



**FITNESS FOR PURPOSE REPORT  
2002**

**for**

**Pipeline Licence No 2  
MOOMBA TO PORT BONYTHON LIQUIDS  
PIPELINE**

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## LIST OF ABBREVIATIONS

ALARP	As Low As Reasonably Practicable
AS2885	Australian Standard 2885 – Pipelines- Gas and Liquid Petroleum
CDP	Corrosion Detection Pig
CHRIS	Complete Human Resources Integrated System
CMMS	Computerised Maintenance Management System
COP	Code of Environmental Practice
COPS	Closed Order Potential Survey
CP	Cathodic Protection
DCVG	Direct Current Voltage Gradient
DEF	Declaration of Environmental Factors.
EGP	Electronic Geometry Pig
EMS	Environmental Management System
ERC	Emergency Response Centre
GPS	Geographical Positioning System
HAZOP	Hazard Operability
KP	Kilometre Point
LMS	Land Management System
MAOP	Maximum Allowable Operating Pressure
MAP	Moomba to Adelaide Pipeline
MLV	Mainline Valve
NB	Nominal Bore
NGL	Natural Gas Liquid
P&ID	Piping and Instrumentation Drawing
PIRSA	Primary Industries and Resources of South Australia
PS	Pump Station
PSV	Pressure Safety Valve
ROC	Remote Operation Controller
ROW	Right of Way
SCADA	Supervisory Control and Data Acquisition
SEO	Statement of Environmental Objectives
SMS	Safety Management System
SRB	Sulphate Reducing Bacteria

SWER	Single Wire Earth Return
TRU	Transformer Rectifier Unit
TSCC	Transportation Services Control Centre
UHF	Ultra High Frequency
VHF	Very High Frequency

## **1. EXECUTIVE SUMMARY**

The South Australian Cooper Basin Joint Venture owns the hydrocarbon liquid pipeline that is operated on behalf of the Joint Venture by Santos Ltd. This pipeline runs from the central processing plant at Moomba to Port Bonython, which is located on Spender Gulf to the north of Whyalla, where the liquids are further processed and exported.

This pipeline, which is licensed under Pipeline Licence 2 (PL 2), was designed and constructed in accordance with AS 2885. The pipeline is operated and maintained in accordance with this Standard by Epic Energy under a contract to Santos.

The Petroleum Act 2000 requires a Fitness for Purpose Report to be completed for this pipeline at five-yearly intervals.

The Pipeline is 659km long and 355.6mm in diameter. Pump Station 1 injects product into the pipeline at the Moomba plant for transport to Port Bonython. Along the pipeline there is one out of service Pump Station and facilities for two future Pump Stations and 25 mainline valves. Pigging facilities are permanently installed at either end of the pipeline and at each Pump Station location.

In the past two years the microwave communications system and the pipeline SCADA system have been upgraded. A detailed Risk Assessment and Hazards and Operability study were completed on the pipeline in 2001. Two of the four pipeline sections were internally inspected in 1998. The last above ground coating defect survey was carried out in 1997. The most recent emergency response exercise was undertaken in 2000.

The Liquids Pipeline has some potential to impact security of supply of natural gas to South Australia. This impact results from an inability to dispose of LPG recovered at Moomba, where there is no storage capacity for these products. While not ideal, it is however possible to flare these products at Moomba thereby reducing or eliminating the impact on natural gas supply.

Based on the physical assessment of the Pipeline, a risk review carried out in accordance with the requirements of AS 2885 in 2001, audits and improvements of the management systems governing the manner in which the Pipeline is operated and maintained, corrosion and protection system surveys and other relevant information, the Moomba to Port Bonython Liquids Pipeline is assessed, as at June 2002, as being in good condition and is considered "fit-for-purpose" for the current and future use, for at least the next five years.

## **2. FACILITY AND DESCRIPTION**

### **2.1 OVERVIEW**

The South Australian Cooper Basin Joint Venture owns the hydrocarbon liquid pipeline that runs from the central processing plant at Moomba, in the far north-east of South Australia, to Port Bonython, located on Spencers Gulf to the north of Whyalla. At Port Bonython, the liquids are further processed for export.

This pipeline is operated under contract by Epic Energy on behalf of the South Australian Cooper Basin Joint Venture.

The Petroleum Act 2000 requires a Fitness for Purpose Report to be completed for the Moomba to Port Bonython Liquids Pipeline at five-yearly intervals. The Report must be submitted to the regulatory authority, Primary Industries and Resources South Australia.

The pipeline is considered to include all the facilities downstream (but not including) the inlet isolation valves to the pump station from the Moomba Plant to the outlet isolation valves from the meter runs at Port Bonython.

The Moomba to Port Bonython Liquids pipeline transports a liquid mixture containing ethane, propane, butane, gas condensate and crude oil. This pipeline was designed and constructed in accordance with AS 2885 and is operated and maintained in accordance with this Australian Standard. The design parameters and description of the facilities for the Moomba to Port Bonython Liquids Pipeline are described in the following sections.



## 2.2 PIPELINE

Date Constructed	1982/83
Date Commissioned	31 January 1984
Length, km	659
Diameter (OD), mm	355.6
Wall Thickness, mm:	
- Normal	7.14
- Special Crossings (eg: rivers, roads, railways)	8.74
- MLVs	8.74
Pipe Grade	API 5LX-52
Pipe Supplier	Tubemakers, Australia
MAOP, kPa	10.38
Fluid	Crude/condensate and high vapour pressure liquid hydrocarbons
Material	Electric Resistance Welded Steel
Coating	Polyken Tape System: Butyl primer/Tape/Butyl mastic/Tape/Polyethylene outer wrap.
Main Line Valves	25 off Adamson & Chronister 350 mm Class 600 slab gate valves.
Bypass Valves	Richards 150 mm Class 600 ball valves.
Actuators	17 - Every third valve from Moomba to Liquid Mainline Valve LMLV 13 is remotely operated while the others are manually operated. From MLV13 to Port Bonython all valves are operated remotely.
Scraper Stations	Scraper stations to facilitate pigging are installed at Moomba, MLV 7, MLV 13, MLV 19 and Port Bonython.
Pump Stations	1 in use, 1 decommissioned, 2 future sites.
Meter Stations	2 – Inlet and Outlet

## 2.3 MOOMBA

### 2.3.1 PUMP STATION 1

Pump Station 1 at Moomba delivers product into the Liquids Pipeline at the required pressure and flow rate. This is achieved using steam turbine driven pumps (one duty and one standby). The pumps, metering facilities and pig launching apparatus at Moomba are operated and maintained by Santos.

Specific details of the pumping equipment are:

Steam turbines:

Type: SSA 8

Rated output: 1485 kW  
Rated speed: 4850 rpm  
Max running speed: 5075 rpm  
Over speed trip: 5329 rpm

**Pumps:**

Type: Horizontal DVMX  
No of stages: 7  
Design capacity: 73.6 L/S  
Design head: 1209 m  
Design speed: 4,450 RPM  
Form of drive: Direct coupled to steam turbine  
Santos P&ID drawings 5500-10-003 and 5500-10-004 apply.

### **2.3.2 METER STATION**

To accurately measure the quantity of product being delivered into the pipeline, three meter runs are installed at Moomba. Densitometers and flow computers are installed to enhance overall accuracy of measurement.

