. Reference Materials: Environmental Authority MIN100656507; Land Access Code 2010; Petroleum and Gas (Production and Safety) Act 2004; Petroleum and Gas (Production and Safety) Regulation 2004; Cougar Energy safety and risk management plans; and Landholder’s specific requirements.
Operator/SSM APPROVAL: Majority consensus reached by those persons participating in this risk assessment, any non consensus has been noted at the back of this form. Name: _____ Signature: _____ Date: _____	

RISK ASSESSMENT FORM											
STEP 6 – Break the Process down into Activity, Task or Job Steps; Identify the potential incidents, hazards and energies. Discuss, consider and ask questions about potential human factors/errors slips/lapses, mistakes and shortcuts, fatigue and changes etc. Identify existing or current controls and review any prior similar incidents, assess each incident/ hazard for likelihood and consequence, allocate a Risk Ranking, Identify new or recommended controls, Reassess the Risk Ranking and score the residual risk.											
Activity	Potential Unwanted Event	Most Likely Cause; Based on experience and relevant data included in Reference Material	Most Likely Unwanted Outcome	Current Control Measures	C	L	Risk	New/Recommended Controls	C	L	Residual Risk
Mobilisation to Site	Vehicle accident	Fatigue, faulty vehicles, driver error, vehicle interaction	Serious injury	<ul style="list-style-type: none"> 5/8 or 7/10 roster QLD open manual drivers licence (equivalent) Drug and alcohol testing process Vehicle / plant pre-start checks Fit for purpose vehicles Site access road process and induction Day shift only Vehicle/equipment servicing schedules (tracked through MEX fleet maintenance) Live defect reporting & tracking through MEX SWP Equipment Mobilisation SWP Mobilisation to Site SWP Vehicle3 Parking & Reversing Fit for Work Policy & Procedure OP Vehicle Rules OP Journey Management All major services outsourced to qualified workshops Equipment Familiarisation Manuals for Heavy Vehicles (Make/Series specific) Annual third party inspection of all vehicles Annual internal equipment audit 	A	AI	M5	<ul style="list-style-type: none"> Vehicle / Plant compliance check prior to mobilisation 	4	D	M5

Activity	Potential Unwanted Event	Most Likely Cause; Based on experience and relevant data included in Reference Material	Most Likely Unwanted Outcome	Current Control Measures	C	L	Risk	New/Recommended Controls	C	L	Residual Risk
	Environmental contamination	Poor vehicle / equipment cleaning / inspections	Spread of weeds	<ul style="list-style-type: none"> Weed and seed clearance prior to site mobilisation for all vehicles Cleared drill pads 	B	3	H12	<ul style="list-style-type: none"> Confirm landowner clearance requirements 	B	3	H12
	Contact with overhead electrical services		Electrocution, vehicle damage	<ul style="list-style-type: none"> Qualified operators Heavy vehicle height stickers in cabs 	A	3	H15	<ul style="list-style-type: none"> Confirmation of electrical services for site access routes 	A	3	H15
	Unauthorised site access	No Landowner approval	Reputational, breach	<ul style="list-style-type: none"> Notifications in place prior to mobilisation Specific access conditions to be included in site induction 	E	2	L2	<ul style="list-style-type: none"> Notifications issued Develop induction to include site access requirements Confirm landowner contact process 	E	2	L2
	Bogged vehicle	Soft ground	Lost time, vehicle damage, reputation, injury	<ul style="list-style-type: none"> Site reconnaissance prior to mobilisation Drill site inspection form Site access tracks developed prior to mobilisation Rig recovery procedures <ul style="list-style-type: none"> SWP Bogged Vehicle Recovery MOP Towing Rated recovery gear 	E	4	L4	<ul style="list-style-type: none"> Weather monitoring / alert process Landowner access / notification 	E	4	L4
	Animal / insect bites	Animal / insect interaction	Allergic reaction, snake bites	<ul style="list-style-type: none"> First aid kits in all vehicles Minimum 3 person crew Snake bite kit for crew UHF and mobile phone communications PPE – long trousers, boots, long sleeves Insect repellent 	B	3	H12	<ul style="list-style-type: none"> Implement emergency response plan 	B	3	H12
	Workers slip / trip / fall Working at heights	Uncleared areas / uneven ground	Personal injury	<ul style="list-style-type: none"> First aid kits in all vehicles Minimum 2 person crew Mobile phone communications Safety Harnesses Fall arresters 	D	3	L6	<ul style="list-style-type: none"> Implement emergency response plan 	D	3	L6
	Lack of respect to owners	Discrimination, awareness, sensitivity	Reputational issues, site shutdown	<ul style="list-style-type: none"> Positive communications Key Stakeholder management 	D	3	L6	<ul style="list-style-type: none"> Communicate any disagreements with the supervisor and Mediate with the land holder 	D	3	L6

