Water Industry Competition Act 2006
Network Operator's Licence Application

SPI Rosehill Network Pty Limited and Rosehill Water Network Pty Limited (the Applicants)

Supplementary Information provided in response to questions contained in IPART email dated 29 January 2009

Technical capacity issues

- **reuse of existing gas mains.**

  The Secretariat requires RAJV to provide further information to demonstrate that the proposal to reuse existing isolated gas mains for parts of the recycled water network is technically feasible and that hydrocarbon (or other) contaminants in the gas mains will not impact on recycled water quality.

Applicants' response:

Pipe bursting

The pipe bursting technique proposed for the Woodville Road network main involves splitting the existing 300mm (12 inch) cast iron main by a hydraulic or pneumatic nose cone. The new pipeline (400mm high density polyethylene) is attached to the cone which pulls the new pipeline through the void created as the existing pipe is split. Pipe bursting destroys the existing isolated gas main and replaces it with a new pipe.

Prior to bursting, any water that has collected in the isolated gas main will be pumped out and transported to a liquid waste transfer facility. Any remaining sludge or silt would be removed by jet cleaning or other suitable method and disposed of appropriately.

As the isolated gas main is cleaned prior to pipe bursting and then replaced by a new pipe, any contaminants that may have been present in the old main cannot come in contact with the recycled water and/or affect recycled water quality.

In 2007, JAM conducted a successful pipe bursting trial in the Woodville Road 12 inch main to demonstrate the feasibility of the technique. There are a large number of contractors around Australia who are very experienced in this technique and Jemena will conduct a competitive tender process to ensure that the chosen subcontractor has the appropriate expertise.

Insertion

Pipe insertion is the process of installing a new pipe inside an existing larger diameter pipe. The existing pipe therefore acts as a conduit for the new pipe. The recycled water does not come into contact with the existing pipe. A benefit of pipe insertion is that the existing "conduit" pipe helps to protect the new pipe from any third party damage.

This technique is used widely in the gas and water industries. Jemena owns the principal NSW Gas Network and has applied the technique extensively in the process of rehabilitating and upgrading the network from low to medium pressure. That process,

known as the “Goldline” project, began in 1988 and involved the insertion of over 6,000km of mains.

Pipe lining

Pipe lining is the process whereby an existing main is lined with a pipe sleeve, which is then “cured in place” to form a pipe that has its own structural integrity. The recycled water would flow through this new pipe and would not come in contact with the original isolated gas main. As discussed above for insertion, the existing isolated gas main will help to protect the new pipe from third party damage. This technique is used widely overseas to rehabilitate old gas and water mains and there are a number of contractors around Australia with the appropriate level of expertise.

- **Critical Control Points**

  The Secretariat requires RAJV to develop critical control points (CCPs) for the network and provide a completed preliminary HACCP analysis.

Applicants’ response:

The completed Preliminary HACCP Analysis and updated Preliminary Risk Assessment Risk Register for the Rosehill Recycled Water Scheme are attached. These documents replace information already contained in Appendix 11 of the public version of the application and Appendix 12 of the confidential version.

- **Experience and qualifications of key personnel**

  The Secretariat requires RAJV to provide the qualifications and experience of the new CEO which we understand from the licence application was to be appointed in November 2008.

Applicants’ response:

Mr Paul Adams was appointed Chief Executive Officer of Jemena Limited in November 2008. His qualifications and experience are as follows:

> Paul has a breadth of experience in the Australian energy sector, having worked across the gas and electricity industries for the past 25 years. He began his career as a trainee at the State Electricity Commission of Victoria, where he worked in electricity generation, transmission, distribution and retail. He moved into the gas industry in the mid 1990s, working on generation and distribution network opportunities for the development of the Eastern Gas Pipeline.
>
> Since then, Paul has held various senior roles managing and operating gas and electricity networks. He was Group Manager Networks at TXU and, most recently, Group Manager Network Services Group at SP AusNet. He has worked in Australia, the United States and the United Kingdom.
>
> Paul holds qualifications in engineering, finance and management and has received awards from the Institution of Engineers (Victorian Young Engineer of the Year 1991) and Ernst and Young (Financial Planning Award 1995).

