



Narrabri CCC Monthly Update

APRIL/MAY 2018

The following is a monthly update for the Narrabri Community Consultative Committee (CCC) regarding activities undertaken by the NSW Environment Protection Authority (EPA) relating to PEL 238, PAL 2 and PPL 3 (Narrabri Gas Project).

It includes activities relating to the regulation of Environment Protection Licence (EPL) 20350 and the EPA's functions conducted under the NSW Gas Plan.

Attachments to this month's update:

- Running Log – Old Investigations of PEL 238 Outcomes
- Inspections undertaken by EPA – April 2018
- EPA Site Inspection Map – April 2018
- Inspections undertaken by EPA - May 2018

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EPA ACTION ITEMS SINCE LAST NCCC

No new items.

INVESTIGATIONS

Background

On 19 February 2013 the EPA became responsible for investigating environmental incidents that occur during coal seam gas activities under the provisions of the *Protection of the Environment Operations Act 1997* (POEO) and issuing Environment Protection Licences (EPL) for coal seam gas activities.

On 1 July 2015 the EPA commenced a new role as the lead regulator for compliance with, and enforcement of, conditions of approval for gas activities in NSW. This includes regulating consent conditions and activity approvals issued by other agencies (excluding work health and safety). In carrying out this role the EPA works with the relevant experts and NSW Government agencies.

Gas activities must comply with a broad range of regulatory controls, including Acts, regulations, codes of practice, titles, approvals and other controls.

The prioritisation of investigations is determined using a risk assessment for investigations that considers the level of environmental impact and the likelihood of environmental harm occurring.

Current Investigations

The EPA is continuing the ongoing investigation on the matter related to approvals required by Santos for the irrigation activity at the Narrabri Gas Field. Santos have temporarily ceased irrigation at Leewood following discussions with the EPA, with no evidence of environmental harm identified.

Running Log – Old Investigations PEL 238 and PAL 2 Outcomes

Incident	Outcome
<p>February 2018 <u>Crop health at the Leewood Facility</u> The EPA investigated the Leewood facility following a community complaint on 9 February 2018 that raised concern about the alleged poor condition of the Lucerne crop being irrigated at the Leewood facility.</p>	<p>EPA officers inspected the Leewood facility on 12 February 2018, and reported that the irrigated crop appeared to be healthy and relatively uniform across the irrigated area. The matter was finalised, as no environmental harm was identified from the inspection that warranted further investigation.</p>
<p>December 2018 <u>Crop Health at the Leewood Facility</u> A community complaint was received on 27 November 2017 regarding alleged poor condition of the crop being irrigated at the Leewood facility and concerns about the high level of water in one of the Leewood Ponds. NSW EPA officers attended the Leewood facility on the 15 December 2017 to check the irrigated crop, and were satisfied that the growth of the irrigated crop appeared to be healthy and was relatively uniform across the irrigated area. An inspection was also undertaken at the Leewood Ponds on the same day, and EPA officers confirmed the produced water levels were within operating capacity. Water levels in the ponds can often fluctuate dependent on several factors including the weather, water treatment at the Reverse Osmosis Plant and the irrigation activities taking place at the time.</p>	<p>Following the inspections at the irrigated crop and produced water ponds, the EPA were satisfied that the crop was in good health and observed no environmental concerns during the inspection that would warrant further investigation. The EPA advised the complainant of the outcome of the inspection.</p>
<p>August 2017 <u>Crop health at the Leewood Facility</u> The EPA is liaising with Crown Lands and Water on a matter raised with the EPA relating to approvals required by Santos for the irrigation activity at the Narrabri Gas Field. Multiple approvals and licences are currently in place for the irrigation activity including an Environment Protection Licence.</p>	<p>The results from the initial round of monitoring, as required by the Environment Protection Licence, has been submitted to the EPA. The EPA has reviewed the data and confirmed that the irrigation water meets the monitoring requirements of this Licence.</p>
<p>June 2017 <u>Bohena 13C and Bohena South 2C (PAL 2)</u> The EPA undertook a review of Bohena 13C and Bohena South 2C following the submission of ESF2 rehabilitation relinquishment documents from Santos. The EPA undertook unaccompanied inspections of the sites, and followed up on some matters with Santos regarding the rehabilitation status of the sites. A community call to the EPA Environment Line was also lodged with regards to Bohena 13C.</p>	<p>EPA officers re-inspected both sites. No environmental harm was identified from the inspections, with the matters finalised and no further action considered necessary. The EPA also sent a response letter to the complainant advising the outcome and finalisation of the matter at Bohena 13C.</p>