Specific details of the metering equipment are:

- 3 off meter runs with Smith Turbine meters:
  - Max flow per meter run: 76 l/s
  - Min flow per meter run: 7 l/s
  - 1 off 12 inch Smith bi-directional pipe meter prover, used to calibrate any of the three turbine meters.
  - Twin parallel Solartron densitometers.
  - 3 off flow computers providing the following functions:
    - Computation of volumetric flow at operating temp. and pressure
    - Computation of density at operating temp. and pressure
    - Computation of mass flow from the above flow and density
    - Input into Epic Energy pipeline leak detection system
    - Control of meter proving

### **2.3.3 PIG LAUNCHER**

A single scraper barrel launcher assembly is installed in the Moomba pump station facility. The scraper barrel is 4m long and 450 NB, which is 100mm larger than the mainline pipe diameter. A conical reducer connects the barrel to a 600mm long 350 NB pipe spool and the scraper trap/pipeline isolation block valve (350mm Adamson Chronister).

The scraper trap is suitable for launching 350mm cleaning, batching, geometry, spheres and intelligent type pigs. It is equipped with a quick opening, horizontally hinged, swing closure, with safety interlock (Unibolt Closure).

Kicker and launcher bypass connections are 150NB to accommodate the entire pipeline flow without significant throttling effect.

A 100mm drain connection is installed near the end of the trap. A closed pipe

system is connected to a 15,000lt below ground containment tank. Equaliser lines of 50mm NB, with connections at both ends of the trap, are provided. Vent and/or purge connections of 25mm NB are provided on top of the scraper barrel, to allow venting to the closed drain system and purging with natural gas or nitrogen. There is an over pressurisation mechanical device fitted to the scraper.

## **2.4 FUTURE PUMP STATION 2**

Provision was made in the initial pipeline design for PS2 and includes the following facilities:

- Mainline Block Valve No 7 with remotely controlled Shafer Actuator and an above ground 150mm NB by-pass.
- Scraper facilities (see Section 2.4.1).
- A 100mm NB closed drain system connects the scraper traps to a disposal pit.
- A fenced disposal pit, including pilot, with spark ignition system.
- Station inlet and outlet valves (300mm NB Adamson & Chronister slab gate through conduit) with manual geared operators.

Pump Station 2 facilities (pumps, drivers etc) have never been installed. The PS2 site serves as a scraper station for pigging activities.

### **2.4.1 PIG LAUNCHER / RECEIVER**

One each Scraper receiver and launcher are installed. These are units of the same type and size to that installed at PS 1.

A transfer system connects the two traps to allow product from either scraper trap, to be injected back into the mainline using nitrogen as the medium.

A 100mm NB drain connection is installed near the end of the traps, to take remaining product through a closed pipe system to a disposal pit.

## **2.5 PUMP STATION 3**

The Liquids pipeline passes through PS3 and includes the following facilities:

- Mainline Block Valve No 13 with remotely controlled Shafer Actuator and an above ground 150mm NB by-pass.
- Scraper facilities (see Section 2.5.1).
- A 100mm NB closed drain system connecting the scraper traps with a below ground 15,000lts containment tank and a disposal pit.

- A fenced disposal pit, including pilot with spark ignition system.
- Station inlet and outlet valves (300mm NB Adamson & Chronister slab gate through conduit) with manual geared operators.

### **2.5.1 PIG LAUNCHER/RECEIVER**

The pig launching and receiving facilities at Pump Station 3 are identical to those at PS 1 and future Pump Station 2.

### **2.5.2 PUMPS (DECOMMISSIONED)**

Pump Station No 3 was operated between 1983 and 1990. The facility was then mothballed. The two 2400kW turbines that powered the Byron Jackson pumps were removed by Santos for sale. Both suction and discharge valves are closed and isolated from power gas. Pipework has been positively isolated on suction and discharge sides of both pumps by the installation of spectacle blinds.

Fuel and power gas provided from Epic Energy's MLV13 has been isolated and blinded from this site. The remaining pump facilities are in a mothballed state.

## **2.6 FUTURE PUMP STATION 4**

The Liquids pipeline passes through the provision for PS4 and includes the following facilities:

- Mainline Block Valve No 19 with remotely controlled Shafer Actuator and an above ground 150mm NB by-pass.
- Scraper facilities (see Section 2.6.1).
- A 100mm NB closed drain system connecting the scraper traps with the disposal pit.
- A fenced disposal pit including pilot with spark ignition system.
- Station inlet and outlet valves (300mm NB Adamson & Chronister slab gate through conduit) with manual geared operators.

As with PS 2, PS 4 was never installed and currently serves as a scraper station for pigging activities.

### **2.6.1 PIG LAUNCHER/RECEIVER**

Pump Station 4 was never installed as the pipeline rates were able to be managed by the installed facilities at PS1 and PS3. Consequently, the PS4 site serves as a scraper station for pigging activities.

## **2.7 PORT BONYTHON**

### **2.7.1 METER STATION**

To accurately measure the quantity of product being delivered from the pipeline, three meter runs are installed at Port Bonython. Densitometers and flow computers are also installed to enhance overall accuracy of measurement. This metering equipment is the same as installed at Moomba.

### **2.7.2 PIG RECEIVER**

A single scraper receiver assembly is installed in the Port Bonython processing terminal. The scraper barrel is 4m long and 450mm NB, which is 100mm larger than the mainline pipe diameter. A conical reducer connects the barrel to a 600mm long, 350mm NB pipe spool and the scraper trap/pipeline isolation block valve (350mm Adamson Chronister).

The scraper trap is suitable for receiving 350mm cleaning, batching, geometry, spheres and intelligent type pigs. The Scraper trap is equipped with a quick opening, horizontally hinged, swing closure with safety interlock (Unibolt Closure).

Kicker and launcher bypass connections are 150mm NB to accommodate the entire pipeline flow without significant throttling effect.

A 100mm drain connection is installed near the end of the trap. A closed pipe system is connected to a 15,000lt below ground containment tank.

Equaliser lines of 50mm NB, with both connections at both ends of the trap, are provided. Vent and or purge connections of 25mm NB are provided on top of the scraper barrel, to allow venting to the closed drain system and purging with natural gas or nitrogen. There is an over pressurisation mechanical device fitted to the scraper.

## **2.8 MAIN LINE VALVES**

### **2.8.1 ACTUATED**

There are 17 actuated Mainline block valves between Moomba and Port Bonython, which are remotely operated with pneumatic-hydraulic Shafer actuators powered by either nitrogen or natural gas. The valves are Adamson & Chronister valves welded through conduit, full bore, double block and bleed, slab gate valves. All valves are a below ground installation with a 150mm NB bypass, incorporating two 150mm NB ball valves and 100mm NB flange connections. The bypass pipe work is fitted with a Pressure Relief Valve to accommodate product expansion if exposed to high temperatures.

### **2.8.2 NON ACTUATED**

There are 8 non-actuated mainline block valves located between Moomba and PS3. The valves are Adamson & Chronister valves welded through conduit, full bore, double block and bleed, slab gate valves. All valves are a below ground installation with a 150mm NB bypass, incorporating two 150mm NB ball valves and 100mm NB flange connections. The bypass pipe work is

fitted with a Pressure Relief Valve to accommodate product expansion if exposed to high temperatures.

Mainline block valves from Moomba to PS3 are located adjacent to the mainline valves of Epic Energy's 558mm NB Moomba to Adelaide natural gas Pipeline.

## **2.9 ROW**

The ROW is inspected monthly by vehicle. An aerial patrol is conducted four times a year by rotary wing aircraft. The aerial patrol extends from Port Bonython to Pump Station 3.