Activity	Potential Unwanted Event	Most Likely Cause; Based on experience and relevant data included in Reference Material	Most Likely Unwanted Outcome	Current Control Measures	C	L	Risk	New/Recommended Controls	C	L	Residual Risk
	Clearance / earthworks without landowners consent	Discrimination, awareness, sensitivity	Reputational issues, site shutdown	<ul style="list-style-type: none"> Positive communications Key Stakeholder management CCA and other agreements Permit process Site access requirements included as part of induction Site geological location confirmation 	B	3	H12	<ul style="list-style-type: none"> Confirm landowner clearance requirements 	B	2	M8
	Vehicle / plant and person interaction	Unsecured site, lack of site control	Serious injury	<ul style="list-style-type: none"> Site supervision Hazard identification process RII Qualified operators Compliant equipment Site pad / lay down plan Positive communications PPE – high vis clothing Day shift only 	A	2	H10	<ul style="list-style-type: none"> Confirm project hazard processes Develop site traffic management plan 	A	1	M5
	Vehicle / plant rollover	Uneven ground	Serious injury	<ul style="list-style-type: none"> Site supervision Hazard identification process Qualified operators Compliant equipment Site pad / lay down plan Positive communications PPE – high vis clothing Day shift only 	A	2	H10	<ul style="list-style-type: none"> Confirm project hazard processes 	A	1	M5
	Breach of Enviro compliance	Poor clearance process, failure to comply with permits, lack of awareness of requirements	Reputational, fine	<ul style="list-style-type: none"> Pegging / GPS out of sites Enviro Permits / documentation for earthworks crew Site access requirements included as part of induction 	B	3	H12	<ul style="list-style-type: none"> Environmental Authority MSDS Testing 	B	2	M8
	Exposed sumps	Open pits, livestock / people / vehicle	Landowner reputation	<ul style="list-style-type: none"> Fencing sumps once constructed Sumps built with animal ramps 	C	4	H12	<ul style="list-style-type: none"> Confirm landholder requirements and include on CCA 	C	4	H12
	Sump rehab/ evaporation pond	Vehicle/People/Animals	Injury, equipment breakdown	<ul style="list-style-type: none"> Hazard identification Qualified Operators Compliant equipment Hi vis clothing Toolbox meeting 2 persons operation 	B	3	H12	<ul style="list-style-type: none"> 			
	Failure to achieve landowner sign off		reputation	<ul style="list-style-type: none"> Community communication person. Visit landholders and discuss the desirable outcome 	D	4	M8	<ul style="list-style-type: none"> 			

Activity	Potential Unwanted Event	Most Likely Cause; Based on experience and relevant data included in Reference Material	Most Likely Unwanted Outcome	Current Control Measures	C	L	Risk	New/Recommended Controls	C	L	Residual Risk
	Lay down area			<ul style="list-style-type: none"> • Inspections • Housekeeping • Chemical / fuel / oil storage? • MOP Hazardous Substances • Chem Alert SDS tracking & register • SDS folder in crew vehicle 	A	2	H10	•			
	Unauthorised access to site	People wandering onto site	Injury, driller distraction	<ul style="list-style-type: none"> • All project personnel and visitors to have rig induction • Remote shutdown devices • Site setup plan • Site signage • Limited access points • Established no-go zones around equipment 	B	4	H16	•			
	Rig/Crain Mast intersects Overhead hazards	Not following procedures	Falling objects on workers	<ul style="list-style-type: none"> • Site inspection / checklist • Site setup plans • Hazard identification process • PPE - helmets • Preparation process • SWP Overhead & Underground Hazards 	B	L	H12	•			
	Intersecting underground services	Excavating / digging into lines	Cutting services, reputation, financial impact	<ul style="list-style-type: none"> • Localised visual inspection • SWP Overhead & Underground Hazards 	C	3	M9	<ul style="list-style-type: none"> • Check Underground drawings and planes • Confirm local services with landowners • Dial before you dig • Confirm with neighbouring mines for service plans 	E	3	L3
	Gas intersection		Ignition, blowout, multiple injury, equipment damage	<ul style="list-style-type: none"> • Gas detectors & Training • Gas Detectors calibrated to OEM, register maintained • Gas management plan (MOP) • SWP Gas Control • Drilling technique • Qualified operators • Hot work procedure MOP, SWP • Permit to work procedure (MOP) • Safe Act Observations • Pre-start checks 	B	1	L4	•			

Activity	Potential Unwanted Event	Most Likely Cause; Based on experience and relevant data included in Reference Material	Most Likely Unwanted Outcome	Current Control Measures	C	L	Risk	New/Recommended Controls	C	L	Residual Risk
	Hydrocarbon spills	Equipment failures, refuelling spills	Environmental damage, fire	<ul style="list-style-type: none"> Pre-start checks Spill kits and training Environmental plan Refuelling procedures Isolation procedures Critical component maintenance schedules, Defect reporting SDS Chem Alert First aid kits PPE Hazardous substances procedure MOP Haz Subs 	C	4	H12	<ul style="list-style-type: none"> Permit to work 			
	Manual handling incidents	Poor manual handling techniques	Injury	<ul style="list-style-type: none"> Manual handling procedure Rod handling equipment Minimum crew size Job Fit assessment Medicals Hazard assessment procedure Safe Act Observations PPE- gloves 	B	4	H16	<ul style="list-style-type: none"> Permit to Work 			
	Use of Lifting equipment			<ul style="list-style-type: none"> Competent operators Remote control Load / unload procedure Lifting equip inspections Pre-start inspection Equipment Familiarisation Manuals <ul style="list-style-type: none"> General Lifting Operations Truck Cranes MOP Truck Cranes MOP Lifting Gear 	A	2	H10	<ul style="list-style-type: none"> Permit to Work 			

