

The logo consists of the text "Energy in action.™" in a blue sans-serif font, positioned within a large, light brown rounded rectangle. Below this rectangle are three smaller, overlapping light brown shapes: a small square on the left, a medium square in the center, and a small square on the right. At the bottom right corner of the entire graphic is the AGL logo, which is a blue square containing a white stylized sun icon and the letters "AGL" in white.The AGL logo is a blue square with a white stylized sun icon and the letters "AGL" in white.

AGL UPSTREAM INVESTMENTS PTY LTD

CAMDEN GAS PROJECT

Annual Leak Detection and Repair Summary Report

Reporting Period: 22 December 2013 – 21 December 2014

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Foreword

PREMISES	Rosalind Park Gas Plant Lot 35 Medhurst Road GILEAD NSW 2560
LICENCE DETAILS	<u>Environment Protection Licence 12003</u>
LICENCEE	AGL Upstream Investments Pty Limited (AGL)
LICENCEE'S ADDRESS	Locked Bag 1837, North Sydney, NSW 2060
REPORTING PERIOD	22 December 2013 – 21 December 2014
REPORT DATE	16 February 2015
REPORT PREPARED BY	Aaron Clifton, Environment Manager

1. Introduction

1.1 Background

The Camden Gas Project (CGP) is owned and operated by AGL and is located in the Macarthur region 65 km southwest of Sydney, in the Wollondilly, Camden and Campbelltown Local Government Areas. The CGP has been producing gas for the Sydney region since 2001 and currently consists of gas wells, low-pressure underground gas gathering pipes and the Rosalind Park Gas Plant (RPGP).

The Environment Protection Licence for the CGP (EPL12003) includes requirements for the operation and reporting of a Leak Detection and Repair (LDAR) program.

This LDAR Summary Report has been prepared to satisfy the LDAR reporting requirements of the EPL.

1.2 EPL12003: Leak Detection and Repair Program

EPL12003 includes the following requirements for Leak Detection and Repair:

- Condition M7.2: *The licensee must operate a Leak Detection and Repair Program for all relevant components of plant and equipment.*
- Condition M7.3: *The LDAR Program must, unless otherwise approved by the EPA, monitor for the detection of leaks in accordance with US EPA Method 21- Determination of Volatile Organic Compound Leaks (40 CFR Part 60, Appendix A, Method 21).*
- Condition R4.2: *The licensee must submit a brief summary report on the Leak Detection and Repair (LDAR) program with the annual return. The summary report must include, but may not be limited to:*
 - *The total number of components inspected, as well as the number and percentage of minor, major and significant leaking components found by component types;*
 - *The type of components and the scale of the leak for any equipment where leaks are found;*
 - *The emission level of leaking equipment and emission level of re-check after leak was repaired;*
 - *The repair responses and times as listed in Table 1.*

Table 1- Scale of leaks and classification

Scale of leak (ppmv)	Classification
1000-<10,000	Minor
>= 10,000 - <50,000	Major
>=50,000	Significant

- Condition R4.3: *Where a leak is identified, AGL should aim to have the component repaired as follows:*
 - *Within a period of 14 days if the concentration of the fugitive VOCs emission is greater than or equal to 1,000 parts per million by volume (ppmv) but not more than 10,000 ppmv (minor leak), as methane, above background .*
 - *Within a period of 5 days if the concentration of the fugitive VOCs emission is greater than or equal to 10,000 ppmv but not more than 50,000 ppmv (major leak), as methane, above background*
 - *Within a period of one day if the concentration of the fugitive VOCs emission is greater than or equal to 50,000 ppmv (significant leak > 50,000 ppmv), as methane, above background.*

1.3 Methodology

The LDAR program was undertaken at the CGP by independent third party specialists, Heath Pipeline Services Pty Ltd (HPS). The LDAR program was conducted from 23 September 2014 to 03 October 2014, and comprehensively assessed 125 wellheads, associated above ground facilities and gas gathering lines, and RPGP vessels and piping.

The LDAR program was undertaken in accordance with US EPA Method 21 – Determination of Volatile Organic Compound Leaks (40 CFR Part 60, Appendix A, Method 21).

The LDAR program was undertaken using a GMI leak surveyor operating at 10 parts per million (ppm) sensitivity level.

2. LDAR Program Results

2.1 Field

The results of the LDAR program for the Camden field (including wellheads and associated above ground facilities and infrastructure, and gas gathering lines) are provided in **Table 2**.

Table 2- Leak detection results for the Camden field LDAR program

Component		Detected Leaks					
		Minor		Major		Significant	
Type	No.*	Total	%	Total	%	Total	%
Valve	3500	1	0.03	2	0.06	2	0.06
Pressure Safety Valve	375	0	0	0	0	0	0
Instrumentation	1125	2	0.17	0	0	0	0
Vessel	250	0	0	0	0	0	0
Flange	500	0	0	0	0	0	0
Pipe Thread	5000	0	0	2	0.04	0	0
Wellhead	125	1	0.80	1	0.80	0	0
Gas gathering line (km)	71.41	0	0	0	0	0	0

* Approximate, based on standard free flow well configuration for 125 wells.

Where leaks were identified during the field LDAR program, the scale, emission level (pre and post repair), and the repair response and response times were recorded and are summarised in **Table 3**.