At the same time the Applicants wish to advise the Tribunal of recent changes to the managements of the various entities that will be involved in delivering the Rosehill

Recycled Water Scheme. In particular, Mr Paul Adams and Ms Lim Lay Hong have joined the Boards of those entities as described in the following tables. This information replaces the information contained in the response to question 1(c) and in Appendix 2 in both versions of the application:

Directors and Chief Executive Officer of SPI (Australia) Assets Pty Ltd (SPIAA):

Name	**Position**	**Address**	**Date of Birth**
LIM Howe Run	Deputy Chief Executive Officer and Director	42 Tidcombe Crescent, Doncaster East, VIC 3109	14 September 1965
CHIA Chee Ming Timothy	Director	7 Nassim Road, #01-01, Singapore 258374, Singapore	5 January 1950
Peter William MAGARRY	Director	30 Dudley Road, Wonga Park, VIC 3115	7 June 1949
QUEK Poh Huat	Director	18 Kingsmead Road, Singapore 267969, Singapore	7 August 1946
Dilhan Pillay SANDRASEGARA	Director	18 Ford Avenue, Singapore 268697, Singapore	10 June 1963
YAP Chee Keong	Director	11 Countryside Grove, Singapore 789966, Singapore	29 June 1960
ADAMS, Paul John	Director	10 Stornoway Crescent, Camberwell, VIC 3124	25 April 1964
LIM Lay Hong	Alternate Director for Mr Yap Chee Keong	15 Taman Permata, Singapore, 575138, Singapore	25 April 1957

Directors and Chief Executive Officer of Jemena Limited:

Name	**Position**	**Address**	**Date of Birth**
LIM Howe Run	Deputy Chief Executive Officer and Director	42 Tidcombe Crescent, Doncaster East, VIC 3109	14 September 1965
LIM, Lay Hong	Director	15 Taman Permata, Singapore, 575138, Singapore	25 April 1957
ADAMS, Paul John	Chief Executive Officer and Director	10 Stornoway Road, Camberwell VIC 3124	25 April 1964

Rosehill Water Pty Limited, SPI Rosehill Pty Limited, AquaNet Sydney Pty Limited, and Jemena Asset Management Pty Ltd all have the same Directors:

Name	**Position**	**Address**	**Date of Birth**
LIM Howe Run	Director	42 Tidcombe Crescent, Doncaster East VIC 3109	14 September 1965
LIM Lay Hong	Director	15 Taman Permata, Singapore, 575138, Singapore	25 April 1957
ADAMS, Paul John	Director	10 Stornoway Road, Camberwell VIC 3124	25 April 1964

Ms Lim Lay Hong's qualifications and experience are as follows:

> Ms Lim Lay Hong is the Chief Financial Officer of Singapore Power. Prior to assuming that role on 1 February 2009, Ms Lim was Deputy Chief Financial Officer providing support to the Chief Financial Officer. She is actively involved in monitoring financial performance of Singapore Power Group's Australia investments. These include SPI (Australia) Assets Pty Ltd and SP AusNet.
>
> Prior to joining Singapore Power Ltd, Ms Lim held a number of management and executive positions in a Singapore-based bank. Ms Lim has a Bachelor of Accountancy degree from the National University of Singapore and a Master of Business Administration (Finance) from the New York University.

Note that the qualifications and experience of Mr Adams and Ms Lim should be inserted in Appendix 12 of the public version and Appendix 13 of the confidential version of the application.