Activity	Potential Unwanted Event	Most Likely Cause; Based on experience and relevant data included in Reference Material	Most Likely Unwanted Outcome	Current Control Measures	C	L	Risk	New/Recommended Controls	C	L	Residual Risk
	Falling loads	Equipment failure, incorrect handling techniques, inadequate training, lack of maintenance	Serious injury	<ul style="list-style-type: none"> Pre-start inspection Equipment compliance inspections and maintenance lifting procedures <ul style="list-style-type: none"> SWP Lifting with Sand Line SWP Running Rods Wireless RC RL Control MOP Training Drop zones, no-go zones Lifting equipment certification inspections / registers 3rd party inspections of lifting equipment Qualified operators 	A	3	H15	•			
	Site stability	Uneven ground, voids	Equipment falls, workers slip, trip falls	<ul style="list-style-type: none"> Equipment setup procedure (SWP) Site inspections prior to setup Pad clearance PPE – safety boots Day shift only Qualified operators Hazard Reporting process Permit to work 	B	3	H12	•			
	Entanglement	Exposed rotation points, inexperienced crews	Worker entrapment	<ul style="list-style-type: none"> Rotation guarding Emergency stops, Supervision Qualified operators Safe Act Observations Isolation procedures Automated rod handling <ul style="list-style-type: none"> Wireless RC Operation No Go Zone SWP Running Rods Wireless RC RL Control Rod Loader Operation 	B	2	M8	•			
	Vehicle / personnel interaction	Uncontrolled movement	Vehicle damage, potential work injury	<ul style="list-style-type: none"> Qualified operators, Vehicle stabilisation Vehicle movement procedures (SWP Vehicle Parking & Reversing; MOP Vehicle Rules) Spotter Reverse alarms, flashing lights Positive communications Day shift only Secure site 	A	2	H10	•			

Activity	Potential Unwanted Event	Most Likely Cause; Based on experience and relevant data included in Reference Material	Most Likely Unwanted Outcome	Current Control Measures	C	L	Risk	New/Recommended Controls	C	L	Residual Risk
	Poor housekeeping	Not following procedures	Slips, trips falls, reputation	<ul style="list-style-type: none"> Pre-start checks Hazard assessment process Safe Task Observations Induction process Inspections Daily rubbish removal Permit to work procedure 	C	4	H12	•			
	Uncontrolled release of stored energy	Equipment failure, poor training, not following procedures, High Pressure Hydraulic failures	Serious Injury, high pressure injection injury	<ul style="list-style-type: none"> Pre-start inspections Isolation Procedures No-go zones, Rated anchor points, Equipment compliance checks Maintenance processes Qualified operators Safe Task Observations Task supervision High pressure lines socked and sheathed, guarded Pre-start inspection Equipment compliance inspections and maintenance Automated equipment Isolation devices and procedure SWP Maintenance & Repairs 	B	3	H12	•			
Maintenance	Fall from heights	Not following procedure	Serious Injury	<ul style="list-style-type: none"> Use EWP Specific risk assessment SSE approval Permit to Work System 	B	2	M8	•			
	Chemical interaction	Not following procedure	Injury	<ul style="list-style-type: none"> SDS Hazardous substance procedures PPE Qualified operators Hazard assessments Supervision Safe Task Observations First aid kits Permit to work System 	C	2	L6	•			
	Unplanned Movement	Incorrect isolation, not following procedure	Serious Injury	<ul style="list-style-type: none"> Isolation procedures Lockout processes Hazard assessment Positive communications Supervision Qualified operators PPE Maintenance Procedures 	A	2	H10	•			

Activity	Potential Unwanted Event	Most Likely Cause; Based on experience and relevant data included in Reference Material	Most Likely Unwanted Outcome	Current Control Measures	C	L	Risk	New/Recommended Controls	C	L	Residual Risk
	Fire	Hot works, not following procedure, smoking	Equipment damage, property damage, injury	<ul style="list-style-type: none"> Hot works procedure Permit to Work System Fire extinguishers on all vehicles Automatic fire suppression on rig and compressor No-smoking within 10m of open hole Water truck Qualified operators Permit to work process Maintenance process Pre-start checks First aid kits and training Spray water around 	A	1	M5	<ul style="list-style-type: none"> Confirm high fire condition and site actions Check on fire ban rating 	C	2	L6
Water truck Operation	Drowning hazard			<ul style="list-style-type: none"> Permit to work Approach to water sources Ground conditions Hazards identification 	A	1	M5	<ul style="list-style-type: none"> 			
	Manual handling incidents	Poor manual handling techniques	Injury	<ul style="list-style-type: none"> Manual handling procedure Minimum crew size JobFit assessment Medicals Hazard assessment procedure Safe Act Observations PPE- gloves 	C	4	H12	<ul style="list-style-type: none"> Determine which procedure 			
	Failure to provide emergency response	Lone worker	Worker injury	<ul style="list-style-type: none"> Positive communication Communication devices No work to be done in isolation 	A	1	M5	<ul style="list-style-type: none"> Develop Lone worker procedure 			
	Dust suppression	Eye and respiratory consequences	Injury	<ul style="list-style-type: none"> Safety glasses Dust mask Water truck 	D	4	M8	<ul style="list-style-type: none"> 			
	Poor housekeeping	Not following procedures	Slips, trips falls, reputation	<ul style="list-style-type: none"> Pre-start checks Hazard assessment process Safe Task Observations Induction process Inspections Daily rubbish removal 	C	3	M9	<ul style="list-style-type: none"> 			
Grouting	Pre-mature grouting	Not following procedure, Poor communications	Re-drill	<ul style="list-style-type: none"> Inspection test plan Pre-start communications 	C	3	M9	<ul style="list-style-type: none"> 			
	Manual handling incidents	Poor manual handling techniques	Injury	<ul style="list-style-type: none"> Manual handling procedure Grouting procedure Minimum crew size JobFit assessment Medicals Hazard assessment procedure Safe Act Observations PPE- gloves 	B	4	H16	<ul style="list-style-type: none"> Determine which procedure 			