<p>February 2017 <u>Groundwater pH levels at Dewhurst 14C (EPL 20350)</u> The EPA investigated data from groundwater monitoring bore, Dewhurst 14C, following an Environment Line call on 17 February 2017 that raised concern about data published on the Santos Water Portal, showing alkaline results (pH>9.5) for water samples collected from monitoring well Dewhurst 14C.</p>	<p>An EPA investigation showed the findings indicated the alkaline pH reported for Dewhurst 14C was the result of local geological and groundwater conditions, and that there was no evidence that the groundwater chemistry in Dewhurst 14C had been modified because of water pollution.</p> <p>The investigation has been finalised, with no issues identified.</p>
<p>February 2017 <u>Tintsville Flare Incident (PEL 238)</u> On 24 February 2017, the EPA were notified by Santos of an incident relating to unauthorised access to Wilga Park, resulting in damage to the Tintsville Flare.</p>	<p>Investigation confirmed that the gas pipe had not been ruptured and there was no environmental harm.</p> <p>The EPA has concluded its investigation.</p>
<p>December 2016 <u>Leewood Northern Sediment Dam</u> EPA Officers Investigated Leewood Northern Sediment Dam following an Environment Line call alleging an overflow incident from Leewood Ponds Water Treatment Facility.</p>	<p>Incident was investigated and samples taken, with lab results confirming no BTEX present and the materials classed as organic; dried sun bleached algae; and a naturally occurring protozoa. Investigation finalised, with no issues identified.</p>
<p>November 2016 <u>Bohena Creek</u> Report alleging that Bohena Creek was impacted by the Bibblewindi Water Treatment Plant and gas wells.</p>	<p>EPA officers visited the area of Bohena Creek that the reporter referenced. There was no evidence that environmental harm has occurred.</p>
<p>September 2016 <u>Leewood (PAL002)</u> Report alleging Leewood produced water dams were overflowing.</p>	<p>The EPA officers visited the site and all ponds were observed to be operating with adequate freeboard. There was no evidence of any overflow or spill from the ponds.</p>
<p>September 2016 <u>Bohena 2</u> Report alleging Santos were using produced water from Leewood for watering program at Bohena 2 salinity site.</p>	<p>Environment Line complaint alleging Santos were using produced water from Leewood for the watering program at Bohena 2 salinity site following a Namoi Waste truck seen leaving Leewood and heading to Bohena 2 salinity site. EPA Officers attended the site, investigated and took water samples. Lab results indicate that the source of water is not consistent with produced water.</p> <p>The EPA sent a response letter to complainant advising this.</p>
<p>April 2016 <u>Bohena Creek Road</u> Methanol Drum on road.</p>	<p>Santos staff located a 44 gallon drum labelled 'Methanol' dumped on Bohena Creek Road near the Leewood Water Treatment Facility. Police and HAZMAT attended and secured the item.</p> <p>The drum was not on the Santos site, nor related to its activities as per media Tweet by the EPA.</p>
<p>March 2016 <u>Leewood Pond</u> Alleged leaking.</p>	<p>EPA officer inspected storage ponds and met with Santos staff. No evidence that produced water was leaking.</p> <p>No further action was required.</p>
<p>March 2016 <u>Bohena Creek Road</u> Report that a vent had been left open, unattended and emitting methane gas.</p>	<p>Santos has approval to vent gas from high and low point vents along the water gathering lines for safety and operational purposes – this is performed manually by a field operator.</p> <p>Santos has amended the manual venting operating procedure. The procedure clearly notes that a high point vent is not operated without an operator present.</p>