There have been very few incidents of unauthorised encroachment on the Liquids Pipeline. In the five year period to 2002, there has been one recorded encroachment. In this instance an aerial patrol detected trenching from the installation of a 50mm poly pipe across the pipeline. The water pipe had been placed in a 300mm deep, hand-dug trench. The Liquids Line was at a recorded depth of one metre at this point. The landowner concerned was visited and made aware of the risks associated with unsupervised excavation within the easement and the penalties under the Petroleum Act that would apply to such activity.

### **2.9.1 ACCESS ROADS**

Access to the pipeline facilities between Moomba and Pump Station 3 is generally via the Right of Way servicing the Moomba to Adelaide gas Pipeline. From Pump Station 3 to Port Bonython, access is generally via tracks across pastoral leases or private land. These tracks are generally covered by underleases, which provide access rights to maintain and repair facilities. Access tracks are gated and secured by lock and chain.

Maintenance of access roads has generally been confined to the repair of water erosion damage, following periods of unusually heavy rainfall.

## **2.10 SWER LINES**

A Santos owned, 19kV SWER line runs parallel to the liquids line for 49.8 km from Compressor Station 4 to Martins Well. This incorporates MLV14 and MLV15. This line provides power to the MLVs, a CP TRU site and the Martins Well homestead. The capacity of the line is limited by the supply generation and the line is fused at 2 Amps. Average load is 5kVA.

## **2.11 PIPELINE MONITORING SYSTEMS**

### **2.11.1 SCADA SYSTEM**

Epic Energy operates and controls the Moomba to Port Bonython Liquids Pipeline for the South Australian Cooper Basin Joint Venture from the Transportation Services Control Centre (TSCC) in Perth, Western Australia, using the Epic Energy Metso SCADA System. The Liquids Pipeline can also be monitored and controlled from Epic Energy's emergency backup control centre in Dry Creek, South Australia. The SCADA incorporates the Santos

SSI Liquids modelling and leak detection package, recently ported to the Epic Energy SCADA from the decommissioned PDP11 SCADA system.

The Epic Energy SCADA system is a distributed, dual redundant, SCADA system which utilises Epic Energy and Santos communications infrastructures to communicate to Fisher ROC RTUs for the monitoring and control of the Liquids Pipeline. Liquids Line facilities at Moomba and Port Bonython, plus 15 MLV sites are monitored and controlled by the SCADA system.

### **2.11.2 COMMUNICATIONS AND SCADA**

Communication links between the MLV RTUs and the TSCC consist of Epic Energy owned and leased infrastructure as well as Santos owned infrastructure.

The Santos infrastructure, which consists of a microwave bearer and multiplexer, originates at Port Bonython and terminates at Moomba. This equipment provides the backbone of the transmission path. Small scale spur radios provide the transmission path to the main line valve sites that are not adjacent to the backbone.

The Epic Energy owned or leased infrastructure provide the transmission path from Port Bonython to Adelaide and then through to the TSCC. Epic Energy also owns the Cisco routers, which provide the switching in Adelaide and Perth.

### **2.11.3 LEAK DETECTION SYSTEM**

The SSI model has been ported from the old PDP11 platform and continues to operate on Epic Energy's Metso SCADA system. The new system has been proven to be very stable.

## **3. RISK ASSESSMENT SUMMARY**

### **3.1 AS2885 PIPELINE RISK ASSESSMENT**

Between 13 and 15 November 2001, Epic Energy facilitated a Pipeline Risk Assessment of the Moomba to Port Bonython Liquids Line. This risk assessment was conducted in accordance with *AS2885.1* and the associated *HB105-1998: Guide to pipeline risk assessment in accordance with AS2885.1*.

This Risk Assessment was limited to the pipeline and did not address the above ground facilities, such as the Terminals, Pump Stations and MLVs, which were evaluated through the Hazard and Operability (HAZOP) risk assessment.

The intent of the Pipeline Risk Assessment was to update the diverse locations, through which the pipeline passes and review the potential threats to and from the pipeline. Moreover, the Risk Assessment process ensured

that all possible threats at the different locations are identified, evaluated and appropriately managed.

Following a review of the location and non-location specific threats to the pipeline, 23 threats were considered to be credible. Of those credible threats, existing protection was determined to be adequate for the majority, which were consequently assessed as being As Low As Reasonably Practicable (ALARP).

The remaining threats were then assessed and risk ranked. While additional actions were identified, all of the assessed threats were considered to be at ALARP. These are detailed in Report TEB-012-0006-01. Further detail on these threats is included in 4.5.

### **3.2 HAZOP RISK ASSESSMENT**

As indicated in Section 3.1 above, Pipeline Licence 2 requires a risk assessment to be carried out and the findings reported to PIRSA. As part of the risk assessment process, Epic Energy carried out a Hazard and Operability (HAZOP) Study for the above ground facilities associated with the Moomba to Port Bonython Liquids Line.

The study was conducted at Compressor Station 4 in South Australia between 13 and 15 November 2001.

The HAZOP process involved representative Engineering, Operational and Maintenance Team personnel from Epic Energy, as well as Maintenance and Engineering representation from Santos. The people involved in the HAZOP workshop were familiar with the physical environment and associated Process system's operational requirements.

The workshop activities commenced with a review of the facility Process Systems and a review of the scope of operations and maintenance activities.

This was followed by a systematic assessment of each process system and its operational and maintenance requirements, using HAZOP Guide Phrases to identify safety and operability risk potential.

The scope of the HAZOP Study included all above ground facilities associated with the Moomba to Port Bonython Liquids Line. To facilitate effective analysis during the HAZOP Study, the above ground facilities were separated into 9 Nodes.

Node 1 Pump Station 1 Pig Launching Facility – P&ID 701-A-01 Rev6

Node 2 Port Bonython Pig Receiving Facility – P&ID 725-A-01 Rev7

Node 3 Typical MLV Nitrogen Actuator – P&ID 102-A-01 Rev8

Node 4 Typical MLV Natural Gas Actuator – P&ID 102-A-01 Rev8

Node 5 Typical MLV Manually Actuated – P&ID 102-L-50 Rev7

Node 6 Pump Station 2 – P&ID 713-A-03 rev8

Node 7 Pump Station 3 – P&ID 713-A-03 rev8

Node 8 Pump Station 4 – P&ID 713-A-03 rev8

Node 9 TRU Sites – analysed separately



The HAZOP Study generated 30 actions, (included in Report TEB-012-0010-01) which were considered not to impose a significant threat to the operation of the pipeline. The identified actions were subsequently followed up and closed out.

## **4. FITNESS FOR PURPOSE STATEMENT**

The Moomba to Port Bonython Liquids Pipeline was constructed in 1983 and commissioned in 1984. The pipeline has a MAOP of 10.38MPa, but generally operates between 6.5 and 8.5 MPa. The Pipeline was designed in accordance with AS 2885 for the express purpose of transporting liquid hydrocarbons, with varying mixtures from high NGLs to stabilised crude.

A Risk Assessment in accordance with AS2885 and a detailed Hazards and Operability study, conducted in 2001, confirmed that there are no threats to the pipeline, which are not being managed appropriately, and the asset poses an acceptable risk to public health, safety and the environment.

This pipeline is being operated and maintained by Epic Energy, an experienced Australian pipeline owner and operator. Epic Energy has appropriate management systems in place to ensure the integrity of the Pipeline is maintained at all times.

Two of the four piggable sections of the Pipeline were internally inspected in 1998. Fourteen excavations were carried out as a result of this inspection. The excavation results, combined with the inspection data, confirmed that the pipeline is in good condition.