Activity	Potential Unwanted Event	Most Likely Cause; Based on experience and relevant data included in Reference Material	Most Likely Unwanted Outcome	Current Control Measures	C	L	Risk	New/Recommended Controls	C	L	Residual Risk
	Poor grouting result	Not following procedure	Incomplete grout	<ul style="list-style-type: none"> grouting procedure 	C	3	M9	•			
Site surveyor	Unauthorised access		Reputation / landowner	<ul style="list-style-type: none"> Site inducted Escorted on site CCA process (landowner consultations) 	D	3	L6	•			
	Site rehab completed before survey	Not following procedure, poor communication	Project delay	<ul style="list-style-type: none"> Work schedule Sign off process 	D	1	L2	•			
De-mobilisation from site	Failure to clean up site	Not following procedure, poor communication	Reputation	<ul style="list-style-type: none"> General housekeeping Site inspection Site close-out process Environmental checks Pre-start meetings 	D	2	L4	•			
Disconnection of site Equipment	Fall from heights	Not following procedure	Serious Injury	<ul style="list-style-type: none"> Use EWP Specific risk assessment SSE approval Permit to Work System 	B	2	M8	•			
	Burning injury	Not following procedure	Serious Injury	<ul style="list-style-type: none"> Use PPE Hot work permit Specific risk assessment Permit to Work System 	B	3	H12	•			
	Gas bottle explosion	Not following procedure	Fatality or serious Injury	<ul style="list-style-type: none"> Procedure for Handling pressure vessels Welding procedures Competent person Specific risk assessment Permit to work system 	A	2	H10	•			
	Electrocution	Not insuring isolation of the plant's electrical equipment	Fatality or serious Injury	<ul style="list-style-type: none"> Isolation locking and tagging out of service equipment Specific risk assessment JSA Permit to work 	A	2	H10	•			
	Injury from falling objects	Not following specific procedures	Serious Injury	<ul style="list-style-type: none"> No go zone Hazard assessment Permit to work Prestart meeting 	B	3	H12	•			
	Manual Handling	Poor manual handling techniques	Injury	<ul style="list-style-type: none"> Manual handling procedure Minimum crew size JobFit assessment Medicals Hazard assessment procedure Safe Act Observations PPE- gloves 	C	4	H12	<ul style="list-style-type: none"> Determine which procedure 			

STEP 7 – Implementation Plan: Please complete for all extreme and high risks. (When allocating accountabilities ensure person is competent for the allocated role/task)						
No	ITEM/ISSUE	AGREED ACTION	Who	When	Comp Date	Review/Audit Date
	Compliance review / gap analysis of SHMS	SHMS		Prior to start		
	Confirm Site Requirements	Develop Project / Site induction		Prior to start		
		Deliver site induction		Prior to start		
	Confirm worker competencies	Populate Project Training Matrix		Prior to start		
		Provide worker competencies to SSE		Prior to start		
	Site Emergency Plan	Develop Site ERP		Prior to start		
		Communicate ERP with local response agencies		Prior to start		
		Conduct ERP drill		During site activity		
	Fitness for work	Implement site FFW plan		Prior to start		
	Plant and Equipment fit for purpose	Vehicle / Plant compliance check prior to mobilisation		Prior to start		
	Landowner requirements	Confirm landowner clearance requirements		Prior to start		
	Site traffic management	Develop site traffic management plan		Prior to start		
	Hazard / Risk analysis tools / processes	Confirm project hazard processes		Prior to start		
	Overhead powerlines	Confirmation of overhead electrical services for site access routes		Prior to start		
	Contact with landowners	Confirm landowner contact process		Prior to start		
	Landowner access requirements	Develop induction to include site access requirements		Prior to start		
	CCA	Finalise CCA		Prior to start		
	Severe weather	Weather monitoring / alert process for site		Prior to start		
	Pad clearing	Confirm landowner site clearance requirements		Prior to start		
	Exposed sumps	Confirm landowner requirements for fencing and include on CCA		Prior to start		
	Manual handling procedures	Determine which procedures to utilise across project		Prior to start		
	Lone workers	Develop project lone worker procedure		Prior to start		
	Fire danger	Confirm high fire condition and site actions		Prior to start		
	Underground services	Confirm local services with landowners Dial before you dig Confirm with neighbouring mines for service plans		Prior to start		
	Grouting procedures	Approval of grouting procedures		Prior to site activities		

Non-Consensus Issues

Name	Reason For Non Consensus	Date	Signature

REFERENCE MATRIX

The following qualitative risk analysis matrix has been taken from Cougar Risk Management Standard.
This matrix is used to arrive at the "Level of Risk" score throughout the risk analysis and is presented here for reference

		CONSEQUENCE							
Grade	Rating – 1-5	Safety	Environment	Property Damage	Production interruption	Financial	Quality	Reputation / Publicity	Legal action
A	5	Fatality or Disability	Major Spill; Serious Env. Harm	>\$.100k / Significant	Full interruption – Many days	> \$100k	Unusable	National press attention	Litigation commenced
B	4	Serious Lost Time injury or illness	Spill; Env. Harm	< \$100k / Minor plant Damage	Plant / Well < 1 day	< \$100k	Unusable	Regional reporting	Credible threat of litigation
C	3	Medical treatment injury	Env. Nuisance (noise, dust)	< \$10k / Heavy Equipment	Plant / Well interruption minor	< \$10k	Just usable	Local reporting/	Mediation
D	2	Minor first aid injury	Minor Env. Nuisance	< \$1k / Tooling	Partial Loss / significant	< \$1k	Below Spec.	Not a core value	Disagreement
E	1	No Injury	No Env. Nuisance	< \$200	Partial Loss / Minor	< \$200	Per Spec.	None	None