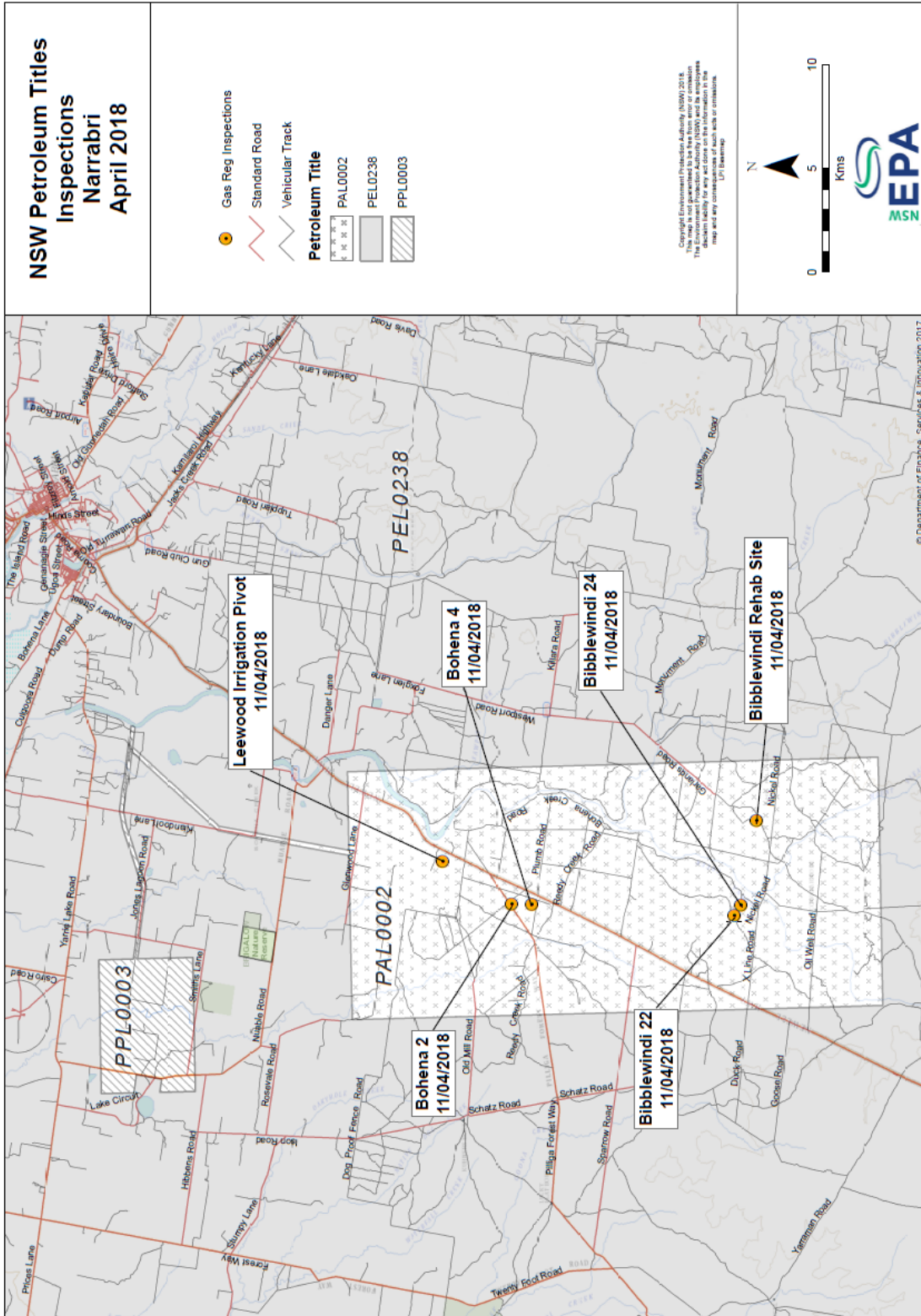
<p>March 2016 <u>Santos Pilliga</u> Report received that there was a 'foamy residue' left along Beehive Road. The complainant returned to the site some days later with a Geiger counter and recorded a reading allegedly linked to the high and low point vents.</p>	<p>An EPA Officer spoke to the complainant who advised that the location they took the Geiger counter reading was a few kilometres away from the area of concern and there was no evidence to support the initial claim. No further action required.</p>
<p>March 2016 <u>Leewood Water Treatment Facility</u> Report alleging a truck was spraying produced water between the internal fence and the property boundary fence for dust mitigation.</p>	<p>An EPA Officer viewed available data confirming raw water from an on-site bore was used for dust suppression at the time of the allegation. The EPA supports dust suppression which is a requirement of the Santos EPL. No further action required as at 15 March 2016.</p>
<p>February 2016 <u>Santos Pilliga</u> Report of 35,000 litre spill at unmanned Santos facility.</p>	<p>Investigations proved minor water run off with no environmental or health risks. Media release: Water Run-off From Leewood Water Treatment Facility in Narrabri Cleaned Up</p>
<p>January 2016 <u>Leewood Water Treatment Facility</u> Alleged discharge of sediment laden water.</p>	<p>The rainwater discharge followed heavy rain. Santos undertook immediate works to prevent further discharge from the site installing coir mats and construction of bunding. The EPA inspected site and determined no environmental harm had occurred and that no regulatory action was required.</p>
<p>January 2016 <u>Santos Pilliga</u> Report a 'foamy caramel coloured' material on the roadside near operation site.</p>	<p>The EPA inspected the site and collected samples. Analysis determined it was a natural event, likely due to the decomposition of organic material. No further action was required.</p>
<p>September 2015 <u>Bohena Creek</u> Piezometer located in creek.</p>	<p>No regulatory action required.</p>
<p>January 2015 <u>Santos Dewhurst Southern</u> Water flow line.</p>	<p>No breach of EPL 20350 identified. Santos varied operational practices for high point vents following negotiations with the EPA. Media release: No environmental harm but improvements needed</p>
<p>February 2014 <u>Namoi Waste</u> Storage of Santos drilling mud onsite.</p>	<p>6 May 2014 The EPA issued Namoi Waste Corp with a Penalty Notice for breach of s145 of the POEO Act. Note - The Penalty Notice issued was not related to the original complaint regarding waste from coal seam gas, rather other waste material identified during the course of the investigation. Media release: EPA issues Naracor and Namoi Wastecorp with penalty notices for unlawful waste transport and storage</p>
<p>March 2013 <u>Bibbiewindi Water Treatment Facility</u> Pond liner failure.</p>	<p>11 Feb 2014 The EPA issued a Penalty Notice for s120 Pollution of Waters. A Pollution Reduction Program (PRP) was added to EPL 20350 (Environment Protection Licence) requiring the development of a Remediation and Monitoring Plan and the implementation of this plan.</p>
<p>March 2013 <u>Tintfield Ponds</u> Detection of elevated levels salinity and metals.</p>	<p>Insufficient evidence to determine if the changes detected in groundwater were the result of leaks from the Tintfield ponds or were from natural factors. A PRP was added to EPL 20350. Media release: No environmental harm but improvements needed</p>