Above ground coating surveys, coating inspections during excavations and analysis of sludge collected during pigging operations confirm that internal and external corrosion are minimal and acceptable.

Noting the above, the Moomba to Port Bonython Liquids Pipeline is assessed as being in good condition and fit-for-purpose for current and future use.

### **4.1 GROUNDS FOR FITNESS FOR PURPOSE**

#### **4.1.1 OVERVIEW OF GROUNDS FOR FITNESS FOR PURPOSE**

The Fitness for Purpose statement in Section 4.0 is made on the basis of:

- The pipeline being designed and constructed in accordance with AS 2885, and is operated and maintained in accordance with this Standard.
- Risk Assessments conducted in 2001 in accordance with the requirements of AS 2885 identified risks “ALARP”.
- Review of 1998 Intelligent Pigging data and subsequent validation of results through physical inspection;
- Analysis of sludge recovered from pigging operations;

- Coating defect surveys;
- Coating inspections during excavations;
- Physical assessment of above ground facilities during routine maintenance activities;
- Audits of Epic Energy's management systems;
- Lessons learned from Emergency Response Exercises;
- A training review of people employed to operate and maintain the asset.
- Upgrades made to the microwave and SCADA systems.

#### **4.1.2 EPIC ENERGY SAFETY POLICY**

##### **Safety is our most important value**

Epic Energy is committed to providing an accident free and healthy workplace for all employees, contractor and the public by implementing an integrated safety management system and maintaining the highest possible standards.

We believe that good OHS performance and practices are the responsibility of everyone at Epic Energy and are critical to the success of our business.

To achieve this, Epic Energy will:

- Ensure that systems are in place to protect the Health and Safety of all personnel on Epic Energy facilities as well as the environment surrounding it.
- Develop and maintain systems to promote employee involvement and communication in Health and Safety issues.
- Demonstrate effective management of Health and Safety through risk assessments and the development and implementation of safe operational procedures.
- Evaluate and manage changes to process, equipment, organisation and personnel to ensure that safety and environmental risks remain as low as practicable.
- Promote a health system, which ensures that employees are not, as far as reasonable practicable, exposed to risks, which may effect their health whilst at the workplace.
- Provide a system for the reporting and investigation of incidents and ensure follow up and remedial actions are implemented to prevent recurrence.
- Assess compliance with Health and Safety performance standards, good practice and legislative requirements and communicate this to all employees and interested parties.
- Review the OHS policy periodically to ensure relevance, in line with our business.

**Sue Ortenstone**

**Chief Executive Officer**

### **4.1.3 EPIC ENERGY ENVIRONMENTAL POLICY**

#### **Epic Energy Operates in an Environmentally Friendly Manner**

Epic Energy is Australia's largest gas transmission company, who construct, own and/or operate gas transmission pipelines throughout Australia. Epic is committed to minimising the impact of its activities on the environment in keeping with its belief that companies be increasingly responsible in their management of environmental issues.

To achieve this, Epic will:

- Ensure that it continues to research into and apply new technologies and procedures that reduce the impact of its activities on the environment.
- Comply with all relevant environmental legislation and the requirements of industry standards as a minimum requirement.
- Integrate care for the environment into the responsibilities and work ethics of all personnel.
- Minimise land and habitat disturbance by adopting best proactive environmentally sensitive means where no other requirements exists.
- Promote open communication with landholders and interested parties.
- Avoid disturbance to known or identified sites of cultural, historical, natural or scientific significance.
- Implement work practices to minimise erosion and sedimentation impacts on neighbouring properties and land.
- Develop opportunities for recycling and more efficiently using energy, water and other resources.

Environmental performance will be monitored regularly and the information communicated to all employees and interested parties/members of the community.

**Sue Ortenstone**  
**Chief Executive Officer**

#### **4.1.3.1 LANDOWNER LIAISON**

An integral part of Epic Energy's Environmental Management System to ensure compliance with the Petroleum Act (2000) and Regulations (2000) and the Epic Environmental Policy is landowner liaison.

There are a total of 43 landowner/residents whose property is crossed by the Liquids Pipeline. A property owner contact scheme is operated where a Land Management Officer visits each owner or occupier along the Liquids Pipeline annually.

Other contacts, made by Field Maintenance Officers and Superintendents during the course of daily business, are recorded in the Land Management System.

Land Management is supported by dedicated LMS software that provides a powerful data base and MapInfo facilities. All property details and notes relating to discussions or issues with the property owners are recorded in the LMS.

Through its MapInfo facility an image of the cadastral boundaries of each property relative to the pipeline route can be displayed for any property.

Where personal contact cannot be made, contact is made with the occupier or owner by telephone or mail, and an explanation of the reason for the visit, the contact officer's contact details, information brochures on pipeline safety and the "dial-before-you-dig" contact phone number is provided.

All property owners are provided with a pipeline safety brochures, which contain the "**Dial Before You Dig**" contact phone number and strongly reinforce safe working practices near high pressure pipelines.

A hard file is maintained for each of the land parcels crossed by the Liquids Pipeline. Each property is flagged with the Land Titles Office who inform Epic of any changes in ownership or land tenure details, ensuring that records are always up to date for mail outs and personal visits.

Public awareness presentations for the Liquids Pipeline are held annually at either Hawker or Whyalla. These are provided for local earthmoving contractors, utilities, and emergency service providers. The focus of these presentations are on the specific nature and characteristics of the products carried by the Liquids Pipeline, the route of the pipeline, basic information about the pipeline and its monitoring, control and emergency procedures.

#### **4.1.4 EMERGENCY RESPONSE POLICY**

Epic Energy maintains an emergency response capability designed to ensure that Epic Energy:

- minimises or eliminates any danger or risk to individuals,
- minimises or eliminates any risk to the business, and
- ensures that the pipeline system is returned efficiently to a safe, operational state, with minimum customer and environmental impact.

Epic Energy will maintain a comprehensive team structure, equipment and services, all of which are tested regularly to ensure their preparedness and responsiveness to emergency events.

To enable this, the Emergency Response Manual and the mapped business process of *Responding to breakdown and emergency* is utilised.

The Emergency Response Plans will provide an Emergency Management Overview detailing the Epic Response Notification and the Emergency Management Team supplemented by the State response recovery plans.

Epic Energy's Emergency Response will follow a process based on Incident Command System that will work towards the establishment and maintenance of a uniform, fully integrated, well coordinated, response effort. Its aim will be to move the response from a reactive to a proactive mode of operation as quickly and efficiently as possible. By addressing the needs of an emergency as a project, the techniques and benefits of project management will be utilised in achieving this aim.

Epic Energy reviews and tests its preparedness to respond to an emergency as follows:

- Two emergency response exercises are conducted in each state annually; and
- The first emergency response exercise on each pipeline system is performed as a desk top exercise.
- The second emergency response exercise on each pipeline involves considerable mobilisation and limited involvement of external parties.
- The third emergency response exercise on each pipeline system involves full mobilisation and maximum involvement of external parties.

#### **4.1.5 MAINTENANCE PROGRAM**

##### **4.1.5.1 MAINTENANCE PROGRAM**

Epic Energy's Maintenance Program is designed to provide timely, quality and cost-effective maintenance and technical guidance in support of the pipeline operation.

The program outlines Epic Energy's maintenance organisation, detailing maintenance commitment, resource structure and work control philosophy.

The maintenance commitment outlines the maintenance to be performed on varying types of asset, detailing the frequency, duration, plant condition, type of maintenance action, rationale behind the activity to be undertaken and technical expertise required for the task.