Sensitivity	Rating 1-5	Description
Very Likely	5	Almost certain. This event is expected to occur in most circumstances or will happen today or in less than one week.
Likely	4	Between once per week and once per month; or the event will probably occur in most circumstances.
Unlikely	3	Between once per month and once per year; or the event should occur at some time.
Highly Unlikely	2	Between once per year and once per ten years; or the event could occur some time
Almost Impossible	1	Unlikely to ever recur; or may occur in exceptional circumstances. Greater than one event in ten years.

Likelihood – Inherent Risk Rating					
Grade	Very Likely	Likely	Unlikely	Highly Unlikely	Almost Impossible
A	Extreme - 25	Extreme - 20	High - 15	High - 10	Medium - 5
B	Extreme - 20	High - 16	High - 12	Medium - 8	Low - 4
C	High - 15	High - 12	Medium - 9	Low - 6	Low - 3
D	High - 10	Medium - 8	Low - 6	Low - 4	Low - 2
E	Medium - 5	Low - 4	Low - 3	Low - 2	Low - 1



9. APPENDIX C: PERMIT TO WORK PROCEDURES

RTI DL RELEASE - EHP

Permit to Work Procedure

205-PRO-177

A	Xx/02/2010	First draft	SH XX/02/2010	AB	LW
Rev	Date	Description	Drafted	Checked	Approved

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RTI DL RELEASE - EHP

1 Introduction

This procedure describes the Permit to Work System to be adopted at Cougar Energy Kingaroy Underground Coal Gasification Pilot Plant. The Permit to Work System forms a crucial part of the Safety Management System and shall be reviewed periodically to ensure its effectiveness in the light of ever changing legislation. All personnel engaged in work activity within the Permit to Work System must have received formal training prior to using the system to ensure that the procedure is implemented correctly.

No work activity will be authorized to commence until the requirements of this procedure have been considered and the necessary actions completed to ensure the activity can be carried out without risk to health, safety or the environment.

The Cougar Energy Site Manager will ensure that personnel appointed to operate this procedure have the necessary training, knowledge, experience and status to implement, develop and continually improve the Permit to Work System.

2 Purpose

The purpose of any Permit to Work System is to ensure that work can be carried out in a safe and controlled manner. The system provides the most efficient means of co-ordinating multiple work activities by a competent authorized person.

The co-ordination of work activity provides a controlled interface whereby one activity does not clash or present additional hazards with any other operation being undertaken.

The procedure will ensure that all personnel have a basic awareness of the Permit to Work System, and those with specific roles, have received adequate training and are appointed in writing to undertake those specific duties

The Permit to Work should clearly state the nature of the activity and list any isolations necessary to render the work safe to commence.

3 Definitions

3.1 Site Manager

The most senior position of responsibility under this procedure.

3.2 Officer in Charge - OIC

The Officer in Charge is responsible for the Request for Permit to Work. They have the freedom to delegate tasks as and when necessary. They are responsible for the creation of and authorizing of the Work Method Statement and any associated paperwork. They will be regarded as the Permit Holder.

3.3 Issuing Authority

The Issuing Authority who requires work activities to be carried out in Accordance with a programme and who has the responsibility to ensure others Perform a work activity within the requirements of the Permit to Work. Upon Receipt of the Request for Permit to Work the Issuing Authority is responsible For raising the Permit to Work

3.4 Electrical Tradesperson (Competent Observer)

(Only applicable to work on/test live electrical apparatus)
Competent person/s to work on live electrical apparatus in accordance with the LV Code of practice.

3.5 Permit User

The person(s) actually performing the work activity. The work team members.

3.6 Authorisation

The Issuing Authority shall satisfy himself as to the content of the request for a Permit to Work, and take whatever action necessary to ensure that those performing the work activity are not placed in danger. He shall then complete the necessary sections of the permit to work.

3.7 Acceptance

The Issuing Authority provides instruction to the Officer in Charge of the work on the proposed work activity and the limitations/precautions imposed by the Permit to Work. The Officer in Charge of the work acknowledges the instructions by signing the permit to work.

The Officer in Charge of the work explains to the work team the permit requirements and then confirm that they have understood the instructions and sign on the access sheet.

3.8 Completion

The Officer in Charge of the work will satisfy himself as to the progress of the work and on completion will:

- a) Discuss the completed work with the operatives in the team and agree all work is completed.
- b) Ensure that all the operatives in the team have removed all tools, equipment and safety devices.
- c) Return and sign off the permit with the issuing authority

3.9 Cancellation

The Issuing Authority on receipt of the completion signatures will satisfy himself that all is satisfactory, that no matters remain outstanding relative to the authorized work, then sign, date and time the cancellation.

3.10 Documentation

The following documentation is required to ensure the foregoing procedure is adequately recorded

- a) Permit Register including: Copies of Requests for Permit to Work and Log of all permits issued/completed
- b) Permit to Work documents
- c) Duplicate copy of the permit

3.11 Isolation

Means of rendering all sources of energy safe and detached from potential sources of energy

3.12 Group Isolation Box

A secured box containing an Isolation Plan and keys used to secure any isolations. This board is kept locked and the key held in the Group Isolation key board located in the control room.