Inspections undertaken by the EPA – April 2018

Inspections					
Site ID	Date Inspected	Reasons	Action/Outcome	Site Status	Statutory Document
Biblewindi 22	11/04/2018	General Inspection	No issues identified	Active	PAL 2
Bohena 4	11/04/2018	General Inspection	No issues identified	Plugged & Abandoned	PAL 2
Biblewindi 24	11/04/2018	General Inspection	No issues identified	Active	PAL 2
Bohena 2	11/04/2018	General Inspection	No issues identified	Plugged & Abandoned	PAL 2
Biblewindi Legacy Salinity Site	11/04/2018	General Inspection	No issues identified	Rehabilitating	PAL 2
Leewood Irrigation Pivot	11/04/2018	Investigation	Ongoing	No activity	PAL 2

SITE INSPECTION MAP

EPA site inspections undertaken at Narrabri during April 2018



Inspections undertaken by the EPA – May 2018

Inspections					
Site ID	Date Inspected	Reasons	Action/Outcome	Site Status	Statutory Document
Nil	Nil	Nil	Nil	Nil	Nil

FEATURE ARTICLE

Oil and gas industry standard measurements

The aim of this article is to provide you with information that will help you to understand some of the abbreviations and acronyms used in the oil and gas industry, such as industry standard measurements. It may be helpful to have this list of definitions on hand when you are reading other articles relating to the gas industry. It is worth noting that this list is by no means exhaustive.