Rosehill Recycled Water Scheme Preliminary Risk Assessment Risk Register

Risk Category	Assessment Category	Risk Title	What could go wrong?	Describe the impact if this negative event eventuate.	Do you own this risk? If not, then who is the owner?	Location or Name the application used	Likelihood 5 = Almost certain 4 = Likely 3 = Moderate 2 = Unlikely 1 = Rare	Consequence 4 = Extreme 3 = Major 2 = Moderate 1 = Minor	Inherent Risk Level = Likelihood x Consequence	Current Risk Rating	Describe how existing control activities can mitigate the likelihood or consequence. *(NB: More than 1 controls attached to one risk is allowed. Insert new row to separate control activities)*	Is it a Preventative or Monitoring control?	Control Frequency (Continuous, Daily, Weekly, Monthly, Quarterly, Half-Yearly, Yearly)	Is it a key control? (Y/N) (Critical control)	Is it an automatic (system or application) or manual control?	Who is the owner of this control?
Public Health	Water Quality - chemical	Ammonia	Legionaire's disease infection resulting from poorly disinfected cooling tower water (ammonia in recycled water exceed specification of 1 mg/L (raw sewage can contain up to 40 mg/L)	Cooling tower disinfection processes compromised. - one or more cases per year of legionaire's disease	WRP		3	3	9	High	Existing WWTP do not have any ammonia remoal Reverse osmosis will remove 80% of ammonia	Preventative	Continuous	Y	Automatic	
											Ion exchange remove additional ammonia to reach <1 mg/L of ammonia in recycled water	Preventative	Continuous	Y	Automatic	
											Chlorination -dose to free chlorine setpoint break - some ammonia	Preventative	Continuous	N	Automatic	
Environmental	Water Quality - Chem	Phosphorus	High phosphorus in Rosehill racecourse dam could cause proliferation of blue green algae (around 9 mg/L in raw sewage)	High level of algae could block up irrigation system - blue green algae toxins could cause health impacts on ingestion	WRP		2	2	4	Medium	No P-removal at WWTP Reverse Osmosis - 99% removal	Preventative	Continuous	Y	Automatic	
Public Health	Water Quality - Biological	Viruses	Pathogenic viruses present in raw sewage can cause illness when ingested. Exposure assessment revealed the maximum log removal required for viruses from raw sewage is 6.5.	Ingestion of recycled water through exposure to use of recycled water in industry and irrigation	WRP		4	3	12	High	WWTP Delivery of diversion system to ensure only secondary treated effluent is discharged into LAP Montoring on LAP - can decide to take or not based on surrogates such as SCAN	Preventative	Continuous	Y	Automatic	
											Microfiltration	Preventative	Continuous	Y		
											Reverse Osmosis	Preventative	Continuous	Y		
											Chlorination at plant - residual 0.7-5 mg/L, 95 percentile 3 mg/L.- 1 hour contact time	Preventative	Continuous	Y		
Public health	Water Quality - Biological	Viruses in pipeline	Contamination occur in treated recycled water pipeline, mains break, huge amount of dirt - pumped system - pressure system	Illness caused in population exposed to water used in industry and irrigation	Aquanet/Jemena		1	3	3	Low	Maintaining chlorine residual In pipeline Backflow prevention and air gaps at customer end					
Public Health	Water Quality - Biological	Bacteria	Pathogenic bacteria present in raw sewage can cause illness when ingested. Exposure assessment revealed the maximum log removal required for viruses from raw sewage is 5.3	Illness caused by ingestion of pathogens in recycled water through exposure to use of recycled water in firefighting, industry and irrigation			4	3	12	High	WWTP Delivery of diversion system to ensure only secondary treated effluent is discharged into LAP Montoring on LAP - can decide to take or not based on surrogates such as SCAN	Preventative	Continuous	Y	Automatic	
											Microfiltration	Preventative	Continuous	Y		
											Reverse Osmosis	Preventative	Continuous	Y		
											Chlorination at plant - residual 0.7-5 mg/L, 95 percentile 3 mg/L.- 1 hour contact time	Preventative	Continuous	Y		