3.13 Live Permit Board

A system for displaying the Permit to Work documents that is currently in operation, including any support documentation that will be held in the control room

3.14 Permits

Permit to Work documents will be issued with a triplicate copy. The triplicate copy shall also share a specific serial number for identification. Completed copies will be distributed as follows:

- a) The original copy will be issued to the Officer in Charge of the work and stored in plastic envelopes, prominently displayed at the job site or attached to the lock box;
- b) The green copy will be retained in the Permit Office/Control Room folder – Live Permits;
- c) The pink copy will be retained in the Permit to Work book.

Both the original and green copy will be returned to the Issuing Authority when work is complete to be cancelled with cancellation signature and retained for record purposes in the Completed Permit to Work folder.

Completed Permit to Work documents including any associated documents must be held onsite for a period of one year then archived for a further three years.

3.15 Work Method Statement - WMS

4 Levels of Responsibility

4.1 Site Manager

Must ensure implementation of this system and the implementation of the Permit to Work system is satisfactory and complies with relevant standards

Since there may be a requirement to stipulate and approve isolations, the Site Manager must be able to demonstrate knowledge of hierarchical isolation techniques. It may be necessary for him to utilize the services of others, should this activity fall outside his sphere of knowledge or experience. Co-ordination of work activities requires the Site Manager to prioritize potential clashes of work. For this reason the Site Manager must have the necessary status within the organization so as not to be influenced by third parties.

A list of authorized signatories to issue a permit and perform isolations shall be prepared and held on file.

4.2 Officer in Charge – OIC

Must have a comprehensive knowledge of isolation techniques, the relevant Legislation and OH & S requirements.

The OIC is responsible for raising the Request for Permit to Work and the Satisfactory completion of the Work Method Statement (WMS). The OIC has the Authority to delegate tasks as he or she sees fit but must satisfy themselves that All documents are completed to a satisfactory standard – in particular the WMS.

4.3 Issuing Authority

Must have a comprehensive knowledge of this procedure and the implementation of the Permit to Work system.

Since there may be a requirement to stipulate and approve isolations, the Issuing Authority must be able to demonstrate knowledge of hierarchical isolation techniques. It may be necessary for him to utilize the services of others, should this activity fall outside his sphere of knowledge or experience.

4.4 Electrical Tradesperson

(only applicable to essentially live permits)

The Site Manager will nominate competent electrical personnel to work on all LV live electrical apparatus.

4.5 Permit User (Work Team Member)

All persons working under the control of the Permit to Work system will assume the responsibilities of permit users. They will be made aware of the requirements of both the permit to work and any associated documentation (which may include method statement, risk assessments, manual handling and pre-job hazard card prepared by the person in charge of the work). In a briefing, prior to the commencement of any work activity all workers and outside specialists will sign the permit to work or access signature sheet to acknowledge that they have attended this briefing and that they have been made fully aware of the permit to work requirements.

5 Permit Identification

There are eight types of permit within the Permit to Work system.

- a) Cold Work/General
- b) Hot Work
- c) Explosive/Radioactive
- d) Confined Space Entry
- e) Pressure Systems
- f) Working at Heights
- g) Electrical
- h) Excavation and Penetration

5.1 Electrical Work Permits

The permit work to be undertaken on equipment, which would otherwise be hazardous because of electricity. Such permits normally cover formal isolations and earthing procedures and allow either electrical work or testing to be performed.

Another form of permit is designed to cover work on, or testing of, exposed conductors (at dangerous voltages), which only for very serious reasons, cannot be isolated. Use of this permit should be rare and the isolation method is to be preferred. Normally such work is restricted to low voltage up to 415V.

5.2 Confined Space Entry Permit

A Confined Space in accordance with AS 2815, Entry Permit is issued for work in confined spaces, such as vessels, manholes, tanks and sewers, in which the atmosphere is or could become toxic, flammable or oxygen deficient.

5.3 Hot and Cold/General Work Permit

Hot Work Permits are concerned with preventing fires (or more commonly explosions) where work has to be carried out in circumstances where there would be a risk of fire through the presence of flammable liquids/materials and/or explosions, a fire watch must be present, in the presence of a flammable environment. A Hot Work Permit allows general work (i.e. welding, flame cutting etc) to be carried out providing all the precautions prescribed, have been affected.

A general Work Permit allows general work (i.e. use of chisels etc, which could nevertheless cause a spark) or any other form of work which although ostensibly cold could produce a source of ignition (e.g. discharge of static electricity, chemical reaction etc)

5.4 Excavation and Penetration

All such work will be carried out under the Cougar Energy Permit to Work system. This permit is mainly used in connection with the minimizing of risks from buried and hidden services, such as electric cables, gas and water mains.

5.5 Explosive/Radioactive

These permits are concerned with any explosive devices or radioactive Material brought on to site. This includes any measurement equipment That may contain radioactive material. Accompanying documents regarding Containment, authority to use etc. Conforming to the relevant Australian Standards must be produced by the persons bringing such materials to site.

5.6 Pressure Systems

Pressure system permits are concerned with the safe management and work Practices concerning pressurized pipelines, tanks, wells etc. They will identify The safe management, isolation and de-pressurization of such systems.

5.7 Work at Heights

Work at heights permits are concerned with the safe management of working At heights over 1.8M or when it is deemed necessary to instigate working at Heights measures due to other unsafe circumstances. Working from ladders is only acceptable after all other avenues have been exhausted. Ladders must be secured and of appropriate height for the task.