The measurement units or terms used may vary across geographic area and type of petroleum industry. For example, methane for production and sale is typically measured in standard cubic feet or barrels of oil equivalent, whereas fugitive emissions of methane are typically measured in parts per million.

Some of these measures may be familiar to you already however, there may be others around you who are less familiar with these terms so please share this information with them, too.

Abbreviation	Standard name	Definition
b	billion	1,000,000,000 or 10^9 . Also known as 'giga'
bbl	barrel	The standard unit of measurement for all production and sales. One barrel = 159 litres, 42 US gallons or 35 imperial gallons
bcf	billion cubic feet	This measure is used to define volumetric rates of natural gas. One billion cubic feet per day of natural gas is enough to meet about 2 percent of the natural gas used in homes around the world. Six billion cubic feet per day of natural gas is equivalent to about 1 million barrels of oil-equivalent per day
boe	barrel of oil equivalent	A unit of energy equivalent to the heating value of burning 1 bbl of oil. It provides a way of comparing reserves of different types of hydrocarbon fuels (ie gas vs coal vs oil), taking into account their heating potential
bopd	barrels of oil per day	A Barrel is a standard term used to measure the volume unit of oil or fluids recovered from an oil well. An oil barrel (bbl) defines 159 liters, 42 US gallons or 35 imperial gallons

blpd/ bfpd	barrels of liquid per day or barrels of fluid per day	blpd can also be known as barrels of fluid per day (bfpd) and is the sum of barrels of oil per day (bopd) and barrels of water per day (bwpd). blpd/bfpd is generally associated with the volume of crude oil and water which gets produced together along with the natural gas & natural gas condensates (if any) from a producing well. Thus, blpd can also be called the total volume of recoverable liquids from a reservoir
bscf	billion standard cubic feet	1,000,000,000 or 10^9 or one billion standard cubic feet
Btu	British thermal unit	British thermal units are the imperial measurement unit for heat energy. 1 Btu = ~1055 joules
G	Giga	10^9 or 1,000,000,000. From Greek <i>Gigas</i> meaning Giant
GJ	Gigajoule = 10^9 J	A gigajoule is equal to 1 joule $\times 10^9$. Also known as a billion joules
J	Joule	Joules are the metric measurement unit for energy. The equivalent imperial measure to joules is British Thermal Units (Btu). One kilojoule = 0.9478 Btu
k	kilo	10^3 or 1,000. From the Greek ' <i>chilio</i> ' meaning Thousand
kL	kilo Litre	One thousand litres or 220 imperial gallons
kt	kilo tonne	One thousand tonnes
m	Thousand	1000 or 10^3
M	Mega	1,000,000 or 10^6
mbbls	Thousand barrels	One thousand barrels
mm	million	One million
mmbbls	million Barrels	One million barrels
mmbtu	million British thermal units	Natural gas is generally bought and sold using the unit of measurement One million British Thermal Units
mmscf	million standard cubic feet	10^6 or 1,000,000,000 or one million standard cubic feet
mmscfd	million standard cubic feet per day	10^6 or 1,000,000,000 or one million standard cubic feet per day
mscf	thousand standard cubic feet	10^3 or 1000 or one thousand standard cubic feet
P	Peta	10^{15} or 1,000,000,000,000,000. From the Greek ' <i>pente</i> ', meaning Five. I.e. the fifth power of 1000 (1000^5)
PJ	Petajoule = 10^{15} J	A petajoule is equal to 1 joule $\times 10^{15}$