											Treated water spec requires protoxzoa indicators to be <1/50 L.	Monitoring	Monthly	N		
Public health	Water Quality - Biological	Bacteria in pipeline	Regrowth or Contamination occur in treated recycled water pipeline (short retention, covered storages and plastic pipes reduce inherent likelihood	Illness caused in population exposed to water used in idnustry and irrigation	Aquanet/Jemena		2	3	6	Medium	Maintaining chlorine residual - chlorine boosting in pipeline (this does not impact entire pipeline)	Preventative	Continuous	N	Automatic	
Public Health	Water Quality - Biological	Protozoa	Pathogenic protozoa present in raw sewage can cause illness when ingested. Exposure assessment revealed the maximum log removal required for viruses from raw sewage is 5.1.	Illness cause by Ingestion of protozoa in recycled water through exposure to use of recycled water in industry and irrigation			4	3	12	High	WWTP Delivery of diversion system to ensure only secondary treated effluent is discharged into LAP Montoring on LAP - can decide to take or not based on surrogates such as SCAN	Preventative	Continuous	Y	Automatic	
											Microfiltration	Preventative	Continuous	Y		
											Reverse Osmosis	Preventative	Continuous	Y		
											Chlorination at plant - residual 0.7-5 mg/L, 95 percentile 3 mg/L.- 1 hour contact time (not for cryptosporidium)	Preventative	Continuous	Y		
											Treated water spec requires protozoa indicators to be <1/50 L.	Monitoring	Monthly	N		
Public health	Water Quality - Biological	Protozoa in pipeline	Contamination occur in treated recycled water pipeline (refer to virus assessment) - covered storages would prevent recontamination	Illness caused in population exposed to water used in idnustry and irrigation	Aquanet/Jemena						Maintaining chlorine residual In pipeline	Preventative	Continuous	Y	Automatic	
Public health	water Quality Chemical	Heavy metals	Ingestion of heavy metals could lead to long term health effects.	Levels in treated waste water generally below health guideline values for drinking water - no risk at levels of exposure assessed			1	1	1	Low	Reverse osmosis removal >99% for all heavy metals (divalent)	Preventative	Continuous	Y	Automatic	
Public health	water Quality Chemical	Organic micro pollutants (herbicides, pesticides, pharmaceuticals, hormones, THMS)	Ingestion of micro pollutants could lead to long term health effects.	Levels in treated waste water generally below health guideline values for drinking water - no risk at levels of exposure assessed			1	1	1	Low	Reverse Osmosis	Preventative	Continuous	Y	Automatic	
Environmental	Water Quality - chemical	Salinity	High saline water is irrigated onto racecourse	High salinity in irrigation water can lead to sodificatioin of soil and limit plant growth			3	2	6	Medium	Reverse Osmosis removes TDS	Preventative	Continuous	Y	Automatic	
Environmental	Water Quality - chemical	Boron	Boron > 1 could impact certain plants used by irrigation customer	Boron can impact grasses used in golf courses					0	Low						
									0	Low						
Public Health	Water Quality - biological		Cross connection to recycled water network could mean that customers ingest recycled water for an extended period of time	Illness caused in population due to ingestion of or long term contact with recycled water suitable for industry and irrigation	AquaNet/Jemena		3	3	9	High	Purple pipe and fittings and marker tape all indicate presence of recycled water pipes and should reduce risk of accidental connections	Preventative	Continuous	Y	Automatic	AquaNet/Jemena
											Recycled water customer connection points will operate at a lower pressure than the potable network which will reduce risk of recycled water intrusion to potable network (as per WSAA code)	Preventative	Continuous	N	Automatic	AquaNet/Jemena
											Approved air gap and backflow prevention devices will be used to prevent recycled water flowing into the potable water network at reservoir sites	Preventative	Continuous	Y	Automatic	AquaNet/Jemena