6 Circumstances of Use

Since permit to work systems constitute the most formal and detailed method of ensuring safe systems of work, they should be reserved for circumstances where:

- a) The potential hazards are severe
- b) Where at the same time, the precautions necessary are complex and need positive enforcement
- c) Responsibility for use of a particular permit to work rests with the most senior site management

The Permit to Work shall be regarded as a written agreement between the person authorizing the work and the organization or personnel receiving it.

7 Procedures

7.1 Request for Work Permits

Persons requesting a permit to work must have a detailed knowledge of the activity to be carried out in order to give an adequate description of the proposed work to the Issuing Authority. This person will be deemed the Officer in Charge (OIC)

7.2 Authorizing Permits

The appointed Issuing Authority must ensure that requested permits will not cause interface problems with existing permits and/or operating conditions. It is the duty of the issuer to ensure that the work activity is safe to be carried out before permission is given for the activity to commence. Where plant, equipment, process or electrical systems are energized, there may be a requirement to isolate such systems from all potential sources of energy. The issuer will undertake an assessment to establish the need for isolation.

7.3 Issuing Permits

Prior to the permit being authorized the person issuing the permit must familiarize themselves with all the activities to be undertaken in order to be able to co-ordinate the various work activities.

The Issuing Authority must ensure that those persons accepting the permit as Officers in Charge of the work have the relevant experience, skills and competencies to accept control of the permit.

The Officer in Charge of the work must read and ensure they fully understand the requirements of the permit and risk assessment before signing to accept responsibility for the activity.

7.4 Communication

When all the necessary documentation is in place, the Officer in Charge of the work must ensure that the requirements of the permit, together with all the accompanying documents, are communicated to all persons involved in the activity. This will be achieved by holding a pre-job safety meeting at the work site. All those involved must attend the meeting.

All persons, who join the work team at a later date, must be taken through an identical communication session.

The permit to work will assist the officer in charge of the work in prescribing all the necessary precautions.

The following points are to be discussed at the pre-job safety meeting:

- Nature of work and the equipment/plant involved
- Place of work and the equipment/plant involved
- The period of time in which the work will be completed
- The hazards involved
- The tests and checks to be made and precautions taken
- Equipment to be used or made available on a standby basis
- Personal protective equipment to be used
- The requirement for further tests and checks
- The emergency/rescue procedures
- The personnel permitted to the work

7.5 Changes in the Nature of Work

When changes occur in the work activity, it is essential that a review is to be carried out by a competent person (Site Manager/Supervisor) to ensure that the constraints originally identified on the documents remain sufficient to control the risk of injury or damage. Any changes shall be documented.

Operatives executing the work activity must cease work immediately on identifying a change and report the changes to the Officer in Charge of the work, who in turn reports back to the Issuing Authority.

7.6 Suspending Permits

All work permits are automatically suspended following an emergency or evacuation and all copies must be returned to the Issuing Authority on return to work. The status of the activity must be communicated to the issuer along with the short and long term requirements for re-issue.

Since the permit is not cancelled, merely suspended, any isolation cannot be removed.

Permits going over the nominated shift will be deemed suspended and will need to be revalidated via a toolbox talk and review of WMS by all involved. If there are no significant changes to the nature of work the permit will be deemed valid and work can continue. Should there be any significant changes to the nature of work the permit will be cancelled and a new permit issued appropriate for the task and nature of work.

7.7 Cancelling Work Permit

On completion of the work activity, the Officer in Charge of the work must return the permit to the Issuing Authority for cancellation. The status of the activity is confirmed as complete by the Officer in Charge of the work with a signature.

After cancelling the permit to work, the unique permit number must be cancelled from any isolation certificate. When all the work permits associated with any isolation have been cancelled, arrangements will be made by the Issuing Authority to remove the isolation.

When the isolation has been removed, the permit will be cancelled, confirming that the equipment has been commissioned. The Officer in Charge of the work must ensure that the work has been satisfactorily completed and signed off and cleared before the Issuing Authority signs the cancellation section on the permit.

RTI DL RELEASE - EIR



8 Work Permit Flow Chart for Issuing Authorities

RTI DL RELEASE - EHP

9 References

Petroleum and Gas Act 2004
 Petroleum and Gas Regulation 2004
 HSE Management Plan 205 – PROC – 170
 Emergency Contacts List
 Emergency Response Plan 205 – PROC - 176
 Work Permit Flow Chart for Issuing Authorities
 Request for Work Permit
 Isolating Persons Guide Procedure
 Transfer of Officer in Charge Responsibilities
 Suspension/Reinstatement of Permit to Work

10 Revision

Version	Rev. Date	Revision Description	Author
1	XX/02/2010	First Issue	S. Havebond
2	18/02/2010	Second Issue	S.Havebond



PERMIT TO WORK

Permit No 00204

SECTION A – SCOPE

CATEGORIES OF WORK (more than one work type may be performed using one form, if appropriate)

☐ Cold Work

☐ Explosive/Radioactive

☐ Pressure Systems

☐ Electrical Work

☐ Hot Work

☐ Confined Space Entry*

☐ Working at Height

*The user of a confined spaces entry permit must also use the confined space entry permit supplement.

Date of Issue:

Issued to Permit Holder (Name):

Equipment Name / Number:

Permit Holder Company:

Name of Location:

Specific Work Location:

Specific Work Description to be done:

Tools/Equipment to be used:

Associated Documents (list or attach):

Work Precautions Verifier (Name & company)
(If not Permit Authority list name/role/company):

WORK PARTY ACCEPTANCE

I understand the work to be performed, the plant & equipment to be worked on, all work precautions and conditions prescribed for this permit & agree to abide by all the requirements of this permit.