ppm	parts per million	Parts per million means out of a million. The number of parts of a thing in another thing
scf	standard cubic feet	A Standard Cubic Foot is one cubic foot of gas at standard temperature and pressure (15.5°C or 60° F and at sea level)
scm	standard cubic metre	A Standard Cubic Metre is one cubic metre of gas at a standard temperature and pressure
stb	stock tank barrel	One barrel of stabilized or dead oil at the surface after the gas has escaped
T	Tera	10 ¹² or 1,000,000,000,000. From the Greek 'teras', meaning Monster
t	tonne	One thousand kilograms
tcf	trillion cubic feet	One trillion (standard) cubic feet
TJ	Terajoule = 10 ¹² J	A terajoule is equal to 1 joule × 10 ¹²
toe	tonne of oil equivalent	A toe is a <u>unit of energy</u> defined as the amount of energy released by burning one <u>tonne of crude oil</u> . 1 toe = 7.33 <u>barrel of oil equivalent</u> (boe)

Reserves

In the oil and gas industries, reserves are typically classified as proven, possible and probable. These gradings are based on the likelihood of resource recovery, respectively the, best case, middle case and worst case, recovery scenario. Many standards exist for classifying reserves across the globe, as it is this information that companies 'take to the bank' for loans.

Reserves are those quantities of petroleum anticipated to be commercially recoverable under a specified development project with given dates and defined conditions. Reserves must be discovered, recoverable, commercial and remaining.

- **Proven reserves:** This is the lowest estimate and is typically associated with a 90% chance that recovery will exceed the estimate. Proven reserves are termed 1P.
- **Probable reserves:** This is the next estimate and is typically associated with a 50% chance that recovery will exceed the estimate. Probable reserves are termed 2P or, 'proved plus probable' reserves.
- **Possible reserves:** This is the lowest estimate and is typically associated with a 10% chance that recovery will exceed the estimate. Possible reserves are termed 3P or, 'proved plus probable plus possible' reserves.

The percentage chances of recovery exceeding the estimate are considered a 'best case' scenario.

Reserve Estimates

Discovered	Commercial	Reserves		
		Proved 1P	Probable 2P	Possible 3P
	Sub-commercial	Contingent Resources		
		Proved 1C	Probable 2C	Possible 3C
Unrecoverable				
Un-discovered		Prospective Resources		

Contingent Resources

Contingent resources are those quantities of petroleum estimated to be potentially recoverable from a known location, but the associated development projects are not yet considered mature enough for commercial development. Reasons for this can include; no viable market, economic hurdles, regulatory hurdles, insufficient evaluation of reservoir, or if commercial recovery is dependent on technology under development.

Prospective Resources

Prospective resources are those quantities of petroleum estimated to be potentially recoverable from undiscovered accumulation by the application of future development projects.

Proven/Probable/Possible Contingent Resources

As with Reserves, Contingent Resources can also be split into Proven, Probable and Possible, the associated 1C, 2C and 3C labels.

CONTACT US

Want to know more about what the EPA does? Want to understand a process used by the gas industry in a bit more detail? ...

...Tell us what you would like discussed in a Feature Article!

The EPA is happy to include a feature article in the monthly newsletters as it's a good opportunity to provide additional information and address any questions you have. Your feedback is key to ensuring we are providing the sort of information the community would like to see, and so, we would like to hear from you all.

Previous editions of this newsletter have included articles on 'who we are and what we do', groundwater quality monitoring, specific EPA projects and decommissioning and rehabilitation of gas well sites – these examples may give you an idea of a question you would like to ask.

While we work to find the most helpful way to communicate with stakeholders we will continue to ask for your feedback and comments regarding our communication methods and styles. We want to know what works for you so please have your say.

As always, please send us any activities, processes, questions or information you would like to see in a feature article to gas.req@epa.nsw.gov.au

We look forward to hearing from you!

Every effort has been made to ensure that the information in this document is accurate at the time of publication. However, as appropriate, readers should obtain independent advice before making any decision based on this information.

Published by:
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ISSN 2206-3234
EPA 2018P0923
June 2018