Rosehill Recycled Water Scheme Preliminary Risk Assessment Risk Register

How do you rate the effectiveness of the current control? 1.5 = Very Effective 2 = Effective 4.5 = Ineffective 9 = Very Ineffective 0 = No Control	Likelihood 5 = Almost certain 4 = Likely 3 = Moderate 2 = Unlikely 1 = Rare	Consequence 4 = Extreme 3 = Major 2 = Moderate 1 = Minor	Mitigated Risk Level = Likelihood x Consequence	Mitigated Risk Rating	Accept? (Y/N)	If the mitigated risk level is rated high or extreme and is accepted, justification must be provided and required Senior Management's approval.	Describe the action to be taken to further mitigate (likelihood or consequence) and ensure that the mitigated risk level is within the Company risk appetite.	Action by Name	Action Due Date	Action Status	Likelihood 5 = Almost certain 4 = Likely 3 = Moderate 2 = Unlikely 1 = Rare	Consequence 4 = Extreme 3 = Major 3 = Moderate 2 = Minor	Projected Risk Level = Likelihood x Consequence	Projected Risk Rating	Comments
1.5	1	3	3	Low	Y								0	Low	
1.5	**1**	2	2	Low									0	Low	
1.5	1	3	3	Low									0	Low	
1.5	1	3	3	Low									0	Low	
	2	3	6	Moderate											
1.5	1	3	3	Low									0	Low	
	2	3	6	Moderate											
1.5	1	1	1	Low			Obtain records of salt rejection properties of membranes and supplier specification						0	Low	
1.5	1	1	1	Low			Obtain records of salt rejection properties of membranes and supplier specification						0	Low	
1.5	1	2	2	Low									0	Low	
			0	Low									0	Low	
			0	Low									0	Low	
1.5	1	2	2	Low									0	Low	
1.5	1	1	1	Low											
1.5	1	2	2	Low									0	Low	

Rosehill Recycled Water Scheme Preliminary HACCP Analysis

WATER QUALITY MANAGEMENT & CCP ANALYSES												
Activity or Process Step	Decision Tree					CCP/QCP	Potential Hazards	Monitoring	Critical Limits	Corrective Actions	Supporting programs	Records
	Q1	Q2	Q3	Q4	Q5							
Wastewater Treatment	Y	Y	Y			CCP	BOD	(DO)				
Diversion of untreated and poorly treated wastewater	Y	Y	Y			CCP	Wet weather event causes Micro organisms, organic pullutants, heavy metals.					
Treated wastewater offtake on LAP online measurement and shutdown at WRP	Y	Y	N	N		QCP	Micro organisms, organic pullutants, heavy metals					
Chemical dosing (chloramine)	N			N		No	Free chlorine and chloramine - not a health hazard					
Micro filtration	Y	Y	Y			CCP	Bacteria and Protozoa and viruses					
Reverse Osmosis	Y	Y	Y			CCP	Ammonia, phosphorus, organic pollutants, heavy metals, micro organisms					
Ion exchange	Y	Y	Y			CCP*	Ammonia. (may not be health or environmental hazard)					
Chlorination and 1 hour retention	Y	Y	Y			CCP	Bacteria and Protozoa and viruses	Monitoring on distribution system				
Treated recycled water offtake point monitoring	Y	Y	N	N		QCP	Ammonia, phosphorus, organic pollutants, heavy metals, micro organisms					
Distribution line chlorine boosting	N						Bacteria and Protozoa and viruses					
Irrigation practices												
Discharge - unintentional	Y	N	Y			QCP	Erosion from mains breaks	DBYD, Pipeline patrol, marker tape, depth of cover				
Storage in lakes							Ammonia, phosphorus, nitrogen,chlorine					
Cooling tower uses												
Purple pipe, fittings and marker tape	Y	Y	Y	Y		CCP	Cross connections with potable network	Depth of cover, Pipeline patrol, DBYD, security at facilities			NSW Code of Practice for Plumbing and Drainage, WSAA Codes	
Backflow prevention devices and air gaps	Y	Y	Y	Y		CCP	backflow to potable system				WSAA design codes	
Network pressure differential	Y	Y	N	N		QCP	backflow to potable system	Pressure monitoring in distribution system			(i) NSW Code of Practice for Plumbing and Drainage (ii) WSAA Dual Water Supply Systems 1st Edition V1.2	