Name	Signature	Time	Name	Signature	Time
1			4		
2			5		
3			6		

SECTION D – PERMIT ISSUE/PERMIT CLOSEOUT

This permit is active from

Date:

Time (24hrs):

This permit expires at (unless suspended earlier)

Date:

Time (24hrs):

Permit Holder Acceptance

I have read, understand & will ensure compliance with all the requirements of this permit.

Name:

Signature:

Permit Authority Approval

I approve the issuing of this permit for work at the specific work location under the precautions & work conditions listed.

Name:

Signature:

Permit Holder Closeout

I confirm all persons under my supervision, materials & equipment have been withdrawn.

Work complete? ☐ Yes ☐ No

List details of incomplete work:

Permit Authority Closeout

I confirm this permit is closed & all persons working under this permit, materials & equipment have been removed & the work area made safe.

Work complete? ☐ Yes ☐ No

Time of closeout (24 hrs)

Time of closeout (24 hrs)

Site cleaned up/
locks/tags removed?

☐ Yes ☐ No

Site cleaned up/
locks/tags removed?

☐ Yes ☐ No

Name:

Name:

Signature:

Signature:

14-013

SECTION B – WORK PRECAUTIONS - CHECKLISTS

All specified work precautions must be completed before work is commenced

GENERAL: All Permits

WORK PRECAUTION CHECKLIST

Required Yes/No

Initial by Verifier

Fluid power locked out & tagged

Mechanical power locked out & tagged

Electrical power locked out & tagged

Equipment drained/depressurised & purged.

Written procedure to be used (record procedure reference in Associated Documents in Section A)

Work Party members briefed on work to be done

Job Hazard Analysis (JHA) to be performed (list JHA in Associated Documents in Section A)

Non-essential personnel cleared from work area

Gas detection test required prior to work.

Warning signs posted at work location.

Work area bunted off to exclude other personnel

All personnel informed of work to be done

Continuous gas monitoring

Cold Work Permit

WORK PRECAUTION CHECKLIST

Required Yes/No

Initial by Verifier

Excavation survey required

Hot Work Permit

WORK PRECAUTION CHECKLIST

Required Yes/No

Initial by Verifier

Protective screens erected

Full spark containment

Drains covered

Competent Fire Watcher on duty (name recorded in work party)

Area free from combustible material

Fire extinguishers placed in work area

Fire hose charged & available

Pressure Systems Work Permit

WORK PRECAUTION CHECKLIST

Required Yes/No

Initial by Verifier

Isolations proved

Pressure relief devices in place & tested

Pressure lines secured against movement

Bleed off lines directed to safe areas

VOIDS checked for trapped pressure

Hammer union compatibility verified

System of communication established & tested

Electrical Work Permit

WORK PRECAUTION CHECKLIST

Required Yes/No

Initial by Verifier

Capacitors discharged

Isolations proved – correct item de-energised

Residual current device (RCD) in place

Grounding of equipment completed

Personnel certification available / sighted

Explosive/Radioactive Permit

WORK PRECAUTION CHECKLIST

Required Yes/No

Initial by Verifier

Storage area designated for explosives & radioactive sources

Radiation badges worn & survey meter available

Grounding clamps in place

Overhead power shutdown/ top drive isolated

Welding unit turned off & isolated

Cathodic protection turned off & isolated

Shot firers / blasters ticket sighted

Radio silence enforced

Perforating safety checklist to be used

Working at Height Permit

WORK PRECAUTION CHECKLIST

Required Yes/No

Initial by Verifier

Inspected & maintained inertia reel required

Hand tools secured by lanyards or similar

Personnel working at height trained & competent for working at height

Area below the work cleared of all personnel

Emergency rescue plan in place & recovery equipment available

Fall prevention / protection equipment in working order & personnel trained to use

Confined Space Entry Permit

WORK PRECAUTION CHECKLIST

Required Yes/No

Initial by Verifier

Work location to be purged before entry

Documented risk assessment completed

Confined space entry permit attached

Training certificate for person entering confined space

Stand by person

Respirator or self contained breathing apparatus

Emergency rescue plan in place & recovery equipment available

Entry way to be secured open

SECTION B - WORK PRECAUTIONS - PRESTART GAS DETECTION & MONITORING RECORD

Gas tester name	Initials	Time 24hr	% LEL	CO ppm	H ₂ S ppm	% O ₂	Other gases

SECTION B - ISOLATION RECORD

Description of Isolation	Lock/Tag number	Location of Lock/Tag	Initial Verified in place	Initial Verified removed

SECTION C – ONGOING WORK CONDITIONS

WORK CONDITIONS – MANDATORY FOR PERMIT HOLDER & ALL WORK PARTY MEMBERS

☐ Continuous gas monitoring during work

☐ Goggles

☐ Respirators

☐ Face shield

☐ Hearing protection

Other details and conditions:

GAS DETECTION & MONITORING RECORD – ONGOING

Gas tester name	Initials	Time 24hr	% LEL	CO ppm	H ₂ S ppm	% O ₂	Other gases



10. APPENDIX D: REHABILITATION PLAN BUDGET COSTINGS

RTI DL RELEASE - EHP



11. APPENDIX E: LETTER FROM CHIEF INSPECTOR OF COAL MINES

RTI DL RELEASE - EHP