The resource structure details the types of resource available and their responsibilities in the maintenance organisation. The work control

philosophy details the methodology on how the work is to be controlled.

#### **4.1.5.2 MAXIMO**

Maximo is the Computerised Maintenance Management System (CMMS) utilised to implement the Maintenance Program. This is a work management tool for planning, scheduling, executing, controlling and recording the maintenance work.

#### **4.1.5.3 WORK INSTRUCTIONS**

Work Instructions are a method statement of how routine maintenance or project work is to be progressed.

### **4.1.6 FIELD PERSONNEL**

#### **4.1.6.1 TRAINING/COMPETENCY**

Field Maintenance employees undertake a range of training covering basic induction courses, job ready courses, corporate training and technical training. Refresher training is provided on a scheduled or as required basis (dictated by the course involved).

With the re-issue of AS2885.3 in 2001, Epic Energy is embracing competency based training.

#### **4.1.6.2 EXPERIENCE**

The Maintenance Officers have cumulative skills covering all aspects of pipeline maintenance and emergency response. The average years of service of these Officers exceeds 15 years.

### **4.1.7 AUDITS**

The next internal audit of Epic Energy's Safety Management System will be completed prior to the fourth quarter of 2002.

## **4.2 PHYSICAL ASSESSMENT OF FACILITIES**

### **4.2.1 PIPELINE**

#### **4.2.1.1 INTELLIGENT PIGGING SURVEY**

An internal pipeline survey using a Corrosion Detection Pig (CDP) was carried out from Moomba to Pump Station 2 and from Pump Station 3 to Pump Station 4, in 1998. These sections were selected for inspection by Santos. The survey was carried out with the assistance of Rosen Australia.

Details of the distribution of identified features are provided in Appendix 3.

#### **4.2.1.2 METAL LOSS AND OTHER PIPE DEFECTS**

From the features identified during the 1998 internal inspection, a total of 11 defects between Moomba and Pump Station 2 were excavated in 1999.

These features were:

- Two circumferential welds with incomplete caps. Those welds were reinforced by sleeves, during the refurbishment process.
- Three minor dents – no action required.
- Two suspected laminations – following excavation, no evidence of laminations could be identified via external ultrasonic inspection of the exposed pipe.
- Four minor corrosion defects due to ingress of moisture under the narrow overlap of the tape coating – the pipe and coating was refurbished at these locations.

Three excavations were conducted between Pump Station 3 and Pump Station 4, in 2001. These excavations were for minor external corrosion defects, which were refurbished prior to backfilling.

Maximum measured metal loss in the investigation was 33% of the wall thickness. However, as the measured length of the defects were well below the critical limits set by AS 2885.3-1997, no reinforcement or reduction in the MAOP of the pipeline was necessary.

#### **4.2.1.3 SIZING PIGGING SURVEYS**

Before running the Rosen CDP tool, a series of other tools were run through the pipeline. This included a cleaning pig, followed by an Electronic Gauging Pig (EGP) No geometrical anomalies were detected in the two sections of pipe inspected.



#### **4.2.1.4 CORROSION CONTROL**

##### **4.2.1.4.1 Performance**

Performance of the pipeline cathodic protection system is checked:

- Two-monthly by checking the functionality of the transformer rectifier units for correct operation and output adjustments; and
- Six-monthly by conducting ON/OFF potential surveys at all test points, to determine the level of protection and to retune the pipe to the required CP criteria of -0.850 V to -1.18 V OFF potential versus Copper/Copper Sulphate half cell.

##### **4.2.1.4.2 Internal Corrosion**

Sulphate Reducing Bacteria (SRB) in areas with low fluid velocity is considered a potential source of internal corrosion in the pipeline. For this reason, the pipeline is pigged annually to remove water, which promotes SRBs. Any sludge collected is tested for the presence of SRB. No significant SRB count has been recorded to date.

##### **4.2.1.4.3 Coating Condition**

The condition of the coating on a pipeline can be determined qualitatively from the protective current density of the pipe and quantitatively by applying techniques like Close Order Potential Surveys (COPS) and Direct Current Voltage Gradient Surveys, (DCVG). The latter technique is more widely used as it is more efficient and can provide reliable results in a shorter period of time.

##### **4.2.1.4.4 Current Density**

Average protective current density of the pipe has changed from 26 microA/M<sup>2</sup> in 1996 to 27 microA/M<sup>2</sup> in 2001. This indicates a very good performance of the pipeline coating. The average total current output of 12 Transformer Rectifier Units (TRUs) on the pipeline was 20A. The TRU at Pump Station 3 has the highest current output, ranging from 8A to 12A depending on seasonal changes.

##### **4.2.1.4.5 Review Of The Cathodic Protection Results**

The pipeline cathodic potential profiles from March and September 2001 surveys are given in Appendix 1. These indicate that the pipeline was protected for its entire length except for 4 test points:

- KPs 9.4 and 9.6: Slight depression on the pipe potential due to crossing Santos Pipelines A and B. The OFF potential readings at those locations were -0.810V and -0.685V respectively. The slight interference was detected in the September survey.
- KPs 161.4 and 357.6: OFF potential readings on these two test points are incorrectly represented in the graph in Appendix

1, as readings from these points were not recorded. These potential readings are -1090 mV and -970 mV, which are adequate. These test points are included in future surveys.

Examination of the potential survey results of the pipe since 1997 indicate that the pipeline has been protected to the criteria levels as set by AS 2832.1 and AS 2885.1.

#### **4.2.1.5 DCVG SURVEYS AND PIPELINE EXCAVATIONS**

The last DCVG survey was conducted on the pipeline in January 1997. Six defects were identified for excavation. The percentage IR of these defects ranged from 20% to 55%. Three of these were excavated in 1998, which highlighted defects due to the ingress of moisture into the overlap region of the coating. No pipe reinforcement or reduction of the MAOP was necessary, as the defects were minor and required coating repair only. Denso R20/S40 with Densolen primer was used for repairs.

The next DCVG Survey will be carried out in 2002.

#### **4.2.1.6 CONCLUSION ON PIPELINE CONDITION**

##### ***4.2.1.6.1 Pipeline Coating Condition***

The results of the coating defects surveys, coating inspections and the magnitude of the protective current requirement of the pipeline indicate that the pipeline coating is in good condition and has performed satisfactory after approximately 20 years in service.

##### ***4.2.1.6.2 Cathodic Protection System***

The pipeline cathodic protection system has performed satisfactory and has provided the pipeline with adequate current to keep it within the criteria limits. The system has sufficient capacity for future requirements of increased current outputs, due to the aging of the pipeline coating.

The depression at the end of the pipeline at Port Bonython terminal is due to cathodic field of the compound facilities.

##### ***4.2.1.6.3 Pipeline Integrity***

The results of the intelligent pigging program and the subsequent pipeline repairs program together with DCVG Surveys, cathodic protection six-monthly checks and analysis of the cleaning pig sludge, indicate that the pipeline is in good condition and has not suffered from significant internal or external corrosion.

## **4.2.2 PUMP STATIONS**

### **4.2.2.1 BUILDINGS AND ENCLOSURES**

Pump Station 3 buildings have been mothballed/abandoned. No maintenance is carried out on these facilities. The Control Room is not operational, but provides a data collection point for Liquids Line SCADA.

The Services Building has recently been renovated to provide a Field Office for Epic Energy's Maintenance Superintendents and Field Technical Services Officers.