Table 3- Camden field LDAR program repair response

Equipment	Component	Leak Scale	Repair Response	Repair Time	Pre Repair (ppmv methane)	Post Repair (ppmv methane)
Well Johndilo 01	Instrumentation	Minor	Removed, cleaned and reinstalled	3 days	3,200	<10
Well Logan Brae 07	Wellhead	Minor	Tighten well head	14 days	3,930	<10
Well Logan Brae 10	Pipe Thread	Major	Removed, cleaned and reinstalled	Same day	33,922	<10

Equipment	Component	Leak Scale	Repair Response	Repair Time	Pre Repair (ppmv methane)	Post Repair (ppmv methane)
Well Spring Farm 08	Valve	Major	Removed, cleaned and reinstalled	Same day	36,860	<10
Well Spring Farm 02	Valve Actuator	Significant	Solenoid replaced	Same day	53,000	<10
Well EM 38	Pipe Thread	Major	Removed, cleaned and reinstalled	1 day	14,310	<10
Well MT 02	Instrumentation	Minor	Removed, cleaned and reinstalled	Same day	2,360	<10
Well WG 03	Valve Actuator	Significant	Replaced valve	Same day	51,940	<10
Well MP 16	Wellhead	Major	Tighten wellhead	5 days	26,500	<10
Well MP 30	Valve	Minor	Removed, cleaned and reinstalled	5 days	1,030	<10
Well MP 14	Valve	Major	Removed, cleaned and reinstalled	Same day	10,600	<10

2.2 RPGP

The results of the LDAR program for RPGP (including valves, vessels, instrumentation, piping and compressors) are provided in **Table 4**.

Table 4 – Leak detection results for the RPGP LDAR program

Component		Detected Leaks					
		Minor		Major		Significant	
Type	No.*	Total	%	Total	%	Total	%
Valve	335	5	1.5	6	1.8	2	0.6
Pressure Safety Valve	13	0	0	0	0	0	0
Instrumentation	75	1	1.3	1	1.3	0	0
Vessels	16	0	0	0	0	0	0
Compression Packages	3	1	<0.01^	1	<0.01^	0	0

* Approximate, excluding threaded fittings, flare package and gas odouriser. The number of vessels excludes compression package components and connections.

^ Each compression package has multiple systems with large numbers of components and connections (greater than 2000 per package).

Where leaks were identified during the RPGP LDAR program, the scale, emission level (pre and post repair), and the repair response and response times were recorded and are summarised in **Table 5**.

Table 5- Rosalind Park Gas Plant LDAR program repair response

Equipment	Component	Leak Scale	Repair Response	Repair Time	Pre Repair (ppmv methane)	Post Repair (ppmv methane)
Slug Catcher V-305	Valve Actuator ZS-302	Significant	Replaced solenoid block and tightened Swagelock fitting	1 day	84,800	<10
Suction Filter V-300	Valve LL-323	Major	Applied thread seal tape and tightened grub screw	1 day	30,740	<10
Suction Filter V-300	Valve Actuator ZS-322	Major	Applied thread sealant and tightened	3 days	12,190	<10

Equipment	Component	Leak Scale	Repair Response	Repair Time	Pre Repair (ppmv methane)	Post Repair (ppmv methane)
			Swagelock fitting			
Pipe Rack	Valve 6125	Major	Tightened Swagelock fitting	1 day	13,250	<10
Pipe Rack	Valve 6125	Minor	Tightened Swagelock fitting	3 days	1,070	<10
Compressor #2 Inlet/Outlet	Instrument PI-904	Minor	Tightened Swagelock fitting	3 days	5,940	<10
Compressor #2 Inlet/Outlet Piping	Valve Actuator ZSO-2102	Minor	Tightened Swagelock fitting	3 days	2,540	<10
Compressor #3 Outlet Piping	Valve Actuator (Bettis)	Major	Tightened grease injection fitting	2 days	49,820	<10
TEG Reboiler	Valve Actuator XY-273	Significant	Replaced solenoid valve	1 day	180,200	<10
Scrubber V-301	Valve Actuator SDV-362	Minor	Applied thread sealant on the Swagelock fitting and retightened	4 days	4,620	<10
Scrubber V-301	Valve Actuator SDV-362	Major	Replaced solenoid block	2 days	23,320	<10
Instrument Gas Receiver V-304	Valve Actuator XY-365	Minor	Tightened two Swagelock fittings	3 days	1,070	<10
TEG Contactor V-001	Valve Actuator SDV-268	Major	Tightened Swagelock fitting	1 day	12,700	<10
Compressor #2	Carburettor	Major	Bushes reseated	3 days	16,430	468
Compressor #2	Carburettor	Minor	Bushes reseated	3 days	4,540	320
4 th Stage Scrubber	Instrument	Major	Applied thread seal	2 days	44,520	<10

Equipment	Component	Leak Scale	Repair Response	Repair Time	Pre Repair (ppmv methane)	Post Repair (ppmv methane)
			tape on lower plug and re-tightened			

3 Conclusion

The LDAR program was implemented at the CGP and included an assessment of field and RPGP facilities and infrastructure.

The LDAR program was undertaken by third party leak detection specialists in accordance with US EPA Method 21 – Determination of Volatile Organic Compound Leaks (40 CFR Part 60, Appendix A, Method 21).

Leaks that were identified during the LDAR program were classified in accordance with methane emission levels and repairs were undertaken within the target period recommended in EPL12003.

4 References

1. Gas Leakage Audit Report - Camden Field (v.1), Heath Pipeline Services, 2014.
2. Gas Leakage Audit Report - Rosalind Park Gas Plant (v.1), Heath Pipeline Services, 2014.
3. Gas Leakage Audit Report – PL30 High Pressure Pipeline (v.1), Heath Pipeline Services, 2014