### **4.2.2.2 PLANT AND EQUIPMENT**

PS3 plant and equipment is non-operational after being mothballed in 1990. This equipment is physically isolated from the pipeline. There is no plant or equipment at future Pump Stations 2 & 4.

### **4.2.2.3 SITE SECURITY**

A 1800mm high, chain mesh fence with three strands of barbed wire atop posts surrounds all Pump Station compounds. All gates to these compounds are locked in accordance with the Epic Energy common locking system. Scraper facility valves, mainline valves and bypass valves are also locked.

Two of these sites are located at Epic Energy base location sites for Epic Energy's Maintenance Teams and are staffed for a high proportion of the time.

### **4.2.2.4 ENVIRONMENTAL CONDITIONS**

Environmental conditions for the Liquids Pipeline are outlined in the Statement of Environmental Objectives. This document was based on a Declaration of Environmental Factors and Code of Environmental Practice approved under the Petroleum Act (1940).

The current SEO was approved under the transitional provisions of the Petroleum Act 2000. A revised SEO, based on an Environmental Impact Report, is being prepared for submission. It is anticipated this will be approved by the end of 2003.

### **4.2.3 MAIN LINE VALVES**

#### **4.2.3.1 PLANT AND EQUIPMENT**

All mainline valves with manual operators, Schafer operators and bypass valves are subjected to regular maintenance and maintained in a fully operational condition. Remote sites have regulated nitrogen supply to power Schafer operators. The supply is alarmed for low gas pressure and is monitored by TSCC, with bottles changed as required.

At remote sites, Fisher ROC RTUs are calibrated two-monthly. All equipment is fully operational.

PSV testing at all mainline valve sites is carried out six-monthly. All equipment is fully operational.

#### **4.2.3.2 SITE SECURITY**

An 1800mm high, chain mesh fence topped with three strands of barbed wire, surrounds all compounds to secure the mainline valves. All gates to these compounds are locked in accordance with Epic Energy's common locking system.

All mainline valves and bypass valves, which can be tampered with are locked in accordance with Epic Energy's common locking system.

Regular maintenance visits along with routine road and aerial patrols provide additional security checks.

#### **4.2.3.3 ENVIRONMENTAL CONDITIONS**

The environmental conditions at the MLV sites do not differ significantly from the conditions at the Pump Stations.

### **4.2.4 COMMUNICATIONS FACILITIES**

#### **4.2.4.1 PLANT AND EQUIPMENT**

There is a digital microwave system installed along the length of the pipeline, consisting of masts ranging from 40m through to 107m in height and equipment shelters, which contain battery systems and radio bearer equipment. There are ten remote UHF repeater sites and seven leased line sites, which service the Liquids Pipeline SCADA, to Fisher ROC RTUs. Power to all sites is provided by SWER line, with the exception of 5 sites (Repeater sites at KP115, 209 and 306, as well as remote Liquids Line MLVs 16 and 17).

Mobile communications is maintained by a semi-cellular radio network that provides for communications with TSCC from anywhere along the pipeline. This consists of microwave site VHF base stations and Epic Energy vehicle mobile VHF radios.

#### **4.2.4.2 SITE SECURITY**

All communications repeater station sites have entry alarms fitted to the outer and inner building doors. These are alarmed back to TSCC, which is monitored 24 hours a day. The external and internal doors are locked in accordance with Epic Energy's common locking system.

#### **4.2.4.3 ENVIRONMENTAL CONDITIONS**

The environmental conditions at the communications sites do not differ significantly from the conditions at the Pump Stations.

### **4.3 MANAGEMENT SYSTEMS**

#### **4.3.1 SAFETY MANAGEMENT SYSTEMS**

The Safety Management System (SMS) developed and implemented at Epic Energy provides all Epic Energy personnel with a framework for the management of health and safety related risks on facilities operated by Epic Energy, including the Liquids Pipeline.

The Safety Management System provides guidance to personnel at all levels of the organisation, to ensure that all activities on site are undertaken safely. It is an integral part of the overall management system at Epic Energy, designed to complement other systems in order to facilitate the management of safety and risk at each facility.

The Safety Management System also provides a means for review of individual performance and a mechanism for continuous improvement of operational performance.

#### **SCOPE**

The Safety Management System document has been specifically designed for Epic Energy and applies to all employees, contractors and visitors on facilities.

#### **COMMITMENT**

Epic Energy management believes that all incidents are preventable and that the safety and health for all employees is the foremost business priority. As such Epic Energy has demonstrated its commitment to ensure compliance with good safety management practices by developing the Epic Energy Safety Management System in line with relevant standards and industry good practice guidelines.

#### **SAFETY MANAGEMENT SYSTEM STRUCTURE**

The Safety Management System Standards define the goals, deemed by Epic Energy, to be necessary to achieve a high level of Health and safety performance and reduce risk.

The Safety Management System structure comprises of:

**Standards:** There are fourteen (14) Health and Safety Standards  
**Objectives:** Objectives are defined for each Standard  
**Requirements:** The requirements address the scope of each element.

The fourteen (14) Standards are as follows:

1. Policy and Objectives
2. Organisation and Responsibility
3. Risk Assessment and Risk Management
4. Employee Involvement
5. Employee Selection, Competency and Training
6. Contractors and Support Services
7. Design, Construction, and Commissioning
8. Safe Operational Procedures
9. Maintenance, Inspection, Testing and Modification
10. Management of Change
11. Health System
12. Emergency Response
13. Accident/Incident Investigation and Reporting
14. Performance Audit and Review

## **SAFETY MANAGEMENT REVIEW**

The Safety Management System is periodically reviewed and updated as a result of operational, personnel, legislative and/or management changes. Epic Energy also audit and monitor compliance with the Safety Management System on an annual basis.

### **4.3.2 ENVIRONMENTAL MANAGEMENT**

As the contractor responsible for the operation and maintenance of the Liquids Pipeline, Epic Energy is required to have in place an Environmental Management System. A complete review of that EMS was carried out in 2001, following the development of the SEOs for the operating pipelines in SA.

The Audit reviewed the effectiveness and system structure relating to the SEOs. Modifications were carried out on the Aspects Register and included an update of the Obligations Register.

In 2001 external audit/monitoring was carried out on:

- Groundwater monitoring at Pump Station 2.
- Groundwater monitoring at Pump Station 3.

With regard to the Liquids Pipeline, the objective of this monitoring is to confirm natural attenuation of residual petroleum hydrocarbon contamination in the vicinity of the former burn pits (wells CS2-9 and CS2-5). Results of the monitoring continue to be positive in that detected residual product concentration is diminishing.

### **4.3.3 EMERGENCY RESPONSE**

#### **4.3.3.1 EMERGENCY RESPONSE DRILLS**

Emergency response procedures, equipment and materials are maintained to allow a prompt and effective response to any emergency situation, which may develop on the liquids pipeline.

The procedures are regularly tested to provide training for involved personnel and as a check that the response plans and procedures ensure an effective response. The practice drills and their outcomes are reported separately to PIRSA.

### **4.3.4 MAINTENANCE PROGRAM**

#### **4.3.4.1 MAINTENANCE PROGRAM**

The maintenance program for Epic Energy operated assets has been developed from “what we have always done”. This basis is not in line with an effective and efficient maintenance program. To improve maintenance practices, a “Bottom up” analysis will be performed, taking into consideration the failure characteristics, statutory and regulatory requirements of the items and the relative criticality of the equipment/system based on Safety, Environmental and Business risk. The maintenance workflow process lacks detail and does not fit, or is not aligned to the CMMS. Detailed mapping is to be undertaken to align specific business processes, with positions in the organisation and the CMMS.

#### **4.3.4.2 MAXIMO**

The CMMS functionality has not been fully explored to return maximum benefit for the company. Identified areas of improvement include:

- The methodology in which the workload is grouped in the CMMS does not allow for interrogation of maintenance performed and improvement of that maintenance. A detailed “bottom up” analysis will allow the maintenance to be identified and structured differently to facilitate the improvement process, utilising the CMMS;
- The functionality of specific areas of the CMMS is not used to its fullest extent. This is in lieu of details written into other documents; specifically lock out/tag out and Safety instructions; and
- The resource structure in the CMMS places constraints on the efficient utilisation of maintenance resources.

#### **4.3.4.3 WORK INSTRUCTIONS**

Work Instructions exist in various forms from Draft to Approved. These Instructions need to be brought up to a standard and stored within the central filing system within the business. Some Instructions were created before the implementation of the CMMS. These Instructions need to be revisited to determine if the functionality of the CMMS can meet the intent of the Instructions.

The Work Instruction documentation needs to be dissected and areas such as tag out / lock out and safety instructions must be reviewed to determine if the CMMS functionality can provide the required outputs and control. This work is currently underway and will be well advanced by the end of 2002.

#### **4.3.5 FIELD PERSONNEL**

##### **4.3.5.1 TRAINING**

In 1999, as a result of an organisational review, Epic Energy centralised corporate functions into the Head Office in Perth. Included in this review was the level of Maintenance staff and work patterns. An integral component of the process was an assessment of skills and competencies in the workforce. The skills assessment identified key training needs.

Specific training arising from the above process included:

- Baseline training for all Operations personnel.
- Liquids Line specific training.
- Specific technical training.

##### **4.3.5.2 EXPERIENCE**

Turnover within Epic Energy is monitored as a key performance indicator. The turnover among personnel directly associated with the operation and maintenance of the Liquids Pipeline is less than 5%.

#### **4.3.6 AUDITS**

An internal audit of Epic Energy's safety management system is conducted on an annual basis. Results of the audit are circulated to senior management for delegation of the close out actions. The status of action items is checked for completion on a regular basis prior to the commencement of the following year's audit.

Recent audits indicate a satisfactory level of compliance and action finalisation.



#### **4.3.6.1 CLASS LOCATION CHANGES**

Through the audit process, no class location changes along the Liquids Pipeline have been identified.

#### **4.3.7 RIGHT OF WAY MAINTENANCE**

##### **4.3.7.1 WASH OUTS**

Washouts are identified through routine patrols and site visits for maintenance. Repairs are carried out at the first opportunity after the wash outs are identified. The Liquids Pipeline was not exposed at any time due to wash outs.

##### **4.3.7.2 SIGNAGE**

In order to bring the pipeline signage into line with the requirements of AS2885, additional signage was installed at 500m intervals along the Whyalla Road to Port Bonython for approximately 40km and from Moomba to MLV 2, a distance of 16km. An ongoing program has been developed to upgrade the signage along the entire length of the Liquids Pipeline and routine maintenance will ensure the signs are maintained to the required standard.

All compounds are clearly identified with signage indicating what the facility is and who to contact in the event of an emergency.

#### **4.3.7.3 AERIAL SURVEILLANCE**

Aerial patrols are conducted quarterly, between Port Bonython and Pump Station 3. Given the proximity to the main pipeline access road north of Pump Station 3 and the remoteness of the region, road patrols are considered sufficient. Through the reporting period, only one encroachment issue was identified, as reported in Section 2.9.

#### **4.3.7.4 ROAD PATROLS**

Road patrols are conducted monthly and after heavy rains. Being much closer to the asset, the road patrol is usually the most efficient in identifying anomalies, such as wash outs. North of Pump Station 3, the Right of Way servicing the MAP travels parallel to the Liquids Pipeline and anomalies are identified during normal travel along the pipelines, as well as during the dedicated road patrols. This is considered an effective means of monitoring the easement.

From Pump Station 3 to Port Bonython, the pipeline passes through the Flinders Ranges and pastoral land and road access is more difficult for Epic Energy and the general public. Given the restricted access, monthly road patrols through this area is considered sufficient.

#### **4.3.7.5 PIPELINE LOCATION SERVICE**

Epic Energy subscribe to the Dial-Before-You-Dig program and offer a free pipeline location service. The remoteness of this pipeline results in a limited number of applications for this service. Cooperation with the community has been excellent in this matter.

Combined with the landowner contact program, the pipeline is considered to be well protected from external interference. This was reflected in the 2001 Pipeline Risk Assessment.

#### **4.3.7.6 LANDHOLDER CONTACT PROGRAM**

Every twelve months all property owners and local bodies, such as councils and emergency services along the pipeline are visited as part of a contact scheme. The scheme is intended to remind and keep property owners abreast of the potential hazards associated with high pressure pipelines and the rules and obligations associated with landowner activity in the vicinity of the pipeline.

### **4.4 OTHER RELEVANT INFORMATION**

#### **4.4.1 OTHER REPORTING REQUIREMENTS**

Through the period covered by this report, other reports provided to Santos and PIRSA by Epic Energy related to:

- Annual Reports;
- Emergency Response Exercise Reports; and
- Incident Investigation Reports

#### **4.4.2 OTHER RELEVANT INFORMATION**

The isolation valves for several of the pig traps are known to be passing. This makes pigging operations more hazardous and action is required to repair the defective valves. Proposals will be developed in 2002 to commence a valve refurbishment program. In the meantime, pigging will be accommodated through reliance on the pig trap drain system and use of larger collection vessels to contain all discharges, thus preventing spillage to the environment.

#### **4.4.3 FUTURE OPERATIONS**

No unusual operations are planned for the Liquids Pipeline.

### **4.5 ADVERSE FACTORS**

#### **4.5.1 REPORT ON HAZARDS TO THE PIPELINES**

The AS2885 Risk Assessment of the Liquids Pipeline identified the following as significant threats to the asset. A summary of threat mitigation measures is provided against each threat to help the reader understand why those threats have been assessed as being ALARP:

- External Corrosion – mitigated by active cathodic protection system, regular DCVG surveys, coating inspections during excavations, visual inspection of above ground facilities and intelligent pigging.
- Dam Building
- Power Pole Hole Boring
- Trenching Operations

These are mitigated by Liaison with landowners and other parties as determined in the location specific threat analysis, involvement in the Dial Before You Dig program, pipeline signage, aerial and road patrols and Epic Energy's Permit to Work system (when advised of the work). A line break monitoring system will enable rapid response in the event that damage is sustained.

The HAZOP Study did not identify any unacceptable threats to the asset; however, 30 follow up actions were identified to confirm the integrity, or to reinforce the integrity of the asset.

A preliminary audit of electrical equipment in hazardous areas was compiled in 2001. That audit report highlights a requirement for remedial action, including the complete decommissioning and isolation of Pump Station 3, as well as the development of an accurate Verification Dossier of installed equipment.

Corrective action arising from that report will be initiated in 2002.

## 5. SECURITY OF NATURAL GAS SUPPLY

An incident which results in the shutdown or significant restriction in throughput of the liquids pipeline has the potential to adversely impact the security of supply of natural gas to South Australia. This adverse impact results from the inability to store propane and butane at Moomba.

In such circumstances it is possible to include as much of the propane and butane in the natural gas stream as gas specification will allow, and flare the remainder of the LPG. This would reduce the impact of security of supply of natural gas. It is recognised that this is not a desirable outcome but is more favourable than the other options.

The systems and procedures used to manage maintenance work and third party activities, monitor pipeline condition, emergency systems and procedures are directed at eliminating or minimising the risk of a serious incident which may result in a shutdown of the pipeline.

## 6. FITNESS FOR PURPOSE SUMMARY

Based on the physical assessment of the Moomba to Port Bonython Liquids Pipeline, a review of the management systems governing the manner in which the Pipeline is operated and maintained and any other relevant information, the Moomba to Port Bonython Liquids Pipeline is assessed as being in good condition and fit for current and future purpose.

## 7. CONCLUSIONS

This Fitness for Purpose Report has been compiled in accordance with the requirements of the South Australian Petroleum Regulations 2000, Division 4, Regulation 30. It is concluded that the Moomba to Port Bonython Liquids Pipeline, covered under Pipeline Licence 2, is fit for its current and intended future purpose.

An assessment of the above ground facilities has identified them to be in good condition. Exceptions to this statement are:

- The facilities at Pump Station 3, which need to be fully decommissioned and isolated;
- A Verification Dossier is required for all electrical equipment installed in hazardous areas along the pipeline; and
- Pig trap isolation valves need to be refurbished on a priority basis, in order to reduce the risk associated with future pigging activities.

The recent upgrade of the microwave communications and SCADA systems has significantly improved the reliability of the systems and hence the ability to accurately monitor and control the Liquids Pipeline.

The condition of below ground pipework has been verified through intelligent pigging of two sections, coating defect surveys and coating inspections. While the results of the intelligent pigging were favourable, two girth weld defects were identified. These were subsequently satisfactorily addressed.

The AS2885 Risk Assessment and HAZOP carried out in 2001 confirmed that the pipeline is adequately protected from external threats and poses an acceptable threat to the public and the environment.

The management systems employed by Epic Energy in the operation and maintenance of the Liquids Pipeline are robust and regularly audited. Incorporation of the Environmental Impact Report and Statement of Environmental Objectives has further reinforced the integrity of managing environmental issues on the Pipeline.

Santos involvement in risk reviews, HAZOPS and audits provides confirmation that the pipeline system is being operated in accordance with AS 2885 and the Petroleum ct 2000.

Epic Energy has a structured process in place for recruitment and training of employees, which ensures personnel involved in the operation and maintenance of the Liquids Pipeline are competent and have appropriate levels of experience.

Emergency response exercises are conducted to test the emergency response capability. Identified improvements are subsequently incorporated.

It is concluded that the Moomba to Port Bonython Liquids Pipeline is fit for purpose and will continue to be fit for purpose for the foreseeable future. As a minimum, the Pipeline is assessed as being fit for purpose for the next five years, when the "Fitness for Purpose" will be reviewed. Should the operational circumstances surrounding this asset change within that five year period, the Fitness for Purpose Report will be reviewed to determine whether any operational adjustment is required.

## **8. APPENDICES:**

### **8.1 Appendix 1 : Pipeline Cathodic Protection Potential Profiles**

### **8.2 Appendix 2: DCVG Coating Survey Results**

### **8.3 Appendix 3: Intelligent Pigging Results**

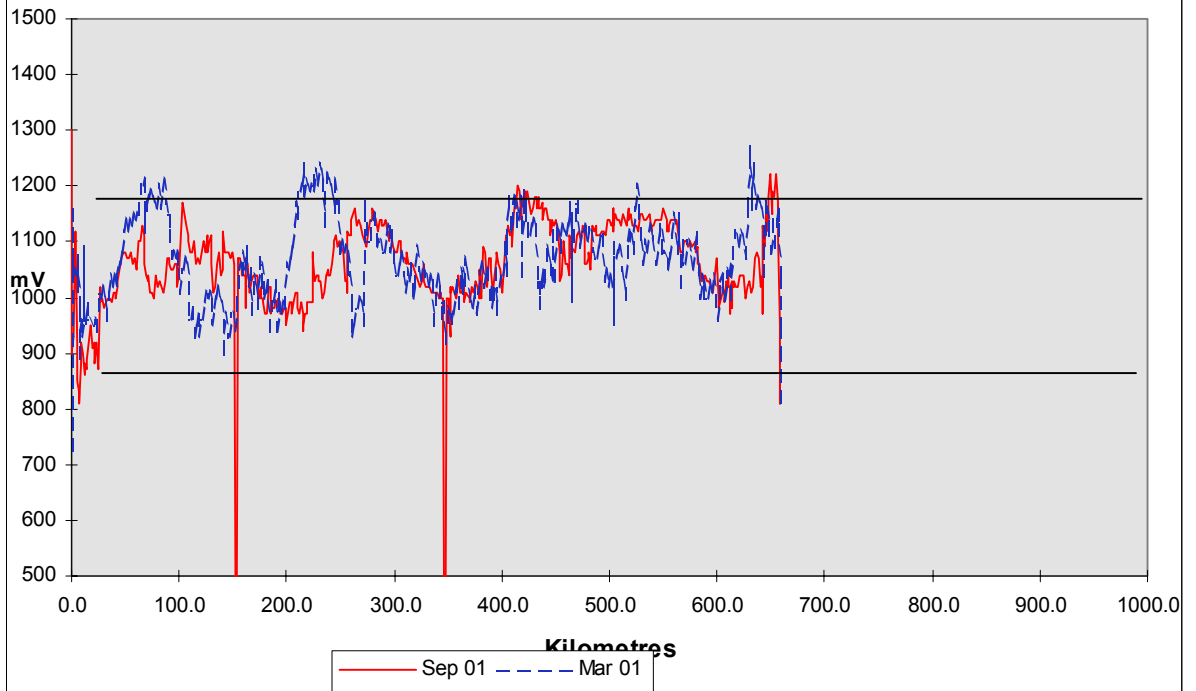
**APPENDIX 1**

**2002 PL2 FITNESS FOR PURPOSE REPORT**

**DATED JUNE 2002**

**PIPELINE CATHODIC PROTECTION POTENTIAL PROFILES**

### Liquids Line Full Line "Off" Potential Surveys



**APPENDIX 2**

**2002 PL2 FITNESS FOR PURPOSE REPORT**

**DATED JUNE 2002**

**DCVG COATING SURVEY RESULTS**



**ELECTRONIC COPY UNAVAILABLE**

**APPENDIX 3**

**2002 PL2 FITNESS FOR PERFORMANCE REPORT**

**DATED JUNE 2002**

**INTELLIGENT PIGGING RESULTS**

## INTELLIGENT PIG INSPECTION RESULTS

Location	Type of Defect	Remedial Action
18.644	Incomplete cap weld	Reinforcement sleeve (Note 1)
18.697	Incomplete cap weld	Reinforcement sleeve (Note 1)
24.800	Lamination	None (Note 2)
45.535	Pitting	Coating repair
41.662	Minor pitting	Coating repair
45.535	Pitting	Coating repair
56.331	Pitting	Coating repair
60.157	Dent	None
75.902	Pitting	Coating repair
98.878	Minor lamination	None
114.673	Dent and coating damage	Coating repair
114.726	Dent and coating damage	Coating repair
392.6651	Pitting	Coating repair
402.559	Pitting	Coating repair
426.600	Minor lamination	None

Note 1: In both cases RSTRENG 2 calculations indicated that the pipe with the incomplete cap welds was still acceptable to operate within the limits of MAOP. However, both defects were reinforced as an extra precaution.

Note 2: Non destructive tests indicated that there were no laminations present.